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ORNL-6657/V1/R5

NOV 20 1991

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Oak Ridge National Laboratory Corrective Action Plan in Response to Tiger Team Assessment

August 1991

Volume 1

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ORNL-6657/V1/R5

Oak Ridge National Laboratory Corrective Action Plan in Response to Tiger Team Assessment

Volume 1

Date Issued: August 23, 1991
(Revision 5)

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

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PREFACE TO REVISION 5

The *ORNL Corrective Action Plan in Response to Tiger Team Assessment* presents a complete response to the Tiger Team assessment that was conducted at Oak Ridge National Laboratory (ORNL) and at the U.S. Department of Energy (DOE) Oak Ridge Operations Office (ORO) from October 22, 1990, through November 30, 1990. The action plans have undergone both a discipline review and a cross-cutting review with respect to root cause. In addition, the action plans have been integrated with initiatives being pursued across Martin Marietta Energy Systems, Inc., in response to Tiger Team findings at other DOE facilities operated by Energy Systems. The root cause section is complete and describes how ORNL intends to address the root causes of the findings identified during the assessment.

The action plan has benefitted from a complete review by various offices at DOE Headquarters as well as review by the Tiger Team that conducted the assessment to ensure that the described actions are responsive to the observed problems.

All actions listed in this action plan are contingent upon suitable funding being provided. Action plan schedules for findings listed as "funded" are current best estimates of expected completion. The projected completion dates for actions listed as "requested" or "new" are technically feasible dates based on work scope and available or projected nonfinancial resources. Actual completion dates will depend on when work is authorized and funding is received.

This action plan has been a cooperative effort between ORNL and ORO and is the result of exceptional efforts by many individuals in both organizations to meet a very demanding schedule.

Michael A. Kuliasha
Action Plan Leader

August 23, 1991

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LIST OF ABBREVIATIONS

AC	air-conditioning
ACD	Analytical Chemistry Division
ACM	asbestos-containing materials
ADS	Activity Data Sheet
AERO	Association for Excellence in Reactor Operations
AFDP	Award Fee Determination Plan
AIP	Agreement in Principle
ALARA	as low as reasonably achievable
AMERD	Assistant Manager for Energy Research and Development
AMERWM	Assistant Manager for Environmental Restoration and Waste Management
AMESQ	Assistant Manager for Environment, Safety, and Quality
ANS	American Nuclear Society
ANSI	American National Standards Institute
AOI	abnormal operating instruction
APRAS	Automated Procedures Requirements Accountability System
ARIMS	Accelerator and Reactor Improvements Modifications
ARSRC	Accelerators and Radiation Sources Review Committee
ASME	American Society of Mechanical Engineers
AST	advanced systems technology
ATF	Advanced Toroidal Facility
AVID	Accelerated Vendor Inventory Delivery
AWS	American Welding Society
BMAP	Biological Monitoring and Abatement Program
BMP	best management practice
BSF	Bulk Shielding Facility
BSR	Bulk Shielding Reactor
BVLLW	Bethel Valley low-level waste
CAP	corrective action plan
CARTS	Critical Actions and Requirements Tracking System
CAS	criticality alarm system
CE	Conservation and Renewable Energy
CEF	Critical Experiments Facility
CEMP	Comprehensive Emergency Management Plan
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFL	credible fire loss
CFR	Code of Federal Regulations
CFS	Comprehensive Facility Survey
CH	contact-handled
CM	construction manager
CME	continuing medical education

CMS	corrective measures study
COR	contracting officers representative
CPAF	cost plus award fee
CPX	command post exercises
CRC	Criticality Review Committee
CSA	criticality safety analysis
CSAUP	Comprehensive Safety Appraisal and Upgrade Program
CSO	criticality safety officer
CTD	Chemical Technology Division
CWMD	Central Waste Management Division
CY	calendar year
CYRTF	Coal Yard Run-off Treatment Facility
CXD	categorical exclusion determinations
D&D	decontamination and decommissioning
DASMA	Deputy Assistant Secretary for Military Applications
DCC	Document Control Center
DCG	derived concentration guide
DCM	design change memorandum
DCN	design change notice; drawing change notice
DIMS	Data Information Management System
DOE	Department of Energy
DOELAP	Department of Energy Laboratory Accreditation Program
DOP	dioctylphthalate
DOT	Department of Transportation
DP	Defense Program
DRC	Director's Review Committee
DRD	direct-reading dosimeter
DSO	division safety officer
E&HPD	Environmental and Health Protection Division
EAG	Exposure Assessment Group
EAL	emergency action level
EAM	environmental ALARA memorandum
EDS	Evaluation Database System
EHP	Office of Environmental and Health Protection
EIS	environmental impact studies
EM	Environmental Restoration and Waste Management
EM&C	environmental monitoring and compliance
EMF	electromagnetic field
EMP	Environmental Protection Manual
EOC	Emergency Operations Center
EOP	emergency operating procedure
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
EPO	environmental protection officer
EPZ	emergency planning zone
ER	Energy Research
ERAI	Emergency Response Action Items

ERD	Ecological Research Division
ERDS	Environmental Review and Documentation Section
ERP	Environmental Restoration Program
ES&H	environment, safety, and health
ES&HC	environmental, safety, and health compliance
ESA	environmental and safety activity
ESAMS	Energy Systems Action Management System
ESD	Environmental Sciences Division
ESH	Environmental Safety and Health (Standard)
ESI	environmental sampling and instrumentation
ESP	Exploratory Studies Program
ESPQCP	Environmental Surveillance Procedures Quality Control Program
ESQIS	Energy Systems Quality Information System
ETD	Engineering Technology Division
F&MD	Finance and Materials Division
FFA	Federal Facility Agreement
FFCA	Federal Facility Compliance Agreement
FHA	fire hazard analysis
FIP	Facility Inspection Program
FP	fire protection
FPE	fire protection engineering
FR	Federal Register
FS	feasibility study
FSAR	final safety analysis report
FSET	Facility Safety Evaluation Teams
FTE	full-time equivalent
FWP	Field Work Proposal
FY	fiscal year
G&A	general and administrative
GEAT	General Employee Access Training
GET	General Employee Training
GFCI	ground fault circuit interrupter
GIS	geographic information system
gpm	gallons per minute
GM	Geiger-Muller
GOCO	government-owned contractor-operated
GPE	general plant equipment
GPS	General Plant Services
GPNAAF	General Purpose Neutron Activation Analysis Facility
GPP	General Plant Project
GQM	groundwater quality monitoring
GWC	Groundwater Program Coordinator
GWPC	Ground-Water Program Coordinator
H&R	hoisting and rigging
HAD	heat-activated device

HAZCOM	Hazardous Communication
HAZWRAP	Hazardous Waste Remedial Action Program
HEPA	high-efficiency particulate air
HFIR	High Flux Isotope Reactor
HHIRF	Holifield Heavy Ion Research Facility
HHMS	Hydraulic Head Monitoring Station
HPIC	Health Physics Instrument Committee
HMIS	Hazardous Materials Inventory System
HP	health physics
HPP	Health Physics Procedure
HPRR	Health Physics Research Reactor
HQ	headquarters
HRD	Human Resource Development
HSWA	Hazardous and Solid Waste Amendments
HVAC	heating, ventilation, and air conditioning
HWOG	Hazardous Waste Operations Group
I&C	Instrumentation and Controls Division
ICM	interim corrective measure
IDLH	immediately dangerous to life and health
IEEE	Institute of Electrical and Electronics Engineers, Inc.
IEF	Isotope Enrichment Facility
IFSP	Isotopes Facilities Shutdown Program
IFSTA	International Fire Service Training Association
IHAS	Industrial Hygiene Air Sampling
IHP	Industrial Hygiene Procedure
INEL	Idaho National Engineering Laboratory
INPO	Institute of Nuclear Power Operations
IPA	ionic and physical analysis
IPDP	Isotope Production and Distribution Program
IRMS	Integrated Resource Management Systems
ITSM	Installation Transportation Safety Manager
LANL	Los Alamos National Laboratory
LASL	Los Alamos Scientific Laboratory
LDR	land disposal restricted
LEPC	Local Emergency Planning Committee
LIP	Line Item Project
LLLW	low-level liquid waste
LLW	low-level waste
LMA	laboratory monitor alpha
LMB	laboratory monitor beta
LOCA	loss-of-coolant accident
LSA	low specific activity
M&O	manage and operate
M&TE	measurement and test equipment
MAPS	Manpower Analysis and Planning Survey
MC&A	Materials Control and Accountability

MD	Materials Department
ML	large PCB mark
MMES	Martin Marietta Energy Systems, Inc.
MMP	Maintenance Management Plan
MMS	Materials Management System
MOA	memorandum of agreement
MOP	measures of performance
MORT	management and oversight risk tree
MOU	memorandum of understanding
MPL	maximum possible loss
MRDL	Metrology Research and Development Laboratory
MSDS	material safety data sheet
MVLLLW	Melton Valley liquid low-level waste
NAD	nuclear accident dosimeter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan (National Contingency Plan)
NCR	noncompliance report; nonconformance report
NCS	nuclear criticality safety
NDE	nondestructive examination
NE	nuclear energy
NEC	National Electric Code
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NFC	National Fire Code
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology
NPDES	National Pollutant Discharge Elimination System
NQA-1	Nuclear Quality Assurance Standard One
NRC	Nuclear Regulatory Commission
NRDA	Natural Resources Damage Assessment
NRWTF	Non-Radiological Wastewater Treatment Facility
NRWTP	Non-Radiological Wastewater Treatment Plant
NSR	Nuclear Safety Requirement; Nuclear Safety Review and Approval Form
O&M	operation and maintenance
OECD	Office of Environmental Compliance and Documentation
OEHP	Office of Environmental and Health Protection
OJT	on-the-job training
OHIS	Occupational Health Information System
OM	occupational medical
OORS	Office of Operational Readiness and Safety
OR	DOE Oak Ridge Operations Office
ORHSP	Oak Ridge Hydrologic Support Program
ORNL	Oak Ridge National Laboratory
ORO	DOE Oak Ridge Operations Office
ORR	Oak Ridge Research Reactor; Oak Ridge Reservation

ORRHAGS	Oak Ridge Reservation Hydrologic and Geologic Studies
ORS	Occurrence Reporting System
OS&Y	outside screw and yoke
OSA	Office of Safety Appraisals
OSHA	Occupational Safety and Health Administration/Act
OSR	Operational Safety Requirement
OWMRA	Office of Waste Management and Remedial Action
P&A	plugging and abandonment
P&E	Plant and Equipment Division
P&T	packaging and transportation
PAG	protective action guideline
PC	personal computer
PCA	pool critical assembly
PCB	polychlorinated biphenyl
PDM	Project Description Memorandum
PEC	Performance Evaluation Committee
PFT	pulmonary function test
PIP	Performance Improvement Process
PIV	post indicator valves
PLC	Professional Loss Control, Inc.
PM	programmed maintenance
PNAD	personnel nuclear accident dosimeter
PO&C	performance objectives and criteria
POC	particulate organic carbon
PORC	Plant Operations Review Committee
PPE	personal protective equipment
PPR	Performance Planning and Review
PR	posted regulation
PRA	probabilistic risk assessment
PSO	program secretarial officer
PT	packaging and transportation
PVC	polyvinyl chloride
PWTP	Process Water Treatment Plant
QA	quality assurance
QAC	quality assurance coordinator
QAP	quality assurance plan
QAS	quality assurance specialist
QC	quality control
QE&I	Quality Engineering and Inspection
QER	quality event report
QIR	quality investigation report
R&R	roles and responsibilities
RAMSPAC	radioactive materials shipping and packaging
RAP	Remedial Action Program
RAP	Radiological Assistance Program
RASCAL	Radiation Standards and Calibration Laboratory

RCO	radiation control officer
RCRA	Resource Conservation and Recovery Act
REALab	Radiation Exposure Assessment Laboratory
REDC	Radiochemical Engineering Development Center
RERC	Reactor Experiments Review Committee
RFA	RCRA facility assessment
RFI	RCRA facility investigation
RFM	Request for Modification
RH	remote-handled
RH TRU	remote-handled transuranic
RI	remedial investigation
RMW	radioactive mixed waste
RORC	Reactor Operations Review Committee
RP	Radiation Protection Section
RPC	risk prioritization committee
RPPA	Radiation Protection Program Assessment
RQ	reportable quantity
RRD	Research Reactors Division
RSWO	Radioactive Solid Waste Operations
RTP	Reactor Technology Procedure
RW	Civilian Radioactive Waste Management
RWP	radiation work permit
S&H	safety and health
SAIC	Science Applications International Corporation
SAR	Safety Analysis Report
SARA	Superfund Amendment Reauthorization Act
SARPS	Safety Analysis Report for Packaging
SC	special case
SERC	State Emergency Response Committee
SHD	Safety and Health Division
SOI	special operating instruction
SOP	standard operating procedure
SNM	Special Nuclear Materials
SPCC	Spill Prevention Control and Countermeasure
SPP	standard practice procedure
SRP	Savannah River Plant
SSD	Solid State Division
SSE	Systems Safety Engineering
STEL	short-term exposure limit
STP	Sewage Treatment Plant; Surveillance Test Procedure
SWMU	Solid Waste Management Unit
SWOD	Solid Waste Operations Department
SWP	safe work permit
SWSA	Solid Waste Storage Area
TBD	to be determined
TCLP	Toxicity Characteristic Leaching Procedure

TDHE	Tennessee Department of Health and Environment
TEG	Technical Evaluation Group
TLV	threshold limit value
TORC	Technical Oversight and Review Committee
TOMS	Transportation Operation Management Section
TPAP	Training Program Accreditation Plan
TRU	transuranic
TRUST	Thorium Reactor Uranium Storage Tank
TSA	Technical Safety Appraisal
TSCA	Toxic Substances Control Act
TSF	Tower Shielding Facility
TSR	Tower Shielding Reactor
TSR-II	Tower Shielding Reactor II
TVA	Tennessee Valley Authority
UEPIP	Uranium Enrichment Performance Improvement Program
UL	Underwriters Laboratories
UOR	Unusual Occurrence Report
USQ	unreviewed safety question
USQD	unreviewed safety question determination
UST	underground storage tank
VOC	volatile organic chemical
VOG	vessel off-gas
WAC	waste acceptance criteria
WAG	waste area grouping
WEAF	Waste Examination Assay Facility
WFO	Work for Others
WHPP	Waste Handling and Packaging Plant
XSO	ORNL (X-10) Site Office

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3.3.11 Security/Safety Interface

SS.1-1	Analyses of Protective Force Equipment

3.3.12 Experimental Activities

EA.2-1	ORNL Policy Regarding Independent Safety Reviews
EA.3-1	Guidance on Internal Safety Reviews
EA.3-2	Documentation of Safety Reviews of Experimental Plans
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3.3.13 Site/Facility Safety Review

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FR.2-1	Review of Safety Questions and Topics
FR.3-1	Shortcomings of the Safety Review System
FR.4-1	Management Response to Safety Committee Recommendations
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3.3.14 Radiological Protection

RP.1-1	Accomplishing ES&H Compliance
RP.1-2	ES&H Compliance Staff
RP.1-3	Management Oversight
RP.3-1	ORNL Posting and Contamination Program
RP.3-2	Contamination Control Program
RP.3-3	Source Control Program
RP.3-4	X-Ray Generating Machine Policy and Requirements
RP.3-5	Accelerator Policy Requirements and Oversight
RP.3-6	Material Clearance
RP.3-7	Documentation of Radiation Hazards
RP.5-1	Personnel Nuclear Accident Dosimeters
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RP.6-1	Air Samples
RP.6-2	Timeliness of Air Sampling Program
RP.6-3	Surveying Personnel for Contamination
RP.7-1	Internal Radiation Dosimetry Program
RP.7-2	In Vivo Calibrations
RP.8-1	Radiation Protection Instrument Program
RP.8-2	Approval of Radiation Protection Instruments
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RP.8-5	Radiation Protection Instrumentation Program
RP.10-1	Positive Control of Contamination
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RP.10-3	Control of Laundry Wastewater
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RP.11-1	Management Support for ALARA
RP.12-1	Occupational Exposure Records Program
RP.12-2	Reporting of Dosimetry Data
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3.3.15 Personnel Protection

PP.1-1	Resources for Workplace Maintenance
PP.2-1	ORNL Health and Safety Program
PP.2-2	Workplace Exposure Monitoring and Medical Records
PP.3-1	Health and Safety Concerns
PP.3-2	ORNL Construction Oversight Program
PP.5-1	Hazard Communication Program Deficiencies
PP.5-2	Health and Safety Program Deficiencies
PP.5-3	Explosives Safety Program
PP.5-4	Implementation of the Industrial Safety Program

3.3.16 Worker Safety

WS.3-1	Control of Asbestos
WS.4-1	Machine Guarding
WS.4-2	Noncompliances of Building Egress
WS.4-3	Machinery Inspection and Preventative Maintenance
WS.4-4	ORNL Electrical Compliance
WS.4-5	Equipment and Operations Areas
WS.4-6	ORNL Fire Protection

3.3.17 Industrial Hygiene

IH.2-1	Documentation of Procedures by Industrial Hygiene
IH.2-2	Implementation of Industrial Hygiene Reviews
IH.3-1	Personnel Protective Equipment
IH.4-1	Surveillance of Industrial Hygiene Monitoring
IH.5-1	Hearing Conservation Program
IH.5-2	Chemical Carcinogen Program
IH.5-3	Confined Space Entry
IH.5-4	Respiratory Protection Program
IH.5-5	Sanitation and Potable Water Program
IH.5-6	Ergonomics Program
IH.6-1	Handling, Storage, and Labeling of Chemicals

3.3.18 Fire Protection

FP.1-1	Resources of Fire Protection Engineering Section
FP.1-2	Fire Department Resources and Work Load
FP.1-3	Fire Protection of ORNL Facilities at the Y-12 Plant
FP.1-4	Fire Protection Policies Regarding Improved Risk
FP.1-5	Facility Reoccupancy Policy
FP.1-6	Management's Role in Fire Protection
FP.2-1	Egress from Bldg. 4500N, Machinery Space
FP.2-2	Egress from Bldg. 4500N, Office Space
FP.2-3	Life Safety Code Surveys
FP.2-4	Action Plans Regarding Life Safety Code Surveys
FP.3-1	ORNL Testing of Fire Equipment
FP.3-2	Adequate Documentation of Fire Study
FP.3-3	Design Basis Fires Review Program
FP.4-1	Adequacy of Fire Protection
FP.5-1	Fire Protection Systems in Bldg. 4500N
FP.6-1	Physical Fitness Program for Fire Fighters
FP.6-2	Fire Department Staffing Level
FP.6-3	Prefire Plans for ORNL Facilities
FP.7-1	Fire Protection of Main Computer Centers
FP.7-2	Fire Hazard Analysis and Facility Protection Survey
FP.7-3	Fire Protection Oversight
FP.7-4	Review of Documents Affecting Fire Protection
FP.7-5	Fire Water Supply System

3.3.19 Medical Services

MS.1-1	Voluntary Health Examination Program
MS.2-1	Medical Division Administrative Assistance
MS.3-1	Backup Pulmonary Function Testing Personnel
MS.3-2	Medical Division Space Allocation
MS.3-3	Decontamination Facilities

3.4 REACTORS

3.4.1 Organization and Administration

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ROA.1-2	Approval of ORR Shutdown Plans
ROA.1-3	Decommissioning Plan for HPRR
ROA.1-4	Funds for Maintenance of HPRR
ROA.1-5	Funding for the Bulk Shielding Facility
ROA.1-6	Status of the Bulk Shielding Facility

ROA.1-7	Status of the CEF "W" Cell
ROA.1-8	Line Management Responsibilities in RRD
ROA.1-9	Management Position Descriptions for RRD
ROA.3-1	Program to Increase Safety
ROA.6-1	Performance Evaluations for Safety
ROA.7-1	HFIR Final Safety Analysis Report
ROA.7-2	Updating of Safety Analysis Reports for BSF and PCA
ROA.7-3	Updating of Safety Analysis Report for TSF
ROA.7-4	Control of Documents
ROA.7-5	Procedures
ROA.8-1	Substance Abuse Program

3.4.2 Quality Verification

RQV.1-1	RRD Quality Assurance Program Manual
RQV.1-2	Management Assessment of RRD
RQV.1-3	Implementing RRD Procedures
RQV.1-4	Thoroughness of Procedures
RQV.1-5	Revision of Procedures
RQV.1-6	Frequency of RRD QA Audits
RQV.1-7	Method of Questioning in RRD QA Audits
RQV.1-8	RRD Corrective Action Program
RQV.1-9	Conflicting Goals in RRD
RQV.1-10	Data Base Trending System
RQV.1-11	Occurrence Reporting System
RQV.2-1	Justification of Procurement Deviations
RQV.2-2	Purchase Order and Quality Requirements
RQV.3-1	Adequacy of Inspections
RQV.3-2	Documentation of "Use-As-Is" Classification
RQV.4-1	Documentation of Acceptance Inspections
RQV.4-2	Measurement and Test Equipment Calibrations
RQV.4-3	Use of Uncontrolled and Uncalibrated Instruments
RQV.4-4	Determining Effects of Out-of-Tolerance Equipment
RQV.5-1	Justification of Deviations and Nonconformances
RQV.5-2	Trending of Nonconforming Items
RQV.5-3	Identification and Storage of Parts and Material
RQV.5-4	Evaluating Unreviewed Safety Questions
RQV.6-1	Inspection Reports
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3.4.3 Operations

ROP.2-1	Deficiencies in HFIR Operating Instructions
ROP.2-2	Technical Specifications at HFIR
ROP.2-3	Ambiguities in HFIR Operating Instructions

ROP.2-4	HFIR Shift Check Sheets
ROP.2-5	HFIR Reactor Log
ROP.2-6	HFIR Crew Communications
ROP.3-1	HFIR Operating Manual
ROP.3-2	Use of HFIR Procedures
ROP.3-3	Preparation and Review of HFIR Operating Procedures
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3.4.4 Maintenance

RMA.1-1	Control of Maintenance Support
RMA.2-1	Torquing of Equipment Bolting
RMA.2-2	Unsafe Conditions at the B Reactor Facilities
RMA.3-1	Maintenance of B Reactor Areas
RMA.3-2	Inspection of RRD Maintenance Activities
RMA.4-1	Oversight by Maintenance Supervisors
RMA.5-1	Maintenance at Shut Down Reactors
RMA.8-1	Deficient Procedural Information

3.4.5 Training and Certification

RTC.1-1	Position Task Analyses
RTC.1-2	Class B Reactor Training Plan
RTC.1-3	Instructors for Maintenance Training
RTC.2-1	Examinations for Operator and Reactor Supervisor Training
RTC.4-1	General Employee Access Training
RTC.5-1	Maintenance Personnel Training Program
RTC.5-2	Training Facilities for Maintenance Personnel
RTC.10-1	Training for Managers, Supervisors, and Technical Staff

3.4.6 Auxiliary Systems

RAX.2-1	Resin Carryover in Resin Regenerative System
RAX.3-1	Contamination of the HFIR Pool
RAX.4-1	HFIR Spent Fuel Cask Not Approved by DOE

3.4.7 Emergency Preparedness

REP.2-1	HFIR Emergency Preparedness Planning
REP.3-1	Training of Designated Emergency Responders
REP.5-1	HFIR Stack Radiological Effluent Monitors

REP.5-2	Emergency Resources
REP.6-1	Emergency Assessment and Notification Procedures
REP.7-1	HFIR Emergency Preparedness Planning

3.4.8 Technical Support

RTS.1-1	Technical Support for RRD Tasks
RTS.1-2	Backup for RRD Staff
RTS.2-1	Consistency of Technical Specifications and Procedures
RTS.2-2	Safety Analysis Reports for the HFIR and TSF
RTS.3-1	"Facility Design Modifications"
RTS.3-2	"Configuration Control of Plant Design Modification"
RTS.3-3	Drawing Changes for the HFIR
RTS.4-1	Equipment Performance Tracking
RTS.5-1	Environmental Impact
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3.4.9 Nuclear Criticality Safety

RCS.1-1	Management of Criticality Safety Program
RCS.1-2	Timely Resolution of Criticality Safety Issues
RCS.5-1	Criticality Alarm Systems
RCS.5-2	Distribution of Nuclear Accident Dosimeters
RCS.5-3	Performance of Criticality Drills

3.4.10 Security/Safety Interface

RSS.1-1	New Safeguards and Security Elements
RSS.3-1	Analyses to Determine Appropriate Weapons
RSS.4-1	Safety Appraisals and Audits for Firearms

3.4.11 Experimental Activities

REA.1-1	Safety Overview of Bldg. 7900
REA.3-1	Updating of Research Reactors Experimenters' Guide
REA.3-2	Verification of Reactor Experiment Calculations
REA.4-1	Control of Potential Personnel Exposure

3.4.12 Site/Facility Safety Review

RFR.1-1	Training for Unreviewed Safety Question Determinations
RFR.1-2	Review Board for Nuclear Safety Assessments
RFR.4-1	New Format for Written Reports

3.4.13 Radiological Protection

RRP.3-1	Source Control
RRP.3-2	Radioactive Source Inventories
RRP.4-1	Posting of Radiological Conditions
RRP.4-2	Radiological Controls in the Experiment Area
RRP.8-1	Instruments
RRP.10-1	Control of Low-Level Contamination
RRP.10-2	Waste Minimization
RRP.11-1	Addressing ALARA Issues

3.4.14 Personnel Protection

RPP.1-1	Review of RRD
RPP.2-1	ORNL Safety Manual
RPP.2-2	Safety Personnel Involvement with Safety Work Permits
RPP.2-3	Updating of RRD Manuals
RPP.2-4	ORNL Hoisting and Rigging Equipment
RPP.3-1	Industrial Safety at TSF
RPP.3-2	Carcinogens in RRD Facilities
RPP.3-3	ORNL Electrical Program
RPP.4-1	RRD Monitoring Program
RPP.5-1	HAZCOM Program at RRD

3.4.15 Fire Protection

RFP.1-1	Organization and Administration of Fire Protection Program
RFP.4-1	Sprinkler System in Bldg. 7902
RFP.4-2	Smoke Detection Systems at the HFIR
RFP.4-3	Use of Preaction-Type Sprinklers
RFP.7-1	Diking and Fire-Resistant Enclosures at the HFIR
RFP.7-2	Potential Fire Hazards at the HFIR

3.5 MANAGEMENT

MF-1	ES&H Goals and Objectives
MF-2	ES&H Management Systems
MF-3	Quality Assurance
MF-4	Human Resources
MF-5	Independent Oversight Systems
MF-6	ORNL Tracking ES&H Issues to Closure
MF-7	ORNL ES&H Interfaces with Onsite External Groups
MF-8	ES&H Review of Work for Others
MF-9	Contractual Matters
MF-10	DOE Directive System
MF-11	OR Oversight Systems
MF-12	Contract Award Fee Process

3.6 SELF-ASSESSMENT

SA-1	The ORNL Self-Assessment Process

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

ASSESSMENT RESULTS

A Tiger Team assessment was conducted at Oak Ridge National Laboratory (ORNL) and the U.S. Department of Energy (DOE) Oak Ridge Operations Office (ORO) between October 22, 1990, and November 30, 1990. The assessment was conducted by a team of over 80 specialists from various DOE offices, contractors, and consultants organized into four subteams: environmental, sitewide safety and health assessment, reactors safety and health assessment, and management.

Although the Tiger Team acknowledged that there has been significant improvement in ORNL's environmental, safety, and health (ES&H) performance since the release of the Secretary of Energy's initiatives in June 1989, many deficiencies in the ES&H program were identified during the review. The environmental subteam identified a total of 70 findings; 43 findings related to nonconformance with ORNL procedures, Martin Marietta Energy Systems, Inc., (Energy Systems) procedures, DOE orders, or federal or state laws and regulations, and 27 findings in which best management practices were not attained. The sitewide safety and health appraisal identified 202 findings. No Category I findings were identified, ten of the findings were Category II findings, and the balance were Category III findings. The reactors safety and health appraisal identified 128 findings of which 2 were Category II and the rest were Category III. The management subteam noted 12 management findings and 1 finding related to the self-assessment process.

Five noteworthy practices were highlighted during the Tiger Team assessment.

ORNL is using a risk-based prioritization system as an aid in scheduling and allocating resources. The system considers consequences in the areas of public health and safety, environmental protection, site personnel safety, regulatory compliance and external confidence, and business performance and economic concern, together with the probability of events occurring to derive a risk weight for each problem. A plot of the risk weights for all Tiger Team findings shows a sharp break in the curve of risk weights, with 75 of the 413 Tiger Team findings having risk weights greater than 200. Six findings were determined to have risk weights greater than 900, and these are considered serious safety hazards. Other factors besides risk weight are also considered in prioritization, with higher priority given to actions that relate to improving ORNL's ability to manage its ES&H activities and to actions that directly address root causes that contribute to other, more serious problems.

Each finding was also prioritized by using the Tiger Team Action Prioritization System. This system assigns each activity a priority of 1, 2, 3, or 4 according to the following definitions: Priority 1—actions necessary to prevent significant risk to the public, worker health or safety, or the environment; Priority 2—actions necessary to meet statutes and DOE orders, although lack of action would not result in a significant risk to the public, worker health or safety, or the environment; Priority 3—actions consistent with best management practices; and Priority 4—actions not required by law, regulation, or agreement but that would be desirable to

accomplish. When these definitions were applied to the Tiger Team findings at ORNL, 16 findings were determined to be Priority 1; 211, Priority 2; 158, Priority 3; and 28, Priority 4.

ACTION PLAN PROCESS

The action plan deals with three types of problems. The first type relates to the large legacy of conditions resulting from past practices dating back to the inception of ORNL in 1943. Many of these conditions require extensive and expensive remedial actions. The second type relates to deficiencies in current programs. In many cases, correcting these deficiencies will require a substantial reallocation of programmatic resources to meet all ES&H expectations with an attendant impact on research missions. The third type relates to correcting management deficiencies and improving acceptance and responsibility for ES&H requirements. Many of these changes can be implemented at little or no cost and offer the potential to make ORNL a better research institution.

The results of the Tiger Team assessment of ORNL, previous audits of ORNL, the results of Tiger Team assessments of other Energy Systems sites, Tiger Team assessments of other DOE installations, and the ORNL self-assessment were carefully considered to identify 11 root causes that appear to explain the findings identified during the ORNL Tiger Team assessment. These 11 root causes are inadequate policy, inadequate policy implementation, insufficient resources, inadequate management commitment, inadequate management approach, inadequate oversight, inadequate communications, ambiguous requirements or expectations, inadequate training, poorly defined roles and responsibilities, and regulatory barriers. The 11 root causes are being addressed by ORNL's adopting a comprehensive management approach consisting of seven key elements described below, by actions outlined in individual action plans, and by Energy Systems initiatives. Collectively, the action plan seeks to remedy these root causes and provide an infrastructure that not only meets all ES&H requirements and expectations but can support ORNL's long-range goal of excellence.

The action plan used a matrix approach to identify common elements and to ensure a consistent approach in dealing with root causes. All action plans in a given assessment area were reviewed by discipline experts to ensure that the proposed actions were consistent in technical approach and to identify common elements. Individual action plans were also submitted to a cross-cutting review whereby all action plans attributable to a particular root cause were reviewed as a group by ORNL division directors to ensure that the root causes were being addressed in a consistent manner. Consequently, many action plans contain cross-references to other findings addressing similar problems. A special cross-cut review of other internal and external audit findings across Energy Systems was made to coordinate management and root cause issues with Energy Systems initiatives addressing similar problems.

KEY FINDINGS AND ACTIONS

The Tiger Team identified 12 Category II findings and highlighted a number of key findings in management and environmental areas. These key issues were also amplified in the Secretary of Energy's memorandum transmitted with the draft Tiger Team report to various DOE offices and

in his letter to Mr. Norman Augustine, Chairman and Chief Executive Officer of Martin Marietta Corporation, on the Tiger Team Assessment. ORNL was directed to pay special attention to self-assessment, contamination spread, waste minimization, quality verification, safety programs, corporate oversight, and management issues. Key actions completed, under way, or planned to respond to these issues are summarized in this section.

The action plan outlines a series of aggressive actions, many of which have already been completed, to mitigate the present risks associated with each finding as well as long-term actions designed to address the root cause of the problem. Of the 12 category II concerns identified by the Tiger Team, actions to resolve 2 have already been completed, 5 more will be completed before the end of FY 1991, 3 will be completed in FY 1992, 1 in FY 1993, and 1 in FY 1994. In those cases that require extensive action over an extended period of time, such as correcting serious electrical deficiencies in ORNL's 306 buildings, actions are being prioritized to address the most serious problems first.

The Tiger Team noted in Finding SA-1 that ORNL has not institutionalized its self-assessment process and that the current process lacks many of the elements of an effective self-assessment program. The action plan prepared to respond to that finding outlines a plan to fully implement a continuous self-assessment process combined with periodic independent external review that meets all the criteria for an effective self-assessment program.

Virtually all contamination spread from ORNL occurs through runoff from waste sites or permitted releases within the White Oak Creek drainage basin. To control the latter, the Process Waste Treatment Plant was modified in 1986 to reduce low-level liquid waste volume by 80%. A zeolite ion exchange project is scheduled for FY 1992 to remove cesium-137 from process wastewater discharges. Removal of sediments that are impacting the hydraulic performance of flow-monitoring structures is a key concern in the assurance of quality of surface water-flow data, which are essential to monitoring liquid radioactive releases. Additional funding is being requested to complete time-critical removal of contaminated sediment to address this issue.

Another possible path is to deep aquifers along pathways created by abandoned, unplugged wells. Corrective actions focus is mainly on ensuring that plugging and abandonment is carried out in instances where potential exists for contaminant spread along boreholes and poorly constructed or poorly maintained wells. A groundwater program coordinator has been appointed to provide a central focus for all groundwater activities at ORNL. Funds are being requested to accelerate previously planned projects to maintain, characterize, and remediate potential paths for groundwater contamination. These actions, together with the other actions outlined in the action plan, provide an aggressive start to addressing this long-term problem.

With regard to waste minimization, nonhazardous scintillation cocktails are being used wherever possible. ORNL has instituted an aluminum recycle program, and efforts are under way to develop a comprehensive waste-minimization program.

Management is fully committed to an effective and comprehensive quality verification program. Energy Systems has instituted a total quality management program, led by senior management. A Quality Assurance Audit Program Manager was named effective December 1, 1990. A central tracking system called the Energy Systems Action Management System is currently under development to provide tracking of actions resulting from all audits and Energy Systems sites. An

Integrated Resource Management System is also being developed to assist in prioritizing actions and managing resources.

The action plan describes numerous actions proposed to improve safety programs in industrial hygiene, fire protection, radiation protection, and hazards communication. The Tiger Team cited insufficient resources in a number of findings related to safety programs, and discussions are continuing with DOE Headquarters to identify options for funding these activities to bring them into compliance. In the meantime, efforts are continuing to make the best use of available resources.

Martin Marietta Corporation is also playing an active role in improving ES&H performance at Energy Systems facilities. The Energy Systems board of directors, chaired by Tom Young, the President of Martin Marietta Corporation, meets bimonthly and provides top management review of Energy Systems operations with special attention to performance deficiencies in ES&H. Technical and management assistance is provided to Energy Systems by other parts of Martin Marietta Corporation through an interdivisional operating directive. Recent ES&H-related assistance provided by Martin Marietta Corporation to Energy Systems includes planning assistance for the Y-12 technical audit; calibration standards and measuring; analysis, development, and implementation of plant performance objectives; and environmental task force assistance. In addition, ORNL is using the knowledge base and experience of Martin Marietta Corporation and other Energy Systems sites in developing its self-assessment process. Technical audits are performed by Martin Marietta Corporation for all Martin Marietta businesses. A pre-Tiger Team audit was conducted at ORNL during 1990. During 1991, eleven audits are scheduled, including three at Energy Systems installations. Finally, the Corporate Environmental Management group has established a local office in Oak Ridge, Tennessee, with two full-time staff members. The activities of this group include reviewing ongoing environmental programs relative to compliance with applicable federal, state, and local regulations.

ORNL's response to its acknowledged management deficiencies is to firmly establish ES&H as an integral part of the mission of the Laboratory and to apply the same rigor to meeting ES&H laws and requirements as is applied to scientific laws and requirements. Energy Systems and ORNL management have developed the following approach to establishing and maintaining excellence in ES&H. This approach envisions seven key elements:

- Strategic plan for ES&H: a strategic plan for ES&H is under development to provide vision and coherence to ES&H activities. It will integrate with the strategic plan being developed Energy Systems-wide.

- Goals and structure: institutional goals will be established and roles and responsibilities will be clearly defined and utilized in performance planning and review.

- Conduct of Operations: uniformity of management approach and formality of operations will be strengthened by the implementation of Conduct of Operations throughout ORNL.

- Surveillance: effective and independent oversight of ES&H performance will be established, and adequate technical assistance will be provided. The oversight and technical assistance roles will be managed to avoid conflicts of interest.

- Measurement: performance goals will be established, and tracking and trending systems will be implemented.

- Self-assessment: a continuous self-assessment process combined with periodic independent external review that meets all the criteria for an effective self-assessment program will be implemented.

- Total quality management: a philosophy of continuous improvement and dedication to excellence will serve as the umbrella under which elements are defined and implemented.

FINANCIAL ASSUMPTIONS

As a multiprogram laboratory, ORNL receives funding from many program sponsors, and each is responsible for providing adequate resources to ensure that its programs are conducted in a manner that protects health and safety and prevents environmental damage. Estimated project costs for corrective actions to address Tiger Team findings are allocated to various funding sources based upon the type of work to be completed and the expected beneficiaries. Each action plan includes a cost estimate by action and source for the corrective actions listed. Many actions required to address a finding establish new infrastructure that must be perpetuated to stay in compliance. One-time and annual ongoing costs are listed separately, with the understanding that ongoing costs must be continually supported with suitable escalation factors to maintain compliance with the requirement cited in the finding.

The cost estimates contained in this action plan are current best estimates and are generally planning-quality estimates rather than budget-quality estimates. DOE's *Environmental Restoration and Waste Management Five-Year Plan* is currently being revised. If there are discrepancies between the resource estimates for EM activities in this action plan and the validated cost estimates in the five-year plan, then the cost estimates in the five-year plan shall supersede those in this action plan.

All actions listed in this action plan are contingent upon suitable funding being provided. The schedules for actions listed as "funded" are current best estimates of expected completion. The projected completion dates for actions listed as "requested" or "new" are technically feasible dates based on work scope and available or projected resources. Actual completion dates will depend on when work is authorized and funding received.

The implementation strategy proposed for use at ORNL includes submitting to DOE a prioritized collection of proposed actions based on risk assessment, cost, and other factors each year as part of the normal DOE budget process. An annual operating plan will be prepared based upon the funding provided that allocates funds and assigns responsibility for each action to be undertaken.

Expected results during the year and prioritization of remaining actions will be the basis for the development of proposals for subsequent year funding.

Actions to respond to the Tiger Team assessment represent only part of ORNL's ES&H activities. ES&H improvements started long before the Tiger Team arrived, and substantial resources have already been spent or committed to correct known problems. By definition, Tiger Team findings only cover deficiencies in the activities that were assessed. Underway activities that the Tiger Team found sufficient are not the subject of findings but must be continued until the problem is fully resolved. Also, most Tiger Team findings are narrowly drawn. For example, the majority of ORNL's facilities were constructed during a time when asbestos was a common material of construction. ORNL has committed substantial resources to its asbestos control program, and consequently there are no findings of a general nature that capture the cost of this long-recognized, expensive activity. Rather, there are two findings that relate to specific aspects of the asbestos program, one on controlling the use of new asbestos-containing materials (Finding WS.3-1) and one on designation of the asbestos disposal area (Finding A/BMPF-4). Consequently, Tiger Team costs must be considered in the context of ORNL's total ES&H requirements.

RESOURCE REQUIREMENTS

ORNL is the oldest and largest of DOE's multiprogram research and development (R&D) laboratories, with an estimated replacement cost in the range $7–10 billion. About 63% of ORNL's facilities were constructed before 1960. DOE capital expenditures to upgrade and replace facilities have been a small fraction of normal industrial practice. The buildings, utilities, and equipment have now aged to the point where substantial increases in maintenance costs and decreases in reliability are being experienced for systems and facilities supporting R&D efforts, and many facilities have not been upgraded to current health and safety standards. The low capital expenditure rate has been highlighted to DOE as a major institutional issue for many years. The Tiger Team concurred citing insufficient resources in two of its nine root causes. Combined with the unique environmental contamination problems at ORNL related to its original participation in the Manhattan Project, ORNL has accumulated a substantial ES&H legacy.

Estimated project costs for corrective actions to address Tiger Team findings are allocated to various funding sources based upon two criteria: the type of work to be completed and the expected beneficiaries. Each action plan includes a cost estimate by action and source for the corrective actions listed. "Funded" project costs have already been spent or are currently available in an approved ORO financial plan. "Requested" project costs have been previously requested in a field work proposal (FWP), activity data sheet (ADS), or similar budget submission to DOE. "New" costs are not currently funded or have not been previously requested.

The total estimated cost of ES&H requirements to meet DOE's goal of full compliance with all ES&H laws and regulations at ORNL is on the order of $1.5 billion. It is highly unlikely that this large amount of money will be available over any near-term planning horizon. Consequently, prioritization is absolutely necessary to ensure that the most important problems are addressed first. Implementation will require careful allocation of available funding to achieve the best results with limited resources and to weigh Tiger Team actions against other ES&H needs.

Table S.1 shows a summary of the estimated cost to bring ORNL into compliance with current ES&H laws, regulations, orders, and standards. Entries in the table listed as "to be determined" have not had work scope and cost estimates completed, but most are known to represent substantial additional costs. The planning effort to support this action plan has made a substantial contribution toward developing a comprehensive strategic plan for all ES&H activities at ORNL.

Table S.2 shows a summary of the estimated costs for all actions required to fully address the findings of the ORNL Tiger Team assessment. The table shows a fiscal year breakdown of costs by type of cost and by funding source. The table also summarizes what portion of the funding listed is funded, requested, or new by year and funds category.

A number of key conclusions can be drawn from Table S.2. As stated above, the current estimate for bringing ORNL into compliance with current ES&H laws, regulations, orders, and standards is on the order of $1.5 billion. Actions related to the Tiger Team assessment total approximately $739 million. The majority of action plan cost, $457 million, is in three findings related to environmental restoration and waste management:

- SW/BMPF-4, Unrepaired Leaks from Wastewater Sewer Systems ($229 million);
- GW/BMPF-5, Inadequate Characterization of the Hydrogeologic Regime ($168 million); and
- GW/BMPF-1, Inadequate Well and Borehole Abandonment ($60 million).

All three findings had been identified previously and are included in the current Environmental Restoration and Waste Management 5-year plan. Next to the Office of Environmental Restoration and Waste Management, the Office of Energy Research, as the major funding sponsor of R&D at ORNL, experiences the greatest programmatic cost associated with new ES&H requirements.

Of the total estimated cost of $739 million, only $78.9 million is new costs that had not been previously identified and submitted to DOE for funding. As actions are completed, ongoing costs necessary to support the improvements in the future grow to around $16 million per year.

Of the total estimated cost of $62.3 million in FY 1991 needed to be fully responsive to the Tiger Team assessment, consisting of both one-time and ongoing costs, over $51 million is already funded. These activities include Tiger Team–related activities that were already under way prior to the Tiger Team assessment as well as new tasks resulting from the Tiger Team assessment that have been funded in lieu of lower priority tasks and represent a substantial commitment of overhead and programmatic funds to ES&H activities. Of the $11 million shortfall for FY 1991, roughly $5 million is needed to initiate high-priority activities to move toward compliance with ES&H laws, regulations, orders, and standards.

Table S.1. Approximate Total ES&H Cost Summary (in millions of dollars)

	FY91	FY92	FY93	FY94	FY95	Beyond	Total
Total ES&H Cost	>111.3	>167.7	>270.4	>210.2	>307.5	>487.5	>1554.6
Tiger Team-Related Costs							
One-Time Costs	61.6	88.0	160.3	105.7	119.1	138.2	672.9
Annual Ongoing Costs	0.7	8.0	12.4	14.1	14.3	>16.3	>65.8
Subtotal	62.3	96.0	172.7	119.8	133.4	>154.5	>738.7
ES&H-Related Portion of Other Costs							
Overhead	35.7	37.3	39.0	40.7	42.6	TBD	>195.3
Operating Legacy Cost	TBD	TBD	TBD	TBD	TBD	TBD	TBD
GPP	2.5	4.8	15.0	TBD	TBD	TBD	>22.3
MGPF	0.0	1.1	16.4	18.2	40.0	333.0	408.7
Line Items	0.0	TBD	TBD	TBD	TBD	TBD	TBD
Waste Management	10.8	28.5	27.3	31.5	91.5	TBD	>189.6
Subtotal	>49.0	>71.7	>97.7	>90.4	>174.1	>333.0	>815.9

Table S.2. ORNL Corrective Action Plan Cost Summary (in millions of dollars)

Description	FY91	FY92	FY93	FY94	FY95	Beyond	Total	Funded	Requested	New
Overhead										
Overhead	7.5	4.1	0.6	0.4	0.1	0.1	12.8	5.8	1.0	6.0
Division	1.7	1.1	0.1	0.0	0.0	0.0	2.9	1.3	1.0	0.6
Subtotal	9.2	5.2	0.7	0.4	0.1	0.1	15.7	7.1	2.0	6.6
Program										
EM	28.8	47.1	52.2	46.3	46.8	89.7	310.9	24.8	283.9	2.2
ER	10.2	14.3	13.2	6.3	0.7	0.0	44.7	6.2	21.1	17.4
NE	1.0	0.1	0.3	0.2	0.2	0.0	1.8	1.0	0.0	0.8
Subtotal	40.0	61.5	65.7	52.8	47.7	89.7	357.4	32.0	305.0	20.4
Capital										
EM	0.5	9.6	4.4	4.0	4.0	4.0	26.5	0.5	26.0	0.0
ER	0.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0
GPP	0.7	3.7	5.8	1.0	1.0	0.0	12.2	0.7	5.5	6.0
GPE	0.1	0.0	0.2	0.0	0.0	0.0	0.3	0.0	0.1	0.2
Subtotal	1.3	14.3	11.4	5.0	5.0	4.0	41.0	1.2	31.6	8.2
Line item										
EM	7.1	4.6	15.9	26.5	39.1	35.0	128.2	7.1	121.1	0.0
ER	3.1	0.5	61.7	3.0	6.0	2.4	76.7	3.1	31.9	41.7
MGPF	0.9	1.9	4.9	18.0	21.2	7.0	53.9	0.9	51.0	2.0
Subtotal	11.1	7.0	82.5	47.5	66.3	44.4	258.8	11.1	204.0	43.7
Subtotal one-time costs	61.6	88.0	160.3	105.7	119.1	138.2	672.9	51.4	542.6	78.9
Funded	51.4	0.0	0.0	0.0	0.0	0.0	51.4			
Requested	5.5	73.1	105.1	104.4	116.4	138.1	542.6			
New	4.7	14.9	55.2	1.3	2.7	0.1	78.9			
Annual ongoing costs	0.7	8.0	12.4	14.1	14.3	>16.3	>65.8			
Tiger Team subtotal	62.3	96.0	172.7	119.8	133.4	>154.5	>738.7			
Other ES&H costs	>49.0	>71.7	>97.7	>90.4	>174.1	>333.0	>815.9			
Total ES&H costs	>111.3	>167.7	>270.4	>210.2	>307.5	>487.5	>1554.6			

THE CHALLENGE

ORNL's involvement in radiochemical processing for the Manhattan Project led to historic environmental contamination problems, unique among the DOE multiprogram R&D laboratories. Also, as the oldest and largest of DOE's multiprogram laboratories and lacking adequate resources for capital improvements, ORNL not surprisingly has substantial problems in meeting current health and safety standards. However, one resource that ORNL is not lacking is a high-quality, motivated staff. ORNL has a long and outstanding record of national R&D leadership in the biomedical, health and safety, and environmental sciences and has DOE's largest single R&D program in those areas. The Tiger Team acknowledged that ORNL has a wealth of talent from which to draw, that improvements have been significant, and that pockets of excellence exist in some areas. The challenge stated by the Tiger Team for ORNL is to prove that the improvement can be sustained—a challenge accepted with this action plan.

1. INTRODUCTION

1. INTRODUCTION

1.1 BACKGROUND

On June 27, 1989, Secretary of Energy James D. Watkins announced a ten-point initiative to strengthen safety, environmental-protection, and waste-management activities at the U.S. Department of Energy's (DOE's) production, research, and testing facilities. In support of the ten-point initiative, the Secretary established independent Tiger Teams to conduct environmental compliance assessments at DOE facilities. The assessments are on-site, independent reviews of DOE environmental, safety, and health (ES&H) programs to ensure compliance with applicable federal, state, and local regulations; permit requirements; agreements, orders, and consent decrees; and DOE orders. In addition, the Tiger Teams assess DOE operations for conformance with applicable "best" and "accepted" industry practices and for the adequacy of DOE and site contractor management programs.

A Tiger Team assessment was conducted at the Oak Ridge National Laboratory (ORNL) and the DOE Oak Ridge Operations Office (ORO) between October 22, 1990, and November 30, 1990. The assessment was conducted by a team of over 80 specialists from various DOE offices and subcontractor organizations. The team was directed by a senior DOE manager, John R. Patterson, Deputy Director of the Savannah River Special Projects Office. Four subteams comprised the Tiger Team: environmental, site-wide technical safety appraisal (TSA), reactors TSA, and management. A report, *U.S. Department of Energy Environment, Safety, and Health Tiger Team Assessment, Oak Ridge National Laboratory*, DOE/EH-0148 (Draft), November 1990, documents the findings of the Tiger Team.

Two separate TSA subteams worked on-site during the ORNL assessment, evaluating sitewide and reactor operations according to a standard set of TSA performance objectives and criteria. Consequently, many findings in the sitewide TSA portion of the Tiger Team report have duplicate finding numbers to findings in the reactors TSA portion of the report. To help minimize confusion, all reactors TSA findings are preceded by an "R" to distinguish them from sitewide findings with the same number. For example, Finding EP.5-1 refers to a sitewide TSA finding, and Finding REP.5-1 refers to a reactors TSA finding. Also, the term "finding" designates the conclusion drawn from a number of observations, encompassing both the term "finding" used by the environmental and management subteams and the term "concern" used by the TSA subteams.

1.2 PURPOSE AND SCOPE OF THE ACTION PLAN

This action plan provides a formal response to each of the findings cited in the Tiger Team assessment report. The action plan describes the actions planned to satisfy the findings, action schedules and milestones, and associated costs; it also identifies the parties responsible for implementation. The document also identifies actions and costs that are included, or planned for inclusion, in DOE's *Environmental Restoration and Waste Management Five-Year Budget Plan Fiscal Years 1992–1996,* DOE/S-0078P, June 1990.

1.3 ORGANIZATION AND CONTENT OF THE ACTION PLAN

The action plan includes four sections. Section 1 provides background on the Tiger Team assessments, outlines the purpose and scope of the action plan prepared in response to the Tiger Team assessment report, describes the methodology used to produce the action plan, describes the ORNL site, outlines key financial assumptions, and presents the risk-based system used to prioritize findings and actions. Section 2 describes the principal parties and their roles in implementing the plan. Section 3 encompasses six subsections: (1) Root Causes; (2) Environmental Findings, Responses, and Planned Actions; (3) Sitewide Safety and Health Findings, Responses, and Planned Actions; (4) Reactors Safety and Health Findings, Responses, and Planned Actions; (5) Management Findings, Responses, and Planned Actions; and (6) Self-Assessment Findings, Responses, and Planned Actions. Each of the last five subsections includes planned actions, schedules for implementing the actions, and associated costs for addressing those findings. Section 4 summarizes the action plan, including planned actions, schedules, and costs, and provides a 5-year plan of budgets for the planned actions.

1.4 ACTION PLAN METHODOLOGY

ORNL is the fourth DOE facility operated by Martin Marietta Energy Systems, Inc. (hereafter referred to as Energy Systems), that has undergone a Tiger Team assessment. Many of the findings identified during the Tiger Team assessment are similar to those identified at the other sites. As described in the ORNL Tiger Team assessment report, a Tiger Team assessment is a "snapshot in time." Improvements that are under way or planned but not completed are identified as findings to ensure that the assessment documents a complete and accurate status of the site's condition.

In response to previous audits and Tiger Team assessments, Energy Systems has instituted a number of initiatives across all its facilities to improve management and tracking systems, more clearly define roles and responsibilities, improve communications, clarify policies, and improve policy implementation. In many cases, the Tiger Team acknowledged that progress has been made but that implementation is not yet complete. The ORNL action plan must be considered in the context of these corporate-wide initiatives; every attempt is being made to ensure that actions executed at various levels in the organization are integrated and consistent (see Sects. 2.2 and 3.1).

A fundamental premise of the Tiger Team process is that action plans must address the root causes and not just the symptoms of a problem. It is very easy to lose sight of this objective when faced with the prospect of addressing 413 individual findings. The results of the ORNL Tiger Team assessment, previous audits of ORNL, and Tiger Team assessments of other Energy Systems sites and other DOE installations were carefully considered in identifying 11 root causes that appear to explain the findings identified during the ORNL Tiger Team assessment. Section 3.1 describes the 11 root causes.

This action plan used a matrix approach to identify common elements and to ensure consistency in determining root causes. All action plans in a given assessment area were reviewed by discipline experts to ensure (1) that the proposed actions were consistent in technical approach and (2) to

identify common elements. In addition, a crosscutting review scrutinized all action plans attributable to a particular root cause as a group to ensure consistency in root causes. Consequently, many action plans contain cross-references to other findings that address similar problems.

1.5 SITE DESCRIPTION

ORNL is a multiprogram energy research and development (R&D) laboratory situated on a number of sites on the Oak Ridge Reservation. Figure 1.1 shows a map of the main ORNL site. The total land area used by ORNL approaches 26,680 acres. The Laboratory proper encompasses 330 acres, and outlying facilities and waste-management storage areas include another 1135 acres. A total of 19,500 acres is managed to protect renewable resources for programmatic requirements, and 13,590 acres are assigned for ecological study. Remaining areas are used for other special environmental studies.

ORNL possesses the oldest physical plant of any DOE laboratory. About one-third of ORNL's total existing building area is over 40 years old. Only 37% of ORNL's facilities have been constructed since 1960, compared with 45 to 61% for all other energy R&D laboratories.

ORNL occupies 306 buildings, totaling approximately 3.8 million square feet of gross building area. Over two-thirds of this building space (about 2.6 million square feet) is located at the main Bethel Valley site and the adjacent Melton Valley site. More than 1 million square feet is located at the Oak Ridge Y-12 Plant, and the remaining 200,000 square feet is at the K-25 Site. A few buildings are located in the remote areas south of Melton Valley. The types of buildings range from accelerators and reactors to laboratories, offices, and support structures.

The Laboratory's Bethel Valley area can be divided into five distinct building groups: (1) the Life Sciences Complex (1000 and 1500 areas) at the west end of the site; (2) the Laboratory's Initial Development (2000, 2500, 3000, and 3500 areas) just east of the Life Sciences Complex; (3) the Central Research Complex (4000, 4500, 5000, and 5500 areas) in the center of the site; (4) the Physics Complex (6000 area) to the east of the Central Research Complex; and (5) Support Services (7000 area) at the far east end of the site. The Melton Valley area contains buildings clustered in several widely separated locations. The two major locations are the High Flux Isotope Reactor area (7900 area) and the Consolidated Fuel Reprocessing Program (7600 area). The remaining major structures in Melton Valley are inactive reactors (awaiting decontamination and decommissioning) and their support buildings. South of Melton Valley are two experimental reactor facilities: the Health Physics Research Reactor and the Tower Shielding Facility. Each of these facilities contains a cluster of smaller facilities.

Most ORNL buildings at the Y-12 Site were built during World War II to house uranium-enrichment processes or their support activities. Several smaller structures were added in the 1960s and 1970s to house offices, laboratories, and support equipment. Although the Laboratory's facilities are commingled with those at the Y-12 Site, four relatively distinct areas can be identified: (1) the Biology Complex, (2) the Engineering Technology facilities, (3) the Fusion Energy facilities, and (4) the Isotope Separation Facility. Figure 1.2 shows a map of the Y-12 Site.

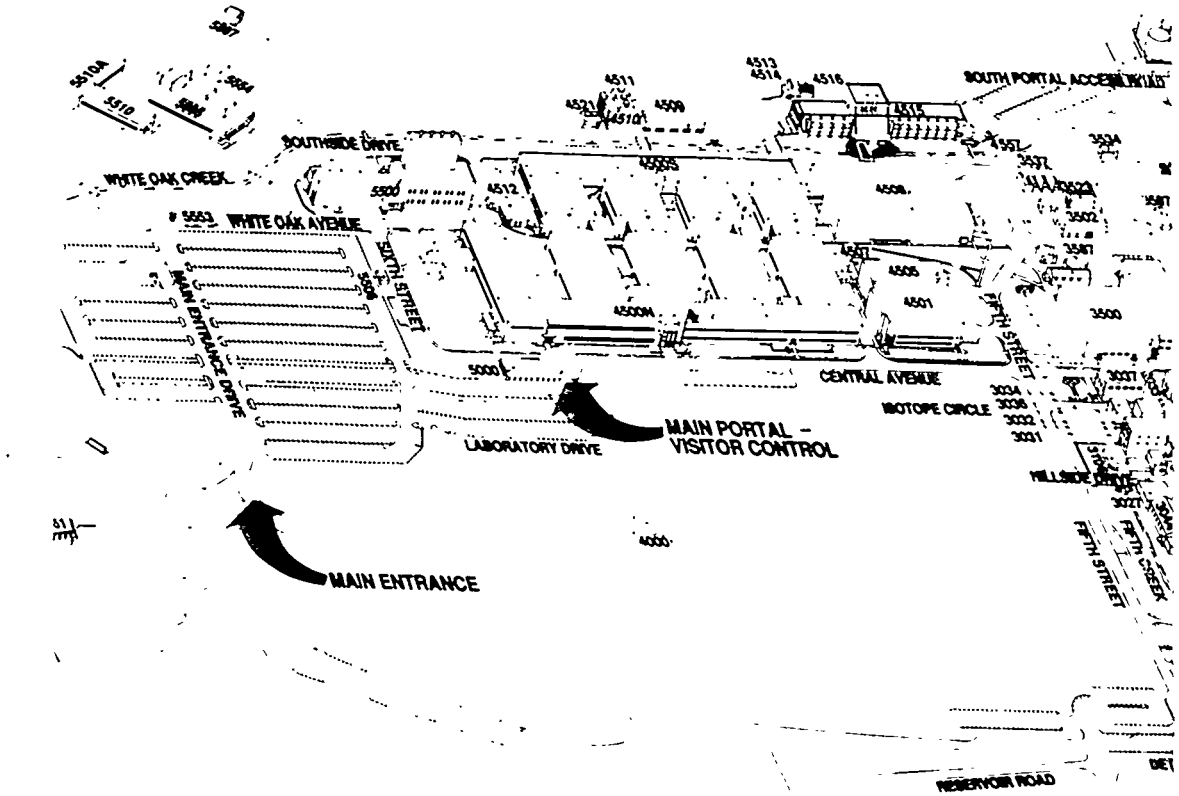
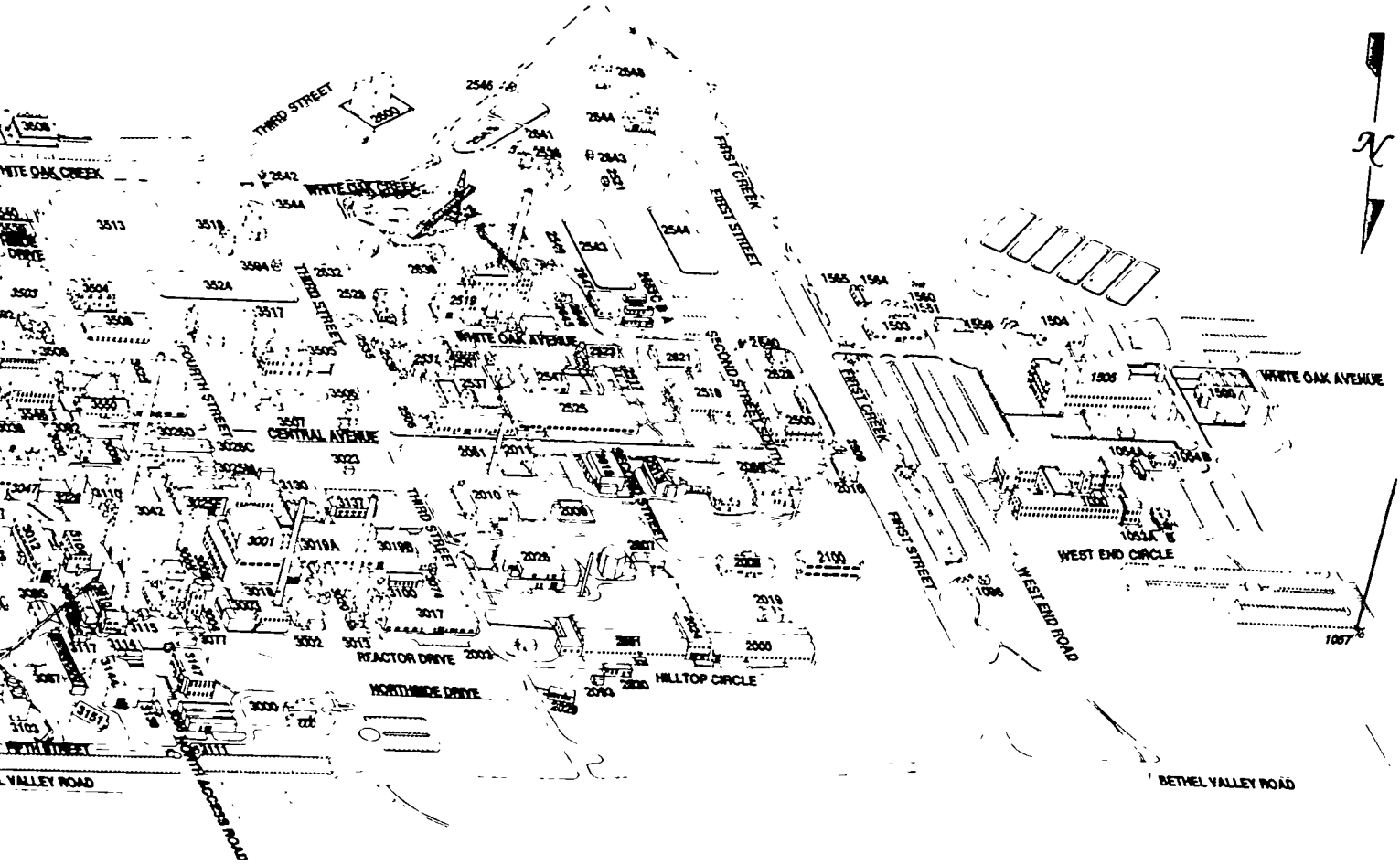


Fig. 1.1. Oak Ridge National Laboratory.


THIRD STREET
WHITE OAK CREEK
FIRST CREEK
FIRST STREET
WHITE OAK AVENUE
SECOND STREET
FOURTH STREET
CENTRAL AVENUE
WEST END CIRCLE
WEST END ROAD
REACTOR DRIVE
NORTHSIDE DRIVE
HILLTOP CIRCLE
BETHEL VALLEY ROAD
NORTH ACCESS ROAD
N

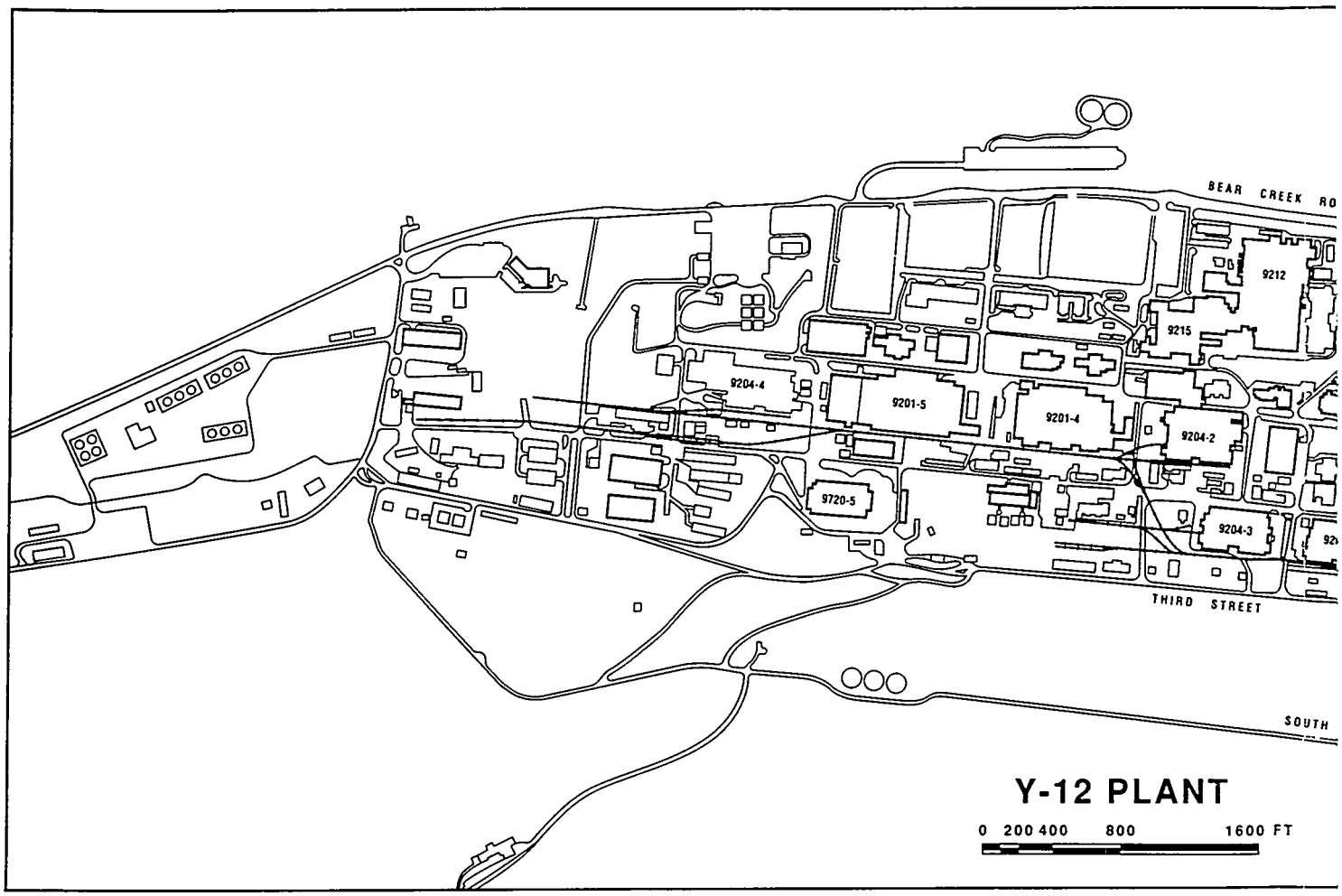
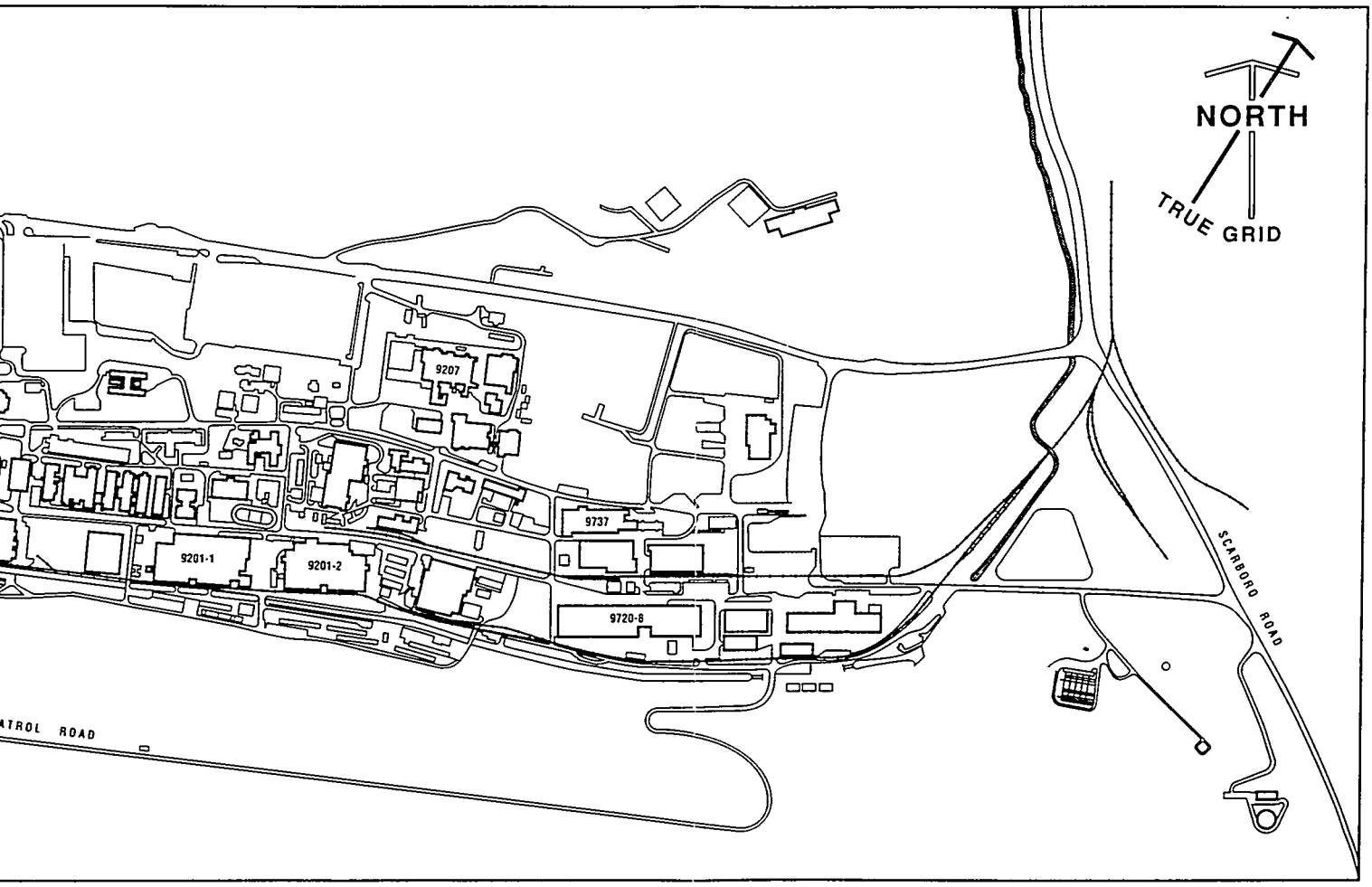


Fig. 1.2. Oak Ridge Y-12 Plant.


NORTH
TRUE GRID
9207
9737
9201-1
9201-2
9720-8
SCARBORO ROAD
ATROL ROAD

ORNL's primary facility at the K-25 Site is the Applied Technology Division, engaged in the development of polymer composites and rotating mechanical systems. Several other ORNL activities of the Chemical Technology Division are housed at various locations within the K-25 Site. ORNL facilities at K-25 were not reviewed during the ORNL Tiger Team assessment but will be included in the Tiger Team assessment of the K-25 Site, currently scheduled for 1991.

1.6 FINANCIAL ASSUMPTIONS

As a multiprogram laboratory, ORNL receives funding from many program sponsors. Each sponsor is responsible for providing adequate resources to ensure that its programs are conducted in a manner that protects health and safety and prevents environmental damage.

Estimated project costs for corrective actions to address Tiger Team findings are allocated to various funding sources based upon two criteria: the type of work to be completed and the expected beneficiaries. Each action plan includes a cost estimate by action and source for the corrective actions listed.

The cost estimates contained in this action plan are current best estimates and are generally planning-quality estimates rather than budget-quality estimates. DOE's *Environmental Restoration and Waste Management Five-Year Plan* is currently being revised. If there are discrepancies between the resource estimates for EM activities in this action plan and the validated cost estimates in the five-year plan, then the cost estimates in five-year plan shall supersede those in this action plan.

"Funded" project costs have already been spent or are currently available in an approved ORO financial plan. "Requested" project costs have been previously requested in a field work proposal (FWP), activity data sheet (ADS), or similar budget submission to DOE. "New" costs are not currently funded or have not been previously requested.

A single action plan or individual action item may require funding from several sources. For example, procedures may be developed by overhead personnel and implemented by an individual program or division (via training, equipment purchase, and upgrade of facilities).

Proper consideration of ongoing costs poses a major dilemma: many required actions establish new infrastructures at ORNL that will require funding long after a Tiger Team action has been closed. For example, to fully address Finding EP.5-1, an emergency field monitoring team must be organized, equipped, and trained. Once the team is fully functional, the finding has been fully addressed. However, the emergency field-monitoring team must be perpetuated to stay in compliance. In this action plan, one-time and annual ongoing costs are listed separately, with the understanding that ongoing costs must be continually supported and suitable escalation factors must be included to maintain compliance with the requirement cited in the finding. A 4.5%/year escalation factor has been used for cost estimates contained in this action plan.

Documentation relating to the calculation of estimates has been retained. Items such as personnel estimates and materials usage are documented with the calculations and methodology used to

arrive at the estimate, including rationales such as prior-year experience and professional judgement.

1.6.1 Research Programmatic Funds

Programmatic funding is the preferred category if a specific sponsor or program can be identified. Research programmatic funds include all project costs for which the benefit of the project accrues to one final cost objective or one program. Each activity is evaluated to determine which DOE program (i.e., FWP/Project) will receive the direct benefit if the Tiger Team issue is corrected, and costs are budgeted to that program as appropriate. Examples include development of safety analysis reports (SARs) for a single program facility and environmental compliance costs for a program's operation such as National Environmental Policy Act (NEPA) documentation and Resource Conservation and Recovery Act (RCRA) requirements. If the costs cannot be identified within an existing FWP, then the costs are added to the upcoming FWPs and scheduling is based on the funds being available in FY 1993. If an action is critical and requires funding in FY 1991 or FY 1992, funding needs are prioritized and funds are requested. As an example, the shutdown B-reactor funding should be programmatic, and direct funding has been requested from the previous sponsor(s) rather than using overhead funds. These and other legacy problems constitute a major funding dilemma. Progammatic sponsors see no value from money spent on legacies, and the use of overhead is inappropriate.

1.6.2 ES&H and OSHA Programmatic Funds

FWPs are being submitted to cover the cost to upgrade programs and facilities to reach compliance. These FWPs are not intended to fund ongoing, routine ES&H compliance activities, but rather to fund one-time upgrades to achieve compliance or to provide critical funding to facilities without an identifiable sponsor. In most cases, these costs represent fixes to multiprogram or sitewide compliance problems, and multiple FWPs will be prepared for these tasks. These follow-ons to the two compliance FWPs submitted for FY 1991 provide opportunities to request funding in critical cases for activities during FY 1991 through FY 1993, with FY 1993 having the highest probability of funding. An individual FWP will be prepared and submitted to the site landlord for each of the following tasks.

Safety Documentation. This task supports the development of safety documentation (SARs and Operational Safety Requirements) of ORNL facilities that do not have an identifiable program sponsor or that require critical funding.

Configuration Management. DOE Order 5481.1B stipulates that SARs include a detailed comparison of the current plant configuration against current DOE design criteria, highlighting and explaining any deviations. This task will meet this requirement as well as "as-built" drawings of all safety systems as required by DOE/OR-901 through development of the configuration management program and assistance for facilities that lack an identifiable program sponsor or that require critical funding.

Natural Phenomena Analysis. This task analyzes hazardous facilities to identify vulnerabilities to natural phenomena and disasters (earthquakes, tornadoes, and floods).

Emergency Preparedness. This task provides the required support to allay concerns involving personnel accountability, protection of response personnel, protective-action guides, predetermined emergency-response levels, and emergency alarm/notification systems. These tasks are one-time upgrades of ORNL's Emergency Preparedness Program. Examples include a design for the expansion of the Emergency Operations Center and the acquisition of emergency equipment.

Radiation Protection. This funds activities such as the ORNL as low as reasonably achievable (ALARA) program, including implemention of ORO's Contamination Control Policy and establishing a tracking and trending program for radiation incidents; radiation characterization of areas (including buildings) adjacent to but not controlled by operations involving the presence of radioactive materials; surveys of roadways, walkways, and parking lots; establishing a program for the contamination survey of vehicles accessing/egressing ORNL; a metrology system; records management; and other radiation protection programs.

NEPA Regulations. This task provides ORNL staff support and information to outside parties in the preparation of reservation-wide environmental documentation as required by SEN-15-90.

Environmental Compliance. This task is necessary to ensure a comprehensive and rigorous environmental compliance program at the Laboratory to achieve full compliance with all applicable orders and state and federal regulations.

Industrial Hygiene. This task provides resources necessary to address ORNL Industrial Hygiene compliance with regulatory and DOE guidelines. Examples are procedures upgrades and other projects necessary to comply with regulatory and DOE requirements and a sitewide evaluation for compliance status. Also included are localized asbestos abatement, indoor air-pollution studies, development of protocols for monitoring and managing hazardous materials, and records-management/data-management methods development to enhance the Industrial Hygiene section's ability to track and ensure quality data.

Training Accreditation. This task provides resources that will concentrate on the accreditation of ES&H-related positions and reactor-related technical positions as well as design of a comprehensive, accredited training program for ORNL.

OSHA. This task funds activities to bring ORNL into compliance with OSHA requirements. It supports program management; long-range planning; installation of equipment for walking/working surfaces; improvements in egress, health, and environmental signs and protective equipment; installation of hazardous material protective equipment; accident-prevention signs; upgrade of the fire extinguisher program; machine guarding; general electrical improvements; and air-contaminants evaluation and sampling (including asbestos).

1.6.3 Environmental Restoration and Waste Management Funds

Under a Memorandum of Understanding (MOU) among DOE line programs, the Office of Environmental Restoration and Waste Management (EM) provides programmatic oversight, program direction, and significant funding for environmental restoration and waste management (ERWM) actions at ORNL. Activities that fall under the jurisdiction of EM include corrective actions; environmental restoration including remedial actions, decontamination, and decommissioning; waste operations; and technology development related to restoration and clean-up. DOE's plans for each of its sites are described in the report *Environmental Restoration and Waste Management Five-Year Plan, Fiscal Years 1992–1996,* DOE/S-0078P, June 1990. Specific projects are described in ADSs. If a required action is part of the current 5-year plan, the ADS number is cited. If the action falls within the scope of EM and is not contained in the current 5-year plan, it is listed as a new activity and will be submitted for inclusion in the next 5-year plan.

1.6.4 Division Administration: Overhead Funds

Division Administration includes project costs for which the benefit of the project accrues to one division but cannot be specifically linked to a single program within that division. Examples include additional personnel resources applied to division ES&H activities (procedures writing, monitoring, assistance) and purchase of minor safety equipment for division personnel. This category is not applicable to nonprogrammatic divisions (i.e., divisions that are funded with overhead dollars).

1.6.5 Laboratory Overhead Funds

Overhead funding should not be used as an alternative funding source. Several tests must be met to qualify for overhead funding. Specifically, overhead-funded projects should be ongoing, base (i.e., routine) activities that benefit multiple programs and multiple divisions. Examples include funding for the ongoing activities of the ES&H Compliance offices, Plant and Equipment, and Medical.

1.6.6 Capital Equipment

Capital equipment is defined as equipment having a cost exceeding $5000 and a useful life of more than 2 years. Capital equipment includes all costs incurred in the acquisition or fabrication of capital equipment not related to construction projects for additions or replacements, including any necessary installation and transportation costs. It also includes the removal costs of demolishing, dismantling, tearing down, or otherwise removing equipment associated with an equipment project. Sources for these funds are programmatic with General Purpose Equipment (GPE) funds identified as Energy Research Budget and Reporting Numbers.

1.6.7 GPP and Line-Item Projects

General Purpose Projects (GPP) and line-item projects include all costs incurred on projects and subprojects involving the design, construction, installation, or other acquisition of land, property rights, buildings, structures, equipment, utility lines, roads, and other facilities. It also includes betterments, additions, and replacements of plant and equipment and the removal cost less salvage in the retirement of plant and equipment. GPP cost between $5000 and $1.2 million. Projects exceeding the $1.2 million limit must be reviewed by Congress on a line-item basis.

1.7 PRIORITIZATION AND TRACKING

The efforts to respond to the 1990 Tiger Team findings build on a continuing initiative at ORNL to improve and formalize the methods that introduce new commitments into the system and allocate or plan for allocation of resources. This initiative, known as the Resource Management System, is depicted in Fig. 1.3. New findings and issues raised by audit and review teams are prioritized using a risk-based methodology developed by Energy Systems for use at all five Energy Systems sites (described in Appendix A of this report). This process stems from work pioneered by the ORNL Research Reactors Division and is a good example of implementing lessons learned.

A team of top-level ORNL managers and key ES&H personnel, chaired by the Director of the Office of Environmental and Health Protection, prioritized the Tiger Team findings. The findings reported by the Reactor TSA team were prioritized separately by the Research Reactors Division Technical Evaluation Group, chaired by the division director. Figure 1.4 shows the distribution of weights for all 413 Tiger Team TSA, environmental, and management findings. Section 4 discusses the consequences of this risk distribution. Following prioritization, the findings were distributed to the appropriate managers for development of the actions plans.

The Tiger Team process specifies that each activity be prioritized using the Tiger Team Action Prioritization System. This system assigns a priority of 1, 2, 3, or 4 to each activity using the following definitions.

> *Priority 1.* Actions necessary to prevent significant risk to the public, worker health or safety, or the environment, whether or not they are required by statute or DOE orders. This priority also includes all compliance agreements and corrective activities necessary to prevent near-term adverse impacts to the public, worker health or safety, or the environment.
>
> *Priority 2.* Actions necessary to meet statutes and DOE orders, although lack of action would not result in a significant risk to the public, worker health or safety, or the environment. This priority also includes those activities required to meet the terms of compliance agreements (in place or in negotiation) between DOE and local, state, or federal agencies, although lack of action would not result in near-term adverse impacts to the public, worker health or safety, or the environment.

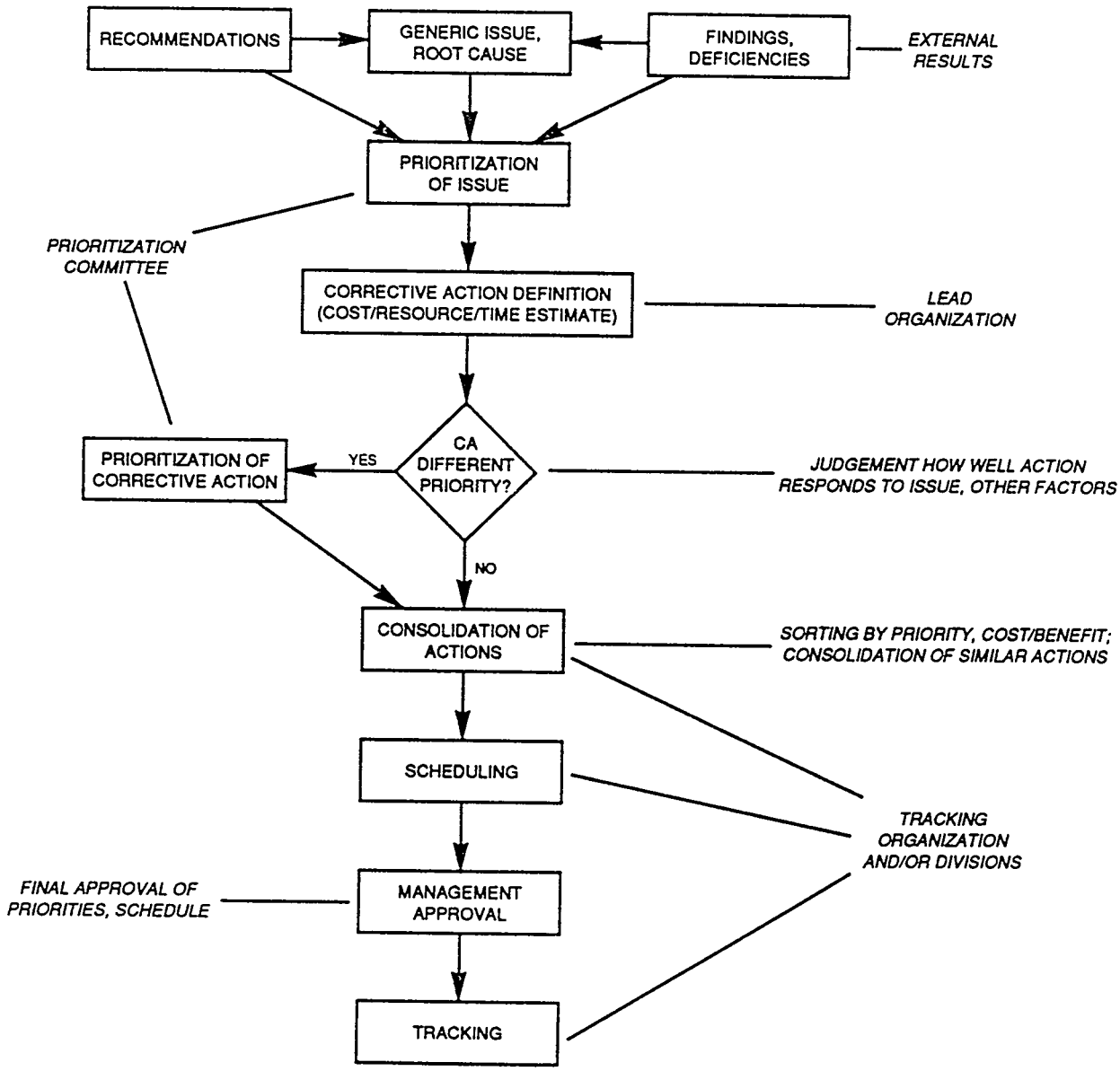


Fig. 1.3. ORNL Resource Management System.

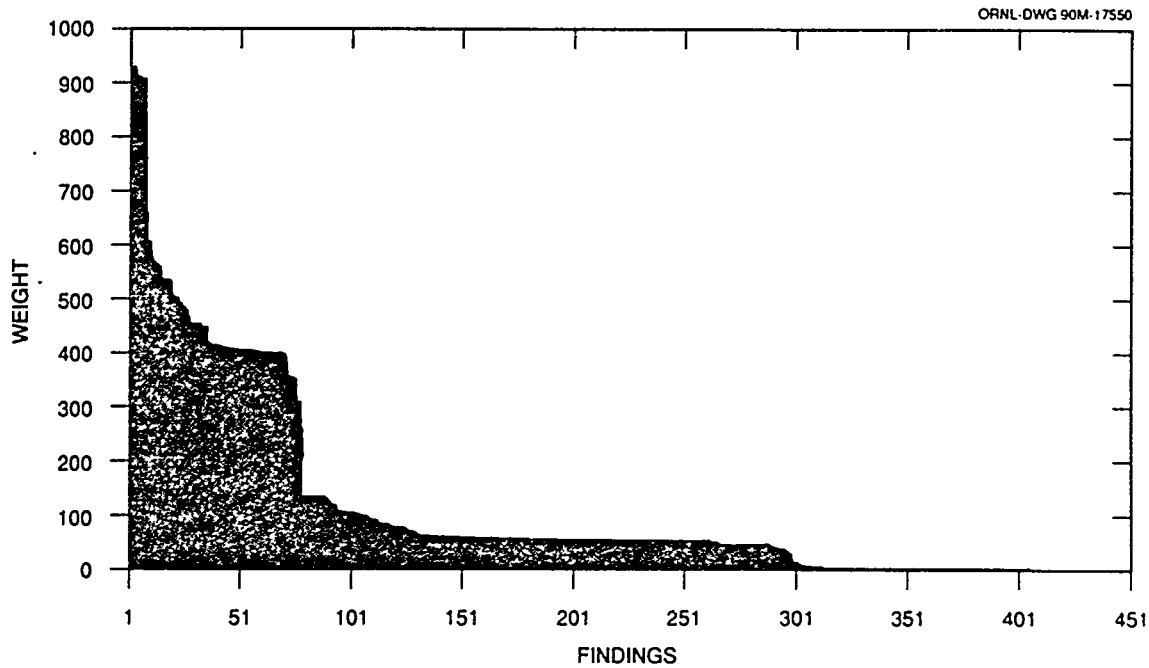


Fig. 1.4. Distribution of weights for all Tiger Team findings.

Priority 3. Actions consistent with Best Management Practices. This priority also includes regulatory activities not captured under priorities 1 or 2 including compliance with DOE orders that implement external regulations or that set specific DOE regulatory standards, actions that would reduce risks or costs, or actions that would prevent disruption of the DOE production mission.

Priority 4. Actions not required by law, regulation, or agreement but that would be desirable to accomplish.

When these definitions were applied to the Tiger Team findings at ORNL, 7 findings were determined to be Priority 1; 219 Priority 2; 159 Priority 3; and 28 Priority 4.

Consequently, each action plan listed in Sect. 3 has been prioritized using both the Energy Systems Resource Management System and the Tiger Team Action Prioritization System. The Energy Systems risk weight and Tiger Team action plan priority are listed on each finding. The two prioritization systems produce substantially similar results. For example, the 7 Priority 1 findings all have risk weights greater than 600. The only other finding with a risk weight greater than 600 was Finding NEPA/CF-1, Inefficient DOE NEPA Implementation Procedures, with a risk weight of 658 which derives from a combination of being a compliance with law issue together with having a substantial impact on business performance. Consequently, the Energy Systems risk weight can be viewed as a means to rank actions within the 4 major priorities of the Tiger Team Action Prioritization System.

The findings and related corrective actions will be tracked via a PC-based system, the Evaluation Database System. The ORNL Quality Department is responsible for monitoring progress and reporting monthly to line and ES&H managers on the status of Tiger Team items as well as other key ES&H findings. In November 1990, ORNL began meeting with the Performance Evaluation Committee (PEC) of DOE-ORO to discuss significant accomplishments during the month, key issues, and corrective-action status. In addition, the ORNL Quality Department prepares a quarterly status report on ES&H/QA audits, reviews, and appraisals and related corrective actions. These reports cover internal as well as external audits. The quarterly reports are previewed by the ORNL ES&H Coordinating Committee prior to presentation to the Energy Systems Technical Evaluation Committee, which is chaired by the vice president for Technical Operations.

Tracking and reporting efforts should be significantly facilitated in the summer of 1991 with the introduction of a new mainframe system, Energy Systems Action Management System (ESAMS). This system will be made available to all five Energy Systems sites to track key issues, findings, and corrective actions and to share information and lessons learned. Representatives from ORNL's ES&H organization and the Research Reactors Division have played a key role in the design development and critical design reviews of ESAMS.

Closure of all corrective actions is independently verified by a professional QA specialist. Documentation of closure is maintained in the Central Quality Department audit files for external audits including the DOE Tiger Team. The corrective action management process is described in ORNL QA procedure, QA-L-16-102, "Corrective Actions."

This revision of the action plan lists many actions that have been completed. Because the action plan has not yet been approved and is still subject to change, efforts have not yet been initiated to verify completion. Consequently, no actions in the plan are considered closed.

ORNL strongly believes that the responsibility for corrective-action implementation lies with line and support organizations. The Quality Department provides the independent monitoring, verification, and reporting that are essential elements of a strong, effective, auditable system. The corrective-action management system is routinely audited by Energy Systems and external audit teams, as well as the independent safety appraisal system at ORNL. The organizations responsible for corrective-action monitoring of all items including Tiger Team findings are shown in Fig. 1.5. This process is one of the important ingredients of the overall self-assessment program currently being upgraded at ORNL to fully meet the intent of the recent guidance provided by the Secretary of Energy.

1.8 IMPLEMENTATION STRATEGY

As discussed in Sect. 4 of the report, the total estimated cost of ES&H requirements to meet DOE's goal of full compliance with all environmental and safety laws and regulations at ORNL is on the order of $2 billion. It is highly unlikely that this large amount of money will be available over any near-term planning horizon. Consequently, prioritization is absolutely necessary to ensure that the most important problems are addressed first. Implementation will require careful allocation of available funding to achieve the best results with limited resources and to weigh Tiger Team actions against other ES&H needs. The prioritization process is not static, and priorities will change as previous problems are solved or new problems arise.

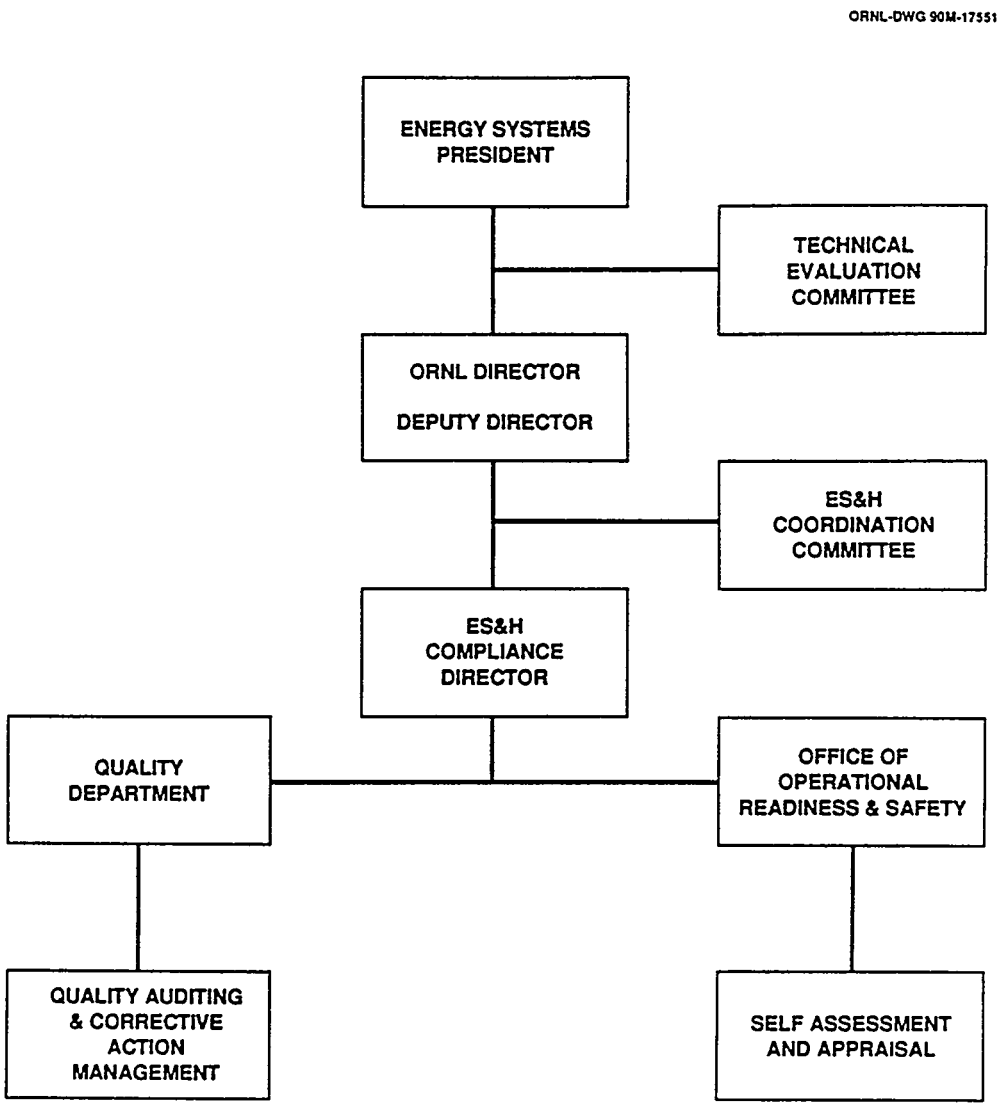


Fig. 1.5. Organizations responsible for corrective action monitoring.

All actions listed in this action plan are contingent upon suitable funding being provided. The implementation strategy proposed for use at ORNL is tied to the DOE annual funding cycle. ES&H proposals in the various categories outlined in Sect. 1.6 will be submitted as part of the normal DOE budget process. The proposals will contain a prioritized collection of proposed actions based on risk assessment, cost, and other factors as described in Sect. 1.7.

The funding authorized for the subsequent fiscal year will provide the basis for actions taken during that year. An annual operating plan will be prepared based on the available funding. The plan will be prepared by the Environmental Health and Safety Compliance organization, approved by the ORNL ES&H Coordinating Committee, and submitted to DOE for concurrence. Based on this plan, funds will be allocated and responsibilities will be assigned for each action to be undertaken. The assignments, budgets, and expected milestones will be entered into the Evaluation Database System described in Sect. 1.7. The Quality Department will be responsible for tracking the status of actions and providing periodic reports as required by DOE. The reports will be evaluated by the ES&H Coordinating Committee along with information provided by ongoing self-assessment and oversight activities to ensure that appropriate corrective steps are taken in the event of problems.

Documentation of action closure will be made by the organization assigned implementation responsibility, and verification will be accomplished by the Quality Department and DOE as appropriate.

Expected results during the year and prioritization of remaining actions will be the basis for the development of proposals for subsequent year funding. The preparation of these proposals will be organized and reviewed by the ES&H Coordinating Committee.

2. ORGANIZATION AND MANAGEMENT STRUCTURE TO IMPLEMENT THE ACTION PLAN

2. ORGANIZATION AND MANAGEMENT STRUCTURE TO IMPLEMENT THE ACTION PLAN

2.1 OVERVIEW

Management and staff from the oversight and line organizations of DOE, Energy Systems, and ORNL worked as a team to respond to the Tiger Team assessment of ORNL. This section identifies the management structure in these organizations for implementing the Action Plan and outlines their relationships and responsibilities. This structure includes changes already implemented in response to independent audits and the Tiger Team findings that became effective January 1991.

ORNL is a multiprogram energy research and development laboratory managed by Energy Systems for DOE. Sections 2.2 through 2.4 describe the management structures of DOE, Energy Systems, and ORNL. The names and addresses of key contacts are listed in Section 2.5.

2.2 DEPARTMENT OF ENERGY

2.2.1 DOE Headquarters

The Secretary of Energy, Admiral James D. Watkins, has clearly identified his expectations for Headquarters line management responsibility and accountability in operating DOE facilities. While the DOE Office of Energy Research (ER) exercises landlord responsibility for ORNL, many other program sponsors share the responsibility for ensuring that their programs are conducted in a manner that protects the health and safety of the employees and prevents environmental insult. Other major DOE sponsors include the Assistant Secretary for Nuclear Energy, the Assistant Secretary for Conservation and Renewable Energy, the Assistant Secretary for Defense Programs, and the Office of New Production Reactors.

ER provides Headquarters oversight and program direction; it is also the major funding sponsor of R&D at ORNL. Under an MOU among DOE line programs, the Office of Environmental Restoration and Waste Management (EM) provides programmatic oversight, program direction, and significant funding for waste management and environmental corrective actions at ORNL. In accordance with a management agreement between DOE-Nuclear Energy (NE) and ER, NE has line management responsibility for the operation of the ER-funded reactors at ORNL. One exception is the Tower Shielding Facility, funded and operated by NE.

For this action plan, ER will take responsibility for overall Headquarters coordination of activities. Headquarters' responsibilities include the following:

- requesting the appropriate funding from Congress to implement this action plan,

- concurring in the prioritization of activities established by ORO and ORNL,
- providing ORO guidance identifying which items to delay if funding is not available,
- assessing the status and quality of the action plan implementation, and
- ensuring that the contractor's performance is adequately reflected through the contractor performance evaluation process.

2.2.2 DOE–Oak Ridge Operations

ORO provides day-to-day management oversight of ORNL operations. Joe La Grone, the ORO manager, is the contracting officer and fee-determining official responsible for the management and administration of the contract. Funding for Energy Systems–managed facilities is allocated from DOE and other government agency program offices and controlled through ORO.

Within ORO, line management responsibility is assigned to the Assistant Manager for Energy Research and Development (AMERD), R. L. Egli. The Deputy AMERD, J. A. Reafsnyder, is the Contracting Officers Representative (COR) for ORNL; he is located at the ORNL site. The Assistant Manager for Environmental Restoration and Waste Management (AMERWM), W. D. Adams, has COR authority for Environmental Restoration and Waste Management Activities at ORNL. Several ORO organizations provide support to these two groups. Figure 2.1 shows the ORO organization.

Within ORO, lead responsibility for action plan implementation rests with AMERD and will be directed by James A. Reafsnyder, Deputy Assistant Manager for Energy Research and Development, in accordance with AMERD policies and procedures. AMERD responsibilities include the following:

- ensuring that adequate funding is requested from Headquarters,
- implementing Headquarters guidance,
- providing the contractor with formal guidance for implementation of Headquarters directives,
- coordinating activities with ORO support organizations,
- identifying problems and barriers to implementation,
- evaluating contractor performance,
- verifying, on a prioritized basis, the completion of action items, and
- providing periodic status reports to Headquarters on the progress of implementation.

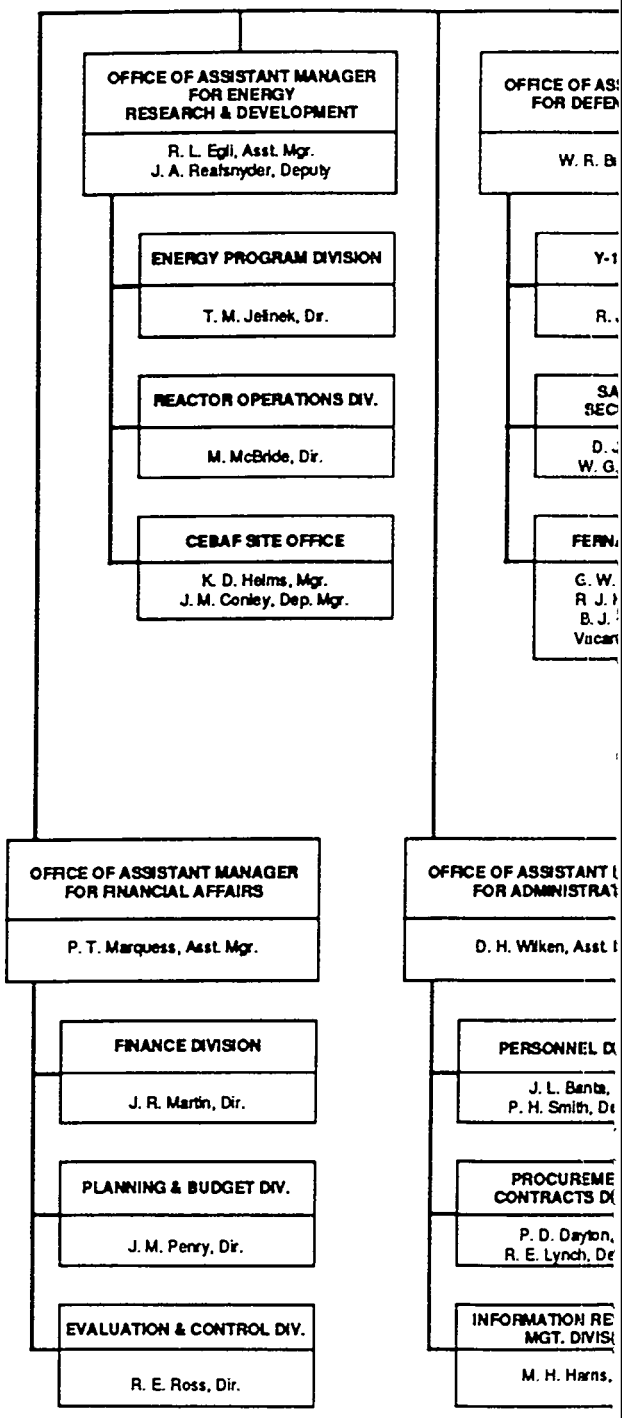
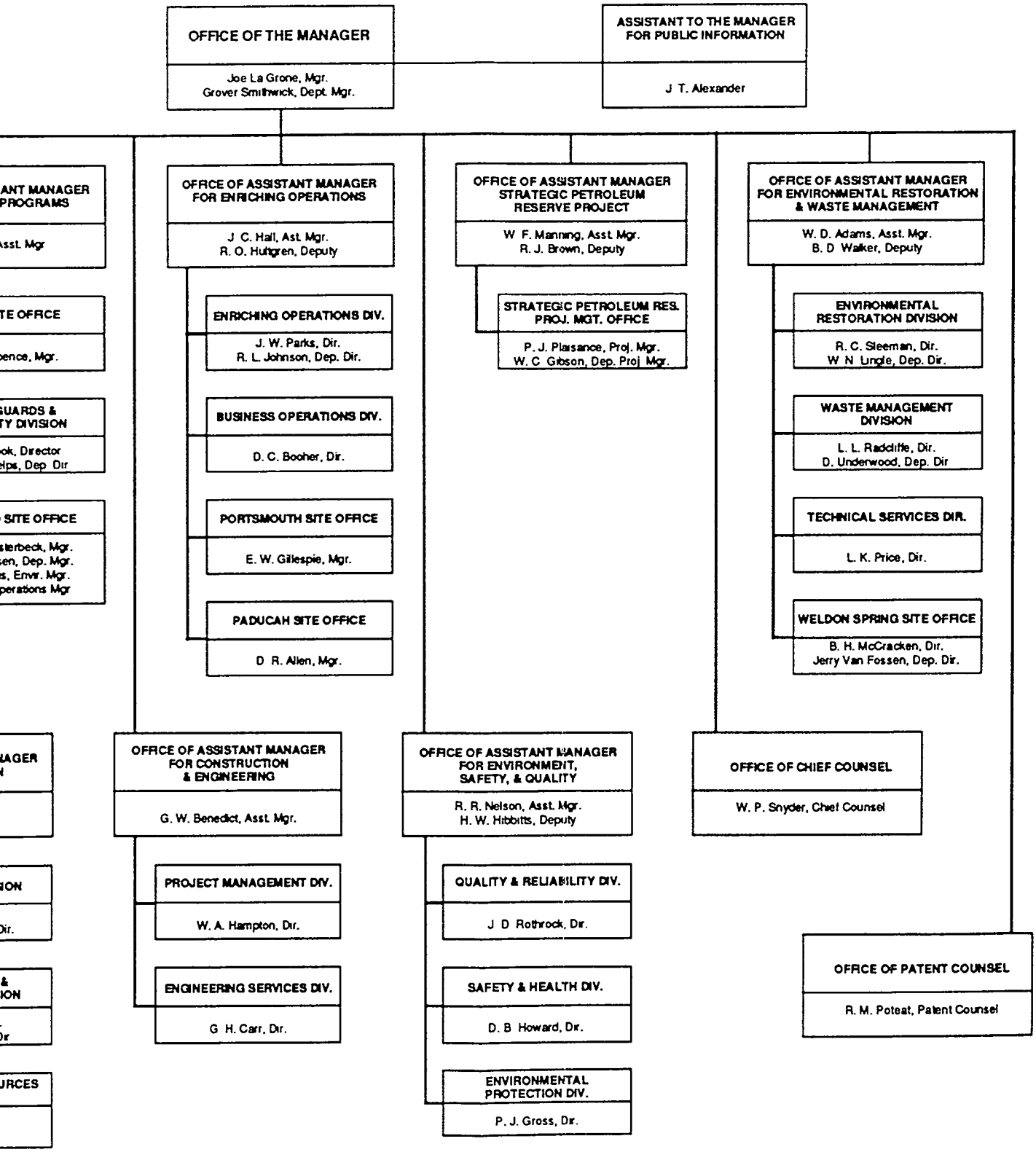


Fig. 2.1. DOE-ORO organization



ed management structure.

As explained above, AMERWM has responsibility for Environmental Restoration and Waste Management activities according to the memorandum of agreement with AMERD. These responsibilities extend to items identified in this action plan. AMERWM is responsible for:

- ensuring that adequate funding is identified and requested for ERWM activities;
- ensuring that Headquarters concurs in any prioritizations that are established;
- assessing that the contractor's performance is adequately reflected in the performance evaluation process;
- verifying, on a prioritized basis, the completion of action items; and
- providing periodic status reports on action plan implementation to AMERD for inclusion in reports to Headquarters.

These ORO responsibilities add to the reporting requirements currently established for individual programs and other requirements formally established in MOUs and other formal management plans. Headquarters sponsors are encouraged to seek information on action plan progress through existing reporting systems.

The ORO support organizations will assist AMERD and AMERWM in providing independent verification of action completion, evaluation of contractor performance, identification of problem areas, and technical assistance, as needed. These organizations will provide periodic status reports to AMERD on the action plan implementation. In addition, these groups will serve an important function in ensuring that lessons learned are shared across ORO organizations and contractors. As necessary, ORO will utilize support contractors to aid in performing several of these roles.

2.3 ENERGY SYSTEMS

Energy Systems is an operating entity of Martin Marietta Corporation responsible to DOE for managing ORNL, the Y-12 Plant, and the K-25 Site in Oak Ridge; the Paducah Gaseous Diffusion Plant in Kentucky; and the Portsmouth Gaseous Diffusion Plant in Ohio. Energy Systems is contracted under a cost-plus-award-fee contract using a "government-owned, contractor-operated" agreement. Energy Systems provides centralized ES&H policy, compliance oversight, QA, and lessons learned support to its five facilities. Martin Marietta Corporation management has established a matrix relationship between Energy Systems staff members and the corresponding functions at the Martin Marietta Corporation level to facilitate effective communications and oversight.

The president of Energy Systems is Clyde Hopkins, responsible to the Martin Marietta Corporation president and chief operating officer. Management oversight is provided by a board of directors that meets bimonthly and is chaired by the president of Martin Marietta Corporation. Hopkins has delegated responsibility for management of the Energy Systems production facilities to the senior vice president who, in turn, has delegated operational responsibility to the three vice

presidents responsible for applied technology, uranium enrichment, and the Y-12 Plant. ORNL reports directly to the president. Six other vice presidents provide support to Energy Systems in administration; compliance, evaluation, and policy; human resources; technical operations; procurement; and technology applications. Additionally, the staff of the president of Energy Systems includes a general counsel, public relations director, and financial audit manager. Figure 2.2 shows the top-level Energy Systems organization.

Policies established by the president and vice presidents are implemented through standards and procedures that define requirements and responsibilities and provide guidance to the operating organizations in Energy Systems. Top-level standards and procedures are prepared by staffs of Energy Systems vice presidents. These documents are periodically reviewed to ensure that Energy Systems standards and procedures fully respond to federal laws, rules, and DOE orders. Chartered formal committee structures meet regularly to review and guide the development of policies, standards, procedures, progress in improvement performance, technical audit schedules, findings and corrective action status, and key personnel development and assignments.

The Vice President for Compliance, Evaluation, and Policy has delegated responsibility for environmental, safety, and health and quality oversight to the Environmental and Safety Activities Director, the Corporate Medical Director, the Quality Director, and the Evaluations Program Manager. The Evaluations Program Manager and the Quality Director each direct independent Energy Systems-level reviews of environmental, health, safety, quality, and operations performance at each site each year.

The Evaluations' effort is a bottom-to-top, field-observation-based process that uses a core group of INPO-trained observers in a 3 to 5 week annual review of each site. The Quality Director organizes and leads a top-down integrated technical audit composed of several subteams to review ES&H and quality performance across all Energy Systems functions. These combined reviews are conducted with a frequency that meets or exceeds DOE independent oversight requirements. Martin Marietta Corporation conducts periodic audits of Energy Systems and the respective sites in technical audits led by the corporate Vice President of Quality and integrated with the Energy Systems technical audit process. The results of these technical audits and evaluations and those of site audits and surveillance are reviewed quarterly by the Energy Systems Technical Review Committee.

2.4 OAK RIDGE NATIONAL LABORATORY

ORNL is DOE's largest multiprogram laboratory, with strong programs in energy technology development and applied and basic research. The Director of ORNL is Alvin Trivelpiece, and the Deputy Director is Murray Rosenthal. ORNL has a large and experienced environmental and health R&D program that matrixes its technical capabilities to provide supplemental scientific support for ES&H compliance to ORNL and other Energy Systems facilities.

Teamwork and cooperation form the management philosophy of ORNL with thorough commitment to excellence in science and ES&H. Although the delegation of responsibilities in a large and complex organization clearly compartmentalizes the organizational structure, open communications are encouraged while ensuring accountabilities of line management in all organizational elements.

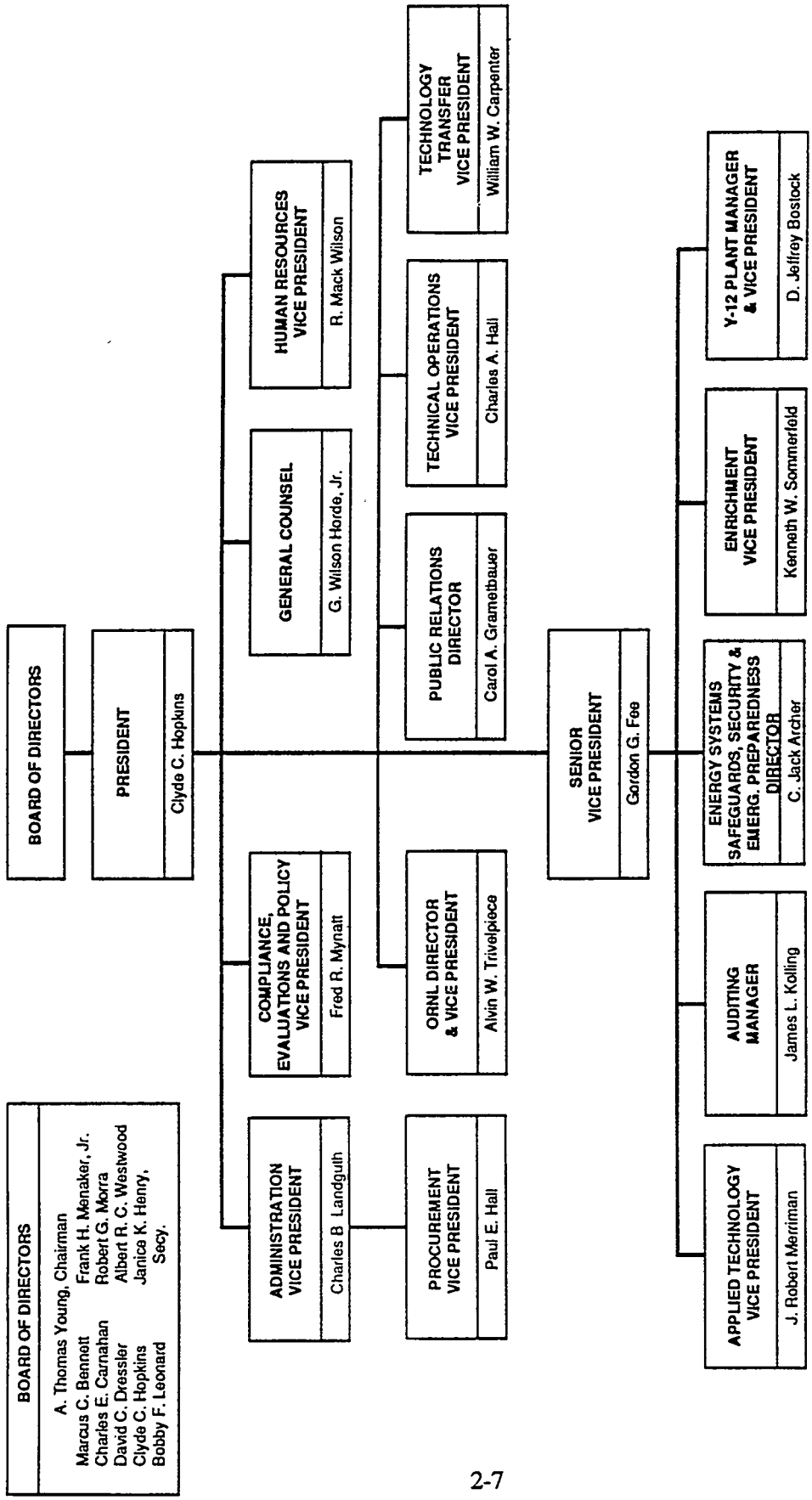


Fig. 2.2. Martin Marietta Energy Systems, Inc., organization and management structure.

Management duties are divided along divisional and program lines. In this structure, four technical associate directors manage both divisions (generally organized by discipline or technology) and programs (using the expertise within multiple divisions to accomplish programmatic objectives): Advanced Energy Systems, Biomedical Sciences, Environmental Sciences, Nuclear Technologies, and Physical Sciences and Advanced Materials. Another associate director is responsible for Operations; separate organizations are responsible for Research Reactors and ES&H Compliance. The ORNL Executive Committee comprises all seven of these entities with the Laboratory Director and Deputy Director. Consequently, multidivisional efforts are characteristic of the Laboratory's R&D projects. The majority of the Laboratory divisions are located at the X-10 site, with approximately 25% of the technical divisions at the Y-12 and K-25 sites. Figure 2.3 shows the organization chart for ORNL.

The ORNL central ES&H Compliance organization consists of four offices: Environmental Health and Protection, Environmental Compliance and Documentation, Operational Readiness and Safety, and Quality Assurance (called the Quality Department). Each office directs the oversight and support for a different facet of compliance and improvement in the operations of ORNL. This directorate was formed recently by reorganizing one division into separate offices and transferring the responsibilities of two of the offices from the Operations Directorate. These actions better coordinate the ES&H and QA functions and bring a unified and higher-level focus of attention on its activities. A number of strategic goals have been identified:

- provide a compliance program that protects staff and allows efficient conduct of operations,
- provide guidance for changes in the operational philosophy needed to achieve excellence,
- provide an operational environment that reduces the need for extensive ES&H and QA audits,
- anticipate regulatory changes in sufficient time to plan cost-effective compliance,
- maintain current levels of trust by state and federal regulations, and
- improve communications with DOE.

This organization will play an important role in the success of ORNL as the emphasis of DOE and its contractors on ES&H and QA continues.

An ES&H Coordinating Committee was created in 1989 to provide better communication and coordination of tasks among the central support, management, and line organizations involved in ES&H facilities. The committee is chaired by the Deputy Director of the Laboratory and consists of senior ES&H managers and four members of the Executive Committee, providing top-level overview of this vital area.

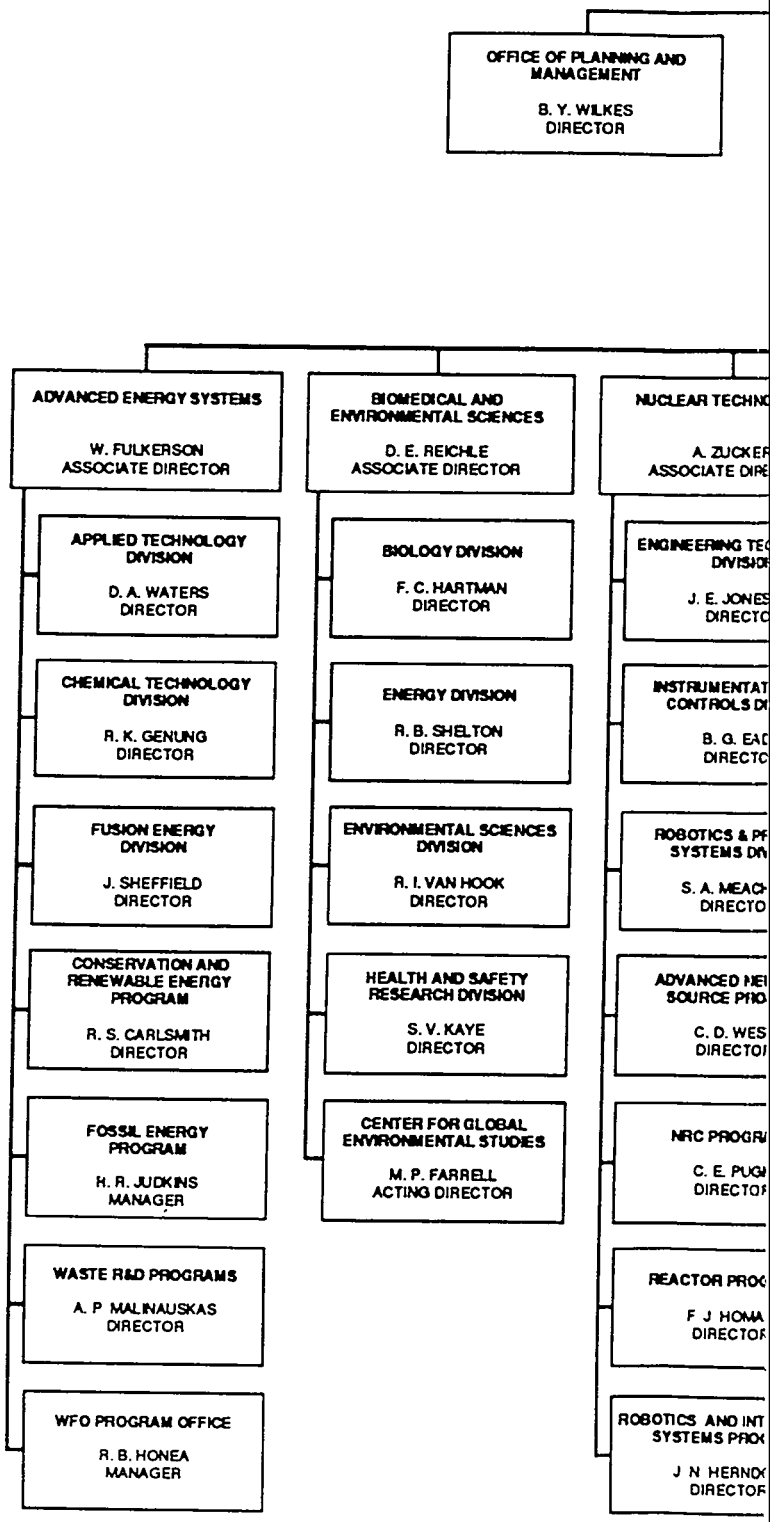


Fig. 2.3. ORNL organization and manageme

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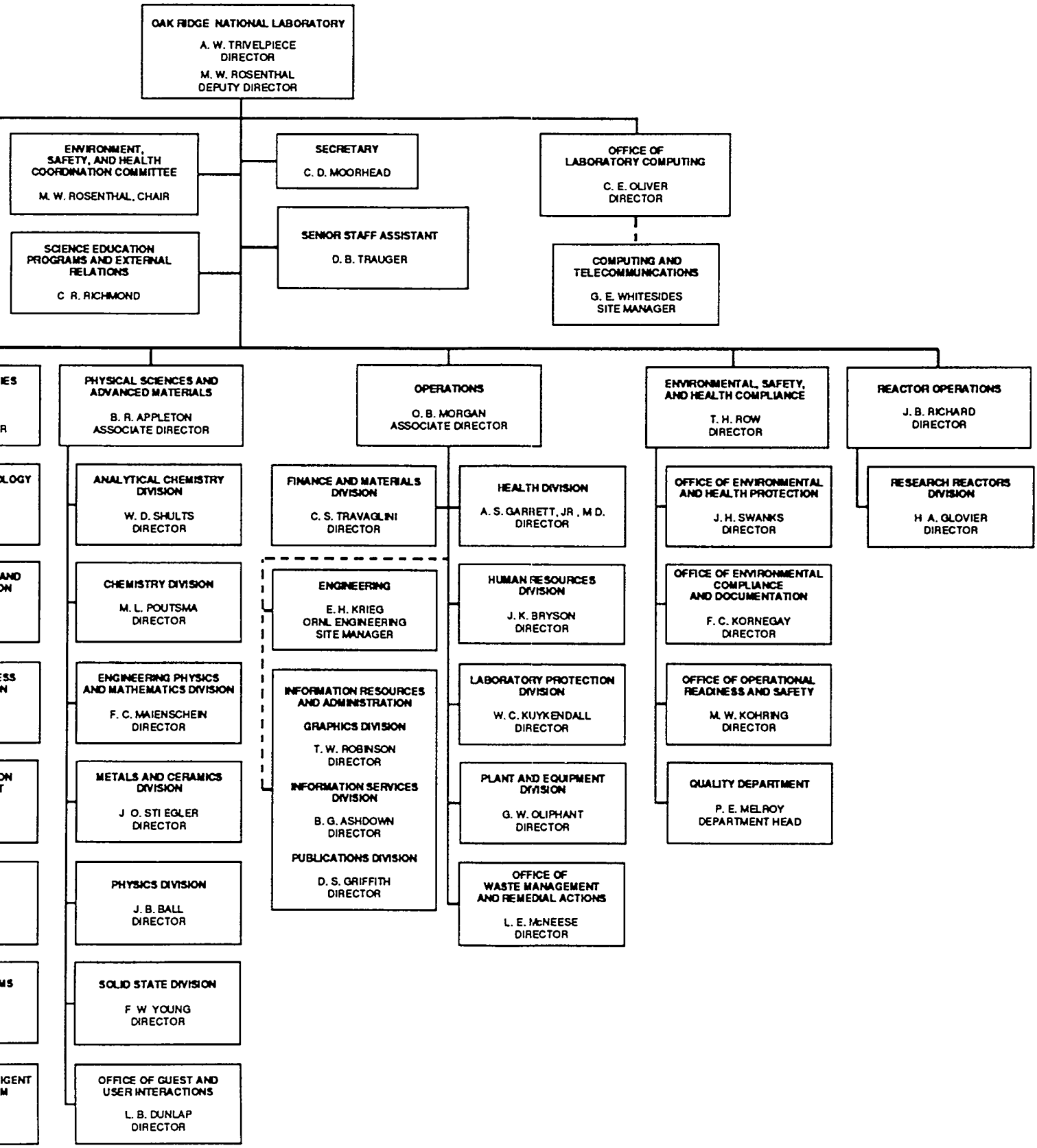

structure.

2.5 KEY CONTACTS

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3. FINDINGS, RESPONSES, AND PLANNED ACTIONS

3. FINDINGS, RESPONSES, AND PLANNED ACTIONS

3.1 ROOT CAUSES

3.1.1 Root Cause Determination

The results of the Tiger Team assessment of ORNL, previous audits of ORNL, Tiger Team assessments of other Energy Systems sites, Tiger Team assessments of other DOE installations, and the ORNL self-assessment were carefully considered to identify 11 root causes that appear to explain the findings and concerns identified during the ORNL Tiger Team assessment. The following definitions are used for the 11 root causes.

Inadequate policy—Policy statements do not exist or are incomplete regarding all requirements or expectations.

Inadequate policy implementation—Policy statements exist but are not being used because of unclear or incompletely documented and controlled procedures or instructions.

Insufficient resources—Funding, personnel, equipment, or facilities are insufficient to comply with requirements or expectations.

Inadequate management commitment—Management has not accepted the need to meet the requirement or expectation or has not devoted sufficient attention to ensuring that adequate policies are defined and implemented.

Inadequate management approach—Management systems and organization are not effective in implementing, tracking, and reviewing requirements that have been committed to.

Inadequate oversight—Independent evaluation and review systems are inadequate to ensure that all operations are meeting requirements and expectations, including auditing, tracking, trending, and feedback functions.

Inadequate communications—Communications are not effective in conveying requirements or expectations down to the level of implementation, or do not provide adequate information to management to properly determine the state of affairs.

Ambiguous requirements or expectations—Requirements or expectations for performance have not been clearly defined, leading to interpretation and disagreements as to whether all requirements have been met.

Inadequate training—Training has not been sufficient to ensure that personnel have adequate understanding of all requirements or the necessary skills to implement required procedures.

Poorly defined roles and responsibilities—Roles, responsibilities, and accountability for requirements have not been adequately documented and understood, leading to confusion as to who is responsible for implementation and oversight of requirements.

Regulatory barriers—Laws, regulations, orders, or standards are conflicting or prohibit required actions necessary to meet all requirements or expectations.

Each finding or concern is attributable to one or more of these 11 root causes. Collectively, the action plan seeks to remedy these root causes and provide an infrastructure that not only meets all ES&H requirements and expectations but can support ORNL's long-range goal of excellence.

3.1.2 Relationship to Tiger Team Assessment Root Causes

The ORNL Tiger Team cited nine root causes in their report for the findings and concerns noted during the assessment. The 11 ORNL root causes listed previously are in many cases an attempt to break down into key elements the root cause statements made by the Tiger Team. There is a well-defined relationship between the 9 root causes listed by the Tiger Team and 11 root causes used in this action plan.

The environmental subteam of the Tiger Team cited 2 root causes for the 70 environmental findings: policy and policy implementation. Inadequate policy and inadequate policy implementation are also elemental root causes as described in this action plan.

The TSA teams cited three root causes for both the sitewide and the reactors TSA concerns identified during the assessment. The root cause statement by the Tiger Team is followed in parentheses by the ORNL root causes that correspond to the statement.

> "Management has not effectively identified and implemented ES&H requirements throughout ORNL." (inadequate policy and inadequate policy implementation)
>
> "Implementation of ES&H requirements and management attention to the details of meeting those requirements is not done with the same rigor as that applied to scientific research." (inadequate policy implementation and inadequate management commitment)
>
> "There are insufficient resources to support essential functions in key safety and health programs." (insufficient resources)

The management subteam cited 4 root causes for the 12 management and 1 self-assessment finding. The root causes identified by the Tiger Team and their relationship to the ORNL element root causes follow.

> "ORNL management has not accepted ES&H as an integral part of their scientific program responsibilities and, accordingly, has not demanded those actions which are necessary to accomplish ES&H excellence." (inadequate management commitment and inadequate policy implementation)

"ORNL's collegial, consensus, and informal management style is not well-suited to the demands of ES&H compliance." (inadequate management approach)

"MMES has not responded to the DOE ES&H initiatives with the imaginative, aggressive management action necessary to bring about definitive improvements in ORNL's management of the ES&H program." (inadequate management commitment and inadequate policy implementation)

"DOE has not accompanied its mandate for vigorous DOE oversight of ORNL's ES&H program, with planning, guidance, and resources necessary to successfully accomplish that mandate." (inadequate policy, inadequate policy implementation, and insufficient resources)

3.1.3 ORNL Actions to Address Root Causes

There is a strong consensus that a collegial management style is an essential part of ORNL's scientific culture. It is the exchange of ideas, the give and take, and the consensus identification of scientific certainty that sets the scientific method apart from speculation. However, **there needs to be a clear demarcation between consensus in deciding on a course of action and uniform adherence to the consensus decision.** The Tiger Team touched on this distinction in their discussion of root causes. One root cause states that "ORNL's collegial, consensus, and informal management style is not well-suited to the demands of ES&H compliance." However, in another root cause, the Tiger Team cites ORNL's distinguished record of scientific achievement and concludes that some ES&H deficiencies can be traced to the fact that "Implementation of ES&H requirements and management attention to the details of meeting those requirements is not done with the same rigor as that applied to scientific research." ORNL's response to its acknowledged management deficiencies is to firmly establish ES&H as an integral part of the mission of the Laboratory and to apply the same rigor to meeting ES&H laws and requirements as is applied to scientific laws and requirements. At the same time, initiatives are being pursued that will hopefully strengthen both research and ES&H performance.

Energy Systems and ORNL management have developed the following approach to establishing and maintaining excellence in ES&H. This approach envisions seven key elements:

- Strategic plan for ES&H: a strategic plan for ES&H is under development to provide vision and coherence to ES&H activities. It will integrate with the strategic plan being developed Energy Systems-wide.

- Goals and structure: institutional goals will be established and roles and responsibilities will be clearly defined and utilized in performance planning and review.

- Conduct of Operations: uniformity of management approach and formality of operations will be strengthened by the implementation of Conduct of Operations throughout ORNL.

- Surveillance: effective and independent oversight of ES&H performance will be established, and adequate technical assistance will be provided. The oversight and technical assistance roles will be managed to avoid conflicts of interest.

- Measurement: performance goals will be established, and tracking and trending systems will be implemented.

- Self-assessment: a continuous self-assessment process combined with periodic independent external review that meets all the criteria for an effective self-assessment program will be implemented.

- Total quality management: a philosophy of continuous improvement and dedication to excellence will serve as the umbrella under which elements are defined and implemented.

ORNL intends to strengthen its management approach by using a framework modeled after the Institute of Nuclear Power Operations (INPO) Guidelines for Conduct of Operations and as required in DOE Order 5480.19. Conduct of Operations is a philosophy of doing work in a formal, disciplined manner to enhance safe and efficient management of activities and to achieve excellence. Key elements of the Conduct of Operations philosophy are that individuals take "ownership" for their activities and that management be routinely visible in the workplace to observe and assist where feasible.

Because of their wide acceptance, Conduct of Operations guidelines will be used as the starting point for the ORNL system. The guidelines fail to address many of the issues of importance to the Laboratory and must be supplemented in many areas, including conduct of research, definition of research directions, resource allocation, hiring practices, reporting procedures, evaluation of performance of both individuals and operating units, and recognition of performance through awards and salary administration. Furthermore, the guidelines are intended to cover the operation of nuclear power plants and are written in the jargon specific to that operation, so they must be translated into language appropriate for a research organization.

Implementation of Conduct of Operations will utilize a graded approach commensurate with the level of operational risk involved. Energy Systems is currently training managers in Conduct of Operations principles in preparation for implementing a program throughout the organization. The implementation at ORNL will be within the context of the Energy Systems-wide initiative.

Other root causes are being addressed by Energy Systems actions that have been initiated to strengthen ES&H management as a result of Tiger Team visits and other audits at other Energy Systems sites. Energy Systems management has recognized the need and accepted the challenge to improve its ES&H performance. As described in Sect. 2, this recognition led to the establishment of the position of Vice President for Compliance, Evaluations, and Policy, a function charged with identifying the need for improvements and implementing these improvements within Energy Systems.

The Energy Systems Senior Vice President has chartered Management Issue Teams to develop solutions to generic issues. Fourteen generic issues are being addressed by Energy Systems at this time: roles and responsibilities, policies and procedures, resources, self-assessment, ES&H

training, records management, Conduct of Operations, ES&H strategic planning, management, safety analysis reports, emergency preparedness, environmental compliance, OSHA compliance, and radiation protection. Comparing the list of generic issues being addressed by Energy Systems with the root causes determined from the ORNL Tiger Team Assessment, one notes that all but two of the root causes, regulatory barriers (a regulatory agency issue) and ambiguous requirements or expectations (primarily a DOE issue), are being addressed either wholly or partially at an Energy Systems level. In many cases, actions listed in response to concerns describe ORNL implementation plans for Energy Systems initiatives.

Martin Marietta Corporation is also playing an active role in improving ES&H performance at Energy Systems facilities. The Energy Systems board of directors, chaired by Tom Young, the President of Martin Marietta Corporation, meets bimonthly and provides top management review of Energy Systems operations with special attention to performance deficiencies in ES&H. Technical and management assistance is provided to Energy Systems by other parts of Martin Marietta Corporation through an interdivisional operating directive. Recent ES&H-related assistance provided by Martin Marietta Corporation to Energy Systems includes planning assistance for the Y-12 technical audit; calibration standards and measuring; analysis, development, and implementation of plant performance objectives; and environmental task force assistance. In addition, ORNL is using the knowledge base and experience of Martin Marietta Corporation and other Energy Systems sites in developing its self-assessment process. Technical audits are performed by Martin Marietta Corporation for all Martin Marietta businesses. A pre-Tiger Team audit was conducted at ORNL during 1990. During 1991, eleven audits are scheduled, including three at Energy Systems installations. Finally, the Corporate Environmental Management group has established a local office in Oak Ridge, Tennessee, with two full-time staff members. The activities of this group include reviewing ongoing environmental programs relative to compliance with applicable federal, state, and local regulations.

Substantive organizational transformations do not occur instantaneously. Energy Systems recognizes that some findings traceable to generic root causes will likely continue to be identified during subsequent assessments. Achievement of lasting and continuous improvement will require persistence and the continued dedication of resources.

The 11 root causes identified during the ORNL Tiger Team assessment are being addressed by ORNL's implementation of Conduct of Operations, by actions outlined in individual action plans, and by Energy Systems initiatives. The Energy Systems initiatives are described more fully in the report *Environmental Safety and Health Program Action Plan for Martin Marietta Energy Systems*, Y/MS-0001, January 1991. The key actions addressing each root cause are summarized in the following sections.

Inadequate Policy

Energy Systems is pursuing an initiative to create a management system for policies and procedures that will provide the formality, discipline, and accountability needed for adequate document control and to ensure compliance with regulations. The initiative includes central policy direction; interpretation; integration of requirements; and controlled flowdown of policies, standards, guidelines, and procedures. For each major functional area, a Central Policy Manager has been assigned, reporting directly to the executive manager of that functional area. Overall

integration of policy initiatives will be the responsibility of a Policy Review Board composed of Energy Systems executives and chaired by the Vice President of Compliance, Evaluations, and Policy. A phased approach to implementing the management system is planned with early emphasis on those functional areas most likely to be addressed by DOE's rule-making process.

Organizational policies are also the subject of Chapter 1 of Conduct of Operations and will be addressed by ORNL's implementation of Conduct of Operations. Under Conduct of Operations, policy is to be established in support of regulatory guidance with clearly documented responsibility, authority, and interface. Measures to ensure that policy is understood will be taken as required.

Inadequate policy guidance was also the subject of ORNL Tiger Team Finding MF-10 (DOE Directive System). The finding states that "DOE's communication of ES&H directives (Orders, Secretary of Energy Notices, and Memoranda of Understanding) does not provide guidance or specific instructions to the contractor or provides differing instructions depending on the program sponsor." The action plan in response to Finding MF-10 outlines a series of actions to clarify DOE policy including ORO establishing a Compliance Guidance Coordination Team to serve as a focal point for preparing and controlling ES&H policy guidance, and improving procedures for distribution and control of DOE directives.

Inadequate Policy Implementation

Effective policy implementation depends not only on clear and adequate procedures or instructions but also on effective communications, adequate resources to implement the policy, and measuring expected performance against actual performance. Consequently, this root cause is closely related to several other root causes.

There are several elements to effective policy implementation, and these elements are outlined in action plans prepared in response to various findings. The first element is to identify what procedures and instructions are needed. The action plan in response to Finding MF-2 (ES&H Management Systems) describes the development of a strategic plan for ES&H so that individual policies and procedures can be viewed in the context of a cohesive ES&H program. The second element is to establish clear authority for developing procedures. This authority has been assigned to functional managers under the Energy Systems initiative described previously under the response to the inadequate policy root cause. The third element is to ensure that the procedures developed under this authority are adequate. The response to Finding OP.3-1 (ORNL Operating Procedures) describes a plan to develop an ORNL standard practice procedure to provide guidance on format, content, and approval of operating procedures and requirements. When adequate procedures have been defined, they must flow down to the appropriate levels of the organization for implementation. The response to Finding OA.1-1 (Flowdown of ES&H Policies and Requirements) describes implementation of the Automated Procedures and Requirements Accountability System that provides flowdown of requirements, orders, policies, and procedures and that identifies the individual responsible for implementation. Once procedures and instructions have been implemented, documents must be adequately controlled to ensure that the appropriate version is being used. Document control is the subject of one of the elements of the NQA-1 quality assurance program being implemented at ORNL as well as a new standard practice procedures on controlled document tracking and auditing as described in the action plans

in response to Findings OA.7-1 (Centralized System for Safety Document Control) and ROA.7-4 (Control of Documents).

Insufficient Resources

Insufficient resources for implementing ES&H requirements is cited in two of the nine root causes identified by the ORNL Tiger Team. Some aspects of the problem of insufficient resources are within ORNL's or ORO's control, whereas others are completely dependent on external factors and decisions. ORNL is responsible for identifying ES&H funding requirements and requesting funding. The ES&H strategic plan described in the response to Finding MF-2 will aid the identification of funding needs and provide a cohesive framework for prioritizing ES&H needs.

Many cases are cited by the Tiger Team where ES&H funding has been requested but adequate funds have not been provided to meet all requirements. The entire DOE complex is struggling with the problem of the huge costs associated with environmental restoration and waste management and with bringing a very old physical plant up to modern standards. In such an environment, ORNL must prioritize and apply the limited resources in the most cost-effective manner. However, achieving DOE's goal of full compliance with all applicable laws, orders, and standards will require a substantial and sustained commitment to increased funding for ES&H.

In a few cases, funding is available but staffing and facilities are the critical constraint on the pace of ES&H improvements. Energy Systems has conducted a systematic and thorough assessment of personnel availability and recruitment initiatives to ensure that adequate staffing levels are established, that appropriate budget levels are requested, and that the staffing organizations are provided with timely information regarding staffing needs. With regard to facilities, DOE attention to correcting the problems with the NEPA process cited by the Tiger Team in Finding NEPA/CF-1 will remove what has proven to be a major obstacle to the timely completion of new facilities.

Inadequate Management Commitment

Management commitment is a difficult concept to quantify and is likely to result in various answers depending on what criteria are used to measure it. The ORNL Tiger Team concluded that "It is apparent that Laboratory personnel have heard DOE's message relative to ES&H performance and are working to achieve it, but ownership and commitment to the values associated with ES&H performance have not yet developed." In its self-assessment report, ORNL stated that "We do believe that the required change in culture is now spreading through the Laboratory, but we know that some people accept it with reluctance. The upper management is convinced of the need and is trying to convert everyone through example, exhortation, and mandate." A number of initiatives are being pursued to strengthen management commitment to and acceptance of ES&H goals.

Energy Systems is pursuing a number of actions to reinforce management commitment and to promote leadership in ES&H areas. A values program has been developed to communicate corporate values to all levels of management. A total quality management program, led by senior

management, has been instituted to achieve a leadership role in performance that meets all ES&H requirements.

Setting comprehensive, quantifiable goals for ES&H performance is another tool for fostering management commitment. The determination of ES&H goals is the subject of several Tiger Team findings. The responses to Findings MF-1 (ES&H Goals and Objectives) and OA.1-4 (Acceptance of ES&H Requirements at ORNL) outline steps being taken to develop a consistent, ORNL-wide set of ES&H goals that stress specific, positive, attainable, and measurable ES&H goals. ES&H goals will also be incorporated into position descriptions and the ORNL Performance Planning and Review System.

The award fee process for providing appropriate incentives for enhanced ES&H performance is the subject of Tiger Team Finding MF-12 (Contract Award Fee Process). A properly structured incentive system is one tool to help foster management commitment. In its action plan in response to this Tiger Team finding, ORO states that additional measurable performance criteria will be identified and incorporated into the Award Fee Determination Plan and that it will continue to seek Headquarters participation in the process.

Inadequate Management Approach

As described above, ORNL's response to an inadequate management approach is to firmly establish ES&H as an integral part of the mission of the Laboratory and to apply the same rigor to meeting ES&H laws and requirements as is applied to scientific laws and requirements. A Conduct of Operations framework is being used to strengthen its management approach, with the desired outcome being improved performance in both ES&H and research.

Also as described above, Energy Systems has established the position of Vice President for Compliance, Evaluations, and Policy to identify and implement improvements within Energy Systems. Management Issue Teams have been chartered to address a total of 14 generic issues, and further management changes can be expected as recommendations are implemented.

Inadequate Oversight

The inadequate oversight root cause encompasses a number of related aspects of independent evaluation and review systems including auditing, tracking, trending, and feedback functions. The primary function of an oversight system is to provide management with accurate information regarding the true status of the organization. Oversight includes both internal and external reviews. ORNL has undergone a near-continuous series of external audits and reviews leading up to and including the Tiger Team assessment. In addition, ORNL conducted a comprehensive self-assessment activity in preparation for the Tiger Team. The challenge is to institutionalize an effective oversight process that can provide accurate feedback on an ongoing basis.

A key component of the Energy Secretary's ten-point initiative is a robust self-assessment process whereby ES&H deficiencies are identified, reported, and corrected. The Tiger Team noted in Finding SA-1 (The ORNL Self-Assessment Process) that ORNL has not institutionalized its self-assessment process and that the current process lacks many of the elements of an effective self-

assessment program. The action plan prepared to respond to that finding outlines a plan to fully implement a continuous self-assessment process combined with periodic independent external review that meets all the criteria for an effective self-assessment program.

The Tiger Team also cited inadequate oversight of ORNL ES&H activities by ORO in Finding MF-11 (OR Oversight Systems). The action plan in response to that finding describes a staffing plan to fully implement ES&H surveillance procedures.

Adequate oversight is also a basic element of the NQA-1 quality assurance program. Inadequate oversight was cited in a number of quality verification concerns including Findings QV.1-3 (Quality Department Audit Program), QV.1-4 (Frequency of Internal Audits and Surveillances), and RQV.1-6 (Frequency of RDD QA Audits). As described in the action plans to those concerns, a Quality Assurance Audit Program Manager was named effective December 1, 1990. Minimum requirements for audits and surveillances have been established and will be tracked to ensure that they are performed as scheduled.

Another aspect of oversight is tracking and trending systems for corrective actions. ORNL is participating in an Energy Systems initiative to develop an Energy Systems-wide corrective action prioritization and tracking system that will help direct management attention and resources to the most critical issues. A central tracking system called the Energy Systems Action Management System is currently being developed to track actions resulting from all audits at Energy Systems sites. Energy Systems is also developing the Integrated Resource Management System that will assist in prioritizing actions through a risk-based approach.

In addition, Martin Marietta Corporation has assigned full-time advisory personnel to Energy Systems to strengthen corporate oversight.

Inadequate Communications

The root cause of inadequate communications encompasses a variety of communication needs, including conveying requirements or expectations down to the level of implementation, feedback required to provide a clear understanding of the actual state of the organization, and communications needed to properly coordinate complex or multiple tasks.

Several of the Tiger Team findings relate to communications issues. Findings OA.1-1 (Flowdown of ES&H Policies and Requirements) and OA.1-2 (Dissemination of DOE Orders and Other Requirements) deal with the issue of top-down communications used to convey requirements or expectations down to the level of implementation. The response to these concerns describes implementation of the Automated Procedures and Requirements Accountability System that provides flowdown of requirements, orders, policies, and procedures and identifies the individual responsible for implementation. Finding OP.7-1 deals with shift overlap to permit effective turnover of duties, while facility status displays are the topic of Finding OP.4-1. Both shift overlap in critical facilities and facility status displays are elements of Conduct of Operations, which is being implemented at ORNL and will be applied to operations where deemed necessary. The need for an improved lockout/tagout procedure was identified in the ORNL self-assessment and was the topic of Findings OP.4-2 and MA.2-1. A draft procedure consistent with the requirements of DOE Order 5480.19 has been completed and will be implemented.

The bottom-up aspect of communication in providing management with timely information on the true status of the organization is closely related to the root cause of inadequate oversight. The responses to Findings SA-1 (The ORNL Self-Assessment Process), QV.1-3 (Quality Department Audit Program), QV.1-4 (Frequency of Internal Audits and Surveillances), and RQV.1-6 (Frequency of RDD QA Audits) describe a set of actions being taken to ensure that the frequency and quality of communications regarding facility status are adequate to keep management fully informed.

Ambiguous Requirements or Expectations

Ambiguous requirements or expectations arise when policies are unclear, incomplete, or conflicting, leading to interpretation and disagreements as to whether all requirements have been met. Given the explosive growth in the number and scope of ES&H policies, it is inevitable that some confusion exists with regard to requirements or expectations.

Inadequate policy guidance was the subject of ORNL Tiger Team Finding MF-10 (DOE Directive System). The action plan in response to this finding outlines a series of actions to clarify DOE policy, including the establishment by ORO of a Compliance Guidance Coordination Team to serve as a focal point for preparing and controlling ES&H policy guidance and the improvement of procedures for distributing and controlling DOE directives.

Conflicting policy guidance from different program secretarial officers was the subject of Tiger Team Finding NEPA/CF-1 (Inefficient DOE NEPA Implementation Procedures). With a multiprogram laboratory such as ORNL, DOE must make some effort to coordinate requirements and resolve conflicts between various cognizant officials.

Inadequate Training

Training is one means used to communicate new requirements, as well as a mechanism to assist in developing the skills necessary to respond to requirements. Inadequate training is cited in numerous Tiger Team findings. Insufficient resources is cited in a number of training findings including TC.1-3 (Training Staff), TC.7-1 (Training Facilities), and TC.7-2 (Storage of Training Records).

Prior to the Tiger Team visit, ORNL formed a Training and Development Department under the Human Resources Division with the objective of providing a central focal point for coordinating training activities to ensure consistency, eliminate redundancy, and achieve programs that meet compliance requirements. ORNL is currently conducting a needs assessment of training to determine critical needs within the context of currently available limited resources.

An Energy Systems Central Training organization has been established to manage the development and delivery of compliance, technical, and management training applicable to all of Energy Systems. Training will be implemented by using a lead site concept, with training being developed to a consistent standard.

Poorly Defined Roles and Responsibilities

Energy Systems is developing and implementing a roles and responsibilities policy applicable to all of Energy Systems. The objective of this policy is to provide a rigorous process for the definition and delineation of the roles and responsibilities of organizations, individuals, and key committees. The system will provide a consistent process and format and will be regularly maintained. It will also be used as a factor in performance planning and review. The system has been implemented on a pilot basis at both the K-25 Site and ORNL, with sitewide implementation to be initiated by December 1991.

The responses to Findings MF-4 (Human Resources) and OA.1-5 (Implementing ES&H Activities) describe ORNL's implementation of this Energy Systems initiative. Position, organization, and committee charters will be developed to include ES&H roles, responsibility, and authority. ES&H performance goals will be included in training for managers and supervisors and emphasized in employee performance evaluations.

Regulatory Barriers

Regulatory barriers arise when laws, regulations, orders, or standards are conflicting or prohibit required actions necessary to meet all requirements or expectations. By definition, regulatory barrier issues must be negotiated with the cognizant regulatory agency. When a potential regulatory barrier is identified, clarification must be sought from the regulatory body. If there is indeed a regulatory barrier, ORNL will work with DOE to reach agreement with the appropriate regulatory authority.

3.2 ENVIRONMENTAL FINDINGS, RESPONSES, AND PLANNED ACTIONS

3.2 ENVIRONMENTAL FINDINGS, RESPONSES, AND PLANNED ACTIONS

Finding discipline	Finding number prefix	Section number
Air	A	3.2.1
Soil/Sediments/Biota	SSB	3.2.2
Surface Water/Drinking Water	SW	3.2.3
Groundwater	GW	3.2.4
Waste Management	WM	3.2.5
Toxic and Chemical Materials	TCM	3.2.6
Quality Assurance	QA	3.2.7
Radiation	RAD	3.2.8
Inactive Waste Sites	IWS	3.2.9
National Environmental Policy Act	NEPA	3.2.10

3.2.1 Air

Finding No.: A/CF-1 Excursions Above Air Permit Limits

Finding Description: **Air releases from 3 of approximately 105 ORNL nonradiological air sources have exceeded permit operating conditions, and have the potential to continue exceeding them until TDHE concurs in modifying the permit conditions.**

Code: Compliance

Compliance Protocol: All air permits issued to ORNL by the TDHE contain conditions that must be adhered to in order to maintain compliance with regulatory requirements (TDHE Rule 1200-3-9).

Priority: Energy Systems Risk Weight 448
Tiger Team Action Plan Priority 2

Response: It is the policy of the Environmental Compliance staff to transmit a copy of air permits to facility operators with instructions to ensure that they review the permit conditions and ensure compliance with all permit conditions.

The concern of policy implementation to ensure compliance with all air permit conditions was addressed in two letters to facility operators on April 12, 1990, and on June 19, 1990. As a result of increased awareness by facility operators of their responsibilities regarding compliance with air permit conditions, three exceedances of permit conditions were identified.

These exceedances of specific air permit conditions were previously identified by ORNL staff in the Self-Assessment Report for the Nonradiological Wastewater Treatment Plant and the Process Water Treatment Plant. In the case of Tank 2519A exceedances were identified by the Facility Manager. Revised permit applications have been prepared and submitted to the TDHE. As of this writing, two of the revised air permits have been received from TDHE. Routine follow-up to ensure compliance with permit conditions has been implemented.

These policies will be formalized in a plant procedure to be included in the Environmental Protection Manual under the procedure for Air Permits, procedure number EPM-9.0.

Root Causes:

Inadequate policy implementation, inadequate procedures, and inadequate training

Planned Actions and Schedules:

Item/Description	Completion Date
1. ORNL submit revised permit applications to DOE-ORO for sources that can not meet permit conditions.	Complete
2. DOE-ORO submit revised permit applications to TDHE.	Complete
3. Initiate source-specific compliance surveillance.	Complete
4. Issue Revised EPM-9.0 to reflect responsibility of facility operators for ensuring continued compliance with permit conditions.	7/91

Costs: No significant costs associated with action listed.

References: Letter from C. E. Nix to Distribution, "Compliance with Air Pollution Control Permits", dated April 12, 1990

Letter from C. E. Nix to Distribution, "Compliance with Air Pollution Control Permits", dated June 19, 1990

Finding No.: A/CF-2 High Efficiency Particulate Air (HEPA) Testing Program Deficiencies

Finding Description: **Scheduled MMES-ORNL HEPA filter testing deadlines imposed by the MMES-ORNL Health Physics Procedure RP-1.3 are routinely missed, and tests are currently being conducted by an MMES-ORNL employee who is not properly trained and certified in accordance with ACP 14.**

Code: Compliance

Compliance Protocol: Inspectors performing HEPA filter tests were not certified per the requirements of ACP 14.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: Filter tests are sometimes missed in the month that they are originally scheduled. Approved Operational Safety Requirements documents do, however, allow a 2-month extension on semiannual inspections and three months on annual inspections. These extensions are adhered to with the exception of a very small number of inspections that are delayed due to extenuating circumstances. If an extension must be exceeded, this fact and the reason for the extension is agreed to by both Inspection and the filter owner. The inspection is completed as soon as possible.

The particular filter inspection observed was conducted by one qualified filter inspector and another inspector who was being given on-the-job instruction as required under ACP 14. The inspector being trained was functioning as an assistant and all pertinent data were being taken by the qualified inspector. No filters are inspected without the presence of at lease one qualified filter inspector.

ACP 14 was recently revised to provide an extensive written examination for certification in addition to previously required classroom instruction and on-the-job training. Filter inspection procedures SSI 150-155 are currently being upgraded. Five filter inspectors will be trained on SSI 150-155 and given an examination in accordance with ACP 14.

Root Causes:

Inadequate policy implementation and inadequate training; training of filter inspectors was not sufficiently documented with a written examination as required by policy.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Revise and issue QE&I Procedures SSI 150-155.	Complete
2. Train filter inspectors to procedures SSI 150-155 in accordance with ACP 14.	10/91

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	2	*					2
2	2	*					2
Status:							
Funded	4						
Requested							
New							$4

*Estimated annual ongoing cost: $2K.

References: ORNL Health Physics Procedure RP-1.3 and ORNL Quality Engineering and Inspection Procedure ACP 14

Finding No.: A/CF-3 Absence of State Air Permits for Radionuclide Sources

Finding Description: XSO has not obtained air permits for ORNL radionuclide sources, in accordance with TDHE Air Pollution Control Rule 1200-3-9-.04(4).

Code: Compliance

Compliance Protocol: TDHE Rule 1200-3-9-.04(4) states, in part, that "...no facility processing materials containing lead, beryllium, asbestos, mercury, or any other pollutant named in rule 1200-3-11 shall be exempt." TDHE Rule 1200-3-11-.01(1) states, in part, that radionuclides are designated as hazardous air contaminants.

Priority: Energy Systems Risk Weight 400
Tiger Team Action Plan Priority 2

Response: The TDHE presently has no specific permit requirements for radioactive air emissions. The NESHAPS regulations establish emission and ambient radioactive limits. The Energy Systems NESHAPS compliance strategy will be provided to TDHE, and written concurrence that this strategy finally satisfies TDHE permitting requirements will be requested.

Root Causes:

Lack of clearly defined TDHE, DOE-HQ and/or DOE-ORO policy

Planned Actions and Schedules:

Item/Description	Completion Date
1. Submit NESHAPS compliance strategy to and request concurrence from TDHE.	Complete

Costs: The submission will be accomplished with existing resources.

References: TDHE Rules 1200-3-9-.04(4) and 1200-3-11-.01

Finding No.: A/CF-4 Ambient Air Monitoring Deficiencies

Finding Description: **The MMES-ORNL siting and design configuration of at least 7 of 18 ORR ambient air sampling stations (Stations 7, 22, 23, 34, 41, 44, and 46) may not be providing representative measurements to assess radiation dose to members of the public, in accordance with the Draft DOE Regulatory Guide for 10 CFR 834.**

Code: Compliance

Compliance Protocol: 10 CFR 834 states "unless documented site-specific evidence exists to justify otherwise, the sample(s) at each air sampling station should be collected at a height of 2.0 m above ground level, in a location free from unusual localized effects or other conditions (proximity to a large building, vehicular traffic, or trees) that could result in artificially high or low concentrations." In addition, flow uniformity should be ensured, leak tests conducted, and adequacy of exchange of samples documented.

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: Improvements in siting and design configuration are presently under review as part of the overall Oak Ridge Reservation Environmental Monitoring Plan. Compliance inspections will be completed and documented at all stations to ensure proper intake height, proximity to buildings or trees, and potential perturbations of air flow. Correspondence will be initiated with DOE-ORO discussing fencing at Station 46 since present direction from ORO stipulates that a slated fence be erected.

Maintaining +/- 20% flow rate is already being addressed. The need for leak testing was recognized, and implementation is planned. Documentation for tritium sampling frequency is being prepared.

Standard Operating Procedures and protocols addressing these subjects, which will be an integral part of the Environmental Monitoring Plan, will include new requirements.

Root Causes:

Inadequate policy implementation, inadequate oversight, and inadequate communications

Planned Actions and Schedules:

Item/Description	Completion Date
1. Perform and document a survey to evaluate air stations in the ORNL environmental surveillance system for compliance with Draft DOE Regulatory Guide for 10 CFR 834 siting and/or design configuration requirements. Results of the evaluation will be compiled and a status report issued.	Complete
2. Determine, from survey, tasks to be completed in order to meet the draft regulatory guide to 10 CFR 834.	Complete
3. Develop an action plan to carry out needed tasks to bring stations into compliance. This plan will include necessary work orders and associated permits.	06/91
4. Complete items listed on the action plan.	11/91
5. Submit a summary to DOE-ORO of siting and design configuration noncompliances and related recommendations at stations 41 and 46.	01/92
6. Implement further actions based upon written guidance from DOE/ORO regarding the recommended modifications and include the rationale applied to these changes.	02/92

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	10						10
2	—						
3	15						15
4		40					40
5	—						
6	—						
Status:							
Funded	25						
Requested							
New		40					$65

References: Draft Regulatory Guide for 10 CFR 834

Finding No.: A/CF-5 Effluent Stack Sampling and Monitoring Deficiencies

Finding Description: Six of the 11 radionuclide stack monitoring systems examined at ORNL have some air monitoring deficiencies with respect to the draft Regulatory Guide for 10 CFR 834, including poor sample extraction sites, unsuitable sample transport line configurations, absence of air-flow measurements, an inappropriately designed sampling probe, and a non-operational strip chart.

Code: Compliance

Compliance Protocol: DOE's Draft Radiological Effluent Monitoring and Environmental Surveillance Regulatory Guide for 10 CFR 834 (July 1990) requires effluent monitoring to provide representative measurements of the quantities and concentrations of airborne discharges.

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: The items listed in this finding were listed in self assessment with the exception of the strip chart. The nonoperational strip chart recorder is located at the Y-12 Site. The roles and responsibilities between Y-12 and ORNL for ORNL facilities at Y-12 have not been fully established and documented.

Effluent monitoring to comply with National Emission Standards for Hazardous Air Pollutants (NESHAP) will be conducted. Modification to the system will be conducted in accordance with a NSHAP compliance plan, which will be approved by EPA.

Root Causes:

Inadequate policy implementation, poorly defined roles and responsibilities, and insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Document roles and responsibilities for Y-12 and ORNL management for stack sampling of ORNL facilities located at Y-12.	Complete
2. Survey all ORNL radionuclide stack systems to determine compliance with draft DOE Regulatory Guide for 10 CFR 834 and with NESHAP compliance plan.	Complete

3. Review and document status of funding of ORNL stack upgrade projects. — Complete

4. Review and document status of project criteria to ensure that the design configuration is in accordance with Draft DOE Regulatory Guide for 10 CFR 834. — 05/91

5. Initiate required upgrade projects and funding for radionuclide stacks which are not currently included in an upgrade program. — 06/91

6. Complete required stack upgrades. — 12/94

Costs: Stack upgrades will require additional capital funding. In addition, the upgrades will require expense funding to complete study, estimates, and maintenance.

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	15						15
4		200					200
5	—						
6				*			
Status:							
Funded	15						
Requested		200					
New							$215

*Estimated annual ongoing cost: $200K.

Type of funds: Capital
Source of funds: GPP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
4			3000				3000
Status:							
Funded							
Requested							
New			3000				$3000

References: Draft Regulatory Guide 10 CFR 834

Finding No.: A/CF-6 Lack of Control Room Operator Training in Stack Release Emergency Procedures

Finding Description: **At least one control room technician in the High Radiation Level Analytical Laboratory is not trained in the stack emergency operating procedures required by Section 9 of the Emergency Operating Procedure.**

Code: Compliance

Compliance Protocol: Section 9 of the Emergency Operating Procedure for Building 2026 requires the facility manager to make sure the procedure is understood, adhered to, and current at all times.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: A formal training program is in place within the Ionic and Physical Analysis (IPA) Group which contains a two-hour session on each of the operating procedures related to the safe operation of the facility. Each requirement of these procedures is discussed to make sure that personnel working within the facility understands the procedure and their responsibility relative to the procedure. These training sessions are documented by an examination taken by attending personnel on the material covered.

These training requirements and training sessions are part of the facility training program outlined in SOP AC-OP-104-0203, "Training for the IPA Laboratory." Retaining requirements will be specified.

Root Cause:

Inadequate policy implementation and inadequate training

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue the Emergency Operating Procedure.	Complete
2. Complete Training Session on the Emergency Operating Procedure.	Complete
3. Document understanding of responsibilities within the procedure by facility personnel.	Complete

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
2	2						2
Status:							
Funded	2						
Requested							
New							$2

References: ORNL SOP AC-OP-104-0203

Finding No.: A/BMPF-1 Inadequate Stack Emission Monitoring and Test Procedures for NESHAP Compliance

Finding Description: **ORNL-MMES has not conducted a formal evaluation of its radionuclide emission points, stacks, or vents in accordance with best management practice, to implement monitoring requirements as defined in of 40 CFR 61.93(b), Subpart H.**

Code: Best Management Practice

Compliance Protocol: EPA does not have sufficient information to approve the current stack sampling program as an alternative to the stack monitoring requirements in 40 CFR 61.93(b).

Priority: Energy Systems Risk Weight 45
Tiger Team Action Plan Priority 3

Response: In accordance with the requirements for stack monitoring in 40 CFR 61, a study of all ORNL radioactive emission sources will be completed to determine which sources require monitoring. Details of this study will be described in a NESHAP Compliance Plan, which will be submitted to EPA-IV and will form the basis for a Federal Facilities Compliance Plan. The NESHAP regulations provide guidance for determining which sources require monitoring. The TDHE regulatory requirements are very similar to the NESHAP criteria for evaluation of sources which require monitoring, and therefore a single study, with appropriate modifications, will be used to provide documentation for both requirements. Emission sources to be evaluated will include, but will not be limited to, laboratory hoods, laboratory equipment, and LLLW tanks.

Root Cause:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Complete radionuclide NESHAP Compliance Plan and submit to EPA.	5/91

Costs: Preparation is part of ongoing scheduled activities and therefore requires no additional costs or manpower.

References: None

Finding No.: A/BMPF-2 Lack of Verifying Documentation to Demonstrate Compliance with Air Permit Conditions

Finding Description: **ORNL compliance with opacity and emission limit conditions in TDHE air operating permits is not being documented by MMES-ORNL in accordance with best management practice.**

Code: Best Management Practice

Compliance Protocol: Facility operators should have in place an auditable system that documents compliance with air permit conditions.

Priority: Energy Systems Risk Weight 1
Tiger Team Action Plan Priority 4

Response: Permit conditions for some permitted air emission sources limit the opacity of the stack discharge. In a letter dated October 18, 1990, the Environmental Protection Officers were notified that a representative from each facility should be certified by the TDHE to read stack opacity. Facility operators will be required to provide documentation of annual opacity readings to demonstrate continued compliance with this condition, however based on an evaluation of the potential for emissions, some sources may be evaluated more frequently. As an immediate resolution of this deficiency a subcontract will be placed with a consulting firm to obtain an opacity reading for sources which contain this limiting condition and have not been evaluated by the operator.

Emissions from five permitted emission sources are limited to .02 grains per cubic foot at the stack. An evaluation of these sources will be completed to determine the potential emissions and if necessary, an appropriate stack monitoring schedule will be initiated to prove compliance with this permit condition.

These deficiencies were identified by ORNL in the Self-Assessment Report and corrective measures were planned.

The procedure for Air Permits, EPM-9.0, in the Environmental Protection Manual will be modified to indicate that facility operators are responsible for demonstrating compliance with these, and all conditions listed on the air permits for their permitted emission sources.

Permit conditions for some permitted emission sources limit the opacity from the source. However, due to the nature of the activity conducted at some sources, emissions resulting in opacity above the permitted level are extremely unlikely or in some cases impossible. In these cases, an annual opacity reading is adequate. Compliance with all permit conditions, including opacity limitations, is discussed in response to Compliance Finding A/CF-1. Specifically, EPM-9.0 will be revised to reflect responsibility of facility operators for ensuring continued compliance with

permit conditions, and an annual inspection program to discuss appropriate compliance documentation with facility operators has been initiated.

Root Causes:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Evaluate sources with grain loading limitations to determine the potential emissions and if necessary initiate appropriate stack monitoring schedule to prove compliance with this permit condition.	Complete
2. Obtain certification for facility operators for future demonstration of compliance status for affected facilities.	10/91
3. Document by Environmental Compliance personnel opacity readings conducted by facility operators.	12/91
4. Issue revised EPM-90.	10/91

Costs: Estimated annual ongoing cost: $20K.

References: Tennessee Department of Health and Environment, Air Pollution Control Rules, 1200-3

Finding No.: A/BMPF-3 Lack of Consistent Installation of Stack Sampling, Monitoring, and Alarm Systems for Radioactive Releases

Finding Description: **MMES-ORNL surveillance of some atmospheric radionuclide emissions from existing sources at ORNL is inconsistent and is not in accordance with best management practice.**

Code: Best Management Practice

Compliance Protocol: Similar air releases of radionuclides should have similar surveillance systems, in accordance with best management practices.

Priority: Energy Systems Risk Weight 1
Tiger Team Action Plan Priority 4

Response: ORNL is submitting to the EPA a description of all ORNL stack sampling systems (see Finding A/BMPF-1). A stack and vent survey is also being conducted which will provide additional information. Once these actions are completed an analysis will be done to determine the level of consistency necessary for best management practice at ORNL.

Root Causes:

Inadequate policy and ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Determine the criteria for stack real-time monitoring at ORNL based on an ORNL needs assessment and requirements of DOE orders.	Complete
2. Determine the criteria for stack sampling at ORNL.	Complete
3. Determine which systems meet the above criteria.	08/91
4. Establish policy and necessary procedures to assure stack surveillance for atmospheric radionuclide emissions is uniform and consistent with the established criteria.	01/92
5. Submit funding request as required to upgrade stack monitoring systems.	06/92

Costs: Costs for items listed are funded under Finding A/CF-5.

References: A/BMPF-1 Inadequate Stack Emission Monitoring and Test Procedures for NESHAP Compliance

Finding No.: A/BMPF-4 Deficient Asbestos Waste Disposal Management

Finding Description: MMES-ORNL is sending asbestos wastes to the Y-12 landfill, where the asbestos disposal area is not designated, which is not in accordance with best management practices.

Code: Best Management Practice

Compliance Protocol: None

Priority: Energy Systems Risk Weight 1
Tiger Team Action Plan Priority 4

Response: The asbestos disposal operations are conducted in accordance with the operation plan for the Y-12 sanitary landfill as approved by the TDHE. The areas used for the disposal of asbestos are designated with appropriate signs as required by the TDHE regulations 1200-3-11-.02 during the periods in which asbestos is being removed from the transport vehicle, placed in the prepared cell, and covered with soil. Additional signs to identify the landfill as an asbestos disposal facility will be placed at the entrance to the landfill.

Root Causes:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Install signs to identify the Y-12 landfill as an asbestos-disposal facility.	Complete

Costs:

Type of funds: Overhead

Source of funds: Y-12 Plant Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	1						1
Status:							
Funded	1						
Requested							
New							$1

References: None

3.2.2 Soil/Sediments/Biota

Finding No.: SSB/CF-1 Inadequate Radioactive Contamination Control

Finding Description: **MMES-ORNL is not adequately surveying and containing surface and subsurface radioactive contamination in accordance with DOE 5400.1 and 5400.5.**

Code: Compliance

Compliance Protocol: None

Priority: Energy Systems Risk Weight 108
Tiger Team Action Plan Priority 2

Response: Health Physics procedures, including the frequency of local surveys and administrative controls, will be reviewed for the SWSAs. The vehicle monitors at SWSA 6 and at Post 24 (pits and trench areas) will continue to be used. The general SWSA areas and roadways have been surveyed and are not contaminated. The primary control of personnel and vehicle contamination will continue to be entry and egress controls at the actual contaminated sites within the SWSA boundaries. Frisking is required upon exiting Contamination Areas and Regulated Areas; these requirements are well understood by the persons who work at or enter the SWSAs. General access to the SWSA should not present a risk of contamination and, therefore, does not require a frisk upon exiting.

All areas of access to the SWSA 4 have signs that state "Health Physics Coverage Required." The Health Physics staff is required for access to these areas to provide advisement as well as monitoring equipment for personnel and vehicle frisking. Postings of the SWSA 4 perimeter shall be verified and corrected to clearly identify the area with "Radiation Hazard Keep Out" signs.

Office of Environmental and Health Protection field personnel will be instructed to be alert for evidence of animal intrusions into contaminated areas. Reported intrusions will be investigated, and if a potential for contamination "trackout" is verified, appropriate measures (trapping, exterminations, etc.) will be taken.

Problems with birds and wasps transporting radioactive material from 3524 pond are well understood by the Radiation Protection staff in that area. Buildings surrounding 3524 have had an extensive survey to determine the extent of the problems caused by the birds and wasps. Closure of the 3524 pond is part of a scheduled remedial action and will eliminate the source of contamination.

Sediment sampling to determine the spread of material will continue in the Clinch River.

Root Causes:

Insufficient resources, inadequate oversight, ambiguous requirements or expectations, and inadequate training

Planned Actions and Schedules:

Item/Description	Completion Date
1. Assess and document the requirements of DOE Order 5400.1 and DOE Order 5400.5 against the monitoring and posting practices at the SWSAs.	6/91
2. Submit corrective action plans to EM for review and request of funds to implement approved corrective actions.	8/91
3. Review Health Physics procedures, including the frequency of local surveys and administrative controls.	8/91
4. Assess regulatory requirements for the SWSAs and bordering areas.	12/91
5. Complete time critical removal to control contaminated sediment transport into the Clinch River.	12/91

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	24						24
4		30					
Status:							
Funded	24						
Requested							
New		30					$54

Type of funds: ERWM Programmatic
Source of funds: EM

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
4		1500					1500
Status:							
Funded							
Requested							
New		1500					$1500

References: DOE Order 5400.1
DOE Order 5400.5

Finding No.: SSB/BMPF-1 Delayed Benthic Data Analyses and Reporting

Finding Description: Benthic samples collected as part of the ORNL Biological Monitoring and Abatement Program are not being analyzed and, therefore, the resulting data are not being reported in a timely manner, as is expected using best management practices.

Code: Best Management Practice

Compliance Protocol: The Biological Monitoring and Abatement Program (BMAP) should ensure that benthic invertebrate samples are analyzed and reported in a timely manner.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: Currently, there is a 2.5-year backlog for the analysis of benthic invertebrate samples collected as part of the ORNL BMAP. Although this is a new finding and has not been identified in previous audits/appraisals of the BMAP, the backlog was recognized as a concern in July 1990, and a plan has been developed to address the issue. More laboratory space has been obtained, and the hiring of additional personnel to work on the sample backlog is currently in progress. An off-site subcontractor will also be selected to assist with the reduction of the backlog of samples from uncontaminated reference sites and a plan will be developed to monitor progress and to establish milestones.

Root Cause:

Insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Obtain additional on-site staff for the benthic invertebrate laboratory.	Complete
2. Complete data analyses and procedures to support modifications in sampling program (e.g., reduced sampling frequency or number of sampling sites).	7/91
3. Establish capability for off-site analysis of benthic samples from uncontaminated reference streams.	3/92
4. Eliminate benthic sample backlog.	2/93

Costs: Sufficient funding is available in the current FY 1991 BMAP budget to support Items 1 and 2; the source of this funding is Laboratory overhead. An estimate of $150K is necessary to facilitate and fast track an off-site contract in FY 1992. Completion of the backlog will require approval of the FY 1992 and FY 1993 budgets, to accommodate the accelerated rate of sample analysis.

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	*						
2	—						
Status:							
Funded							
Requested							
New							$

*Estimated annual ongoing cost: $50K starting in FY 1991.

Type of funds: ESH Programmatic
Source of funds: ER-AT EC

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
3		150					150
4			75				75
Status:							
Funded							
Requested		150	75				
New							$225

References: None

3.2.3 Surface Water/Drinking Water

Finding No.: SW/CF-1 Discharges Not Included on the ORNL NPDES Permit or Permit Renewal

Finding Description: **At least eight liquid waste discharges at ORNL are not listed in the existing NPDES Permit No. TN0002941, and the XSO has not listed at least six of them in the application for permit renewal as required by the performance objective.**

Code: Compliance

Compliance Protocol: The Tennessee Code Annotated Section 69-3-108(b)(6) requires a valid permit for the discharge of sewage, industrial wastes, or other wastes, into surface waters or a location from which it is likely that the discharged substance will move into surface waters.

The instructions for Item II-B on EPA Form 3510-2C used in applying for an NPDES Permit require that the applicant list all sources of wastewater to each outfall.

Priority: Energy Systems Risk Weight 448
Tiger Team Action Plan Priority 2

Response: ORNL had previously identified additional point source outfalls that are not listed on the current permit. Efforts had been initiated to characterize the discharges and to prepare the EPA Form 3510-2C applications. Some outfalls (Well Drilling Steam Cleaning Area, Hill Cut Disposal Demonstration) were considered as non-point source discharges, i.e., the discharged substance does not pass discernably into a surface stream. Therefore they had been listed on the NPDES permit application with the recommendation that the discharges be handled by Best Management Practices plans. The interpretation of the Tiger Team differed from that of ORNL and Energy Systems ESA environmental compliance staff. The Tiger Team recommended the listing of diffuse sources as discrete discharges. In order to achieve resolution on this portion of the finding, ORNL will enter into discussion with Energy Systems Central Staff ES&A, DOE, and TDHE personnel to ensure that the Tiger Team interpretation of what constitutes a permittable point source discharge conforms to regulatory expectations. Final decisions on permitting strategy for those outfalls in this category will be based on the results of such discussions with TDHE.

For those point source outfalls previously identified by ORNL and the new ones identified in this finding, the wastewater discharges are being characterized, and EPA Form 3510-2C applications will be prepared and submitted as an amendment to the permit renewal application.

A program to conduct surveillances of wastewater discharges will be developed in concert with the Division Environmental Protection Officers.

Root Causes:

Inadequate evaluation systems to ensure that all outfalls are verified, characterized, and permitted; and inadequate policy and procedures implementation. (1) Energy Systems interpretation of requirements of the Tennessee Code Annotated was not as conservative as the Tiger Team's. (2) Lack of formal documentation of regulatory requirements necessitates some interpretation by the regulated community.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request a formal interpretation by the TDHE of the regulatory requirements and/or interpretation of what constitutes a permittable point source discharge under NPDES.	06/91
2. As required, eliminate the outfall or prepare and submit NPDES applications.	10/91
3. Initiate comprehensive ORNL outfall and drain system survey to identify and characterize all contributions to ORNL outfalls (see Finding SW/BMPF-1).	
4. Prepare NPDES application for all sources identified by comprehensive study.	09/94

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
All	12			90			102
Status:							
Funded	12						
Requested							
New				90			$102

Type of funds: Overhead
Source of funds: Division Administration

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
All	90						90
Status:							
Funded							
Requested							
New	90						$90

References: Tennessee Code Annotated 69-3-108(b)(6); 40 CFR 122

Finding No.: SW/CF-2 Inconsistent Labeling of ORNL Sinks and Drains

Finding Description: **MMES-ORNL administrative controls on labeling of sinks and drains are applied inconsistently and are not in accordance with EPM 18.0, part 6.2.3.**

Code: Compliance

Compliance Protocol: ORNL Environmental Protection Manual (EPM) Section 18.0, Liquid Waste Disposal, part 6.2.3 lists under responsibilities of a supervisor in charge of waste generators: "Ensures that laboratory drains and sinks are labelled properly and that waste generators use the appropriate drainage systems for the disposal of liquid waste."

Priority: Energy Systems Risk Weight 20
Tiger Team Action Plan Priority 3

Response: Although a program exists to label sinks and drains with labels indicating (a) the system to which that drain is tied (e.g., sanitary sewer, process waste, etc.) and (b) any materials not appropriate for disposal in that particular system, this policy is inconsistently and incompletely applied across various Divisions and in various ORNL buildings. In addition, the policy does not provide sufficient instructions for drain labeling.

During the next scheduled update of EPM-18.0, additional instructions concerning appropriate labeling of the various laboratory liquid drainage systems will be included. Consistent and complete implementation of the policy will be accomplished through training provided to all ORNL Division Environmental Protection Officers who are responsible for implementing and coordinating EPM policy requirements. In order to verify that EPM-18.0 policy requirements are properly implemented, Environmental Compliance staff members will initiate a surveillance program to document that drains are appropriately labelled.

Root Causes:

(1) Inadequate policy implementation; existing procedure requiring drain labeling is not sufficiently detailed, and the existing procedure has been incompletely implemented. (2) Inadequate training and supervision; the importance of administrative controls has not been adequately and completely communicated to all ORNL personnel.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue revised Environmental Protection Manual Chapter 18.0.	06/91
2. Develop and implement an EPO training module that incorporates the revised policy requirements.	09/91
3. Implement periodic drain system inspection and documentation.	12/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1–2	12		-				12
3	53	*					53
Status:							
Funded	12						
Requested							
New	53						$65

*Estimated annual ongoing cost: $8K.

References: ORNL Environmental Protection Manual Section 18.0

Finding No.: SW/CF-3 Inaccurate Stream Flow Measurement Devices

Finding Description: **Weirs at Outfalls X13 and X14 are not being maintained by MMES-ORNL to provide accurate stream flow measurements, as required by the ORNL NPDES Permit, due to sediment accumulation behind both weirs and obstructions downstream of the weir at Outfall X13.**

Code: Compliance

Compliance Protocol: Part II, Section C, Paragraph 2 of ORNL's NPDES Permit requires that stream flow measurement devices be maintained to ensure the accuracy of these measurements.

Priority: Energy Systems Risk Weight 405
Tiger Team Action Plan Priority 2

Response: The NPDES standards and guidelines call for an accuracy tolerance on measured flow rate of +/- 10% of actual flow. Standard references for primary device configuration call for the approach to a sharp crested weir to have a clear depth below the notch of twice the maximum head of the weir. Effluent conditions should not cause submergence of the primary device.

The sites listed do not meet the requirements for approach and effluent configuration, primarily due to sediment and vegetation accumulation, and were identified in self-assessment. One site suffers from original design deficiencies and limitations on the natural channel. Preliminary investigations indicate that the sediment to be removed will be classified as mixed waste, which will significantly influence remediation.

Several steps toward resolution have been initiated. Sediment and vegetation data have been collected. An Engineering Service Order is active for a study and estimate to define the work to be done along with the method of accomplishment and associated costs. The results of the study may significantly affect the completion date. Erosion control has been improved through the efforts and practices of the environmental field interface staff. Hydraulic studies are collecting data on flow parameters and investigating methods of management. Funding is being requested through the ESP expense budget as well as through Environmental Restoration Projects.

Root Causes:

Inadequate policy implementation, inadequate policy, and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Perform engineering study and estimate for method, scope, requirements, and costs for a project to remove and dispose of the materials and bring the sites to proper conditions.	06/91
2. Develop a procedure for weir, flume, and channel inspection and routine maintenance.	06/91
3. Integrate the defined maintenance tasks into a maintenance schedule.	12/91
4. Initiate engineering design.	01/92
5. Complete construction phase.	09/93

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	40						40
2	2						2
3				*			
Status:							
Funded	42						
Requested							
New							$42

*Estimated annual ongoing cost: $100K starting in FY 1994.

Type of funds: Capital
Source of funds: ER

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
4		50					50
5			950				950
Status:							
Funded							
Requested							
New		50	950				$1000

Reference: NPDES Permit No. TN0002941

Finding No.: SW/CF-4 NPDES Permit Exceptions

Finding Description: **Surface water discharges from ORNL periodically exceed the discharge limits as established in the NPDES Permit.**

Code: Compliance

Compliance Protocol: As described in Chapter 1200-4-1-.05 of the Rules and Regulations of the State of Tennessee and under ORNL's NPDES Permit No. TN0002941, ORNL is required to comply with the limitations and standards established in its discharge permit.

Priority: Energy Systems Risk Weight 448
Tiger Team Action Plan Priority 2

Response: As indicated in the discussion of this finding, except for storm water outfalls, Building 7002 drains, the single event at the ORNL Sewage Treatment Plant (STP), and chlorine in cooling water discharges, NPDES limit exceptions are infrequent and have no identifiable trends. ORNL has addressed or is addressing each NPDES Permit exceedence. Actions concerning resolution of each of these exceedences are taken immediately or as soon as practicable, and they have been documented in the Monthly Environmental Compliance Report since June 1989. ORNL has recognized that several of the exceedences are of a recurring nature and actions have been initiated to address each. A corrective action has been implemented or proposed for each type of exceedence. On April 11, 1990, ORNL requested an NPDES Permit modification to revise Permit limitations on total suspended solids, oil, and grease in ORNL storm water runoff, based on knowledge to date indicating no significant impacts on ORNL surface waters from these pollutants. In addition, ORNL is conducting preliminary studies and cost estimates on storm water treatment strategies and methods and will submit a line item funding request for the event that the Permit modification request is refused by TDHE.

In May 1990 STP clarifier operating procedures were revised to preclude recurrence of the carry-over event mentioned in the Tiger Team finding. In addition, an experimental high-sludge-level alarm was purchased for the clarifier and is currently being installed. This alarm should provide further assurance against carry-over. A GPP proposal to de-chlorinate several of ORNL's most significant chlorinated cooling water discharges has been submitted to DOE-ORO. Activities to minimize discharge of pollutants from ORNL cooling towers include replacement of metal components with PVC; minimizing chlorine usage, and modifying maintenance and operating procedures. The 7002 discharge was discontinued in March 1990.

Root Cause:

Inadequate management commitment; perceived low risk by ORNL and DOE of exceedances of NPDES Permit limits at storm water outfalls and cooling water/cooling tower outfalls, pending TDHE resolution of permit modification requests on storm water outfall limits, and completion of GPP project(s) to remove chlorine from cooling water discharges; this perception is tempered by the fact that ORNL is not unique among DOE facilities in discharges of chlorinated water and conventional storm water pollutants.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Complete installation of experimental STP sludge blanket level alarm.	06/91
2. Complete a Conceptual Design Report for treatment systems(s) for storm water runoff.	09/91
3. Submit line item funding request for storm drain remediation for FY 1994.	12/91
4. Complete FY 1991 Chlorine Removal GPP Project.	04/93

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	4						4
2	48						48
Status:							
Funded	52						
Requested							
New							$52

Type of funds: Capital
Source of funds: EM-ADS399 GPP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
4		700					700
Status:							
Funded							
Requested		700					
New							$700

References: Tennessee Rules Chapter 1200-4-1-.05; NPDES Permit No. TN0002941

Finding No.: SW/CF-5 Lack of NPDES Best Management Practices Program Plan

Finding Description: **MMES-ORNL does not have a finalized NPDES BMP Program Plan as required by 40 CFR 125.104 and the State of Tennessee NPDES Permit.**

Code: Compliance

Compliance Protocol: Regulations promulgated under the Clean Water Act require all dischargers who use, manufacture, store, handle, or discharge any pollutant listed as toxic or hazardous to prepare a Best Management Practices (BMP) Program Plan to control those activities that may result in significant amounts of those pollutants reaching surface waters. The BMP Program Plan must be submitted as part of a current NPDES application. The existing ORNL NPDES Permit, in effect from April 1986 to March 1991, required the submittal of a BMP Plan within 6 months of the effective date of the permit.

Priority: Energy Systems Risk Weight 354
Tiger Team Action Plan Priority 2

Response: ORNL submitted a BMP Plan to the TDHE on October 31, 1986. TDHE has not commented on the Plan; therefore it has not been finalized. As indicated in the Tiger Team discussion of this finding, the TDHE did not enforce the NPDES requirement for completion of BMP Plans during the term of existing NPDES permits anywhere in the state. In 1989 ORNL noted that the existing BMP Plan document was outdated relative to current ORNL staffing, policies, and facilities; therefore, a program requiring activity- and location-specific BMP Plan was implemented in early 1990. The facility-wide baseline BMP Plan is currently being revised under a subcontract. The subcontract work was completed in December 1990.

This finding had been previously identified by ORNL and documented in the Monthly Environmental Compliance Report. Actions to correct the deficiency had already been implemented as a result of the prior identification.

Root Causes:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Complete preparation of finalized ORNL BMP Baseline Plan.	Complete
2. Submit the BMP Baseline Plan to DOE for transmittal to TDHE.	Complete
3. Develop and implement SOPs for NPDES Permit application preparation and submittal. Define requirements and roles/responsibilities.	06/91

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
All	25						25
Status:							
Funded	25						
Requested							
New							$25

References: 40 CFR 125.104

Finding No.: SW/CF-6 Deficiencies of Spill Prevention Control and Countermeasure Plan

Finding Description: **The MMES-ORNL combined SPCC and RCRA Contingency Plan contains deficiencies, some of which adversely affect the effectiveness of the spill control program, and is therefore not in conformance with 40 CFR 112.3 and best management practice.**

Code: Compliance

Compliance Protocol: The federal regulations governing oil pollution prevention, 40 CFR Part 112, require that secondary containment be provided for the entire contents of the largest single tank plus sufficient freeboard to allow for precipitation [112.7(e)(2)]. At least one tank was identified that does not meet this criterion. Also, it was noted that not all oil tanks have dikes (or other means of secondary containment), and that the SPCC Plan lists 47 ground-mounted transformers which do not have dikes; ORNL policy (EPM 13.0) requires that these transformers also have dikes.

The federal regulations governing the reporting of spills of hazardous substances (40 CFR Part 355) require that spills of hazardous substances that go beyond the facility's boundaries be reported to the Local Emergency Planning Committee (LEPC); however, the ORNL SPCC Plan does not address this reporting requirement.

Priority: Energy Systems Risk Weight 410
Tiger Team Action Plan Priority 2

Response: A comprehensive survey of all bulk oil storage tanks will be conducted for the purpose of verifying the adequacy of existing diking. All existing dikes will be measured and their volumes calculated. Corrective actions will be taken as necessary to upgrade existing dikes or construct new dikes to meet the requirements of 40 CFR Part 112 for bulk oil storage tanks. The ground-mounted transformers will be reevaluated to determine those facilities that need to be diked; dikes will be constructed for those for which diking is a requirement. The ORNL policy concerning diking of <u>all</u> ground-mounted transformers will be reevaluated and documented during the next scheduled update of EPM-13.0.

The requirement to report to the LEPC will be added to the SPCC Plan during the next revision of the plan.

The amendments/revisions will include incorporation of the results of the ongoing dike survey, i.e., the volumes of all dikes around oil storage tanks will be added to the oil storage locations appendix and the need for additional diking capacity will be noted where necessary. Also, the revisions to the plan will include the requirement to report spills of reportable quantities of hazardous substances that go beyond the facility's boundaries to the local Emergency Planning Committee (LEPC). Furthermore, the plan will be revised to delete the items identified by

the Tiger Team as "superfluous" to the plan, such as the listing of hazardous substances in the appendix labeled "Oil Storage Locations." Separate lists of petroleum products and hazardous substances will be developed and put in separate appendices so that the SPCC Plan will be more usable.

Root Cause:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Conduct survey of all bulk oil storage tanks, measure dikes, and calculate required volumes.	06/91
2. Evaluate transformers to determine the need for dikes.	06/91
3. Modify Environmental Protection Manual (EPM) Procedure 13.0 to include a requirement for listing of secondary containment volume in the Secondary Containment Structure Inspection Report.	09/91
4. Amend SPCC Plan.	09/91

Costs:

Type of funds: Overhead
Source of funds: Division Administration

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
All	50						50
Status:							
Funded	50						
Requested							
New							$50

References: 40 CFR Parts 112 and 355
ORNL Environmental Protection Manual, Chapter 13.0

Finding No.: SW/BMPF-1 Inadequate ORNL Cross-Connections Study

Finding Description: MMES-ORNL has not conducted a rigorous study at ORNL to identify cross connections or misconnections of storm, process, and sanitary drains as required by current industry practice.

Code: Best Management Practice

Compliance Protocol: The existence of drain system cross connections or misconnections does not indicate noncompliance; however, these situations can serve as conduits for inappropriate/inadvertent discharges of wastewaters that would represent noncompliance with the Clean Water Act.

Priority: Energy Systems Risk Weight 121
Tiger Team Action Plan Priority 3

Response: This finding has been previously identified by ORNL. ORNL has previously recognized that inappropriate drain connections exist, and has instituted administrative controls in an effort prevent unpermitted discharges via these connections. ORNL is currently conducting an in-house survey to identify all existing information on drain systems including the systems within individual buildings.

Root Causes:

(1) Inadequate policy implementation; the current industry practice of identifying cross connections has not been implemented at ORNL. (2) Insufficient resources; an unacceptable level of risk may have been taken by ORNL by not providing the resources to preclude unnecessary pollutant discharges to surface waters.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Survey ORNL Divisions and buildings for drain listings, characterizations, activities and substances utilized. Develop data management system.	04/92
2. Initiate comprehensive ORNL outfall and drain system survey to identify and characterize all contributions to ORNL outfalls.	06/93
3. Develop corrective action plan and funding request for issues identified in the comprehensive survey.	09/93

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1		24					24
Status:							
Funded							
Requested		24					
New							$24

Type of funds: ESH Programmatic
Source of funds: ER-AT EC

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
2			3900				3900
Status:							
Funded							
Requested							
New			3900				$3900

References: None

Finding No.: SW/BMPF-2 Liquid Radionuclide Releases from ORNL Facilities

Finding Description: **Liquid waste releases from ORNL, including the Non-Radiological Wastewater Treatment Facility (NRWTF) and SWSA 5, are elevating radionuclide concentrations in the receiving streams which is not in accordance with DOE 5400.5.**

Code: Best Management Practice

Compliance Protocol: None

Priority: Energy Systems Risk Weight 103
Tiger Team Action Plan Priority 1

Response: NRWTF

The inability of the Process Waste Treatment Plant (PWTP) to remove the cesium-137 present in the process wastewater was identified as a deficiency/concern in the ORNL self-assessment. However, this limitation of the processing capability of the PWTP has been recognized for approximately 4 years. In 1986, the PWTP treatment process was modified in response to a critical need to reduce the volume of liquid low level waste (LLLW) generated by ORNL. The modification resulted in an 80% decrease in the volume of LLLW generated by the PWTP annually, but adversely affected the capability of the PWTP to remove the cesium-137. Since 1986, development studies have been underway to identify a process to remove the cesium-137 without resulting in an increase in the more hazardous LLLW. Those studies have concluded that a zeolite ion exchange system will remove the cesium-137 while producing a minimum volume of solid secondary waste (spent zeolite resin) for which an approved disposal method exists. During the development period, Waste Operations has used the temporary zeolite column to reduce the cesium-137 concentration in the PWTP effluent when sampling results indicated an elevated concentration in the PWTP influent.

A general plant project will be proposed for fiscal year (FY) 1992 to install a zeolite ion exchange system at the PWTP for removal of cesium-137. The functional requirements document for this system has been prepared and issued to Energy Systems Engineering to prepare the study and estimate and the preliminary proposal for the project during FY 1991.

SWSA 5

Actions required to address the radionuclide releases from SWSA 5 into Melton Branch will include (1) focus on the Melton Branch flood plain in the early phase of the Waste Area Grouping (WAG) 5 and WAG 2 remedial investigations (RI) and take full advantage of ongoing source-term definition studies at SWSA 5; (2) compilation, evaluation, and trending of new and historical surface water

release data in annual environmental reports; and (3) integration of environmental ALARA goals and objectives into planning and implementing measures to reduce contaminant discharges into surface waters.

The first action will specifically address the cited deficiency in evaluating releases from SWSA 5 seeps into surface waters which flow into Melton Branch. Both the WAG 5 and the WAG 2 RIs are scheduled to begin in FY 1991. In addition, studies of source-term definition will be conducted in FY 1991 and will emphasize storm-event transport and evaluation of the importance of matrix diffusion processes on rates of contaminant releases. Goals are to further identify localized significant sources in SWSA 5 and to provide sufficient characterization for planning effective corrective measures. Data acquired during the RIs and source term definition studies will be factored into the need for and priority of interim corrective measures (ICMs) to reduce or eliminate discharges to surface waters from sources within WAG 5. The ICM prioritization process for FY 1992 funding will include consideration of actions needed to reduce releases from WAG 5.

The second action will more universally address the need for comprehensive review and evaluation of past and current surface water release data. As part of compliance with 10 CFR 834 (Draft), the Energy Systems-ORNL Information Integration and Analysis Group has initiated the evaluation of trends in environmental surveillance and effluent monitoring data. Trends in surface water contaminant characteristics are being investigated with respect to average concentrations, flow-weighted average concentrations, discharge, and discharge relative to flow. Trends will be investigated in different time scales in order to evaluate the impact of averaging upon the recognition of fluctuations in contaminant release rates versus apparent changes in the rate of flux relative to precipitation and discharge. The Energy Systems-ORNL Information Integration and Analysis Group's Standard Operating Procedure "E-SP-005-05, Data Reporting," will be revised in Section 7.1.5 "Trends" to include specific guidance for surface water trend analysis and reporting. Surface water trends analysis will be incorporated into the ORNL portion of the annual Oak Ridge Reservation Annual Environmental Report beginning with the report for 1992.

The third action will address the need to formally integrate environmental ALARA goals and objectives into reducing contaminant releases to surface waters. Beginning with the prioritization process for FY 1992 ICMs, consideration of environmental ALARA goals will formally become a criterion used in the prioritization process. The mechanism by which ALARA will be integrated into the FY 1992 process will be the first of an annual series of baseline design reports for ICMs. These reports will document the scope, cost, and schedule of all ICMs planned for the ORNL site. This first report is scheduled to be released by the end of FY 1991.

Root Causes:

(1) NRWTF: inadequate management approach; relying on one process to dispose of LLLW concentrate without foreseeing the loss of that process as a result of regulatory changes has left the Laboratory without an effective means of disposal of LLLW concentrate. (2) *SWSA 5*: inadequate policy implementation; consideration and implementation of the environmental ALARA principle has been inadequate in planning ICMs. (3) Inadequate policy implementation and inadequate communications; formalization of surface water discharge data analysis, trending, and reporting has been inadequate to integrate the information into environmental restoration activities.

Planned Actions and Schedules:

Item/Description	Completion Date
NRWTF	
1. Complete the study and estimate and prepare/submit the preliminary proposal to DOE for capital funding of the GPP to install the zeolite ion exchange system at the PWTP.	08/91
2. Complete design and construction of the zeolite ion exchange system.	05/94
SWSA 5	
1. Issue the first baseline design report for the ICMs incorporating environmental ALARA into the prioritization process.	09/91
2. Integrate source-term definition and WAG 5 and WAG 2 remedial investigation data into the annual baseline design report for the ICM prioritization process.	9/92
3. Issue the revised standard operating procedure for the Energy Systems-ORNL Information Integration and Analysis Group to formally evaluate and report trends in surface water release data.	12/92
4. Issue the first Oak Ridge Reservation Annual Environmental Report incorporating ORNL surface water trends analysis.	12/92

Costs: *NRWTF*

Type of funds: ERWM programmatic
Source of funds: EM-ADS 350 and 366

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	110						110
2		45	35	30			110
Status:							
Funded	110						
Requested		45	35	30			
New							$220

Type of funds: Capital—GPP
Source of funds: EM-ADS 366

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
2		1000					1000
Status:							
Funded							
Requested		1000					
New							$1000

SWSA 5

Type of funds: Overhead
Source of funds: Overhead

Action item	Estimated costs per fiscal year ($K)						Total
	1991	1992	1993	1994	1995	Beyond	
1	—						
2	—						
3		75					75
4		75					75
Status:							
Funded							
Requested							
New		150					$150

References: *NRWTF*

DOE Order 5400.5
Strategy for Management of ORNL Process Wastewater

SWSA 5

DOE Order 5400.5
Environmental Restoration and Waste Management Five-Year Plan

Finding No.: SW/BMPF-3 Lack of Backflow Prevention Devices

Finding Description: Backflow prevention devices are not installed in at least five locations in the ORNL water supply system which is not in accordance with best management practice.

Code: Best Management Practice

Compliance Protocol: Current industry practice requires the installation of backflow prevention devices to prevent the contamination of potable water systems by the backsiphonage of contaminated water in the event of pressure loss in the water distribution system.

Priority: Energy Systems Risk Weight 6
Tiger Team Action Plan Priority 3

Response: See Finding MA.5-1

Planned Actions and Schedules:

Corrective actions for this finding are addressed in Finding MA.5-1. These actions include the training needed to identify requirements.

Costs: Costs are addressed in Finding MA.5-1.

References: None

Finding No.: SW/BMPF-4 Unrepaired Leaks from Wastewater Sewer Systems

Finding Description: **MMES-ORNL has not repaired some sewer lines at ORNL that are known to be leaking, including low level liquid wastewater (LLLW) lines, noncontaminated wastewater lines, and sanitary sewage lines in accordance with best management practices.**

Code: Best Management Practice

Compliance Protocol: None

Priority: Energy Systems Risk Weight 49
Tiger Team Action Plan Priority 1

Response: This action plan addresses three activities: (1) rehabilitation of piping within the LLLW system, (2) the installation of flow monitoring equipment within the process waste system, and (3) an upgrade of the sanitary sewer system.

LLLW System

Projects, both GPPs and Line Items, have either been identified or planned to upgrade the LLLW system at ORNL. A series of 19 GPPs (beginning in FY-1992 and extending through FY 1996) and four Line Items (FY 1991 through FY 1995) are being implemented to upgrade the LLLW collection and transport system. By approximately 2000, all LLLW lines will be replaced with doubly contained piping or be taken out of service by bottling, trucking, waste reduction, or source treatment. A leak testing program for active lines within the LLLW system will be implemented in accordance with the Federal Facilities Agreement. LLLW systems will be repaired or taken out of service when leaks are discovered. Contaminated soil encountered during reconstruction of the LLLW system will be managed in a manner consistent with the level of contamination present as required by established Energy Systems Health Physics procedures.

Process Waste System

It is likely that unidentified leaks exist within the piping systems at ORNL. Rehabilitation of the process waste, sanitary sewer, and storm sewer systems via insitu-lining and point repairs has been conducted over the past several years. Some areas of the process waste system were purposely left unlined to allow collection of groundwater known to be contaminated (i.e., under Bldg. 3047 and near Bldg. 3517) as an implementation of Best Management Practices. A water balance to identify leaks within the various systems needs to be conducted. Such an effort will require accurate flow rates of the water entering: (1) the plant, (2) the buildings where the waste is generated, and (3) each identified subsystem within the sewer system.

Efforts have been underway since the early 1980s to identify and eliminate the pathways by which undesirable in-leakage into the process waste system occurs. Upgrading existing flow and radiation monitoring equipment, in addition to the centralized monitoring system, the Waste Operations Control Center, was one of the first steps taken toward determining the location and type of in-leakage. Additionally, an inflow/infiltration study of the process waste system was performed by a subcontractor to provide additional guidance on how to address the problem.

The inflow/infiltration study identified sections of process piping that had cracks, off-set joints, and broken pipes. In situ lining of the process piping was selected as the most cost effective method for rehabilitating the piping. Lining of the process waste system was accomplished primarily under three General Plant Projects (GPP), namely *Upgrade 3000 Area Collection System (FY-1985, WBS 3.25)*, *Process Waste System Inflow/Infiltration (FY-1986, WBS 3.18)*, and *Volume Reduction Piping Modifications, PWTP (FY-1985, WBS 3.08)*, which lined approximately 4100, 3800, and 2000 feet of process waste piping, respectively. Approximately $1.15M of capital funds was spent under the three GPPs mentioned above. Expense funding of approximately $480K was spent in support of these GPPs. In situ lining of process waste piping was also accomplished utilizing non-GPP funding under emergency conditions (i.e., pipe collapsed, pipe in imminent danger of collapsing, etc.).

GPPs to install new flow monitoring equipment in the process waste system are planned: *Manhole Monitors - Process Waste*, FY 1989, WBS 3.50; *Manhole Monitors - Process Waste, 4500*, FY 1993, WBS 3.58; and *Manhole Monitors - Process Waste Phase 2*, FY 1993, WBS 3.92. Data collected from these additional flow monitoring stations will be used with data from existing stations to provide a more accurate determination of the amount of unknown infiltration or exfiltration from the process waste system. An evaluation of flow data, both within the process waste system and at the inlet to the generators, will be performed and used to evaluate sealing the manholes within the piping systems would be effective.

Sanitary Sewer System

Evidence of in-leakage into the sanitary sewer system led to lining approximately 80% of the piping with diameters 6 in. or greater. The lining was accomplished under two GPPs: *Sewer System Infiltration and Inflow (FY 1984)*, and *Sewer System Infiltration Inflow (FY 1985, WBS 3.13)*. A 30% reduction in the amount of inflow/infiltration was noted after this work was completed. The capital expenditure for these projects totalled $828K, in addition expense funding of $340K for support was spent. Some of the piping identified for rehabilitation under the two sanitary sewer GPPs was deleted because of radioactive contamination and the lack of procedures, safety review, quality assurance, and methods for outside contractors to work in radioactively contaminated areas at the time the projects were underway. The need for Sanitary Sewer Systems improvements has been recognized. A proposed ORNL Line Item, Project No.: 93-ORNL-EX-1, *Upgrade Sanitary Sewerage System, ORNL (FY-93)* has been submitted and is in the preliminary review process.

Appropriate corrective actions to address contamination discovered during the upgrade will be developed. The level of remediation required cannot be estimated at this time.

Root Causes:

LLLW System: insufficient resources. **Process Waste System:** insufficient resources; currently lack the ability to accurately detect and locate leaks within the system. **Sanitary Sewer System:** inadequate management approach and policy implementation; the philosophy has been to use a number of GPPs and expense funding in an effort to "make-do" instead of repairing the system using one or two line items.

Planned Actions and Schedules:

Item/Description	Completion Date
LLLW System	
1. Identified capital projects and line items to upgrade portions of the waste collection and transfer systems of the LLLW System.	Complete

WBS	TITLE
3.01	HFIR LLW Upgrade FY 1992, GPP
3.02	3000 Area LLW Upgrade FY 1992, GPP
3.03	Building 3047 Trucking Station FY 1992, GPP
3.28	FFA Compliance Work I FY 1992, GPP
3.31	Bethel Valley FFA Upgrade FY 1994, LI
3.35	LLLW Treatment Alternatives FY 1993, GPP
3.37	BVLLW Collection & Transfer FY 1988, LI
3.45	MVLLLW Collection & Transfer FY 1992, LI
3.79	ORR/BSR LLW Upgrade FY 1992, GPP
3.85	FFA Compliance Work II FY 1993, GPP
3.96	4500 Area LLW Upgrade FY 1992, GPP
-	Bethel Valley FFA II FY 1995, LI

2. Request funding for out-year (beyond FY 1993) GPPs and Line Items.	09/95
Process Waste System	
1. Provide additional flow monitoring capability at five process waste stations in the 4500 area. Each station will be equipped with flow-measuring instrumentation, sampling equipment, telemetry equipment, and an instrument enclosure. WBS 3.50, Manhole Monitors - Process Waste, FY 1989, ADS 350.	09/91

2. Provide additional flow-monitoring capability at up to six process waste stations within the Bethel Valley area of ORNL. Each station will be equipped with flow-measuring instrumentation, sampling equipment, telemetry equipment, and an instrument enclosure. Manhole Monitors - Process Waste Phase 2, WBS 3.92 and Manhole Monitors - Process Waste 4500, WBS 3.58; FY 1993, ADS 350. — 09/94

3. Evaluate the need for lining or sealing manholes within the process waste system. — 09/95

Sanitary Sewer System

1. Submit Preliminary Construction Data Sheet for project to upgrade the sanitary sewage collection and disposal system to current standards. — Complete

Costs: Capital and expense funding has been approved for the FY 1989, 1990, and 1991 GPPs. Program planning activities will be accomplished with existing resources. Projects scheduled for FY 1993 and beyond will require receipt of the requested capital and expense funding to meet the goals. Funding sources for upgrading the LLLW System is expected to come from ADS 302, 304, 349, and 378 of the EM program. ADS 350 of the EM program will provide funding for the Process Waste System activities.

LLLW System

Type of funds: ERWM Programmatic
Source of funds: EM - ADS 302, 304, 378

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	5,026	6,840	16,722	11,490	8,540	16,440	65,058
2	10	10	10	10	10	10	60
Status:							
Funded	5,036						
Requested		6,850	16,732	11,500	8,550	16,450	
New							$65,118

Type of funds: Capital—GPP
Source of funds: EM - ADS 378, 349, 350

Action item	Estimated costs per fiscal year ($K) 1991	1992	1993	1994	1995	Beyond	Total
All		6,650	3,000	4,000	4,000	4,000	21,650
Status:							
Funded							
Requested		6,650	3,000	4,000	4,000	4,000	
New							$21,650

Type of funds: Line items
Source of funds: EM ADS 378, 302, 304, 378-AA, 378-AB

Action item	Estimated costs per fiscal year ($K) 1991	1992	1993	1994	1995	Beyond	Total
1	7,081	4,647	15,900	26,500	39,100	35,000	128,228
Status:							
Funded	7,081						
Requested		4,647	15,900	26,500	39,100	35,000	
New							$128,228

Process Waste System

Type of funds: ERWM Programmatic
Source of funds: EM - ADS 350

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	20	40	40				100
2		200	100	80	30		410
3					30		30
Status:							
Funded	20						
Requested		240	140	80	60		
New							$540

Type of funds: Capital—GPP
Source of funds: EM - ADS 350

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	500						500
2			1400				1400
Status:							
Funded	500						
Requested			1400				
New							$1900

Sanitary Sewer System

Type of funds: ESH Programmatic
Source of funds: ER-AT

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1		100	200	100	100	—	500
Status:							
Funded							
Requested		100	200	100	100	—	
New							$500

Type of funds: Line Item
Source of funds: ER

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1			2,000	5,000	4,000		11,000
Status:							
Funded	—	—					
Requested			2,000	5,000	4,000		
New							$11,000

References: **LLLW System:** ADS 378; ADS 302; ADS 304; ADS 349; Federal Facilities Agreement; Site Specific Plan for the Oak Ridge Reservation, February 1990

Process Waste System: ADS 350; Site Specific Plan for the Oak Ridge Reservation, February 1990

Sanitary Sewer System: Cost Per Preliminary Construction Data Sheet

Finding No.: SW/BMPF-5 Lack of Certification of Treatment Plant Operators and Backflow Preventer Repairers

Finding Description: **All MMES-ORNL sewage treatment plant operators and backflow preventer repairers are not certified by the State, as recommended by best management practices.**

Code: Best Management Practice

Compliance Protocol: Supervision of the Sewage Treatment Plant operations will be done in accordance with applicable regulations and best management practice. Backflow preventer repairs will be done by state certified personnel.

Priority: Energy Systems Risk Weight 1
Tiger Team Action Plan Priority 4

Response: In accordance with best management practices, supervisors and operators directly responsible for operation of the Sewage Treatment Plant will be state certified to Grade 1 as the state training program permits. Pipefitters involved in repairing backflow preventers will receive state sponsored training on those devices to accomplish state certification as training program vacancies permit.

Root Cause:

Ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request funding necessary to train, certify, and maintain state certification for steam plant operators and pipefitters.	10/91
2. Upon receipt of funding, issue standard operating procedures to establish and implement required certification.	1/92
3. Two pipefitters engaged in the repair of backflow preventers will receive state certification each year until all required are certified.	06/94
4. One supervisor will receive state certification to operate the Sewage Treatment Plant each year until all are certified.	06/96

5. Upon receipt of funding, train, test, and certify four operators/year until all who operate sewage treatment plant are certified. 12/98

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	2.6	2.7	2.8				8.1
4	4	4.1	4.2	4.3	4.4	4.5	25.5
5		60	62.7	65.5	68.5	71.6	328.3
Status:							
Funded	6.6						
Requested							
New		66.8	69.7	69.8	72.9	76.1*	$361.9

*Estimated annual ongoing cost: $76.1K.

References: None

3.2.4 Groundwater

Finding No.: GW/CF-1 Inadequate Hydrogeologic Characterization at SWSA 6

Finding Description: **The studies associated with the RCRA Facility Investigation at Solid Waste Storage Area (SWSA) 6 at ORNL have not adequately characterized the hydrogeology of the site, the extent of the contaminant source, and potential exposure pathways through environmental media in accordance with DOE 5400.4, CERCLA Requirements and 40 CFR 300.430.**

Code: Compliance

Compliance Protocol: DOE Order 5400.4, "CERCLA Requirement," states that DOE shall respond to inactive waste sites in compliance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR 300). The Order additionally states that where cleanup is being conducted under other authority, such as Resource Conservation and Recovery Act (RCRA) corrective action, DOE needs to ensure that this process is consistent with the NCP.

The NCP [40 CFR 300.430(d)] requires that remedial investigations be conducted to characterize the nature of and threat posed by releases of hazardous substances; to gather data necessary to assess the extent to which the releases pose risks to human health and the environment; and to support the characterization, including field investigations to assess the hydrogeology of the site, the extent of the contaminant source, and potential exposure pathways through environmental media.

The Oak Ridge Reservations's RCRA Hazardous and Solid Waste Amendment permit requires that corrective action, including a RCRA Facility Investigation (RFI), be conducted at SWSA 6 [a portion of Waste Area Grouping (WAG) 6]. The RFI process, as reflected in the *Resource Conservation and Recovery Act Facility Investigation Plan for ORNL WAG 6*, has the same basic requirements for characterization as described above for the NCP.

Priority: Energy Systems Risk Weight 507
Tiger Team Action Plan Priority 2

Response: SWSA 6 is being closed in accordance with a RCRA closure plan which was approved by the Tennessee Department of Health and Environment (TDHE) in September 1988. The RCRA closure plan specifies a series of activities leading to final closure. These activities follow the RCRA corrective action plan, that is, conducting an RFI and a corrective measures study (CMS) followed by design and implementation. The closure plan states that the closure activities will be conducted in general conformance with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) guidance although the Environmental

Protection Agency (EPA) Region IV and TDHE have stated that, as a RCRA closure, site activities need not be conducted in strict accordance with the pending Federal Facility Agreement (FFA). The NCP (40 CFR 300.430) states that "the purpose of the remedial investigation is to collect data necessary to adequately characterize the site for the purpose of developing and evaluating effective remedial alternatives." 40 CFR, Part 300, EPA, in the Preamble, stresses "the need to balance the desire for definitive site characterization and alternatives analysis with a bias for initiating response actions or control hazards posed by a site as early as possible." Finally, the newly proposed Subpart S of 40 CFR Part 264 seeks to clarify guidance and allow a streamlining of the remedial facility investigation process. Investigations are to be focused on plausible concerns and conducted in a step-wise fashion, with early screens to determine whether further investigation is necessary. Where an owner/operator proposes a remedy that is effective and protective, it may be appropriate for the regulators to approve the remedy and avoid continued studies that would serve only to delay cleanup. Under this guidance, there is need for a high level of interaction between the permittee, EPA and TDHE to determine the adequacy of an investigation. Since the process is acknowledged as step-wise, and the results of the current site characterization will be submitted to EPA-Region IV and TDHE for evaluation this fiscal year, the best way to address the root cause is to seek clarification from the regulators to resolve ambiguities in how much characterization is enough. This will result directly from review and comment, followed by discussion at the regulatory interface sessions that are held at regular intervals.

Root Cause:

Ambiguous requirements and expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Submit RFI report to DOE/ORO containing point-by-point response to the Tiger Team finding for review.	8/91
2. Issue RFI containing point-by-point response report to EPA and TDHE for review, comment, and approval, and to EH-5 (DOE Tiger Team Office) for information.	9/91

Costs: Preparation of the RFI report will be accomplished with existing Environmental Restoration resources (EW) (ADS OR-363).

References: ORR RCRA/HSWA Permit
40 CFR 300
DOE Order 5400.4
ORNL/RAP/Sub-87/99053/9 & V1/R1, *Closure Plan for Solid Waste Storage Area 6, Volume 1: Closure Plan*

Finding No.: GW/CF-2 Inadequate Implementation of Well Purging Procedures at SWSA 6

Finding Description: **Water level measurements and well purging for the SWSA 6 groundwater quality monitoring (GQM) wells are not being implemented in a consistent, reliable manner as required by MMES-ESP-302-2, State of Tennessee Rule 1200-1-11.05, and 40 CFR Part 265, Subpart F, and are resulting in the underestimation of purge volumes.**

Code: Compliance

Compliance Protocol: Energy Systems, the state of Tennessee, and EPA requirements all include provisions that a groundwater sampling program must be implemented utilizing consistent, reliable, and accepted procedures for water level measurements and purging of wells.

Priority: Energy Systems Risk Weight 405
Tiger Team Action Plan Priority 2

Response: Based on a review of well purging records it was determined that the action referenced in this finding in fact only occurred one time and that was during the Tiger Team investigation. The error was due to one "old" reference document describing well depths in SWSA-6 from the ground level instead of the casing level. The day after this finding was recognized memos were issued requiring all files be checked and purged of outdated procedures and protocols. These instructions were followed up by staff inspection of files to ensure that all outdated material had been destroyed. Additional plans are outlined in the actions section in order to ensure that this does not recur.

Root Causes:

Inadequate communications and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue memo to the Environmental Sampling and Instrumentation Group to purge all files of old outdated materials immediately.	Complete
2. Instruct field technicians responsible in all sampling areas, including groundwater, to ensure that all log sheets and associated paperwork are current. This will be accomplished by crosschecking with the Master SOP copies in the Group Leaders office.	Complete

3. Inspect group files to ensure all outdated materials have been removed.	Complete
4. Implement an internal audit program (p 3-115 of the Tiger Team Environmental Assessment). The Group Leader will assign a staff member to develop, oversee, and conduct an internal audit program of field log sheets and associated material every 2 weeks.	Complete
5. Conduct internal field surveillances on a monthly basis (normally done quarterly) for the next year in order to ensure that field technicians are properly carrying out all activities in the field per Standard Operating Procedures.	Complete
6. Conduct tests covering sampling activities (field and classroom) on a quarterly basis (normally done yearly) for the next year in order to ensure that field technicians are properly carrying out all activities per Standard Operating Procedures.	Complete
7. Develop and present a performance-based training module specifically addressing proper use and maintenance of all field log sheets and associated materials.	8/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

Action item	Estimated costs per fiscal year ($K) 1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	—						
4	1	*					1
5	2	*					2
6	2	*					2
7	5	*					5
Status:							
Funded	10						
Requested							
New							$10

*Estimated annual ongoing cost: $10K.

References: SOP-EMC-003.025 Collection of RCRA Well Samples

Finding No.: GW/BMPF-1 Inadequate Well and Borehole Abandonment

Finding Description: **Many unneeded wells and boreholes at ORNL are not being "abandoned" by MMES-ORNL, which is not in accordance with current industry practice or regulatory agency guidance.**

Code: Best Management Practice

Compliance Protocol: None

Priority: Energy Systems Risk Weight 50
Tiger Team Action Plan Priority 2

Response: The issue that no uniform, sitewide well and borehole plugging and abandonment (P&A) program exists for ORNL was identified in the DOE Environmental Survey of 1987, the DOE Oak Ridge Operations Environmental Protection and QA Appraisal of August and September, 1988, and again in the DOE ESH&QA Appraisal of April, 1990. An organizational basis for a sitewide P&A program was suggested in the draft ORNL Groundwater Protection Program Management Plan (May 1990, Sec. 6.9), as a functional responsibility of the Groundwater Protection Program Manager, a position which at that time had not been established. ORNL has now established and filled the position of Groundwater Program Coordinator. The P&A of unneeded wells and boreholes is an integral part of the WAG closure process, and wells requiring abandonment in and near SWSA 6 currently are being identified by an ORNL interorganizational group under the leadership of the interim GWC.

ORNL will establish and implement a sitewide P&A program. Tasks identified under planned actions and schedules will also address P&A for all other ORNL candidate wells except hydrofracture which will be handled separately because of cost and technology required. The need to plug and abandon all wells is not equally urgent because many have been in place for a long time and hydrostatic conditions within and adjacent to such holes are expected to be stabilized. Wells installed since 1985 have been constructed to high standards and are likely to have lower priority under the sitewide P&A program. An additional factor is that 60 percent of the wells in the ORNL area are less than 50 ft deep and only 4 percent are greater than 100 ft deep. There is lower risk of contaminant transfer within a shallow hole than in deeper holes, although a primary concern in regard to shallow holes is that they may be an avenue for entrance of contaminated surface water. The ORNL P&A program will be carried out in timely fashion, in an orderly, planned sequence, first addressing those wells and boreholes in known contaminated areas that clearly require P&A. An example category is that of wells in waste areas constructed with continuously-perforated galvanized corrugated pipe, described in Finding GW/BMPF-1.

The program, as specified in the ORNL Groundwater Protection Program Management Plan (latest revision available end July, 1991), includes a process for identifying candidate wells and boreholes and categories of wells for P&A; prioritization based on contaminant migration potential within the borehole and from surface inflow of the wells selected; and formulation of a set of P&A procedures and guidelines applicable to the range of conditions, both of the well and of surrounding subsurface conditions. Responsibility for management, coordination, and continuing administration of the program will be that of the GWC. These current roles and responsibilities are outlined in the ORNL Groundwater Protection Program Management Plan.

Special-case wells and boreholes, such as certain of those referred to in Findings GW/BMPF-1 (Joy Test Well) and GW/BMPF-3 (wells in the vicinity of Hydrofracture Facility No. 4) may require interim corrective measure treatment until decisions are reached as to their ultimate disposition. Special procedures must be developed for these wells, designed to prevent borehole fluid migration and to protect casing integrity from corrosive fluids. Investigation of current status of hydrofracture wells and available technology for ICM and P&A activities will be initiated in 1992.

Root Causes:

The need for a sitewide P&A program was not recognized by management, thus resources were not provided to establish such a program. No organizational responsibility for a sitewide P&A program was identified. Following earlier audits, action plans for a sitewide P&A program were not developed, of if developed, were not implemented.

Planned Actions and Schedules:

	Item/Description	Completion Date
1.	Appoint ORNL Groundwater Coordinator (see Finding GW/BMPF-4, planned actions and schedules).	Complete
2.	Identify wells and boreholes in WAG 6 that are candidates for P&A, under leadership of Groundwater Coordinator. Establish a preliminary inventory of wells and boreholes for the X-10 site.	Complete
3.	Complete planning document for P&A of WAG 6 wells and boreholes. This document will contain P&A procedures and will be transmitted to EPA and TDHE to give them the option to comment (per agreement with EPA and TDHE).	1/92
4.	Review status of hydrofracture wells and the available technology for ICM and P&A activities.	6/92

5.	Complete planning document for identifying and categorizing non-WAG 6 wells and boreholes requiring P&A or interim corrective measures (ICM). Develop guidelines for prioritizing on basis of contaminant migration potential. This action does not include hydrofracture wells, which are included in Items 10 and 11.	9/92
6.	Complete P&A and ICM procedures and guidelines suited to the range of conditions of ORNL wells and boreholes. This action does not include hydrofracture wells, which are included in Items 10 and 11.	9/92
7.	Establish an accurate, sitewide well inventory (see Planned Actions and Schedules, Finding GW/BMPF-2). This action includes all wells except hydrofracture wells, which are included in Items 10 and 11.	9/93
8.	Complete P&A for WAG 6.	12/92
9.	Identify and prioritize wells and boreholes in/near all WAGs for P&A; develop schedule for specific wells and boreholes or groups of wells and boreholes. This action does not include hydrofracture wells, which are included in Items 10 and 11. An agreement has been reached with the EPA and TDHE to formalize this as an interim ROD to be submitted on or before 9/93.	9/93
10.	Complete P&A operations at WAGs other than 6 except hydrofracture wells.	9/97
11.	Conduct ICM cold demonstration, special-case (hydrofracture site) wells.	9/97
12.	Complete ICMs for hydrofracture injection wells. This includes planning, development of procedures, and implementation.	9/97
13.	Complete P&A of the 150 observation wells associated with hydrofracture site. This includes planning, development of procedures, and implementation.	9/97

Costs:

Type of funds: ERWM Programmatic
Source of funds: EM-ADS 0332AB (WAG 6)

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	15						15
3	10						10
5	—						
6	50						50
7	50						50
8	402	6390					6792
Status:							
Funded	527						
Requested		6390					
New							$6917

Type of funds: ERWM Programmatic
Source of funds: EM-ADS 0329

Action item	Estimated costs per fiscal year ($K) 1991	1992	1993	1994	1995	Beyond*	Total
5		190					190
6		90					90
7		120	100				220
9		50	40				90
10	250	0	2860	3000	3000	6000	15,110
Status:							
Funded							
Requested		450	3000	3000	3000	6000	
New	250						$15,700

*Through FY 1997.

Type of funds: ERWM Programmatic
Source of funds: EM-ADS 0333

Action item	Estimated costs per fiscal year ($K) 1991	1992	1993	1994	1995	Beyond*	Total
4		110					110
11		102	1,200				1,302
12					1,800	19,177	20,977
13	250	2,182	1,830	3,788	4,656	2,400	15,106
Status:							
Funded							
Requested		2,284	3,030	3,788	6,456	21,577	
New	250	110					$37,495

*Through FY 1997; FY 1992 required budget as shown, current target is 0.

References: None

Finding No.: GW/BMPF-2 Inadequate Monitoring Well and Borehole Inventory, Security, and Maintenance

Finding Description: **A significant number of monitoring wells and boreholes at ORNL have been inadequately inventoried, secured, or maintained by ORNL-MMES, which is not in accordance with current industry practice or technical guidance documents.**

Code: Best Management Practice

Compliance Protocol: None

Priority: Energy Systems Risk Weight 50
Tiger Team Action Plan Priority 1

Response: This action plan addresses monitoring well inventory, security, and maintenance of wells and boreholes at ORNL. The need for a monitoring well inventory has been recognized for over a decade. Early compilations of well location, construction and associated observations have been made by the U.S. Geological Survey and by ORNL investigators. In 1986, the Remedial Action Program initiated development of a computerized data base that contained data on locations, construction details, geologic parameters and observations of groundwater variables. At the present time, the data base contains information on over 1500 wells, however there are some gaps in information for wells constructed in earlier decades, and there is some concern that the inventory is incomplete, especially for wells or boreholes constructed in earlier years or in association with limited scope-research activities. Virtually all of the wells that have been constructed for monitoring purposes in recent years were initiated by the Environmental Restoration program or its precursor, and are contained in the data base. The contents of the data base have been documented (Hook et al., 1990) and a guide to the well locations, including maps generated by a Geographical Information System (GIS) program is in preparation. A field inventory of wells in the ORNL Waste Area Grouping (WAG) 6 is planned for FY 1991 to physically check for the existence of wells not in the current inventory and to verify locations of existing wells. This inventory will result in an update of the data base for WAG 6. A more comprehensive plan (GW/BMPF-1 action item 7) will be developed for improving the well inventory for the remaining WAGs and surrounding areas, taking into consideration the planned requirements of the Federal Facilities Agreement, DOE priorities for resource allocation, and the expected schedule for Remedial Investigations (RIs) for ORNL. The responsibility for requesting funding for maintenance of the well inventory data base in future years lies jointly with the ORNL Groundwater Program Coordinator and the Environmental Restoration Program.

Security of wells and boreholes involves procedures designed to assure that control is maintained of the integrity of samples collected and that the well or borehole does not serve as a conduit for transmission of contaminants from one level to another, which could result in contamination of the ground water. For permitted

facilities, a written schedule for inspection is required, together with a list of items to be inspected. The record of inspections must be kept in an inspection log. The Groundwater Program Coordinator will develop a procedure that includes the written schedule for inspection of wells and boreholes, the items to be checked, and the guideline for maintaining the inspection log. The GWPC will also be responsible for assuring that the inspections are carried out, evaluated, and any needed maintenance is completed.

Maintenance of wells and boreholes will be the joint responsibility of the GWPC and the ER program. The GWPC will develop a plan for well and borehole maintenance that specifies expected performance standards and roles and responsibilities for conducting the maintenance program. This plan will draw upon the well and borehole inventory and inspection activities outlined above. The ER program will carry out surveillance and maintenance tasks.

Coordination of these actions, along with those specified in GW/BMPF-1, GW/BMPF-3, and GW/BMPF-4, is the responsibility of the ORNL Groundwater Coordinator. An integrated approach to these activities is presented in the ORNL Groundwater Protection Program Management Plan (latest revision available end July, 1991).

Root Cause:

Ambiguous requirements or expectations; unclear expectations resulting in low priority for management action for a centralized groundwater well and borehole management program.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Appoint an ORNL program coordinator (see Finding GW/BMPF-4).	Complete
2. Issue a guide to ORNL well locations. This document will be updated annually from the well and borehole database.	8/91
3. Develop a wells and boreholes surveillance and maintenance plan to include preliminary field inventory (see GW/BMPF-1 action item 2) in WAGs and surrounding areas. Provide procedures or guidelines for well security and maintenance inspections, record keeping, and required actions. This plan will include production well evaluation, which will be incorporated into the ORNL Environmental Monitoring Plan.	12/91

4. Implement, complete, and document execution of the field inventory plan for WAG 6 (See Finding GW/BMPF-1). 9/91

5. Implement the wells and boreholes surveillance and maintenance plan (Item 3) and document completion of objectives and milestones. 1/92

Costs: The position of groundwater program coordinator has been created with existing resources. Program planning activities will require funding of approximately $50K, which is currently not budgeted. The field inventory at WAG 6 will require approximately $50K, which has been budgeted under Finding GW/BMPF-1, but not yet authorized, through ADS332AB. Reporting requirements are approximately $40K, budgeted through ER. Additional funds will be requested for similar inventory verification activities through the Environmental Restoration Program surveillance and maintenance activity for FY 1992–1997 (ADS311AA, see cost table).

Type of funds: Overhead

Source of funds: Energy Systems

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	40						40
Status:							
Funded							
Requested	40						
New							$40

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
3	50						50
Status:							
Funded							
Requested							
New	50						$50

Type of funds: ERWM Programmatic
Source of funds: EM-ADS 311AA

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
5		150	*				150
Status:							
Funded							
Requested		150					
New							$150

*Estimated annual ongoing cost: $350K.

References: None

Finding No.: GW/BMPF-3 Cross-Contamination Between Aquifers and Strata

Finding Description: **Wells, piezometers, and boreholes at ORNL represent conduits for cross-contamination, which is not in accordance with best management practices.**

Code: Best Management Practice

Compliance Protocol: None

Priority: Energy Systems Risk Weight 50
Tiger Team Action Plan Priority 2

Response: This response pertains to wells associated with hydrofracture, corrugated-pipe wells, and water-supply wells. Most of the issue of cross-contamination via wells as expressed in this finding will be met by the ORNL Well Plugging and Abandonment Program (managed by the GWC), described in the response to Finding GW/BMPF-1, and by the actions described in the response to Finding GW/BMPF-2 relating to well inventory, security, and maintenance (also managed by the GWC).

For planned actions, schedules, and costs associated with cross-contamination between aquifers, see Finding GW/BMPF-1.

With regard to existing uncapped wells, any wells retained for further use at ORNL will be protected as described in the response to Finding GW/BMPF-2. Wells not retained for further use will be candidates for the ORNL P&A program. Interim maintenance and security measures will be identified for all wells until final resolution is reached.

ORNL will assess the potential of any production wells to induce migration of contaminants, as described in the finding, and will incorporate into its environmental monitoring program a continuing surveillance of potential effects on contaminant movement created by any water supply well in or near known contaminant sources.

Boreholes installed for engineering purposes and never closed will be included in the ORNL well inventory and treated as wells under the P&A program.

Root Causes:

Poorly defined roles and responsibilities, insufficient resources, inadequate management approach, and inadequate training. Wells and boreholes have been installed at ORNL by several different organizations, over a period of many years for a wide variety of purposes. There has been no centralized ownership of responsibility for ORNL wells. Organizational responsibility for custody and maintenance of wells and boreholes was not assigned by management. Personnel

who developed the hydrofracture operation did not adequately recognize the environmental risks associated with the deep wells installed into or through the waste injection zone, or recognize the regulatory implications of issues such as cross-contamination of groundwater. Users of water from the supply well did not fully recognize or investigate the potential for inducing contaminant migration. Funding resources for wells and boreholes management were not allocated.

Planned Actions and Schedules:

See Planned Actions and Schedules in Finding GW/BMPF-1.

Costs: Current funding requirements are included in Finding GW/BMPF-1.

References: None

Finding No.: GW/BMPF-4 No Custodian for Unused Wells

Finding Description: **MMES-ORNL has not assigned the official responsibility of maintenance, upkeep, closure, and custodianship for unused wells at ORNL to any site organization, which is not in accordance with best management practices.**

Code: Best Management Practice

Compliance Protocol: None

Priority: Energy Systems Risk Weight 50
Tiger Team Action Plan Priority 2

Response: This groundwater finding will be appropriately addressed by the addition of a staff member to serve as ORNL Groundwater Program Coordinator. The coordinator will be currently informed on all ORNL groundwater activities to ensure a comprehensive program without duplications or omissions. The Groundwater Program Coordinator will ensure that wells and boreholes are formally assigned to an appropriate custodian, and the responsibilities of the custodian will be documented of that time. Also ensured by the new position will be effective identification, communication, and recognition of all responsibilities and accountabilities within and among the numerous groundwater activities. Cross reference to other groundwater best management practice findings: GW/BMPF-1, inadequate monitoring well and borehole abandonment; GW/BMPF-2, inadequate monitoring well and borehole inventory, security, and maintenance; GW/BMPF-3, cross-contamination between aquifers and strata; and GW/BMPF-5, inadequate characterization of the hydrogeologic regime.

Root Cause:

Poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Appointment of an interim ORNL Groundwater Program Coordinator. (see Findings GW/BMPF-1, 2, and 5.)	Complete
2. Develop approved charter for ORNL Groundwater Program Coordinator position.	Complete
3. Hire permanent ORNL Groundwater Program Coordinator.	Complete

4. Complete assignment of custodianship of unused wells. 7/92

Costs: No significant costs are associated with Action Items 1 and 2. Estimated annual ongoing costs: $100K (1.0 FTE).

References: DOE Order 5400.1, General Environmental Protection Program

Immediate Action Directive, Energy Systems Environmental, Health, and Safety Procedure for Groundwater Management Program, ES-ESH-P-1

Immediate Action Directive, Energy Systems Environmental, Health, and Safety Standard for Groundwater Management Program, ES-ESH-17

Finding No.: GW/BMPF-5 Inadequate Characterization of the Hydrogeologic Regime

Finding Description: **The hydrogeologic regime underlying ORNL has not been adequately characterized to define aquifer characteristics and boundaries, aquifer communication between geologic formations, vertical and horizontal extent of contamination, and local groundwater flow paths and velocities in accordance with best management practices.**

Code: Best Management Practice

Compliance Protocol: DOE Order 5400.4, CERCLA Requirements, and the NCP [40 CFR 300.430(d)] require an adequate hydrologic characterization at inactive waste sites consistent with those required by RCRA [OSWER Directive 9950.1 (RCRA Ground Water Monitoring Technical Enforcement Guidance Document)] for active sites.

Priority: Energy Systems Risk Weight 117
Tiger Team Action Plan Priority 2

Response: ORNL has long familiarity with the need for adequate hydrogeologic characterization at proposed, active, and inactive waste sites. A large number of hydrogeologic studies were completed in the period 1951-85, and each of these studies obtained adequate data and information to determine local flow paths and contaminant concentrations. This information was used for corrective actions, wherever and whenever necessary. Beginning in 1985-86, the RAP Program and, later, the Environmental Restoration Program funded studies to obtain the additional hydrogeologic information needed for RI/FS Programs in the WAGs. These studies are continuing and address the hydrogeologic characteristics of subsurface materials in the ORNL area, a determination of the limits of the shallow aquifer, measurement and calculation of the parameter values needed for modeling, the likelihood of deep or offsite flows of groundwater, contaminant source terms, flow paths, and fluxes in the WAGs, and sampling locations for site characterization, risk assessment, closure evaluation, and long-term compliance monitoring. However, because of the extensive area involved, the work is phased by WAG, in a priority ranking established through the Federal Facilities Agreement.

An adequate hydrogeologic characterization of the ORNL area is presently incomplete because the process leading to identification of contamination and evaluation of the need for corrective actions at ORNL is still in the initial stages. A prioritized, phased, scientific approach will be used to obtain the necessary information. It is important, however, that the problems have been identified and that work is underway or planned to correct the most important deficiencies in the understanding of hydrogeologic flow systems. For example, two items mentioned by the Tiger Team are the inadequate understanding of drains, pipe networks, and trench-fill materials in industrial areas and of perched stormflow waters in vegetated areas; the hydrologic importance of both types of features previously

were findings of research sponsored by Environmental Restoration and other Programs at ORNL. The Tiger Team is correct that additional data are needed on the characteristics of these features and on their relationships to groundwater and surface streams. A study to characterize the industrial area of WAG 1 is presently underway by the RI/FS team. A negotiated schedule for other ORNL work area groupings is contained in the pending FFA. Stormflow research was funded by Environmental Restoration Program in FY 1990, and is being continued under ADS 322 in FY 1991.

Another, broader approach to hydrogeologic characterization on the Oak Ridge Reservation was begun at ORNL in FY 1990 under the Oak Ridge Reservation Hydrologic and Geologic Studies (ORRHAGS) Program. One goal of this program is an adequate understanding of all flow processes for water on the Oak Ridge Reservation, including flow paths, fluxes, velocities, modeling, and contaminant concentrations in the stormflow and groundwater zones. A summary report, scheduled for release in 1991, will describe all data, parameter values, interpretations, and conclusions from 40 years of hydrogeologic studies, will identify remaining deficiencies in hydrogeologic characterization, and will prioritize these deficiencies. A companion document that focuses on geology will also be issued.Tiger team findings will be considered, but it is presently anticipated that the priority list will differ in some respects from the items listed by the ORNL Tiger Team. It is unlikely, for example, that inadequate delineations of aquifers and zones of contaminations will be priority deficiencies.

There is general agreement among ORNL hydrogeologists that the base of the active groundwater flow system is adequately known; this boundary occurs at depths of about 100-250 ft and is determined by a change in chemical water type and by the absence of tritium and other contaminants in the water. There is also general agreement that the lateral extent of groundwater contamination is in the process of being adequately defined by existing programs for sampling and analysis; there is no need to accelerate this effort. Finally, there is general agreement that geologic contacts are not hydrologic barriers, that there is a single groundwater zone from the water table to the base of active circulation, and that nearly all groundwater is discharged to a nearby surface stream. We believe that if the Tiger Team had been given more time to study available data, they would agree with these conclusions, which are based on a convergence of evidence.

Several issues will be given a high priority by the ORRHAGS/hydrogeology report. These deficiencies in hydrogeologic characterization may include (1) surface and groundwater relationships, especially the hydrogeology of riparian zones, (2) the relative importance of matrix diffusion, which may affect groundwater velocities and determine the practicality of groundwater pump-and-treat and other remedial alternatives, (3) the determination of accurate groundwater ages, (4) the use of hydrograph analysis to determine average values of various aquifer parameters such as transmissivity and effective porosity, (5) the use of innovative methods to determine whether contaminant concentrations along the various flow paths are increasing or decreasing, and (6) a determination of the best approach to groundwater modeling and the data needed for this approach.

In summary, the determination of an inadequate hydrogeologic characterization by the ORNL Tiger Team is valid. We agree that additional work is needed to support the RI/FS processes of risk analysis and the selection of alternatives for remedial action. However, all specific issues addressed by the Tiger Team have been previously considered and evaluated by the Environmental Restoration Program. The phased RI/FS program to study ORNL waste sites specified in the FFA will implement collection of data to meet deficiencies. The approach is to use ORHSP results and synthesis of information to guide future RI/FS work. Some priority deficiencies will be addressed by Environmental Restoration and other programs through the ORRHAGS project.

Root Causes:

Insufficient resources—Funding limitations across the DOE system result in phased studies that control the rate of progress. Regulatory requirements for planning and getting approval for remedial investigations constrain the rate of progress that can be made toward hydrogeologic characterization when the scope of the project is of major proportions.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Appoint an ORNL groundwater program coordinator (see Finding GW/BMPF-4).	Complete
2. Issue an evaluative report by ORRHAGS investigators on deficiencies of hydrogeologic characterization for the Oak Ridge Reservation (ORR), including ORNL conditions.	9/91
3. Issue an evaluative report by ORRHAGS staff on geologic conditions and data gaps for the ORR, including ORNL.	9/91
4. Issue an evaluation of model suitability for application to ORNL hydrogeologic conditions by ORHSP staff.	6/92
5. Conduct a workshop between ORHSP staff and staff from other DOE facilities and/or academic institutions to initiate collaboration in modeling and characterizing hydrogeology of the ORR.	6/92

6. Conduct RI/FS studies, including site-specific groundwater characterization, in accordance with the pending Federal Facilities Agreement between DOE, EPA, and TDHE to provide site characterization of ORNL WAGs. Incorporate conclusions and recommendations from ORHSP evaluations and address all GW/BMPF-5 findings from the Tiger Team point-by-point response (see Finding GW/CF-1) at the initiation of RI/FS projects and ensure that any deficiencies in earlier RI/FS studies are rectified in subsequent work. This is an ongoing item because of the nature of the RI/FS process. — Ongoing

Costs: The costs of the groundwater program coordinator have been discussed elsewhere, and are to be met within existing resources. Costs and allocations for Environmental Restoration activities at ORNL are determined by DOE priority rankings, regulatory agreements, and availability of funds. Those specifics are part of the negotiated FFA conditions and cannot be specified here. Costs for activities of ORRHAGS and ORHSP projects will total about $300K in FY 1991, and are in planned budgets, although not all planned funding has been authorized for use. Costs for modeling and characterization activities in FY 1992 and are estimated to be approximately $450K. These funds will be requested, but have not been budgeted.

Type of funds: Overhead

Source of funds: Energy Systems

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	75						75
3	75						75
4		100					100
5		125					125
Status:							
Funded	150						
Requested		225					
New							$375

Type of funds: ERWM Programmatic
Source of funds: EM-ADS 413

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
2	75						75
3	75						75
4		100					100
5		125					125
Status:							
Funded	150						
Requested		225					
New							$375

Type of funds: ERWM Programmatic
Source of funds: EM-ADS 363, 324 and 325

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond*	Total
6	17,796	26,670	27,650	26,367	26,733	42,091	167,307
Status:							
Funded	17,796						
Requested		26,670	27,650	26,367	26,733	42,091	
New							$167,307

*Through FY 1997.

References: None

3.2.5 Waste Management

Finding No.: WM/CF-1 Inadequate Operation of Mixed Waste Storage Facilities

Finding Description: **The 7507W and 7654 Mixed Waste Storage Facilities do not meet Tennessee Hazardous Waste Management Rules for segregation of incompatible wastes, and the 7507W Mixed Waste Storage Facility does not meet Tennessee Hazardous Waste Management Rules for site security and does not meet best management practice standards for fire protection/detection, secondary containment, facility location, container locating methods, or aisle space.**

Code: Compliance

Compliance Protocol: Tennessee Hazardous Waste Management Rule 1200-1-11-.05 requires interim status hazardous waste storage facilities to be maintained with adequate site security through either 24-hour surveillance or fencing completely surrounding the facility. This rule also requires incompatible wastes to be segregated.

Best management practices requires that such facilities

1. have a secondary containment that is free of cracks,
2. provide an automatic fire detection or sprinkler system at an unattended hazardous waste storage facility holding flammable waste to ensure prompt emergency response in the event of a fire,
3. be located in clearings away from wooded areas where trees can fall,
4. be able to readily locate individual containers in a storage facility through use of a facility grid map or other means, and
5. provide for adequate aisle space.

Priority: Energy Systems Risk Weight 413
Tiger Team Action Plan Priority 1

Response: The Solid Waste Operations Department (SWOD) in the ORNL Waste Management Operations Section is responsible for the operations conducted in Buildings 7654 and 7507W which are both interim status facilities. Building 7654 became operational in 1988 and is used for storage of mixed waste. The majority of the waste consists of bulk scintillation fluids and scintillation vials. In 1981, Building 7507W began to be used for the storage of mixed wastes, including oils, scintillation liquids, and corrosive RCRA wastes as well as some nonhazardous radioactive wastes.

The deficiency cited for Building 7654 has not previously been identified; however, the Energy Systems-ORNL self-assessment identified the findings for 7507W and recognized the majority of the best management practice concerns cited.

It has been recognized that Building 7507W should be replaced and/or upgraded. Planning for a new facility (Building 7668) was initiated in 1988 and was originally scheduled to be operational in October 1991. Delays may result from NEPA documentation requirements.

Immediate plans call for the reduction of the present inventory of Building 7507W by moving approximately 100 drums of oils to another interim status facility. It is anticipated that further reductions of the present inventory can be achieved after the completion of comprehensive waste characterization effort which is scheduled to be completed in FY 1992.

The findings involving segregation of incompatible wastes in Buildings 7654 and 7507W will be corrected by segregating the hazardous wastes and placing the different waste types in polyethylene secondary containment. The security finding for Building 7507W will be corrected by installing a fence around the area.

The segregation of incompatible wastes into secondary containers will reduce the usable inventory space for Buildings 7654 and 7507W. Inventories will be reduced as detailed above prior to implementing the incompatible waste segregation corrective action.

The remaining best management practice concerns will be corrected as detailed below in the planned actions.

Root Causes:

Insufficient resources; lack of funding to provide facilities in a timely manner. Ambiguous requirements or expectations; differences in interpretation of regulatory requirements.

Planned Actions and Schedules:

	Item/Description	Completion Date
1.	Identify funding from existing programmatic funding to cover corrective action costs.	Complete
2.	Reduce mixed waste inventories as much as possible.	Complete
3.	Generators will be notified that mixed waste storage space is limited and that the generation of mixed waste should be minimized.	05/91

4.	Identify facility needs in annual funding requests beginning with first ADS submission.	Complete
5.	Install fence around 7507W.	06/91
6.	Clear the area around Building 7507W to prevent possibility of trees falling on the facility.	06/91
7.	Segregate incompatible wastes in Buildings 7654 and 7507W and place different waste types in polyethylene secondary containment. The polyethylene secondary containment will mitigate the finding relating to cracks in the concrete sink in 7507W. Building 7507W will be replaced with a new facility within the next 2 years.	07/91
8.	Provide appropriate aisle space between containers.	07/91
9.	Prepare and implement standard operating procedure for readily identifying location of individual containers in Building 7507W.	07/91
10.	Determine most appropriate fire detection system for Building 7507W and install system.	09/91

Costs:

Type of funds: ERWM Programmatic
Source of funds: EM-ADS 348

Action item	Estimated costs per fiscal year ($K) 1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	5						5
3	—						
4	—						
5	35						35
6	2						2
7	120						120
8	*a*						
9	10						10
10	30						30
Status:							
Funded	202						
Requested							
New							$202

[a]Will be completed as a part of Action Item 7.

References:
Tennessee Hazardous Waste Management Rule 1200-1-11-.05
Tennessee Hazardous Waste Management Rule 1200-1-11-.06
ORNL Self-Assessment Report
40 CFR 265.14
40 CFR 270.72

Finding No.: WM/CF-2 Improper Operation of Satellite Accumulation Areas at ORNL Facilities at Y-12

Finding Description: **MMES-ORNL does not manage hazardous waste satellite accumulation areas at its Y-12 facilities such that the areas at or near the initial point of accumulation, and the areas contain less than 55 gallons of hazardous waste in accordance with the Tennessee Hazardous Waste Management Rule 1200-1-11-.03.**

Code: Compliance

Compliance Protocol: Tennessee Hazardous Waste Management Rule 1200-1-11-.03.

Priority: Energy Systems Risk Weight 406
Tiger Team Action Plan Priority 2

Response: ORNL operations at Y-12 satellite accumulation areas are located near the point of generation, and each satellite area is limited to 55 gallons. Satellite accumulation areas which could be moved closer to areas under control of the operators whose processes generate the waste have been moved where possible and where safety issues did not pose problems or concerns. These various satellite areas are established to separate incompatible wastes that cannot be stored together in a 90-day accumulation area or for other safety concerns. Once these ORNL operations at Y-12 research and development laboratory areas purge their systems of these surplus chemicals, many of the satellite areas will be dismantled.

At present, the wastes in these areas are adequately and safely contained in compatible containers of good condition. The TDHE has inspected these areas during previous inspections and has not indicated a problem with the RCRA Waste Management Operations in these various locations.

Root Cause:

Inaccurate policy interpretation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Review ORNL at Y-12 operations for compliance with TDHE requirements.	Complete
2. Verify TDHE requirements met.	Complete

Costs: No additional costs are expected as a result of this review.

References: None

Finding No.: WM/CF-3 Inadequate Hazardous Waste Accumulation and Minimization at ORNL Biology Division at Y-12 Plant

Finding Description: **Hazardous waste management practices of the MMES-ORNL Biology Division at Y-12 for waste accumulation, minimization, spill control, and training do not conform to the requirements of Tennessee Hazardous Management Rules 1200-1-11-.03 and .05.**

Code: Compliance

Compliance Protocol: TDHE 1200-1-11-.03, 1200-1-11-.05

Priority: Energy Systems Risk Weight 406
Tiger Team Action Plan Priority 2

Response: The hazardous waste accumulation areas in the ORNL Biology Division have been audited and judged to be in compliance with the requirements of the TDHE. An additional review of the practices including mixed waste handling will be conducted to document full compliance.

The use and accumulation of waste scintillation cocktails in the Biology Division are under review, and non-hazardous cocktails will be substituted wherever possible. Cocktails that are hazardous waste will be segregated to minimize mixed or hazardous waste generation.

The Biology Division complies with the Y-12 Spill Prevention, Control, and Countermeasures Plan and the Y-12 RCRA Contingency Plan for spills, etc.

RCRA-required training will be provided to ensure proper management of hazardous wastes.

Root Causes:

Inadequate policy implementation and inadequate training

Planned Actions and Schedules:

Item/Description	Completion Date
1. Review and document training requirements for Biology personnel.	Complete
2. Review and document use of and management of waste scintillation cocktails as hazardous waste.	Complete

3. Develop and distribute waste segregation policy and action plan.	Complete
4. Implement waste segregation action plan.	Complete
5. Review RCRA Contingency Plan and SPCCC Plan and provide spill control equipment as required.	Complete
6. Complete required training.	Complete
7. Review ORNL at Y-12 Hazardous Waste Accumulation Areas for compliance with TDHE requirements.	Complete

Costs: Action Items 1–7 will be accomplished with existing funds.

References: None

Finding No.: WM/CF-4 Lack of Integrity Assessment of 7860A Hazardous Waste Storage Tank

Finding Description: **MMES-ORNL has not conducted an integrity assessment of the 7860A interim status hazardous waste storage tank as required by Tennessee Hazardous Waste Management Rule 1200-1-11-.05.**

Code: Compliance

Compliance Protocol: Tennessee Hazardous Waste Management Rule 1200-1-11-.05

Priority: Energy Systems Risk Weight 409
Tiger Team Action Plan Priority 1

Response: As identified in this finding, Energy Systems-ORNL is delinquent in not having closed the 7860A storage tank within one year after having determined it received hazardous waste during its period of operation. In addition, Energy Systems-ORNL has not conducted an integrity assessment as required to determine the structural soundness of the tank. The planned action to mitigate this deficiency was completed in March 1991 with the removal of the contents of the tank and placement of the RCRA-regulated constituents in a permitted facility.

The root cause of inadequate implementation of regulatory policy at inactive waste sites was previously cited in the self assessment report for the Energy Systems-ORNL Office of Waste Management and Remedial Action. This problem stems from: (1) inadequate flowdown of regulatory requirements and DOE orders from Energy Systems-ORNL oversight organizations to facility management staff, and (2) the substantial increase in ES&H-related facility management requirements experienced in recent years. To rectify these problems and thereby the root cause of the finding, the Energy Systems-ORNL Remedial Action Section prepared proposals for the FY 1993 budget submission to acquire its own regulatory expertise to stay abreast of all relevant and appropriate orders and regulations. Once acquired, this additional staff will directly transmit updates, changes, and miscellaneous nuances of applicable regulatory and DOE requirements to Remedial Action staff and facility managers.

Root Causes:

Inadequate policy implementation and inadequate communications; transmittal of regulatory requirements for management of hazardous waste tanks to Energy Systems-ORNL staff responsible for tanks is inadequate.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Remove contents from tank 7860A.	Complete
2. Prepare budget proposals to acquire regulatory expertise staff for the Energy Systems–ORNL Remedial Action Section.	Complete

Costs:

Type of funds: ERWM Programmatic
Source of funds: EM ADS 311-AA and 331

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	20						20
2	—		*				
Status:							
Funded	20						
Requested							
New							$20

*Annual ongoing cost will be $25K per year beginning in FY 1993.

References: Environmental Restoration and Waste Management Five-Year Plan

Finding No.: WM/CF-5 Inadequate Training for Onsite Hazardous Waste Transporters

Finding Description: **MMES-ORNL has not provided job-specific hazardous waste training to the laborers and drivers who collect and transport hazardous waste between onsite accumulation areas and onsite storage facilities as required by Tennessee Hazardous Waste Management Rule 1200-1-11-.05(2).**

Code: Compliance

Compliance Protocol: Tennessee Hazardous Waste Management Rule 1200-1-11-.05(2) requires facility personnel to complete a program of classroom instruction or on-the-job training that teaches them to perform their duties in a way that ensures the facility's compliance with the requirements of this Rule. This program must include instruction which teaches personnel the hazardous waste management procedures relevant to the positions in which they are employed.

Priority: Energy Systems Risk Weight 410
Tiger Team Action Plan Priority 2

Response: This action plan requires the development and implementation of a procedure for the collection of hazardous waste from accumulation areas and transport of the waste to ORNL centralized storage facilities. The procedure(s) will be incorporated into the "Hazardous Waste Operations Manual," Manual No. WM-SWO-401. This series of procedures governs operations of Hazardous Waste Operations Group of the Office of Waste Management and Remedial Actions which has responsibility for the procedure development and implementation. When the procedure has received final approval, training will be developed and implemented by the Technical Resources and Training Section of the Office of Environmental and Health Protection in accordance with current practices described in the Waste Management Section Training Plan (currently in draft form). This training is to include successful completion of written Procedures-Use Exercises and On-the-Job Training Checklists tailored to the procedure(s). This training strategy ensures that the participant reviews the relevant procedures and performs tasks in accordance with the procedures. Waste Management will ensure that only those Plant and Equipment personnel having successfully completed the procedure-based training are assigned to support the hazardous waste collection and transport operation.

Other than the Hazardous Waste Operations Group Supervisor directing collection and transport operations, a team of two laborers and one driver from the Plant and Equipment (P&E) Division are involved. A continuing aspect of this action plan requires that requests for P&E Support by the Hazardous Waste Operations Group be filled only by personnel that have successfully completed the procedure(s)-based training. This responsibility lies with the P&E Division supervisor supplying the support personnel in cooperation with the P&E Division Training Coordinator. Currently P&E support personnel supplied for the collection

and transport operation have completed the 24 hours of health and safety training for hazardous waste operations and activities; the newly developed training based on the procedure(s) will build upon this training base.

These activities will be reviewed by ongoing hazardous waste activity surveillances.

Root Cause:

Inadequate policy; lack of Hazardous Waste Operations Group procedure for collection and transport of hazardous waste from accumulation areas to central storage areas.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Draft procedure(s) for collection/transport of hazardous waste from accumulation areas to central storage area.	Complete
2. Review and incorporate revisions to procedure(s).	05/91
3. Approve final procedure(s).	06/91
4. Develop "procedures-use exercises" and "on-the-job training checklists" based on the approved procedure(s).	08/91
5. Complete and document training of initially identified Hazardous Waste Operations Group supervisor(s) and Plant and Equipment Division support personnel who perform the hazardous waste collection and transport operation.	10/91

Costs:

Type of funds: ERWM Programmatic
Source of funds: EM-ADS347,348

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1-3	9						9
4	4.5						4.5
5	9						9
Status:							
Funded							
Requested							
New	22.5						$22.5

*Estimated annual ongoing cost: $10K.

References: Tennessee Hazardous Waste Management Rule 1200-1-11-.05(2) Waste Management Section Training Plan (Draft), Oak Ridge National Laboratory, October 19, 1990

Finding No.: WM/CF-6 Storage of Land Disposal Restricted Mixed Waste

Finding Description: MMES-ORNL is currently storing mixed solvent and corrosive wastes that are subject to LDR requirements for purposes other than accumulating such quantities as necessary to facilitate proper recovery, treatment, or disposal, and is therefore not operating in accordance with the requirements of 40 CFR 268.50.

Code: Compliance

Compliance Protocol: RCRA requirements found in 40 CFR 268.5, prohibit storage of LDR wastes other than for purposes of accumulating sufficient quantities to facilitate treatment.

Priority: Energy Systems Risk Weight 406
Tiger Team Action Plan Priority 1

Response: ORNL has recognized and documented this noncompliance in the Office of Waste Management and Remedial Action's Self-Assessment, Sect. 2.4.1. Currently, treatment is unavailable for these mixed wastes, with the exception of some scintillation fluids that meet the waste acceptance criteria of the Quadrex facility in Florida. Thus the wastes are being stored in permitted facilities while capabilities are developing.

ORNL's action plan consists of several elements:

1. Characterization of the waste is planned for FY 1991 to enable ORNL to certify the waste to meet WAC of treatment facilities when they become available.

2. When adequate characterization data is available, wastes will be grouped by treatability, and existing appropriate treatment facilities will be identified and utilized as available. The TSCA Incinerator at the K-25 Plant, expected to begin operation on a large back-log of waste in FY 1991, is the primary facility planned to treat ORNL's mixed waste.

3. Treatment technology development or adaptation will be initiated for waste groupings for which treatment facilities are currently unavailable.

4. Reduction of LDR waste (hazardous scintillation waste) generation at the source will be implemented, as appropriate, by generating divisions. (See also the action plan for WM/BMPF-2.)

5. An FFCA will continue to be pursued by DOE/ORO and supported through the Energy Systems Central Waste Management Division (CWMD). Extensive supporting data has already been provided, and ORNL has worked with CWMD and HAZWRAP to outline strategic "road maps" for each noncompliant waste stream.

Root Causes:

Insufficient resources and regulatory barriers; (1) nationwide unavailability of treatment technology for mixed radioactive wastes and (2) inadequate funding (FY 1991) and staffing (FY 1990) to conduct the characterization on the accelerated schedule deemed appropriate. Although some funding has been provided in FY 1991, characterization cannot be completed without additional funds.

Planned Actions and Schedules:

	Item/Description	Completion Date
1.	Request funding for characterization, treatment development, and treatment.	Complete
2.	Complete development of technical data package to support RCRA land disposal restrictions FFCA negotiation. (FFCAs [Federal Facilities Compliance Agreements] are negotiated in situations where noncompliances already exist.)	Complete
3.	DOE/ORO initiate negotiation of "prethirds" FFCA.	Complete
4.	Issue letter to scintillation-cocktail-generating divisions requesting source substitution and segregation, as appropriate.	Complete
5.	Provide technical data in support of negotiation of FFCA concerning RCRA LDR first, second, and thirds mixed waste.	Complete
6.	Develop schedule for acceptance of ORNL LDR RMW by TSCA Incinerator.	06/91
7.	Issue letter report on characterization of stored mixed waste (AF WM-8).	07/91
8.	Issue final report on characterization of stored mixed waste.	06/92

9. Issue initial recommendations on disposition of treatability groupings. 08/92

10. Issue report on RMW treatment technology demonstrations. 09/92

Costs:

Type of funds: ERWM Programmatic
Source of funds: EM-ADS 349

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
7	240						240
8		500					500
10		150	300	300	400	*	1150
Status:							
Funded	240						
Requested		650	300	300	400	*	
New							$1890

*Estimated annual ongoing cost: $200K.

Type of funds: ERWM Programmatic
Source of funds: EM-ADS 350

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
4	5						5
5	10						10
6	10						10
7	275						275
8		500	350	200	100	50	1200
Status:							
Funded	300						
Requested		500	350	200	100	50	
New							$1500

References: Letter, C. P. East to T. E. Myrick, "FY 1991 ORNL Corrective Activity and Waste Management Program Prioritized Task Listing," September 5, 1990

Finding No.: WM/CF-7 Inadequate Storage of Radioactively Contaminated Hazardous Waste Lead

Finding Description: **MMES is accumulating and storing radioactively contaminated scrap lead without demonstrating a commitment to a contaminated lead recycling program and without managing it as a hazardous waste subject to RCRA regulation, as required by Tennessee Hazardous Waste Rules 1200-1-11-.01 through .09 and 40 CFR Part 268.**

Code: Compliance

Compliance Protocol: Tennessee Rule 1200-1-11 outlines requirements for managing hazardous waste, including storage in a permitted facility. Exception is made for scrap metal and other recyclable materials. ORNL is storing its contaminated lead for decontamination and reuse.

Priority: Energy Systems Risk Weight 405
Tiger Team Action Plan Priority 1

Response: In accordance with DOE Order 5400.2A, the Office of Environment, Safety, and Health (EH) was assigned the lead to resolve a number of significant, cross-cutting mixed waste and materials management issues. One of the cross-cutting issues deals with the management of excess or scrap lead. The workgroup has proposed strategies for several different categories of lead. Depending on the category, the lead may or may not be subject to RCRA regulations. The approach taken to address this specific finding is consistent with one of the approaches being developed by the work group.

Once the department's positions and strategies are clarified, discussions will be held with the appropriate regulatory agencies, as necessary. Clear DOE-wide policies and guidance will be prepared.

ORNL's strategy for management of contaminated lead is consistent with the DOE-wide strategy for management of lead and other scrap material. ORNL will document the present inventory of scrap lead. The storage of the scrap will be reviewed to ensure responsible management practices are followed. The ORNL lead management strategy will be documented.

In 1987, HAZWRAP conducted a private sector technology demonstration that successfully decontaminated an assortment of ORNL lead using a high-pressure water system. Secondary wastes were solidified and passed EP toxicity tests. (TCLP tests will need to be done.) ORNL plans to implement a full-scale decontamination campaign during FY 1991, utilizing this proven technology. Funding has been allocated, and contact with several subcontractors has already been made. Markets for the contaminated or recycled lead will be reviewed.

Root Causes:

(1) Inadequate oversight; interpretation of requirements that differ from Tiger Team interpretations. (2) Insufficient resources; inadequate funding to implement lead decontamination in prior years.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Prepare an ORNL lead management strategy.	Complete
2. Document contaminated lead inventory.	Complete
3. Review storage practices.	Complete
4. Issue statement of work for lead decontamination campaign.	05/91
5. Initiate lead decontamination.	08/91
6. Review potential markets for contaminated and recycled lead.	08/91

Costs:

Type of funds: ERWM Programmatic
Source of funds: EM-ADS 349

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	—						
4	100						100
5		*					
6	—						
Status:							
Funded	100						
Requested							
New							$100

*Estimated annual ongoing cost: $150K starting in FY 1992.

References: None.

Finding No.: WM/CF-8 Inadequate Training Documentation and Procedures for 7507 Hazardous Waste Storage Facility

Finding Description: **MMES-ORNL has not documented the training for waste management operations in Bldg. 7507 in accordance with Tennessee Hazardous Waste Management Rule 1200-1-11-.05 and has not, as a best management practice, updated the operational procedures to meet new operational conditions at that facility.**

Code: Compliance

Compliance Protocol: Tennessee Hazardous Waste Management Rule 1200-1-11-.05 requires that personnel involved in the operations of interim status hazardous waste management units be trained in the hazardous waste management procedures necessary to perform their duties and that the training be documented. As a best management practice, documented procedures should be provided for waste-handling activities.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: The operations conducted in Building 7507 are assigned to the Hazardous Waste Operations Group (HWOG) in the ORNL Waste Management Operations Section. The HWOG is responsible for the proper characterization, storage, and disposal of hazardous, mixed, and conventional wastes generated from research, development, and production programs at ORNL. The HWOG operations conducted in Building 7507, as well as other HWOG facilities, are to be conducted in such a manner to ensure compliance with federal, state, DOE, Energy Systems, and ORNL policies, procedures, and regulations. The training requirements and procedures detailed in Hazardous Waste Operations Manual WM-SWO-401 are used for meeting existing and anticipated requirements for HWOG activities. Adherence to the training requirements detailed in WM-SWO-401 would have precluded the deficiency cited.

The changes to the facility and operations were communicated verbally to HWOG operating personnel.

Root Cause:

Inadequate management commitment; failure by management to ensure changes in a facility were incorporated in procedures and training.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Detail operational changes for Building 7507, review with appropriate personnel and document review.	Complete
2. Review facility and process control requirements with Solid Waste Operations personnel, including training requirements and document review. (Note: Training requirements are specified in the waste management section training plan and include periodic retraining. Annual regulatory audits help ensure adherence to established procedures.)	Complete
3. Revise and issue HWOG procedure to incorporate changes.	06/91
4. The need to revise ORNL training programs for providing and documenting regulatory driven or other training on short notice will be reviewed with the Technical Resources and Training Section of the Office of Environmental and Health Protection.	05/91

Costs:

Type of funds: ERWM Programmatic
Source of funds: EM-ADS344

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	1.5						1.5
2	1.5						1.5
3	3						3
4	—						
Status:							
Funded	6						
Requested							
New							$6

References: Tennessee Hazardous Waste Management Rule 1200-1-11-.05

Finding No.: WM/CF-9 Inadequate Training Records and Inspection Records at the 3001 Storage Canal

Finding Description: **MMES-ORNL personnel performing RCRA inspections of the 3001 Storage Canal do not have their training documented in accordance with Tennessee Hazardous Waste Management Rule 1200-1-11-.05, and the RCRA inspection record is not complete in accordance with best management practices.**

Code: Compliance

Compliance Protocol: Tennessee rule 1200-1-11-.05 requires that personnel involved in the operations of interim status hazardous waste management units be trained to perform their duties and that the training be documented.

40 CFR 265.195(c) requires that facility inspections be documented in the facility operating records.

Priority: Energy Systems Risk Weight 405
Tiger Team Action Plan Priority 1

Response: Deficiencies in training and upkeep of training records, and inadequate implementation of regulatory policy at inactive waste sites have been documented in the Environment, Safety and Health and Management and Organization Self Assessment report for the ORNL Office of Waste Management and Remedial Action. To correct these deficiencies, facility-specific RCRA training and documentation will be developed and conducted through the Technical Resources and Training Department in the Office of Environmental Compliance and Health Protection. Retraining is incorporated in the training program. In addition, the Energy Systems–ORNL Remedial Action Section will prepare proposals for the FY 1993 budget submission to acquire additional regulatory compliance staff to ensure inspections and surveillances are properly conducted.

In accordance with 40 CFR 265.195(c), the Remedial Action Section has documented operating records of facility inspections. However, in keeping with best management practices, documentation will be revised to include personnel sign-offs in the operating records as a requirement.

Root Causes:

Inadequate policy implementation and inadequate communications; transmittal of regulatory requirements for management of hazardous waste tanks to Energy Systems–ORNL staff responsible for tanks is inadequate.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Upgrade operating records for the 3001 Storage Canal log to include personnel sign-offs (includes memo informing personnel who perform the daily inspections of this requirement).	01/91
2. Conduct and document on-the-job-training of reactor operators performing the daily inspections at the 3001 Storage Canal.	01/91
3. Prepare budget proposals to acquire additional staff for regulatory expertise and training oversight for all contaminated sites managed by Energy Systems–ORNL's Remedial Action Section.	04/91
4. Develop and implement facility-specific RCRA training module and records management system for all RCRA regulated sites managed by Energy Systems–ORNL's Remedial Action Section.	06/91

Costs: Operating records upgrade for additional sign-off, training, development, implementation, and budget proposal preparation can be accomplished through Environmental Restoration (EM) funded work under Waste Area Grouping Surveillance and Maintenance - GF (ADS OR 311-AA).

Type of funds: ERWM Programmatic

Source of funds: EM—ADS 311AA

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	1						1
2	1						1
3	1		*				1
4	25						25
Status:							
Funded	28						
Requested							
New							$28

*Estimated annual ongoing cost: $25K per year beginning in FY 1993.

References: Tennessee Hazardous Waste Management Rule 1200-1-11-.05
40 CFR 265.195(c)
Environmental Restoration and Waste Management Five-Year Plan

Finding No.: WM/CF-10 Inadequate Leak Detection of Petroleum Underground Storage Tanks

Finding Description: **MMES-ORNL does not perform daily leak detection by "stick checking" on 8 of approximately 30 nonradioactive petroleum underground storage tanks in accordance with the MMES-ORNL SOP EMC-012-01.**

Code: Compliance

Compliance Protocol: 40 CFR 280 defines the requirements for leak detection of underground storage tanks (USTs) that store petroleum products. Deadlines for compliance are determined by specific requirements relating to tank capacity, tank age, etc., and are mandated by this regulation. There are certain types of USTs that are "deferred" from the requirements of leak detection but are included in the requirements for annual fees and potential environmental remediation. Included in these types are USTs used for storing fuel for the sole purpose of supplying emergency generators. Therefore, all USTs at ORNL that store petroleum products (with the exception of three tanks at the ORNL Fuel Service Station) are deferred from the regulations. As a "best-management" practice and in response to a DOE order, the SOP EMC-012-01 was issued to facilitate monitoring of product levels in USTs to minimize potential environmental liability in the event of a leaking UST.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: SOP EMC-012-01 was issued in July 1990. Following the issuance of the SOP, a letter to the Environmental Protection Officers (EPOs) of each "non-complying" division was sent that specifically listed the tank owners that failed to comply. At that time, the number was thirteen. On November 12, 1990, a second letter was sent to the Division EPOs requesting their compliance with the SOP. This time, the number of tank owners that failed to comply was eight. Currently, efforts are underway to resolve discrepancies that exist with these tank owners. This plan proposes final resolution of these discrepancies.

Root Cause:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Identify ORNL organizations responsible for noncompliant USTs.	Complete

2. Clearly define and document roles and responsibilities (R&R).	Complete
3. Meet with tank owners to discuss specific requirements of the SOP.	Complete
4. Initiate quarterly audits of the "stick-check" data for compliance.	06/91
5. Complete the training for personnel performing the "stick-checks" with each UST division owner/operator.	09/91

Costs: Program planning activities will be accomplished with existing resources. Division activities related to compliance with the SOP will be borne by the respective divisions.

References: 40 CFR Part 280, Subtitle I
Technical Regulations of the Tennessee Underground Storage Tank Division, Chapter 1200-1-15-.01 through .07

Finding No.: WM/CF-11 Inadequate Hazardous Waste Determination of Sanitary Sewage Treatment Plant Sludge

Finding Description: **MMES-ORNL does not subject its sanitary sewage treatment plant sludge to a hazardous waste determination as required by Tennessee Hazardous Waste Rule 1200-1-11-.03.**

Code: Compliance

Compliance Protocol: Tennessee Hazardous Waste Rule 1200-1-11-.03 requires generators of hazardous waste to perform hazardous waste determinations on all solid waste streams by either performing an analysis or using process knowledge.

Priority: Energy Systems Risk Weight 408
Tiger Team Action Plan Priority 2

Response: Prior to October 1, 1990, ORNL considered the sewage treatment plant sludge to be non-RCRA hazardous waste based on process knowledge. While this determination was not confirmed routinely by analysis, an EP-tox analysis for mercury in 1989 confirmed this parameter to be in accord with the nonhazardous determination and a TCLP analysis of sludge samples taken on November 5, 1990, also confirmed the determination that the sludge is a nonhazardous waste stream.

To provide ongoing assurance that the sewage treatment plant sludge is correctly classified as a nonhazardous waste stream, the following action plan will provide for development and implementation of a sampling and analysis protocol for this waste stream. Characterization of other ORNL solid waste streams is in progress where similar regulatory requirements apply.

Root Cause:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Prepare and implement sampling and analysis plan.	03/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

Action item	Estimated costs per fiscal year ($K)						Total
	1991	1992	1993	1994	1995	Beyond	
1	12	*					12
Status:							
Funded	12						
Requested							
New							$12

*Estimated annual ongoing cost: $5K starting in FY 1992.

References: TDHE Hazardous Waste Rule 1200-1-11-.03

Finding No.: WM/CF-12 Inadequate Daily Inspections of RCRA Facilities on Weekends

Finding Description: **MMES-ORNL does not conduct daily inspections on weekends at the 7860A interim status hazardous waste storage tank in accordance with Tennessee Hazardous Waste Storage Rule 1200-1-11-.05, and at the Bldgs. 7652 hazardous waste facility in accordance with the facility RCRA permit.**

Code: Compliance

Compliance Protocol: TN rule 1200-1-11-.05(10)(f) requires that owner/operators conduct inspections of tank systems at lease once each operating day to determine whether or not the system is operating correctly or whether or not a release has occurred.

ORNL's Part B Permit for Building 7652 states that daily inspections will be conducted to check container placement and aisle space, container labeling, container condition, and segregation and storage of incompatible wastes.

Priority: Energy Systems Risk Weight 405
Tiger Team Action Plan Priority 2

Response: Clarification of the regulatory requirements for facility inspections for Building 7652 and tank 7860A and the correction of deficiencies in facility inspections are addressed by this action plan.

To date, verbal clarification of the regulatory interpretation of "daily" inspection requirements for tanks was obtained form T. P. Perry (ESA Central Staff). Perry confirmed that hazardous waste tanks must be inspected each day the tank is storing hazardous waste (i.e, 7 days per week).

Corrective actions will be implemented to ensure that daily (each operating day) inspections are being carried out for tank 7860A. Standard operating procedures and inspection forms will be revised to reflect the additional inspection requirements for tank systems storing hazardous wastes. Tank operators will receive annual training to ensure the facility's compliance with the RCRA regulations. Compliance staff will review and approve the inspection forms and will confirm that inspections meet the regulatory requirements.

The Part B permit for Building 7652 does indicate that daily inspections are to be conducted; however, past verbal communications with TDC staff confirmed their acceptance of normal work week (excluding weekends and holidays) inspections for that permitted unit. To resolve the finding for Building 7652, verbal clarification of the daily inspection requirements for Building 7652 was again obtained from Jacqueline Okoreeh-Baah (TDC) on November 16, 1990. Okoreeh-Baah indicated that container storage units including Building 7652 need not be inspected each day (i.e., 7 days per week); the state and federal regulations do not require daily inspections of container storage units

[TN Rule 1200-1-11-.05(9)(e)]. Because TDC recognizes that inspections seven days per week are not required by the regulations, they accept an inspection schedule based on a normal work week for those units including Building 7652. TDC's acceptance of daily (i.e., normal work week) inspections for container storage areas has been reaffirmed by the September 29, 1990, issuance of the final permit for Building 7855, which defines daily as normal work week (see p. 3-6).

Written confirmation of the state's definition of daily inspections for Building 7652 will be obtained form TDHE. ORNL will ask DOE to request that TDHE issue a letter which outlines their position or that they modify the text within the permit to define "daily" for ORNL's permit files for Building 7652.

Root Causes:

Inadequate policy implementation; poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request clearly defined inspection requirements under TN Rule 1200-1-11-.05 for container storage facilities from TDHE to verify compliance of Building 7652.	Complete
2. Revise standard operating procedures and inspection forms for hazardous waste tank 7860A to reflect the additional inspection requirements. Implement the necessary training for facility personnel to ensure that facility will be in compliance and then implement the inspections for tank 7860A.	Complete
3. Verify and document that corrective actions have been fully implemented.	Complete

Costs: Clarification of container storage inspection requirements was accomplished with existing resources at no significant cost.

Revision of standard operating procedures and inspection forms and implementation of the training and actual inspections for tank 7860A were accomplished with existing resources. Verification that corrective actions have been implemented has been accomplished with existing resources.

References: Tennessee Hazardous Waste Storage Rule 1200-1-11-.05(10)(f)

Tennessee Hazardous Waste Permit TN1 890 090 003, Hazardous Waste Storage Facility, Building 7652, dated September 26, 1986; revised February 21, 1989

Memorandum of Conversation between N. S. Dailey and J. Okoreeh-Baah, dated November 16, 1990

Letter from J. H. Swanks to J. L. Radcliffe, "Resubmittal of Oak Ridge National Laboratory's Comments on the Draft Part B Permit for the Transuranic Concrete Cask Storage Unit (Building 7855) and Request for Confirmation of Inspection Requirements for the Hazardous Waste Storage Facility (7652)," dated December 17, 1990

Letter from Larry L. Radcliffe to Dale Ozier, "Resolution of ORNL's Comments on the Draft Part B Permit for the Transuranic Concrete Cask Storage Unit (Bldg. 7855)," dated January 16, 1991. (This letter also requested clarification of "daily" for the 7652 permit.)

Finding No.: WM/CF-13 Inadequate Characterization of Mixed Waste in Storage

Finding Description: **MMES-ORNL has not adequately characterized its stored mixed waste at the Transuranic Retrievable Concrete Cask Burial Ground and at the 7507W Low-Level Mixed Waste Storage Facility to determine whether it is hazardous in accordance with Tennessee Hazardous Waste Rules 1200-1-11-.03 and .05 and the ORNL RCRA Hazardous Waste Analysis Plan, and whether it is restricted from land disposal in accordance with 40 CFR 268.7.**

Code: Compliance

Compliance Protocol: The ORNL RCRA Hazardous Waste Analysis Plan requires stored waste to be characterized to determine if it is hazardous under Tennessee Hazardous Waste Rules 1200-1-11.

Priority: Energy Systems Risk Weight 408
Tiger Team Action Plan Priority 2

Response: Remote-Handled Transuranic (RH TRU) Waste

Energy Systems–ORNL is storing 190 casks of RH TRU waste generated before 1980 in the RCRA interim status TRU Retrievable Concrete Cask Burial Ground. None of these casks has received an analysis or characterization. They were generated before Energy Systems–ORNL implemented an approved TRU waste certification program that provides for adequate characterization of newly generated RH TRU waste. Additionally, the RH TRU casks do not have certification data to determine whether they contain hazardous mixed waste or whether the waste is subject to the RCRA Land Disposal Restrictions (LDRs). The information was not developed at the time the casks were filled and put into storage, and the high radiation levels associated with the wastes (i.e., greater than 1000 R/hr) and the nature of containment of the casks limit further characterization or analysis from being performed. Energy Systems–ORNL conducted interviews and record reviews to characterize the cask contents and determined that some of the casks contain lead, mercury, and oil. However, Energy Systems–ORNL does not have adequate records to verify which casks contain these wastes, whether the casks also contain small quantities of other hazardous wastes, and whether the wastes are properly stored (i.e., incompatibles are properly segregated).

Because the greatest concern with these mixed wastes is the radiation levels rather than the possible hazardous constituents, during characterization, handling the waste outside a shielded hot cell facility must be minimized. Numerous other technical issues remain to be resolved. Plans are to investigate various approaches to determine the most cost effective means of addressing the finding in a safe manner. Current robotics activities funded by the Office of Technology Development will ultimately contribute pertinent control architectures,

characterization, and long manipulator reach capabilities to this project. After the technical issues are resolved and feasible options are evaluated, a strategy will be developed to address the finding.

7507W Waste

This activity is covered in the response to Finding WM/CF-6 Storage of Land Disposal Restricted Mixed Waste.

ORNL has recognized and documented this noncompliance in the Office of Waste Management and Remedial Action's Self-Assessment, Sect. 2.4.1. Currently, treatment is unavailable for these mixed wastes, with the exception of some scintillation fluids that meet the waste acceptance criteria of the Quadrex facility in Florida. Thus the wastes are being stored in permitted facilities while capabilities are developing.

Root Cause:

Inadequate management approach

Planned Actions and Schedules:

Item/Description	Completion Date
1. Identify research and development requirements.	06/92
2. Based on approved research and development requirements, develop characterization strategy.	08/93
3. Conduct development activities.	09/97

Costs:

Type of funds: ERWM Programmatic
Source of funds: EM-ADS 352

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
All		1,000	1,000	1,000	1,500	3,500	8,000
Status:							
Funded							
Requested		1,000	1,000	1,000	1,500	3,500	
New							$8,000

References: ORNL RCRA Hazardous Waste Analysis Plan ORNL/TM-11050, Remote-Handled Transuranic Solid Waste Characterization Study

Finding No.: WM/BMPF-1 Inadequate Assessments of Offsite Vendors Recycling Lead-Acid Batteries and Circuitboards

Finding Description: MMES-ORNL does not assess the operations of offsite vendors who recycle RCRA-exempt hazardous recyclable lead-acid batteries and precious-metal-containing circuitboards, in accordance with best management practices, to ensure that the vendor practices are environmentally sound.

Code: Best Management Practice

Compliance Protocol: Energy Systems is liable for improper disposal of materials at off-site recycle vendors. Best management practice requires periodic assessment of the vendor operations to ensure compliance with applicable regulations to reduce Energy Systems and DOE liability.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: ORNL and Energy Systems have recognized the deficiencies in the off-site vendor surveillance program. Energy Systems Central ES&H staff will develop a surveillance program to review the recycle and disposal practices of off-site vendors. The review will be periodic, and the results of the review will be documented.

Root Cause:

Inadequate policy; Energy Systems has not issued a policy requiring surveillance of off-site vendors.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue draft Energy Systems vendor surveillance.	01/91
2. Initiate off-site vendor surveillance for lead-acid battery and circuitboard recyclers.	03/91

Costs: Vendor Surveillance—$10K.

Existing Energy Systems Central ES&H funds will be used to accomplish FY 1991 tasks. Ongoing reviews will be incorporated into future Central ES&H budget submittals.

References: None

Finding No.: WM/BMPF-2 Inadequate Waste Minimization Program

Finding Description: **MMES-ORNL does not have an adequate waste minimization program and therefore is unnecessarily generating hazardous, mixed, and solid wastes, which is not in accordance with best management practices.**

Code: Best Management Practice

Compliance Protocol: Tennessee Hazardous Waste Management Rule 1200-1-11-.03, RCRA Section 3002, and DOE Order 5400.3 require waste minimization plans and programs for hazardous and radioactive mixed waste generating facilities. DOE Order 5820.2A requires DOE facilities to establish an auditable waste reduction program for LLW. DOE Order 5400.1 requires preparation of a waste reduction program plan, which must be reviewed annually and updated every three years. In 1985 ORNL issued a letter setting forth hazardous waste minimization as a Laboratory Policy. In addition, in 1986 Energy Systems issued a policy letter calling for implementation of a comprehensive waste minimization program.

Priority: Energy Systems Risk Weight 56
Tiger Team Action Plan Priority 1

Response: ORNL has recognized deficiencies in its Waste Reduction Program, as documented in the Office of Waste Management and Remedial Action's Self Assessment, dated October 1, 1990. The requirements for and benefits of an effective waste reduction program are recognized by waste management staff. ORNL developed its first formal waste reduction plan in 1985, and several revisions have since been issued. The current plan, dated April 1990, outlines an effective waste reduction program that includes waste stream identification, evaluation, and targeting for reduction. However, full implementation of the plan has not occurred due to inadequacies in personnel resources and funding. Partial funding was provided for the continuation of a comprehensive ORNL Waste Reduction Program in FY 1991.

Responsibility for reducing waste generation lies with line management. The general approach taken by this action plan is to charge and empower Division Directors with this responsibility. Each division will be required to develop and implement a plan for evaluating its waste streams, identifying and implementing waste reduction projects, and tracking and reporting progress against quantitative goals.

A comprehensive ORNL policy procedure for waste reduction will be developed. Waste generation tracking and reporting capabilities will be improved to allow divisions to better monitor their waste reduction progress. Resources will continue to be sought to provide Laboratory-wide leadership, reporting, and evaluation. (See also Findings AX.2.1, p. 3.3.6-7; AX.3.1, p. 3.3.6-9; and RRP.10.2, p. 3.4.13-11.)

Root Causes:

(1) Inadequate policy; ORNL has not issued a policy calling for minimization of all types of waste. Only a hazardous waste policy has been issued. (2) Poorly defined roles and responsibilities; DOE-ORO and ORNL have not clearly and formally charged line managers with the responsibility for waste minimization.
(3) Insufficient resources; funding is inadequate to support personnel and activities to implement waste reduction. (4) Inadequate management commitment; although DOE has declared a policy of waste minimization and established requirements for such in its orders, waste minimization is assigned a priority of 3 (system of 1 through 4) in its budget guidance.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Continue to request funding.	
• Request waste minimization funding in draft FY 1993 ADS submission.	Complete
• Charge divisions with responsibility for requesting funding for their waste minimization activities (via Task No. 2).	Complete
2. Issue letter from ORNL management to Division Directors reaffirming commitment to waste minimization and assigning responsibilities and divisional goals and requesting development of divisional waste minimization plans.	05/91
3. Conduct first waste-reduction workshop using updated lesson plan.	06/91
4. Issue first monthly report by division of generation of all types of waste and progress toward waste minimization goals.	08/91
5. Hire waste-reduction coordinator to lead, coordinate, report, and evaluate program.	10/91
6. Issue ORNL standard practice procedure for waste minimization.	06/92
7. Conduct Energy Systems audit of ORNL waste reduction program.	04/92

8. Revise ORNL waste-reduction plan to reflect divisional roles and plans. 05/92

Contingent upon receipt of funding in FY 1992 and assumes no FY 1991 funding.

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
6		5					5
Status:							
Funded							
Requested							
New		5					$5

Type of funds: ERWM Programmatic
Source of funds: EM—ADS 356

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	5						5
2	5						5
5		*					
7	—						
8		*					
Status:							
Funded							
Requested							
New	10						$10

*Estimated annual ongoing cost: $170K starting in FY 1992 ($5K for Item 8 and $165K for Item 5).

Type of funds: ERWM Programmatic
Source of funds: EM—ADS 349

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
4	10	*					10
Status:							
Funded							
Requested							
New	10						$10

*Estimated annual ongoing cost: $165K.

Type of funds: ERWM Programmatic
Source of funds: EM—ADS 350

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
3	10	*					10
Status:							
Funded							
Requested							
New	10						$10

*Estimated annual ongoing cost: $10K starting in FY 1992.

References: R. M. Schultz, *Waste Reduction Plan for the Oak Ridge National Laboratory*, ORNL/TM-11283, April 1990

R. M. Schultz, *Waste Reduction Program at Oak Ridge National Laboratory During CY 1989*, ORNL/TM-11504, May 1990

3.2.6 Toxic and Chemical Materials

Finding No.: TCM/CF-1 PCB Wastes Stored Longer Than One Year

Finding Description: **MMES-ORNL is storing radioactively contaminated PCB wastes in excess of 1 year in Bldg. 7507W, which is not in accordance with 40 CFR 761.65(a).**

Code: Compliance

Compliance Protocol: 40 CFR Part 761.65(a) requires that PCB wastes with concentrations of 50 ppm or greater be disposed within one year from the date they are placed in storage.

Priority: Energy Systems Risk Weight 405
Tiger Team Action Plan Priority 2

Response: This action plan addresses the proper disposition of one 30-gal and one 55-gal storage drum of radioactively contaminated PCB wastes that have been stored in Building 7507W in excess of the one-year regulatory limit. The corrective actions specified will preclude the recurrence of this deficiency.

The deficiency was identified to ORNL compliance personnel by Waste Management Operations personnel in June 1989 and subsequently was identified by Energy Systems–ORNL in the Energy Systems Monthly Environmental Compliance Report for June 1989.

Energy Systems–ORNL requested that this noncompliance be addressed by DOE-ORO and EPA. A request was submitted by DOE-ORO to EPA Region IV on November 15, 1989, proposing that DOE and EPA enter into an agreement on a schedule to dispose of the stored material. A formal compliance strategy is under development by ORO.

In the interim, a request was made to the K-25 Site for transfer of the two drums to K-25 for storage. The request was denied March 15, 1991. The disposal of the two waste drums will be initiated after the K-25 TSCA incinerator becomes operational which is projected to be in 1991.

Delays have occurred in the transfer of the two waste drums to K-25 as the result of discrepancies in two analyses. A third analysis will be completed to ensure K-25 waste acceptance criteria are met, and the drums will be transferred to K-25.

After completion of the third analysis, the request for storage of the radioactively contaminated PCB wastes at K-25 was denied by K-25 on March 25, 1991. The rejection was based on the concentration of radionuclides present. Negotiations between ORNL and K-25 personnel for storage of the contaminated PCB wastes

at K-25 will continue. Storage of the two contaminated PCB waste drums at ORNL will continue until approval is recovered to ship them to K-25 for storage.

Root Causes:

(1) Regulatory barriers; presently, there are no disposal facilities for radioactively contaminated PCB wastes. (2) Inadequate management approach; failure to negotiate a federal facility compliance agreement to address this issue in a timely manner.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Resample the two contaminated PCB waste drums as per K-25 requirements.	Complete
2. Energy Systems–ORNL will send a letter to DOE-ORO requesting that this issue and future similar issues be resolved in a timely manner.	Complete
3. Complete analyses of the two contaminated PCB waste drums.	Complete
4. Request approval for shipment and ship the two contaminated PCB waste drums to K-25; request denied 3/15/91.	Complete
5. DOE-ORO request negotiation of an FFCA with regulators.	Complete

Costs:

Type of funds: ERWM Programmatic
Source of funds: EM-ADS344

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	1.5						1.5
2	—						—
3	4.5						4.5
4	1.5						1.5
5	8.0[a]						8.0
Status:							
Funded	20						
Requested							
New							$15.5

[a]Best estimate of staff time required to support DOE-ORO in its negotiations with EPA.

References: 40 CFR, Part 761.65(a)

Energy Systems Monthly Environmental Compliance Report, June 1989

Letter from ORNL to DOE-ORO dated July 5, 1989, requesting that DOE and EPA negotiate a consent order to address the noncompliance

DOE-ORO letter to EPA Region IV dated November 15, 1989, proposing that DOE and EPA enter into an agreement on a schedule to dispose of the stored waste

Finding No.: TCM/CF-2 Deficiencies with the TSCA Assumptions Requirements for Liquid Filled Electrical Equipment

Finding Description: **Some ORNL transformers which should be assumed to be PCB transformers in accordance with 44 FR 31517, including those in Bldgs. 2018, 1058, and 3025 at ORNL and in Bldg. 9204-3 at Y-12, are not being managed as PCB transformers by MMES-ORNL in accordance with 40 CFR Part 761.**

Code: Compliance

Compliance Protocol: 40 CFR 761

Priority: Energy Systems Risk Weight 410
Tiger Team Action Plan Priority 2

Response: 40 CFR 761 requires that any transformer which contains mineral oil but for which there is no information on the concentration of PCBs in the transformer, the concentration of PCBs in the transformer must be assumed to be 50 ppm to 499 ppm. *Federal Register* (*FR*) Volume 44, No. 106, May 31, 1979, requires that if a transformer does not have a nameplate to indicate the type of dielectric fluid in it, the transformer must be assumed to be a PCB transformer (500 ppm or higher), unless the dielectric fluid is analyzed and found to contain less than 500 ppm PCB. Transformers at ORNL with no nameplates, no manufacturers information, and no sampling information must be labeled as > 500 ppm and inspected quarterly. If the sampling analyses determine that the PCB contamination is > 500 ppm, > 50 ppm, or nondetectable, then the transformer should be labeled as explained in Environmental Protection Manual 4.0-PCB. The ORNL PCB Inventory and Annual Report will be revised to provide the appropriate concentrations for each transformer remaining on site at ORNL. The information for ORNL at Y-12 will be submitted to Y-12 Environmental Compliance for inclusion in the Y-12 PCB Annual Report. PCB requirements are defined in Chapter 4.0 of the Environmental Protection Manual. Training of these requirements to division environmental protection officers and PCB generators was provided in May 1990. PCB issues will be discussed in the ORNL "Hazardous and Mixed Waste Generators Training."

Root Causes:

Ambiguous requirements or expectations; the previous interpretation of 40 CFR 761 was inadequate in relation to unidentified, untested transformers at ORNL. Under previous policy: assumed to be 50 ppm to 499 ppm.

Staffing extra funds to inspect, test, and validate all transformers at ORNL were not appropriated in past years at ORNL.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Prepare letter to each Division Director and Environmental Protection Officer.	Complete
2. EPOs update transformer inventory and begin inspections.	5/91
3. Initiate sampling for unknown transformers and/or apply labels as necessary.	6/91
4. Confirm receipt of sampling results and review inspection logs.	7/91
5. Second quarter of inspections by EPOs completed. Environmental Compliance reviews records.	9/91

Costs:

Type of funds: Overhead

Source of funds: Division Administration

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
3	22						22
5		*					
Status:							
Funded							
Requested							
New	22						$22

*Annual ongoing costs: $10K for inspections.

References: 40 CFR Part 761.3—Definitions
44 *FR* No. 106 (May 31, 1979)

Finding No.: TCM/CF-3 Inadequate Labeling of Equipment Containing PCB Capacitors

Finding Description: **MMES-ORNL did not label three electrical equipment units containing large, high-voltage PCB capacitors in Bldg. 4501 and 9201-2, in accordance with 40 CFR 761.40(a)(4) and applicable ORNL and Y-12 MMES procedures.**

Code: Compliance

Compliance Protocol: 40 CFR 761.40(a)(4) requires that equipment which contains large, high-voltage PCB capacitors or a PCB transformer be marked with a PCB label at the time of removal of the equipment from use, if not already marked. Also, Energy Systems Procedure 4.0 requires marking of equipment containing large high-voltage PCB capacitors or transformers.

Priority: Energy Systems Risk Weight 405
Tiger Team Action Plan Priority 2

Response: The equipment containing PCB capacitors which was observed during audits of Buildings 4501 and 9201-2 has PCB small labels on the capacitors inside the equipment. Each piece of equipment was marked on the outside of the cabinet(s) as the audit was completed for the building.

PCB labeling requirements are defined in Chapter 4.0 of the ORNL Environmental Protection Manual. PCB issues will be discussed in the ORNL "Hazardous and Mixed Waste Generators Training."

Root Causes:

Ambiguous requirements or expectations—lack of clear instructions to mark the outside of the equipment, instead of (or in addition to) the capacitor(s) inside; also, an interpretation of the regulations was that the equipment must be marked "at the time of removal of the equipment from use . . . ;" it was unclear as to the status of the equipment, whether it was in use, on standby, or on reserve.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Prepare letter to EPOs which clarifies that every piece of equipment containing capacitors (except for small capacitors) must have appropriate sized PCB ML label on the outside.	Complete

Costs: No significant costs are associated with the action listed.

References: 40 CFR 761.40(a)(4) and ORNL EPM 4.0 Procedure

Finding No.: TCM/CF-4 Deficiencies with TSCA Temporary Storage Facility Requirements

Finding Description: **At the Transformer Service Area, Bldg. 9204-3, a drum of PCB waste was not marked with the date the PCB material was placed into the drum as waste, and the area was not appropriately marked with a large M_L mark in accordance with 40 CFR 761.65(c)(1), 40 CFR 761.65(3), and 40 CFR 761.40(a)(10).**

Code: Compliance

Compliance Protocol: 40 CFR 761.65(c)(1) requires that the initial date to storage of PCB wastes be indicated for a temporary storage area. 40 CFR 761(b) establishes PCB storage area requirements and 40 CFR 761(c)(3) defines PCB storage area labeling requirements, by reference to 40 CFR 761.40(a)(10), that apply to Building 9204-3.

Priority: Energy Systems Risk Weight 405
Tiger Team Action Plan Priority 2

Response: A Management Plan for PCBs at the Isotope Enrichment Facility was developed by IEF personnel and submitted to Chemical Technology Division management on November 28, 1990. This plan, among other items, addressed the dating of initial waste storage and the labeling of the PCB storage area. Both of these compliance deficiencies have been corrected and the Management Plan provides for quarterly inspections to ensure future compliance.

Building 9204-3 is an ORNL facility located at Y-12. Historically, there have been questions and problems resulting from this organizational arrangement. The PCB compliance deficiencies are an example of the problems that arise when there are questions over organizational jurisdictions. In some cases, roles, responsibilities and accountability on issues that involve both organizations are poorly documented and, to a lesser extent, poorly understood. Recently, a Memorandum of Understanding between ORNL and Y-12 was signed and adopted to try to improve the delineation of roles and responsibilities between these two organizations for ORNL facilities at Y-12. Implementation of the Memorandum of Understanding is in progress; however, since it is a broad agreement between two large organizations, details of implementation remain to be resolved as new situations are encountered.

Root Cause:

Poorly defined roles, responsibilities, and accountability involving the ORNL/Y-12 interface

Pla ... ...ies:

Item/Description	Completion Date
t a memorandum of understanding ınd responsibilities of managing ORNL 2.	Complete
ment plan for PCBs at the Isotope ility.	Complete

C th the corrective actions and the development of the PCB vere less than one full-time equivalent month funded out of the operating budget.

R.

edure 70-905
nmental Protection Manual 4.0

Finding No.: TCM/CF-5 Lack of Hazard Identification Labels for Some Chemical Storage Tanks

Finding Description: Some aboveground chemical storage tanks, including a total of five tanks located at Bldgs. 5554, 7002, 7740, and Barn "D," do not have hazard identification labels as required by MMES-ORNL EPM-15.0.

Code: Compliance

Compliance Protocol: ORNL EPM-15.0 requires hazard identification labels on chemical storage tanks.

Priority: Energy Systems Risk Weight 10
Tiger Team Action Plan Priority 3

Response: Hazardous material labels have been placed on aboveground chemical storage tanks identified in this finding. However, to facilitate continued compliance with ORNL's hazard identification labeling requirements the environmental tank compliance section over the next 12 months (FY 1991) will conduct random surveys at various AST sites throughout the Laboratory.

Root Cause:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Place labels on tanks	Complete

Costs: No significant costs were associated with this action item.

References: None

Finding No.: TCM/CF-6 Lack of Secondary Containment for Some Aboveground Hazardous Materials Chemical Storage Tanks/Containers

Finding Description: Some MMES-ORNL hazardous/toxic material aboveground storage tanks and containers (drums), and tank truck transfer stations do not have adequate containment structures as required by EPM-13.0.

Code: Compliance

Compliance Protocol: None

Priority: Energy Systems Risk Weight 9
Tiger Team Action Plan Priority 3

Response: Secondary containment upgrade for truck transfer stations at ORNL's PWTP (Building 3544) is being addressed under a 1992 GPP. The functional requirements for this project have been drafted and are presently in the review cycle. Several internal division assessments for the upgrade of ORNL aboveground storage tanks (AST) with inadequate or no secondary containment has been conducted by respective tank owners. In addition, the lack of secondary containment for truck transfer stations and ASTs were identified and documented in a 1989 tank survey conducted by ORNL's Environmental and Health Protection Division. However, plans to retrofit existing AST systems with adequate secondary containment at Buildings 2522, 3004, 5554, 7002, 7012, and 7702 have been delayed due to lack of funding. Relative to the matter concerning 55-gallon drums, overpacks were provided for those drums needing to be secondarily contained as of November 27, 1990. Therefore, the action to provide secondary containment for 55-gallon drums is closed.

Root Cause:

Tank systems and truck transfer stations at ORNL which lack secondary containment are structures that began operating in the 1960s. As such, these tanks and truck transfer stations were not mandated in regulations to have secondary containment beyond when they became operational. Plans to upgrade various tanks with secondary containment have been delayed because of lack of funding.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Equip the PWTP with transfer stations that provide a minimum containment volume sufficient to hold the largest tank truck volume which is to be handled.	12/92
2. Request funding for secondary containment for ASTs at Buildings 2522, 3004, 7002, 7012, and 7702 in accordance with 40 CFR PT 151 under Hazardous Substance Spill Prevention as well as other relevant DOE, State, and Federal requirements as funding become available.	8/91
3. Close ASTs at facilities which are on a "standby" status as an alternative to diking.	9/92
4. Add one FTE to the ongoing AST management program to assist in facilitating this long-term compliance of DOE Order 5400.1, Section 5 relative to General Environmental Protection Requirements.	10/91
5. Request resources for full implementation of database tracking system for ASTs and other vessels containing liquid regulated substances with a capacity of 55 gallons or greater.	12/91

Costs:

Type of funds: Capital
Source of funds: GPP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1		1000					1000
2			750				750
Status:							
Funded							
Requested							
New		1000	750				$1750

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
3		80					80
4		21					21
5		5					5
Status:							
Funded							
Requested							
New		106					$106

References: Clean Water Act of 1972 as amended in 1977
40 CFR Pt. 112—Oil Pollution Prevention
40 CFR Pt. 151—Hazardous Substances Spill Prevention
NFPA 30 (1984)—Flammable and Combustible Liquids Code
DOE Order 5400.1, Section 5—General Environmental Protection Program Requirements (4/7/88)
Energy Systems-ORNL Environmental Protection Manual—13.0

Finding No.: TCM/CF-7 Deficiency with TSCA Storage for Disposal Monitoring Policy and Storage for Disposal Policy

Finding Description: **MMES-ORNL has not met the storage for disposal monitoring policy guidelines in accordance with Federal Register, Volume 54, No. 244, December 21, 1989, or the 1-year storage for disposal requirement in accordance with 40 CFR Part 761.65(a) for some of the PCB waste drums in Bldg. 7507.**

Code: Compliance

Compliance Protocol: 40 CFR Part 761.65(a) limits the storage of PCB waste to a period of up to one year prior to disposal. Under EPA's existing compliance monitoring policies (*Federal Register*, Volume 54, No. 244, December 21, 1989), the one-year storage period is allocated between storage at the generator's facility and storage at the commercial disposal facility. Generators of PCB wastes are presumed to be in compliance with the one-year limit on storage if they can demonstrate that the storage period prior to delivery to a disposal facility did not exceed nine months.

Energy Systems-ORNL has not met the storage for disposal monitoring policy guidelines in accordance with Federal Register, Volume 54, No. 244, December 21, 1989, or the one-year storage for disposal requirement in accordance with 40 CFR Part 761.65(a) for some of the PCB waste drums in Building 7507.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: The drums of PCB wastes that were generated November 9, 1989, were shipped from ORNL to Rollins Environmental in Texas on November 9, 1990. Part of the drums were incinerated on November 10, 1990, and the remaining drums were incinerated the next week. An Exception Report as required by 40 CFR Part 761.215(d) has been prepared by ORNL which will be submitted to EPA, Region IV in January 1991.

EPM Procedure 4.0—PCBs will be revised to include the February 1990 *Federal Register* requirements concerning disposal of PCB wastes, manifesting of wastes, and submittal of Exception Reports. The procedure will encourage the shipment of all PCB wastes (> 50 ppm) to be shipped off-site to an EPA-TSCA permitted incinerator within nine months of the generation date. PCB issues will be discussed in the ORNL "Hazardous and Mixed Waste Generators Training."

Root Causes:

Inadequate policy and inadequate policy implementation; lack of clearly defined ORNL policy for storage and shipment of PCB wastes.

Inadequate oversight and insufficient resources; human factor delays, limited staff time, and laboratory analysis delays which led to the 1-year disposal deadline being missed.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Submit Exception Report to DOE-ORO for submittal to EPA 1/31/91; resubmit to DOE-ORO 3/14/91.	Complete
2. Issue revised EPM - 4.0 - PCBs.	5/91
3. Initiate quarterly inspections by Environmental Compliance.	6/91

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
3	*						
Status:							
Funded							
Requested							
New							$

*Estimated annual ongoing cost: $70K.

References: None

Finding No.: TCM/BMPF-1 Pesticides Program Deficiencies

Finding Description: **MMES-ORNL does not adequately label and properly equip pesticide storage areas at Bldgs. 2567 and 0855, Barn "D," and equipment at Barn "D" in complete accordance with 40 CFR 165.10.**

Code: Best Management Practice

Compliance Protocol: None

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: Pesticides and herbicides shall be stored in a safe and effective manner to support ongoing field work and programmatic needs. These improvements were accomplished by clarifying the requirements imposed by laws and procedures and implementing these requirements. Labeling requirements for storage areas and training requirements for staff will be incorporated in the ORNL Environmental Protection Manual (EPM).

Root Cause:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Label storage areas and equipment at Bldgs. 2567, 0855, and Barn "D" in accordance with 40 CFR 165.10.	Complete
2. Install two ABC type fire extinguishers at Barn D.	Complete
3. Modify EMP to include procedure defining labeling, training, and monitoring requirements.	09/91

Costs: No significant costs are associated with the actions outlined.

References: None

3.2.7 Quality Assurance

Finding No.: QA/CF-1 Standard Operating Procedures Deficiencies for Some MMES-ORNL Projects

Finding Description: **Some operating procedures for the ORNL Materials Division, Biological Monitoring and Abatement Program, Pesticides Program, and air and groundwater quality tasks have not been approved (i.e., are drafts) or have not been developed by MMES-ORNL in accordance with the ORNL Quality Assurance Manual and DOE 5700.6B. In addition, 18 of 21 Environmental Protection Manual procedures have not been updated by MMES-ORNL as required by EPM-20.0.**

Code: Compliance

Compliance Protocol: DOE Order 5700.6B invokes ANSI/ASME NQA-1, which requires the development of instructions, procedures, and drawings for activities that affect quality.

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: The lack of approved procedures to perform important activities consistently at ORNL has been long been recognized as a major concern at ORNL.

A Quality Assurance Bulletin was issued to all ORNL employees on September 10, 1990, reminding them that it is their obligation to see that procedures are prepared, reviewed, and approved for all important activities.

The division and program QA specialists will work with their line managers to prepare lists of procedures that need to be developed. These lists will also indicate the persons responsible for developing the procedures and prioritized completion dates. Surveillances will then be conducted to determine adherence to those schedules.

Root Cause:

Inadequate policy implementation; management has not fully implemented the policy requiring procedure development.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Instruct QAS/QACs to work with their respective line organizations to develop lists of procedures needed for their important activities.	6/91
2. Complete procedures development schedules per Item 1.	7/91
3. Perform surveillances to verify adherence to the procedure development schedules.	12/91

Costs:

Type of funds: Research Programmatic
Source of funds: ER

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	2	*					2
3	2	*					2
Status:							
Funded	4						
Requested							
New							$4

*Estimated annual ongoing cost: $4K.

References: ANSI/ASME NQA-1.

Finding No.: QA/CF-2 Deficiencies with the MMES Environmental Surveillance Procedures Quality Control Program Manual

Finding Description: The MMES Environmental Surveillance Procedures Quality Control Program Manual is not used for all MMES-conducted environmental sampling at ORNL in accordance with the MMES Manual requirements and is not managed in accordance with accepted practices for document distribution, completeness, accuracy, and review.

Code: Compliance

Compliance Protocol: The Energy Systems ESPQCP "is to be used" for all environmental data collection conducted by Energy Systems, including Energy Systems-ORNL. Additionally, good management practices dictate that environmental surveillance procedure guidance documents be properly managed. These practices include ensuring that the document is properly distributed, is complete and accurate, and is reviewed, approved, and implemented by all cognizant organizations.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: Improvements in the management of the ESPQCP are addressed by this action plan. Energy Systems Central Staff will better define the implementation and revision procedures. Procedures will be reviewed by the Environmental Sampling and Instrumentation Group. Specifically, any procedures that do not follow approved EPA protocols will be submitted for revision. Document control procedures will be improved. Biological Monitoring and Abatement Program-associated SOPs will be written and submitted for inclusion in the ESPQCP, and each ORO site office will be included in the review process.

Root Causes:

Inadequate oversight, ambiguous requirements or expectations, regulatory barriers, and inadequate policy

Planned Actions and Schedules:

Item/Description	Completion Date
1. Document and distribute to all ES&H organizations protocols which have been developed for revisions to the ESPQCP.	Complete

2.	Include all DOE Site Offices in the review process for the manual and manual revisions. Review comments and/or approval will be forwarded to Central Staff in writing.	6/91
3.	Environmental Sampling and Instrumentation Group will review all procedures in the ESPQCP and specifically submit to Energy Systems Central Staff a procedure for collection of volatile organic samples by the sample container immersion method.	6/91
4.	Submit any other findings and suggestions for revision to the ESPQCP document to Energy Systems Central Staff.	7/91
5.	Issue a revised policy for document control of the ESPQCP manual.	7/91
6.	Develop draft SOPs specifically applying to Biological Monitoring and Abatement Programs for approval by the appropriate ORNL QA representative.	6/91
7.	Forward SOPs to Energy Systems Central Staff for review and inclusion in the ESPQCP.	6/91

Costs: The Action Items will be accomplished with no significant costs.

References: None

Finding No.: QA/BMPF-1 QA/QC Deficiencies in MMES-ORNL Environmental Sampling Programs

Finding Description: A few MMES-ORNL environmental sampling activities do not follow such accepted QA/QC practices as collecting blanks and duplicates, field monitoring for pH and conductivity, maintaining chain-of-custody for periphyton samples, and using ink for data entries into analytical logbooks.

Code: Best Management Practice

Compliance Protocol: Good environmental monitoring practices dictate that standard accepted sampling and analysis protocol be followed to help ensure the generation of defensible analytical data. These practices include: establishing field sampling QC programs, following field monitoring protocols for pH and conductivity, following chain of custody, and entering all laboratory logbook notations in ink.

Priority: Energy Systems Risk Weight 9
Tiger Team Action Plan Priority 3

Response: A QC program outline was in place at the time of the audit as noted in the discussion. Further development of this program is planned and the lack of a complete program identified in self-assessment. The ESI will provide ESD with appropriate documentation and control procedures and chain of custody for use in their biological monitoring program. Along with these initiatives, the ESI will also perform internal audits on the program, as manager of the BMAP budget, in order to ensure compliance with QA requirements.

Root Causes:

Inadequate policy, inadequate communications, inadequate policy implementation, and poorly defined roles and responsibilities

Planned Actions and Schedules:

	Item/Description	Completion Date
1.	Prepare an outline for a complete QC program for all compliance sampling activities.	Complete
2.	Inform all field personnel by memo that all entries in BMAP field logbooks must be made in waterproof ink, and pH and conductivity measurements must be taken in the field.	Complete
3.	Develop a QC program plan.	6/91

4.	Develop a procedure requiring that field readings for pH and conductivity be taken in situ or by grab.	Complete
5.	Distribute SOP-EMC-003.002 Chain of Custody for use and reference by appropriate staff.	Complete
6.	Submit a budget to support the QC program.	8/91
7.	Initiate implemention of the QC program plan.	11/91

Costs:

Type of funds: ESH Programmatic
Source of funds: ER-AT EC

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	—						
4	—						
5	—						
6	—						
7		235	*				235
Status:							
Funded							
Requested							
New		235					$235

*Estimated annual ongoing cost: $235K.

References: None

3.2.8 Radiation

Finding No.: RAD/CF-1 Inadequate Radiological Dose Assessment

Finding Description: **The MMES-ORNL dose assessment process has deficiencies in that data documentation and traceability, computer validation, dose calculation assumptions, and dose assessment oversight are not in accordance with DOE 5400.5, 5700.6B, and ANSI/ANS 10.3, 1986.**

Code: Compliance

Compliance Protocol: DOE Order 5400.5 states, among other things, that doses to members of the public in the vicinity of DOE activities shall be evaluated and documented to demonstrate compliance with the dose limits of the order, that appropriate transport models and dose conversion factors should be used, that calculated doses should be as realistic as practicable, and that parametric values used in the dose calculations should be recorded and should be realistic or, lacking real data, should be conservative.

The draft regulatory guide for 10 CFR 834 restates the requirements of DOE Order 5400.5 and provides additional guidance on some items. Of particular applicability to this finding is that parameter values used in the dose calculations be evaluated and documented.

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: The deficiencies noted in this finding are attributable to two things: lack of formal procedures and documentation of the rationale for choosing a few parameter values. The lack of formal procedures has been identified in ORNL and Office of Environmental and Health Protection self-assessment reports. Procedure development has begun, and documentation for the identified parameter values will be prepared.

Root Cause:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Reconstruct documentation for generic exposure parameters used in annual surveillance reports.	7/91
2. Issue a procedure for "input data management."	7/91
3. Issue procedures for performance of dose calculations to demonstrate compliance with DOE Order 5400.5.	8/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	6						6
2	12						12
3	12						12
Funded							
Requested	30						
New							$30

Estimated annual ongoing cost: $15K.

References: None

Finding No.: RAD/CF-2 Inadequate Radiological Postings

Finding Description: **MMES-ORNL posting of some radioactively contaminated areas, and radiological control boundaries of Solid Waste Storage Area (SWSA) 4, is inconsistent with DOE 5480.11, MMES-ORNL Health Physics Procedure RP 2.3, Revision 1, and OR Radioactive Contamination Control Policy.**

Code: Compliance

Compliance Protocol: Compliance with radioactive contamination posting requirements

Priority: Energy Systems Risk Weight 65
Tiger Team Action Plan Priority 2

Response: The laboratory is in the process of completing the posting requirements as required by the "ORO Contamination Control" implementation plan, dated September 29, 1990. Due to the large areas involved and the replacements that are required because of the weather, posting upgrades at SWSA 4 will be needed. Irregularities in the "zone" and "area" signs will be corrected. The use of the "General Radiation Hazard Information Sign" is specified in Health Physics procedure RP 2.3, and areas at the SWSAs will continue to use this approved sign to specify and supplement the other radiological postings. Many of the posting discrepancies were corrected as they were identified.

The general SWSA areas and roadways are not contaminated, and the primary control of personnel and vehicle contamination will continue to be entry and egress controls at the actual contaminated sites within the SWSA boundaries.

The postings of the White Oak area will need to be studied to determine the appropriate use of the "Radiation Hazard Keep Out" signs, as well as the other signs that are presently in use. Agreements with other agencies will be needed on areas that are outside Energy Systems-ORNL control.

A complete survey of the White Oak Creek floodplain and other associated SWSA run-off areas will be completed to determine if any areas, that meet radiological area criteria, are not properly identified.

Additional information is provided in response to SSB/BMPF-1.

Root Causes:

Insufficient resources, inadequate oversight, and inadequate communications

Planned Actions and Schedules:

Item/Description	Completion Date
1. Complete the posting upgrades around SWSA 4.	Complete
2. Post "Radiation Hazard Keep Out" signs at areas of White Oak Dam and the surrounding areas that are controlled by Energy Systems-ORNL.	6/91
3. Request funds to contract a survey of the White Oak floodplain and tributary run-offs leaving the SWSAs.	8/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	16						16
2	8						8
Status:							
Funded	24						
Requested							
New							$24

Type of funds: ESH Programmatic
Source of funds: ER-AT RP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
3			225				225
Status:							
Funded							
Requested							
New			225				$225

References: DOE Order 5480.11, "ORO Contamination Control Policy"

Finding No.: RAD/CF-3 Unmonitored Decontamination Laundry Discharges

Finding Description: MMES-ORNL has not adequately evaluated the discharge of the radioactive component of the laundry facility effluent to determine if discharges are below 5 times the DCGs, as required by draft Regulatory Guide for 10 CFR 834 and DOE 5400.5.

Code: Compliance

Compliance Protocol: All liquid effluent streams shall be evaluated and their potential for release of radioactive material assessed. Based on this assessment, decisions shall be made regarding necessary effluent monitoring systems.

Priority: Energy Systems Risk Weight 58
Tiger Team Action Plan Priority 2

Response: Though initially monitored and evaluated for inclusion in the Sewage Treatment Plant wastewater stream in 1986, the wastewater from the contaminated clothing washer has not been formally evaluated since. Because of this, a new evaluation of this wastestream's components will be made. Using the results of this study, a decision will be made regarding whether the Sewage Treatment System provides for the proper treatment and disposal of this wastestream.

Root Cause:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Reevaluate the wastewater stream and the Sewage Treatment Plant's Waste Acceptance Criteria to determine if contaminated washer wastewater can be legally disposed of by this process.	10/91

Costs:

Type of funds: ESH Programmatic
Source of funds: ER-AT RP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1		15					15
Status:							
Funded							
Requested							
New		15					$15

Estimated annual ongoing cost: $5K.

References: Draft Regulatory Guide for 10 CFR 834

Finding No.: RAD/CF-4 Inadequate Calibration of Radiological Monitors

Finding Description: **MMES-ORNL surface water radiological monitors at all monitoring stations are not calibrated in accordance with the Regulatory Guide for 10 CFR 834 (draft) and cannot provide quantitative data for alarm set points and unplanned radiological releases.**

Code: Compliance

Compliance Protocol: The compliance protocols are found in 10 CFR 834 (Summary Section 2.a through 2.s) and DOE Order 5400.5.

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: ORNL should establish at stream monitoring sites radiological monitors that are calibrated against known standards. Readout instrumentation in concentration units that correlate directly with regulated discharge limits should also be obtained. It should be pointed out that if possible, all environmental data reported by ORNL (and any accompanying formal actions) are acquired through sampling and analysis; therefore, the importance of this improvement is providing alarm set points. A single system that serves multiple purposes will require establishment of performance criteria, operating procedures, and most probably equipment modifications.

Root Causes:

Poorly defined roles and responsibilities, inadequate policy, and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue a project charter and assign duties to a radiological monitoring review committee with participation by responsible ORNL groups including Emergency Response and Waste Operations.	7/91
2. Assign a staff member to develop, oversee and conduct an internal audit program of check sheets and associated material for the project and keep all such information in a document file for the life of the project.	Complete

3. Complete a summary report of committee review of applicable regulations from different sources with common interests to insure all requirements are met. — 9/91

4. Issue an "approved policy statement" containing specific definitions of responsibilities including funding, training, functional criteria, operational guidelines, matrix support agreements, and referencing the specific data sheets listed in Item 4. — 8/91

5. Prepare budget and request funding for required upgrades. — 9/91

6. Modify, upgrade, or replace monitors or system components as determined by the above actions. — 9/93

7. Issue SOPs for maintenance, calibration, and operation of modified system components. — 12/93

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	—						
4	—						
5	10	*					10
6	—						
7	—						
Status:							
Funded	10						
Requested							
New							$10

*Estimated annual ongoing cost: $5K.

References: None

3.2.9 Inactive Waste Sites

Finding No.: IWS/CF-1 Inadequate Inventory and Identification of Inactive Waste Sites

Finding Description: **OR has not adequately identified all inactive waste sites and does not have formal procedures in place to ensure site identification and reporting of potential inactive waste sites in conformance with its RCRA/HSWA permit and 40 CFR 300.410 and 40 CFR 300.420.**

Code: Compliance

Compliance Protocol: The National Contingency Plan (NCP), 40 CFR 300.410 and 40 CFR 300.420, requires that the lead agency use readily available information to prepare a report that includes a history of waste handling and inventory of potential inactive waste sites.

DOE Order 5400.4, "CERCLA Requirements," states that DOE shall respond to inactive waste sites in compliance with the NCP.

The ORR RCRA/HSWA permit contains a compliance schedule under which DOE must provide the regulatory agencies with a solid waste management unit (SWMU) identification and characterization report, i.e., a RCRA Facility Assessment (RFA) for all SWMUs listed in the attachment to the permit.

Priority: Energy Systems Risk Weight 410
Tiger Team Action Plan Priority 2

Response: Because ORNL's April 1987 RFA was prepared on an accelerated schedule to meet ORR's RCRA/HSWA permit deadline, SWMUs were identified based on readily available information. Since that time additional sites have been identified and further characterization of the new, and existing sites has been accomplished as part of the facility's surveillance and maintenance, environmental compliance and monitoring, and environmental restoration activities. Site characterization will be accomplished mainly via the remedial investigation (RI) process. The schedules for conducting RIs is negotiated with the EPA-Region IV and the TDHE annually as part of the pending Federal Facility Agreement (FFA). Additional sites and/or changes in status of existing sites have been reported to the regulatory agencies and corrective action has been accomplished as required. Reclassification of sites resulting in "no further action" change in regulatory status, i.e., RCRA or CERCLA, and deletion of facilities requiring only decontamination and decommissioning, i.e., not a source of continuing release to the environment, have been negotiated with the regulatory agencies. The lack of a formalized approach, i.e., procedures, for such activities as site identification, preliminary assessment, and determination of regulatory status documentation of agreement has resulted in numerous discrepancies in the site listing.

The list of sites was revised and baselined in September 1990 incorporating input and review by personnel of the ORNL Office of Environmental Compliance and Documentation (OECD), ORNL Office of Waste Management and Remedial Actions (OWMRA), and the Energy Systems Environmental Restoration Division. This listing of sites provides consistency in site identification and reporting and identifies all major sites requiring, or potentially requiring, remediation at the ORNL. This listing of sites will be incorporated as Appendix C of the pending FFA. Additional sites of lesser importance may be discovered during such activities as surveillance and maintenance, and remedial investigation but these are expected to be few in number. These sites, as they are discovered, will be reported to the regulatory agencies as required, and corrective actions will be negotiated as part of the pending FFA. It is not considered cost effective to initiate a separate effort at this time to fully investigate the ORNL property to identify any remaining sites. The ORNL OECD will prepare procedures to address roles and responsibilities; site discovery; preliminary assessment/site inspection; regulatory status determination; documentation of regulatory agency interfaces; and site-listing configuration control.

Root Causes:

Poorly defined roles and responsibilities inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue plan/schedule for procedures development.	6/91
2. Issue approved procedures.	9/91
3. Conduct RIs.	Negotiated annually as part of FFA
4. Baseline site listing.	Effective date of FFA

Costs:

Type of funds: ERWM Programmatic
Source of funds: EM-ADS 322

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1–2	25						25
Status:							
Funded	25						
Requested							
New							$25

References: ORR RCRA/HSWA Permit
40 CFR 300.410
40 CFR 300.420
DOE Order 5400.4

Finding No.: IWS/CF-2 Lack of Formal Natural Resources Damage Assessment Notification

Finding Description: **Formal notification by OR to the Natural Resources Trustees of potential damages to the environment from releases of hazardous substances from inactive waste sites at ORR has not been made, as required by CERCLA Section 104(b) and Executive Order 12580.**

Code: Compliance

Compliance Protocol: DOE, as mandated under Section 107 of CERCLA, serves as the Primary Federal Natural Resource Trustee at DOE facilities and as a CERCLA lead response agency performing environmental restoration actions at DOE facilities, DOE has a dual role.

Pursuant to DOE Order 5400.4, Program Senior Officials are responsible for overseeing implementation of the Natural Resource Trustee provisions of CERCLA, and Heads of Field Organizations are responsible for overseeing response actions under CERCLA. Many of the assessment activities required under the National Resource Damage Assessment (NRDA) are also required by the CERCLA response and/or the federal RCRA corrective action process.

Priority: Energy Systems Risk Weight 495
Tiger Team Action Plan Priority 2

Response: ORO and Energy Systems–ERD are aware of the need for NRDA notification, which was raised in ORO's recent environmental compliance audit at Y-12, as well as in the October 1990 environmental compliance review at ORNL, conducted by Energy Systems corporate staff (IWS-175, in reference to Control Number ORNL-ER-1).

ORR has recently received draft guidance from Headquarters and are actively discussing notification strategies with DOE Headquarters. ORR will use the draft guidance as a baseline in which to implement a standard procedure for the ORO and revise accordingly if Headquarters guidance is substantially modified from the proposed draft.

An NRDA seminar with DOE Headquarters and the Department of the Interior was held in March 1991 in Oak Ridge.

Root Causes:

Lack of formal guidance from Headquarters and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Develop DOE-ORO Environmental Restoration Division roles and responsibilities.	Complete
2. Formally notify trustees.	5/91
3. Devleop training procedures.	9/91

Costs: This action was accomplished with existing resources.

References: CERCLA Section 104, CERCLA Section 107, Executive Order 12580, DOE Order 5400.4

Finding No.: IWS/CF-3 Incomplete Distribution of Emergency Planning and Community Right-to-Know Act Reports

Finding Description: **XSO or OR have not sent the initial list of hazardous chemicals and its first and second updates to the LEPC and jurisdictional fire department; the third update to the SERC, LEPC, and jurisdictional fire department; nor the most recently 1989 EPA Tier I and II forms to the jurisdictional fire department, as required in 40 CFR 370.**

Code: Compliance

Compliance Protocol: Sections 311 and 312 of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA or SARA Title III) requires the owner or operator of a facility subject to this act to submit specific emergency planning information "...to the commission, committee, or the fire department having jurisdiction over the facility..." (40 CFR 370, Subpart B).

Priority: Energy Systems Risk Weight 405
Tiger Team Action Plan Priority 2

Response: Due to several DOE reorganizations and the attendant changing of personnel responsible for SARA Title III reporting, the XSO was not able to substantiate that all SARA Title III reports had been transmitted to the appropriate entities since the promulgation of EPCRA, as required in 40 CFR Part 370.

Root Causes:

Poorly defined roles and responsibilities for SARA Title III reporting with DOE-ORO and inadequate policy implementation as defined in 40 CFR 370

Planned Actions and Schedules:

Item/Description	Completion Date
1. Transmit the SARA 311 report for 1989 to the ORNL Fire Department.	Complete
2. Transmit previous SARA reports to the appropriate commissions, committees, and jurisdictions.	Complete
3. Assign XSO responsibilities regarding SARA Title III reporting.	Complete
4. Establish filing and distribution system for SARA Title III reports.	Complete

5. Establish procedure on Environmental Compliance reporting.	Complete
6. Provide SARA Title III training to the XSO environmental staff.	9/91

Costs: XSO program activities will be accomplished with existing resources.

References: 40 CFR Part 370

Finding No.: IWS/BMPF-1 Informality of Operations in the Environmental Restoration Program

Finding Description: **OR, XSO, MMES-ERD, and MMES-ORNL have not adequately established formal procedures, lines of communication, and documentation of significant ORR environmental restoration program (ERP) activities and technical review in accordance with best management practice.**

Code: Best Management Practice

Compliance Protocol: None

Priority: Energy Systems Risk Weight 10
Tiger Team Action Plan Priority 3

Response: ORO and Energy Systems-ERD recognize the need for greater formality and procedures, which were identified by Energy Systems-ORNL in its self-assessment, as well as by ORO in several internal audits and in its most recent Performance Evaluation Committee report. The need to formally document day-to-day policy and technical decisions is acknowledged; conscious efforts to maintain record of communication logs, notes to the file, and follow-up letters to each other, as well as the regulators on conversations and other informal direction received, are made.

DOE-ORO is developing a program management plan that will address ER activities at all of its facilities, including ORR and has finalized an internal memorandum of agreement (MOA) between the Assistant Manager for Environmental Restoration and Waste Management and Assistant Manager for Energy Research and Development to coordinate waste management and environmental restoration work at ORNL. Energy Systems-ERD is developing a Remedial Investigation/Feasibility Study Surveillance Plan that will strengthen Energy Systems-ERD's oversight procedures for administering the ERP.

Revised performance criteria are currently under development, including a draft position description for the Technical Oversight and Review Committee chairman. Energy Systems-ERD has also drafted a missions statement for the TORC and operating instructions for document review. Energy Systems-ERD's subcontract team is currently developing procedures to address issue resolution and follow-up.

Root Causes:

Unclear roles and responsibilities resulting from the recent organizational changes at ORO, Energy Systems-ERD, and Energy Systems-ORNL; inadequate policy implementations; and lack of resources for technical review and oversight from both the regulators and DOE-ORO

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue the ORO Environmental/Waste Management program management plan.	Complete
2. Finalize the missions statement for the TORC and position description for the TORC chairman.	Complete
3. Develop procedures requiring documentation of informal communication and agreements with the regulators.	Complete
4. Develop formal procedures for review and approval of ERP documents prior to submittal to DOE Headquarters that will ensure adequate technical oversight by ORO of remedial activities.	Complete
5. Issue the ORNL Energy Systems-ERD Remedial Investigation Feasibility Study Surveillance Plan.	9/91
6. Develop written procedures for rectifying and tracking issues of concern that are identified by ORNL Energy Systems-ERD while conducting oversight of subcontractor ERP activities.	9/91

Costs: No significant costs are associated with these activities.

References: None

Finding No.: IWS/BMPF-2 Proceeding Without Approved Plans

Finding Description: OR and DOE Headquarters are implementing corrective action plans and schedules that have been submitted under ORR's RCRA/HSWA permit without receiving formal regulatory approval from EPA Region IV and TDHE, which is not in accordance with best management practice.

Code: Best Management Practice

Compliance Protocol: None

Priority: Energy Systems Risk Weight 7
Tiger Team Action Plan Priority 3

Response: DOE-ORO and Headquarters are very much aware of the risk associated with implementation of corrective action plans without receiving formal regulatory approval from EPA and TDHE. However, EPA and TDHE have been made aware of our on-going work through regularly scheduled technical working group meetings and have informally supported DOE's initiation of remedial activities.

ORO is under continued pressure by the regulators to proceed with our investigations and not allow the slow approval process to serve as a barrier. We will continue to keep the regulators fully apprised of our on-going investigations being sure to receive verbal approval prior to initiation of any new activities as agreed to in an October 17, 1990, letter to both EPA and TDHE.

DOE-ORO and representatives from the EPA and TDHE agreed that no new field work will proceed without approved work plans. Corrective actions will not occur until the remedial investigation report, feasibility study, and draft remedial action plan are approved.

Root Cause:

Insufficient regulatory resources to ensure timely reviews of DOE plans

Planned Actions and Schedules:

Item/Description	Completion Date
1. Briefing with both TDHE and EPA will be held prior to initiation of any new investigation. EPA and TDHE must provide verbal concurrence with the proposed actions prior to initiation of work. These briefings will be held on an as needed basis.	Complete

2. DOE-ORO issue letter to EPA and TDHE to clarify action approval approach. Complete

Costs: Activity accomplished with existing resources.

References: October 17, 1990, letter to EPA and TDHE from DOE ORO-ERD

Finding No.: IWS/BMPF-3 Lack of Adequate Planning for Federal Facility Agreement Activities

Finding Description: **Contrary to best management practice, ORO has not factored in the costs and additional time associated with preparing NRDAs into any of the FFA negotiations and draft agreements, nor has OR fully analyzed the cost impacts associated with implementing the AIP.**

Code: Best Management Practice

Compliance Protocol: The NCP Section 300.615 specifies requirements for Natural Resources Damage Assessments. Any negotiations of Federal Facility Agreements (FFA) or agreements with states such as Agreements in Principle (AIP) should take into account costs and schedules associated with NCP requirements and impacts of state oversight.

Priority: Energy Systems Risk Weight 42
Tiger Team Action Plan Priority 3

Response: It is true that ORO did not explicitly factor in the costs and additional time associated with preparing NRDAs into any of the FFA negotiations and agreements. However, upon examining what actions are routinely taken in implementing the FFA, such costs are accounted for in budgeting and planning for the RI/FS process including the requirements of the NCP.

While a fully comprehensive analysis of impacts associated with implementing the AIP may not have been performed, ORO was one of the first field offices to recognize that impacts on the M&O Contractor and Federal staff should be included in the ER budget submissions. A telephone canvass was made to Hanford and Rocky Flats in early 1990 to gather input from DOE staff on the impacts to M&O and Federal staff caused by execution of the AIPs. This information was passed on to Energy Systems–ERD who later provided DOE-ORO with AIP implementation cost estimates and a draft ADS. ORO and Energy Systems are continuing to refine this cost estimate and to develop a formal AIP implementation plan to define FY 1991 reporting baselines and to meet the FY 1993 Budget submission.

Budgeting and planning for the RI/FS process are addressed in the individual ADSs for site-specific waste area groupings.

Root Cause:

Ambiguous requirements or expectations

Planned Actions and Schedules:

No further action is planned at this time.

Costs: None

References: Energy Systems-ERD AIP implementation cost estimates and draft ADS

Finding No.: IWS/BMPF-4 Incomplete Evaluation of Continuous Releases

Finding Description: OR, XSO, and MMES-ORNL have not completed a systematic evaluation of releases to the environment at ORR, in accordance with best management practice, to determine whether reporting of continuous releases under 40 CFR 302.8 is appropriate.

Code: Best Management Practice

Compliance Protocol: CERCLA Section 103(f) (2) requires the reporting of non-Federally permitted continuous releases.

Priority: Energy Systems Risk Weight 50
Tiger Team Action Plan Priority 3

Response: ORNL has been directed on two separate occasions to perform an assessment of non-Federally permitted releases to determine if any releases have occurred that were in excess of the Reportable Quantity.

Root Cause:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue request to ORNL to perform assessment.	Complete
2. Issue directive to ORNL to perform assessment.	Complete
3. Develop ORNL action plan for report.	Complete

Costs: Action Items 1-3 will be accomplished at no significant costs.

References: 40 CFR 302

3.2.10 National Environmental Policy Act

Finding No.: NEPA/CF-1 Inefficient DOE NEPA Implementation Procedures

Finding Description: **Differences among DOE program offices in document format and the number of required concurrences on NEPA-decisional documents are resulting in confusion, lack of NEPA focus, and project delays at ORNL, such that the NEPA process is not always fully implemented in accordance with Council on Environmental Quality regulations and DOE directives.**

Code: Compliance

Compliance Protocol: Secretary of Energy Notice 15-90

Priority: Energy Systems Risk Weight 658
Tiger Team Action Plan Priority 2

Response: The concurrence chains in all programs are built into the DOE system and are therefore difficult to streamline. In ORO, for example, the concurrence chain for a Section D NEPA determination for a project funded by a program that has delegated authority to the manager requires ten signatures. In nondelegated programs, the program secretarial officer (PSO) has his/her own concurrence chain, format, and submittal procedures.

Once an adequate document has been received from ORNL, processed through the site office, and delivered to ORO, it takes an average of one month to obtain the manager's signature.

Program guidance to standardize NEPA document format and submittal procedures should be provided by EH-25.

Root Cause:

Inadequate policy

Planned Actions and Schedules:

On September 20, 1990, ORO met with ORNL staff to discuss NEPA issues and concerns. Additionally, ORNL participated in a NEPA training session on September 25, 1990, and Energy Systems formed a NEPA committee, which met on November 8, 1990, to discuss ways to streamline the NEPA process. Program guidance is provided by DOE-HQ.

Item/Description	Completion Date
1. Request HQ guidance on streamlining the NEPA approval and format process.	Complete
2. Schedule an ORO/ORNL review of the NEPA process to discuss/agree on specific action items.	2/91
3. Train ORO/ORNL staff in NEPA document processing procedures.	5/91
4. Issue and implement ORO and site office procedures.	6/91
5. Conduct surveillance of NEPA implementation to determine effectiveness of above actions.	8/91

Costs: Activities are part of an ongoing improvement effort and will be accomplished with existing resources.

References: None

Finding No.: NEPA/CF-2 Project Implementation Without Completed NEPA Process

Finding Description: ORNL removed an underground waste storage tank and modified Bldg. 9401-1 to create an energy technology development laboratory without completing the NEPA process as required by CEQ regulations (40 CFR 1505.1), SEN-15-90, and the DOE NEPA Guidelines (52 FR 47662).

Code: Compliance

Compliance Protocol: National Environmental Policy Act, Secretary of Energy Notice 15-90

Priority: Energy Systems Risk Weight 405
Tiger Team Action Plan Priority 2

Response: Adequate NEPA review of all ORNL operations is the responsibility of each ORNL operating organization. The removal of the underground storage tank was completed to meet a scheduled compliance deadline, which could have resulted in fines to ORNL. The building modification was undertaken before the latest DOE NEPA compliance guidance was received.

Root Causes:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Notify all ORNL operating organizations of the requirements for NEPA Complete review of projects.	Complete
2. Implement a bi-weekly review with DOE-ORO of projects with regulatory compliance deadlines to ensure timely NEPA review by DOE-ORO.	Complete

Costs: No significant costs are associated with the actions outlined.

Finding No.: NEPA/BMPF-1 Lack of Environmental Impact Assessment for ORNL Continuing Operations

Finding Description: **MMES-ORNL continues to operate without a comprehensive NEPA analysis and is, therefore, not operating in accordance with best management practices.**

Code: Best Management Practice

Compliance Protocol: Secretary of Energy Notice 15 (SEN-15)

Priority: Energy Systems Risk Weight 10
Tiger Team Action Plan Priority 3

Response: A decision to prepare a sitewide NEPA document for ORNL would involve three or four DOE program offices. ORNL and the other major facilities (Y-12 and K-25) on the ORR are operated under a single M&O contract administered by ORO that reports to NE, as specified in SEN-6D-91. Additionally, ER has programmatic and institutional oversight responsibility at ORNL (as per SEN-6D-91). EM has the landlord function for ORNL in FY 1991 and FY 1992, while landlord responsibilities for ORNL will return to ER in FY 1993. NE is the lead PSO with respect to the Field Office, with all three DOE program offices having responsibility for various programmatic activities and functions at the multiprogram laboratory. A portion of the ORNL physical facility also resides at the Y-12 Plant, managed by DP. In addition, several other DOE program offices that support ongoing research at ORNL would need to be informed of any impending action that might affect their mission.

ORO is in the process of considering the issue of a sitewide NEPA review for the ORR as a whole. Any sitewide NEPA reviews for ORNL, the other facilities on the ORR, or the ORR as a whole would need to be coordinated with each other and with the several other large NEPA reviews currently planned or under way, including the EM Programmatic EIS (PEIS) for Environmental Restoration and Waste Management, the DP PEIS for Reconfiguration of the Weapons Complex, and the ORR Environmental Restoration and Waste Management EIS. Because some of the main environmental problems at ORNL (and on the ORR in general) are related to legacy wastes and waste management, completion of the related ORR ER/WM EIS and the larger EM PEIS (before a determination for preparation of a new sitewide NEPA document for either ORNL or the ORR) would permit a new sitewide NEPA document to benefit from these other documents. ORO currently is examining all of these EIS relationships in an effort to make a recommendation to the program offices and to EH on the best course of action.

A complicating factor in determining the proper course of action on a sitewide NEPA review for ORNL (and for the ORR) is the absence of implementing guidance on the purpose, use, content, and scope of sitewide NEPA documents.

As a result, the decisions these documents would support and the alternatives they would consider are unclear.

In summary, the feasibility, efficacy, and need for the preparation of a comprehensive NEPA analysis for ORNL are being considered by the affected HQ program offices and ORO. This has a high priority. Such a document will be difficult to plan and coordinate, especially in the absence of implementing guidance that is mutually agreed upon. The ORNL Corrective Action Plan alone cannot resolve all of the difficult issues and unanswered questions related to (1) sitewide reviews for the ORR and other ORR facilities and (2) the development of comprehensive guidance by EH.

Root Causes:

Inadequate policy and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
PSOs agree on the need and strategy for sitewide NEPA review.	12/91

Costs: Costs and schedules for the required documents will be prepared when the scope is defined by DOE policy.

References: SEN-15

3.3 SITEWIDE SAFETY AND HEALTH FINDINGS, RESPONSES, AND PLANNED ACTIONS

3.3 SITEWIDE SAFETY AND HEALTH FINDINGS, RESPONSES, AND PLANNED ACTIONS

Finding discipline	Finding number prefix	Section number
Organization and Administration	OA	3.3.1
Quality Verification	QV	3.3.2
Operations	OP	3.3.3
Maintenance	MA	3.3.4
Training and Certification	TC	3.3.5
Auxiliary Systems	AX	3.3.6
Emergency Preparedness	EP	3.3.7
Technical Support	TS	3.3.8
Packaging and Transportation	PT	3.3.9
Nuclear Criticality Safety	CS	3.3.10
Security/Safety Interface	SS	3.3.11
Experimental Activities	EA	3.3.12
Site/Facility Safety Review	FR	3.3.13
Radiological Protection	RP	3.3.14
Personnel Protection	PP	3.3.15
Worker Safety and Health Compliance	WS	3.3.16
Industrial Hygiene	IH	3.3.17
Fire Protection	FP	3.3.18
Medical Services	MS	3.3.19

3.3.1 Organization and Administration

Finding No.: OA.1-1 Flowdown of ES&H Policies and Requirements

Finding Description: **The flowdown of policies and requirements from top management to all levels of the organization to implement environmental, health, and safety initiatives is not consistently managed in an effective manner.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 69
Tiger Team Action Plan Priority 2

Response: Energy Systems and ORNL recognize the need to effectively manage the flowdown of policies and requirements from top management to all levels of the organization so that the environmental, health, and safety initiatives are consistently implemented. Energy Systems and ORNL will formally assign to executive managers responsibility for functional regulatory and management areas (e.g., industrial hygiene, radiation protection, records management, etc.). These managers will be responsible for developing policies to address new requirements or to initiate corrections to existing shortfalls. Likewise, site and operating managers and personnel, who will report through the above managers, will be identified for the development of necessary site- or organization-specific procedures.

The implementation of the Automated Procedures Requirements Accountability System (APRAS) will provide the method to effectively manage the flowdown of requirements, orders, policies, and procedures. This computer system is accessible to appropriate Energy Systems personnel via mainframe computers. It is intended to identify specific executive managers' responsibilities for regulatory or management areas and to identify specific divisional or lower level managers' responsibilities for implementing procedures. This interactive tracking and commitment system will indicate (via electronic mail) that particular compliance or improvement activities must be performed by designated managers and permit a method to follow up to ensure the actions have been taken. In addition, the system will prompt and ensure that specific policies and procedures are reviewed periodically (e.g., every three years or as specified for a given procedure or policy). Management is currently directly involved with the assignment of responsibilities and actions that must be taken in conjunction with the input of information into APRAS. APRAS will generate follow-up requirements directly to managers or individuals assigned specific responsibilities to ensure that APRAS will work.

Root Causes:

Lack of policy, unclear roles and responsibilities, and inadequate management approach

Planned Actions and Schedules:

Item/Description	Completion Date
1. Develop and implement a policy for the effective dissemination of ES&H initiatives to all organizational levels. Establish the authority for development and promulgation of ES&H policy and procedures. (See Finding MF-4.)	5/91
2. Place ORNL SPPs in APRAS. (See Finding OA.1-2.)	Complete
3. Develop schedule for additional ORNL-specific operating or divisional procedures (such as Industrial Hygiene Department or Laboratory Shift Supervisor's procedures) to be entered into APRAS. (See Finding OA.1-2.) This activity is intended to ensure that appropriate lower-level operating procedures reflect higher-level directives or mandates.	12/91

Costs: Costs are included in Findings MF-4 and OA.1-2.

References: None

Finding No.: OA.1-2 Dissemination of DOE Orders and Other Requirements

Finding Description: **The process by which DOE Orders and other compliance requirements are disseminated and implemented is not controlled throughout ORNL.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 58
Tiger Team Action Plan Priority 2

Response: Energy Systems and ORNL recognize the need to control compliance requirements, their dissemination, and their implementation. As a result of a corporate audit finding on lack of command media flowdown, ORNL and Information Resources Division implemented an approach to command media through the Tiger Team Document Control Center. And two new activities now under way are expected to address this need.

The first activity is a management system improvement program, undertaken by Energy Systems, which provide formal assignment of compliance areas to Energy Systems and each of the Energy Systems sites, including ORNL. Executive managers, along with lower-level managers reporting to them, will be assigned responsibility for specific compliance areas. Compliance areas will be divided into functional areas at the Energy Systems level and at the ORNL level. These functions are organized under auditing, business systems, computing telecommunications, and configuration management. (Functional areas include engineering, emergency preparedness, environmental protection, ethics, evaluation, health, human resources, information management, legal, maintenance, policy integration, conduct of operations, policy-standards-procedure system, public relations, quality assurance, quality control, research and development, safeguards and security, safety, technology transfer, and work for others.) Energy Systems will formally review requirements and promulgate necessary policies; ORNL will also develop necessary site procedures in a similar fashion if necessary. The ORNL functional representatives will be responsible for formal implementation of the regulations as interpreted at the Energy Systems level. The documentation and control of this implementation are addressed in the second activity.

The second activity is the implementation of the Automated Procedures Requirements Accountability System (APRAS). This system provides flow down of requirements, orders, policies, and procedures. It also provides identification of the individual responsible for implementation and will provide notification of responsibility as well as tracking of responsibility for implementation of DOE orders. ORNL is beginning input into this accountability system for ORNL Standard Practice Procedures, and will continue for lower level documents.

(Reference OA.1-1, which addresses how APRAS will interact with management, which will ensure practical implementation.)

Root Causes:

Poorly defined roles and responsibilities and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Organize and introduce the Management System Improvement Program, which specifically defines how Energy Systems and ORNL will review DOE orders and other compliance requirements and will disseminate and implement internal compliance policies and procedures.	Complete
2. Identify and assign responsibilities to specific managers for reviewing compliance areas and how Energy Systems and ORNL will respond to compliance needs. These managers will identify what policies or procedures need to be written or revised. Initially managers will concentrate on high-priority areas such as environment, safety, or health. [In the future, lower-priority non-ES&H areas will be reviewed.]	9/91
3. Develop a schedule for medium- to low-priority non-ES&H functional areas of the Management System Improvement Program (i.e., areas not addressed under the second action item). This would include identifying specific individuals to review compliance documents that might require creation or revision of Energy Systems or ORNL policies or procedures.	4/92
4. Finalize and test APRAS software.	Complete
5. Place ORNL SPPs into APRAS.	Complete
6. Develop and implement schedule for additional requirements, orders, policies, and procedures to be entered into APRAS for ORNL specific sections or operating areas. (Same action item for OA.1-1 #3.)	12/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	—						
4	—						
5	1	*					1
6	75	*					75
Status:							
Funded	1						
Requested							
New	75						$76

*Estimated annual ongoing cost: $8K.

References: None

Finding No.: OA.1-3 ES&H Issues for Construction Management

Finding Description: **The roles and responsibilities for environment, health, and safety to support MK-Ferguson construction management activities have not been clearly established by the Oak Ridge Operations Office.**

Code: Category III

Compliance Protocol: Best management practices would indicate that Energy Systems and MK-Ferguson effectively enforce safety requirements upon construction contractors.

Priority: Energy Systems Risk Weight 539
Tiger Team Action Plan Priority 2

Response: Verbal instructions were provided to MK-Ferguson and Energy Systems on October 1, 1990, to continue health and safety roles and responsibilities as defined in document DOE/OR-891 until the new three party interface agreement is finalized. These verbal instructions were formalized in letters to MK-Ferguson and Energy Systems on November 17, 1990.

The new interface agreement that clearly defines Energy Systems and MK-Ferguson roles and responsibilities is now in final draft, and DOE plans to finalize it by February 17, 1991.

The MK-Ferguson ES&H Program Plan is being reviewed by DOE and the Contractor Officer's Representative (COR) will assure that Energy Systems interfaces are addressed.

Root Cause:

Poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Complete ES&H portion of MK-Ferguson–Energy Systems interface document.	Complete
2. Complete review of MK-Ferguson ES&H Program (assure MK-Ferguson–Energy Systems interfaces are addressed).	Complete
3. Begin implementation of interface agreements.	Complete

Costs: Completion of activities will be accomplished within the planned MK-Ferguson indirect rate.

References: None

Finding No.: OA.1-4 Acceptance of ES&H Requirements at ORNL

Finding Description: **Environment, safety, and health requirements have not been fully integrated into or accepted by divisions across ORNL.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 488
Tiger Team Action Plan Priority 2

Response: The level of understanding and acceptance of ES&H requirements varies from division to division within ORNL. Promulgation of a strong directive to implement and institutionalize ES&H requirements, development of a comprehensive set of quantifiable ES&H goals, and an effective set of policies and implementing procedures to communicate ES&H requirements and expectations would ensure understanding and acceptance at all levels of the organization. See Findings MF-4, MF-7, TC.1-1, OA.1-2, OA.3-1, and OA.1-5.

Root Causes:

Inadequate policy, inadequate training, and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Develop and promulgate a policy with respect to compliance with ES&H requirements and the authority of ES&H staff personnel. (See Finding MF-4.)	5/91
2. Implement and document training of all personnel (including guests and consultants) on the laboratory policy with respect to compliance with ES&H requirements, the accountability of Laboratory personnel and the ES&H goals of the Laboratory and their division. (See Findings MF-7 and TC.1-1.)	6/91
3. Develop and implement a program to clearly define the standards and expectations for all ORNL divisions to assess themselves by and the process for performance improvement. (See Finding SA-1.)	10/91

Costs:

Type of funds: Overhead
Source of funds: Division Administration

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	275[a]						
3	—						
Status:							
Funded							
Requested							
New	275						$275

[a]Requires division to conduct training for each individual or ~5000 person hours.

References: DOE-EH Radiation Protection TSA

Finding No.: OA.1-5 Implementing ES&H Activities

Finding Description: **The roles, responsibilities, and interfaces involving important environment, safety, and health activities are not always well established nor defined.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 539
Tiger Team Action Plan Priority 2

Response: This organization and administration finding will be addressed by planned development and implementation of appropriate policies and procedures to establish position, organization, and committee charters which include the desired ES&H accountabilities and authorities.

Root Cause:

Inadequate management approach

Planned Actions and Schedules:

Item/Description	Completion Date
1. Management System for Roles and Responsibilities (see Finding MF-4).	
2. Review and revise as appropriate October 4, 1990, Memorandum of Understanding (MOU) delineating Environmental, Safety, and Health staff responsibilities of ORNL and the Y-12 Plant for ORNL organizations at Y-12.	10/91
3. Implement major interface roles between MK-Ferguson and Energy Systems (see Finding OA.1-3).	5/91

Costs: Costs are included in Findings MF-4 and MF-7.

References: Memorandum of Understanding—ORNL and Y-12 Responsibilities for ORNL Organizations at Y-12, October 4, 1990

Summary of major interface roles between MK-Ferguson and Energy Systems, Draft 5a, November 27, 1990

Finding No.: OA.1-6 Consistency of Safety Requirements

Finding Description: **Martin Marietta Energy Systems has not implemented uniform safety requirements at the X-10 Site and Y-12 Plant.**

Code: Category III

Compliance Protocol: Potential for deviations from orders, requirements, regulations, and good practices.

Priority: Energy Systems Risk Weight 65
Tiger Team Action Plan Priority 2

Response: The deficiencies noted in the observations which support this finding indicate lack of consistency between sites (X-10 and Y-12) relative to ES&H expectations and requirements and lack of clarity regarding roles and responsibility for implementation of ES&H policies and procedures for X-10 facilities and staff located at the Y-12 site. The Laboratory will address this finding primarily in two ways. The more general address will be implementation of the new Energy Systems-wide management system for roles and responsibilities. The more specific address will be full implementation of the recently established (October 4, 1990) "ORNL and Y-12 Responsibilities for ORNL Organization at Y-12," Memorandum of Understanding (MOU). Because of the newness of this MOU, it had been only recently and perhaps incompletely distributed at the time of the Tiger Team assessment. As a result, the affected staff did not have complete benefit of document familiarity and appropriate training. Implementation of the subject MOU will evolve as necessary to be consistent with roles and responsibilities specified in the new Energy Systems-wide management system for roles and responsibilities. At the appropriate juncture, formal review and revision of the MOU will be considered to ensure appropriate coverage of those specific items that continue to require special treatment in addition to that provided via the new management system for roles and responsibilities.

Root Causes:

Poorly defined roles and responsibilities and ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Management System for Roles and Responsibilities (see Findings OA.1-5, MF-1, and MF-4.	
2. Special Attention to Previously Problematic Organizational Interfaces (see Finding OA.1-5).	

Costs:

1. Management System for Roles and Responsibilities (see Finding MF-4).
2. Special Attention to Previously Problematic Organizational Interfaces (see Finding OA.1-5).

References: Memorandum of Understanding—ORNL and Y-12 Responsibilities for ORNL Organizations at Y-12, October 4, 1990

Finding No.: OA.3-1 ES&H Goals for ORNL

Finding Description: **ORNL management has not established an integrated set of comprehensive quantifiable environmental, safety, and health goals for all ORNL facilities.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 64
Tiger Team Action Plan Priority 2

Response: This deficiency existed primarily because environmental and ALARA concerns are not fully established and formalized as an integral part of the ORNL Safety Action Plans. Efforts under way to resolve this deficiency include establishing a policy that will establish annual ES&H goals that will be approved by senior management and incorporation of these goals and objectives into personnel performance plans to better identify and reflect progress in crucial areas. Several other action plans support resolution of this deficiency. See Findings AX.5-1, MF-1, and RP.11-1.

Root Causes:

Inadequate policy, insufficient resources, inadequate management approach, and ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Develop a consistent, ORNL-wide definition of ES&H goals that stresses specific, positive, attainable and measurable objectives (see Finding MF-1).	5/91
2. Establish CY 1991 goals in each ES&H discipline and issue ORNL goal document to divisions.	5/91
3. Division directors establish ES&H goals for the division.	5/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

Action item	Estimated costs per fiscal year ($K) 1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	15						15
3	—						
Status:							
Funded							
Requested							
New	15						$15

Estimated annual ongoing cost: $15K.

References: None

Finding No.: OA.6-1 Requirements for Job Descriptions

Finding Description: **There are neither requirements for job descriptions to be reviewed on a regular basis nor for safety responsibilities to be included in job descriptions.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 58
Tiger Team Action Plan Priority 3

Response: Job descriptions at ORNL are generic and used primarily for bidding and compensation purposes. The Laboratory intends to meet the need for incorporating ES&H responsibilities in the roles and responsibilities documents, position charters, and performance plans described in response to Finding MF-4.

Root Cause:

Inadequate management approach

Planned Actions and Schedules:

This finding is fully addressed by actions listed in Finding MF-4.

Costs: Costs are included in Finding MF-4.

References: None

Finding No.: OA.6-2 Employee Appraisal Plan Requirements

Finding Description: The Performance Planning and Review system does not require that environment, health, and safety factors be part of the appraisal plan for all employees.

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 58
Tiger Team Action Plan Priority 3

Response: ES&H performance is addressed in our present Performance Planning and Review System. The Laboratory intends to address this management concern more formally through the development and implementation of appropriate policies and procedures. The planning aspect will be added.

Root Cause:

Inadequate policy

Planned Actions and Schedules:

This finding is fully addressed by actions in Finding MF-4.

Costs: Costs are included in Finding MF-4.

References: None

Finding No.: OA.7-1 Centralized System for Safety Document Control

Finding Description: **A centralized system for the rigorous control of important safety documents has not been implemented.**

Code: Category III

Compliance Protocol: Violation of various directives including DOE orders could result from using outdated safety documents.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: Various Energy System and ORNL Quality Program documents define actions and responsibilities required to control documents. However, a comprehensive listing of those documents which require rigorous control does not exist.

Root Cause:

Lack of policy

Planned Actions and Schedules:

Item/Description	Completion Date
1. Develop and Implement an ORNL SPP integrating existing Energy Systems and ORNL standards on document control. The SPP should specify a. the tier of documents for which vigorous control is required, b. document control procedures, c. review responsibilities and procedures, and d. document tracking and retrieval system.	6/91
2. Perform a Laboratory-wide audit to ensure all required documents are being maintained in accordance with the ORNL SPP on document control.	2/92

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	4						4
2		4					4
Status:							
Funded	4						
Requested		4					
New							$8

References: Energy Systems Quality Program Standard ESS 6.1, "Document Control," September 30, 1987; ORNL Quality Assurance Procedure QA-L-6-100, "Document Control," January 31, 1987

Finding No.: OA.7-2 Records Storage Facilities

Finding Description: **Records storage facilities at ORNL do not meet the requirements of DOE 5700.6B, ANSI/ASME NQA-1, and NFPA 232.**

Code: Category III

Compliance Protocol: DOE Order 5700.68, ANSI/ASME NQA-1, and NFPA 232

Priority: Energy Systems Risk Weight 130
Tiger Team Action Plan Priority 2

Response: Records storage has long been a concern at ORNL. Records storage problems were cited in the DOE-ORO Multifunctional Appraisal, May 1990, the Martin Marietta Corporate Audit, July 1990, and in other audits prior to those.

It is true that ORNL does not have a single point records storage facility that meets the requirements of NFPA 232. ORNL QA procedure QA-L-17-100 on records storage provides for either single facility storage or dual facility storage as described in Section 4.4.4 of Supplement 175-1 of ANSI/ASME NQA-1. This section allows storage of QA records in dual facilities, and these facilities are not required to meet the requirements of NFPA 232. While we are not in total compliance with either single or dual storage points, many of our QA plan records list specific locations of dual storage points for important records.

The inefficiency of dual storage points and the need for a single point NQA-1 storage area were recognized by the ORNL QA organization and the Energy Systems records personnel. Accordingly, a Performance Improvement Process (PIP) team was chartered in April 1989 to study ORNL's records system. One of the team's recommendations was establishment of a central records storage facility for Energy Systems that meets the requirements of NQA-1 and DOE.

As a result of the ORNL PIP team's recommendation, an Energy Systems PIP team was chartered to study the feasibility of a single Energy Systems records facility. Several options are being considered by the team, including a single facility, two facilities, or satellite centers with one and one-half hour fire rated cabinets in sprinkled, alarmed areas. The exact solution and schedule will depend on the team's recommendations, management acceptance of those recommendations, and obtainment of necessary funding. In the interim, ORNL will continue to utilize the dual file point option that is allowed under Supplement 17S-1 of ANSI/ASME NQA-1, Section 4.4.4.

Root Cause:

Inadequate policy implementation; all areas of the Laboratory have not consistently implemented policy to utilize either dual record storage or approved single-point NQA-1 storage for designated records.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Complete study of records storage alternatives and make recommendations to Energy Systems Management.	11/91
2. Select a storage alternative and develop an implementation schedule to meet the storage requirements.	1/92

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	18						18
2		7					7
Status:							
Funded							
Requested	18						
New		7					$25

References: ANSI/ASME NQA-1

Finding No.: OA.8-1 Supervisory Training in Behavior Observation

Finding Description: A formal sitewide program to train all supervisors in recognition of drug or alcohol use and behavior observation has not been implemented.

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 87
Tiger Team Action Plan Priority 2

Response: ORNL has partially addressed this problem in our training on Illegal Drug Use. We will further address this concern through the completion of supervisory training. See also Finding ROA.8-1.

Root Cause:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Schedule and conduct a 1.5-hour substance abuse awareness training module and a 1-hour aberrant behavior module for all supervisory and management personnel.	5/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	14						14
Status:							
Funded	14						
Requested							
New							$14

Estimated annual ongoing cost: $6K.

References: None

3.3.2 Quality Verification

Finding No.: QV.1-1 Resources for QA Functions

Finding Description: **Resources applied to quality assurance functions are less than those required to meet support obligations, which is contrary to the requirements of DOE 5700.6B, ANSI/ASME NQA-1, and the ORNL Quality Assurance Manual.**

Code: Category III

Compliance Protocol: DOE Order 5700.6B and ANSI/ASME NQA-1

Priority: Energy Systems Risk Weight 60
Tiger Team Action Plan Priority 2

Response: Similar concerns were expressed by the same auditor during the DOE Headquarters Quality Verification Inspection conducted during May 1990. There was some difference of professional opinion as to how closely the QA Specialists should be involved with the line organization and how much of the QA responsibilities should be discharged by the line organization. There is a general agreement that additional QA staffing is required. Three QA Specialists positions are currently being filled through offers which were temporarily being held up due to reductions in force related to budget uncertainties. An additional QA analyst was added during October from a list of individuals identified for budget-related terminations. Interviews are continuing, and it is anticipated that three additional QA Specialists to replace QA Coordinators in the R&D divisions (see Finding QV.1-2) and two certified auditors will be added (see Findings QV.1-3 and QV.1-4) by the end of FY 1991. Staffing levels will be reevaluated prior to submission of the FY 1992 budget, and additional QA Specialist funding will be requested as needed.

ORNL will continue to use existing Quality Assurance Coordinators and provide additional assistance from Quality Assurance Specialists and the ORNL Quality Assurance Program Manager.

Root Cause:

Inadequate policy implementation; adequate quality assurance resources have not been assigned to support full implementation of NQA-1 at ORNL.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Obtain funding agreement from R&D divisions for three QA specialists to replace currently funded QA coordinators.	07/91
2. Evaluate and document needed ORNL QA staffing levels prior to FY 1992 budget submittals.	06/91
3. Submit budget requests for any additional QA specialists identified in Item 2 above.	08/91
4. Contingent on approved funding, hire three additional QA specialists for the R&D divisions per Item 1.	09/91

Costs:

Type of funds: Research Programmatic

Source of funds: ER

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	—						
4	85	*					85
Status:							
Funded							
Requested							
New	85						$85

*Estimated annual ongoing cost: $255K

References: DOE Order 5700.6B, ANSI/ASME NQA-1, ORNL QA Manual

Finding No.: QV.1-2 Implementation of the QA Program

Finding Description: **Contrary to requirements of DOE 5700.6B and ANSI/ASME NQA-1, many line organizations are not implementing the Quality Assurance program, which results in conflicts of interest situations for Quality Assurance Specialist and Quality Assurance Coordinator personnel.**

Code: Category III

Compliance Protocol: DOE Order 5700.6B and ANSI/ASME NQA-1

Priority: Energy Systems Risk Weight 63
Tiger Team Action Plan Priority 2

Response: Potential conflict of interest concerns where line organization personnel function as QA coordinators have long been a concern for the ORNL Quality Department. This concern has been recognized by the DOE Headquarters Quality Verification Inspection, May 1990, as well as earlier audits.

The line organization should play the major role in development of QA plans which define QA actions as a part of their routine activities (see MF-3). In order to implement an aggressive schedule for development of QA plans, the QA specialists and coordinators have often taken a lead role in their development, even to the point of becoming their authors. This does not mean, however, that the line was not actively involved in every step of the development and review process.

It is ORNL's belief that to be truly effective, a QA specialist or coordinator must be knowledgeable enough of the activities being performed to help the line identify the proper controls for their activities. To increase the independence of QA verifications, an effort is being made in 1991 for the QA specialists and coordinators to rotate as lead auditors to provide independence for audits within their divisions.

ORNL has been in the process of replacing QA coordinators with full-time QA specialists for the last 5 years. The last step of this process calls for replacement of QA coordinators in the R&D divisions that do not have a need for full-time specialists by assigning one specialist to two to four divisions. Current plans call for addition of three QA specialists to the ORNL QA staff by the end of FY 1991 to replace the QA coordinators presently being used by the R&D divisions. This will eliminate any potential conflicts of interest and provide the R&D divisions with trained quality professionals. A plan must be developed to determine the anticipated grouping of divisions for each specialist and agreement on funding must be obtained from each division. When funding agreement is reached, interviews of qualified individuals will be conducted by the Quality Department

and key personnel in the R&D divisions. (Hiring of the three specialists was identified as an action item in Finding QV.1-1).

Root Cause:

Inadequate management approach

Planned Actions and Schedules:

Item/Description	Completion Date
1. Develop action plan for assignment rotation of QA Specialists among the R&D divisions.	07/91
2. R&D QA Specialist positions filled. (See Finding QV.1-1.)	

Costs: Costs are reported under Finding QV.1-1.

References: DOE Order 5700.6B and ANSI/ASME NQA-1

Finding No.: QV.1-3 Quality Department Audit Program

Finding Description: **The Quality Department Audit Program is not in compliance with DOE 5700.6B or the ORNL quality assurance manual in maintaining quality assurance program oversight.**

Code: Category III

Compliance Protocol: DOE Order 5700.6B

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: The number of audits conducted by the ORNL quality audit manager and the division QA specialists and coordinators has been identified as a concern by the DOE Headquarters, Quality Verification Inspection, May 1990, DOE-ORO Multifunctional Appraisal, May 1990, Martin Marietta Corporate Audit, July 1990, and the DOE-ORO quality engineer. Due to the large number of externally conducted audits during 1990 and movement of the quality auditing function from Quality Department to the Office of Operational Readiness and Safety and back . to Quality, the number of ORNL QA audits was below those scheduled for 1990.

A quality assurance audit program manager was named, effective December 1, 1990, moving the audit program back from the Office of Operational Readiness and Safety back to the Quality Department. This move places the audit program manager and the QA specialist in the same department, resulting in an organization that will have greater control over the total audit program. Additional budget funds for two full-time auditors will be requested to expand the number of ORNL quality audits performed. As an interim measure, personnel from the ORNL QA staff, division QA specialists, and QA personnel from Energy Systems and the other sites will be used as ORNL auditors to increase the number of audits conducted. All divisions and major programs are required to perform a minimum of one audit per year in addition to three surveillances. These audit and surveillance schedules will be tracked to ensure that they are performed as scheduled.

Root Causes:

Insufficient resources and inadequate management commitments

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue ORNL audit and division audit and surveillance schedules for CY 1991.	Complete
2. Request budget funding for two auditors.	Complete
3. Contingent on approved funding, hire two auditors when budget funding is approved.	06/91
4. Conduct a minimum of one ORNL QA audit per each two-month period in CY 1991 (four audits if no full-time auditors are added to staff).	12/91
5. Issue the first quarterly report during CY 1991 on the status of schedule implementation of ORNL and division audits and surveillances.	Complete

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	57	*					
4	—						57
5	—						
Status:							
Funded							
Requested							
New	57						$57

*Estimated annual ongoing cost: $170K.

References: DOE Order 5700.6B

Finding No.: QV.1-4 Frequency of Internal Audits and Surveillances

Finding Description: **Contrary to requirements of DOE 5700.6B, ANSI/ASME NQA-1, and ORNL Quality Assurance Manuals and Plans, internal audits and surveillances are infrequently performed.**

Code: Category III

Compliance Protocol: DOE Order 5700.6B and ANSI/ASME NQA-1

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: All ORNL divisions were required to perform a minimum of one audit and three surveillances in 1990 in an attempt to ensure adequate coverage across the Laboratory. While the number of audits and surveillances increased, there were a large number which were not performed due to slippage and attention to external audits such as the Martin Marietta Corporate Audit and the DOE Tiger Team Audit.

Each division has provided tentative audit and surveillance schedules to the ORNL Audit Manager for 1991. Two full time auditors have been requested to work with the division audits and surveillances in addition to supporting the ORNL Audit Manager's schedule. In addition, the Audit Manager will prepare quarterly status reports on implementation of the division audit and surveillance program. This report will be provided to the Deputy Laboratory Director for evaluation of schedule implementation and for appropriate action as needed.

Root Cause:

Insufficient resources and inadequate management commitment

Planned Actions and Schedules:

This finding is fully addressed by actions listed in Finding QV.1-3.

Costs: See the cost associated with Finding QV.1-3.

References: None

Finding No.: QV.1-5 QA Plans and Manuals

Finding Description: Most quality assurance plans and manuals fail to reflect all the requirements of DOE 5700.6B and ANSI/ASME NQA-1.

Code: Category III

Compliance Protocol: DOE Order 5700.6B and ANSI/ASME NQA-1

Priority: Energy Systems Risk Weight 56
Tiger Team Action Plan Priority 2

Response: Similar concerns were expressed in the DOE-ORO Multifunctional Appraisal, May 1990, the DOE Headquarters Quality Verification Inspection, May 1990, and the Martin Marietta Corporate Appraisal, July 1990. ORNL's QA Program is based on the premise of graded quality assurance as stated in the Foreword and Quality Assurance Program Basic Requirement of ANSI/ASME NQA-1 that "the Program shall provide control over activities affecting quality to an extent consistent with their importance." The degree of control exercised on bench-scale basic R&D is not intended to be equivalent to that applied to ORNL's reactors, isotope production, and nuclear waste programs. It is difficult for auditors, many of whom come from the nuclear power industry, to grasp and accept the graded quality assurance concept, especially when viewed in its application to the broad spectrum at ORNL.

Ever-increasing customer expectations and requirements have created a need to revise some of our QA plans and manuals to invoke more stringent controls. There are currently over 140 QA plans in effect at ORNL. Those plans that are associated with ongoing activities and current projects will be reviewed to assess their reflection of the requirements of DOE Order 5700.6B and ANSI/ASME NQA-1 and revised as necessary. Audits and surveillance will be used to verify implementation of Item 2 below.

Root Cause:

Inadequate policy and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Review all ORNL QA plans and manuals associated with on-going activities and current projects for inclusion of the appropriate requirements of DOE Order 5700.6B and ANSI/ASME NQA-1 and establish a revision schedule for those procedures identified as requiring revisions.	12/91
2. Issue an SPP that specifies the organizational accountability for training and implementation of QA requirements defined in QA plans and QA procedures.	06/91

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	60	20					80
2	15						15
Status:							
Funded	75						
Requested							
New		20					$95

References: DOE Order 5700.6B and ANSI/ASME NQA-1

Finding No.: QV.1-6 Effectiveness of Corrective Actions

Finding Description: **Corrective actions have been neither timely nor effective in eliminating the recurrence of problems as required by DOE 5700.6B. (See Concern EP.1-2 and PT. 3-2.)**

Code: Category III

Compliance Protocol: DOE Order 5700.6B

Priority: Energy Systems Risk Weight 94
Tiger Team Action Plan Priority 2

Response: The lack of a single, effective corrective action tracking system for ORNL was recognized as a concern in the DOE Headquarters Quality Verification Inspection, May 1990, DOE-ORO Multifunctional Appraisal, May 1990, Martin Marietta Corporate Audit, July 1990, and other external audits prior to 1990. This concern was also recognized in ORNL's self-assessment.

The line organization is responsible under DOE Orders 5700.6B and 5000.3A for determination of root causes of problems and for generating corrective actions to address them. When an investigation team is formed for UORs, QA specialists and coordinators serve as members. All QA specialists will be trained in root cause analysis to ensure the presence of at least one individual on each investigating team with root cause analysis experience.

Effective December 1, 1990, the quality auditing function was returned to the Quality Department. As a part of the reorganization, the Quality Auditing Manager will become a single point for tracking corrective actions, trending problems and concerns, and establishing a lessons-learned system. Once established, a lessons-learned system will allow the line organization to assess its areas for the existence of what could be generic concerns and implement corrective actions to prevent future occurrences.

Root Cause:

Inadequate management approach

Planned Actions and Schedules:

Item/Description	Completion Date
1. Consolidate responsibility for corrective action tracking information (completed) (see Finding MF-6).	
2. Establish a lessons-learned system (see Finding FR.6-1).	
3. Train all QA specialists in root cause analysis.	12/91

Costs:

Type of funds: Overhead

Source of funds: Division Administration

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3		12					12
Status:							
Funded							
Requested							
New		12					$12

References: DOE Order 5700.6B

Finding No.: QV.2-1 Procurement Controls

Finding Description: **Procurement controls are not fully established for the control of purchased material and equipment as required by DOE 5700.6B and ANSI/ASME NQA-1.**

Code: Category III

Compliance Protocol: DOE Order 5700.6B and ANSI/ASME NQA-1

Priority: Energy Systems Risk Weight 82
Tiger Team Action Plan Priority 2

Response: ESS.4.0, "Procurement Document Control," Section 2.0 Scope states: "The extent of application of this procedure will be dependent on the complexity of the Procurement activity." Section 7.2 of QA-L-4-100 states that requisitions which are marked for "special receiving inspection, Code 2, shall be reviewed..." This approach to determining the need for review based on complexity of the Procurement activity is in keeping with the scope of ESS.4.0, and no additional corrective action is required.

QA-L-5-100 requires QA Specialist review of procurement documents for noncommercial items.

Materials Department operational procedure R-1 *Receipt and Inspection* outlines a structured and auditable system for receipt, handling, and tracking of ORNL material received. The procedure was approved and implemented on 7-19-90. Materials Department operational procedure SR-2 *Receipt and Inspection of Safety Related Items or Components* outlines the same system with additional checks and balances, like chain-of-custody requirements for safety related items. The procedure was approved 4-25-90. Procedure implementation is awaiting software development, procurement policy adherence, and warehouse upgrade.

The Materials Department has requested users of stores inventory spare parts to classify each line item as a safety-related item or not. If an item is classified as safety related, the user shall complete the new ORNL stores stock addition form which will identify, if applicable, storage, packaging, shelf life, maintenance requirements, and system description, equipment name, manufacturer, model number, serial number, drawing number, location, and requirements of the vendor. Requests for stores stock addition will not be accepted unless the request is on the new form and complete. The new stores stock addition form requires the requester, if special inspection is required, to identify an inspection plan for each line item.

During the past year, the major emphasis within the Materials Department was focused on the development of a new system for controlling procured materials. This new system would bring ORNL into conformance with the requirements of

the applicable elements of NQA-1 (elements 4 and 7) and procedures and building quality assurance requirements in those procedures. Due to recent administrative problems, progress on the completion of this system has been halted. The revision and implementation of Department QA Plans are needed to illustrate present quality assurance techniques within the Materials Department. The QA plans will include requirements for a surveillance program.

Due to the limitations of the Materials Management System (MMS), data on vendor performance could not be retrieved from that computer system to assess vendor performance. Using a graded approach, Nonconformance Reports (NCRs) were written for discrepant materials received for special inspection (code 2). Data, including vendor name, item description, and discrepancy, were put into the Energy System Quality Information System (ESQIS) and tracked in an effort to identify trends.

Recently, a software package has been identified which has the capability to interact with the MMS and extract the necessary data to perform trend analysis of all discrepant material received at ORNL. This information can also be used to develop and maintain a quality costs system for procured material for the Laboratory. These efforts will constitute effective measures to assess the adequacy of ORNL's procurement activities.

Root Causes:

Poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Develop software for tracking safety materials data and custodianship.	09/92
2. Convert Building 7013 to level "A" and "B" storage (see Finding QV.5-1, Item 3).	
3. Enclose Building 7060 metal storage shed (see Finding QV.5-1, Item 4).	
A. Initiate engineering design	
B. Initiate construction	
4. Construct level "A" inspection area in Building 7001 (see Finding QV.5-1, Item 5).	
5. Review and classify existing stores inventory (see Finding QV.5-1, Item 1).	

6. Revise and issue QA plans to reflect current control mechanism. 08/91

7. Upgrade software to implement trend analysis for discrepant material. 08/91

8. Develop quality cost system and procedurize. 12/91

9. See Finding QV.1-5, Item 2, which addresses QA training for line organizations.

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	1						1
2	—						
3	—						
4	—						
5	—						
6	5						5
7	1						1
8		2					2
9	—						
Status:							
Funded	7						
Requested							
New		2					$9

References: NQA-1, NQA-2, NRC, ORNL QA Manual

Finding No.: QV.3-1 Implementation of Receiving and Preinstallation Inspections

Finding Description: **In many instances, provisions for receiving and pre-installation inspections are not implemented as required by ANSI/ASME NQA-1.**

Code: Category III

Compliance Protocol: ANSI/ASME NQA-1

Priority: Energy Systems Risk Weight 59
Tiger Team Action Plan Priority 2

Response: The current system in place to control the performance of receiving inspection is limited to those activities for which the inspection organization is notified. An automatic invocation of receiving inspection has not been formalized although the personnel assigned to stores are performing some inspections without formal direction or methods of control.

Presently the Receiving Inspector, per procedure QA-L-7-100, places a hold tag on goods received requiring inspection. At that point, an inspection plan has not been transmitted to the inspector. Per procedure the inspector contacts his/her supervisor which in turn contacts the customer requesting an inspection plan. The inspection shall not be performed without an inspection plan.

The responsibility for control must be assigned in a top-level document such as an ORNL SPP, the ORNL Accounting Manual, a QA Plan for procurement of commodities, or ORNL QA Procedure QA-L-7-100. The act of issuing the associated procurement documents by F&M Division will be modified to include notification to the inspection department of the required inspection at receipt. The inspection department, in turn, will generate instruction sheets, including check lists, to perform the inspection and authorize acceptance, rejection, or hold.

For those required items, special inspections are performed under Quality Department IRs. Special high risk areas such as reactors have their own special inspection processes defined and implemented. As part of addressing this issue an Energy Systems audit on receiving inspection has been completed. Surveillances are scheduled to review progress. All of these efforts are designed to improve the system.

Root Causes:

Inadequate policy implementation and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Identify controlling documents/manuals/procedures that need revisions.	05/91
2. Revise and issue controlling documents (manuals, procedures, etc.) identified in Item 1 above.	12/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2		7					7
Status:							
Funded							
Requested							
New		7					$7

References: QE&I Procedures Schedules
F&M Procedures Manual MDR-1, MD-sr-2
Acquisition System Improvement Committee—see A. Kurilik

Finding No.: QV.4-1 Calibration Facilities

Finding Description: **Some calibration facilities are substandard compared to industry metrology standards.**

Code: Category III

Compliance Protocol: Best management practice

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 2

Response: During the self-assessment process, I&C Division reaffirmed the belief held by the Metrology Standards Laboratory manager and staff that the facility was substandard due to environmental control problems. The mission of the Metrology Research and Development Laboratory (MRDL) has been to further measurement science by developing new measurement techniques and to provide traceability of calibration services to National Institute of Standards and Technology (NIST). Present requirements have shifted toward a greater emphasis on providing calibration services to ORNL facilities.

Corrective action, through relocation of some activities, purchase of some additional air-conditioning equipment, and removal of ceramic fiber insulation preceded the arrival of the Tiger Team. The crowded and cramped quarters in the Personal Computer and Process Instrument Maintenance Shop will be relieved in 18 months with the completion of FY 90-91-92 Line Item ORNL 90-R-112, "Measurement and Control Support Facility, ORNL," will add 20,000 ft^2 of office, laboratory, and/or shop space to relieve present crowded conditions in Building 3500.

Root Causes:

Lack of resources and inadequate communications of policy or standards

Planned Actions and Schedules:

	Item/Description	Completion Date
1.	Purchase and install equipment needed to make improvements in temperature regulation.	09/91
2.	Develop a unified quality assurance plan for both field calibration and metrology standards laboratory.	07/91

Costs:

Type of funds: Capital
Source of funds: GPE

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	12						12
Status:							
Funded							
Requested							
New	12						$12

Type of funds: Overhead
Source of funds: Division Administration

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
2	5						5
Status:							
Funded							
Requested							
New	5						$5

References:

I&C Division QA Manual Procedure QA-IC-OP8, "Instrumentation and Controls Division Metrology Laboratory Services" (Draft)

"Long-Range Plan for the Metrology Research and Development Laboratory," R. L. Anderson and R. K. Adams, 1988

"Recommended Practice Laboratory Design," RP-7, July 10, 1986, National Conference of Standards Laboratories

Memo, "Major Safety/Facility Deficiencies in Standards Lab," J. O. Hylton, August 30, 1990

Finding No.: QV.4-2 Calibrations Program

Finding Description: **The calibrations program does not meet all requirements of DOE 5700.6B, ANSI/ASME NQA-1, and the ORNL Quality Assurance Manual. (See Concern RP.8-1.)**

Code: Category III

Compliance Protocol: DOE Order 5700.6B and ANSI/ASME NQA-1

Priority: Energy Systems Risk Weight 56
Tiger Team Action Plan Priority 2

Response: Calibration concerns have been expressed as issues in previous audits, including the DOE Headquarters Quality Verification Inspection, May 1990, the DOE-ORO Multifunctional Appraisal, May 1990, and the Martin Marietta Corporate Audit, July 1990. Ensuring that instruments requiring calibration are identified and properly calibrated was also a concern in ORNL's self-assessment.

In order to clarify the role and responsibility of line management regarding calibration, ORNL QA Procedure QA-L-12-100 was revised in October 1990 to address identification of instrumentation requiring calibration. Section 6.1.2 was added to require project/program mangers to identify and categorize measuring and test equipment. Section 6.1.8 of this procedure also requires the managers to place their equipment in appropriate calibration programs.

Health Physics Procedure RP-1.6 Section VI requires that health physics instrumentation being specified and procured by the line organizations be reviewed and approved by the Health Physics Instrument Committee. This procedure was issued in February 1990.

Line management now has clear and concise guidance defining their roles and responsibilities in ORNL's calibration program. Procedures QA-L-12-100 and RP-1.6 have been approved by ORNL management and must be followed by the line organization.

To ensure that the new requirements of QA-L-12-100 and RP-1.6 are being implemented, surveillances will be conducted by the QA Specialists and Coordinators during 1991 to assess the degree of compliance.

Root Causes:

Inadequate policy implementation and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. A letter will be issued to all QA Specialists and Coordinators instructing them to plan a surveillance during 1991 on the requirements of QA-L-12-100 and RP-1.6.	Complete
2. Verify that division/program 1991 surveillance schedules include at least one surveillance on QA-L-12-100 and RP-1.6 requirements.	Complete
3. Verify and document that all scheduled surveillances on QA-L-12-100 and RP-1.6 were conducted and analyze the results for the presence of trends.	01/92

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	3	3					6
Status:							
Funded	3						
Requested							
New		3					$6

References: ANSI/ASME NQA-1, QA-L-12-100, Rev. 1, and Finding RP-1.6

Finding No.: QV.5-1 Control of Safety-Related Materials

Finding Description: **Control of safety-related hardware and materials is not accomplished in accordance with requirements of DOE 5700.6B and ANSI/ASME NQA-1. (See Concern PT.12-1 and RP.8-1.)**

Code: Category III

Compliance Protocol: DOE Order 5700.6B and ANSI/ASME NQA-1

Priority: Energy Systems Risk Weight 61
Tiger Team Action Plan Priority 2

Response: Users are currently reviewing spare parts set up in Stores to determine the proper classification (Safety, Insurance, or Critical item). If reviewers want the line item to remain in inventory, they shall evaluate the package and product credibility of each warehoused item. They also shall complete the new ORNL stores stock addition form which will identify applicable storage, packaging, shelf life, maintenance requirements, system description, equipment name, manufacturer, model number, serial number, drawing number, location, and requirements of the vendor.

Materials Department internal operating procedure MD-SR-2 has been approved for receipt and inspection of safety-related items or components. This procedure identifies handling and document control responsibilities. A chain-of-custody form for safety-related items or components has been designed where each operational employee who has possession must obtain the new custodian's signature before responsibility is relinquished. Materials Department internal operating procedure MD-SR-3 has been approved for warehousing and issuing safety-related items or components. This procedure identifies stores, receiving, withdrawing, inspection, maintenance, and document control responsibilities.

The mechanism for an on-line electronic system has been identified to track part, serial and/or unique identifier number, and purchase order number; storage, packaging, shelf life, and maintenance requirements, and to alert management when maintenance or packaging or shelf life evaluation is to be performed. Software development is included in the Materials Department FY91 budget request.

An engineering study is in its final stage converting Bldg. 7013 to satisfy levels "A" and "B" storage requirements for safety related materials. Engineering is presently developing plans to enclose 7060 metal storage shed to prevent pedigreed metal from being exposed to the elements. Construction cost to convert 7013 and Engineering cost of 7060 design are in the Materials Department FY91 Budget request. Design is complete for a 7001 inspection area which meets storage level "A" requirements under NQA-1/NQA-2 which states that materials shall be segregated and secured in a level "A" facility while in the inspection process.

Construction cost of level "A" inspection area was in the Materials Department FY91 Budget request.

Root Causes:

Poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Review and classify existing stores inventory.	12/91
2. Develop software for tracking safety materials.	09/92
3. Convert Building 7013 to level "A" and "B" storage.	09/92
4. Enclose Building 7060 metal storage shed.	
A. Initiate engineering design.	09/92
B. Initiate construction.	09/93
5. Construct Level "A" inspection area. See PT-12-1 Item 8.	09/92

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	30	12					42
2		30					30
3		188					188
4		75					75
5							
Status:							
Funded	30						
Requested							
New		455					$335

References: NQA-1, NQA-2, NRC, 10 CFR Part 50

Finding No.: QV.6-1 Quality-Related Inspections

Finding Description: **Quality-related inspections are often not performed and are independently verified infrequently at ORNL, which is contrary to the requirements of DOE 5700.6B and ANSI/ASME NQA-1. (See Concern MA.5-1 and TS.3-1.)**

Code: Category III

Compliance Protocol: DOE Order 5700.6B and ANSI/ASME NQA-1

Priority: Energy Systems Risk Weight 62
Tiger Team Action Plan Priority 2

Response: This concern was previously noted in the DOE Headquarters Quality Verification Inspection, May 1990. Inspection concerns are currently broken down into two areas: those items that are fabricated in the ORNL shops and procured items that are inspected by the requisitioner.

Items that are fabricated in the Plant & Equipment shops must have an associated work request before the item is entered into the shop's backlogs. There is a required entry on the work request forms for indicating whether special QA actions are required or not along with a request for specifying inspection, test, cleanliness, or other requirements.

In addition, Plant & Equipment Procedure F-1.6 requires that if a QA stamp indicating inspection and other requirements is not on the prints, drawings, or sketches furnished by the requestor the supervisor in charge will stamp the instructions provided with a Fabrication Department Work Control Stamp and sign. The customer is then required to fill in needed information on the Work Control Stamp and sign. If there is no personal contact with the customer, the supervisor in charge must fill out the Work Control Stamp. The supervisor in charge is also responsible for signing completed work requests as an indication that all steps have been completed. Surveillance will be conducted by the Plant & Equipment QA specialist to verify adherence to these requirements by Plant and Equipment personnel.

Procured items requiring special receiving inspection are normally inspected by a qualified inspection group and documented with an inspection report. There are, however, items that are inspected by the requester, and these are not always documented. ORNL's QA procedures on procured items will be reviewed, and an acceptable method of documenting inspections will be added. Surveillances will be conducted on random special inspection requisitions to verify implementation of the requirements.

Root Cause:

Poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. The Plant & Equipment QA specialist will conduct a surveillance of shop-fabricated items to verify implementation of P&E Procedure F-1.6 by the P&E organization.	06/91
2. ORNL QA Procedure QA-L-7-100 will be reviewed and revised to incorporate requirements defining roles and responsibilities for documentation of requisitioner inspections (see Finding QV.3-1, Item 2).	12/91
3. ORNL-level surveillances will be performed on random requisitions requiring requisitioner inspection to verify implementation of the new requirements for inspection documentation by the line organization.	03/92

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	4						4
2	7						7
3		2					2
Status:							
Funded	11						
Requested							
New		2					$13

References: ANSI/ASME NQA-1

Finding No.: QV.7-1 Special Process Training

Finding Description: Some special process training does not comply with ANSI/ASME NQA-1. (See Concern TC.1-2.)

Code: Category III

Compliance Protocol: ANSI/ASME NQA-1

Priority: Energy Systems Risk Weight 58
Tiger Team Action Plan Priority 2

Response: This concern was previously identified in the DOE Headquarters Quality Verification Inspection, May 1990. An extensive plan was developed in March 1990 for training of all Quality Engineering and Inspection Inspectors. The plan included an aggressive schedule for reviewing and revising 45 inspection procedures. A training schedule for each group of inspectors was also developed, identifying participants, instructors, and completion dates. In the interim period, only those inspectors who have been judged as qualified by their supervision will be allowed to perform inspections until such training can be conducted and documented.

Root Cause:

Inadequate training

Planned Actions and Schedules:

Item/Description	Completion Date
1. Complete revision of all QE&I inspection procedures.	06/91
2. Revise ACP 14, ACP 15, and NDE 11 to require review of all incorrectly answered questions with the examinee(s).	06/91
3. Conduct training to revised procedures and document with examinations (see Items 1 and 2 above).	09/91
4. Conduct a surveillance of examination records.	11/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

Action item	Estimated costs per fiscal year ($K) 1991	1992	1993	1994	1995	Beyond	Total
1	50	*					50
2	6						6
3	—						
4	—						
Status:							
Funded	56						
Requested							
New							$56

*Estimated annual ongoing costs: $80K.

References: ANSI/ASME NQA-1

3.3.3 Operations

Finding No.: OP.3-1 ORNL Operating Procedures

Finding Description: **No policy exists at ORNL for standardized format, content, review scope and frequency, and approval of operating procedures, as required by DOE 5480.19.**

Code: Category III

Compliance Protocol: DOE Order 5480.19

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: Energy Systems and ORNL agree that no standardized guidance is provided concerning standardized format and content of operating procedures. Energy Systems is developing a writers' guide for Energy Systems and all Energy Systems sites; ORNL is participating in this multisite effort. The guide will address format and content. Administrative procedures will address procedure review and approval.

Root Cause:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue draft Energy Systems writers' guide.	6/91
2. Issue final version of Energy Systems writers' guide.	12/91
3. Develop training module concerning the writing of SOPs and initiate training.	2/92
4. Issue revised SPP to provide guidance and oversight where consistency should be required across ORNL.	2/92

Costs:

Type of funds: Overhead
Source of funds: Energy Systems

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	11						11
2		20	*				20
3		12					12
4		7					7
Status:							
Funded							
Requested							
New	11	39					$50

*Estimated annual ongoing cost: $5K starting in FY 1992.

References: None

Finding No.: OP.4-1 Facility Status Displays

Finding Description: **Facility status displays are not maintained to serve the intended purpose.**

Code: Category III

Compliance Protocol: DOE Order 5480.19, Chapter II, requires that facility status be understood by operations personnel in order to control and coordinate activities.

DOE Order 5480.19, Chapter VIII, requires supervisory personnel to normally direct operations and maintain system configuration. An accurate system status display is mandatory to fulfill this requirement.

DOE Order 5480.19, Chapter XII, requires supervisory personnel to review the facility status during shift turnover. Maintenance of an accurate status board is necessary to comply with this requirement.

Priority: Energy Systems Risk Weight 56
Tiger Team Action Plan Priority 3

Response: Implementation of the Conduct of Operations philosophy at ORNL will provide a formal, disciplined manner of conducting work, which will enhance safe and efficient management of activities and will foster an overall attitude to achieve excellence. Conduct of Operations will be implemented first through training personnel on the objectives of the program, then through an evaluation of the applicability of the guidelines for each facility operation, followed by the development of an implementation plan. Compensatory actions will be accomplished through a risk-based prioritization of cost/benefit studies of the needed actions. Funding for these programs will depend on the results of the division level applicability evaluation and the priority assigned to the required corrective action.

Maintenance of facility status displays is addressed by this action plan. The fundamental corrective action for this problem is the implementation of Conduct of Operations. The DOE implementation order requires each facility to implement the guidelines of Conduct of Operations in a graded fashion, including those pertaining to facility status boards. The Conduct of Operations implementation plan requires that compensatory actions from the implementation of the guidelines be accomplished in a risk-based manner. This ensures that resources are utilized to address the most serious concern in a prioritized fashion. This plan will ensure that the need for all status boards is identified and requirements for maintaining them are promulgated in an appropriate precedence.

The use and maintenance of status boards is a requirement of the implementation of Conduct of Operations. The need to implement Conduct of Operations was in the ORNL Self-Assessment.

Root Causes:

Inadequate policy and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Commence ORNL Conduct of Operations training.	Complete
2. Develop divisional Conduct of Operations implementation plans.	Complete
3. Initiate implementation of Conduct of Operations Compensatory Action plans.	Complete
4. Determine facilities requiring status boards based on Conduct of Operations Compensatory Actions.	10/91
5. Issue written guidance to operating divisions concerning maintenance of status boards.	8/91

Costs: Cost of Developing Divisional Action Plan: Based on experience with the pilot plants, approximately 100 hours of senior divisional management time will be required to assess the guidelines and develop the action plan; approximately $756,000 will be required.

All costs will be paid by current divisional funding.

Compensatory actions will be accomplished through a risk-based prioritization of cost/benefit studies of the needed actions. Funding for these programs will depend on the divisional findings and the priority.

Type of funds: Overhead
Source of funds: Division Administration

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	756						756
3	—						
4	—						
5	—						
Status:							
Funded	756						
Requested							
New							$756

Estimated annual ongoing costs: dependent on divisional action plans and cost of facility upgrades.

References: DOE Order 5480.19, Conduct of Operations

Finding No.: OP.4-2 ORNL Lockout/Tagout Systems

Finding Description: The lockout/tagout systems employed at ORNL do not conform to all aspects of the graded performance requirements of DOE 5480.19. (See MA.2-1)

Code: Category III

Compliance Protocol: DOE Order 5480.19

Priority: Energy Systems Risk Weight 917
Tiger Team Action Plan Priority 2

Response: The need for an improved lockout/tagout procedure was identified in the ORNL self-assessment document. Energy Systems has recognized the need for central guidance to promote uniform compliance with lockout/tagout requirements. A draft procedure consistent with 29 CRF 1910 and DOE Order 5480.19 has been issued for comment by Energy Systems. After comments are resolved, the guidance document will be issued as the procedure for lockout/tagout programs at the three Oak Ridge sites. Each site will provide training to fully implement the procedure.

Root Causes:

Poorly defined roles and responsibilities and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue Energy Systems lockout/tagout procedure. (See Finding MA.2-1, Action 1.)	
2. Train appropriate Laboratory personnel and implement procedure. (See Finding MA.2-1, Action 2.)	

Costs: Costs are included in Finding MA.2-1.

References: 29 CFR 1910, DOE Order 5480.19

Finding No.: OP.7-1 ORNL Shift Overlap

Finding Description: **Not all shifts at ORNL have sufficient required overlap in duty time to permit an effective turnover of duties in conformance with the graded performance requirements of DOE 5480.19.**

Code: Category III

Compliance Protocol: DOE Order 5480.19

Priority: Energy Systems Risk Weight 67
Tiger Team Action Plan Priority 2

Response: Shift turnovers are addressed by this action plan. The fundamental corrective action for this problem is the implementation of Conduct of Operations. The DOE implementation order requires each facility to implement the guidelines of Conduct of Operations in a graded fashion, including those pertaining to shift turnover. The facilities with a need for shift work will be required to include adequate turnover periods.

An adequate turnover is a requirement of the implementation of Conduct of Operations. The need to implement Conduct of Operations and Research was in the ORNL Self-Assessment. The Research Reactors Division has a formalized shift turnover procedure for both supervisors and hourly operators. Waste Management Operations, Analytical Chemistry (REDC), and the Steam Plant require a shift turnover for the supervisors. Negotiations to provide a shift turnover for hourly personnel will be initiated when the affected organizations are identified through implementation of Conduct of Operations.

Root Causes:

Formality and discipline in the conduct of operations and research are inadequate.

Planned Actions and Schedules:

Item/Description	Completion Date
1. See Finding OP.4-1, Items 2 and 3.	
2. Determine divisions requiring shift turnover based on Conduct of Operations Compensatory Actions.	6/91

3. Pursue collective bargaining agreement modifications to provide for an acceptable shift turnover to be applied to operations where deemed necessary. 8/91

4. Issue written guidance to appropriate operating divisions concerning interim shift turnover practices. 6/91

Costs:

Type of funds: Overhead

Source of funds: Division Administration

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	5	*					5
4	—						
Status:							
Funded	5						
Requested							
New							$5

*Estimated annual ongoing costs: $115K for ongoing shift overlap (75 hourly and 25 weekly employees).

The cost of a shift turnover is based on additional work time required of the hourly and nonexempt employee. This cost estimate is for a 15-minute turnover at one and one-half times the normal rate of pay.

References: None

Finding No.: OP.8-1 Uniformity of Data Collection and Terminology

Finding Description: **Data collection and related communications do not always employ generally accepted terminology, thus necessitating specialized additional training and complicating workers' understanding of operational activities.**

Code: Category III

Compliance Protocol: DOE Order 5480.19, Chapter IV requires that communications be accurate for the safe and efficient operation of the facility. It additionally requires that standardized terminology be developed and documented.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: Standardized communication and terminology are addressed by this action plan. The fundamental corrective action for this problem is the implementation of Conduct of Operations. Under the DOE implementation order, each facility will apply the guidelines of Conduct of Operations in a graded fashion, including those pertaining to communications. The Conduct of Operations implementation plan requires that compensatory actions from the implementation of the guidelines be accomplished in a risk-based manner. This ensures that resources are used to address the most serious concern in a prioritized fashion.

To address the need for common terminology within ORNL, a standard policy will be issued.

The use of clear communications is a requirement of the implementation of Conduct of Operations. The need to implement Conduct of Operations was included in the ORNL Self-Assessment.

Root Causes:

Inadequate policy and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. This finding is fully addressed by the corrective actions identified for Finding OP.4-1, Items 2 and 3.	

Costs: See Finding OP.4-1 for Conduct of Operations implementation costs.

References: DOE Order 5480.19, Conduct of Operations

Finding No.: OP.8-2 Alarm Panel Signal Configuration

Finding Description: **Not all alarm panels are configured to readily distinguish between signals requiring operator response and signals that merely are indicators of facility status.**

Code: Category III

Compliance Protocol: DOE Order 5480.19 Chapter II requires alarm and annunciator panels be inspected for abnormal or unusual conditions. Prompt actions are required to be taken if such conditions are noted.

DOE Order 5480.19 Chapter VIII requires the status of alarm and control panels to be readily available. The intent of this requirement is to properly control equipment, satisfying design and operational limits.

Priority: Energy Systems Risk Weight 56
Tiger Team Action Plan Priority 2

Response: Segregation of alarm and status displays are addressed by this action plan. The fundamental corrective action for this problem is the implementation of Conduct of Operations. Under the DOE implementation order, each facility will apply the guidelines of Conduct of Operations in a graded fashion, including those pertaining to alarm and status panels. The Conduct of Operations implementation plan requires that compensatory actions from the implementation of the guidelines be accomplished in a risk-based manner. This ensures that resources are used to address the most serious concerns in a prioritized fashion. This plan will ensure that the need-appropriate alarm panels are identified and requirements for maintaining them are promulgated in an appropriate precedence.

The ability of operators to distinguish between response and status signal is a requirement of implementation of Conduct of Operations. The need to implement Conduct of Operations was included in the ORNL Self-Assessment.

Root Causes:

Inadequate policy and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. See Finding OP.4-1, Items 1–3.	
2. Determine and document facilities requiring alarm systems based on Conduct of Operations Compensatory Actions.	10/91
3. Request funding for required changes. Establish schedule for implementation based on available resources.	1/92
4. Issue written guidance to operating divisions concerning procurement and modification of common alarm panels.	6/91

Costs: See Finding OP.4-1 for Conduct of Operations implementation costs.

References: DOE Order 5480.19, Conduct of Operations

Finding No.: OP.8-3 Uniformity of Labels, Signs, and Signals

Finding Description: **Information is not conveyed in a uniform effective manner to personnel by labeling, signs, and uniformly colored lights.**

Code: Category III

Compliance Protocol: DOE Order 5480.19 Chapter XVIII requires signs to be distinguishable, easy to read, and informative. Color coding for consistency is also recommended. The intent of this requirement is to reduce operator exposure to hazardous materials and to aid in room identification.

29 CFR 1910.145, Appendix A recommends standardized coloring of warning signs, depending upon the threat of personnel hazard.

Priority: Energy Systems Risk Weight 56
Tiger Team Action Plan Priority 2

Response: Standardization of labeling, signs, and lights are addressed by this action plan. The deficiency was previously noted in the ORNL Self-Assessment. The fundamental corrective action for this problem is the implementation of Conduct of Operations. The Conduct of Operations implementation plan requires that compensatory actions from the implementation of the guidelines be accomplished in a risk-based manner. This ensures that resources are used to address the most serious concern in a prioritized fashion. To ensure standardization, a Performance Improvement Process committee should analyze the needs of ORNL and set requirements. They should also place the required signs in the AVID system to minimize expense in instituting the new signs.

The use of labeling and posted operator information is a requirement of the implementation of Conduct of Operations. A specific comment on multiple and inconsistent signs was included in the ORNL Self-Assessment. This is also related to Finding RP.3-5.

Root Causes:

Inadequate policy, inadequate policy implementation, and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Appoint a Performance Improvement Process committee to address requirements for posting signs, labels, and lights.	Complete
2. See Finding OP.4-1, Items 1-3.	
3. Issue a Standard Practice Procedure for the ORNL Safety Manual on installing warning signs, labels, and lights.	11/91
4. Place approved standard sign(s) in the AVID system.	4/92
5. Complete installation of standardized warning signs, labels, and lights and perform internal self-assessment to verify installation and program effectiveness.	4/93

Costs: See Finding OP.4-1 for Conduct of Operations implementation costs.

A commercially available Hazard ID Kit is available from Lab Safety Supply for $16.00 per kit in lots of 100 or more. The kit includes one 10-by-10-in. caution sign and 30 smaller color-coded hazard labels. There are approximately 750 laboratory doors that require some degree of hazard posting for an initial estimate of $12,000.

Installation of warning lights, such as green safety shower lights and red laser operation lights, would cost approximately $400 per installation.

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	10						10
2	*						
3		15					15
4	—						
Status:							
Funded	10						
Requested							
New		15					$25

*See Finding OP.4-1.

Type of funds: Overhead
Source of funds: Division Administration

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
5			67				67
Status:							
Funded							
Requested							
New			67				$67

References: DOE Order 5480.19, Conduct of Operations, 29 CFR 1910

3.3.4 Maintenance

Finding No.: MA.1-1 Control of Removal of Equipment from Service

Finding Description: **ORNL has no policy or procedure to control the removal of equipment from service in a manner that ensures continued safety, resulting in a number of potentially hazardous conditions that require identification and correction.**

Code: Category III

Compliance Protocol: Maintenance organization and administration should ensure effective implementation and control of maintenance activities.

Priority: Energy Systems Risk Weight 41
Tiger Team Action Plan Priority 3

Response: Although no single document exists which defines all the steps for safe removal of equipment, most information is contained in the numerous procedures already in place (i.e., P&E Procedure M-1.7, Modifications to Building and Utilities).

Root Causes:

Inadequate policy and ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Meet with facility managers to discuss expectations and request them to inspect their areas. (See Finding MA.2-2, Items 1 and 3). Items requiring immediate action should be referred to the Rapid Response Team. Work request should be prepared for routine items. Both actions will allow tracking of the corrections.	Complete
2. Train P&E personnel in maintenance fundamentals, stressing excellence of maintenance performance. (See Finding MA.2-2, Item 4). "Proper Use and Care of Tools" by the Hand Tools Institute was used as the lesson plan and was distributed to all attendees.	Complete
3. Issue guidance to all P&E departments requiring an approved action plan for any job involving long-term removal of equipment from service/retirement in place.	Complete

4. Issue a material deficiency tagging procedure. 9/91

5. Prepare and issue an ORNL Standard Practice Procedure for safe removal of equipment from service or retirement in place. 10/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	—						
4	—						
5	1						1
Status:							
Funded	1						
Requested							
New							$1

References: None

Finding No.: MA.2-1 ORNL Lockout/Tagout System's Effectiveness

Finding Description: **ORNL does not have an effective lockout/tagout system. (See OP.4-2.)**

Code: Category III

Compliance Protocol: DOE Order 5480.19

Priority: Energy Systems Risk Weight 917
Tiger Team Action Plan Priority 1

Response: The need for an improved lockout/tagout procedure was identified in the ORNL self-assessment document. Energy Systems has recognized the need for central guidance to promote uniform compliance with lockout/tagout requirements at all sites operated by Energy Systems. A draft procedure consistent with 29 CFR 1910 and DOE Order 5480.19 has been issued for comment by Energy Systems. After comments are resolved, the guidance procedure will be issued to become the basis for lockout/tagout programs at each site. Each site will provide training to fully implement the procedure.

See Finding OP.4-2.

Root Causes:

Poorly defined roles and responsibilities and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Energy Systems issue approved lockout/tagout procedure.	5/91
2. Train all Laboratory personnel on the procedure.	7/91
3. Initiate implementation of procedure.	8/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	12						12
2	190						190
3	*						
Status:							
Funded	202						
Requested							
New							$202

*Estimated annual ongoing cost: $66K.

References: 29 CFR 1910, DOE Order 5480.19

Finding No.: MA.2-2 Conduct of Maintenance

Finding Description: **Plant maintenance personnel do not use fundamental good practices, sometimes resulting in unsafe conditions.**

Code: Category II

Compliance Protocol: Maintenance should be conducted in a safe and effective manner to support each facility condition and operation on the site.

Priority: Energy Systems Risk Weight 86
Tiger Team Action Plan Priority 2

Response: Improvements in the "Conduct of Maintenance" at the ORNL site are addressed by this action plan. These improvements will be realized by: clarifying roles and responsibilities of facility managers and of maintenance supervision and by training of craft personnel and maintenance supervisors in fundamental good practices.

Root Causes:

Poorly defined roles and responsibilities and inadequate training

Planned Actions and Schedules:

	Item/Description	Completion Date
1.	Meet with Division Directors, Facility Managers and P&E Supervisors to clarify roles and responsibilities and to educate on needs identified by Tiger Team.	Complete
2.	Issue notice requiring job inspections by P&E personnel after repair activities (customer orientation).	Complete
3.	Conduct inspections of selected facilities to identify and correct deficiencies.	Complete
4.	Train all Plant & Equipment Division personnel in maintenance fundamentals of quality.	Complete
5.	Initiate training of appropriate P&E personnel in Facility Condition Inspection Techniques ("Walk your spaces training").	9/91
6.	Implement random quality checks of maintenance activities to verify continuing quality.	6/91

7. Define and implement continuing craft specific training activities to ensure quality. (See Finding TC.5-1.) — See Finding TC.5-1

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)							
Action item	1990	1991	1992	1993	1994	1995	Beyond	Total
1		5						5
2		—						
3	529	101						630
4		20						20
5		100						100
6		25	*					25
7		—						
Status:								
Funded	529	251						
Requested								
New								$780

*Estimated annual ongoing cost: $15K.

References: None

Finding No.: MA.5-1 General Facility and Post-Work Inspections

Finding Description: **Systematic, general facility and post-work inspections were not being used to identify all needed corrective actions, resulting in some safety equipment only being identified for corrective maintenance following failure.**

Code: Category III

Compliance Protocol: The material condition of components and equipment should be maintained to support safe and effective operation of all facilities on the site.

Priority: Energy Systems Risk Weight 567
Tiger Team Action Plan Priority 2

Response: Through the years, as maintenance budgets have decreased, various facility inspections have been curtailed. Most significant areas (i.e., roofs, corded equipment, etc.) are still being inspected. The entire process, however, needs to be more formalized with procedures. Manpower resources for implementation of a complete facility inspection program are not available.

P&E Procedure D-1.9, P&E Work Request, requires that the supervisor-in-charge perform a post-work inspection of each completed job. This requirement has typically not been emphasized by management. Memos have been issued requesting P&E supervisors and facility managers to perform post-work inspection of completed jobs.

Root Causes:

Insufficient resources, ambiguous requirements or expectations, and inadequate management commitment

Planned Actions and Schedules:

Item/Description	Completion Date
1. Train all P&E personnel in maintenance fundamentals, stressing excellence of maintenance performance (see Finding MA.2-2, Item 4).	Complete
2. Estimate cost required and request funding for a comprehensive facility inspection program.	9/91

3. Initiate training of appropriate P&E personnel in Facility Condition Inspection (see Finding MA.2-2, Item 5). — 9/91

4. Initiate training of Facility Managers in Facility Condition Inspection. ("Walk your spaces training"). — 9/91

5. Initiate comprehensive facility inspection program, including the need for backflow prevention devices and auxiliary systems. — Funding receipt plus 6 months

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	—						
4	5	20					25
5		*					
Status:							
Funded							
Requested							
New	5	20					$25

*Estimated annual ongoing cost: $450K. Includes Finding AX.1-1.

References: Draft DOE Order 4330.XXX, Maintenance Management Program

Finding No.: MA.5-2 Identification of Energy Conservation Corrective Actions

Finding Description: **Fundamental assessments of facilities had not been completed to identify energy conservation corrective actions as required in DOE 4330.2C.**

Code: Category III

Compliance Protocol: DOE Order 4330.2C

Priority: Energy Systems Risk Weight 58
Tiger Team Action Plan Priority 2

Response: Improvements in the assessment of facilities at the ORNL site are addressed by this action plan. These improvements will be realized by clarifying roles and responsibilities of facility managers and by prioritization of energy management activities based on facility inspections, energy intensiveness, and resource allocation.

Root Causes:

Poorly defined roles and responsibilities and inadequate resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Develop initial plan for prioritized rotational assessment of ORNL buildings on a 5-year cycle.	9/91
2. Issue ORNL Bulletin asking all employees to identify opportunities for energy conservation.	9/91
3. Request funding for assessments and corrective actions.	9/91
4. Train facility managers on assessment and identification of energy management opportunities.	1/92

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	5						5
2	—						
3	—						
4		30					30
Status:							
Funded	5						
Requested							
New		30					$35

Estimated annual ongoing cost: $200K.

References: None

Finding No.: MA.6-1 P&E Preventive Maintenance Program

Finding Description: **The Plant and Equipment Division preventive maintenance program did not include all components important to safety and reliability and did not address routine equipment preservation. (See AX.1-1 and AX.6-1.)**

Code: Category III

Compliance Protocol: The Programmed Maintenance (PM) data base inventory should be reviewed for completeness and facilities and equipment identified for addition to and removal from the PM program to provide adequate coverage.

Priority: Energy Systems Risk Weight 570
Tiger Team Action Plan Priority 2

Response: Adjustments to the PM program are being addressed by this action plan. These adjustments will be realized by: clarifying roles and responsibility for performing PM on safety valves and relief valves and for ensuring the maintenance is conducted; identifying equipment, piping, valves, and supports which need to be added to the PM program for routine maintenance; and evaluating maintenance practices and developing procedures for maintenance in these areas. The proposed practice of using operating personnel to adjust packing glands will be reviewed on a case by case basis and will be assigned in accordance with the Company/Union contract as it pertains to work jurisdiction and assignment of work.

Root Causes:

Ambiguous requirements or expectations, poorly defined roles and responsibilities, and insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Fill PM coordinator position.	Complete
2. Issue operating instructions on how to correctly open and close valves.	6/91
3. Perform general area and system inspections to identify additional equipment, piping, valves, supports,and foundations which need to be added to the PM program.	8/91
4. Define staffing requirements to implement additional PM and system preservation and request funding.	9/91

5. Issue maintenance procedures defining methods of preservation for piping, valves, and supports to retard deterioration. — 12/91

6. Initiate implementation of additional PM. — Funding approval +3 months

Costs:

Type of funds: Overhead
Source of funds: Overhead

Action item	Estimated costs per fiscal year ($K) 1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	10						10
4	—						
5		5					5
6		*					
Status:							
Funded	10						
Requested		5					
New							$15

*Estimated annual ongoing cost: $250K.

References: None

Finding No.: MA.8-1 Appropriate Maintenance Procedures

Finding Description: **Maintenance procedures did not reflect an appropriate level of detail and organization.**

Code: Category III

Compliance Protocol: Maintenance procedures should be clearly written, accurate, and well organized to ensure an adequate description of the job and the proper sequencing of details.

Priority: Energy Systems Risk Weight 42
Tiger Team Action Plan Priority 3

Response: Improvements in the Plant and Equipment (P&E) Division procedure generation and revision process are defined by this action plan. The improvements will be realized by reviewing existing procedures and incorporating a working review of the draft prior to publication. Routine review of all active procedures will be as specified in ORNL Quality Assurance Procedures.

Root Cause:

Ambiguous requirements or expectations

Planned Actions and Schedules:

	Item/Description	Completion Date
1.	Issue revised procedure D-1.2, The Preparation of Standard Operating Procedures, to require all procedures to be field tested prior to being published.	Complete
2.	Issue revised procedure R-3.15, Procedure for Safe Handling and Repair of Contaminated Manipulators.	7/91
3.	Initiate training of P&E procedure writers utilizing Energy Systems writers' guide. (See Finding OP.3-1, Action Step 3).	2/92

Costs:

Type of funds: Overhead
Source of funds: Overhead

Action item	Estimated costs per fiscal year ($K)						Total
	1991	1992	1993	1994	1995	Beyond	
1	1						1
2	3						3
3		*					
Status:							
Funded	4						
Requested							
New							$4

*Estimated annual ongoing cost: $100K.

References: None

3.3.5 Training and Certification

Finding No.: TC.1-1 Consistency and Administration of Training Programs

Finding Description: **Training programs at the Oak Ridge National Laboratory are not consistent and are not being effectively administered.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 358
Tiger Team Action Plan Priority 2

Response: The Training and Development Department has recently been reorganized with the intent to have a central focal point for coordinating training activities to ensure consistency, eliminate redundancy, and achieve programs that are compliance based. The organization concept is in place but lacks procedures that would direct "how to accomplish" the Laboratory training goals. A Training Needs Overview (Assessment) has been initiated to identify (1) training needs for every person, based on over 1200 DOE regulations; and (2) what training is being conducted.

The survey data will allow us to avoid duplication and to administer consistent training. In addition, the size of the Training and Development Department professional staff, consisting of 2-1/2 permanent personnel and one temporary subcontractor, is inconsistent with the department's mandate to achieve effective, centralized coordination and administration of Laboratory training. A review of the objectives has identified a need for four additional HRD staff persons to augment the present staff of 2-1/2 professionals.

Also, see Findings MF-4 and TC.5-1.

The items are categorized chronologically within subject area.

Root Cause:

Inadequate policy implementation and insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Prepare a section for the ORNL Standard Practice Procedures Manual on Training Policies and Procedures and establish criteria. Roles and Responsibilities will be outlined to provide clear management guidance. Examination requirements will be addressed in the above procedure.	10/91
2. Identify status of division training manuals and prepare a schedule for completion.	12/91
3. Based on DOE regulations (orders, CFRs and other directives), issue a checklist to line management to use in identifying tasks performed by each individual and any existing training addressing each requirement.	Complete
4. Prepare training program standards as required for DOE directives.	6/91
5. Identify by name baseline requirements and load into TMIS.	12/91
6. Schedule the revisions or development of programs and presentation timetable.	3/92
7. Issue procedures for systematically upgrading individual training profiles, due to a change in job duties or new requirements, with particular emphasis on ES&H training programs.	3/92
8. Initiate implementation of a Laboratory directive requiring centralized administration of general employee training and retraining for all employees.	Complete
9. Produce guest/visitor training video and provide to the Office of Guest and User Interaction, and implement a Laboratory policy requiring administration of guest/user training to all appropriate personnel.	6/91
10. Update Instructor Skills Training programs and initiate implementation.	10/91
11. Implement procedures to track requalification and retraining requirements for employees prior to expiration.	2/92

Costs:

Type of funds: ESH Programmatic
Source of funds: ER-AT TC

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1		14					14
2		29					29
3, 4, 5, 6, 7	80	100					180
9	5						5
10	116						116
11		25					25
Status:							
Funded							
Requested							
New	201	168					$369

Estimated annual ongoing cost: Item 2, $4K; Items 3 through 4, $8K; Item 5, $10K; Item 7, $5K; Item 8, $8K; Item 9, $48K; Items 7 and 10, $8K.

References: None

Finding No.: TC.1-2 Adequacy of Training Examinations

Finding Description: **Examinations are not always administered to ensure that trainees understand the course subject matter.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 37
Tiger Team Action Plan Priority 3

Response: The DOE Environmental, Safety, and Health Performance Objectives and Criteria for Technical Safety Appraisals at DOE Sites and Facilities require a minimum score of 80% to pass written examinations on the following training programs: GET Radiological Protection, GET Emergency Preparedness, GET Hazardous Materials, GET Criticality Safety, and Radiation Worker. ORNL will prepare an examination policy that will identify the following: programs for which exams should be given; passing standards; and grading, proctoring, and review of exams with employees. This will be a part of Finding TC.1-1, Item 1, Policies and Procedures.

Root Cause:

Inadequate policy

Planned Actions and Schedules:

This finding is fully addressed by Item 1 of Finding TC.1-1.

Costs: Funded in Finding TC.1-1, Item 1.

References: None

Finding No.: TC.1-3 Training Staff

Finding Description: **The training staffs are too small to provide quality training for ORNL, which has numerous hazards.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 562
Tiger Team Action Plan Priority 3

Response: ORNL is in noncompliance with a number of training directives from DOE. Adequate training staff must exist to achieve ES&H and other required training. These deficiencies have been documented. The reduced FY 1991 budget for HRD has resulted in further staffing reductions. A review of the Laboratory-wide staffing needs resulted in an estimate of approximately 50 FTEs needed. The most crucial needs have been estimated at 15 FTEs. The Laboratory needs assessment included in Finding TC.1-1 will enable us to make a more accurate needs request.

This finding is related to Findings TC.1-1, MF-4, TC.5-1, and RTC.5-1.

These staff are required to conduct the compliance training outlined in response to Findings TC.5-1 and RTC.5-1, and other ES&H training.

Root Cause:

Insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request funds for 15 additional training staff.	Complete
2. Hire staff commensurate with funds received.	4 months after funds received

Costs:

Type of funds: ESH Programmatic
Source of funds: ER-AT TC

Action item	Estimated costs per fiscal year ($K)						Total
	1991	1992	1993	1994	1995	Beyond	
2		1035	1077	*			2112
Status:							
Funded							
Requested							
New		1035	1077				$2112

*Estimated annual ongoing cost: $1119K starting in FY 1993.

References: None

Finding No.: TC.5-1 Maintenance Personnel Training Program

Finding Description: **The maintenance training program does not assure that maintenance personnel are qualified to perform their assigned tasks, as required by DOE 5480.5 Section 10.b.(2).**

Code: Category III

Compliance Protocol: DOE Order 5480.6 and DOE Order 5480.5 Section 10.b.(2)

Priority: Energy Systems Risk Weight 588
Tiger Team Action Plan Priority 2

Response: DOE Order 5480.6 requires selective application of the guidelines provided in ANS 3.1 Draft 1980. The intent of the DOE order and ANS 3.1 is to require formal training and qualification programs for maintenance personnel who support and maintain category "A" reactor related systems and components. The training programs shall be based on Job/Task Analysis and shall provide the necessary skills, knowledge, and abilities required to perform maintenance on reactor equipment in a safe and efficient manner.

DOE Order 5480.5, "Safety Of Nuclear Facilities" Section 10.b. requires formal training and qualification programs for maintenance personnel who support and maintain nonreactor nuclear facilities systems and components.

A new DOE Order 5480.XX, Draft 3/90, "Personnel Selection Qualification and Training" states that maintenance training programs shall be based on Job/Task Analysis and provide the necessary skills, knowledge, and abilities required to perform maintenance on nuclear-related equipment in a safe and efficient manner.

Maintenance training program deficiencies were identified and documented in "Radiochemical Engineering Development Center, Building 7920, Accreditation Program Initial Self-Evaluation Report" ORNL, August 1, 1990, and "High Flux Isotope Reactor (HFIR) Reactor Maintenance Training Accreditation Program Initial Self-Evaluation Report" ORNL, September 1989.

Skills training has not been provided to personnel assigned to perform maintenance in reactor and nonreactor nuclear facilities in a formal manner to ensure all personnel demonstrate the required skills, knowledge, and abilities. On-the-job training (OJT) conducted for Plant and Equipment Division and Instrumentation and Controls Division maintenance personnel has not been documented in accordance with current industry standard of excellence. No formal technical skills classroom and/or hands-on laboratory training has been provided for personnel who are assigned to perform maintenance at reactor and nonreactor nuclear facilities.

Both divisions currently have a minimal dedicated and qualified Technical Training staff adequate at this point in time to identify and plan required training program upgrades and to schedule and coordinate compliance training for 850 Plant and Equipment Division and 150 Instrumentation and Control Division maintenance personnel.

Job/task analyses have not been conducted for maintenance positions at non-reactor nuclear facilities. Job/task analyses must be conducted in accordance with the guidelines provided in DOE EP 095 and must indicate the tasks performed that require the training and or retraining.

See Corrective Action Plan Finding TC.1-3 for staffing necessary to address this concern.

This same finding was also identified by the Reactors TSA team as Finding RTC.5-1.

Root Cause:

Insufficient resources; funding has not been authorized for an adequate staff to analyze, design, develop, conduct, implement, and evaluate Plant and Equipment Division Maintenance Training and Qualification programs.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Establish Maintenance Training Policy.	7/91
2. Request training instructor support to analyze, prepare, conduct, evaluate, schedule, and modify training. Request clerical support for miscellaneous administrative duties, typing of lessons, analysis of checklist and job/task, and maintenance of records for 850 Plant and Equipment Division employees and 150 Instrumentation and Controls Division employees. Funding for training staff support has been requested in Finding TC.1-3.	7/91
3. Review formal training and qualification programs established at SRP and INEL for good practices and materials that may be used or adapted for use in the development and implementation of Technical Skills Training and Qualification programs.	11/91
4. Develop Training Policies and Procedures, Training Program Plans, MOUs, and miscellaneous documentation.	11/91

5. Prioritize and conduct job/task analysis for maintenance positions for personnel who support ORNL nonreactor nuclear facilities. Generate reports defining training needs. Initiate design and development of formal classroom and hands-on technical-skills training indicated and required by job/task analysis. 6/92

6. Qualify OJT instructors (P&E and I&C supervisors, Technical Support and selected craft personnel) to develop and conduct formal on-the-job technical skills training. 6/92

7. Develop and implement formal OJT checklist and performance standards for maintenance personnel who are assign to the reactor and nonreactor nuclear facilities and are to perform maintenance on the systems and compontents regulated by NQA-1. (Maintenance supervisors, technical support personnel, pipe fitters, electricians, millwrights and instrument technicians.) 12/92

8. Develop facility-specific access training and systems training. Develop lesson plans and a formal hands-on Laboratory continuing training program for task identified in job/task analysis. Develop maintenance training and personnel-qualification program for reactor and nonreactor nuclear systems and component identified as critical by the facility Safety Analysis Report. 12/92

9. Conduct and maintain maintenance training and personnel qualification programs on systems and components identified as critical by the facility Safety Analysis Reports. 6/93

Costs: Program activities listed above will be complete as scheduled with manpower/resources identified in Finding TC.1-3. No existing resources are available to complete the activities necessary for compliance.

Estimated costs for these activities exclude REDC and HFIR program upgrade costs, scope, and schedule for Training Program Accreditation.
Training program Accreditation and the required upgrades have been addressed in the Training Program Accreditation Plans, "Radiochemical Engineering Development Center Building 7920, Training Program Accreditation Plan," August 1, 1990; High Flux Isotope Reactor Training Program Accreditation Plan, May 1990.

References:

DOE Order 5480.5	"Safety Of Nuclear Facilities"
DOE Order 5480.6	"Safety Of Department of Energy-Owned Reactors
ANSI/ANS 3.1	Draft 1980, "Selection, Qualification and Training of Personnel for Nuclear Power Plants"
DOE Order 5480.18	"Accreditation of Performance-Based Training for Category A Reactors"
DOE Order 5480.XX	Draft 3/90 "Personnel Selection, Qualification and Training Requirements"

Finding No.: TC.7-1 Training Facilities

Finding Description: **Training facilities are not conducive to providing the quality of training required for personnel working at Oak Ridge National Laboratory.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 58
Tiger Team Action Plan Priority 3

Response: Adequate facilities are required to project training in a professional manner and to have an atmosphere conducive to learning. Insufficient facilities send a message that training is not important. Inadequate facilities exist for almost every training organization. The P&E and I&C divisions require hands-on training facilities for many crafts. An informal survey was conducted in July 1990 to identify existing training facilities and determine needs. At the present time, only Research Reactors, Chemical Technology, and Environmental Safety & Health Compliance divisions have any dedicated classroom space. The ES&H organization has one laboratory for about 32 courses taught. All other classes must be conducted in borrowed space that may or may not be available.

Root Cause:

Insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Identify and dedicate training space as an interim measure until permanent facilities are provided.	5/91
2. Conduct preliminary investigation and design.	3/92
3. Request funds.	5/92
4. Develop specifications and bid documents.	6 months after funding received

5. Initiate construction of facilities. — 12 months after funding received

Costs:

Type of funds: Capital
Source of funds: GPP

Action item	Estimated costs per fiscal year ($K) 1991	1992	1993	1994	1995	Beyond	Total
1							
2		295					295
3							
4		25					25
5			2000	1000	1000		4000
Status:							
Funded							
Requested		320	2000	1000	1000		
New							$4320

References: None

Finding No.: TC.7-2 Storage of Training Records

Finding Description: **Training records required to be stored for extended periods are not being protected from potential damage, deterioration, or loss, as required by ASME NQA-1-1989 and DOE 1324.2A.**

Code: Category III

Compliance Protocol: ASME NQA-1-1989 and DOE Order 1324.2A

ASME NQA-1-1989, "Quality Assurance Program Requirements for Nuclear Facilities," lists in Appendix 17A-1, Section 3, those records that are to be considered lifetime records. Paragraph 3.6 identifies lifetime records and includes "Training and qualification records for current members of the plant operating staff."

ASME NQA-1-1989, Part II, "Basic Requirements, "Section 17, "Quality Assurance Requirements" requires records to be protected against damage, deterioration or loss.

DOE Order 1324.2A requires the use of ASME NQA-1-1989.

Priority: Energy Systems Risk Weight 58
Tiger Team Action Plan Priority 3

Response: The storage of ORNL training records does not meet ASME NQA-1 requirement. The QA Department is preparing for a study of alternatives of records storage, and will make recommendations.

Root Cause:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Evaluate storage alternatives and make recommendations to ORNL management.	11/91
2. Request funds for selected method.	12/91
3. Implement selected method.	3 months after receipt of funds

Costs:

Type of funds: Overhead
Source of funds: Overhead

Action item	Estimated costs per fiscal year ($K)						Total
	1991	1992	1993	1994	1995	Beyond	
1		22					22
2	—						
3	—	78					78
Status:							
Funded							
Requested							
New		100					$100

References: None

Finding No.: TC.10-1 Consistency of Supervisory and Management Training

Finding Description: **The training for persons who oversee the activities of others is not consistently applied.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 87
Tiger Team Action Plan Priority 2

Response: ORNL has several supervisory and management-skills training programs as well as a number of compliance programs. The attendance for compliance courses has been good. Renewed efforts will be exerted to ensure that all managers and supervisors attend the appropriate training. Resources are requested in Finding TC.1-3.

The definition of a supervisor is anyone who supervises or oversees the work of one or more individuals. These persons have been identified by divisions/offices and the names loaded into our Training Management Information System. This allows us to schedule for supervisors/managers and identify deficiencies.

Root Cause:

Inadequate policy and insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Develop profiles of required classes for managers and supervisors.	12/91
2. Review existing programs and initiate revisions or development of required classes.	12/91
3. Initiate implementation of training.	2/92

Costs: Included in Findings TC.1-1 and TC.1-3.

References: None

3.3.6 Auxiliary Systems

Finding No.: AX.1-1 Remedial Program for Auxiliary Systems

Finding Description: ORNL has not established a remedial program for age-related degradation of auxiliary systems.

Code: Category III

Compliance Protocol: It is considered a good management practice to address age-related degradation of systems as an element of a comprehensive maintenance program. It is anticipated that the final version of Draft DOE Order 4330.XXX will directly or indirectly include the requirement that the site implementing programs address the aspect of age-related degradation of auxiliary systems. Also, age-related degradation of auxiliary systems is one of the criteria currently considered under the TSA POC.

Priority: Energy Systems Risk Weight 570
Tiger Team Action Plan Priority 2

Response: Currently at ORNL remediation of age-related degradation for auxiliary systems is accomplished piecemeal through the GPP and line item planning process. There has been no official driver for development of a comprehensive maintenance management document to address such issues as age-related degradation of facilities and systems. That driver will be established with the issuance of a DOE Order 4330.XXX, Maintenance Management Program. The order will require that each operating site prepare and implement a comprehensive Maintenance Implementation Plan (MIP). One element of the plan, Facility Material Condition Inspection, will address remediation of age-related degradation of all systems which are important to safe operation. Implementation of DOE Order 4330.XXX will fully address the finding.

Root Cause:

Inadequate policy; ORNL maintenance policy and standards are not defined.

Planned Actions and Schedules:

Corrective actions for this finding are addressed in Finding MA.5-1 General Facility and Post-Work Inspections.

Costs: Costs are addressed in Finding MA.5-1.

References: Draft DOE Order 4330.XXX

Finding No.: AX.1-2 Configuration Control System for Auxiliary Systems

Finding Description: ORNL has not established a configuration control system for auxiliary systems.

Code: Category III

Compliance Protocol: DOE Orders 5480.5, 5480.6, and 5480.19

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: The planned ORNL configuration-management program will include configuration control for auxiliary systems. The interim management directive on configuration management issued November 1, 1990, included ventilation systems, waste systems, inter-facility alarm systems, and the nuclear-material vault as critical auxiliary systems but did not mention the steam plant, a system identified by the tiger team as critical. Although DOE has not provided consistent guidance on configuration management, from earlier internal and external appraisals and the Laboratory self-assessment, ORNL was aware of inadequacies in configuration control but had not yet specifically identified auxiliary systems as requiring control. Implementation of the configuration-management program will be tied to the plan and schedule for the phased approach in developing facility safety analysis documentation.

Root Causes:

Inadequate policy and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. The Office of Operational Readiness and Safety will revise the list of critical facilities and systems that the interim directive places under configuration management to include critical auxiliary systems.	Complete
2. Initiate configuration management training for managers of facilities and systems that are subject to the formal configuration-management program.	9/91
3. Appoint a full-time configuration control program manager to provide direction to facilities and divisions in implementing the configuration-management program.	9/91

4. Issue an ORNL SPP for configuration management to supersede the interim document issued on November 1, 1990. The SPP will specify that it is to be phased in as part of the facility safety evaluation process. 12/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

Action item	Estimated costs per fiscal year ($K) 1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	*a*						
3	20	*					20
4	*b*	*b*					
Status:							
Funded							
Requested							
New	20						$20

*Estimated annual ongoing cost: $85K.
[a]See Finding OP.4-1 for conduct of operations training costs.
[b]Included in cost for FTE in Item 3.

References: ORNL Long-range Plan, 1989-95, ORNL 65-25

FWP ERAT850, ORNL Safety and Health -- Regulatory Compliance, June 1, 1990

Finding No.: AX.2-1 No Implementation of the Waste Minimization Policy

Finding Description: **ORNL has not implemented the 1986 Energy Systems Waste Minimization Policy.**

Code: Category III

Compliance Protocol: Tennessee Hazardous Waste Management Rule 1200-1-11-.03, RCRA Section 3002, and DOE Order 5400.3 require waste minimization plans and/or programs for hazardous and radioactive mixed waste generating facilities. DOE Order 5820.2A requires DOE facilities to establish an auditable waste reduction program for LLW. DOE Order 5400.1 requires preparation of a waste reduction program plan, which must be reviewed annually and updated every three years. In 1985 ORNL issued a letter setting forth hazardous waste minimization as a Laboratory Policy. In addition, in 1986 Energy Systems issued a policy letter calling for implementation of a comprehensive waste minimization program.

Priority: Energy Systems Risk Weight 56
Tiger Team Action Plan Priority 2

Response: See Finding WM/BMPF-2.

Planned Actions and Schedules:

This finding is fully addressed by actions listed in response to Finding WM/BMPF-2.

Costs: Costs associated with this finding are reported under Finding WM/BMPF-2.

References: None

Finding No.: AX.3-1 Energy Systems Policy Procedure on Waste Management

Finding Description: **The draft Martin Marietta Energy Systems Policy Procedure ESH-18, "Waste Management," does not address goals and operating procedures for minimizing radioactive wastes, and its training objectives do not include making generators of wastes more sensitive to the value of full implementation of the policy.**

Code: Category III

Compliance Protocol: Solid hazardous wastes (including radioactive wastes) should be controlled to minimize the volume generated and handled in a manner that provides safe storage and transportation.

Priority: Energy Systems Risk Weight 6
Tiger Team Action Plan Priority 3

Response: Energy Systems Policy Procedure ESH-18 was issued as a review draft for comments by the installation prior to the issuance of DOE Order 5400.1 which contains detailed guidance on waste minimization requirements. The draft will be revised to incorporate the requirements of that order as well as additional guidance received for implementing DOE Order 5820.2A "Waste Management." The schedule for revision of the draft Energy Systems Policy Procedure ESH-18 "Waste Management" is addressed by this action plan. ESH-18 will be revised to address the comments of the Tiger Team as well as comments received from the installations, other reviewers, and to reflect changes in regulations. In response to the Tiger Team comments, the revision of the waste minimization section of the Policy Procedure will specifically include the addition of direction on the establishment of waste minimization goals, reference to operating procedures as a means of reducing radioactive waste volumes and radioactivity levels of the waste, and the requirements to provide generator/employee awareness training of the overall benefits of waste minimization.

Root Cause:

Inadequate policy

Planned Actions and Schedules:

Item/Description	Completion Date
1. Draft and distribute for review revision to ESH-18 incorporating current DOE requirements.	6/91
2. Issue revised ESH-18.	10/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1&2	15						15
Status:							
Funded	15						
Requested							
New							$15

References: None

Finding No.: AX.4-1 Fissile Material Storage Handling Activities

Finding Description: **Fissile material storage handling activities are not in compliance with DOE 5480.5.**

Code: Category III

Compliance Protocol: DOE Order 5480.5

Priority: Energy Systems Risk Weight 56
Tiger Team Action Plan Priority 2

Response: The fissile materials stored in Building 3033 Annex are contained in either plastic or glass inner containers which are sealed in a metal, carbon steel isotope can. The voids between the inner container and the outer metal container are packed with a sorbent material. This outer isotope can is sealed by double crimping, similar to commercial juice cans. Recent, unanticipated, high-moisture conditions in the storage area of Building 3033 Annex resulted in the rusting of some of these carbon steel isotope cans. The outer metal container, or isotope can, is considered to be the primary container for the fissile material.

Prior to the Tiger Team visit, planning for the disposition of all material which was previously in the Isotope Production and Distribution Program (IPDP) was begun. All of the material in Building 3033 Annex was included in these planning activities, in that it was formerly in the IPDP and is now part of the Isotopes Facilities Shutdown Program (IFSP) at ORNL. This plan will address moving this fissile material to a more stable, long-term storage site. The present plan, as a result of this finding, is to take each package that is now in the 3033 Annex (that includes both fissile material and other alpha emitters stored in the facility) to disassemble the present isotope cans, to document the integrity of the inner container (either the glass or plastic container), place that inner container into a new metal container and add back the necessary sorbent material, and seal the outer metal container. As a part of this repackaging, an evaluation of a metal container that meets the requirements of DOE Order 5480.5 with respect to corrosion and container integrity will be developed. The final details of this repackaging activity and disposition of all this material is still under development. The material will be moved to either the 3027 Storage Vault or to Building 3019.

Deficiencies in safety documentation (i.e., the references to container integrity and qualification of materials handling) will be addressed in the FSET Phase I for the facilities for which this material will be stored for the long-term. FSET Phase I will not be required for the 3033 Annex because the plan is to remove the fissile and other material from this facility prior to the completion of the FSET Phase I evaluation.

Root Causes:

Inadequate policy, inadequate policy implementation, and inadequate training

Planned Actions and Schedules:

Item/Description	Completion Date
1. Identify appropriate containers that meet the requirements for DOE Order 5480.5 relative to the storage of plutonium and other fissile materials.	Complete
2. Issue plans and procedures for repackaging material for shipment to a final storage site.	7/91
3. Address requirements of DOE Order 5480.5 in FSET Phase I for 3027 Storage Vault and Building 3019.	6/91
4. Repackage all materials and transfer to an appropriate storage site.	9/91
5. Using strategies developed and lessons learned from 3033A effort, and as required by DOE Order 5480.5, para. 13.b., repackage fissile material stored in a laboratory or other storage area in a quantity greater than ten grams in containers identified in item #1 or in other containers that meet fissile material storage requirements. (Quantities of ten grams or less will be treated the same as other high-toxicity alpha-emitters.)	3/92

Costs:

Type of funds: ERWM Programmatic
Source of funds: EM-ADS387

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	3						3
2	5						5
3	68						68
5		25					
Status:							
Funded							
Requested	76						
New		25					$101

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
4	4						4
Status:							
Funded	4						
Requested							
New							$4

Type of funds: Research Programmatic
Source of funds: DP-GE

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
4	4						4
Status:							
Funded							
Requested							
New	4						$4

References: DOE Order 5480.5.

Finding No.: AX.4-2 Building 3027 Storage Vault Operation

Finding Description: **Contrary to the requirements of DOE 5633.3, ORNL is not in compliance with the need for organizational independence in the operation of Bldg. 3027 Storage Vault.**

Code: Category III

Compliance Protocol: DOE Order 5633.3

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: To resolve the organizational independence issue, external auditors will be exclusively utilized to conduct all required Materials Control and Accountability (MC&A) audits of the ORNL Central SNM Storage Vault [Material Balance Area (MBA 06)] which will remain under the management/operational control of the Safeguards and Security Department. New guidance provided by the DOE-ORO MC&A Branch now allows for the conduct of routine and special audits within Energy Systems by use of external auditors. Independent auditing by an organization external to the ORNL Laboratory Protection Division will ensure compliance with the DOE Order 5633.3 rule on organizational independence.

Root Cause:

Poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Coordinate with the MC&A activity at the K-25 Plant on performance of required MC&A audits of the ORNL Central SNM Storage Vault (MBA 06) by auditor(s) assigned to K-25.	Complete
2. Formalize agreement with K-25 MC&A activity for performance of required MC&A audits of the ORNL Central SNM Storage Vault by auditor(s) assigned to K-25.	Complete

3. Conduct initial external audit of MBA 06. Complete

Costs: Additional costs will not accrue to the Laboratory as a result of realignment of audit responsibility for the Storage Vault.

References: DOE Order 5633.3, Chapter 1, paragraph 1.b.

Finding No.: AX.5-1 Gaseous Effluent Discharges

Finding Description: **ORNL is not in compliance with Martin Marietta Energy Systems as low as reasonably achievable (ALARA) policy and DOE 6430.1A because it is not qualifying or quantifying many gaseous effluent discharges.**

Code: Category III

Compliance Protocol: DOE Order 6430.1A

Priority: Energy Systems Risk Weight 63
Tiger Team Action Plan Priority 2

Response: The emissions from ORNL facilities are regulated by the Tennessee Department of Health and Environment (TDHE). In response to requests from TDHE to all Energy Systems sites in Tennessee, a plan to demonstrate compliance with established de minimis levels (below concern) is under development. To demonstrate compliance with these requirements, administrative limits on the amounts of materials that can be released from each release point at ORNL will be developed, and documentation will be required of each facility manager.

Root Causes:

Inadequate policy implementation and ambiguous regulations and expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Meet with TDHE regulators to discuss compliance agreement.	Complete
2. Document proposed approach to TDHE.	Complete
3. Develop emissions inventory.	5/91
4. Establish administrative limits for each hazardous and radioactive chemical released from each facility.	7/91
5. Perform audits of facility records.	9/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

Action item	Estimated costs per fiscal year ($K) 1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	50						
4	30						
5	10						
Status:							
Funded	90						
Requested							
New							$90

References: None

Finding No.: AX.6-1 Backup Power Diesel Generators

Finding Description: **Periodic testing of diesel generators supplying backup power for vital systems is not in accordance with recommended standards.**

Code: Category III

Compliance Protocol: Periodic testing of diesel generators should be done in accordance with recommended standards.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: This action plan addresses the periodic testing of diesel generators supplying backup power to vital systems. ANSI/IEEE 446-1987 and National Fire Protection Association Standard NFPA-110 contain guidelines for testing emergency and standby power systems. Copies will be obtained, analyzed, and necessary changes made.

Root Cause:

Inadequate policy implementation; testing procedures were written using manufacturer's recommended test.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Classify diesel generators per instructions in NFPA-110.	6/91
2. Issue revised diesel generator testing procedure to comply with ANSI/IEEE 446-1987 and NFPA-110.	9/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	1						1
2	1.5						1.5
Status:							
Funded	2.5						
Requested							
New							$2.5

References: None

3.3.7 Emergency Preparedness

Finding No.: EP.1-1 Accident Consequence Assessment

Finding Description: **ORNL has not completely analyzed credible accidents as required by DOE 5500.1A nor has it clearly assigned the responsibilities to do so.**

Code: Category III

Compliance Protocol: DOE Order 5500.1A

Priority: Energy Systems Risk Weight 109
Tiger Team Action Plan Priority 2

Response: Energy Systems has an ongoing SAR update program to conduct Hazard Classification and Qualitative Analysis (Phase I) and Quantitative Accident Analysis (Phase II) of non-reactor nuclear and selected other facilities with significant hazard potential (see Finding FR.2-1). The primary aspect of this program is based on a risk prioritization of activities. This program is designed to address all facilities simultaneously. Additionally, Industrial Hygiene has undertaken a comprehensive facility survey to identify and evaluate all ORNL operations with respect to potential health hazards and OSHA compliance (see Finding IH.2-2). The results of these inquiries will provide information upon which analysis of major credible accidents can be based.

The installation facility safety manager is responsible for analyzing and evaluating potential accidents and their associated risks.

Root Causes:

Poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue a revised position charter for the emergency preparedness department head to assign the responsibility for coordinating identification and assessment of major credible accidents for emergency planning.	Complete
2. Identify the major credible accidents at ORNL. (See Finding EP.1-4.)	9/91

3. Prepare prioritized schedule for analysis of the major credible accidents. 9/91

4. Analyze major credible accidents for emergency preparedness planning. 9/92

Costs:

Type of funds: ESH Programmatic
Source of funds: ER-AT EP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1–4	15	5	55	*			75
Status:							
Funded							
Requested	15	5	55				
New							$75

*Estimated annual ongoing cost: $50K.

References: Energy Systems *Comprehensive Emergency Management Plan*
Energy Systems Policy Procedures ESH-8

Finding No.: EP.1-2 Emergency Preparedness Recommendations

Finding Description: **ORNL has no effective system to ensure completion of recommendations in emergency preparedness.**

Code: Category III

Compliance Protocol: DOE Order 5500.3A (Draft)

Priority: Energy Systems Risk Weight 11
Tiger Team Action Plan Priority 3

Response: The Emergency Response Action Items (ERAI) tracking system which has been used by the Laboratory Shift Superintendent's office is obsolete and not compatible with current equipment. Effective December 1, 1990, the quality auditing function was assigned to the Quality Department. As a part of the reorganization, the Quality auditing managers will become the single point for tracking corrective actions. (See Finding QV.1-6.)

Root Causes:

Inadequate oversight

Planned Actions and Schedules:

Item/Description	Completion Date
1. Implement the Evaluation Data Base System (EDS), the corrective action tracking system prescribed by the Quality Department to ensure completion of emergency preparedness (EP) recommendations.	Complete
2. Enter all outstanding EP items to be tracked into the prescribed system.	Complete
3. Issue a procedure for entering future items, maintaining contact with persons responsible for action, verifying completion, and closing out of findings.	Complete

Costs:

Type of funds: ESH Programmatic
Source of funds: ER-AT EP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—	*					—
2	25						25
3	—						—
Status:							
Funded							
Requested							
New	25						$25

*Estimated annual ongoing cost: $5K.

References: Energy Systems Comprehensive Emergency Management Plan
DOE Order 5500.3A (Draft)
DOE Order 5700.6B
Laboratory Protection Division Procedure EP-22.

Finding No.: EP.1-3 Facility Hazards Information

Finding Description: **The system of building emergency plans and local emergency supervisors in the X-10 Site does not ensure that emergency responders are provided information on hazards in facilities.**

Code: Category III

Compliance Protocol: DOE Order 5500.3A (Draft)

Priority: Energy Systems Risk Weight 69
Tiger Team Action Plan Priority 2

Response: Building emergency plans (local emergency manuals) maintained by local emergency supervisors are only one of the means used to provide information to emergency responders on hazards in facilities. Each major facility has its own local emergency squad whose members are aware of the hazards where they work through their individual job assignments, through the hazards communication (HAZCOM) program, and through annual training for their local emergency squad. During regular work hours, Monday - Friday, members of the local emergency squad will meet the site shift emergency squad to direct them to the scene of an incident and advise them of hazards which are present. During off-shifts when most ORNL facilities are unoccupied and their local emergency squads are off-duty, the site shift emergency squad relies on its training (which includes Radiation-Worker Training, Special Access Training for particular facilities, Confined Space Entry Training, and annual Emergency Responder Training), pre-fire plans, and posted warning signs to provide indication of hazards in facilities.

Efforts are underway which will provide emergency responders more definitive information on hazards in facilities. Industrial Hygiene has undertaken a comprehensive facility survey to identify and evaluate all ORNL operations with respect to potential health hazards and OSHA compliance (see Finding IH.2-2). Also, the Energy Systems SAR Update Program is conducting hazard classification and accident analysis of non-reactor nuclear and selected other facilities with significant hazard potential (see Finding FR.2-1). The results of these investigations will provide pertinent information for local facility managers and their local emergency supervisors regarding the need for more documentation in local emergency manuals and the posting of warning signs. This information also may be incorporated into HAZCOM and special access training programs.

Additionally, Energy Systems is developing a computerized Hazardous Materials Inventory System (HMIS), which will provide near real-time accounting of hazardous materials on-site by location and quantity. HMIS is expected to become operational by the end of 1991.

Root Causes:

Inadequate oversight, inadequate management approach, and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Revise the annual review page of each local emergency manual to include a block for countersignature by the local emergency supervisor.	Complete
2. Conduct training session for local emergency supervisors to review their responsibilities for providing information on hazards in their facilities.	Complete
3. Revise the local emergency manual for Building 2525 to spell out the hazards in the plating shop.	Complete
4. Issue requirement for Division Environmental, Safety and Health Action Plans to include performance goals and objectives for identifying and documenting a facility's major credible accidents, informing the occupants and, if applicable, restricting access and posting warning signs where significant health and safety hazards exist.	Complete
5. Issue a procedure to provide routine and updated output of the HMIS to emergency responders so that they can maintain a state of informed readiness.	12/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	2						2
2	20						20
3	3						3
4	5						5
5		10					10
Status:							
Funded	30						
Requested		10					
New							$40

Estimated annual ongoing cost: $10K starting in FY 1993.

References: DOE Order 5500.3A (Draft)

Finding No.: EP.1-4 Analysis of Emergency Preparedness

Finding Description: **ORNL facilities have not been surveyed to identify potentially serious emergency preparedness deficiencies.**

Code: Category III

Compliance Protocol: DOE Order 5500.3A (Draft)

Priority: Energy Systems Risk Weight 66
Tiger Team Action Plan Priority 2

Response: As stated in EP.1-1 and EP.1-3, Industrial Hygiene has undertaken a comprehensive facility survey to identify and evaluate all ORNL operations with respect to potential health hazards and OSHA compliance (see Finding IH.2-2). Also, the Energy Systems SAR Update Program is conducting hazard classification and accident analysis of non-reactor nuclear and selected other facilities with significant hazard potential (see Finding FR.2-1). The results of these studies will provide pertinent information relating to emergency preparedness deficiencies.

Energy Systems has assigned each host site responsibility for emergency preparedness. All ORNL facilities at the Y-12 Plant fall under the jurisdiction of the Y-12 emergency preparedness organization and they must abide by Y-12 emergency preparedness policy and procedures. A memorandum of understanding establishes this arrangement and is signed by both site managers (see Finding OA.1-5).

The emergency procedures for Building 9204-3, located at the Y-12 Plant, have been reviewed and accepted by the Y-12 Emergency Preparedness Department. Following the Tiger Team visit there on November 2, 1990, it was determined that the test button for that building's high level alpha stack alarm is designed to be pressed for one minute before actuating the alarm signal to avoid false alarms due to power surges. When so tested, the audio alarm sounded properly.

For consistency throughout the Y-12 Plant, emergency exit doors are painted red. The "Red Door" concept ensures passage to the outside. Periodic evacuation drills are conducted by Y-12 to ensure that their system works. Established practice at the X-10 Site involves maps that identify evacuation route(s) to Local Assembly Points. These maps are maintained in local manuals and are also mounted in conspicuous places for reference during emergencies or evacuation drills. These well-established and well-tested methods have proven to be very effective at the respective sites.

Root Causes:

Insufficient resources, inadequate oversight, and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Conduct evacuation drills for all facilities at the X-10 Site to familiarize occupants with the evacuation routes and location of local assembly points.	Complete
2. Survey ORNL facilities to further identify potentially serious emergency preparedness deficiencies.	Complete
3. Prioritize identified deficiencies and budget for corrective action (see Finding EP.1-1).	9/92
4. Complete correction of deficiencies.	9/93

Costs: Cost of actions listed is included in Finding EP.1-1. Additional funds to be determined following survey completion.

References: DOE Order 5500.3A (Draft)

Finding No.: EP.2-1 Classification of Emergency Events

Finding Description: **The ORNL classification of emergency events is not consistent with DOE 5500.2A, DOE N5500.5, and the State of Tennessee Emergency Plan.**

Code: Category III

Compliance Protocol: DOE Order 5500.2A, DOE Order N5500.5, and the State of Tennessee Emergency Plan.

Priority: Energy Systems Risk Weight 56
Tiger Team Action Plan Priority 2

Response: In Chapter 5 of the Energy Systems *Comprehensive Emergency Management Plan* (CEMP), four levels of event classification are equated to "reduction of the level of safety of the *site*"; whereas, DOE Order 5500.2A, dated 4-13-88, applies those classifications to "reduction of the level of safety of the *facility*." The *X-10 Site Emergency Plan* erroneously adopted the CEMP verbiage. Laboratory Shift Superintendent's (LSS) Procedure EP-6 employs the correct terminology.

Root Causes:

Inadequate policy implementation and ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Notify the Energy Systems Central Staff Emergency Preparedness Manager of the aforementioned discrepancy in the CEMP published by his office.	Complete
2. Issue a change to the *X-10 Site Emergency Plan* correcting the event classification section.	9/91
3. Revise LSS Procedure EP-6 to acknowledge that emergencies may result from release of hazardous materials that are not radioactive.	9/91

Costs:

Type of funds: ESH Programmatic
Source of funds: ER-AT EP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
All	10						10
Status							
Funded							
Requested	10						
New							$10

References:
DOE Order 5500.2A
DOE Order N5500.5
State of Tennessee Emergency Plan
Energy Systems *Comprehensive Emergency Management Plan*
ORNL *X-10 Site Emergency Plan*
LSS Procedure EP-6

Finding No.: EP.2-2 Adequacy of ORNL Emergency Plans

Finding Description: **ORNL Emergency Plans are confusing and incomplete. Implementing procedures have not been prepared as required by DOE 5500.1A.**

Code: Category III

Compliance Protocol: DOE Order 5500.1A

Priority: Energy Systems Risk Weight 106
Tiger Team Action Plan Priority 2

Response: During FY 1990, the top priority for the new Emergency Preparedness Department was the correction of four Category II concerns from the 1989 Radiation Protection Technical Safety Appraisal. In December 1989, Energy Systems issued the *Comprehensive Emergency Management Plan* (CEMP), which, for the first time, established corporate standards. The ORNL counterpart to the CEMP, the *X-10 Site Emergency Plan*, was issued in February 1991. The absence of a site-level emergency plan contributed to the confusion cited above.

The field monitoring teams referred to in the site plan were established March 1991 (see Finding EP.5-1). Chapter 8 of the site plan addresses the duties of all ORNL Emergency Operations Center (EOC) cadre positions.

See Finding EP.6-1 for comments concerning protective action guides and site boundaries. In the absence of other criteria, ORNL emergency responders use the U.S. Department of Transportation *1990 Emergency Response Guidebook to Hazardous Materials Incidents* (DOT P 5800.5). Additionally, the Laboratory Shift Superintendent (LSS) and the EOC cadre may refer to the American Conference of Governmental Industrial Hygienists (ACGIH) pamphlet *1990-1991 Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices* and the *NIOSH Pocket Guide to Chemical Hazards* (DHHS Pub. No. 85-114). Further, Energy Systems has developed a computerized data base of Material Safety Data Sheets as part of its Hazardous Materials Inventory System (HMIS) (see Finding EP.1-3). Together with consultation with knowledgeable facility experts, these documents provide protective guidance which can be applied on an ad hoc basis.

ORNL currently has 25 emergency preparedness implementing procedures (18 LSS procedures, 3 ORNL standard practice procedures (SPP), and 4 Laboratory Protection Division procedures). Two more SPPs are in draft and will be issued after the review and approval process.

Root Causes:

Ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue the *X-10 Site Emergency Plan.*	Complete
2. Issue copy of DOT P 5800.5 to each member of site shift emergency squad.	Complete
3. Instruct shift emergency squad on use of DOT P 5800.5.	Complete
4. Revise EOC cadre position checklists to include review and approval sheet and use of current position titles.	12/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	18						18
2	2						2
3							
4		20					20
Status:							
Funded	20						
Requested		20					
New							$40

References: DOE Order 5500.1A
DOT P 5800.5
CEMP
ACGIH: 1990-1991 TLV/BEI
DHHS Pub. No. 85-114

Finding No.: EP.3-1 Training for Emergency Functions

Finding Description: **Individuals may be called upon in an emergency to perform functions for which they have not been trained.**

Code: Category III

Compliance Protocol: DOE Order 5500.3A (Draft)

Priority: Energy Systems Risk Weight 7
Tiger Team Action Plan Priority 3

Response: Historically, individuals were expected to perform emergency duties by virtue of their primary job assignment. For example, there is one health physics (HP) technician on duty during off-shifts at ORNL; accordingly, when there has been a radiological emergency during off-shifts, that individual automatically responded as a member of the emergency squad. Similarly, management personnel in Security; Fire Protection; Plant and Equipment; Health and Safety; Hazardous Waste Operations Group; and Reactor Operations have been called upon to serve in the Emergency Operations Center with their qualifications being based on their primary job responsibilities. No formal emergency certification was provided for each emergency function. (See Finding REP.3-1.) However, there has been a robust program of drills and exercises at ORNL which has provided emergency response personnel with practical, on-the-job training. See Finding SA-1 for response on self-assessment.

Root Causes:

Inadequate training, insufficient resources, and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Establish a requirement that persons be trained or certified before being placed on the emergency cadre.	Complete
2. Notify the Emergency Preparedness Department at the Y-12 Plant about the Tiger Team's comment on training their Plant Shift Superintendents in the hazard of plutonium.	Complete
3. Ensure that training/certification records have been established for all EOC cadre members.	Complete
4. Verify that all shift emergency squad training records have been brought up to date.	6/91

5. Identify emergency functions for each emergency response group. 12/91

6. Issue an Emergency Preparedness Training Plan. 12/91

7. Identify training requirements and work with the Training Department to develop a program of instruction for each emergency function. 6/92

8. Train and certify each individual responder, as required. 12/92

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1-4	10		*				10
5-6		50					50
7		50					50
8			100				100
Status:							
Funded	10						
Requested							
New		100	100				$210

*Estimated annual ongoing cost: $100 K starting in FY 1993.

References: DOE Order 5500.3A (Draft)
X-10 Site Emergency Plan

Finding No.: EP.3-2 Spill Response Training

Finding Description: **Emergency squad training in spill response lacks depth and rigor to protect emergency responders and mitigate the consequence of spill accidents.**

Code: Category III

Compliance Protocol: DOE Order 5500.3A (Draft)

Priority: Energy Systems Risk Weight 7
Tiger Team Action Plan Priority 3

Response: The ORNL Hazardous Waste Operations Group (HWOG) is responsible for mitigating and cleaning up spills on-site. As part of their qualifications, HWOG personnel have been trained to various hazardous materials certification levels, one of which includes the wearing of total encapsulating suits. Members of the shift emergency squad do not receive the extensive training required for that hazardous materials certification level. The shift emergency squad's duties involve assisting HWOG personnel in donning encapsulating suits, obtaining equipment needed by HWOG personnel, and supporting spill cleanup efforts with minimal exposure to themselves.

Root Cause:

Inadequate training

Planned Actions and Schedules:

Item/Description	Completion Date
1. Change Standard Practice Procedure X-GP-2 to reflect that only personnel trained to the appropriate hazardous materials certification level are permitted to wear total encapsulating suits.	Complete
2. Issue procedures clearly defining roles and interfaces for emergency responders in the mitigation of hazardous materials spills.	10/91
3. Train emergency squads to carry out the spill responsibilities to which they are assigned.	12/91

Costs: Estimated annual ongoing cost: $50K starting in FY 1992.

References: DOE Order 5500.3A (Draft)

Finding No.: EP.4-1 Emergency Preparedness Exercises

Finding Description: **Emergency preparedness exercises are not conducted in a manner to ensure proficient response to emergencies.**

Code: Category III

Compliance Protocol: DOE Order 5500.3A (Draft)

Priority: Energy Systems Risk Weight 7
Tiger Team Action Plan Priority 3

Response: During FY 1990, the Laboratory had three command post exercises (CPXs) in which only the Emergency Operations Center (EOC) was activated and all field responses were simulated and 12 field training exercises (FTXs) in which emergency units actually responded in the field but the EOC was not activated. All these exercises were conducted during regular work hours. No CPX was conducted during off-shift hours and no integrated emergency management exercise (a combined CPX and FTX) was conducted. Further, all the scenarios for the exercises were written in-house.

During the integrated emergency management exercise conducted for the Tiger Team on October 31, 1990, the fire captain at the scene was well aware of the consequences of drum failure; accordingly, even after the fire was extinguished, using a deluge set, he maintained a water curtain between the ruptured sulfuric acid tank and the 20 or more 55-gallon drums marked with "bleach" placards, until the Hazardous Waste Operations Group (HWOG) was able to mitigate the spill. These action were witnessed by the Tiger Team Fire Protection Appraiser who found no fault with the tactics used.

The physical location of the emergency preparedness offices in the same building with the Laboratory Shift Superintendents is not as much a factor in compromising the confidentiality of scenarios as is the large number of people who must be told in advance about a full scale exercise. The artificialities of an exercise imposed by safety, security, logistics, staging, communications, and documentation contribute to the problem. Conversely, when advance notification is incomplete, as cited in finding EP.4-2, insufficient involvement and coordination may result.

Root Causes:

Inadequate oversight and inadequate management approach

Planned Actions and Schedules:

Item/Description	Completion Date
1. In the *X-10 Site Emergency Plan*, require the Emergency Preparedness Department to conduct and critique at least one integrated emergency management exercise annually.	Complete
2. In the *X-10 Site Emergency Plan*, require the Emergency Preparedness Department to conduct and critique an EOC command post exercise off-shift annually.	Complete
3. Conduct at least one tabletop session annually for all EOC cadre personnel, primary and alternates, to review lessons learned from drills and exercises.	Complete
4. Utilize an outside scenario writer for one exercise annually.	Complete

Costs: Estimated annual ongoing cost: $150K.

References: DOE Order 5500.3A (Draft)

Finding No.: EP.4-2 Drill Planning

Finding Description: **There was insufficient guidance and plant involvement in drill planning.**

Code: Category III

Compliance Protocol: DOE Order 5500.3A (Draft)

Priority: Energy Systems Risk Weight 6
Tiger Team Action Plan Priority 3

Response: All disciplines with responsibilities for emergency response have not been involved in the planning of drills and exercises, see Finding SA-1 regarding self-assessments.

Root Causes:

Inadequate oversight and inadequate management approach

Planned Actions and Schedules:

Item/Description*	Completion Date
1. In the *X-10 Site Emergency Plan*, describe the functions of controllers and evaluators in drills and exercises.	Complete
2. In the *X-10 Site Emergency Plan*, require training session be given for controllers and evaluators before each drill or exercise.	Complete
3. In the annual training for emergency responders, explain the methodology for conducting, controlling, evaluating and critiquing drills and exercises.	Complete
4. Develop a checklist to ensure involvement from every appropriate group (discipline) when planning drills and exercises.	6/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1-3	10	*					10
4	5						5
Status:							
Funded	15						
Requested							
New							$15

*Estimated annual ongoing cost: $10K starting in FY 1992.

References: DOE Order 5500.3A (Draft)

Finding No.: EP.5-1 Emergency Monitoring of Releases

Finding Description: **Emergency field sampling and monitoring of chemical and radiological releases are not provided for as required by DOE 5500.3.**

Code: Category II

Compliance Protocol: DOE Order 5500.3A (Draft)

Priority: Energy Systems Risk Weight 68
Tiger Team Action Plan Priority 2

Response: This action plan addresses formal establishment of field monitoring teams for ORNL. Such teams, consisting of one representative from industrial hygiene, health physics, and environmental monitoring will be dispatched in the event of a release of hazardous or radioactive materials. They will provide real-time data regarding concentrations of the materials. The information collected by these teams will be used by crisis management personnel to formulate appropriate emergency responses.

Root Causes:

Inadequate policy implementation, inadequate training, and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Obtain interim mutual aid agreement from the K-25 Site for their field monitoring team to support ORNL if required until establishment of the X-10 site field monitoring teams.	Complete
2. Issue a procedure delineating the roles and responsibilities of the X-10 site field monitoring teams.	Complete
3. Procure equipment needed to deploy field monitoring teams.	Complete
4. Assign coordinators and team members (three teams—primary/alternate for each position).	Complete
5. Conduct technical training for field monitoring teams and coordinators (classroom and field training).	Complete

6. Conduct an emergency exercise involving field monitoring teams and coordinators. Complete

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	10						10
3	50	*					50
4	—						
5	15	*					15
6	15	*					15
Status:							
Funded	90						
Requested							
New							$90

*Estimated annual ongoing cost: $100K.

References: Energy Systems *Comprehensive Emergency Management Plan*
DOE Order 5500.3
Laboratory Protection Division Procedures EP-20

Finding No: EP.5-2 Regional Radiological Event

Finding Description: DOE Oak Ridge Operations Office has not maintained the capability to respond to a regional radiological event as required by DOE Order 5500.1A.

Code: Category III

Compliance Protocol: DOE Order 5500.1A. The regional Radiological Assistance Program (RAP) should be in compliance with DOE orders and directives.

Priority: Energy Systems Risk Weight 56
Tiger Team Action Plan Priority 2

Response: Lack of DOE funding of the regional RAP has been identified and documented. The Deputy Assistant Secretary for Military Applications (DASMA) has now taken the lead role and has identified funding for FY 1991. In FY 1990, ORO funding was provided for upgrade and maintenance of the ORO RAP vehicle. No HQ DOE guidance has been received on the requirements for the RAP program, (i.e. standardized equipment, RAP vehicle requirements, personnel requirements, etc.). An assessment of response requirements, procedure development, and identification of team members is in progress.

As an interim measure until the actions listed below can be accomplished, we will use the radiological assets of the ORNL Field Monitoring Teams (see Finding EP.5-1) for response to RAP emergencies.

Root Cause:

Inadequate resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Identify RAP team members and develop primary and alternate team listings.	Complete
2. Submit a Field Work Proposal (FWP) requesting FY 1993 funds needed for ORNL to maintain a RAP response capability.	Complete
3. Assess the response requirements and determine the capability needed to meet the requirements.	9/91
4. Issue RAP procedures and checklists.	3/92

5. Develop a RAP training program and conduct initial training. 6/92

6. Procure identified equipment needed to enhance the emergency response capability. 12/92

7. Conduct an exercise of the RAP program to validate procedures. 3/93

Costs:

Type of funds: ESH Programmatic

Source of funds: ER-AT EP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	5						5
3	5						5
4		10					10
5		100					100
7			100				100
Status:							
Funded							
Requested	10						
New		110	100				$220

Estimated annual ongoing cost: $150K.

Type of funds: Capital
Source of funds: GPE

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
6			200				200
Status:							
Funded							
Requested							
New			200				$200

References: DOE Order 5500.1A

Finding No.: EP.6-1 Protective Action Guides/Emergency Action Levels

Finding Description: **Protective Action Guides are not established for ORNL. Emergency Action Levels exist only for the High Flux Isotope Reactor.**

Code: Category III

Compliance Protocol: DOE Order 5500.3A (Draft)

Priority: Energy Systems Risk Weight 56
Tiger Team Action Plan Priority 2

Response: The lack of on-site protective action guides (PAGs) is a problem throughout the entire DOE complex, nation-wide. A DOE-HQ subcommittee on dose assessment has provided no definitive instructions to the field. The EPA radiological guides do not address hazardous chemicals. The American Industrial Hygiene Association's Emergency Response Planning Guidelines (EPRGs) are specific for a very limited number of chemicals and don't begin to approach the thousands of chemicals used at ORNL.

In the absence of other criteria, ORNL emergency responders use the U.S. Department of Transportation's *1990 Emergency Response Guidebook to Hazardous Materials Incidents* (DOT P 5800.5). Copies of this document have been issued to all members of the site shift emergency squad and are used as a text in their annual training.

Additional references available to the Laboratory Shift Superintendent are the American Conference of Governmental Industrial Hygienists (ACGIH) pamphlet *1990-1991 Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices* and the *NIOSH Pocket Guide to Chemical Hazardous* (DHHS Pub. No. 85-114).

Neither DOE nor Energy Systems can unilaterally establish PAGs applicable to off-site areas. In December 1990, DOE negotiated am Agreement-In-Principle (AIP) with the State of Tennessee which, when ratified, will provide a formal mechanism by which PAGs for the entire Oak Ridge Federal Reservation (X-10, Y-12, and K-25) may be developed in cooperation with the cognizant state agencies.

The boundaries defining the X-10 Site for emergency preparedness purposes are clearly depicted in the *X-10 Site Emergency Plan* and the state of Tennessee Emergency Plan. The most prominent lines of demarcation are the Clinch River along the east, south, and west sides and Bear Creek Road along the north side.

Root Causes:

Ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. In the *X-10 Site Emergency Plan*, define boundaries and stipulate that roadblocks will be used, where necessary, to prohibit and control the movement of traffic through the site during emergencies.	Complete
2. Develop interim protective action guides for on-site use.	8/91
3. Conduct negotiations with the state of Tennessee regarding off-site protective action guides.	12/91
4. Participate in the preparation of protective actions for the most significant radiological hazards for the ORR.	3/92
5. Establish emergency action levels after analysis of major credible accidents is completed (see Finding EP.1-1).	6/92

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
All	25						25
Status:							
Funded							
Requested							
New	25						$25

Estimated annual ongoing cost: $50K.

References:

Energy Systems *Comprehensive Emergency Management Plan*
DOE Order 5500.3A (Draft)
DOT P 5800.5
ACGIH - 1990-1991 TLV/BEI
DHHS Pub. 85-114
X-10 Site Emergency Plan
State of Tennessee Emergency Plan

Finding No.: EP.7-1 Personnel Accountability Systems

Finding Description: The personnel accountability systems in use at ORNL are incomplete.

Code: Category III

Compliance Protocol: DOE Order 5500.3A (Draft)

Priority: Energy Systems Risk Weight 130
Tiger Team Action Plan Priority 2

Response: The 1989 Radiation Protection Program Assessment/Technical Safety Appraisal (RPPA/TSA) of the three Energy Systems Oak Ridge sites (Y-12, K-25, and X-10) cited personnel accountability as a Category II concern. Several actions were taken to correct that deficiency, including the development of a Facility Hazard Gradation Matrix that categorized facilities into five degrees of risk with a corresponding requirement for accountability. The ORNL reactors and about 20 non-reactor nuclear facilities were identified as requiring accountability of personnel within 30 minutes. The remainder of the Laboratory was determined to have an adequate system of ensuring evacuation by use of local emergency squads conducting thorough building searches.

Root Causes:

Inadequate policy implementation and inadequate management approach

Planned Actions and Schedules:

Item/Description	Completion Date
1. Conduct evacuation drills for all facilities at the X-10 Site to familiarize occupants with the location of local assembly points and to test the effectiveness of building searches conducted by local emergency squads.	Complete
2. Perform a comprehensive review of personnel accountability at ORNL.	9/91
3. Propose a formal personnel-accountability system and review the system through management channels.	10/91
4. Issue a procedure for personnel accountability at ORNL.	2/92

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	50	*a*					50
2	10						10
3		5					5
4		15					15
Status:							
Funded	60						
Requested							
New		20					$80

Estimated annual ongoing cost: $25K.

[a]Additional funds to be determined following review completion.

References: Energy Systems Comprehensive Emergency Management Plan
DOE Order 5500.3A

Finding No.: EP.7-2 Emergency Notification Systems

Finding Description: Emergency notification systems at ORNL do not ensure notification of personnel.

Code: Category III

Compliance Protocol: DOE Order 5500.3A (Draft)

Priority: Energy Systems Risk Weight 133
Tiger Team Action Plan Priority 2

Response: ORNL's public address system consists of a wired network of more than 2200 loud speakers which provide coverage to 80% of the site. In April 1991, installation started on a radio-linked, outdoor public warning system, consisting of eleven siren/speakers which will augment the PA system, providing coverage within a two mile radius—the Immediate Notification Zone—surrounding the X-10 site. This new public warning system is scheduled to be operational in July 1991.

Root Causes:

Insufficient resources and inadequate oversight

Planned Actions and Schedules:

Item/Description	Completion Date
1. Provide audiotapes of ORNL's current alarm signals to the Training Department for playing during General Employee Training/General Employee Access Training (GET/GEAT) classes.	Complete
2. Place radio-linked, outdoor public warning system in service.	7/91
3. Issue procedure to require monthly testing of public warning system to determine effectiveness and document performance.	7/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	2						2
2	*						
3	8						8
Status:							
Funded							
Requested	10						
New							$10

*Estimated annual ongoing cost: $50K; FY 1990 GPP cost $410K.

Additional funds to be determined following determination of required upgrades.

References: Energy Systems Comprehensive Emergency Management Plan
DOE Order 5500.3A (Draft)

3.3.8 Technical Support

Finding No.: TS.2-1 Safety Analysis Report Update Program

Finding Description: **The Safety Analysis Report Update Program does not call for prioritization of the schedule for Operations Safety Requirements preparation based on relative hazard of the facilities.**

Code: Category III

Compliance Protocol: Best Management Practice

Priority: Energy Systems Risk Weight 311
Tiger Team Action Plan Priority 2

Response: Energy Systems and ORNL have recognized for some time the pressing need to upgrade facility Safety Analysis Report (SAR) and accompanying Operational Safety Requirement (OSR) documents. These upgrades have become necessary due to changes in standards which require a significantly higher degree of technical rigor and completeness in safety documentation (SARs, OSRs, and Technical Specifications) than existed in those documents written in the mid-1980s time frame. A phased-approach SAR Upgrade Program has been developed to determine a risk-based prioritization of the facilities and to schedule the upgrading of the facility safety documentation according to this prioritization. Completion of the document upgrades according to the phased-approach schedule is highly dependent on the identification of resources. To date, the costs associated with Phases 0 and I have been borne by the operating divisions out of their program overheads. However, the resources required for Phase II and III upgrade activity are significantly greater, thus requiring appropriate identification of necessary funding within division operating budgets.

The Safety Analysis Report Upgrade Program was developed to apply a risk prioritization of activities in contrast to a serial approach that would upgrade one (or a small group) of SARs and then update the next (or small group). For facilities that require SARs and OSRs, Phase II of the program develops Quantitative Accident Analysis which includes a facility description, the significant accident analysis and the OSRs. For these facilities, the Safety Analysis Report Update Program Overview and Phase I Implementation Plan (Y\CSET-1) does not explicitly require a prioritization of facilities based on relative hazard. Section 3.8.4 of the Phase I Program Plan does require the development of an Installation Action Plan for Implementation of Phase II. What this Action Plan entails is presently under development but was expected to contain prioritization of facilities based on relative hazard. When the Action Plan requirements are fully developed, the Section 3.8.4 of the Program Plan will be revised to include the prioritization of the facilities.

Root Causes:

Inadequate policy and inadequate resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Develop Action Plan requirements and Revise Section 3.8.4 of the Safety Analysis Report Update Program Overview and Phase I Implementation (Y/CSET-1). Include in these requirements a prioritization of facilities based on relative hazard.	Complete
2. Issue a letter from the Laboratory Directorate to Division Directors detailing the estimated costs associated with the safety documentation and related configuration management (as-built drawing) upgrades based on the projected hazard screening classification of ORNL facilities. These estimates are for inclusion in division operating budget requests to DOE for FY 1992 and beyond prioritized by hazard screening classification.	Complete

Costs:

Type of funds: Overhead

Source of funds: Central Engineering Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	4						4
2	2						2
Status:							
Funded	6						
Requested							
New							$6

References: Y/CSET-1 - Safety Analysis Report Update Program Overview and Phase I Implementation

Finding No.: TS.3-1 Procedures for Low-Cost Facility Modification

Finding Description: **Procedures for low-cost (less than $2000) modifications of facilities do not require independent evaluation and approval of the proposed change.**

Code: Category III

Compliance Protocol: DOE Orders 5481.1B and 5480.5 require independent review and approval of modifications that fall within the guidelines of configuration control.

Priority: Energy Systems Risk Weight 8
Tiger Team Action Plan Priority 3

Response: The existing SPP on work order system is obsolete. The procedure in use was developed in June 1977 (SPP 38-C). Most of the work orders under $2000 are for repair work only. However, the concern is that a modification costing less than $2000 could have safety implications but is not receiving an independent review. In addition, the $2000 threshold was established by the Davis-Bacon Act which says that Energy Systems cannot undertake construction jobs estimated to be more than $2000 with Energy Systems craft personnel. These jobs must be referred to the DOE-ORO Davis-Bacon Committee. Therefore, jobs less than $2000 are not necessarily reviewed for safety considerations.

Root Causes:

Inadequate policy, inadequate oversight, and insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue new work order procedure to incorporate a clear distinction between repairs (without modification) of existing facilities and work that modifies the facility in any way.	6/91
2. See Action Item 4 for Finding AX.1-2.	

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	15						15
Status:							
Funded							
Requested							
New	15						$15

Finding No.: TS.3-2 Resource Allocation for Drawing Updates

Finding Description: **In allocating resources to updating of drawings, there is no clear assurance that divisions will receive priority on the basis of need for Safety Analysis Report or Operations Safety Requirements support.**

Code: Category III

Compliance Protocol: Best Management Practice

Priority: Energy Systems Risk Weight 311
Tiger Team Action Plan Priority 2

Response: The ES&H Self-Assessment Report, Section 3.7.1, recognizes that the safety analysis process demands that a firm and fixed basis of as-builts exists to perform the required analysis. These as-builts consist of the design drawings for the facility as they reflect field conditions at the time of the analysis, the procedures as they reflect the activities of operation personnel, and other documents that establish the data used in the safety analysis. The SAR Update Program is designed to accommodate these important interfaces by systematically building a body of knowledge that, in turn, earmarks those components and systems requiring configuration management and as-builts.

At present, resources have not been identified to complete the task of as-builts in support of the Safety Analysis Reports other than divisional funding. Funding has previously been requested in ORNL Field Work Proposal for Safety and Health - Regulatory Compliance, dated June 1, 1990. Cost estimates for the development of as-built drawings for systems and components requiring configuration management are being refined for inclusion in division operating budget requests. As more information is gained through the SAR Upgrade Program, a more detailed cost estimate will be developed.

The SAR upgrade program is being pursued in three phases. Phase I is a hazard screening analysis that will be completed for all facilities and determines which facilities may require more extensive SAR actions. The schedule and costs for Phases II and III are dependent on the results of the Phase I hazard screening.

Root Causes:

Inadequate policy and insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. See Finding TS.2-1, Action Item 2.	
2. In conjunction with the SAR Upgrade Program, develop a process to identify those systems, components, equipment, documentation, etc., requiring configuration management and as-built drawing development based on facility hazard screening classification.	6/91
3. Complete hazard screening analysis for all facilities with identified funding.	9/91
4. Identify funding requirements and scope for Phase II and Phase III of SAR Upgrade Program.	10/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
2	15						15
Status:							
Funded	15						
Requested							
New							$15

Type of funds: Research Programmatic
Source of funds: ER

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
3	1609						1609
Status:							
Funded	1609						
Requested							
New							$1609

Type of funds: Research Programmatic
Source of funds: NE

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
3	871						871
Status:							
Funded	871						
Requested							
New							$871

Type of funds: ERWM Programmatic
Source of funds: EM

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
3	3366						3366
Status:							
Funded							
Requested	3366						
New							$3366

References: The Environmental, Safety, and Health Self-Assessment Report

ORNL Field Work Proposal for Safety and Health—Regulatory Compliance, dated June 1, 1990

Finding No.: TS.4-1 Publication of Unusual Occurrence Reports

Finding Description: **Unusual Occurrence Reports for on-site and off-site occurrences are not sufficiently publicized at ORNL in a summarized, readily comprehended format.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: We are currently in the process of implementing several DOE orders requiring lessons learned. Energy Systems Quality Director is currently revising GP-5.3 to specify an integrated approach for applicability of lessons learned.

Effective December 1, 1990, the quality auditing function was returned to the Quality Department. As a part of the reorganization, the Quality Auditing Manager will become a single point for tracking corrective actions, performing root cause analysis, trending problems and concerns, and establishing a lessons-learned system.

Root Cause:

Inadequate policy; lack of a policy for lessons learned.

Planned Actions and Schedules:

Finding TS.4-1 is fully addressed by actions listed under Finding FR.6-1.

Costs: Costs are reported under Finding FR.6-1.

References: DOE Order 5700.6 and DOE Order 5000.3A

3.3.9 Packaging and Transportation

Finding No.: PT.1-1 Finance and Materials Division Staff

Finding Description: **The Finance and Materials Division is unable to carry out its new responsibilities under the centralized transportation operation due to staff shortages.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 534
Tiger Team Action Plan Priority 2

Response: With the establishment of the Transportation Operations Manager, there was recognition by ORNL management that this function had to be brought up to full staffing with persons trained in the transportation discipline. Finance and Materials Division management identified staffing requirements, and those needs were incorporated into the budget request that was submitted during the summer 1990 budget exercise. Funding has been provided to F&M Division for two Transportation/Packaging positions and additional requests are pending. However, several packaging and transportation positions remain unfilled.

Root Cause:

Insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue position charters and submit in F&M budget request.	Complete
2. Interview and initiate hiring of an on-site transportation specialist.	Complete
3. Interview and initiate hiring of a packaging engineer.	8/91
4. Resubmit funding request for FY 1992 for additional positions in F&M budget.	8/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	*						
3	**						
4	—						
Status:							
Funded							
Requested							
New							$

*Estimated annual ongoing cost: $133K starting in FY 1991 and $163K starting in FY 1992.
**Already funded in FY 1990 budget.

References: Finance and Materials Division FY 1991 Budget Proposal

Finding No.: PT.1-2 Packaging and Transportation Procedures

Finding Description: **Packaging and transportation procedures do not clearly delineate organizational responsibilities as required by DOE 5480.3A (draft) and DOE N 5480.3.**

Code: Category III

Compliance Protocol: DOE Order 5480.3A (draft) and DOE Order 5480.3

Priority: Energy Systems Risk Weight 93
Tiger Team Action Plan Priority 2

Response: The present ORNL Packaging and Transportation (P&T) procedures are in a state of change and are incomplete. A lack of procedures was identified as early as 1988 when it was recognized that SPP-65 was too generic for the needs of the evolving P&T program. As a result of an internal P&T report, a listing of P&T procedures were identified and development work was started. However, the writing of SPPs was instituted on a priority basis which has resulted in a lack of coordination between Responsibility Sections for each SPP.

Additionally, the P&T program at ORNL has been in a dynamic state creating organizational confusion as to responsibilities from one time period to another. Areas such as Waste Operations both at ORNL and at the ORNL facilities at Y-12 have just recently become a part of the centralized P&T program. The development of the Transportation Operations Committee should assist in resolving controversial responsibility and accountability questions in the future.

This problem was recognized in the Self-Assessment report and the identified resources have been requested in the FY 1991 Budget. Present staffing levels hamper a formalized approach to alleviating this problem, but critical procedural requirements are being addressed.

Root Causes:

Inadequate policy, insufficient resources, and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Appoint Transportation Operations Committee.	Complete
2. Request funding to implement actions.	Complete
3. Review and evaluate previously developed SPPs and issue other P&T SPPs as needed.	12/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	15	*					15
2	75[a]	*				*b*	75
Status:							
Funded							
Requested	90						
New							$90

*Estimated annual ongoing cost: $48K starting in FY 1992.
[a]Subcontractor support to expedite the action.
[b]Hiring of a procedure writer will be an ongoing cost.

References: P&T PIP Report

Finding No.: PT.1-3 Packaging and Transportation Procedural Documents

Finding Description: **Packaging and transportation procedural documents do not meet the requirements of DOE 5480.3 and DOE 5480.3A (draft).**

Code: Category III

Compliance Protocol: DOE Order 5480.3 and DOE Order 5480.3A (draft)

Priority: Energy Systems Risk Weight 93
Tiger Team Action Plan Priority 2

Response: As early as 1988 it was recognized that SPP-65 was too general to suffice for the evolving Packaging and Transportation (P&T) program. During that year an effort was mounted to write SPPs in an expedient manner. However, due to staff shortages, only the most critical SPPs were written from FY 1988 to FY 1990. This resulted in an incomplete procedural system for the P&T program. A general procedure was completed, and it (along with some detailed checklists already in place) have sufficed to ensure compliant and safe operations in the interim period.

The 1989 PIP report recommended that an umbrella procedure be written and that a complete set of procedures relating to P&T be developed. The umbrella SPP was completed; however, it was written after completion of four more critical (and detailed) SPPs. The completion of the remaining SPPs is planned, but the pace is slower than desirable and current P&T resources do not allow for the dedicated FTE necessary to do a comprehensive job.

Root Cause:

See Finding PT.1-2

Planned Actions and Schedules:

Item/Description	Completion Date
See Action 3 in PT.1-2.	

Costs: See Costs section for Finding PT.1-2.

References: P&T PIP Report

Finding No.: PT.1-4 ORNL Onsite Transportation Manual

Finding Description: There is no approved Onsite Transportation Manual for the X-10 Site, as required by DOE 5480.3 and DOE 5480.3A (draft).

Code: Category III

Compliance Protocol: DOE Order 5480.3 and DOE Order 5480.3A (draft)

Priority: Energy Systems Risk Weight 133
Tiger Team Action Plan Priority 2

Response: Work was started on the Onsite Transportation Manual in FY88 and the manual has since been through four drafts. The fourth draft has undergone a Laboratory-wide review.

The onsite issue has been quite controversial throughout DOE, and the ORNL manual has been written with a major assumption. That assumption is that the Energy Systems definition of onsite and offsite is acceptable. DOE-ORO is aware of this definition and has not objected, however a recent request from DOE-ORO may change/clarify the current definitions. If there are major changes in the definition, the current ORNL Onsite Manual would have to undergo some major revisions and/or the access to the ORNL site would be severely impacted.

After Executive Committee approval and, if requested, DOE-ORO approval, the manual can be implemented.

Root Causes:

Inadequate policy, insufficient resources, inadequate management commitment

Planned Actions and Schedules:

Item/Description	Completion Date
1. Present final draft of Onsite Transportation Manual for Executive Committee approval.	06/91

Costs: See Costs section for Finding PT.1-1.

References: P&T PIP Report

Finding No.: PT.1-5 Crossover of Packaging and Transportation Responsibilities

Finding Description: **Crossover of packaging and transportation responsibilities between line and staff functions at X-10 could result in conflict of interest and potential degradation of safety.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: The Installation Transportation Safety Manager (ITSM) charter will be revised to define the oversight role of the ITSM. This will eliminate any potential conflict of interest and resultant loss of independence by explicitly defining the interaction between the ITSM and the TOM.

Root Cause:

Poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue a revised ITSM charter to clarify the roles and responsibilities and the interaction between the TOM and the ITSM. Review the TOM charter for potential conflict of interest with respect to safety oversight.	Complete

Costs: No significant cost associated with this action.

References: None

Finding No.: PT.1-6 Transportation Program

Finding Description: **ORNL has not evaluated whether its present transportation program assures compliance with the new Hazardous Materials Transportation Uniform Safety Act of 1990.**

Code: Category III

Compliance Protocol: Hazardous Materials Transportation Uniform Safety Act of 1990

Priority: Energy Systems Risk Weight 45
Tiger Team Action Plan Priority 3

Response: The Hazardous Materials Uniform Safety Act was signed into law in November 1990, and ORNL has conducted an evaluation as to compliance. This action is complete.

Root Cause:

Ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Evaluate impacts of Hazardous Materials Uniform Safety Act on operations at ORNL.	Complete

Costs: Dependent on evaluation of act impacts on ORNL operations (see Finding PT.1-1).

References: Hazardous Materials Uniform Safety Act

Finding No.: PT.2-1 Hazardous Materials Transportation Information

Finding Description: **Useful and necessary information on the transportation of hazardous materials is not provided to all ORNL employees who have a need to know.**

Code: Category III

Compliance Protocol: 49 CFR 100-177

Priority: Energy Systems Risk Weight 133
Tiger Team Action Plan Priority 2

Response: The ORNL Training Program has made significant progress in the areas of course development and instruction. However, the recently passed Hazardous Materials Transportation Uniform Safety Act will require more strenuous certification requirements be placed on training programs. In addition, there is no formalized approach to determining training needs for a division/department at ORNL. TOMS has been chartered with ensuring that DOT regulations are enforced and thus is responsible for auditing the training program and ensuring proper training through surveillance. The current training programs have been audited and approved by TOMS; however, surveillance has been nonexistent and guidance has been issued on an as-requested basis.

The lack of a formalized approach has created confusion for divisions as to the amount of training their employees are required to have. In many cases too much training is being given and in some cases not enough proper training is being given.

ORNL became aware of this problem in 1988 and formally addressed it in the 1989 P&T PIP Report.

Root Cause:

Inadequate communications, ambiguous requirements or expectations, inadequate training

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request divisions to identify personnel who are involved in packaging and transportation activities.	Complete

2.	Prepare a list of all job positions involved in packaging and transportation activities.	07/91
3.	Assess the training needs of these personnel by job requirements utilizing the Transportation Operations Committee (see Finding PT.1-2).	08/91
4.	Identify required training for each job position. (previously identified in Action 1) and, if necessary, recommend new or enhanced training.	12/91
5.	Perform initial program self-assessment.	06/92

Costs: See costs associated with Action 1 in Finding PT.1-2.

References: ES&H Self-Assessment Report, F&M Budget FY91, Numerous Transportation Safety Committee Reviews of ORNL P&T Operations

Finding No.: PT.3-1 Divisional QA Packaging and Transportation Procedures

Finding Description: **Divisional Quality Assurance procedures for packaging and transportation are issued without prior review and approval of ORNL's transportation staff.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: Packaging and transportation related procedures should be reviewed and concurred with by ORNL's transportation staff. The division QA plans for packaging and transportation will be revised to require documented review and concurrence of packaging and transportation related standard operating procedures by the Transportation Operations Manager and the Transportation Program QA Specialist.

Root Cause:

Inadequate policy implementation and inadequate oversight

Planned Actions and Schedules:

Item/Description	Completion Date
1. Notify divisions to revise division packaging and transportation QA plans to require review of and concurrence with all packaging and transportation related standard operating procedures by the transportation operations manager and the Transportation Program QAS.	Complete
2. Define and initiate a system to ensure review of existing divisional packaging and transportation procedures by the transportation operations manager and Transportation Program QAS against the SPP requirements and/or DOT requirements.	12/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	10						10
2		5	*				5
Status:							
Funded	10						
Requested							
New		5					$15

*Estimated annual ongoing cost: $5K.

References: ORNL QA procedure QA-L-5-100, "Instructions, Procedures, and Drawings," requires the review of procedures to assure that appropriate quantitative or qualitative acceptance criteria have been specified and that QA requirements have been included.

Finding No.: PT.3-2 Transportation Program Audits

Finding Description: **Positive and timely follow-up and action on all transportation program audits has not been done. See also Concern QV.1-6.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 30
Tiger Team Action Plan Priority 2

Response: The finding leading to this concern resulted from the absence of a documented action plan for the SAIC audit. The audit was a result of a request from DOE-ORO, for ORNL to perform an internal audit prior to the DOE-HQ review of May 1990. The major finding in the SAIC audit involved the lack of DOT regulatory oversight in the offsite shipments of hazardous wastes. Much discussion was generated by this finding; however, action plans were not documented.

Since the SAIC audit there has been an action plan developed concerning the problems in the offsite shipment of hazardous wastes.

This is the only review for which an action plan was not formally developed in the ORNL P&T discipline.

Root Cause:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Develop necessary action plan(s) for outstanding reviews (see Finding QV.1-6).	

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	9						9
Status:							
Funded	9						
Requested							
New							$9

References: SAIC audit dated 3/30/90

Finding No.: PT.6-1 Onsite Transport of Waste

Finding Description: **Radioactive and mixed wastes are being transported onsite at X-10 without specific knowledge of the nature of the contents, as required by 29 CFR 1910.1200.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 487
Tiger Team Action Plan Priority 2

Response: After further review of the Tiger Team comments, ORNL has concluded that the Finding relates only to the on-site transport of LLLW. At the time of the Tiger Team Assessment, changes in the transportation system for LLLW were being formulated in anticipation of the signing of the Federal Facilities Agreement (FFA).

During this transition it was recognized that better waste characterization needed to be implemented. As a consequence of these activities, a more defined waste characterization (in compliance with regulatory requirements) will be required by waste acceptance criteria before on-site transfers of LLLW are initiated.

See Finding PT.1-4.

Root Cause:

Inadequate policy

Planned Actions and Schedules:

Item/Description	Completion Date
1. Waste management will issue a waste acceptance criteria which ORNL LLLW Generators will be required to meet.	Complete

Costs: Costs associated with waste acceptance criteria, while believed to be significant, are indeterminable without more in-depth study.

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	15	*					15
Status:							
Funded							
Requested							
New	15						$15

*Estimated annual ongoing costs of $150K to meet the requirements.

References: None

Finding No.: PT.6-2 Low-Level Waste Bottle Testing

Finding Description: **The absence of full Type A package testing leaves uncertainties as to the regulatory compliance status of the low-level waste bottles.**

Code: Category III

Compliance Protocol: DOE Order 5480.3 and Draft DOE Order 5480.3A

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: The decision to go to Type A packages (bottles) and to test accordingly was driven by the need to comply with the pending Federal Facilities Agreement (FFA). At the time of the Tiger Team Assessment, the transportation modifications to the LLLW system were in a planning stage. The Type A testing of the packages was in progress. At this time, the Type A testing has been completed.

See Finding PT.1-4.

Root Causes:

Inadequate policy

Planned Actions and Schedules:

Item/Description	Completion Date
1. Evaluate the need for Type A packaging for low level waste bottles and, if affirmed, ensure it is performed in a compliant manner.	Complete

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	10						10
Status:							
Funded	10						
Requested							
New							$10

References: ES&H Self-Assessment Report, Transportation Safety Committee Review of LLLW Activities

Finding No.: PT.6-3 Inconsistency of Regulatory Terminology

Finding Description: **Inconsistent and conflicting use of regulatory terminology at the X-10 Site results in a potential for regulatory violations.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 40
Tiger Team Action Plan Priority 3

Response: The ORNL Self-Assessment did recognize the problem arising from the lack of a firm definition of on-site and off-site and the problems on the horizon with interpretation of the present DOE definition. However, the problem of having conflicting regulatory terminology commonly used in routine Laboratory activities was not recognized as a problem.

To alleviate the risk of conflicting terminology becoming a safety or compliance problem, it will be necessary to ensure that all official Laboratory documentation use proper regulatory terminology. Additionally, it will be necessary to ensure that all SPPs incorporate proper regulatory terminology.

Root Cause:

Inadequate communications

Planned Actions and Schedules:

Item/Description	Completion Date
1. Review and evaluate previously developed SPPs for consistency and accuracy. See Finding PT.1-2.	
2. Issue Laboratory directive clarifying use of terminology for documentation purposes.	08/91

Costs: Cost are included in Finding PT.1-2.

References: ES&H Self-Assessment Report

Finding No.: PT.8-1 Safety Standards for Vehicle Identification

Finding Description: Vehicles carrying hazardous materials onsite are not always identified in accordance with the safety standards in the Department of Transportation and Department of Energy requirements.

Code: Category III

Compliance Protocol: DOE Order 5480.3 and DOE Order 5480.3A

Priority: Energy Systems Risk Weight 58
Tiger Team Action Plan Priority 2

Response: There are inconsistencies in the manner in which hazard communication is displayed on ORNL onsite transport vehicles. This problem was recognized in the ORNL Self-Assessment as it relates to the Onsite Transportation Operations Manual. This is not a problem with shipments moving offsite. The onsite Transportation Operations Manual when implemented will be specific in terms of hazard communication for onsite vehicles and packages.

See Finding PT.1-4.

Root Cause:

Inadequate policy

Planned Actions and Schedules:

Finding is fully addressed in Finding PT.1-4.

Costs: See costs for Finding PT.1-4.

References: None

Finding No.: PT.8-2 Unnecessary Transport of Hazardous Materials

Finding Description: **There is unnecessary transportation of hazardous materials onsite at the X-10 Site.**

Code: Category III

Compliance Protocol: DOE Order 5480.3 and Draft DOE Order 5480.3A

Priority: Energy Systems Risk Weight 87
Tiger Team Action Plan Priority 2

Response: For certain movements of hazardous materials there are unnecessary movements. This practice has evolved from the lack of procedural guidance both from an onsite standpoint and an offsite standpoint.

This concern was not directly addressed in the Self-Assessment Report. Presently none of the existing SPPs address the transfer of material onsite. However, the SPPs do require that this movement be done in accordance with onsite procedures.

This concern can be addressed with an onsite manual describing the safety standards to be used onsite and by revising existing SPPs to require the TOMS and/or RAMSPAC personnel to go to the shipment whenever possible.

See also Findings PT.1-2 and PT.1-4.

Root Cause:

Inadequate policy

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue revised SPPs to ensure unnecessary movements are not executed. See Finding PT.1-2.	

Costs: Costs are outlined in Findings PT.1-2 and PT.1-4.

References: None

Finding No.: PT.8-3 Onsite Transfer of Hazardous Materials

Finding Description: **Onsite transfers of some hazardous materials at the X-10 Site do not meet applicable Department of Transportation standards as specified in DOE N5480.3 and Draft DOE 5480.3A.**

Code: Category III

Compliance Protocol: DOE Order N5480.3 and Draft DOE Order 5480.3A

Priority: Energy Systems Risk Weight 133
Tiger Team Action Plan Priority 2

Response: This concern is recognized at ORNL and is being resolved in the ORNL Onsite Transportation Operations Manual.

See Finding PT.1-4.

Root Cause:

See Finding PT.1-4.

Planned Actions and Schedules:

Actions are outlined in Finding PT.1-4.

Costs: Costs are outlined in Finding PT.1-4.

References: See PT.1-4.

Finding No.: PT.9-1 Central File for Offsite Shipping Documents

Finding Description: **There is no single central file, either computer or hard copy, of shipping papers for offsite shipments of all hazardous materials.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: This concern has never been identified as a significant problem because both filing systems have been audited and have been found to be sufficient. There also is separate accountability for the records because the waste records are considered to be EPA required documents while the shipping records are considered to be DOT required documents. The retention requirements for the documents differ, thus justifying their being filed under two separate systems.

The wording of the finding indicates that the auditor may be looking for a central file located in one physical location. The opinion of ORNL is that the auditor intended to require accountability for the records. From an accountability standpoint, TOMS would be required to ensure maintenance of DOT type documents per the regulatory requirements. TOMS should ensure through surveillance and documented procedure that the waste records are maintained in a manner compliant with the DOT regulations.

Root Causes:

Inadequate oversight and inadequate management approach

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue revised SPPs to document the TOMS accountability function over all records pertaining to DOT regulations. See Finding PT.1-3.	
2. Implement surveillance of all hazardous material offsite shipment records pertaining to DOT regulations.	12/91

Costs: See costs in Findings PT.1-3 and PT.1-1.

References: None

Finding No.: PT.9-2 Traffic Hazards on Bethel Valley Road

Finding Description: Serious, undue, and correctable traffic hazards exist on Bethel Valley Road which is used for ORNL hazardous materials traffic.

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 607
Tiger Team Action Plan Priority 1

Response: Transportation hazards exist at both the east and west ends of Bethel Valley Road. Hazardous material shipments between ORNL and Y-12 generally travel east from ORNL through the Bethel Valley Road - Scarboro Road intersection. This intersection has been studied in the past, most recently in 1987, to determine methods to make the intersection safer. Studies of the intersection have included evaluating the other roads intersecting Bethel Valley and Scarboro Roads, since the traffic problem is not limited to the Bethel Valley - Scarboro intersection. The roads involved in the studies are owned and controlled by various parties - Tennessee Department of Transportation, City of Oak Ridge, DOE and Martin Marietta - so reaching consensus on modifications and identifying funding sources for roadway improvements hasn't been achieved.

The west end of Bethel Valley Road intersects State Highway 95. Although this route doesn't experience as much traffic for shipments between ORNL and Y-12, it is the primary route for shipments between ORNL and K-25. This intersection has a history of accidents, and improvements are needed.

Root Cause:

Inadequate management commitment

Planned Actions and Schedules:

Item/Description	Completion Date
Bethel Valley Road - East	
1. Review the prior traffic studies conducted for the Bethel Valley Road and Scarboro Road intersection; reassess the cost estimates prepared for each of the studies; and determine if additional studies are needed.	Complete

2. A working team composed of members from DOE-ORO, Tennessee Department of Transportation, City of Oak Ridge, and Energy Systems will complete a review of the studies and make recommendations for implementation.	06/91
3. Request that Tennessee DOT perform a traffic study and recommend changes for the Bethel Valley Road - State Route 95 intersection.	06/91
4. DOE-ORO, Tennessee DOT, and Energy Systems review the study and recommended changes and determine the method for funding.	08/91
5. Submit funding request(s).	09/91
6. Initiate implementation of recommended changes.	12/92

Costs: Bethel Valley Road-East will require $20K in FY 91 funding from the operating overhead budget to support review of the studies, estimating, meetings with DOE-ORO, Tennessee DOT, and preparing funding request documentation. The cost for actual implementation is indeterminable until an acceptable modification is agreed upon and the funding source(s) are determined. Bethel Valley Road-West will require $5K. The actual cost for implementation cannot be determined at this time.

Type of funds: Overhead

Source of funds: Overhead

Action item	Estimated costs per fiscal year ($K)						Total
	1991	1992	1993	1994	1995	Beyond	
1-2	20						20
3	5						5
4	—						
5	—						
6		350					350
Status:							
Funded	25						
Requested							
New		350[a]					$375

[a]DOE's share of the estimated cost of recommended changes will depend on what cost-sharing agreements, if any, are reached with Tennessee DOT and the City of Oak Ridge.

References: Scarboro Road Traffic Analysis, November 1987, Prepared by EC Design and Technology, Inc.

Finding No.: PT.12-1 Handling and Storage of Hazardous Materials

Finding Description: **Present practices regarding handling and storage of hazardous materials, especially incompatible materials, do not conform to regulatory requirements, good practice, or Department of Energy safety policy.**

Code: Category III

Compliance Protocol: 29 CFR 1910

Priority: Energy Systems Risk Weight 414
Tiger Team Action Plan Priority 2

Response: Incoming vendor or AVID receipts of hazardous materials are received, staged for immediate delivery or segregated in Bldg. 7001. Technical specification have been developed to procure four portable hazardous materials storage buildings. The four buildings will be located under the 7001 Bldg. east overhang. The Chemical Storage buildings will be utilized for segregation and temporary staging receipts of acids, bases, flammable, and toxic materials while awaiting distribution. Energy Systems Procurement is in the process of purchasing these buildings for ORNL. In the interim, pallet racks in Bldg. 7001 will be used for segregating hazardous materials.

Building 7001 is one of our major operational constraints. It was constructed in 1948 and was not designed for receipt, distribution, and warehousing functions. Receiving and distribution work areas are relatively small in size and become very congested. Congestion problems are magnified when forktruck and pedestrian traffic are added. Engineering studies are complete identifying removing a fire wall and the old transportation offices which will increase Receiving Distribution area by 3,000 sq ft. Increased operational space will allow for a safe and systematic system. Construction contracts are in the Materials Department FY91 budget request.

Materials Department operating procedure MD-S-4 *Loading and Unloading of Motor Vehicles* was approved and implemented 1-25-90. This procedure includes a segregation and separation chart of hazardous materials that is adhered to for staging, segregation, and loading delivery vehicles. Segregation charts have been posted at the hazardous material storage rack in receiving and in the distribution area. Receiving employees have been instructed to stage heavy and/or bulky material on the floor. Interpretation of current DOT regulations transporting less than truck load quantity of hazardous materials necessitates utilizing the segregation chart for single transport vehicle. Distribution employees are continually schooled and supervised for compliance. Materials Department is not in violation of DOT regulations.

Materials Department operating procedure MD-S-3 *Receipt, Handling, and Storage-In-Transit of Hazardous Materials* was approved and implemented January 19, 1990. This procedure is a cook book approach for our employees. Employees are continually schooled and supervised for compliance.

In CY90 Materials Department supervisors were trained by the ORNL Training Department on hazardous communications. Supervisors will train their employees to potential hazardous materials which they may encounter in their day to day duties.

Root Causes:

Lack of resources, inadequate training, and inadequate policy implementation

Planned Actions and Schedules

Item/Description	Completion Date
1. Purchase and install four chemical storage buildings.	9/91
2. Construct level "A" inspection area (see Finding QV.5-1).	9/92
3. Demolish old Transportation offices.	9/92
4. Convert 7001 dry sprinkler system to wet pipe system.	9/92
5. Remove 7001 fire wall and relocate offices.	9/92
6. Construct exit from mezzanine #3.	9/92
7. Upgrade 7001 electrical.	9/92
8. Train employees to site-specific potential hazards.	9/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	100						100
2		150					150
3		125					125
4		58					58
5		94					94
6		50					50
7	75	75					150
8	5						5
Status:							
Funded	100						
Requested							
New	180	552					$732

References: 29 CFR 1910 (Industrial Safety)

Finding No.: PT.12-2 Planning of Radioactive Materials Packaging Needs

Finding Description: **Absence of coordinated planning between ORNL and the Department of Energy on packaging needs has caused delays in shipping radioactive materials, which have adversely affected operations.**

Code: Category III

Compliance Protocol: DOE Order 5480.3 and Draft DOE Order 5480.3A

Priority: Energy Systems Risk Weight 8
Tiger Team Action Plan Priority 3

Response: ORNL has four packages in the queue for DOE Certificates of Compliance approval. Those packages have been prioritized, and DOE has been made aware of this prioritization.

A 1988 DOE-ORO audit recommended that ORNL develop a more formalized and organized packaging and transportation program. The reason for this recommendation stemmed from the fact that ORNL had numerous packages in timely renewal status, which was indicative of less than adequate planning for packaging needs. This problem was addressed in the PIP report of 1989, and a recommendation was made for a packaging engineer to be hired by TOMS. To date ORNL has not been successful in hiring the packaging engineer; however, active recruiting has been and is still under way.

Root Causes:

Inadequate communications, ambiguous requirements or expectations, and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Submit letter to DOE-ORO addressing the packaging under timely renewal and packaging which will adversely impact operations if not available.	Complete
2. DOE-ORO submit ORNL letter to DOE-HQ.	6/91
3. Submit requisition, interview and select Packaging Engineer for TOMS.	8/91

Costs: See Finding PT.1-1.

References: P&T PIP report issued 6/29/89; ES&H Self-Assessment

Finding No.: PT.12-3 Absence of Onsite Transfer Plan

Finding Description: **The absence of a plan coordinated by the involved divisions for onsite transfers of radioactive and mixed wastes is delaying the implementation of cost-effective waste management practices.**

Code: Category III

Compliance Protocol: DOE Order 5480.3 and Draft DOE Order 5480.3A

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: The problem involving onsite transport of radioactive and mixed wastes was recognized in 1988 during a DOE audit which called for the development and implementation of an onsite transportation plan. ORNL set out to develop an onsite plan in 1988 and to date has issued the fourth draft for Laboratory-wide review. Additionally the 1989 P&T PIP Report called for the development of a Transportation Operations Committee to aid in the solution of complex and controversial problems such as the onsite transfer of radioactive and mixed wastes.

The final draft of the onsite plan will need to address the onsite transfer of radioactive and mixed wastes more specifically. The implementation of the onsite plan and the subsequent development of the Transportation Operations Committee will define the methods of onsite transport. The Committee should provide a mechanism for identifying symptoms of less than adequate waste management practices.

See response to Finding PT.1-4.

Root Cause:

Inadequate management commitment

Planned Actions and Schedules:

Actions are outlined in Finding PT.1-4.

Costs: Costs are outlined in Finding PT.1-1.

References: Corporate Audit 1990, DOE-HQ Audit 1990

Finding No.: PT.12-4 Conflicting Contamination Limits

Finding Description: **DOE Headquarters has not resolved the conflicts with regards to the applicable contamination limits.**

Code: Category III

Compliance Protocol: DOE Order 5480.3 established the requirements for the packaging and transportation of hazardous materials, substances, and wastes. DOE Order 5480.11 established the radiation protection standards and program requirements for the protection of the worker from radiation. These orders provide conflicting guidelines regarding contamination limits for transportation operations. DOE-ORO recognized this conflict, and DOE-HQ has been requested to provide a resolution.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: Although DOE-HQ has been made aware of this conflict, no formal resolution has been forthcoming from DOE-HQ. Consequently, DOE-ORO developed a DOE-ORO Radioactive Material Transportation Contamination Policy that was formally transmitted to ORNL on October 29, 1990. It is intended this DOE-ORO policy remain in effect until such time as DOE-HQ takes action on DOE-ORO's earlier request.

Root Cause:

Lack of clearly defined DOE-HQ policy in regard to contamination limits for transportation operations

Planned Actions and Schedules:

Item/Description	Completion Date
1. DOE-ORO request guidance/clarification from DOE-HQ.	Complete
2. While awaiting of DOE-HQ action, DOE-ORO develop and issue policy on transportation contamination.	Complete
3. XSO will formally transmit policy to ORNL.	Complete
4. XSO provide any changes in the policy (from DOE-HQ) to ORNL.	As Necessary

Costs: DOE-ORO and XSO program activities will be accomplished with existing resources.

References: DOE Orders 5480.3 and 5480.11

3.3.10 Nuclear Criticality Safety

Finding No.: CS.1-1 Nuclear Criticality Safety Training Program

Finding Description: **The ORNL Nuclear Criticality Safety Training Program does not meet requirements of DOE 5480.5 pars. 8c and 10.**

Code: Category III

Compliance Protocol: DOE Order 5480.5 pars. 8c and 10

Priority: Energy Systems Risk Weight 60
Tiger Team Action Plan Priority 2

Response: ORNL will develop and issue a Laboratory procedure requiring fissile-material handlers, fissile material supervisors, and other workers who can affect nuclear-criticality safety to have criticality-safety training in compliance with DOE Order 5480.5, par. 10. The ORNL criticality-safety specialists, with help and advice from the ORNL Training and Development Group within the Human Resources Division, will develop and present criticality-safety courses to all workers authorized to handle fissile material or supervise fissile-material handling within 18 months, while the current criticality safety training program continues in the interim. The Technical Resources and Training Group in the Office of Environmental and Health Protection will maintain documentation of training, testing, and qualification status. Fissile-material handlers and supervisors will be retrained and reexamined for emergency response annually and, as appropriate, biennially for other knowledge related to nuclear-criticality safety. The Laboratory will conduct a biennial management assessment of the training program for criticality safety.

Root Cause:

Inadequate training and inadequate management commitment

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue ORNL SPP (or equivalent) to address training requirements of DOE 5480.5, para. 10, and documentation requirements of para. 8c. for fissile-material workers and supervisors. This same SPP will also address other criticality-safety training at ORNL and	8/91

will identify workers who require NCS training at each level. The SPP will include:

- requirements for testing, documentation and timeliness of documentation;
- stated requirements for passing, including mandatory requirements for correct answers to selected questions;

2. Develop and initiate courses, lesson plans, and examinations for fissile-material workers. 11/91

3. Complete first training on all upgraded NCS courses. The course upgrades will include: 10/92

   - revision of criticality-safety training for radiation control officers to include testing;
   - a course description and objectives as part of the approval package for each course;
   - stated requirements for passing, including mandatory requirements for correct answers to selected questions.

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	15		*				15
2		40					40
3			25				25
Status:							
Funded	15						
Requested							
New		40	25				$80

*Estimated annual ongoing cost: $7K biennial costs for Item 1.

References: None

Finding No.: CS.1-2 ORO Oversight and Support Functions

Finding Description: **The Oak Ridge Operations Office is failing to provide to ORNL all the oversight and support functions required by DOE 5480.5 par. 7e.**

Code: Category III

Compliance Protocol: DOE Order 5480.5 par. 7e

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: The Oak Ridge Operations Safety and Health Division has recently reorganized. One entire branch is now devoted to oversight and support of nuclear facility safety. The division has on its staff a Ph.D.-level nuclear physicist with 15 years of applied criticality safety experience for oversight of contractor NCS programs. In addition to providing appraisal and surveillance functions at ORNL, the Safety and Health Division provides direct support to DOE line programs through participation in readiness reviews and investigations, reviews of safety analysis reports (SARs) and operational safety requirements (OSRs), issuance of guidance on SAR and OSR preparation, and review of new designs and proposed configuration changes.

Root Causes:

Inadequate oversight and insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue a plan to conduct at least two surveillances per year and to conduct functional appraisals every 2 years.	Complete
2. Provide the ORNL site safety representative with the UORs affecting criticality safety from within the DOE Order 5000.3A reporting system.	Complete
3. Review ORNL Safety Analysis Reports involving fissile materials as submitted to DOE.	Complete
4. Establish a timely renewal program for ORNL Nuclear Safety Reviews (NSRs) for upgrading to current standards. Programs using NSRs with shortcomings that reduce safety will be stopped.	Complete
5. Provide the ORNL Criticality Safety Officer with draft reports of surveillances and appraisals within 30 calendar days following the visit.	Complete

Costs: No significant costs associated with actions listed.

References: None

Finding No.: CS.1-3 ORNL Criticality Safety Program

Finding Description: **The ORNL Criticality Safety Program lacks controls necessary to satisfy requirements of DOE 5480.5 par. 11c.**

Code: Category II

Compliance Protocol: DOE Order 5480.5 par. 11.c requires that contractor programs involving significant quantities of fissionable materials be governed by written plans and procedures to control the potential of nuclear criticality in the receipt, storage, processing, and shipping of these fissionable materials. The written plans and procedures are to identify the nuclear criticality safety (NCS) controls that were derived from required nuclear criticality safety process analyses.

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: The performance of process analyses and identification of nuclear criticality safety controls (for inclusion in written plans and procedures that are to govern fissionable material conditions) require initiation by ORNL Line Management as the result of

- their knowledge of where to find procedural and operational guidance in the identification of "significant quantities" of fissionable materials and
- their knowledge of clearly defined policies and procedures outlining the ORNL nuclear criticality safety program controls and personnel responsibilities.

Control deficiencies in the ORNL Nuclear Criticality Safety (NCS) Program have been previously identified in the ORNL Self-Assessment, minor nuclear criticality safety incident reports, Criticality Review Committee appraisals, DOE/ORO audits, ORNL Health and Safety Long-Range Plans, and Energy Systems Criticality Safety Committee audits. Although the action plan in response to the last Energy Systems Criticality Safety Committee audit identifies insufficient personnel and procedural deficiencies affecting program controls, it fails to address operating management awareness and knowledge of regulatory requirements for the possession of significant quantities of fissile materials. Although an existing nuclear materials accountability program identifies locations of significant quantities of fissile materials, this resource does not provide for all the regulatory prerequisites associated with possessing these significant quantities of fissile materials (i.e., criticality safety analyses, training, audits, etc.). Regulatory requirements are embodied in ORNL Health Physics Procedure 2.4; however, a knowledge of its contents and regulatory basis is basic to satisfying the requirements of DOE Order 5480.5 par. 11.c.

ORNL Line Management knowledge, awareness, and control of nuclear criticality safety will be heightened as the result of this immediate action plan which includes

- Notification to Line Management of compliance expectations as they relate to nuclear criticality safety program controls and
- Line Management compliance reviews for operations involving fissionable materials and definition of program needs.

The completion of the "Planned Actions and Schedule" provides a prompt response for informing Line Management of needed NCS Program controls and provide closure of the implied concern (Root Cause) as evidenced by the supporting findings.

Root Cause:

Inadequate policy implementation, inadequate management commitment, poorly defined roles and responsibilities, and inadequate personnel resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue an immediate information notice to applicable Laboratory division directors regarding this TSA concern and requiring immediate review of ORNL Health Physics Procedure RP-2.4, "Fissile Material Safety," for compliance with its requirements (see November 29, 1990, letter from J. H. Swanks, "Fissile Material Safety").	Complete
2. Issue memorandum from the Laboratory Director to appropriate line management that outlines regulatory requirements for NCS Program controls and fissile material inventories with a directive for response to Action Item 3 below.	Complete
3. Division directors responsible for fissile materials issue report to Laboratory Director (1) on assessment of holdings and planned activities involving significant quantities of fissile materials, (2) on results of compliance reviews of their operations involving fissile materials relative to Action Item 2, and (3) planned action to correct deficiencies identified.	6/91
4. Identify one FTE to develop a nuclear criticality safety program manual for Laboratory implementation; manual to define roles and responsibilities with respect to NCS and actions necessary to comply with DOE Order Order 5480.5.	Complete

5. Issue revised ORNL Health Physics Manual procedure RP-2.4 to ensure NCS program controls and develop and implement modified procedures in a distinct ORNL nuclear criticality safety manual that includes necessary NCS program controls in compliance with DOE Order 5480.5. — 11/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						0
2	—						0
4	50	*					50
5		—					
Status:							
Funded	50						
Requested							
New							$50

*Estimated annual ongoing cost: $85K starting in FY 1992.

Type of funds: Overhead
Source of funds: Division Administration

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
3	10						10
Status:							
Funded							
Requested							
New	10						$10

References: DOE Order 5480.5, ANSI/ANS-8.1-1988, ANSI/ANS-8.19-1989

Finding No.: CS.1-4 Nuclear Criticality Safety Program Documentation

Finding Description: **The ORNL Nuclear Criticality Safety Program does not satisfy nuclear criticality safety documentation requirements of DOE 5480.5 pars. 8a, 8e, 8j, and 11c, and Energy Systems Policy Procedures.**

Code: Category III

Compliance Protocol: DOE Order 5480.5, pars. 8a, 8e, 8j, and 11c

The nuclear criticality safety analysis and review process at the ORNL is generally described in the ORNL Health Physics Manual, procedure number RP-2.4. However, it does not provide in-depth direction:

- for necessary documentation of the identification and control of risks through the application of DOE Order 5481.1B requirements,
- for the execution and documentation of quality assurance program activities as specified in DOE Order 5700.6B,
- for identifying NCS Program records and documents requiring control and traceability, and
- to Line Management for ensuring that written plans and procedures exist for the receiving, inspecting, shipping, processing, and storing of significant quantities of fissile materials

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: Upgrades to the ORNL NCS Program will address this Concern by replacing the existing ORNL Health Physics Manual procedure RP-2.4 with a comprehensive ORNL Criticality Safety Manual containing specifications for the ORNL Nuclear Criticality Safety Program, which will include a functional role of a Nuclear Criticality Safety Staff.

This corrective action plan (CAP) provides for increasing resources for the purpose of developing procedural requirements for program upgrades, to specify necessary elements for safety analyses, documentation, document traceability and control, facility reviews/audits, training development, and program quality assurance overview. Slightly delayed parallel actions for correcting deficiencies of the stated Findings will be performed as part of the CS.3-1 CAP to reevaluate and document safety analyses in conformance with the program specifications developed in this CAP.

Root Causes:

Inadequate policy, inadequate policy implementation, and inadequate resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Obtain one supplementary staff experienced in nuclear criticality safety (NCS) (see Finding CS.1-3, Item 4).	
2. Define new NCS program requirements by adopting and adapting existing NCS procedures from other Energy Systems facilities (see Finding CS.1-3, Item 4).	
3. Complete draft of new ORNL NCS Procedure Manual (see Finding CS. 1-3, Item 4).	
4. Issue revised NCS Program requirements in an official ORNL Nuclear Criticality Safety Procedure Manual.	11/91
5. Issue guidance to staff and line management concerning revised NCS Program requirements.	11/91

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	*a*						
2	*a*						
3	*a*						
4		10					10
5		10					10
Status:							
Funded							
Requested							
New		20					$20

[a]Costs associated with Items 1–3 are covered by Finding CS.1-3, Item 4.

References: None

Finding No.: CS.3-1 Safety Analysis Documentation Requirements

Finding Description: The ORNL Nuclear Criticality Safety Program does not satisfy safety analysis documentation requirements of ANSI/ANS-8.1-1983 Sect. 4.1.4 and DOE 5480.5 par. 8a. (See also Concern CS.1-4.)

Code: Category III

Compliance Protocol: ANSI/ANS-8.1-1983 Sect. 4.1.4 and DOE Order 5480.5 par. 8a

The nuclear criticality safety (NCS) analysis and review process at the ORNL is generally described in the ORNL Health Physics Manual, procedure number RP-2.4. However, it does not provide in-depth detailed direction:

- to ensure that all required elements for safety analyses and approvals are documented,
- to ensure that controls for nuclear criticality safety are clearly identified,
- to ensure that identified controls are included within operating procedures, and
- to ensure inclusion of safety analyses and approvals into a reliable document control system.

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: This concern is also rooted in the incomplete definition for the specification, performance, audit, oversight, and documentation of the ORNL nuclear criticality safety program and its activities (see Finding CS.1-4) as presented in the Health Physics Manual procedure number RP-2.4.

The corrective action plan (CAP) for Finding CS.1-4 will upgrade the ORNL NCS program and documentation requirements and procedures for nuclear criticality safety and will address the lack of documentation concern. This CAP is provided to increase the necessary resources to upgrade existing safety analyses to meet the NCS program requirements developed by the CAP for Finding CS.1-4.

In event the necessary resources are not obtained, the upgrading of existing nuclear criticality safety analyses will necessarily be completed at a slower rate, extending the completion dates of planned actions 4 and 5 into FY 1996.

Root Causes:

Inadequate policy implementation and insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request funding to obtain additional resources to perform nuclear criticality safety (NCS) analysis.	6/91
2. Prepare a prioritized schedule for NCS analysis re-evaluation contingent on approved funding for FY 92 budget.	10/91
3. Issue revised NCS requirements (see Finding CS.1-4, Item 4).	11/91
4. Contingent upon funding approved for FY 92 budget, re-evaluate and document NCS analyses in accordance with new NCS Procedure Manual being developed in CS. 1-4, Item 4.	11/92
5. Perform first annual appraisal of all facilities authorized to possess significant quantities of fissile materials, in accordance with the new NCS Procedure Manual.	12/92

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
4		276	282				558
5			15				15
Status:							
Funded							
Requested							
New		276	297				$573

References: None

Finding No.: CS.4-1 Review of Nuclear Criticality Safety Analyses

Finding Description: Nuclear criticality safety analyses at ORNL do not always receive a level of review sufficient to satisfy DOE 5480.5 par. 8a.

Code: Category III

Compliance Protocol: DOE Order 5480.5 par. 8a

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: Operations with significant quantities of fissile material are currently governed by the ORNL Health Physics Procedure (HPP) Manual, Procedure 2.4, "Fissile Material Safety." This procedure is deficient per current DOE regulations.

The upgrade of all criticality analyses identified in Finding CS.3-1 according to the new procedure that will be completed in Finding CS.1-4. The reviews of criticality analyses will be performed independently by knowledgeable criticality staff.

Root Causes:

Inadequate policy implementation, inadequate oversight, and insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Include the requirement of independent review of NCS analyses by knowledgeable NCS staff in the new NCS Procedure Manual being developed in CS.1-4, Item 4.	11/91

Costs: Costs are fully addressed in the action plan for Finding CS.3-1.

References: ANSI/ANS 8.19-1984 Sect. 8

Finding No.: CS.4-2 Dissemination of Nuclear Criticality Safety Guidance

Finding Description: **Dissemination of nuclear criticality safety guidance at ORNL does not satisfy requirements of ANSI/ANS-8.1-1983 Sect. 4.1.3 and DOE 5480.5 par. 13b(4).**

Code: Category III

Compliance Protocol: ANSI/ANS-8.1-1983 Sect. 4.1.3 and DOE Order 5480.5 par. 13b(4) are being violated.

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: An ORNL-level procedure, Health Physics procedure RP-2.4, requires approved, written procedures for operations with fissile material, but some of the existing operating procedures do not comply with ANSI/ANS 8.1, Section 4.1.3, and some operating personnel do not understand the importance of criticality control parameters. Managers who operate with, store, or transport fissile material will review and appropriately upgrade all procedures with potential impact on criticality safety. The ORNL criticality safety staff will review and concur with the procedures before they receive approval. These procedures will be used for all fissile material operations after the end of December 1991. (Training that will assist the fissile material manager will begin in October 1991. See Finding CS.1-1.)

As an interim measure, criticality safety personnel will visit fissile material storage areas and instruct supervisors on appropriate posting. The criticality safety staff will prepare or revise an ORNL-level procedure to require posting of limits for criticality safety near storage areas as required by DOE Order 5480.5, par. 13.b.(4). Fissile material supervisors will post these areas, and the areas will be monitored by the criticality safety staff by December 31, 1991.

Root Causes:

Inadequate policy implementation and inadequate training

Planned Actions and Schedules:

Item/Description	Completion Date
1. Verify by inspection that interim postings of criticality safety limits in fissile material storage areas are complete as instructed by criticality safety staff per DOE Order 5480.5, par. 13.b(4).	Complete

2.	Include the requirement of posting of storage areas in compliance with DOE Order 5480.5, par. 13.b.(4) in the new NCS Procedure Manual being developed in CS.1-4, Item 4.	11/91
3.	Initiate upgraded training for fissile material handlers and supervisors. This is part of an action for Finding CS.1-1 and will include guidance on posting areas and appropriate criticality safety parameters for operating procedures.	11/91
4.	Verify and document that all fissile material operations are conducted using approved written operating procedures that have been reviewed and accepted by the ORNL criticality safety staff.	11/92
5.	Include the requirement of making a copy of the NCS approval document readily available at the workplace in the new NCS Procedure Manual being developed in CS.1-4, Item 4.	11/91
6.	Verify by inspection that supervisors have completed posting of NCS limits in storage areas per new NCS Procedures Manual.	2/92

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
4	—	8	*				8
5	—						
6	—						
Status:							
Funded							
Requested							
New		8					$8

*Estimated annual ongoing cost: $5K.

References: Internal appraisals by ORNL CRC and Energy Systems Environmental and Safety Activities

Finding No.: CS.4-3 Nuclear Criticality Safety Remedial Action Plan

Finding Description: **The ORNL Nuclear Criticality Safety Program does not have a remedial action plan for incidents that satisfies the requirements of ANSI/ANS-8.1-1983 par. 4.1.5 and DOE 5480.5 par. 8g.**

Code: Category III

Compliance Protocol: ANSI/ANS-8.1-1983 par. 4.1.5 and DOE Order 5480.5 par. 8g

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: Since October 1, 1990, all ORNL employees adhere to DOE Order 5000.3A, "Occurrence Reporting and Processing of Operations Information." The requirements of the Order are implemented through Energy Systems Policy Procedure GP-13 and associated Standards GP-13.1 and GP-13.2. The system in place "to assure remedial action has been implemented" (per DOE Order 5480.5 par. 8.g) is specified in GP-13.2. The data base computer system, ESQIS/ESAMS, provides the systematic tracking, trending, and reporting system for Energy Systems Occurrences.

ORNL Standard Practice Procedure, X-ESH-3, "Health Physics Manual (HPP)," assigned the Office of Operational Readiness & Safety with the responsibility for tracking incident remedial actions (HPP RP2.4, par. E.4). Tracking of criticality incidents has been a simple task as there have only been less than ten incidents in the past five years at ORNL. According to GP-13.2, Line Management has the responsibility to perform corrective actions and verify and validate completion of corrective actions. For those incidents related to criticality safety, the role of the Quality Department is to provide independent assurance that corrective actions are performed in timely manner. Criticality Safety Section identifies deficiencies in execution of the criticality safety program and provides independent compliance reviews per Criticality Safety SPP.

Root Cause:

Inadequate policy

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue a new SPP regarding reporting criticality safety incidents per DOE Order 5000.3A. (Part of Finding CS.1-4, Item 4); the SPP will also address the update of criticality incident reporting form.	11/91

Costs: Costs are included in Item 4 for Finding CS.1-3.

References: DOE Order 5000.3A, ANSI/ANS-8.1-1988, Energy Systems Policy Procedure GP-13, and Standards GP-13.1 and GP-13.2, and HPP 2.4

Finding No.: CS.5-1 Nuclear Criticality Safety Emergency Response Plan

Finding Description: The ORNL Nuclear Criticality Safety Program does not include all of the elements of an emergency response plan to satisfy requirements of ANSI/ANS-8.1-1983 Sect. 4.1.7 and DOE 5480.5 par. 8k.

Code: Category III

Compliance Protocol: ANSI/ANS-8.1-1983 and DOE Order 5480.5

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: The role of the ORNL Criticality Safety Officer is not specified in an emergency response plan nor is the Criticality Safety Officer listed in an emergency notification roster.

Root Cause:

Poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Specify the role of the Criticality Safety Officer in the X-10 Site Emergency Plan.	Complete
2. Include the Criticality Safety Officer on emergency notification rosters.	Complete

Costs: None

References: DOE Order 5480.5 and ANSI/ANS-8.1-1983

Finding No.: CS.5-2 Criticality Alarm System Evacuation Drills

Finding Description: **Drills conducted at ORNL in support of criticality alarm system evacuations do not satisfy requirements of ANSI/ANS-8.3-1986 Sect. 7.3 and DOE 5480.5 par. 11c (3)(g).**

Code: Category III

Compliance Protocol: ANSI/ANS-8.3-1986 and DOE Order 5480.5

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: Annual evacuation drills have been conducted and are documented for Building 3019; however, two other ORNL facilities with criticality alarm systems are the HPRR and the 3027 Vault, neither of which have personnel assigned in residence.

Root Cause:

Ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Document the requirement for an annual preannounced evacuation drill from each facility where a criticality accident alarm system is required.	Complete

Costs: None

References: ANSI/ANS-8.3-1986 and DOE Order 5480.5
ORNL X-10 Site Emergency Plan

Finding No.: CS.5-3 Criticality Alarm Systems

Finding Description: **The criticality alarm systems at ORNL do not satisfy requirements of ANSI/ANS-8.3-1986 Sects. 4.3, 4.4.5, 5.4, 6.5, and DOE 5480.5 pars. 11c(3)(g), 11c(3)(h).**

Code: Category III

Compliance Protocol: ANSI/ANS-8.3-1986 Sects. 4.3, 4.4.5, 5.4, 6.5, and DOE Order 5480.5 pars. 11c(3)(g) and 11c(3)(h)

Priority: Energy Systems Risk Weight 58
Tiger Team Action Plan Priority 2

Response: All findings noted in the Tiger Team assessment were already being addressed by an ORNL ad hoc committee on criticality alarms (chaired by W. J. DeRossett). The deficiencies with ANSI/ANS-8.3 are documented in the committee's Action Plan. The cost of the effort to achieve compliance is known. Justifications will be prepared to support the contention that the only ORNL facility requiring a criticality alarm is Bldg. 3019.

Root Cause:

Inadequate resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Document the justification of not requiring a criticality alarm system at the High Flux Isotope Reactor and Bulk Shielding Reactor per 5480.5 par. 11c3h.	Complete
2. Submit a change to SAR for Bldg. 3027 which reflects that no criticality alarm system is required (DOE Order 5480.5 par. 11c3h). Pending approval of this SAR change, an interim waiver will be requested from OORS.	Complete

3. Request funding from DOE/Nuclear Fuel Services, Inc., to provide for upgrading of the criticality alarm system in Bldg. 3019. Actions noted in DeRossett's ad hoc committee memorandum including documentation of system placement, maintenance, testing and responsibilities, will be completed nine months after funding is secured. Independent verification of closure will be obtained. 6/91

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	2						2
3	*						
Status:							
Funded	2						
Requested							
New							$2

*Funded by DOE/Nuclear Fuel Services, Inc.

References: DOE Order 5480.5 par. 11c, ANSI/ANS-8.3-1986, Memorandum: W. J. DeRossett to Distribution, November 12, 1990

3.3.11 Security/Safety Interface

Finding No.: SS.1-1 Analyses of Protective Force Equipment

Finding Description: **ORNL does not conduct analyses involving protective force equipment or perform appraisals and audits as required by DOE 5480.16.**

Code: Category III

Compliance Protocol: DOE Order 5480.16

Priority: Energy Systems Risk Weight 112
Tiger Team Action Plan Priority 2

Response: This concern is fully addressed by actions outlined in response to Findings RSS.3-1 (Analyses to Determine Appropriate Weapons) and RSS.4-1 (Safety Appraisals and Audits for Firearms).

Planned Actions and Schedules:

See Findings RSS.3-1 and RSS.4-1.

Costs: Costs are included in Findings RSS.3-1 and RSS.4-1.

References: None

3.3.12 Experimental Activities

Finding No.: EA.2-1 ORNL Policy Regarding Independent Safety Reviews

Finding Description: **There is no Laboratory-wide policy or procedure to address requirements for independent safety review of experiment plans and procedures for low-hazard nuclear and nonnuclear facilities by the Environmental, Safety, and Health Compliance organization.**

Code: Category III

Compliance Protocol: DOE Orders 5480.1B, 5480.10, 5480.11, and 5483.1A

Priority: Energy Systems Risk Weight 69
Tiger Team Action Plan Priority 2

Response: ORNL will prepare and implement a standard-practice procedure (SPP) that will standardize a graded internal (division) review of all experiments and will provide formal guidance to division reviewers for conducting their reviews. The SPP will include guidance on identifying experiments that require independent reviews. An accompanying or included standard will contain guidelines for oversight of low-hazard facilities.

Root Causes:

Poorly defined roles and responsibilities, inadequate policy, inadequate policy implementation, and inadequate oversight

Planned Actions and Schedules:

Item/Description	Completion Date
1. Initiate independent surveillance of experiments in nonnuclear facilities at a level of 0.1 FTE using existing staff.	Complete
2. Issue an SPP to address experiment review, including requirements for graded internal review and review outside the division. The SPP will define the roles and responsibilities regarding independent safety reviews of experiments.	8/91

3. Provide a 2- to 4-hour workshop for division safety officers (DSOs and RCOs) to provide guidance on implementation of the SPP. 10/91

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	8						8
2	15						15
3		2					2
Status:							
Funded	23						
Requested							
New		2					$25

References: ORNL Long-Range Plan, 1989-95, ORNL 65-25

Finding No.: EA.3-1 Guidance on Internal Safety Reviews

Finding Description: **ORNL organizations do not uniformly provide guidance for internal safety review and approval of experimental activities.**

Code: Category III

Compliance Protocol: DOE Orders 5480.1B, 5480.5, 5480.10, and 5483.1A

Priority: Energy Systems Risk Weight 69
Tiger Team Action Plan Priority 2

Response: ORNL will prepare a standard-practice procedure (SPP) that will standardize graded, internal (division) review of all experiments and will provide formal guidance to division reviewers for conducting their reviews. (Refer to Finding EA.2-1.) ORNL management will require divisions to implement the internal-review guidelines. Implementation of this SPP will be evaluated by the independent internal appraisal system (see Finding MF-5).

Root Causes:

Poorly defined roles and responsibilities, inadequate policy, and inadequate policy implementation

Planned Actions and Schedules:

This finding is fully addressed by actions outlined in responses to Findings EA.2-1 and MF-5.

Costs: Costs to address this finding are reported under Findings EA.2-1 and MF-5.

References: ORNL Long-Range Plan, 1989-95, ORNL 65-25

Finding No.: EA.3-2 Documentation of Safety Reviews of Experimental Plans

Finding Description: **Safety reviews of experimental plans and procedures are not always formally documented.**

Code: Category III

Compliance Protocol: DOE Orders 5480.1B, 5480.10. 5480.11, and 5483.1A

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: ORNL will prepare a standard-practice procedure (SPP) that will standardize graded, internal (division) review of all experiments and will provide formal guidance to division reviewers for conducting and documenting their reviews. (See Finding EA.2-1.) This SPP will include requirements for formal documentation of review of experiments, experiment plans, and experiment procedures in compliance with ORNL requirements for record management. Implementation of this SPP will be evaluated by the independent internal appraisal system (see Finding MF-5).

Root Causes:

Poorly defined roles and responsibilities, inadequate policy implementation, and inadequate oversight

Planned Actions and Schedules:

This finding is fully addressed by actions outlined in responses to Findings EA.2-1 and MF-5.

Costs: Costs to implement this finding are reported under Findings EA.2-1 and MF-5.

References: ORNL Long-Range Plan, 1989-95, ORNL 65-25

Finding No.: EA.4-1 Random Safety Surveillances

Finding Description: **The Office of Operational Readiness and Safety does not routinely conduct random safety surveillances of experimental activities.**

Code: Category III

Compliance Protocol: DOE Orders 5480.1B, 5480.10, 5480.11, and 5483.1A

Priority: Energy Systems Risk Weight 6
Tiger Team Action Plan Priority 3

Response: The Office of Operational Readiness and Safety is currently performing routine random inspections of experimental activities on a very infrequent basis with approximately 0.1 FTE and will increase oversight and routine random inspections of low-hazard experimental activities to a level of approximately 0.5 FTE beginning in October 1991 after replacement of a staff member. Issuance of an ORNL SPP will follow addressing ORNL and divisional review and oversight of experiments. The SPP will include standards or have standards as an accompanying document. (See Findings EA.2-1 and EA.3-1.)

Root Cause:

Inadequate oversight and insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request funds to hire staff member to devote at least half time for oversight and routine random inspections of low-hazard experimental facilities.	7/91
2. Contingent on receipt of funding, hire half-time staff member for additional oversight and routine inspections of experimental facilities. Oversight and inspections will follow guidelines from the standard that accompanies the ORNL SPP.	10/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

Action item	Estimated costs per fiscal year ($K)						Total
	1991	1992	1993	1994	1995	Beyond	
2		35	*				35
Status:							
Funded							
Requested							
New		35					$35

*Estimated annual ongoing cost: $37K beginning in FY 1993.

References: ORNL Long-Range Plan, 1989-95, ORNL 6525

3.3.13 Site/Facility Safety Review

Finding No.: FR.1-1 Organization and Implementation of Safety Review System

Finding Description: **ORNL management has not used good industry practice in organizing and implementing its safety review system.**

Code: Category III

Compliance Protocol: DOE Order 5480.5 (9-23-86)—Contractors are required to implement a comprehensive and documented independent review and appraisal system for nonreactor nuclear facilities.

DOE Order 5480.6 (9-23-86)—Contractors are required to implement a comprehensive and documented independent review and appraisal system for all phases of reactor program life.

DOE Order 5482.1B—Contractors are required to implement internal appraisals at the operating level.

Priority: Energy Systems Risk Weight 6
Tiger Team Action Plan Priority 3

Response: The corrective action plan for Finding MF-5 also addresses Findings FR.1-1, FR.3-1, and FR.4-2. These same findings were reported in the DOE-ORO Functional and Multidisciplinary Appraisal, April 1990 (IR-90-04-30-A) and the Martin Marietta Corporate Audit, July 1990 (SAF-14).

Prior to 1990 audit findings, efforts were begun in CY 1990 to enhance the Director's Review Committee (DRC) process. A full-time DRC coordinator was appointed, the process was flow-charted, the existing SPP was revised to reflect the process changes, and quarterly meetings were initiated with the DRC Chairman to discuss improvements and issues. The action plan for Finding MF-5 represents a brief outline of the remaining important steps that must be implemented to fully meet the DOE order requirements. See the response to Finding FR.4-1 for the action plan concerning a strengthened follow-up system.

Root Causes:

Inadequate management commitment, lack of clear policy, ambiguous requirements or expectations, and inadequate implementation of existing policy

Planned Actions and Schedules:

This finding is fully addressed by actions outlined in the response to Finding MF-5.

Costs: The costs to implement this finding are reported under Finding MF-5.

References: DOE Order 5480.5
DOE Order 5480.6
DOE Order 5482.1B
Finding MF-5

Finding No.: FR.2-1 Review of Safety Questions and Topics

Finding Description: **ORNL management has not established a system which ensures that all significant safety questions and topics are identified and submitted to an appropriate safety committee for review. (See also Concerns EA.3-1 and PT.3-1.)**

Code: Category III

Compliance Protocol: Section 9.f of DOE Order 5480.5 requires an internal safety review system that provides an independent determination of whether a proposed activity involves an unreviewed safety question, violation of a Criticality Safety Limit, Operational Safety Requirement (OSR), or any matter for which approval is required.

Section 9.d.(2)(g) of DOE Order 5482.1B requires that the internal appraisal system provide for objective and independent reviews of ES&H functions for conducting reviews of proposed modifications and experiments, procedures, organization and staffing, operating limits, training, and occurrences.

Priority: Energy Systems Risk Weight 60
Tiger Team Action Plan Priority 2

Response: This action plan addresses improvements in the identification of significant safety issues and their submittal to appropriate safety review committees. The action plan for improvement in the review of this finding relates to Findings FR.1-1, EA.2-1, EA.3-1, OA.1-5, PP.3-1, and MF-5.

Correcting the situation which led to this concern requires adequate identification of facility items important to safety. The phased ORNL Safety Documentation Upgrade Program is underway and will accomplish this task by producing updated SARs and OSRs for reactor, nonreactor nuclear, and selected other facilities with significant hazard potential. Refer to Section 3.7, Technical Support, of the ORNL Self-Assessment for more information on this program. A required companion activity to correct the root cause is to implement a configuration management program. This program is to address control, review (including review by the appropriate safety committees), approval, and documentation of changes related to safety. An interim configuration management program is underway and a more rigorous and standardized program will be implemented in the long term. Completion of action items from Findings MF-5 and EA.2-1 along with the action items specified in this corrective action plan will resolve this concern. Implementation of the processes developed as part of this action plan will be evaluated under the independent internal appraisal system developed in response to Finding MF-5.

Root Causes:

Inadequate policy, inadequate policy implementation, and inadequate management approach

Planned Actions and Schedules:

Item/Description	Completion Date
1. Initiate Interim Configuration Management Program.	Complete
2. Develop and initiate implementation of an ORNL SPP for configuration management to supersede the interim document issued on November 1, 1990. The SPP will specify that it is to be phased in as part of the facility safety evaluation process and will address the process to identify those issues which require independent review and approval (see Finding AX.1-2, Item 4).	12/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2		15					15
Status:							
Funded							
Requested							
New		15					$15

References: DOE Order 5480.5
DOE Order 5482.1B
ORNL Self Assessment, Section 3.7, Technical Support
Letter from M. W. Rosenthal of November 1, 1990 "ORNL Interim Configuration Management Program"
"Safety Analysis Report Update Program - Overview and Phase I Implementation," dated October 1990

Finding No.: FR.3-1 Shortcomings of the Safety Review System

Finding Description: The present safety review system has not been organized to perform coordinated, multidisciplinary reviews, and the Director's Review Committees do not have proper guidance from management to achieve a high degree of safety.

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 63
Tiger Team Action Plan Priority 2

Response: The corrective actions for Finding MF-5 address the upgrade of the Safety Review System.

Root Cause:

Inadequate management approach

Planned Actions and Schedules:

This finding is fully addressed by actions outlined in the response to Finding MF-5.

Costs: See Finding MF-5.

References: Finding MF-5

Finding No.: FR.4-1 Management Response to Safety Committee Recommendations

Finding Description: **Contrary to DOE 5480.5 and DOE 5482.1B, ORNL top management has not taken timely action on safety committees' recommendations.**

Code: Category III

Compliance Protocol: DOE Order 5480.5 (9-23-86) 9.a. and c. Management is required to take necessary corrective actions and document such actions in an auditable manner.

DOE Order 5482.1B (9-23-86) 9.c.(4). Appraised organizations shall respond to appraisal recommendations within 30 days.

Priority: Energy Systems Risk Weight 98
Tiger Team Action Plan Priority 2

Response: In the past, the DRC follow-up process has been weak, without a means to escalate critical open and overdue recommendations to the attention of upper management. However, ORNL upper management has been closely involved with the Director Review Committee (DRC) process upgrade in CY 1990. This upgrade includes increased involvement of upper management in the DRC process as well as an improved follow-up system. Implementation of the independent internal review system, as discussed in the corrective actions for Findings MF-5 and MF-6, will verify the adequacy of implementation.

Root Causes:

Inadequate management commitment and inadequate policy

Planned Actions and Schedules:

Item/Description	Completion Date
1. Transmit final review reports to the Laboratory director from the DRC chairmen.	Complete
2. Issue interim guidance to DRC Chairmen.	5/91
a. Require responsible organizations to respond to the Laboratory Director with corrective actions for DRC recommendations.	
b. Quality Department issue monthly reminders and overdue notices regarding DRC recommendation corrective actions.	

c. OORS present quarterly briefing to the ES&H coordination committee on DRC review and corrective action status.

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	15						15
Status:							
Funded	15						
Requested							
New							$15

References: DOE Orders 5480.5, 5480.6, and 5482.1B

Martin Marietta Corporate Audit July 1990, Findings MNG-01 and MNG-05

DOE Memorandum from the Secretary of Energy, Guidance on Environment, Safety, and Health Self-Assessment, July 31, 1990

Finding No.: FR.4-2 Annual Facility Appraisals

Finding Description: The annual facility appraisals have not been independent because those performing appraisals are the same as those performing safety reviews of these facilities.

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 1
Tiger Team Action Plan Priority 4

Response: The corrective actions for Finding MF-5 address the annual facility appraisal issue.

Root Cause:

Poorly defined roles and responsibilities

Planned Actions and Schedules:

This finding is fully addressed by actions outlined in the response to Finding MF-5.

Costs: See Finding MF-5.

References: Finding MF-5

Finding No.: FR.5-1 Triennial Appraisal

Finding Description: **Methods used for the conduct of the triennial appraisal have not provided a comprehensive, independent appraisal of the effectiveness of the overall safety review system at ORNL.**

Code: Category III

Compliance Protocol: DOE Order 5480.5 (9-23-86) 9.i. Contractor independent review and appraisal system is reviewed by contractor management for adequacy of performance at least every 3 years.

DOE Order 5480.6 (9-23-86) 8.g. (9). Contractor independent review and appraisal system is reviewed by contractor management for adequacy of performance at least every 3 years.

DOE Order 5482.1B (9-23-86) 9.d. (2)(d). Internal appraisals are to be reviewed by management for adequacy of performance every 3 years, or more often, as required.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: ORNL agrees that the past triennial appraisals were limited in scope, and appraisal team members were not sufficiently independent. Previous findings from the DOE-ORO Functional Multidisciplinary Appraisal, May 1990, (IR-90-04-30-A and IR-90-04-30-B) address inadequate coverage by the ES&H internal review program and insufficient review of the appraisal system. Items 3, 5, and 7 in the corrective actions for Finding MF-5 address the methods and conduct of the upgraded triennial appraisal.

Root Cause:

Ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Present justification for 1-year extension from DOE-ORO to delay triennial appraisal based on the following: a. Tiger Team, b. other multidisciplinary appraisals, and c. changes being incorporated.	8/91

2. See Items 3, 5, and 7 of the corrective action for Finding MF-5.

Costs: See the costs associated with Items 3, 5, and 7 of Finding MF-5.

References: DOE Orders 5480.5, 5480.6, and 5482.1B

ESH-20, III. D

DOE-ORO Environment, Safety & Health and Quality Assurance (ES&H & QA) Functional & Multidisciplinary Appraisal of Oak Ridge National Laboratory

Finding No.: FR.6-1 Industry Lessons Learned

Finding Description: **ORNL is not fully utilizing an important source of lessons learned in industry in its safety improvement program.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: We are currently in the process of implementing several DOE orders requiring lessons learned. Energy Systems Quality Director is currently revising GP-5.3 to specify an integrated approach for applicability of lessons learned; ORNL Quality staff are participating in the development of ES GP-5.3.

Effective December 1, 1990, the quality auditing function was returned to the Quality Department. As a part of the reorganization, the Quality Auditing Manager (see Finding MF-6) will become a single point for tracking corrective actions, facilitating root cause analysis, trending problems and concerns, and establishing a lessons-learned system. Planned actions listed here also apply to Finding TS.4-1.

Root Cause:

Inadequate resources and inadequate policy; lack of a policy for lessons learned.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue appropriate ORNL procedures to implement ES GP-5.3.	7/91
2. Contingent on approval of funding, hire lessons-learned staff person.	7/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	15						15
2	21	*					21
Status:							
Funded	15						
Requested							
New	21						$36

*Estimated ongoing annual costs: $85K starting in FY 1992.

References: DOE Orders 5700.6 and 5000.3A

3.3.14 Radiological Protection

Finding No.: RP.1-1 Accomplishing ES&H Compliance

Finding Description: **There is little direction in the generation of policy, delegation of responsibilities and authorities, procurement of resources, and management priorities, so that mandatory requirements of DOE 5480.11 are not being met.**

Code: Category III

Compliance Protocol: DOE Order 5480.11

Priority: Energy Systems Risk Weight 68
Tiger Team Action Plan Priority 2

Response: ORNL Standard Practice Procedure X-ESH-3, "Health Physics Manual", dated April 16, 1990, authorizes implementation of the ORNL Radiological Protection Program at ORNL's highest management level and assigns management responsibilities for implementing program policies to the Director, Environmental, Safety, and Health Compliance (ESHC). Even through the procedure authorizes the establishment of policy to the ESHC Director, it was found that the Charters of Responsibility, Authority, and Accountability for Laboratory and ESHC managers do not specifically address this policy-making delegation.

A "DOE Order 5480.11 Implementation Plan" was approved during March 1990 which identified the plans to obtain compliance with DOE Order 5480.11. This implementation plan identified the cost of implementation and the appropriate methods of obtaining the resources. The implementation plan will be reviewed, revised, and approved by Laboratory and ESHC management to ensure that an aggressive approach to becoming compliant with DOE Order 5480.11 is evident.

The Office of Environmental and Health Protection has initiated a surveillance and self-assessment program to ensure that managers and supervisors are involved in surveillance of their work areas and the work performed by their employees. A surveillance plan has been developed which specifies surveillance requirements and applicable procedures. A manager or supervisor will be assigned oversight for each surveillance with a Measurements and Assessments Program Professional assisting in the documentation of findings and development of corrective actions. The surveillance and self-assessment program allows for a structure approach for managers and supervisors to determine compliance with procedures and other regulatory compliance, as well as maintaining an effective working relationship with their employees.

This concern was previously addressed in the "Radiation Protection Program Appraisal of the Oak Ridge Complex" conducted by DOE during May 1989.

Root Causes:

Inadequate policy, inadequate management approach, inadequate communications, ambiguous requirements or expectations, and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Review and, if necessary, issue revisions to the Laboratory's DOE Order 5480.11 Implementation Plan dated March 1990 to ensure that adequate resources and funds are requested and plans for obtaining the resources and funds are documented and approved to comply with mandatory requirements. Revised plan will be issued to DOE-ORO.	05/91
2. Revise and approve the Charters of Responsibility, Authority, and Accountability for the Environmental, Safety, and Health Compliance (ESHC) Director and the ESHC Office Directors to reflect policy-making authority flowdown for ESHC activities. Note: The Charters will delineate and assign responsibility to initiate and enforce corrective action.	05/91
3. Issue a procedure to ensure that individual Charters of Responsibility, Authority, and Accountability for EHP personnel are reviewed annually to determine accuracy.	06/91
4. Issue a standard operating procedure to require EHP management involvement in planned surveillances and assessments for EHP programs and activities in order to provide assurance that managers are aware of area operations.	09/91
5. Issue an administrative procedure specifying requirements for incorporation of new and revised procedures into the appropriate training programs.	09/91
6. Revise the EHP surveillance plans to assign a responsible oversight manager for each surveillance.	06/91
7. Review the process of funding Radiation Protection activities and provide improvement recommendations to the Environmental, Safety, and Health Coordination Committee for review and implementation of approved recommendations.	09/91

Costs:

Type of funds: ESH Programmatic
Source of funds: ER-AT RP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	23						23
2	2						2
3	10						10
4	10						10
5	11						11
6	6						6
7	4						4
Status:							
Funded							
Requested							
New	66						$66

References: None

Finding No.: RP.1-2 ES&H Compliance Staff

Finding Description: **Neither the Environment and Health Protection office nor the Environment, Safety, and Health Compliance division have a sufficient number of trained and experienced staff to effectively correct identified deficiencies to ensure effective implementation and control of health physics activities.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 95
Tiger Team Action Plan Priority 2

Response: The need for qualified replacements for key personnel was identified during the "DOE Radiation Protection Appraisal of the Oak Ridge Complex" during 1989.

The search for replacements for retiring personnel within the Radiation Protection Section is continuing. Qualified replacements for senior health physicists are not readily available, and recruitment of outside professionals is continuing. ORNL has completed recruitment trips to several institutions with Health Physics programs.

Staffing levels of Radiation Protection personnel are dependent on funding availability from supporting divisions and programs. In some areas of the plant, staffing levels that are directly funded and those that are needed to provide optimum health physics coverage are not in agreement, as is the case in some areas of ORNL's Y-12 facilities. An assessment will be made to determine the appropriate level of staffing to support the X-10 site and ORNL operations at Y-12.

As ORNL proceeds with putting in place policies and procedures to implement the new Energy Systems-wide requirements related to conduct of operations and roles and responsibilities, appropriate procedure inclusions will ensure (1) establishment of baseline ES&H programs and staffing levels, (2) budget support for the baseline ES&H programs and staffing, (3) timely communication of staffing needs to staffing organization, (4) ab efficient staffing process to complete requested recruiting and hiring, and (5) self-evaluation of staffing performance and review of baseline goals. (See the RPPA TSA report, Management Issues.)

Root Causes:

Inadequate training, poorly defined roles and responsibilities, management approach, and inadequate resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Conduct a current Radiation Protection and Radiation Monitoring Needs Assessment to define personnel needs in the ORNL Radiation Protection programs at the Laboratory (X-10 and Y-12 Site Operations).	08/91
2. Request funds from divisions, programs, or other sources to obtain resources necessary to support conclusions from the Needs Assessment.	10/91
3. Contingent upon availability of funds, hire additional staff identified in the Needs Assessment.	09/92
4. Issue a Training and Development Plan for Radiation Protection and Monitoring personnel.	09/91
5. Issue a Routine Survey Plan for ORNL Facilities at Y-12 to ensure that survey requirements are in compliance with ORNL Health Physics Procedure RP2.1, "Radiation Surveys," and Standard Operating Procedure 02-50-10, "Radiation Surveillance in Radiological Control Areas."	09/91

Costs:

Type of funds: ESH Programmatic

Source of funds: ER-AT RP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	8						8
4	51						51
5	20						20
Status:							
Funded							
Requested							
New	79						$79

Type of funds: Overhead

Source of funds: Division Administration

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
3		*					
Status:							
Funded							
Requested							
New							$500

*Estimated annual ongoing cost: $500K in FY 1992, and $1,048K in FY 1993.

References: DOE Order 5480.11

Finding No.: RP.1-3 Management Oversight

Finding Description: **There is an absence of oversight at the highest levels of management resulting in a general absence of radiation safety awareness and acceptance of established procedures and practices as required by DOE 5480.11.**

Code: Category III

Compliance Protocol: DOE Order 5480.11

Priority: Energy Systems Risk Weight 73
Tiger Team Action Plan Priority 2

Response: This concern was previously expressed in the "Radiation Protection Appraisal of the Oak Ridge Complex" conducted by DOE in 1989. Prior to the Tiger Team appraisal, a "DOE Order 5480.11 Implementation Plan" was developed, approved by Laboratory management, and issued to DOE. The implementation of the plan has resulted in a commitment by Laboratory management to become compliant with DOE Order 5480.11. The DOE-ORO "X-10 Site Office" personnel have been proactive in the support and oversight of the implementation plan.

The primary basis of the concern was identified by the observation that the DOE Order 5480.11 was driven through the ESHC organization, and ownership by operating division and program managers was not apparent. Increased management oversight, in the form of walk-throughs and self-surveillances, is needed to ensure compliance, completeness, and consistency with the ORNL Health Physics Procedures Manual procedures. The self-assessment process, as outlined in Finding SA-1, will ensure management involvement in the enforcement of Health Physics requirements.

The new requirements and policies for radiation safety and contamination control require a re-education of a large portion of the Laboratory population. The Technical Resources and Training Section of the Office of Environmental and Health Protection has a well-established and current radiation worker program that introduces new requirements as they are added to approved ORNL Health Physics Manual procedures. There is a need to clarify the requirements for who is required to have the varying levels of training that are presently offered.

The radiation source control program is undergoing program upgrades to comply with the "ORO Radiation Source Control Policy", and increased attention within the Office of Environmental and Health Protection is needed to ensure that progress is made towards compliance.

Findings associated with the Laboratory's oversight of the accelerators and X-ray machines require restructuring to ensure compliance with appropriate regulatory requirements. The Accelerator and Radiation Sources Review Committee and the X-ray Safety Review Committee responsibilities and activities will be reviewed to determine the appropriate oversight requirements.

The Radiation Source Control Manager has the authority, accountability, and responsibility for the entire source control program at the Laboratory. The source control program is administered across the Laboratory by the Health Physics Procedure RP 2.14, "Radiation Source Control." The Health Physics Manual is an ORNL Standard Practice Procedure. Program compliance will be maintained through the use of the Measurements Assurance surveillance program and an inventories and leak tests performed by a dedicated technician. Program authority may be escalated to the Director of Environmental, Safety, and Health Compliance, if needed.

ORNL will use DOE Order 5000.3A, Attachment 1, as a mechanism to document noncompliance with ORNL's source control procedures, in respect to lack of registration, leaking, or loss of sources in excess of exempt quantities. The submission of an "Occurrence Report" will provide the Source Control Manager access to all the Laboratory's resources for solving program difficulties.

Root Causes:

Inadequate management commitment, inadequate oversight, and ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Review charters and activities of the Accelerator and Radiation Sources Review Committee and the X-Ray Safety Review Committee and approve necessary changes to the charters for effective oversight requirements. (See Finding MF-5.)	
2. Hire a Laboratory Radiation Source Control Manager to ensure compliance with the "ORO Radiation Source Control Policy."	Complete
3. Review the training status for Laboratory personnel regarding radiation worker training, radiological posting, and radiation source control and make necessary changes to the appropriate training programs.	09/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	107	*					107
Status:							
Funded	107						
Requested							
New							$107

*Estimated annual ongoing cost: $160K.

Type of funds: ESH Programmatic
Source of funds: ER-RP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
3	36						36
Status:							
Funded							
Requested							
New	36						$36

References: DOE Order 5480.11

Finding No.: RP.3-1 ORNL Posting and Contamination Program

Finding Description: **The ORNL posting and contamination program does not meet the intent of DOE 5480.11 as clarified in Draft DOE 5480.11 changes.**

Code: Category III

Compliance Protocol: Draft DOE Order 5480.11.

Priority: Energy Systems Risk Weight 73
Tiger Team Action Plan Priority 2

Response: DOE-ORO personnel state that the requirements specified in the "Oak Ridge Operations Contamination Control Policy" are in strict compliance with the current DOE Order 5480.11. A goal of the development and implementation of the policy was to provide for the best possible contamination control and radiation surveys with available resources as well as to realize an actual size reduction of the radiological areas within the Controlled Areas at the Laboratory. DOE-ORO involved DOE-EH throughout the development of the policy, and all DOE-EH comments have been incorporated into the policy.

ORNL's approach, under the guidance of the DOE-ORO X-10 Site Office, was to implement the policy in such a manner that the maximum protection for employees, visitors, and the environment is achieved. The approach provides the highest degree of assurance against "track-out" of radioactive materials, given current resource restrictions. An "Oak Ridge Operations Contamination Control Policy Implementation Plan" for ORNL was developed and approved for implementation in August 1990. All of the action items contained in the implementation plan have been completed.

The approach refers to the radiological controls established, not the contamination approach. ORNL, with guidance from ORO, has established Controlled Areas postings at the main fence around the facility and around the other facilities located within the Reservation. The majority of the Laboratory's area within the designated Controlled Area is a **Nonradiological Area.** Materials that are surveyed for release are routinely stored in nonradiological areas (inside the Controlled Area) while awaiting transport to the salvage holding area. Procedures specify the requirements for release of material into nonradiological areas. Materials released for use inside the Laboratory are surveyed and held to the same rigid contamination and radiation limits as material intended for off-site use.

Root Causes:

Insufficient resources, inadequate management approach, inadequate oversight, and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Ensure that radiological posting is completed in accordance with the "Oak Ridge Operations Contamination Control Policy Implementation Plan" and document in a letter.	Complete
2. Issue revised ORNL Health Physics Manual procedures and the Radiation Protection and Radiation Monitoring Standard Operating Procedures Manual procedures to reflect the approved requirements for contamination control.	10/91
3. Review and revise the training programs at ORNL which are used to train personnel in the requirements of the contamination control procedures to reflect the approved requirements. (See Item 5 of Finding RP.1-1, which addresses training.)	

Costs:

Type of funds: ESH Programmatic

Source of funds: ER-RP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	5						5
2	23						23
Status:							
Funded							
Requested							
New	28						$28

References: DOE Order 5480.11, "ORO Contamination Control Policy"

Finding No.: RP.3-2 Contamination Control Program

Finding Description: **The technical bases and justification of the contamination control program have not been developed by either Oak Ridge or ORNL.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 8
Tiger Team Action Plan Priority 3

Response: The *ORO Contamination Control Policy* is compliant with DOE Order 5480.11. The specific methods of compliance with the policy were developed by ORNL through the *ORO Contamination Control Policy Implementation Plan*. The *DOE/ORO Contamination Control Policy* made a significant departure from long-standing ORNL radiation area zoning nomenclature. The policy and the required changes to the zoning requirements were made in October 1990. The policy changed the use of a "Regulated Zone (Area)" from a buffer zone around radiological areas to a low-level contamination area. The zoning change and resulting additional frisking requirements caused some delay in full compliance to the policy. An agreement between ORNL personnel and the ORO Site Representative was made on clarifications to ensure maximum "track-out" control and increased acceptance and understandability to the area postings and controls. The Radiation Protection staff has worked in conjunction with facility managers to ensure the complete implementation of policy requirements. The Measurements Assurance Surveillance Program will continue to monitor and enforce the *ORNL Health Physics Manual* procedures and the *Radiation Protection and Radiation Monitoring Standard Operating Procedures Manual* procedures. Emphasis on total-body frisks will continue on egress from all posted contamination areas and Regulated Areas that have significant transferable contamination.

Further consideration has been given to some of the controls that were initiated for Regulated Areas that are possibly contaminated, but are typically clean. In these areas, procedures and policies will be revised to allow more-professional judgment in establishing survey and protective clothing requirements.

ORNL has requested funding and has proposed Item 1, Finding RP.6-3, for a technical bases document. This document will include a study of current ORNL instruments capabilities and survey techniques used for personnel frisking. Upon conclusion of the study, ORNL will act on the conclusions and recommendations of the report. Results of the study will be accommodated by procurement of fixed contamination monitors in an FY 93 line item request.

Root Causes:

Insufficient resources and ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue revision of the ORNL Health Physics Manual procedures and the Radiation Protection and Radiation Monitoring Standard Operating Procedures Manual procedures to specify the contamination control requirements, based upon the technical bases document.	04/92
2. Establish protective measures and surveys required in Regulated Areas and upon exit from these areas, based upon contamination surveys in the area, as well as potential for "track out."	06/91
3. Prepare engineering estimate and submit budget request for procurement and installation of truck monitoring station. (See Item 13 of RP.3-6.)	
4. Contingent on funding, procure and install truck monitoring station. (See Item 14 of RP.3-6.)	
5. Review and revise the radiation worker training to reflect changes in the contamination control program. (See Item 5 of RP.1-1, which addresses training.)	

Costs:

Type of funds: Overhead
Source of funds: Division Administration

Action item	Estimated costs per fiscal year ($K) 1991	1992	1993	1994	1995	Beyond	Total
1		21	*				21
Status:							
Funded							
Requested							
New		21					$21

*Estimated annual ongoing cost: $238K in division administration funds for continuous upgrades for procedures and training.

Type of funds: ESH Programmatic
Source of funds: ER-AT RP

Action item	Estimated costs per fiscal year ($K) 1991	1992	1993	1994	1995	Beyond	Total
2	32						32
Status:							
Funded							
Requested							
New	32						$32

References: DOE Order 5480.11, "ORO Contamination Control Policy"
INPO Radiological Protection at Nuclear Power Stations

Finding No.: RP.3-3 Source Control Program

Finding Description: **Compliance with the source control program will be difficult to achieve due to complexity of requirements and dependence on voluntary response.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 16
Tiger Team Action Plan Priority 3

Response: ORNL's Radiation Source Control Program has added significantly to the control and accountability of radioactive sources at the Laboratory. On April 10, 1990, the "ORO Radiation Source Control Policy" was issued; it specifies the requirements that ORNL is required to comply with by January 1, 1991. Energy Systems has issued ESH-11 to specify requirements for the implementation of the policy.

Office of Environmental and Health Protection personnel are currently initiating a program to become compliant with ESH-11 and the ORO policy. ORNL Health Physics Procedure RP 2.14, "Radioactive Source Control," is currently under revision to specify requirements of the policy. The Radiation Protection and Radiation Monitoring Standard Operating Procedures Manual," Procedure 02-50-55, "Surveying Sealed and Unsealed Radioactive Sources," was issued on September 29, 1990, to provide the technical guidance for the leak testing of radioactive sources. In addition, self-paced training program modules are being developed for each individual responsible for radiation source control.

A vacant position for a Radiation Source Control Manager remains to be filled; until the Manager has been hired, the Radiation Protection Section will administer the program. The Radiation Source Control Manager position will provide the inter-divisional oversight required to ensure compliance with the policy.

Root Causes:

Inadequate policy implementation, insufficient resources, inadequate oversight, ambiguous requirements or expectations, and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Submit the "ORO Radiation Source Control Policy" to DOE-EH for review. (Note: DOE-ORO responsibility.)	Complete
2. Hire a Radiation Source Control Manager to provide oversight and ensure that the appropriate procedures are in compliance (see Item 3 of Finding RP.1-3).	Complete
3. Review and issue revisions to the ORNL Health Physics Manual procedures and the Radiation Protection and Radiation Monitoring Standard Operating Procedures Manual procedures to reflect the requirements of the policy.	10/91
4. Develop and initiate the Radiation Source Control Training Program.	09/91
5. Incorporate the requirements of the radiation source control program in the Office of Environmental and Health Protection surveillance program to ensure compliance. (See Item 6 of Finding RP.1-1.)	

Costs:

Type of funds: ESH Programmatic
Source of funds: ER-AT RP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	0						0
2	0						0
3	17						17
4	21	*					21
Status:							
Funded							
Requested							
New	38						$38

*Estimated annual ongoing cost: $7K in division administrative funds.

References: DOE/ORO Radioactive Source Control Policy
ESH-11

Finding No.: RP.3-4 X-Ray Generating Machine Policy and Requirements

Finding Description: **The ORNL X-ray generating machine policy and requirements are not being applied for ORNL installations in facilities at the Y-12 Plant.**

Code: Category III

Compliance Protocol: ORNL Health Physics Manual Procedure 2.8 requires fail-safe "X-Ray On" indicators. This procedure also requires that qualified operators shall receive the training course "X-Ray Machine Safety."

Priority: Energy Systems Risk Weight 6
Tiger Team Action Plan Priority 3

Response: Improvements in compliance with HPP 2.8 are addressed by this action plan. ORNL X-ray facilities at Y-12 will comply with ORNL HPP 2.8 by February 1991, or operating divisions will request approval of deviations through submission of plans for providing compensating measures. The X-ray units at all ORNL facilities at Y-12 will receive comprehensive triennial reviews beginning in December 1991.

Root Cause:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Appraise all active ORNL X-ray facilities at the Y-12 site.	Complete
2. Remove all individuals who have not received the "X-Ray Machine Safety" training course from the list of qualified X-ray machine operators.	Complete
3. Operators of Biology X-ray facilities with unauthorized lights make the lights fail-safe or provide compensating measures as agreed upon in a formal safety-deviation request and document in a letter to the X-ray Safety Review Committee.	Complete
4. Submit review appraisal report to ORNL management.	Complete
5. Conduct triennial review of all active X-ray facilities at Y-12 site.	10/93

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
5		*					
Status:							
Funded							
Requested							
New							$*

*Estimated annual ongoing cost: $2K triennially.

References: None

Finding No.: RP.3-5 Accelerator Policy Requirements and Oversight

Finding Description: **The ORNL accelerator policy requirements and independent oversight are not consistently applied throughout ORNL.**

Code: Category III

Compliance Protocol: DOE Order 5482.1B

Priority: Energy Systems Risk Weight 6
Tiger Team Action Plan Priority 3

Response: ORNL will issue requirements for accelerators in the form of an SPP based primarily on ANSI N43.1-1978, ANSI N543-1974, DOE Order 5480.11, and an anticipated DOE order on conduct of operations for accelerators. The requirements will also derive from appropriate elements of the ORNL conduct-of-operations/research program that does not specifically include accelerators. The management review committee (currently the Accelerators and Radiation Sources Review Committee [ARSRC]) will use formal, management-approved criteria, that are based on the ANSI standards, the two DOE orders, and good management practices, to improve the current periodic appraisals and to provide better determination whether management and operation of the facilities complies with requirements for safety. The action items to address this finding are described in the corrective action plan for Finding MF.5.

Root Causes:

Poorly defined roles and responsibilities, inadequate policy implementation, and inadequate oversight

Planned Actions and Schedules:

Item/Description	Completion Date
1. Prepare draft Laboratory Standard Plant Procedure (SPP) which clearly defines responsibilities for independent internal appraisal functions including Director's Review Committees and the Health Physics Instrument Committee (see Finding MF-5, Item 3).	
2. Include accelerator stay-time monitors in survey of personnel protection instruments (see Finding RP.8-2, Item 3).	

Costs: Costs are addressed in the corrective action plan for Finding MF-5.

References: An Environmental, Health, and Safety Self-Assessment of ORNL, November 8, 1990, Chapter 3.12, Site/Facility Safety Review

FWP ERAT850, ORNL Safety and Health—Regulatory Compliance, June 1, 1990

Finding No.: RP.3-6 Material Clearance

Finding Description: **The material clearance process does not provide complete assurance to prevent materials that are radioactively contaminated from being taken into unrestricted or uncontrolled areas including the public domain as specified by DOE 5480.11 and DOE 5400.5.**

Code: Category III

Compliance Protocol: DOE Orders 5480.11 and 5400.5

Priority: Energy Systems Risk Weight 63
Tiger Team Action Plan Priority 2

Response: This concern was based on several related findings, which said:

- Material Clearance Tags are an uncontrolled stores item.
- Material Clearance Tags are not adequately and legibly filled out.
- Methods and procedures for material excessing, salvage, and sales do not ensure proper radiological monitoring prior to transfer and release of materials.

The concern requires a review of both the material clearance monitoring methods as well as oversight surveillance practices conducted by the Radiation Protection Section supervisors and managers. The planned corrective actions for the concern and related findings will be addressed through an assessment of the risks associated with the potential problems of releasing contaminated materials and the establishment of the necessary procedural control to mitigate the potential release of contaminated materials.

The Laboratory has placed restrictions and controls on salvage and surplus material. Radiation Protection technicians have been assigned to second-check all salvage material that is generated at a holding area. The holding area is in a Controlled Area. Standard operating procedures have been written to fully detail the material clearance process. The first step in the material release process is an attempt to establish the past history of the material. The standard operating procedures contain requirements to ensure inclusion of all information required in Chapter 2 of DOE Order 5400.5.

All materials sent to the salvage holding area have been surveyed completely for release prior to transportation. The numbers of items found on the second checks are statistically negligible; however, all materials found are reported to Radiation Protection Section supervision and to the responsible technician that performed the survey.

An Energy Systems procedure is being developed for material release surveys. The Energy Systems procedure will not only take into consideration the factors

required to perform an adequate survey, but also the risk assessment and methodology that is required to ensure the highest degree of safety to the public without requiring all surplus materials be buried in the reservation landfills.

Root Causes:

Inadequate oversight, inadequate communications, ambiguous requirements or expectations, inadequate training, poorly defined roles and responsibilities, and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Change the status of the Material Clearance Tags to a controlled stores issue item to ensure that only authorized Radiation Protection Section personnel have access to them.	Complete
2. Establish a holding area for salvage materials that are ready for acceptance by K-25 for salvage sales.	Complete
3. Issue revised Radiation Protection standard operating procedure requirements to reflect needed changes in survey requirements for salvage materials.	Complete
4. Incorporate the requirements of SOP 02-50-80, "Check on the Adequacy of Radiation Surveys," into the Measurements Assurance surveillance program for the Radiation Protection Section. (See Item 6 in Finding RP.1-1.)	
5. Conduct training for technicians who are involved in material clearance surveys. This training shall include a lessons-learned approach on how materials are not getting properly identified during initial surveys.	09/91
6. Issue a Radiation Safety Bulletin for the plant population to provide insight and guidance for materials that may not be appropriate to be sent to salvage.	07/91
7. Make appropriate additions to General Employee Training concerning material clearance policies (see Item 5 in Finding RP.1-1).	09/91
8. Issue an Energy Systems Procedure for material survey and release for unrestricted use.	09/91

9. Prepare and issue Conceptual Design Report (CDR) for Non-Hazardous Materials Clearance Operations (NMCO) Facility. — 06/91

10. Prepare and submit GPP Budget Request for NMCO Facility. — 06/91

11. Contingent on funding approval, construct NMCO Facility. — 09/92

12. Assign additional radiation protection personnel to provide extra surveillance of surplus property. — Complete

13. Prepare an engineering estimate and submit budget request for procurement and installation of a truck monitoring station. — 08/91

14. Procure and install a truck monitoring station. — 09/91

Costs:

Type of funds: ESH Programmatic
Source of funds: ER-RP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	2						2
2	15						15
3	17						17
5	5						5
6	1						1
8	5						5
9	75						75
10	2						2
13	15						15
14		40					40
Status:							
Funded							
Requested							
New	137	40					$177

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
12	115	*					115
Status:							
Funded							
Requested							
New	115						$115

*Estimated annual ongoing cost: $175K starting in FY 1992.

Type of funds: Capital
Source of funds: GPP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
11		1200					1200
Status:							
Funded							
Requested							
New		1200					$1200

References: DOE Order 5400.5

Finding No.: RP.3-7 Documentation of Radiation Hazards

Finding Description: **Radiation hazards are not adequately documented as required by DOE 5480.11.**

Code: Category III

Compliance Protocol: DOE Order 5480.11

Priority: Energy Systems Risk Weight 65
Tiger Team Action Plan Priority 2

Response: The Radiation Protection and Radiation Monitoring Standard Operating Procedures Manual has procedures that are sufficient to provide the guidance that is required to fulfill the documentation requirements as set forth in DOE Orders and policies. The uniform execution of the approved procedures, by technicians in the field, is not always sufficient. Increased supervisory oversight, in the form of walk-throughs and self-surveillances, is needed to ensure compliance, completeness, and consistency with the approved standard operating procedures.

Operating division and program personnel who develop internal standard operating procedures having radioactive operations or concerns are required to have a Health Physics review prior to their approval and use. In some cases, Health Physics review is not being performed. A re-emphasis for the requirement of a Health Physics review is needed to ensure adequate documentation of radiation hazards.

The Laboratory has a mature (> 25 years) RWP program that is well understood and used by the operating groups. The use and issuing of RWPs by the operating groups is supported by specific training programs presented by the Technical Resource and Training Section.

The *ORNL Health Physics Manual* is an ORNL level document and is distributed for implementation to all division, office, and program managers. Section 2 of the manual, Radiation and Contamination Control, will be revised to clearly require procedure reviews. The Radiation Protection staff will assist the operating groups to establish the means and methods for the procedure review process.

Root Causes:

Inadequate oversight, ambiguous requirements or expectations, and inadequate training

Planned Actions and Schedules:

Item/Description	Completion Date
1. See Finding RP.1-1, Action Item 4.	
2. Review and revise routine surveillance plans to ensure proper documentation of surveys that are conducted in the workplace (see Finding RP.1-1, Item 6).	
3. Issue revision to a Health Physics procedure specifying the requirement for a Radiation Protection Section review prior to approval of procedures for operations which have potential health physics hazards.	08/91

Costs:

Type of funds: ES&H Programmatic

Source of funds: ER-AT RP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
3	15						15
Status:							
Funded							
Requested	15						
New							$15

References: DOE Order 5480.11
RP SOP 02-50-80.

Finding No.: RP.5-1 Personnel Nuclear Accident Dosimeters

Finding Description: **ORNL does not use Personnel Nuclear Accident Dosimeters as required by DOE 5480.11 and its draft revision.**

Code: Category III

Compliance Protocol: DOE Order 5480.11

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: ORNL does not use Personnel Nuclear Accident Dosimeters as required by DOE Order 5480.11, Section 9.q.3. This concern was previously stated in the Radiation Protection Program Appraisal (RPPA) of the Oak Ridge Complex conducted during 1989.

Following the RPPA, a corrective action plan was approved which specified that a common PNAD be developed for the Oak Ridge, Tennessee, and Paducah, Kentucky, facilities operated by Energy Systems. A PNAD committee was chartered to identify potential PNAD devices and to determine the most-feasible device for use at the Energy System sites. Following a detailed study, the currently used personnel dosimeter was selected for testing to determine its applicability.

Results from the measurements of neutron and high gamma doses at accidental levels with the personnel dosimeters, using in-house NIST-traceable sealed gamma and neutron radiation sources, demonstrated the dosimeter's capability as a PNAD. A follow-up test with a fast-burst reactor was conducted in November 1990. The data from the test are currently under evaluation. Preliminary review of the data indicates that the dosimeter is able to respond well to all the conditions tested. Testing of the dosimeters and evaluation of the results have been documented in a technical basis document. A program implementation plan was developed to ensure that the requirements of the DOE Order 5480.11 were met. The PNAD program has been fully implemented at the Laboratory. Continued studies are scheduled to improve the accuracy of the dosimeter readings.

Root Causes:

Inadequate policy implementation and insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Complete the technical-basis document for the PNAD program.	Complete

2. Determine present locations of criticality alarms to ensure that personnel in these areas are monitored by a PNAD. — Complete

3. Develop and issue procedures for processing and issuing PNADs and for field retrieval by Radiation Protection personnel in the event of an accident. — Complete

4. Train Centralized External Dosimetry System personnel and field health physicists to implement the PNAD procedures. — Complete

5. Issue a Radiation Safety Bulletin specifying the new PNAD policy. — Complete

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	57						57
2	—						
3	31						31
4	14						14
5	1						1
Status:							
Funded	103						
Requested							
New							$103

References: DOE Order 5480.11

Finding No.: RP.5-2 Direct-Reading Dosimeters

Finding Description: **The procedure for use of Direct-Reading Dosimeters is not consistently applied and enforced across ORNL.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 10
Tiger Team Action Plan Priority 3

Response: All workers are required to wear a Direct-Reading Dosimeter (DRD) for entry into a Radiation Area and for monitoring dose accumulated on Radiation Work Permits. The dosimetry data are entered into the Health Physics Information Management System (OHIS—an Energy Systems Computer network) for entry into the individual exposure history. The procedural steps required to ensure collection and documentation of DRD data are in need of refinement to more clearly specify the DRD requirements for users and documentation personnel. The DRD is a tool that is used to identify individuals who are approaching administrative dose limits as well as a personnel protection instrument that is readable by the wearer. The dose accumulated on a DRD is retained in the OHIS database, but is not the permanent official occupational exposure that is used to show compliance with DOE Order 5480.11. The accredited external dosimeters are used to determine the official occupational exposure.

Implementation of SOP 02-20-10, "Exposure and Contamination Control," will be verified as part of the ongoing EHP surveillance plan. The procedure addressed the direct-reading dosimeter program.

Root Causes:

Inadequate oversight, ambiguous requirements or expectations, and inadequate training

Planned Actions and Schedules:

Item/Description	Completion Date
1. Post areas where Direct-Reading Dosimeters are required.	Complete

2. Revise the ORNL Health Physics Manual procedure RP-3.3, "Personnel Monitoring", and the Radiation Protection and Radiation Monitoring Standard Operating Procedure Manual procedure 02-20-10, "Exposure and Contamination Control", to include detailed instructions concerning the assignment, wearing, reading, and documentation of Direct-Reading Dosimeters. (See Item 5 of Corrective Action RP.1-1, which addresses training.) 09/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	6						6
Status:							
Funded	6						
Requested							
New							$6

Type of funds: ES&H Programmatic
Source of funds: ER-AT RP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
2	11						11
Status:							
Funded							
Requested	11						
New							$11

References: DOE Order 5480.11

Finding No.: RP.6-1 Air Samples

Finding Description: **The current number and placement of air samplers does not demonstrate compliance with the prospective limit as established in DOE 5480.11 for operations within the workplace.**

Code: Category III

Compliance Protocol: DOE Order 5480.11

Priority: Energy Systems Risk Weight 63
Tiger Team Action Plan Priority 2

Response: This finding was previously stated in the Radiation Protection Program Appraisal (RPPA) of the Oak Ridge Complex conducted during 1989. As a result of the finding, a detailed radiological airflow study was conducted in two phases. Phase I identified the location, type, and physical condition of the Laboratory's radiological air monitors. Phase II was a study of the airflows, adequacy of monitors to provide airflow information, and the appropriate placement of the monitors. The location of principal sources of potentially airborne radionuclides were checked with respect to probable worker positions and fixed monitor installations. The study was completed by recommending actions to the Health Physics Instrument Committee for the improvement of airflow measurements. The recommendations have been prioritized, and implementation of approved recommendations will begin during December 1990.

Radiation Protection procedures require that a facility radiological characterization be performed and that facility/area survey plans be developed. These procedures establish criteria for the number and location of air samplers in addition to providing guidance on air-sampling flow rates and sampling intervals, use of appropriate filter media, and dealing with radon daughter interference. Radiation Protection procedures also specify action levels for evaluation of air sampling/monitoring results and for determining necessary exposure controls. The standard operating procedures governing control of exposure to contamination and posting of radiological areas were revised to improve the implementation of these requirements.

Standard operating procedures have been developed to support the calibration of fixed air monitors, based on appropriate technical criteria (including traceability to the NIST), criteria for source checks, electronic checks, and airflow calibrations. Initial calibrations are being established for each monitor. Maintenance records will be combined with calibration records for fixed monitors, as they have been for portable monitors.

One ORNL facility at the Y-12 site was not included in the two phases of the airflow study. The facility is in the security exclusion area at the Y-12 site, and appropriate security measures had to be considered prior to allowing subcontract personnel to complete the final study to include the Y-12 facility. The airflow study is currently scheduled for inclusion in the ORNL Radiological Airflow Study document.

The air monitors at the ORNL facilities are old, and some do not meet the monitoring requirements specified in current regulations and standards. A Conceptual Design Report has been completed to support DOE approval of a line item to upgrade all stationary instruments for radiation protection, including air monitors. Pending line item approval, a program of final design, including interconnections and communications interfaces, hardware procurement, and implementation, will be undertaken. This line item will address the deficiencies identified in this finding.

Root Causes:

Insufficient resources and inadequate oversight

Planned Actions and Schedules:

Item/Description	Completion Date
1. Conduct the airflow study of the ORNL facility located in the exclusion area at the Y-12 site.	12/91
2. Complete implementation of priority airflow study recommendations.	03/92
3. Develop and issue a Conceptual Design Report for stationary instrumentation upgrade.	09/91
4. Request funding for the stationary instrumentation upgrade line item project.	12/91
5. Review and document instrumentation needs identified during the airflow study which will not be covered by the instrumentation upgrade; if necessary, request additional funding.	03/93
6. Contingent on the line item's approval, initiate stationary Health Physics instrument upgrade including air monitors.	01/93

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1		23					23
2		8					8
3	75						75
5		15					15
Status:							
Funded	75						
Requested							
New		46					$121

Type of funds: Line Item
Source of funds: ER-AT

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
6			18,700				18,700
Status:							
Funded							
Requested			18,700				
New							$18,700

References: None

Finding No.: RP.6-2 Timeliness of Air Sampling Program

Finding Description: **ORNL has not demonstrated the air sampling program will supply the necessary timely data required by the Internal Dosimetry Program Performance standard.**

Code: Category III

Compliance Protocol: DOE Internal Dosimetry Performance Standard

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: Radiation Protection and Radiation Monitoring Standard Operating Procedures Manual procedure 02-50-50, " Survey Techniques for Airborne Radioactive Contamination," provides guidance and standardized methods for accurately measuring the presence of airborne radioactivity in the workplace, so that personnel exposures may kept ALARA.

In addition, procedure 02-70-11, "General Counting Techniques," specifies the techniques for measuring radioactivity on smear samples and air filters. The "ORO Contamination Control Policy" specifies mandatory routine monitoring requirements which specify that the turn-around time for the analyses of continuous air samples shall not exceed one week. An exemption of the time limit was requested and approved to allow a ten-working-day time period. The exemption allows an appropriate radon decay period for accurate counting of sample media.

Root Causes:

Inadequate policy implementation, insufficient resources, and unclear requirements or expectations.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Conduct an evaluation of the "Internal Dosimetry Program Performance Standard" against the Radiation Protection and Radiation Monitoring Standard Operating Procedures Manual procedures to determine and document inconsistencies.	10/92
2. If inconsistencies exist, revise and issue the affected procedures to ensure compliance with the "Internal Dosimetry Program Performance Standard."	12/92

3. Review internal doses to assess adequacy of the air monitoring program and document. 10/91

Costs:

Type of funds: ESH Programmatic
Source of funds: ER-AT RP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1		23					23
2		25	8				33
Status:							
Funded							
Requested							
New		48	8				$56

References: DOE Order 5480.11, "Internal Dosimetry Program Performance Standard"

Finding No.: RP.6-3 Surveying Personnel for Contamination

Finding Description: **There is no technical basis and justification for Department of Energy to require 3-minute frisks in surveying personnel for contamination.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 8
Tiger Team Action Plan Priority 3

Response: ORNL uses a well-established industry standard, three minutes, as its required time to perform an adequate whole-body frisk when using a hand-held pancake GM probe. Three minutes has also been found to be acceptable for alpha monitoring using the ORNL alpha scintillation probe.

Contamination survey results at ORNL are recorded in dpm/100 cm^2. Instruments, such as LMAs and LMBs, that are used for frisking give readings in counts per minute (cpm) because of the wide range of isotopes found in Laboratory operations. Identical instructions are posted at each LMA/LMB used for personnel frisking, and in these instructions, any observed count rate above background is to be reported to the health physicist/technician named on the posted notice. This approach is used to give the professional staff the ability to actually determine the true extent of the contamination.

ORNL uses current, proved technology for all personnel survey equipment. The equipment presently in use is capable of detecting low-energy nuclides, such as C^{14} and Pm^{147}, at a low efficiency value. The Health Physics Instrument Committee will explore emerging technologies in radiation detection, as they become available.

Root Causes:

Ambiguous requirements or expectations and regulatory barriers

Planned Actions and Schedules:

Item/Description	Completion Date
1. Develop a technical-basis document for frisking procedures, for anticontamination clothing requirements, for exit requirements at regulated contamination areas, and for the selection and calibration of monitoring instruments.	10/91

2. Review and purchase for evaluation commercially available detection equipment for low-energy nuclides, and provide information to the Health Physics Instrument Committee. 10/91

3. Revise HPP Procedures to reflect required changes as identified in the Technical Basis Document. 12/91

Costs:

Type of funds: ESH Programmatic
Source of funds: ER-AT RP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	57						57
2	30						30
3		70					70
Status:							
Funded							
Requested							
New	87	70					$157

References: DOE Order 5480.11
DOE/ORO Contamination Control Policy

Finding No.: RP.7-1 Internal Radiation Dosimetry Program

Finding Description: **ORNL has not allocated the space and resources to meet DOE 5480.11 effective dose equivalent requirements, the Department of Energy Internal Dosimetry Standard or to participate in all categories of the Department of Energy Bioassay Laboratory Accreditation Program.**

Code: Category III

Compliance Protocol: DOE Order 5480.11 and DOE Internal Dosimetry Performances Standard

Priority: Energy Systems Risk Weight 58
Tiger Team Action Plan Priority 2

Response: Deficiencies in the ORNL Internal Dosimetry program have been documented in the ORNL self-assessment document, specifically the lack of laboratory space for fume hoods, sinks, and programmable muffle furnaces to ash fecal samples, in order to fully participate in the DOELAP testing and to routinely perform fecal analyses. A full assessment of the ORNL Internal Dosimetry facilities and systems needs to be conducted to ensure that deficiencies to standards and other regulatory criteria are identified and that appropriate corrective actions are identified with funding requested.

The Radiation Exposure Assessment Laboratory (REALab) line item project is planned to correct the deficiencies associated with limited space and resources.

Root Causes:

Inadequate policy implementation, insufficient resources, inadequate oversight, and ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Assess the ORNL Internal Dosimetry facilities, operations, and personnel against applicable standards, procedures, and regulations and develop an upgrade plan to address deficiencies with corrective actions and funding requirements identified.	12/91
2. Following the assessment, review the upgrade plan and request needed funds to correct deficiencies.	2/92

3. Issue the Conceptual Design Report for the REALab line item project. 2/92

4. Request funding for the REALab line item project. 3/92

5. Establish a Quality Control Program to support the Internal Dosimetry Program. 12/91

6. Issue QC SOPs. 12/91

7. Contingent on approval of the line item funding, initiate design/construction of the REALab Facilities. 03/93

Costs:

Type of funds: ESH Programmatic
Source of funds: ER-AT RP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1		80					80
2		—					
3		285					285
5		112					112
6		70					70
Status:							
Funded							
Requested							
New		547					$547

Type of funds: Line Item
Source of funds: ER

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
7			41,000				41,000
Status:							
Funded							
Requested							
New			41,000				$41,000

Type of funds: Capital
Source of funds: ER

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
5	20	325					345
Status:							
Funded							
Requested							
New	20	325					$345

References: DOE Order 5480.11
DOE Internal Dosimetry Performance Standard

Finding No.: RP.7-2 In Vivo Calibrations

Finding Description: **ORNL has not completed all in-vivo calibrations including the lung counter and the wound counter as required by the Department of Energy Internal Dosimetry Performance Standard.**

Code: Category III

Compliance Protocol: DOE Internal Dosimetry Performance Standard

Priority: Energy Systems Risk Weight 58
Tiger Team Action Plan Priority 2

Response: Deficiencies in the ORNL internal dosimetry program were identified in the ORNL self-assessment document, specifically the need to complete in vivo calibrations. In order to achieve this goal, additional lung and chest plates with a variety of radionuclides will be needed. The lung counting facility also needs to be upgraded. ORNL has only one shielded room; this precludes the use or calibration of the phoswich lung counters while in vivo counts are being conducted. Additional funding is needed to resolve this situation. The wound counter is currently operated by medical personnel and-calibrated by Radiation Protection personnel. The procedures which deal with the calibration and use of this piece of equipment will, in the future, be reviewed by the whole-body counting supervisor and calibrated by RaSCaL personnel.

Root Cause:

Inadequate resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request funds for lung and chest plates and other identified equipment.	10/91
2. Purchase lung and chest plates and other identified equipment.	12/91

3. Perform an assessment of the Whole-Body Counting Laboratory to applicable standards and regulations and develop a detailed upgrade plan to achieve compliance. 05/92

   [NOTE: Specific to the identified findings, the upgrade plan would assess: (1) identification of needed additional lung and chest plates and (2) upgrades to equipment, facilities, and procedures.]

4. Review upgrade plan and request funds to implement approved recommendations. 07/92

5. Determine calibration adequacy and status of wound-counter operations and issue procedures to ensure compliance to standards. 09/91

Costs:

Type of funds: ESH Programmatic

Source of funds: ER-AT RP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
2		12					12
3		15					15
4		—					
Status:							
Funded							
Requested							
New		27					$27

Type of funds: Overhead

Source of funds: Overhead

Action item	Estimated costs per fiscal year ($K)						Total
	1991	1992	1993	1994	1995	Beyond	
5	7						7
Status:							
Funded							
Requested							
New	7						$7

References: DOE Order 5480.11
DOE Internal Dosimetry Performance Standard

Finding No.: RP.8-1 Radiation Protection Instrument Program

Finding Description: **The radiation protection instrument calibration and maintenance program does not meet the American National Standards Institute N323 requirements.**

Code: Category III

Compliance Protocol: ANSI N323 requirements

Priority: Energy Systems Risk Weight 61
Tiger Team Action Plan Priority 2

Response: Other findings expressed in the appraisal were:

- There is a lack of maintenance calibration and records procedures to meet ANSI N323.
- Some instruments have not received thorough performance testing.
- Fixed instruments, air monitors, and ORNL's Cutie Pies do not meet ANSI standards.
- Instrument field check procedures, and the sources used to complete them, are not adequate. Sources used are not traceable to laboratory standards.
- Not all monitrons meet ANSI N42.17A and B requirements.
- Lack of funding exists to complete instrument upgrades and completion of the calibration laboratory.

The above were previously addressed in the "Radiation Protection Program Appraisal of the Oak Ridge Complex" (RPPA) conducted by DOE during May 1989.

In response to the RPPA, the following aggressive upgrade programs were initiated to improve the radiation monitoring instruments and the Radiation Standards and Calibration Laboratory.

- Approximately one million dollars have been spent to upgrade the portable instrument program to include procurement of instruments, testing, development of procedures, calibration method development, source procurement, and fixture fabrication for testing.
- Calibration facility upgrades are to include fabrication of a low-scatter radiation facility, source transfer equipment, tracking and holding devices for irradiations, and other state-of-the-art upgrades for calibrations and irradiations.
- The planning, engineering, and specification development of a FY 1993 Line-Item project for upgrades of the fixed radiation monitoring instruments.

Although significant improvements have been made and upgrade plans have been developed, the following items have been identified as needing action to meet appropriate standards.

- Documentation, inventory, and quality control activities.
- Improved energy dependance test capability.
- Environmental condition testing.
- Neutron calibration capability.
- High-range and overload testing capabilities.

Root Causes:

Inadequate policy implementation, insufficient resources, inadequate oversight, inadequate training, and poorly defined roles and responsibilities

Planned Actions and Schedules:

	Item/Description	Completion Date
1.	Assess requirements of ANSI N320, ANSI N323, ANSI N42.17A, ANSI N42.17B, and other applicable standards and regulations and document the deficiencies of performance, equipment, and systems at the Laboratory.	10/91
2.	Develop and approve a facility upgrade plan with funding requirements requested and tentative completion dates established to meet applicable standards and regulations. The upgrade plan would specifically include: (1) necessary procedures and records management for calibrations, irradiations, and source traceability; (2) instrument performance testing requirements; (3) field check sources availability and traceability; (4) monitron system upgrades; (5) cutie pie replacements; and (6) calibration facility and equipment upgrades.	12/91
3.	Contingent on approval of funding implement upgrade plan outlined in Item 2.	03/92

Costs:

Type of funds: ES&H Programmatic
Source of funds: ER-RP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	15						15
2		15					15
3		675*					675
Status:							
Funded							
Requested		690					
New	15						$705

*Preliminary estimate.

References: DOE/EH 0135
DOE Order 5480.11
ANSI 323-1978

Finding No.: RP.8-2 Approval of Radiation Protection Instruments

Finding Description: Many ORNL safety-related radiation protection instruments are purchased and used without the review and approval of Radiation Standards and Calibration Laboratory personnel in developing performance specifications.

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 56
Tiger Team Action Plan Priority 2

Response: The ORNL Health Physics Instrument Committee (HPIC) has the responsibility to approve radiation detection instruments used for personnel protection. Although the Procurement Division has a system in place to "flag" instrument requisitions, some older instruments have been found that were not on the inventory listing during the appraisal. A need exists for strengthening the computer "flagging" system by adding selected keywords submitted by the HPIC members. Additionally, increased awareness of instrument procurement requirements must be made to Laboratory personnel.

Root Causes:

Inadequate policy implementation, inadequate management approach, ambiguous requirements or expectations, inadequate training, and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue a Health Physics Bulletin to specify requirements and necessary approvals prior to procurement of radiation detection instruments used for personnel protection.	08/91
2. Identify additional key words and include these words in the Procurement Division Computer System. The addition of more flags will strengthen the searching for procurement of radiation instruments, to ensure that approval has been granted.	08/91

3. Perform complete a survey by divisional Radiation Control Officers and Radiation Protection personnel to identify instruments (monitrons, truck monitors, X-ray measuring instruments, etc.) to determine those that are not on the inventory listing and are used for personnel protection. 10/91

4. Determine the disposition of identified personnel protection instruments to ensure that they function as intended. 10/91
   Note: The Health Physics Instrument Committee will consider specific instruments on a case-by-case basis to determine disposition.

5. Issue standard operating procedures for the newly identified instruments which include calibration and performance testing. 08/92

Costs:

Type of funds: ESH programmatic
Source of funds: ER-AT RP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	2						2
2	6						6
3	33						33
4	20						20
5		225					225
Status:							
Funded							
Requested	61						
New		225					$286

References: DOE Order 5480.11
DOE/EH 0135

Finding No.: RP.8-3 Testing of Safety-Related Instruments

Finding Description: **Testing of safety-related instruments against specifications and periodic calibration and maintenance is not performed in accordance with Department of Energy Prescribed Standards.**

Code: Category III

Compliance Protocol: DOE Prescribed Standards

Priority: Energy Systems Risk Weight 56
Tiger Team Action Plan Priority 2

Response: The ORNL Health Physics Instrument Committee (HPIC) has the responsibility to approve radiation detection instruments used for personnel protection. The purpose of this review and approval is to ensure that instruments used for personnel protection are adequate as well as manufactured in such a manner that repairs and calibrations are possible. Instruments that are found in use that are not calibrated or approved will be reviewed and determinations made if the instruments meet the standards required to provide the required protection. Calibration and routine performance test procedures will be developed and approved for newly identified radiation protection instruments. Standard Operating Procedures are existing for currently used instruments.

Root Causes:

Inadequate oversight, inadequate communications, inadequate training, and poorly defined roles and responsibilities

Planned Actions and Schedules:

This concern is fully addressed by actions outlined in response to Finding RP.8-2.

Costs: None

References: DOE Order 5480.11
DOE/EH 0135

Finding No.: RP.8-4 High Range Radiation Protection Instrumentation

Finding Description: **Emergency and high-range radiation protection instrumentation does not meet requirements of the American National Standards Institute N320, N323, and N42.17C.**

Code: Category III

Compliance Protocol: ANSI N320, N323, and N42.17C

Priority: Energy Systems Risk Weight 58
Tiger Team Action Plan Priority 2

Response: Specific findings identified in the appraisal state that:

- Testing of emergency or high-range radiation protection and safety-related instrumentation is inadequate.
- High-range calibration wells have not been installed to provide capability for calibration of these instruments.
- All monitrons that may become paralyzed in an over-range exposure have not been identified.

Upgrades at the Radiation Standards and Calibration Laboratory (RaSCaL) include the installation of high-range calibration sources and wells and a source transfer system. An Operational Readiness Review will be conducted to determine adequacy and safety of the operation of the new well and source systems, upon completion.

Root Causes:

Inadequate policy implementation and insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. See Finding RP.8-1, Item 1.	
2. See Finding RP.8-1, Item 2.	
3. Complete installation of high-range wells, source transfer system, and X-ray machine at RaSCaL.	04/92
4. Complete an Operational Readiness Review of RasCaL.	06/92

Costs:

Type of funds: ESH Programmatic
Source of funds: ER-AT RP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
3		400*					400
4		118					118
Status:							
Funded							
Requested		518					
New							$518

*Very preliminary estimate

References:
DOE Order 5480.11
DOE/EH 0135
ANSI N320
PNL-SA-13346/CONF-840774

Finding No.: RP.8-5 Radiation Protection Instrumentation Program

Finding Description: **Problems with the operation and logistics of the Radiation Protection Instrumentation Program has led to inefficiency, poor quality control, and absence of centralized responsibility.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 4

Response: The Radiation Protection Instrumentation Program is described in ORNL Health Physics Procedures Manual procedure RP-1.6, "Health Physics Instruments." The procedure describes the program for providing, maintaining, and calibrating radiation detection instruments for personnel protection in the Laboratory's programs and facilities. Program elements are coordinated through a central Health Physics Instrument Committee (HPIC).

Root Causes:

Inadequate policy implementation, insufficient resources, inadequate management approach, inadequate oversight, ambiguous requirements or expectations, and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. An interorganizational team will assess the Radiation Protection Instrumentation Program to address instrument ownership, logistics, quality control, and other requirements as specified in applicable standards and DOE Orders.	11/91
2. Initiate implementation of recommendations concerning organization of the Radiation Protection Instrumentation Program.	01/92

Costs:

Type of funds: ES&H Programmatic
Source of funds: ER-AT RP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	30						30
2	—						
Status:							
Funded							
Requested							
New	30						$30

References: DOE Order 5480.11
ANSI N320
ANSI N323
ANSI N42.17C

Finding No.: RP.10-1 Positive Control of Contamination

Finding Description: **Current contamination control, posting practices, policies, and radiation monitoring capabilities are not conducted or enforced in a manner that ensures positive control of contamination as required by DOE 5480.11.**

Code: Category III

Compliance Protocol: DOE Order 5480.11

Priority: Energy Systems Risk Weight 77
Tiger Team Action Plan Priority 2

Response: The Radiation Protection and Radiation Monitoring Standard Operating Procedures Manual has procedures that are sufficient to comply with the posting and survey requirements specified in DOE Orders and policies. The uniform execution of the approved procedures, by technicians in the field, is not always sufficient. Increased supervisory oversight, in the form of walk-throughs and self-surveillances, is needed to ensure compliance, completeness, and consistency to the standard operating procedures. Procedure 02-50-80, "Check on the Adequacy of Radiation Surveys," provides a schedule of tours and inspections that are required by all levels of Radiation Protection supervision.

ORNL has developed an implementation plan to provide area postings, required by the "ORO Contamination Control Policy," on September 29, 1990. Significant progress has been made to replace old postings; however, some areas remain to be completed.

Root Causes:

Insufficient resources, ambiguous requirements or expectations, and regulatory barriers

Planned Actions and Schedules:

Item/Description	Completion Date
1. See Finding RP.3-1, Item 3.	
2. See Finding RP.1-1, Item 4.	
3. Contingent on funding, obtain necessary additional transportation to facilitate surveillance in remote areas.	01/92

Costs:

Type of funds: ESH Programmatic
Source of funds: ER-AT RP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
3		30					30
Status:							
Funded							
Requested		30					
New							$30

References: DOE Order 5480.11, "ORO Contamination Control Policy"

Finding No.: RP.10-2 Consistency of Radiation Protection Policies

Finding Description: **As a result of absence of oversight by both upper management and Oak Ridge Operations, Radiation Protection policies are not uniformly applied across all ORNL facilities.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 73
Tiger Team Action Plan Priority 2

Response: ORNL

The operating divisions, as well as the radiation protection staff assigned to the Y-12 facilities, have failed to keep pace with the rate of improvement seen in other parts of the Laboratory. Problems that are inherent due to the separation from the bulk of the Laboratory have not been solved by upper-level management.

Radiation Protection Section management focus is needed on the operations of ORNL facilities at the Y-12 plant. The physical separation from the Laboratory has led to the assigned RP staff members losing touch with the changes ongoing at the X-10 site to improve the health and safety programs. Input and review from the RP management are needed to provide guidance into areas where the Y-12 operations are not up to Laboratory standards. A complete review and program, in the form of a Complex Routine Surveillance Plan, shall be established to ensure that all areas of the Y-12 facilities are provided with sufficient coverage to provide adequate radiation protection. Increased attention, in the form of surveillances by the Measurements Assurance Section of EHP, shall be scheduled to ensure that Y-12 practices are consistent with those expected elsewhere at other ORNL facilities. See also plan for Finding MF-5.

DOE/ORO

The need for additional oversight at the site facilities, by the ORO, has been recognized. The approach, recently implemented, to ensure uniform application of Radiation Protection policies shall include the identification of DOE Facility Representatives for all ORNL facilities. Facility representative responsibilities will include scheduled facility inspections to ensure compliance with established radiation protection policies. Uniformity of policy implementation across different facilities will also be reviewed by the X-10 Site Office and during biannual Health Physics appraisals conducted by the ORO Safety and Health Division.

Root Causes:

Inadequate policy implementation, insufficient resources, inadequate management commitment, and inadequate management approach

Planned Actions and Schedules:

Item/Description	Completion Date
ORNL	
1. See Finding RP.1-2, item 5.	
2. See Finding RP.1-2, item 4.	
3. Schedule additional surveillance, as part of the existing plan for Radiation Protection, to measure consistence of procedures, postings, and compliance with approved procedures at the ORNL Y-12 facilities (see Finding RP.1-1, item 6).	
4. Appoint a Health Physicist, from outside the Y-12 area, to conduct an evaluation of the Pu gloveboxes in 9204-3. The evaluation shall consider radiological hazards to building personnel, controls presently established, and additional controls and/or radiological surveys needed to reduce the risk associated with this facility until planned D&D work can be completed. The evaluation shall be forwarded to the Facility Manager, RP Section Head, and the Office Director.	Complete
5. Preliminary to permanent closures, cover all glove ports with radiological hazard tape to warn of contamination potential.	Complete
DOE/ORO	
6. Identify facility representatives.	Complete
7. Develop a facility inspection schedule.	Complete
8. Initiate routine facility inspections.	Complete
9. Complete S&H training of X-10 Site Office facility representative.	10/91

10. Complete first independent appraisal of ORNL facilities for radiation protection compliance and uniformity of policy implementation across facilities. 1/92

Costs: No costs are associated with this finding.

References: DOE Order 5480.11

Finding No.: RP.10-3 Control of Laundry Wastewater

Finding Description: **Wastewater potentially contaminated with radioactive materials is not being monitored prior to release from the laundry to the sanitary sewer system as required in DOE 5400.5.**

Code: Category III

Compliance Protocol: DOE Order 5400.5

Priority: Energy Systems Risk Weight 58
Tiger Team Action Plan Priority 2

Response: This action plan validates the internal monitoring processes currently used in the laundry to control the contaminated washer effluent radionuclide concentration. This action, coupled with an annual waste acceptance criteria validation, will ensure that the total annual discharge of radioactive materials to the sanitary sewer system poses a negligible risk to the general public.

Root Causes:

Insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Screen all incoming protective clothing to limit possibility of unaccep quantities of contamination.	Complete
2. Request funding for hold tank, monitoring equipment, and analytical services.	Complete
3. Develop and issue procedure for implementation of the monitoring program for laundry effluent.	06/91
4. Evaluate the Decontamination Laundry Wastewater Stream and the Sewage Treatment Plant's Waste Acceptance Criteria to define accep parameters. (See RAD/CF-3.)	
5. If funding is approved, purchase and install equipment.	03/92 (estimated)

Costs:

Type of funds: Capital
Source of funds: ER-AT RP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
2		—					
5		250					250
Status:							
Funded							
Requested		250					
New							$250

Type of funds: ES&H Programmatic
Source of funds: ER-AT RP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
3	7	*					7
4		—					
Status:							
Funded							
Requested							
New	7						$7

*Estimated annual ongoing cost: $10K.

References: None

Finding No.: RP.10-4 Requirements for Laundry Contamination Control

Finding Description: **The ORNL laundry does not fulfill the requirements for physical separation of clean and dirty or contaminated laundry, effective contamination control, and personnel protection.**

Code: Category III

Compliance Protocol: The ORNL Decontamination Laundry should keep physically separated contaminated laundry and noncontaminated laundry, properly contain contamination, and keep personal exposure within established limits.

Priority: Energy Systems Risk Weight 13
Tiger Team Action Plan Priority 3

Response: Controls are presently established within the Laundry to segregate clothing during the washing process. Separate Regulated Areas and Nonradiological Areas have been established to handle C-Area clothing and khakis, respectively. ORNL, over the course of the next 2 years, will expand the existing facility to allow for complete physical separation of incoming and outgoing laundry at all times.

ORNL Radiation Protection standard operating procedure 02-70-34 and laundry operating procedures do not allow C-Area clothing to leave the facility with detectable contamination. The laundry uses a state-of-the-art, commercially available, plastic scintillator radiation monitor to check each set of C-Area clothing. Laundry handling of washed and monitored C-Area clothing is consistent with ORNL Health Physics Procedures. In addition, ORNL's limits for incoming C-Area laundry is in accordance with very strict limits agreed upon with ORO, based upon effluent considerations.

ORNL will continue to stress the need for a new laundry facility and the line item that this project will require.

Root Causes:

Insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Evaluate laundry operations to identify interim measures to be taken to improve laundry segregation.	09/91
2. Establish controls (procedures, training) necessary to minimize cross contamination possibilities.	09/91

3. Install new washer/extractor to replace current hot washer and hot extractor which will help maintain control of contaminated waste water. 12/91

4. Contingent on funding, construct new Decontamination Laundry Facility (Line Item ORNL-93-KG01-1). 09/95

Costs:

Type of funds: Capital
Source of funds: ER-AT

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
3		40					40
Status:							
Funded							
Requested		40					
New							$40

Type of funds: Line Item
Source of funds: MGPF

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
4			2600	8000	5400		16000
Status:							
Funded							
Requested			2600	8000	5400		
New							$16000

Type of funds: ESH Programmatic
Source of funds: ER-AT RP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	15						15
Status:							
Funded							
Requested	15						
New							$15

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
2	8						8
Status:							
Funded	8						
Requested							
New							$8

References: None

Finding No.: RP.11-1 Management Support for ALARA

Finding Description: **The As Low As Reasonably Achievable (ALARA) program does not have the management support that is required to make the program effective as required by DOE 5480.11 and the DOE ALARA manual.**

Code: Category III

Compliance Protocol: DOE Order 5480.11 and the DOE ALARA manual

Priority: Energy Systems Risk Weight 63
Tiger Team Action Plan Priority 2

Response: ORNL management supplied adequate funding in FY 1990 to initiate the ALARA Program. While the budget for FY 1991 has not been finalized, ORNL has every intention of continuing the program with adequate funding and with support from the highest levels of Laboratory Management. The Program has been formally chartered by the Laboratory Director, and a steering committee consisting of Division Directors is in place. Laboratory-wide ALARA goals are developed and approved annually by the ALARA Steering Committee. The ALARA Program Manager monitors the progress of the goals and reports quarterly to the Steering Committee. The Laboratory recognizes that additional support in the form of personnel and office space is needed in order for the ALARA Program to fulfill its responsibilities in the field of radiation protection. The lengthy time period for scheduled completion of action item 1 is due to a lack of funding. To fully adopt the ALARA philosophy into operations of the Laboratory, each Division will develop its own ALARA goals that will be tracked by the ALARA manager.

Root Causes:

Insufficient resources and inadequate management commitment

Planned Actions and Schedules:

Item/Description	Completion Date
1. Complete staffing of the ALARA program (2 radiological engineers, 1 computer technician, and 1 clerical person).	10/92
2. Issue an ALARA policy through the Laboratory Director's Office to emphasize support and requirements of the ALARA program.	05/91
3. Issue a directive to Division Directors to formalize and submit ALARA goals for their Division to the ALARA	05/91

Program Manager for concurrence. The directive shall state that the ALARA goals will be reflected in the Measures of Performance (MOP) plan.

4. Develop, approve, and issue changes to the Health Physics Manual, Section 6, to include the requirements and guidance for establishing Divisional ALARA goals. 06/91

Costs:

Type of funds: ESH Programmatic
Source of funds: ER-AT RP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
2	2						2
3	1						1
4		15					15
Status:							
Funded							
Requested							
New	3	15					$18

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1			510*				510
Status:							
Funded							
Requested							
New			510				$510

*Estimated ongoing cost: $510K.

References: DOE Order 5480.11

Finding No.: RP.12-1 Occupational Exposure Records Program

Finding Description: **The Occupational Exposure records program is not in compliance with requirements in DOE 5480.11 and ANSI N13.6.**

Code: Category III

Compliance Protocol: DOE Orders 5480.11 and ANSI N13.6

Priority: Energy Systems Risk Weight 65
Tiger Team Action Plan Priority 2

Response: This finding was previously identified in the Radiation Protection Program Appraisal (RPPA) conducted by DOE in 1989.

In response to the RPPA, Energy Systems chartered a management-level task group to evaluate records management requirements. The task group will develop corporate policy and procedures for approval which will provide guidance to ORNL and other Energy System's sites. Concurrent with the task force evaluation, ORNL will evaluate the occupational radiation exposure records system against the requirements of ANSI N13.6, DOE Order 5480.11, and DOE Order 5700.6.

Root Causes:

Insufficient resources and ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Assess the ORNL occupational radiation exposure history records systems and methods against the requirements of ANSI N13.6, DOE Order 5480.11, and DOE Order 5700.6 and develop a comprehensive records management plan.	12/91
2. Review the comprehensive records management plan and request funding and resources to implement approved corrective actions.	2/92
3. Implement a comprehensive records management plan.	12/92

Costs:

Type of funds: ESH Programmatic
Source of funds: ER-AT RP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1		47					47
Status:							
Funded							
Requested							
New		47					$47

References: DOE Order 5480.11
DOE Order 5700.6
ANSI N13.6

Finding No.: RP.12-2 Reporting of Dosimetry Data

Finding Description: **Dosimetry data are not reported to all staff or visitors as required in DOE 5480.11 and DOE 5484.1.**

Code: Category III

Compliance Protocol: DOE Orders 5480.11 and 5484.1

Priority: Energy Systems Risk Weight 60
Tiger Team Action Plan Priority 2

Response: DOE Order 5484.1 specifies that all positive internal and external exposures of a visitor must be documented on Form 5484.8 and copies submitted to the visitor's employer or visitor if he/she has no employer and to System Safety Development Center (EG&G at Idaho) within thirty days after the visit or thirty days after the exposure determination whichever is later. Other specific requirements are stated if exposure limits exceed limits set in DOE Order 5480.11.

A need has been identified to upgrade the current visitor exposure reporting program and to ensure that nonemployee terminations are reported to the occupation radiation exposure reporting personnel in a timely manner by the Human Resource Division personnel.

Root Causes:

Insufficient resources, inadequate oversight, inadequate communications, and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue a standard operating procedure for visitor/nonemployee termination reporting methods to ensure required records submittal.	11/91

Costs:

Type of funds: ES&H Programmatic
Source of funds: ER-AT RP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	15	*					15
Status:							
Funded							
Requested							
New	15						$15

*Estimated annual ongoing cost: $5K for increased reporting activities to be added to overhead.

References: DOE Order 5480.11
DOE Order 5484.1

Finding No.: RP.12-3 Control of Occupational Exposure Records

Finding Description: **Occupational Exposure Records are not controlled, maintained, and protected as required in DOE 5480.11, DOE 5484.1, ANSI N13.6, and ANSI/ASME NQA-1.**

Code: Category III

Compliance Protocol: DOE Orders 5480.11 and 5484.1, ANSI N13.6, and ANSI/ASME NQA-1

Priority: Energy Systems Risk Weight 108
Tiger Team Action Plan Priority 2

Response: ORNL is assessing the requirements of records related to occupational radiation exposure to ensure that the records are systematically generated and maintained consistent with ANSI N13.6 and other applicable standards, procedures, and regulations. Primarily these records include:

- Radiation records related to an individual, (e.g., prior exposure history, bioassay data, dose assessment methodology, personnel dosimetry, results, etc.);
- Radiation records related to status of work areas (e.g., radiation surveys, air sampling results, etc.);
- Records that describe the technical and administrative bases for radiological protection programs (e.g., standards, policies, procedures, methods of dose evaluations, etc.); and
- Records of unusual occurrences, accidents, and incidents (e.g., investigations, corrective action, followup, etc.).

The need to protect exposure data is recognized, and plans are currently being made to correct deficiencies. This finding was previously identified in the Radiation Protection Program Appraisal conducted by DOE in 1989.

Root Causes:

Insufficient resources and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue Standard Operating Procedures for the occupational radiation exposure record generation and retention system.	11/92

2. Develop comprehensive records management plans for the Dosimetry Data Management Group to ensure that records are maintained in accordance with applicable standards, procedures, and orders. 08/92

3. Request funding to implement corrective action elements of the comprehensive records management plans. 09/92

4. Implement interim methods of record duplication by microfilm copying of exposure data. 09/92

5. Appoint a manager of the records management program for radiological protection. 06/91

Costs:

Type of funds: ESH Programmatic
Source of funds: ER-AT RP

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1		225					225
2		30					30
3		—					
4		127	*				127
5		—					
Status:							
Funded							
Requested							
New		382					$382

*Estimated annual ongoing cost: $23K to maintain microfilming.

References: DOE Order 5480.11
DOE Order 5484.1
ANSI N13.6
ANSI/ASME NQA-1

3.3.15 Personnel Protection

Finding No.: PP.1-1 Resources for Workplace Maintenance

Finding Description: **Neither Oak Ridge National Laboratory nor Martin Marietta Energy Systems, Inc., has allocated resources to effectively maintain workplaces free of health and safety concerns.**

Code: Category III

Compliance Protocol: 29 CFR 1910 and 1926 (including the "General Duty Clause") and DOE Orders 5480 and 5483 require the employer to implement an effective personnel protection program.

Priority: Energy Systems Risk Weight 505
Tiger Team Action Plan Priority 2

Response: This finding was based on several related findings, including those dealing with

- inadequate workplace monitoring and tracking and trending of monitoring and exposure data;
- incomplete corporate-level policies, standards, and procedures;
- vacancies in corporate industrial hygiene staff positions;
- inappropriate assignment of responsibilities for policy development;
- lack of formality in the assignment of responsibilities and authorities for Industrial Hygiene and Industrial Safety;
- lack of procedures for interface between departments;
- lack of quality assurance plans and QA personnel;
- inconsistent interpretation of DOE requirements;
- heavy reliance on the division safety officers for program implementation;
- inadequate position descriptions for DSOs; and
- lack of support for the ORNL safety policy by some division directors.

Many of these findings can be traced to a lack of resources (especially staffing) for Industrial Safety and Industrial Hygiene. Over the past year, both sections have

been involved in setting up new programs to ensure personnel protection and to achieve compliance with new regulations. Now that the programs have been developed, implementation will depend on the availability of qualified personnel. Because of the resource restrictions in these sections, both groups have relied in the past on the support of the DSOs. However, the DSOs are often assigned other responsibilities within their own divisions, and these responsibilities sometimes account for as much as 85% of their time. An in-depth needs assessment dealing with administration of these programs at ORNL is needed (see Corrective Action Items 1 and 2 below). As part of this overall assessment, the proper role of the DSOs will be studied, and recommendations will be made to the division directors.

Many of the corrective action plans contained in this document require the addition of staff to existing ES&H programs. At ORNL, a shortage of office space already exists. Additional space will be needed to house these new staff members. In addition, more space is needed for such commitments as an expanded records management program. The corrective action shown below (Item 13) is intended to address these office space and storage needs associated with the corrective actions for Findings AX.1-1, CS.3-1, FP.1-1, IH.2-1, IH.5-4, IH.6-1, MS.3-3, OA.7-2, PP.1-1, PP.2-1, PP.2-2, QV.1-1, QV.1-3, QV.4-1, RP.1-3, RP.11-1, RP.12-3, and RP.7-1.

Root Causes:

Insufficient resources (staffing), poorly defined roles and responsibilities, inadequate policy implementation, and inadequate management commitment

Planned Actions and Schedules:

Item/Description	Completion Date
1. Conduct a needs assessment for administration of the Industrial Safety program at ORNL.	6/91
2. Conduct a needs assessment for administration of the Industrial Hygiene program at ORNL.	6/91
3. Based on the results of the needs assessment, develop a program management plan for Industrial Safety.	7/91
4. Based on the results of the needs assessment, revise the existing program management plan for Industrial Hygiene.	9/91
5. Based on the needs assessment and the program management plans, develop position charters for DSOs and submit to the division directors for their comment and approval.	8/91

6.	Issue revised guidelines for DSOs to reflect any changes involving DSOs (roles, responsibilities, etc.).	9/91
7.	Request funding to implement the program management plan for Industrial Safety.	7/91
8.	Request funding to implement the program management plan for Industrial Hygiene.	7/91
9.	Contingent on approval of funding, hire five additional staff members for Industrial Safety. (This number may change, depending on the results of the needs assessment. Additional staffing for Industrial Hygiene is covered in the action items in the IH section of this plan.)	10/91
10.	Develop additional training modules for DSOs and begin training.	12/91
11.	Assign members of the Industrial Hygiene and Industrial Safety staffs to serve as liaisons between the two sections on matters of policy and responsibilities.	5/91
12.	Prepare engineering estimate and submit CDR for office/storage space.	12/91
13.	Initiate construction of Central Research Support Building.	12/92

Costs:

Type of funds: Overhead
Source of funds: Overhead

Action item	Estimated costs per fiscal year ($K) 1991	1992	1993	1994	1995	Beyond	Total
1	6						6
2	4						4
3	5						5
4	2						2
5	1						1
6	10						10
7	—						—
8	—						—
9		*					
10		8					8
11	—						
12	40						40
Status:							
Funded	28						
Requested		8					
New	40						$76

*Estimated annual ongoing cost: $425K starting in FY 1992.

Type of funds: Line Item
Source of funds: ER-AT

Action item	Estimated costs per fiscal year ($K) 1991	1992	1993	1994	1995	Beyond	Total
13			1000	3000	6000	2400	12400
Status:							
Funded							
Requested			1000	3000	6000	2400	
New							$12400

References: 29 CFR 1910 and 29 CFR 1926
DOE Orders 5480 and 5483

Finding No.: PP.2-1 ORNL Health and Safety Program

Finding Description: **The ORNL Health and Safety Program does not ensure that all work places are free from hazards as required by DOE 5480.4.**

Code: Category III

Compliance Protocol: DOE Order 5480.4

Priority: Energy Systems Risk Weight 505
Tiger Team Action Plan Priority 2

Response: The ORNL *Safety Manual* is recognized as being out of date and not in total compliance with applicable standards due to inadequate resources. Moreover, the tracking of identified hazards has also been hampered by inadequate staff resources. The Industrial Safety Section has recognized the need to update the safety standards, and these needs were discussed in the Section's self-assessment document. All present procedures will be reviewed and revised, as needed, to reflect current DOE, OSHA, and industry consensus requirements. Additional staffing will be required as new procedures are created, as appropriate, to ensure that industrial safety requirements are documented, tracked, and made available to ORNL line management.

Root Causes:

Inadequate policy, inadequate policy implementation, and insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Evaluate existing procedures and establish priorities for overall procedure upgrade to ensure procedures reflect current DOE, OSHA, and industry consensus requirements.	Complete
2. Conduct OSHA compliance inspections, document results, and initiate fixes to ensure workplaces are free from recognized hazards.	5/91
3. Request funding to hire an additional staff member.	7/91
4. Contingent on approval of funding, hire additional staff to write procedures and to develop hazard-tracking systems.	10/91

5. Revise and issue *Safety Manual.* 9/92

Costs:

Type of funds: Overhead
Source of funds: Overhead

Action item	Estimated costs per fiscal year ($K) 1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	—						
4			*				
5		280		*			
Status:							
Funded							
Requested							
New		280					$280

*Estimated annual ongoing cost: $140K starting in FY 1993 and an additional $315K every other year beginning in FY 1994.

References: DOE Order 5483.1A

Finding No.: PP.2-2 Workplace Exposure Monitoring and Medical Records

Finding Description: **Workplace exposure monitoring and medical records are not controlled in the manner or are they structured and coordinated to ensure generation of defensible and readily retrievable exposure assessment data required by 29 CFR 1910 Subpart C.**

Code: Category III

Compliance Protocol: 29 CFR 1910 Subpart C

Priority: Energy Systems Risk Weight 415
Tiger Team Action Plan Priority 2

Response: This finding was based on several related findings, including:

- Personnel exposure records are maintained in various locations, which limits the ability to relate a person's exposure to a specific hazard.
- Chain of custody for workplace monitoring samples is not established.
- Budgeted money for Industrial Hygiene, Medical, Industrial Safety, and Radiation Protection improvements to the Occupational Health Information System (OHIS) were eliminated in the FY 1991 budget. This means that the OHIS will operate in a maintenance mode in FY 1991.
- Sample protocols and laboratory and field standard operating procedures are not developed for the evaluation of most hazards.

IHAS, the Industrial Hygiene portion of the Occupational Health Information System (OHIS), will—once it is fully implemented—meet most of the records management needs for employee exposure data. The IH Section is working with the OHIS committee to ensure that the industrial hygiene components of OHIS will receive adequate attention in any upgrade efforts. Any records management needs that are not met by the OHIS upgrade will be considered in the development of the Section's in-house records management system (see action Item 1 below). Funding for OHIS improvements will again be requested for FY 1992. In the meantime, the corrective actions planned to address these findings are listed below.

It is currently possible to manually relate exposures to specific hazards, and this is done routinely; the existing manual process will be automated with full implementation of OHIS/IHAS.

Root Causes:

Insufficient resources, poorly defined roles and responsibilities, and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Develop a comprehensive records management system for IH exposure records; this new system will specify a centralized location for storage of all relevant records.	6/92
2. Develop and issue a standard operating procedure covering chain-of-custody requirements for workplace monitoring samples.	9/91
3. Determine needs for upgrading OHIS to meet records management requirements and submit recommendations to the OHIS committee.	6/91
4. Issue standard operating procedures covering field sampling protocols and laboratory analyses protocols for workplace hazards.	12/91

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
2	15						15
3	2						2
4	46						46
Status:							
Funded	63						
Requested							
New							$63

Type of funds: ESH Programmatic

Source of funds: ER-AT IH

Action item	Estimated costs per fiscal year ($K)						Total
	1991	1992	1993	1994	1995	Beyond	
1		61					61
Status:							
Funded							
Requested		61					
New							
							$61

References: 29 CFR 1910, Subpart C

Finding No.: PP.3-1 Health and Safety Concerns

Finding Description: **ORNL does not have a formal system for identifying and evaluating health and safety concerns for all of its activities.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 68
Tiger Team Action Plan Priority 2

Response: Issues of major environmental, safety, and health (ES&H) concern (e.g., yttrium-90 production at Building 3038 laboratory, shock-sensitive chemicals at Building 9207, isotope production laboratory shutdown, and removal of cesium and cobalt capsules from leaking canal at Building 3001) surface at ORNL, sometimes requiring a rapid and often complicated course of action to correct. At present, no systematic process exists to ensure that the appropriate risk and hazard assessment and independent ES&H reviews are triggered.

Situations may be further confused by overlapping jurisdictions and responsibilities, both within and external to ORNL.

Unless a systematic process is developed to quickly dispatch clear, responsive authority supported by a team of experts (line management, appropriate ES&H disciplines, etc.) to develop a course of action based on a comprehensive risk assessment which has early buy-in with DOE, situations such as the long delay in removal of shock-sensitive chemicals from the Biology Division laboratory will continue leaving ORNL and DOE extremely vulnerable.

Root Causes:

Inadequate policy, inadequate management approach, ambiguous expectations or requirements, and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Develop and initiate implementation of a systematic process (including issuance of an SPP) which is initiated by line management to assign clear unambiguous responsibilities and to draw upon the expertise of appropriate ES&H, QA, security, or other discipline experts to develop a comprehensive course of action for Laboratory activities.	9/91

Process will include methodology to ensure:

a. appropriate safety and environmental assessments are performed,
b. appropriate levels of review and surveillance are conducted,
c. decisions are made at a necessary level to get issues resolved in a safe and timely manner,
d. startup requirements are appropriately defined, and
e. lessons learned are incorporated and deficiencies are corrected.

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	15						15
Status:							
Funded							
Requested							
New	15						$15

References: None

Finding No.: PP.3-2 ORNL Construction Oversight Program

Finding Description: **The ORNL Construction Oversight Program does not apply an effective system to enforce safety requirements and correct noncompliances.**

Code: Category III

Compliance Protocol: DOE Order 5480.9

Priority: Energy Systems Risk Weight 68
Tiger Team Action Plan Priority 2

Response: Lack of definition of roles and responsibilities between MK-Ferguson and Energy Systems is the primary problem. Construction activity is in a transition period from the past practices of multiple contracting agencies to the present practice of assigning all construction activity to the construction manager (CM) for his administration. An interface agreement is being developed which will clearly define roles and responsibilities for future construction safety enforcement and oversight. As CM, MK-Ferguson will be responsible for enforcing safety requirements for all construction contractors and for conducting a formalized review of contractor health and safety programs. The CM will be responsible for tracking all open items and ensuring correction of noncompliances in a timely manner. Energy Systems will monitor and oversee the CM's safety activities and construction projects bringing to the attention of the CM any noncompliances. In the event of a situation with imminent danger to life or health, Energy Systems will correct the noncompliance immediately and notify the CM.

Root Causes:

Inadequate policy, inadequate policy implementation, and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue an interface document which outlines the roles and responsibilities of environmental, safety, and health personnel of Energy Systems and MK-Ferguson (see Finding OA.1-3).	Complete
2. Update and revise the ORNL construction safety standard to reflect current needs (see Finding PP.2-1, Item 4).	7/91
3. Develop and implement internal operating procedures for ORNL industrial safety relative to the requirements of the interface document and the ORNL construction safety standard (see Finding PP.2-1, Item 3).	9/92

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	7						7
3	—						
Status:							
Funded	7						
Requested							
New							
							$7

References: 29 CFR 1926
DOE Order 5483.1A

Finding No.: PP.5-1 Hazard Communication Program Deficiencies

Finding Description: **The Hazard Communication Program does not fully inform ORNL personnel of industrial hazards as required by 29 CFR 1910.1200.**

Code: Category III

Compliance Protocol: 29 CFR 1910.1200

Priority: Energy Systems Risk Weight 418
Tiger Team Action Plan Priority 2

Response: This finding was based on several related findings, which said:

- Although a new hazard communication program has been developed and some ORNL employees, visitors, and visiting scientists have been trained, the program does not contain elements regarding Industrial Safety.
- Employees taking the HAZCOM training course are not formally tested to determine their level of understanding of the program.
- Supervisors are not required to take the basic HAZCOM training program prior to taking the HAZCOM training for supervisors.

On September 12, 1990, the Industrial Hygiene Section issued procedure IHP-01, "ORNL Hazard Communication Program," which was designed to address the requirements of OSHA's HAZCOM regulation. That regulation is specifically targeted at chemical hazards, including the "physical" hazards of chemicals (e.g., flammability, explosive potential, instability). The HAZCOM training course and IHP-01 both address such physical hazards. Awareness of other types of industrial hazards (not related to chemicals) is ensured through other avenues (e.g., divisional safety meetings and Safety Department bulletins).

Corrective actions that have been planned in response to the other findings are listed below.

Root Causes:

Inadequate management approach, ambiguous requirements or expectations, and inadequate training

Planned Actions and Schedules:

Item/Description	Completion Date
1. Revise the HAZCOM training courses to include tests that will determine employees' understanding of the program.	6/91
2. Issue revised IHP-01 to specify that supervisors must complete the basic HAZCOM course before taking the supervisors' course or combine the general course information with the supervisors' course so that supervisors must take only the one course.	6/91

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	3						3
2	7						7
Status:							
Funded	10						
Requested							
New							$10

References: 29 CFR 1910.1200

Finding No.: PP.5-2 Health and Safety Program Deficiencies

Finding Description: **The ORNL health and safety program does not ensure that all employee health and safety concerns are addressed.**

Code: Category III

Compliance Protocol: Best management practices prescribe that the tracking system and feedback mechanism for employee safety and health concerns be as uncomplicated as possible.

Priority: Energy Systems Risk Weight 13
Tiger Team Action Plan Priority 3

Response: This finding was based on the following:

- Although a documented program exists for the voicing of health and safety concerns of employees to ORNL and DOE management, the tracking system for resolutions of these concerns and the feedback mechanism to the employees are unnecessarily complicated.

The Industrial Safety Standard IS-1.6 outlines the procedure for the employee to follow in submitting a safety suggestion/complaint to their supervisor or industrial safety. This safety standard also documents the tracking system and feedback mechanism that are used in ORNL for an employees safety suggestion/complaint.

ORNL has an ongoing effort to ensure compliance with DOE Order 5483.1A, "Occupational Safety and Health Program for Government-Owned Contractor-Operated Facilities." This order requires that ORNL employees be provided with safe and healthful working conditions in accordance with DOE safety and health standards which incorporate OSHA standards. Also, this order specifies the feedback mechanism to the employee when he/she may voice a health and safety complaint to DOE-ORO.

Root Cause:

Inadequate policy

Planned Actions and Schedules:

Item/Description	Completion Date
1. Revise and issue Industrial Safety Standard IS-1.5, "Handling Employee Complaints Pertaining to Health and Safety," to include the feedback mechanism as stated in DOE Order 5483.1A.	3/92
2. Develop internal procedure to audit tracking system and feedback mechanism quarterly.	9/92

Costs: Costs associated with these action items are included in Finding PP.2-1, Item 4.

References: DOE Order 5483.1A

Finding No.: PP.5-3 Explosives Safety Program

Finding Description: **The Explosives Safety Program at ORNL is not in compliance with DOE 5480.4 and DOE 5480.3.**

Code: Category III

Compliance Protocol: DOE Orders 5480.4 and 5480.3

Priority: Energy Systems Risk Weight 133
Tiger Team Action Plan Priority 2

Response: Despite the lack of clearly defined roles and responsibilities governing the program for explosives safety at ORNL, the Industrial Safety Section has continued to pursue a phased approach for compliance with applicable laws, regulations, and DOE orders. This ongoing effort was constrained, in part, due to the perception that support by senior management was limited and confusion over necessary elements of authority and responsibility.

Senior management responded positively as evidenced by approval of a major policy change that restructured the explosives safety program at ORNL. This action signaled a more well-defined and documented effort and provides clear direction for the development and implementation of effective policy for this program. The Industrial Safety Section will aggressively integrate the following planned actions to achieve program compliance while also redirecting staff effort for providing oversight to identify other potential noncompliance issues.

Root Causes:

Inadequate policy implementation, inadequate training, and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Industrial Safety will obtain and ensure receipt of controlled copies of procedures regarding explosives operations in the Hazardous Waste Operations Manual (WM-SWO-401).	Complete
2. Industrial Safety will obtain and verify distribution of additional copies of the DOE Explosives Safety Manual to program managers, division safety officers, line management, and supervisors involved with explosives transportation, use, and storage.	5/91
3. ORNL senior management will appoint a coordinator for explosives safety as provided by SPP X-ESH-8.	Complete
4. Industrial Safety will revise and reissue the procedure for explosives safety in the ORNL Safety Manual.	7/91
5. Technical Resources and Training Section will develop and implement formalized training for employees engaged in explosives handling, transportation, and storage.	11/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1							
2							
3							
4	7						7
5		10	*				10
Status:							
Funded	7						
Requested							
New		10					$17

*Estimated annual ongoing cost: $3K for continuing training.

References: DOE Orders 5480.4 and 5480.3

Finding No.: PP.5-4 Implementation of the Industrial Safety Program

Finding Description: **As evidenced by the number and severity of work place hazards, the basic concepts of the industrial safety program are not fully implemented by ORNL personnel.**

Code: Category III

Compliance Protocol: Best management practices indicate that the number and severity of work place hazards should be minimal if the basic concepts of an effective industrial safety program are fully implemented.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: This concern was based on the following related findings:

- Industrial Safety training for ORNL visitors and visiting scientists is not formalized.
- See WS, Section 4.5.1.16.
- The number and severity of workplace hazards identified by this appraisal indicate that the basic concept of workplace safety hazard identification by ORNL employees is not fully implemented.

The ORNL Training and Development Department, Human Resources Division, is in the process of developing safety orientation videotapes for employees, visitors, and visiting scientists which explain basic concepts of ORNL's safety program.

The Technical Resources and Development Section and the Industrial Safety Section developed a training program for supervisors to enable them to identify workplace hazards.

Root Causes:

Inadequate policy implementation, insufficient resources, and inadequate training

Planned Actions and Schedules:

Item/Description	Completion Date
1. The ORNL Training and Development Department will complete an orientation videotape for visitors, guests, and facility users (see Finding TC.1-1, Item 7).	Complete
2. Division supervision will attend the course, "Industrial Safety for Supervisors," to obtain training in hazards identification (see Finding TC.1-1).	9/91
3. Issue an SPP defining ES&H training requirements for all personnel.	9/91

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
3	15						15
Status:							
Funded							
Requested							
New	15						$15

References: DOE Order 5483.1A

3.3.16 Worker Safety

Finding No.: WS.3-1 Control of Asbestos

Finding Description: **ORNL does not control the use of asbestos-containing materials nor do they have a current inventory of the products on site that contain asbestos and therefore does not comply with all requirements of 29 CFR 1910.1001, Asbestos Standard, and 29 CFR 1910.1200, Hazard Communication.**

Code: Category III

Compliance Protocol: 29 CFR 1910.1001 and 29 CFR 1910.1200

Priority: Energy Systems Risk Weight 468
Tiger Team Action Plan Priority 2

Response: This finding was based on several related findings.

- ORNL stores will order products containing asbestos if the Laboratory Director will authorize it by letter or if a substitute is not readily available.
- ORNL has not identified all asbestos-containing materials (ACM).
- Areas were noted where ACM are breaking off and causing a housekeeping problem and where they could eventually be reentrained and become an inhalation hazard.
- ORNL acknowledged a considerable amount of asbestos on site.

Over the past year, an extensive survey has been conducted at ORNL to establish an ACM inventory. Over two-thirds of the inventory has already been completed, approximately half of the engineering drawings for the inventory have been finished, and an inventory database has been set up. Additional funding will be requested for a follow-up survey to ensure that all ACM areas have been identified (see Action Item 4 below).

An Asbestos Operations and Management Plan for ORNL is being developed. Once this plan is issued and the IH Section staff members are assigned to provide individual coverage for operating divisions, asbestos issues will receive more detailed attention. The Plan will provide for systematic surveillance and repair of damaged ACM areas. Specific corrective actions planned to address these findings are listed below.

Root Causes:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue the ORNL Asbestos O&M Plan, which will address in detail the policy and management approach for oversight of asbestos activities at ORNL.	9/91
2. Issue a procedure concerning review of purchases (including asbestos). (Costs are covered in Finding IH.2-1, Item 4.)	6/91
3. Revise the asbestos awareness training to strengthen the guidance concerning procurement of ACM.	5/91
4. Request funds to conduct a follow-up survey to ensure that all possible areas involving ACM have been identified.	8/91
5. Contingent on funding, initiate follow-up survey.	11/91
6. Initiate and document periodic review of Stores inventory for asbestos-containing material.	7/92

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	77						77
2		—					
3	8						8
4	—						
5		175					175
6		21					21
Status:							
Funded	85						
Requested							
New		196					$281

*Estimated annual ongoing cost: $21K.

References: 29 CFR 1910.1001
29 CFR 1910.1200

Finding No.: WS.4-1 Machine Guarding

Finding Description: **Guarding was not universally available and in place, as specified in 29 CFR 1910 Subpart O, for machines and tools with moving and rotating parts.**

Code: Category III

Compliance Protocol: 29 CFR 1910 Subpart O. Workplaces should be free of uncontrolled physical hazards and shall be in compliance with DOE-prescribed occupational safety standards.

Priority: Energy Systems Risk Weight 910
Tiger Team Action Plan Priority 2

Response: ORNL recognized the need for proper guarding of machines and equipment in the self-assessment. Beginning in August 1990, the NUS Corporation conducted an Industrial Safety OSHA inspection that included machines and equipment guarding in all the facilities. That inspection has been completed, and each division is correcting noncompliances where funding is available. Also, the Fabrication Department of the Plant and Equipment Division conducted an assessment of all machines and equipment in the machine shops. Most all of the deficiencies have been corrected.

We have a comprehensive list of guarding deficiencies, and abatement will proceed in direct proportion to funding. A request for funding machine guarding noncompliances was made to DOE in May 1990 (Field Work Proposal "ORNL Safety and Health Regulatory Compliance").

Machine guarding deficiencies have been prioritized with high emphasis placed on employee exposure. Machines that are used frequently have been corrected first. Other pieces of equipment, such as exposed belt pulleys and sprockets on pumps, HVAC systems, or fans, have also been addressed with special emphasis training and safety analysis that is provided to employees on low-risk, unguarded machines. Those that are in traffic areas have been or are being corrected immediately.

Root Cause:

Inadequate policy, insufficient resources, ambiguous requirements or expectations, inadequate management commitment, and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue a Safety Standard on Machine Guarding to include engineering and purchase specifications against OSHA and ANSI machine guarding standards, and organizational roles and responsibilities.	7/91
2. Resubmit request for OSHA machine guarding funds with a FWP to DOE.	Complete
3. Correct specific machine guarding findings as listed in the Tiger Team assessment (Appendix F) and document in a letter.	9/91
4. Develop and initiate implementation of training on 29 CFR 1910 Subpart O for Engineering, Facility Managers, and machinists.	12/91
5. Contingent on approval of funding, complete and document installation of machine guarding as identified in comprehensive NUS Corporation and Plant and Equipment Surveys.	9/94

Costs:

Type of funds: ESH Programmatic

Source of funds: ER-AT OSHA

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
5		405	425	485			1315
Status:							
Funded							
Requested		405	425	485			
New							$1315

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	15						15
3	150						150
4		10					10
Status:							
Funded	165						
Requested							
New		10					$175

References: None

Finding No.: WS.4-2 Noncompliances of Building Egress

Finding Description: **Exits were not properly marked, adequately lighted, and not all means of egress are continuous and unobstructed to the nearest exit in accordance with 29 CFR 1910 Subpart E.**

Code: Category III

Compliance Protocol: 29 CFR 1910 Subpart E. Workplaces should be free of uncontrolled physical hazards and should be in compliance with DOE-prescribed Occupational Safety Standards.

Priority: Energy Systems Risk Weight 458
Tiger Team Action Plan Priority 2

Response: The ORNL Fire Protection Inspectors conduct monthly building inspections. Inspection criteria includes properly marked, adequately lighted, and clear, unobstructed egress to exits.

Fire Protection Engineering surveys are conducted on all major facilities annually.

A rigorous Plan Review Procedure to address all Fire Protection issues, including means of egress for new and modified facilities, is in place to ensure conformance to the Life Safety Code NFPA 101.

In FY 1991, major ORNL facilities will be inspected as part of the Fire Protection Conformance Plan to comply with Subpart E 29 CFR 1910, General Industry Standards. This inspection will be performed by an outside consulting group to address specific criteria such as emergency lighting, exit signs, and exit travel.

In May 1990, ORNL requested from DOE funding for abatement of Means of Egress noncompliances. Field Work Proposal (ORNL Safety and Health—OSHA Regulatory Compliance) was submitted.

Root Causes:

Inadequate policy, inadequate policy implementation, insufficient resources, inadequate management approach, inadequate management commitment, and ambiguous requirements and expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. See Finding FP.2-3.	
2. Resubmit request for OSHA Means of Egress funds with a FWP to DOE.	Complete
3. Prepare an action to plan to correct specific items of noncompliance as listed in Appendix F, Subpart E, Means of Egress, of the Tiger Team Assessment of ORNL.	6/91
4. See Finding FP.2-3, Item 1.	
5. Contingent upon funding, complete abatement of Priority I noncompliances, as determined by inspections of buildings.	12/91
6. Contingent on funding of FWP, complete abatement of remaining noncompliances.	9/94

Costs:

Type of funds: ESH Programmatic
Source of funds: ER-AT OSHA

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
6		625	2830	3030			6485
Status:							
Funded							
Requested		625	2830	3030			
New							$6485

Type of funds: Overhead
Source of funds: Division Administration

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
3	10						10
Status:							
Funded	10						
Requested							
New							$10

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
5		300					300
Status:							
Funded							
Requested							
New		300					$300

References: None

Finding No.: WS.4-3 Machinery Inspection and Preventative Maintenance

Finding Description: The inspection and preventative maintenance program for powered platforms, hoisting and rigging devices, cranes and other powered tools, and machinery was not in compliance with the DOE Hoisting and Rigging Manual and 29 CFR 1910 Subparts F and N.

Code: Category III

Compliance Protocol: DOE Hoisting and Rigging Manual and 29 CFR 1910 Subparts F and N

Priority: Energy Systems Risk Weight 483
Tiger Team Action Plan Priority 2

Response: Quality Engineering and Inspection hoisting and rigging procedures SSI 220 through SSI 229 will be reviewed for compliance with 29 CFR 1910 Subparts F&N and the DOE Hoisting and Rigging Manual and revised as necessary. The DOE Hoisting and Rigging Manual and 29 CFR 1910 Subparts F&N will be listed as references in the procedures to ensure their review and/or revision when the referenced documents are revised in the future. The Quality Engineering and Inspection safety inspectors will be retrained to the revised procedures. Formal sessions on OSHA requirements for hoisting and rigging will be presented to applicable divisions by the Quality Engineering and Inspection group.

Root Causes:

Inadequate policy implementation and ambiguous requirements or expectations. Flowdown of requirements to ORNL procedures is incomplete or unclear, resulting in incomplete implementation of orders and policies.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue revised QE&I procedures SSI 220-229 to comply with 29 CFR 1910, Subparts F&N, and the DOE Hoisting and Rigging Manual and revise as necessary.	5/91
2. Retrain safety inspectors to the revised SSI 220-229 procedures.	7/91
3. Present formal sessions on OSHA requirements for hoisting and rigging to applicable divisions.	12/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	2						2
2	2						2
3	2	2					4
Status:							
Funded	6						
Requested		2					
New							$8

Estimated annual ongoing cost: $4K.

References: 29 CFR 1910, Subparts F&N, and the DOE Hoisting and Rigging Manual

Finding No.: WS.4-4 ORNL Electrical Compliance

Finding Description: **Serious electrical noncompliances noted in specific buildings (Bldgs. 2010, 3587, and 3500) and a representative sample of buildings indicate that ORNL does not comply with 29 CFR 1910, Subpart S- Electrical standard.**

Code: Category II

Compliance Protocol: The electrical system and maintenance program should ensure that workplaces are free of uncontrolled physical hazards and are in compliance with DOE-prescribed occupational safety standards.

Priority: Energy Systems Risk Weight 935
Tiger Team Action Plan Priority 1

Response: ORNL has over 250 buildings that have been constructed and modified over a period of 47 years. Construction and maintenance practices, as well as electrical codes, standards, and regulations, have changed many times. The Laboratory has not kept pace with the changing regulatory requirements, and this is manifested in the generic electrical deficiencies that have been cited. This problem has been recognized, and several initiatives have been implemented to mitigate the problem. Initiatives that are currently in place include the following.

- An inspection program exists for corded equipment and receptacles.
- An OSHA conformance plan has been developed for compliance with Subpart S.
- OSHA inspections of 46 high-priority buildings for violations of Subpart S have been initiated, and violations have been documented.
- Action plans are in place to correct identified violations.
- A review of engineering standards, technical specifications, and selected procedures is in progress by Science Applications International Corporation (SAIC) to detect any nonconformances to OSHA compliance. SAIC is also preparing training modules for Engineering on OSHA compliance.
- The Facility Manager concept is being implemented to establish accountability.

These initiatives will supplement existing system safeguards that are in place to ensure compliance with regulatory requirements. In addition, increased training will be provided to personnel who have responsibility for electrical maintenance.

The three specific buildings noted in the Tiger Team inspection contained the following deficiencies.

- Building 2010—Lack of Ground Fault Circuit Interruption (GFCI) in wet or damp areas, unguarded live electrical parts, and unused openings not being effectively closed.

- Building 3587—Unguarded live electrical panels.

- Building 3500—Improper use of a circuit box.

The problems are typical of those found during the ORNL-initiated OSHA-type electrical audit of 46 high-priority buildings that began in May 1990. Limited resources have allowed inspections of only high-priority buildings. Building 3500 was included in the 46 high-priority buildings inspected and the deficiencies noted by the Tiger Team were also noted on the previous inspection. Buildings 2010 and 3587 were categorized as medium priority in the ORNL OSHA Electrical Conformance Plan. Limited manpower and funding have allowed only the Priority I issues documented to be abated.

Specific electrical deficiencies (Appendix F) noted in the assessment will be corrected. The remaining ORNL buildings will be inspected as outlined in the ORNL conformance plan for Subpart S and the ORNL OSHA Implementation Plan. Deficiencies are being corrected on a priority basis. All of the Priority I items have been corrected, and corrective action for Priority II items has begun. Budgets and schedules for Priority II and other noncompliances are being developed and resources will be requested.

To ensure that additional serious electrical compliances did not exist at ORNL, a Tiger Team workshop for serious findings meeting was held with all division directors, facility managers, and facility engineers. Pictures of noncompliances that were cited by the Tiger Team were shown; each was returned to those areas to look for similar problems. The quick fix team corrected those items, thus ensuring that similar serious situations did not exist. The remainder of noncompliances are of a less serious nature, and experienced electricians are correcting these.

Root Causes:

Inadequate policy implementation, poorly defined roles and responsibilities, lack of management commitment, insufficient resources, and inadequate training

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request funding from DOE for abatement of OSHA electrical noncompliances at ORNL.	Complete
2. Correct known electrical deficiencies that present an immediate hazard as defined by the Tiger Team.	Complete

	3. Instruct electrical supervisors concerning importance of job completion. See Finding MA.2-2.	Complete
	4. Correct Priority I electrical non-conformances as described in the ORNL electrical inspection findings of high-priority buildings.	Complete
Near-Term		
	5. Evaluate and prioritize electrical nonconformances listed in Appendix F of the Tiger Team Assessment.	6/91
	6. Review criteria and clearly define and document roles and responsibilities for post-job inspections to ensure work completion, document and enforce compliance. See Finding MA.2-2.	6/91
	7. Develop and initiate training on OSHA Subpart S and the National Electric Code (NEC) for electrical maintenance personnel.	6/91
	8. Issue revised inspection procedure for corded equipment and receptacles to include verification of the proper use of portable cords as described in the National Electric Code (NEC).	6/91
	9. Resubmit request for OSHA electrical funds with a FWP to DOE.	Complete
	10. Correct serious OSHA electrical deficiencies in each building at ORNL with a dedicated team of electricians, using specific criteria developed from Lessons Learned of the Tiger Team.	9/91
	11. Contingent on receipt of funding, complete electricalprojects identified above.	9/94

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	80						80
3	—						
4	60						60
5	10						10
6	—						
7	30						30
8	—						
10	262						262
Status:							
Funded	442						
Requested							
New							$442

Type of funds: ESH Programmatic
Source of funds: ER-AT OSHA

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
11		1350	1945	2035			5330
Status:							
Funded							
Requested		1350	1945	2035			
New							$5330

References: 29 CFR 1910.303, 304, 305, 307, and 308
National Electric Code
X-03--510; ORNL OSHA Implementation Plan

Finding No.: WS.4-5 Equipment and Operations Areas

Finding Description: ORNL does not comply in equipment/operations areas with 29 CFR 1910 Subpart Q (Welding, Cutting, and Brazing) and Subpart H (Hazardous Materials).

Code: Category II

Compliance Protocol: 29 CFR 1910.253 Section (e)(3)(C)(2) states "Backflow protection shall be provided by an approved device that will prevent oxygen from flowing into the fuel-gas system or fuel from flowing into the oxygen system."

29 CFR 1910.253 Section (d)(2)(iii)(B) states "Unalloyed copper shall not be used for acetylene or acetylenic compounds except in listed equipment."

29 CFR 1910.253 Section (b)(4)(iii) states "Oxygen cylinders in storage shall be separated from fuel-gas cylinders or combustible materials (especially oil or grease), a minimum distance of 20 feet (6.1m) or by a noncombustible barrier at least 5 feet (1.5m) high having a fire-resistance rating of at least one-half hour."

29 CFR 1910.253 Section (b)(5)(ii)(E) states "Cylinders not having fixed hand wheels shall have keys, handles, or nonadjustable wrenches on valve stems while these cylinders are in service. In multiple cylinder installations only one key or handle is required for each manifold."

29 CFR 1910.253 Section (e)(3)(c)(5)(i) states "Hose for oxy-fuel gas service shall comply with the Specification for Rubber Welding Hose, Compressed Gas Association and Rubber Manufacturers Association."

29 CFR 1910.253 Section (e)(3)(C)(5)(III) states "Hose connections shall comply with the Standard Hose Connection Specification, Compressed Gas Association."

Priority: Energy Systems Risk Weight 935
Tiger Team Action Plan Priority 1

Response: A meeting was held with facility managers to discuss the noncompliances identified during the review. The managers were informed of the basic requirements for storage, tubing, connections, and valves for compressed gas systems used for welding, cutting, and brazing and were asked to inspect the systems in their areas. They were instructed to correct any noncompliances identified or contact the Safety Department and Plant and Equipment to correct the noncompliances.

Root Causes:

- Inadequate policy, inadequate policy implementation, and inadequate communications

Planned Actions and Schedules:

	Item/Description	Completion Date
Immediate		
	1. Conduct a meeting with all facility managers to • inform them of the basic requirements for storage, tubing, connections, and valves for compressed gas systems for welding, brazing, or cutting; • show pictures of systems which are not in compliance; and • instruct them to survey their areas to (1) identify where compressed gas systems are used, (2) inspect systems to verify compliance with requirements, and (3) fix any noncompliances which are identified.	Complete
	2. Issue a memo informing the facility managers of requirements for compressed gas systems and instruct them not to use compressed gas systems which do not comply with these requirements.	Complete
	3. Obtain and evaluate torch, hose, and connectors with flashback which are in compliance with the OSHA standard.	Complete
	4. Establish interim inventory of hoses and flashback devices making them available to the facility managers until the approved items can be made available on the AVID system. Issue guidelines to the facility managers stating that the compressed gas systems must be reviewed and approved by the Safety Department before they can be used.	Complete
Near Term		
	5. Modify the Safety for Supervisors Course to address the issues identified in action items 1 and 2 above for use of compressed gas for welding, brazing or cutting.	6/91
	6. Issue revised Safety Procedure IS-8.8 to reflect current requirements of 29 CFR 1910.253.	7/91
	7. Make approved torches, hoses, and connectors available on the AVID 2-day delivery system.	7/91

8. Develop and implement a program for routinely inspecting compressed gas systems to verify compliance with revised Safety Procedure IS-8.8. The inspection checklist will include tubing, connector, and storage requirements as well as other critical items identified in IS-8.8. 7/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	6						6
2	1						1
3	4						4
4	5						5
5	—						
6	14						14
7	7						7
8	42	*					42
Status							
Funded	37						
Requested							
New	42						$79

*Estimated annual ongoing cost: $50K division administration.

References: 20 CFR 1910.253

Finding No.: WS.4-6 ORNL Fire Protection

Finding Description: **ORNL does not comply with 29 CFR 1910 Subpart L: Fire Protection.**

Code: Category III

Compliance Protocol: 29 CFR 1910 Subpart L requires fire extinguishers to be visually checked on a monthly basis and fire doors to be operational and not held open by wedges, etc. Requirements include a more comprehensive annual check of extinguishers depending upon type, e.g., CO_2 extinguishers must be weighed annually.

Priority: Energy Systems Risk Weight 409
Tiger Team Action Plan Priority 2

Response: This item was identified in the ORNL Protective Services 1990 Self-Assessment. A monthly building program is now in place that includes monthly visual checks of fire extinguishers. Tags are not signed for these monthly checks; however, the Building Fire Inspection form includes this check-off provision for the inspector. Fire door operability is also checked monthly during the building inspection and requires check-off by the inspector. Needed fire door repairs are reported immediately to P&E. Repairs are field verified by fire inspectors.

Portable fire extinguisher annual inspections are currently behind schedule. The schedule slipped due to time demands necessary to meet hydrostatic test data requirements. Available resources were utilized to address the more serious issue of hydrostatic testing.

Root Causes:

Insufficient resources, inadequate policy implementation, inadequate management commitment, and inadequate management approach

Planned Actions and Schedules:

Item/Description	Completion Date
1. Fire extinguishers shall be checked and work performed as required by NFPA/OSHA annually. The backlog of out-of-date fire extinguisher inspections shall receive priority inspections.	8/91
2. A letter from upper ORNL management, which reiterates ORNL policy regarding fire protection requirements, shall be transmitted to all ORNL employees.	7/91

3. A system shall be developed to report fire protection deficiencies to ORNL managers (see Finding RFP.1-1).

4. The action plan for FP.1-2 shall be referenced for additional resources.

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	25						25
Status:							
Funded	25						
Requested							
New							$25

References: 29 CFR 1910 Subpart L

3.3.17 Industrial Hygiene

Finding No.: IH.2-1 Documentation of Procedures by Industrial Hygiene

Finding Description: **ORNL Industrial Hygiene Department has not documented all procedures as required by DOE 5480.10.**

Code: Category III

Compliance Protocol: DOE Order 5480.10

Priority: Energy Systems Risk Weight 68
Tiger Team Action Plan Priority 2

Response: This finding was based on several related findings, which said:

- Although over 250 standard operating procedures have been identified by the Industrial Hygiene Department of ORNL as being required for a safe and healthy work environment, fewer than 20 are in draft form or have been issued.
- Specific quality criteria are not established for data collection and use of data associated with industrial hygiene programs. Chain-of-custody records are not used as part of analytical laboratory practices.
- The IH analytical laboratory turn-around time on some IH samples exceeded two months.
- A complete inventory of beryllium-regulated areas is not maintained, so that there is no record of where all beryllium is used, the equipment used, the location, and the time period the operation was conducted as required in DOE Order 5480.10.
- Substitution of nontoxic chemicals for toxic chemicals has not been integrated into the ORNL IH program and in procurement policies in areas such as cyanide plating, asbestos gasket use, and dioctyl phthalate.
- No implementation schedule has been set for correcting deficiencies in documentation and procedures.

The Industrial Hygiene Section has recognized the need for a comprehensive set of programmatic procedures [Industrial Hygiene Procedures (IHPs)] as well as standard operating procedures (SOPs). These needs were discussed in the Section's self-assessment document as well as in the Program Management Plan for IH. In May 1990, a professional industrial hygienist was hired to coordinate the production of more than 20 IHPs and at least 250 SOPs. The issuance of the

Industrial Hygiene Manual, containing the IHPs, was given top priority. After that manual was issued in October 1990, the focus shifted toward production of the SOPs.

Because of the large number of SOPs to be issued over the next three years, the Industrial Hygiene Section has set certain priorities. High-priority procedures are those that have been identified as possibly having a major impact on health and safety and those that are involved with other corrective actions in response to audit/surveillance findings. Medium-priority procedures are those which have significant health risk potential or are associated with programs which are considered high-profile. All other procedures have been assigned low-priority status.

The corrective actions planned to address these findings are listed below.

Root Causes:

Insufficient resources, ambiguous requirements or expectations, inadequate training, and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request funds to hire an additional staff member (a procedures writer) in FY 1992.	7/91
2. Contingent on approval of funding, hire an additional staff member to write procedures.	8/91
3. Evaluate all IH activities to identify and list any additional procedures that are needed, and develop a prioritized schedule for developing SOPs. (Costs are included in Item 4.)	8/91
4. Issue all high-priority Industrial Hygiene SOPs	3/92
5. Issue all medium-priority Industrial Hygiene SOPs	10/92
6. Issue all low-priority Industrial Hygiene SOPs	3/93
7. Develop and issue quality assurance plans for field monitoring and laboratory analyses.	Complete
8. Develop and issue laboratory analysis SOP that specifies an acceptable turn-around time for sample analysis. (Costs are included in Item 4 above.)	8/91

9. Complete and document a beryllium inventory as part of the Chemical Carcinogen Control Program. — 9/91

10. Issue additional guidelines to Procurement and the operating divisions, specifying that, whenever possible, nontoxic chemicals be substituted for toxic chemicals. — Complete

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	43						43
3	—						
4	307			*			307
7	15						15
8	—						
9	11						11
10	3						3
Status:							
Funded	253						
Requested							
New	126						$379

*Estimated annual ongoing cost: $91K starting in FY 1994.

Type of funds: ESH Programmatic
Source of funds: ER-AT IH

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
5		852					852
6			417				417
Status:							
Funded							
Requested							
New		852	417				$1269

References: DOE Order 5480.10

Finding No.: IH.2-2 Implementation of Industrial Hygiene Reviews

Finding Description: **The policy for implementing Industrial Hygiene reviews is not in place at ORNL.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 90
Tiger Team Action Plan Priority 4

Response: This finding is based on a related finding, which said:

Reviews of proposed activities and modifications to existing operations, including reviews of new or modified processes and chemicals, are not always completed. Interface with Procurement on purchases of new chemicals, asbestos, and other health concerns does not require the endorsement of Industrial Hygiene.

The Industrial Hygiene Section is nearing completion of the first phase of the Comprehensive Facility Survey (CFS), a walk-through effort to identify and evaluate IH concerns throughout ORNL. The results of this initial phase of the CFS will serve as a baseline for future continuing evaluations and assessments.

The IH Section's procedures require the operating divisions to contact Industrial Hygiene whenever a new or modified activity involves the potential for generating hazards. However, Industrial Hygiene recognizes the need for in-depth field surveillance to ensure that the operating divisions are meeting this responsibility. To ensure adequate coverage, one corrective action planned for the first quarter of CY 1991 is the assignment of IH professional staff to particular divisions where they will be responsible for surveillance of those divisions.

The corrective actions planned to correct this finding are listed below.

Root Causes:

Inadequate policy implementation and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Revise the Industrial Hygiene Procedure (IHP) as necessary to reflect the items included in Finding PP.3-1, Item 1.	12/91

2. Assign individual Industrial Hygiene Section staff members to provide IH oversight for particular divisions.	Complete
3. Issue procedures for conducting IH reviews of projects/programs. (Costs are covered in Finding IH.2-1, Item 4.)	12/91
4. Conduct surveillance and distribute surveillance reports to IH management as well as the management of the operating division(s) involved. Quarterly summary reports will be sent to the director of ES&H Compliance.	5/91
5. Issue a procedure concerning Industrial Hygiene review of purchases (asbestos, respirators, chemical carcinogens, etc.). (Costs are covered in Finding IH.2-1, Item 4.)	6/92

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1		2					2
2	11						11
4	5	*					5
Status:							
Funded	11						
Requested	5	2					
New							$18

*Estimated annual ongoing cost: $18K.

References: DOE Order 5480.10

Finding No.: IH.3-1 Personnel Protective Equipment

Finding Description: **ORNL is not in compliance with DOE 5480.10 and 29 CFR 1910.95, .133, .134, .252, regarding documentation and protective measures in the work place.**

Code: Category III

Compliance Protocol: DOE Order 5480.10 and 29 CFR 1910.95, .133, .134, and .252

Priority: Energy Systems Risk Weight 458
Tiger Team Action Plan Priority 2

Response: This finding was based on several related findings, which said:

- Periodic inspections and maintenance programs are not performed or established for all mechanical/engineered containment control systems.
- Supervision is not enforcing proper use of personnel protective equipment.
- Eyewash stations were not available in several buildings. Flushing of stations or monitoring for bacteria are not documented or done on a regular basis.
- Identification, evaluation, and control of environmental factors and stresses found in the workplace, including chemical, physical, biological, and ergonomic stresses, are not documented as a means for identifying existing and potential occupational health concerns.
- Documentation, identification, surveillance, and training for all magnetic fields and microwaves are not being completed.

In September and October of 1990, the Industrial Hygiene Section developed a Program Management Plan covering all IH activities at ORNL. As part of the development, IH staff assessed (1) whether their programs were in compliance with existing regulations and DOE Orders and (2) what actions would be needed to achieve compliance. The document includes plans for staffing and near-term action items designed to upgrade the IH programs.

During the first quarter of CY 1991, individual staff members in the Industrial Hygiene Section will be assigned responsibilities for particular operating divisions. These assignments will lead to an increased IH presence "in the field" and thus ensure that many of these findings will be corrected.

As for magnetic fields and microwaves, a staff member was recently added to the IH Section to focus on these areas. Guidelines, procedures, and training programs will be forthcoming. The individual corrective actions planned for these findings are listed below.

Root Causes:

Insufficient resources, ambiguous requirements or expectations, poorly defined roles and responsibilities, and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. See Finding IH-2.2, Item 2.	
2. Evaluate all containment/control systems and add systems, as necessary, to establish an inspection schedule for containment control systems.	6/91
3. Conduct field surveillance to verify the adequacy of new SOP for ensuring that supervisors are enforcing proper use of personnel protective equipment, and distribute surveillance reports to supervisors in the field.	Complete
4. Conduct a survey to determine the need for additional eyewash stations, document the results, and submit recommendations to the operating divisions.	6/91
5. Revise the SPP to document the requirements for flushing or monitoring of eyewash stations. (Costs are included in IH.2-1, Item 4.)	7/92
6. Complete and document the results of the Comprehensive Facility Survey.	6/91
7. Develop and issue standard operating procedures dealing with the industrial hygiene aspects of magnetic fields and microwaves. (Costs are included in IH.2-1, Item 4.)	7/92
8. Develop a training program dealing with the industrial hygiene aspects of magnetic fields and microwaves.	9/91
9. Conduct and document a survey of ORNL facilities to establish an inventory of EMF and microwave sources (excluding microwave ovens).	9/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	2						2
3	—						
4	7						7
5		—					
6	—						
7		—					
8	7						7
9	—						
Status:							
Funded	16						
Requested							
New							$16

References: DOE Order 5480.10
29 CFR 1910.95
29 CFR 1910.133
29 CFR 1910.134
29 CFR 1910.252

Finding No.: IH.4-1 Surveillance of Industrial Hygiene Monitoring

Finding Description: **Surveillance of industrial hygiene monitoring activities is not performed as required by DOE 5480.10.**

Code: Category III

Compliance Protocol: DOE Order 5480.10

Priority: Energy Systems Risk Weight 60
Tiger Team Action Plan Priority 2

Response: This finding was based on several related findings, which said:

- There is no documented program for periodic monitoring of chemical, physical, and biological stresses to ensure maintenance of satisfactory conditions.
- Quality assurance and quality control programs are not in place for the IH programs at ORNL.
- Line management is not ensuring that all operational areas are being covered by the Comprehensive Facility Survey.
- Management oversight is not present for the formal system that exists for employees to report potential health concerns.
- IH professionals are not out in the field overseeing the monitoring activities of technicians or interfacing with line management.

Each ORNL employee has access to Safety Suggestion Forms to report potential health concerns. Management is required to respond to these suggestions.

During the first quarter of CY 1991, individual staff members in the Industrial Hygiene Section will be assigned responsibilities for particular operating divisions. These assignments will lead to an increased IH presence "in the field" and thus ensure that many of these findings will be corrected.

The finding concerning management oversight for the formal system for reporting health concerns is being addressed as part of the corrective action for PP.5-2. A revision of procedure IS-1.5, "Handling Employee Complaints Pertaining to Health and Safety," will ensure that employee concerns receive appropriate management attention.

The specific actions planned to address these findings are listed below.

Root Causes:

Insufficient resources, inadequate oversight, and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue procedures related to routine and special monitoring in the workplace. (Costs are covered in Finding IH.2-1, Item 4.)	9/91
2. Develop quality assurance plans (which specify quality control measures) for all IH programs and issue them.	9/92
3. Issue summary reports concerning Comprehensive Facility Survey results to each division and request that the management of each division identify any operational areas that were not included in Phase I of the CFS.	6/91
4. See Finding IH.2-2, Item 2.	

Costs:

Type of funds: ESH Programmatic

Source of funds: ER-AT IH

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
2		435					435
Status:							
Funded							
Requested							
New		435					$435

References: DOE Order 5480.10

Finding No.: IH.5-1 Hearing Conservation Program

Finding Description: **The ORNL Hearing Conservation Program does not comply with DOE 5480.10 and 29 CFR 1910.95.**

Code: Category III

Compliance Protocol: DOE Order 5480.10 and 29 CFR 1910.95

Priority: Energy Systems Risk Weight 455
Tiger Team Action Plan Priority 2

Response: This finding was based on several deficiencies identified in the ORNL Hearing Conservation Program:

- Only one person was assigned to fully comply with the needs of the program.
- Although the in-house training and documentation were complete, tests to ensure workers' understanding were not given.
- Transmittal of the Standard Threshold Shifts from the Medical Department to Industrial Hygiene took longer than 2 months, thus not allowing prompt evaluation of the work areas.
- Not all areas were identified as requiring hearing protection, and other areas were not posted as to the range of the hazard.

Other findings concerning the Hearing Conservation Program included:

- Employees were observed without hearing protection in areas where protection was required.
- In areas where the standard was exceeded, hearing protection was available but no sign was posted requiring hearing protection.

Industrial Hygiene procedure IHP-04, "IHS Hearing Conservation Program," was issued on September 12, 1990. IH staff will be conducting surveillance in the field to ensure that employees are fulfilling the requirements of the procedure. The new procedure also specifies that supervisors in the field are responsible for ensuring that their employees wear required hearing protection.

Root Causes:

Insufficient resources, inadequate oversight, inadequate policy implementation, and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. See Finding IH.2-2, Item 2.	
2. Include written testing as part of the annual training portion of the Hearing Conservation Program.	7/91
3. Develop and document a system for ensuring more timely transmittal of STS notifications to permit prompt evaluation of the workplace.	6/91
4. Develop a database to serve as an inventory of high-noise sources; these areas are now being identified as part of the Comprehensive Facility Survey.	9/91
5. Review all high-noise-source areas and equipment, document the results, and ensure that high-noise sources are posted as required.	12/91
6. Conduct field surveillance and document results to ensure compliance with procedural requirements (e.g., the use of hearing protection devices in posted high-noise areas).	5/91
7. Review and update the list of Hearing Conservation Program participants and provide any new names to the Health Division.	Complete

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
2	2						2
3	7						7
4	7						7
5		12	*				12
6	1	*					1
7	—						
Status:							
Funded							
Requested							
New	17	12					$29

*Estimated annual ongoing cost: $13K starting in FY 1993 for Item 5 and $1K starting in FY 1992 for Item 6.

References: DOE Order 5480.10
29 CFR 1910.95

Finding No.: IH.5-2 Chemical Carcinogen Program

Finding Description: **The Chemical Carcinogen Program does not comply with DOE 5480.10 and 29 CFR 1910 Subpart Z.**

Code: Category III

Compliance Protocol: DOE Order 5480.10 and 29 CFR 1910 Subpart Z

Priority: Energy Systems Risk Weight 418
Tiger Team Action Plan Priority 2

Response: This finding was based on several related findings, which said:

- Not all areas have been evaluated, as required by DOE Order 5480.10, to determine if the use of carcinogens creates a significant potential for occupational exposures.
- An employee was observed without proper personnel protective equipment when potential exposures to a suspected carcinogenic material could occur.
- Pathways of ingestion and skin absorption are not always being considered.
- Although ORNL has a medical surveillance program for carcinogen users, it does not appear to be in place at this time; ORNL does not cover all aspects of the program.
- Laboratory carcinogens are not labeled.

Industrial Hygiene procedure IHP-13, "ORNL Chemical Carcinogen Control Program," was issued on October 8, 1990. The program is still in the initial development phase, and most of these findings will be addressed as the program moves into the actual implementation phase.

Root Causes:

Inadequate oversight and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Complete and issue Standard Operating Procedures for administration of the Chemical Carcinogen Program. (Costs are covered in Finding IH.2-1, Item 4.)	9/91

2.	Provide a copy of the currently existing inventory to individual divisions for their review, validation, and comments.	Complete
3.	Complete the chemical carcinogen inventory, using division responses and the final data from the Comprehensive Facility Survey.	7/91
4.	Complete and document the detailed evaluations of any operations currently identified with high or moderate risk potential.	5/91
5.	Evaluate and document any new operations identified through divisional review of the existing inventory and through the remainder of the baseline CFS.	9/91
6.	Recommend and verify implementation of additional controls where necessary (as identified by the detailed evaluations).	10/91
7.	Issue IH guidance covering general rules for handling carcinogens (including guidance on storage, labelling, and minimum controls required for work with carcinogens).	Complete
8.	Develop and implement a training module dealing with chemical carcinogen work.	5/91
9.	Provide names to the Health Division of all personnel currently identified as qualifying for medical surveillance.	5/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
2	2						2
3	15						15
4	7						7
5	7						7
6	7						7
7	2						2
8	7						7
9	—						
Status:							
Funded	40						
Requested							
New	7						$47

References: DOE Order 5480.10
29 CFR 1910, Subpart Z

Finding No: IH.5-3 Confined Space Entry

Finding Description: **Personnel are allowed to enter confined working spaces without proper monitoring and training as required by DOE 5480.10 and 29 CFR 1910.146.**

Code: Category II

Compliance Protocol: 29 CFR 1910.146 Section (c)(8) states "Rescue. Ensure that the procedures and equipment necessary to rescue entrants from permit spaces are implemented and provided."

ANSI Z117.1 Section 12.2.1 states "A mechanical device shall be available to retrieve personnel from vertical-type PRCSs greater than five feet in depth."

ANSI Z117.1, Section 13.1 states "Identification. All confined spaces which could be inadvertently entered shall have a sign identifying it as a confined space. Signs shall be maintained in a legible condition. For PRCSs, the sign shall contain a warning that a permit is required before entry."

OSHA 29 CFR 1910.146 Section (g) states "The employer shall ensure that individuals authorizing or in charge of entry receive the appropriate training and perform duties, as follows...."

Priority: Energy Systems Risk Weight 913
Tiger Team Action Plan Priority 0

Response: An interim IH Procedure has been issued specifying requirements related to confined spaces. The Confined Space Inventory is complete and posting has been initiated.

An additional safety harness and tripod have been procured and provided for use by the Emergency Response Organization.

The Confined Space Survey has identified all confined spaces. Posting is now being completed.

A contractor provided general, entrant/attendant, supervisory, instrumentation, and emergency response training in October 1990 and in February 1991. The Office of Environmental and Health Protection Training Section is currently offering general and entrant/attendant training on an on-going basis.

Root Causes:

Inadequate policy, inadequate policy implementation, and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue an interim IH procedure to specify requirements related to confined spaces. (Costs are covered in Finding IH.2-1, Item 4.)	Complete
2. Issue standard operating procedure for performing measurements in confined spaces. (Costs are covered in Finding IH.2-1, Item 4.)	Complete
3. Conduct a meeting with facility managers to inform them of evaluation, posting, monitoring, and training requirements for control of confined spaces. The managers will be instructed to survey their areas to ensure that confined spaces have been identified and are posted. (Costs are covered in Finding WS.4-5, Item 1.)	Complete
4. Issue a memo to division directors and facility managers informing them of evaluation, posting, monitoring, and training requirements associated with confined spaces. The memo will state that work in confined spaces will not be permitted until an evaluation by the Industrial Hygiene Section has been completed.	Complete
5. Complete the Industrial Hygiene Confined Space Inventory.	Complete
6. Develop Confined Space Entry training modules for general, entrant/attendant, supervisory, instrumentation, and emergency response. Offer the general and entrant/attendant training on an on-going basis.	Complete
7. Identify and assign responsibility to line organizations that require retrieval equipment.	5/91
8. Add existing retrieval equipment to Quality Department inspection schedule and perform initial inspection.	Complete
9. Execute a memorandum of understanding between Industrial Safety and the Emergency Response Organization to make available retrieval equipment for high-hazard confined space entry jobs.	5/91

10.	Implement the Confined Space Entry Training Program, including: - train the appropriate emergency response personnel; - identify instructors to provide on-going training modules for supervisory, instrumentation, and emergency response modules; - issue memo to all divisions specifying confined space entry training criteria; and - develop standard operating procedure for confined space entry training.	5/91
11.	Issue revised IHP-14 "ORNL Confined Space Entry Program" to require - retrieval equipment be provided by the line organization with guidance from the Safety Department, - designation of the Industrial Hygiene Section to identify confined spaces and authorize posting of these areas, - only trained personnel are permitted to work in confined spaces, and - line organization responsibility for providing retrieval equipment and verifying that personnel are trained before working in confined spaces.	8/91
12.	Issue guidance to facility managers concerning posting of signs for confined spaces identified during the Confined Space Inventory.	Complete
13.	Issue standard operating procedures for the Confined Space Entry Program which require Industrial Hygiene to periodically verify that retrieval equipment is in place and personnel meet applicable training requirements before work is allowed in confined spaces.	12/91
14.	Assign an Industrial Hygiene staff member to oversee Confined Space Entry program.	Complete

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
4	—						
5	176						176
6	7						7
7	—						
8	—						
9	—						
10	43	*					43
11	—						
12	—						
13	—						
14	78	*					78
Status:							
Funded	304						
Requested							
New							$304

*Estimated annual ongoing cost: $106K starting in FY 1992.

References: DOE Order 5480.10, ANSI Z117.1, and 29 CFR 1910.146

Finding No.: IH.5-4 Respiratory Protection Program

Finding Description: **The ORNL respiratory protection program is not in compliance with DOE 5480.10, ANSI Z88.2, and 29 CFR 1910.134.**

Code: Category III

Compliance Protocol: DOE Order 5480.10, ANSI Z88.2, and 29 CFR 1910.134

Priority: Energy Systems Risk Weight 415
Tiger Team Action Plan Priority 2

Response: This finding was based on several related findings, which said:

- Respirators were stored on shelves stacked on top of each other and in the direct sunlight. Positive control is not exercised in controlling respirators.
- Training as to limitations and proper fit-testing for 3M dust masks was not provided for the worker.
- An employee's half-face, dual-cartridge respirator was stored inside the work area at the Lead Building.
- A worker was observed donning a respirator without doing a positive and negative fit-test prior to use.
- Industrial Hygiene did not verify, through a field inspection program, whether respirators were being used properly.
- Surveillance forms used for field work are not tied back to the supervisor when misuse of respirators is observed.
- Monitoring of work sites by Industrial Hygiene personnel is not being done prior to issuance of respirators.
- Air-purifying respirators are routinely maintained for emergency use in violation of ANSI Z88.2, which prohibits the use of these devices in an unknown atmosphere.
- A biological laboratory worker and supervisor have not been trained in selection, use, maintenance, and limitations of a respirator.
- A worker with a full beard thought a dust mask was adequate for him while he was mixing a carcinogen.

The window in the respirator storage room has been covered to protect the equipment from exposure to direct sunlight. Other problems resulting from inadequate storage space are being addressed by plans for a new industrial hygiene office/storage facility (see Finding PP.1-1, Item 13).

The deficiencies leading to several of these findings are already addressed in Respiratory Protection Program procedures. Since the issuance of the procedures, the Respiratory Protection staff has been conducting field surveillances to ensure that workers in the field are complying with requirements. Field surveillance will be stepped up to ensure adherence to procedures, and, if necessary, the training program will be revised to emphasize problem areas. Other specific corrective actions planned to address these findings are listed below.

Root Causes:

Inadequate training, poorly defined roles and responsibilities, and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Contingent upon funding, hire one additional person for the Respiratory Protection Program staff.	6/92
2. Establish and document a field surveillance schedule and initiate implementation.	5/91
3. Review the respiratory protection training module and, if deemed necessary, revise it to strengthen the guidance concerning the use of proper respirators for particular working conditions.	5/91
4. Revise the respirator field surveillance form to include the supervisor's name, and revise the procedure to require that surveillance reports be disseminated to the supervisors and the division office.	5/91
5. Label emergency cabinets specifying that air-purifying respirators are not to be used in unknown atmospheres.	5/91
6. Implement the new training course for supervisors of workers who use respiratory protection; the training will emphasize job-specific respiratory requirements.	Complete
7. In a letter to upper management, request a policy decision concerning the storage of non-emergency-type respirators in ORNL emergency cabinets.	7/91

Costs:

Type of funds: Overhead
Source of funds: Division Administration

Action item	Estimated costs per fiscal year ($K) 1991	1992	1993	1994	1995	Beyond	Total
1		44	*				44
2	7	*					7
3	—						
4	7	*					7
5	7						7
7	—						—
Status:							
Funded	21						
Requested							
New		44					$65

*Estimated annual ongoing cost: $8K for 1992, $96K starting in 1993.

Type of funds: Overhead
Source of funds: Overhead

Action item	Estimated costs per fiscal year ($K) 1991	1992	1993	1994	1995	Beyond	Total
6	28	*					28
Status:							
Funded	28						
Requested							
New							$28

*Estimated annual ongoing cost: $31K.

References: DOE Order 5480.10
ANSI Standard Z88.2
29 CFR 1910.134

Finding No.: IH.5-5 Sanitation and Potable Water Program

Finding Description: **The ORNL Sanitation and Potable Water Program is not in compliance with DOE 5480.4, DOE 5480.10, ANSI Z4.1-1988, Public Law, Chapter 14, Part I, and the "Tennessee Food Service Establishment Law."**

Code: Category III

Compliance Protocol: DOE Order 5480.4; DOE Order 5480.10; ANSI Z4.1-1988; Public Law, Chapter 14, Part I; and the "Tennessee Food Service Establishment Law"

Priority: Energy Systems Risk Weight 408
Tiger Team Action Plan Priority 2

Response: This finding was based on several related findings, which said:

- Although the ORNL Industrial Hygiene procedures require inspections and surveillance of eating facilities, vending machines, microwaves, ice machines, and refrigerators, inspections have not been done on a regular basis.
- ORNL found unsanitary conditions in three of five vending machines checked.
- There is no formal inside-building, cross-connection control program with oversight by Industrial Hygiene.
- There were no back-flow valves provided on the potable water side of the syphon hose to prevent contamination of the water system.

In the past, the Industrial Hygiene Section has provided limited, informal coverage for most food sanitation and potable water issues. However, on October 8, 1990, a new IH procedure was issued (IHP-16, "ORNL Program for the Implementation of Health Requirements for Sanitation and Potable Water"). The procedure covers inspection, maintenance, and personnel training activities conducted to ensure compliance with health protection requirements and regulatory standards for sanitation and potable water. Formal administration of the program will be improved once a staff member has been hired to oversee this area.

The finding concerning back-flow valves (in a Biology Division facility at the Y-12 Plant) was corrected immediately. The staff member to be assigned responsibility for potable water will be conducting surveillance to correct any similar deficiencies. Specific corrective actions that will address the other findings are listed below.

Root Causes:

Insufficient resources and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Assign an Industrial Hygiene staff member to administer the sanitation and potable water program (i.e., conduct inspections, provide surveillance, etc.).	7/91
2. Issue standard operating procedures for tasks to be performed as part of the sanitation and potable water program. (Cost covered in Finding IH.2-1, Item 4.)	5/92
3. Issue written guidance to the division safety officers and to the Engineering Division concerning control of cross connections inside buildings and the use of back-flow valves or other means to prevent contamination of water systems.	12/91

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	7	*					7
2	—						
3		2					2
Status:							
Funded	7						
Requested		2					
New							$9

*Estimated ongoing annual cost: $22K.

References:
DOE Order 5480.4
DOE Order 5480.10
ANSI Standard Z4.1-1988
Public Law, Chapter 14, Part I
Tennessee Food Service Establishment Law

Finding No.: IH.5-6 Ergonomics Program

Finding Description: **The ORNL Ergonomics Program does not comply with DOE 5480.10.**

Code: Category III

Compliance Protocol: DOE Order 5480.10

Priority: Energy Systems Risk Weight 80
Tiger Team Action Plan Priority 2

Response: Health problems caused by ergonomic situations have always been a concern of the Health Division. Physicians within the Health Division have taken CME (Continuing Medical Education) courses in Ergonomics. Until recently Health Division activities related to ergonomic problems have been handled on a case by case basis. At the present time, the Health Division is involved in the assessment of a specific ergonomically related problem. Expert consultation has been obtained from Dr. Thomas J. Armstrong, Associate Professor, Industrial and Operations Engineering, The University of Michigan.

Root Cause:

Inadequate resources have not permitted the development of a plant-wide proactive program.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Charter a PIP committee to assess the ORNL Ergonomics Program and to make recommendations for improvement to achieve compliance with DOE Order 5480.10.	Complete
2. Assign organizational responsibility for the administration of the Ergonomics Program.	9/91
3. Issue ORNL SPP reflecting the recommendations of the PIP committee and the requirements of DOE Order 5480.10.	12/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	15						15
2	*						
3		15					15
Status:							
Funded							
Requested							
New	15	15					$30

*Estimated annual ongoing cost: $44K.

References: 5480.10, Contractor Industrial Hygiene Program

Finding No.: IH.6-1 Handling, Storage, and Labeling of Chemicals

Finding Description: **Handling, storage, and labeling of chemicals and training of personnel at ORNL did not comply with DOE 5480.10, DOE 5480.4, 29 CFR 1900.1200, 29 CFR 1910.145, and 29 CFR 1910 Subpart Z. (See Concern PP.5-1.)**

Code: Category III

Compliance Protocol: DOE Order 5480.10, DOE Order 5480.4, 29 CFR 1900.1200, 29 CFR 1910.145, and 29 CFR 1910 Subpart Z

Priority: Energy Systems Risk Weight 422
Tiger Team Action Plan Priority 2

Response: This finding was based on several related findings, which said:

- Not all initial baseline medical monitoring was conducted for employees who work with regulated substances.
- A complete chemical list for all areas of ORNL does not exist. Only 1 of 31 divisions had completed inventories of chemicals.
- Containers of hazardous chemicals in the workplace are not properly labeled, tagged, or marked.
- Flammable materials were not in an approved storage location; they were observed in wall cabinets and on countertops. Flammable cabinets contained both flammables and nonflammables. Resource Conservation and Recovery Act (RCRA) hazardous waste was stored in laboratory hoods not designed for flammable storage.
- Drinks were placed on benches next to solvents.
- Many employees do not know how to obtain Material Safety Data Sheets for chemicals in their work areas.

Industrial Hygiene procedure IHP-01, "ORNL Hazard Communication Program," was issued on September 12, 1990. The program described in that IHP includes several levels of HAZCOM training: general awareness training for new employees, job-specific training for those who work with hazardous chemicals, and additional training for supervisors and division HAZCOM coordinators.

Once the HAZCOM program is fully implemented with additional staff, training, and surveillance, many of these concerns (e.g., container labelling, storage of flammable chemicals, eating in certain areas) will be corrected. The specific corrective actions planned to address these findings are listed below.

Root Causes:

Insufficient resources and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Initiate hiring of two additional staff members for the Hazardous Materials Management Program (HMMP).	5/91
2. Compile a chemical inventory for ORNL divisions, which gives specific locations for all hazardous chemicals.	5/91
3. Develop SOPs for HMMP surveillance of areas throughout the Laboratory. (Costs are included in Finding IH.2-1, #4.)	6/92
4. Conduct HMMP surveillance and review surveillance reports to identify any trends of recurring problems, document the results, and, if necessary, revise the HAZCOM training program(s).	2/92
5. Issue an informational bulletin emphasizing the importance of MSDSs and how to access them.	5/91
6. Review operations involving regulated substances to determine if additional workers need to be added to the medical surveillance program, and, if necessary, provide names to the Health Division.	9/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	85	*					85
2	55						55
3	—						
4		66	*				66
5	2						2
6	14						14
Status:							
Funded	156						
Requested							
New		66					$222

*Estimated annual ongoing cost: $176K for Item 1 in 1992 and $264K starting in 1993.

References: DOE Order 5480.10
DOE Order 5480.4
29 CFR 1910.1200
29 CFR 1910.145
29 CFR 1910, Subpart Z

3.3.18 Fire Protection

Finding No.: FP.1-1 Resources of Fire Protection Engineering Section

Finding Description: **The Fire Protection Engineering Section is not provided with adequate resources to carry out its assigned tasks as established by DOE 5480.4, DOE 5480.7, and DOE 6430.1A.**

Code: Category III

Compliance Protocol: DOE Order 5480.4, DOE Order 5480.7, and DOE Order 6430.1A

DOE Order 5480.4 requires the application of the National Fire Codes (NFC) published by the National Fire Protection Association (NFPA) to DOE facilities. DOE Order 5480.7 requires qualified fire protection engineers to review specifications and designs for major construction projects, and to perform scheduled in-depth fire protection engineering surveys and life safety surveys on DOE facilities.

DOE Order 6430.1A contains fire protection requirements for the design and construction of DOE facilities.

Priority: Energy Systems Risk Weight 133
Tiger Team Action Plan Priority 2

Response: The majority of this concern was identified in the ORNL Self-Assessment.

Currently, two fire protection engineers report to the fire department supervisor. The second of the two fire protection engineers was hired in May 1990. This increased staffing by 100 percent in the fire protection engineering group. The impact that the new engineer will have on the groups capability to keep up with design reviews and facility fire protection engineering surveys is not currently apparent. Management approval has been granted to hire an additional fire protection engineer. Evaluation of the current staff's ability to perform the required workload will continue.

Facility operational requirements and experimental requirements are reviewed by Division Safety Officers. Experimental requirements receive additional review by a panel of qualified scientists familiar with the details of the specific experimental arrangements. When requested, fire protection engineering expertise is provided to the review groups.

Fire protection recommendations and findings from surveys and appraisals (Factory Mutual, DOE Technical Safety Appraisal, internal reviews, etc.) are prioritized and tracked by ORNL tracking systems. The fire protection section currently has a

"recommendation tracking" system under development. This PC-based system is called "Evaluation Database System" (EDS) and when complete will provide the mechanism to prioritize, track, and document the status of fire protection recommendations and findings in a centralized management system.

Root Causes:

Insufficient resources and inadequate management commitment

Planned Actions and Schedules:

Item/Description	Completion Date
1. Perform "Needs Assessment" to determine how many Fire Protection Engineers are necessary for conducting assigned tasks.	6/91
2. Develop a Fire Protection Management Plan for securing the necessary resources.	8/91
3. Advise management of the "Needs Assessment" results and the "Fire Protection Management Plan" requirements.	8/91
4. Hire additional personnel and secure other resources as directed by management.	12/92

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	2						
3	—						
4		*					
Status:							
Funded	2						
Requested							
New							$2

*Estimated annual ongoing cost: $60K per fire protection engineer starting in FY 1992.

References: DOE Order 5480.4, DOE Order 5480.7

Finding No.: FP.1-2 Fire Department Resources and Work Load

Finding Description: **The Fire Department's allocated resources to carry out mandatory and good practice fire prevention inspections, fire watches, fire protection system inspection and testing, and fire hydrant flow test, as required by mandatory standards listed in DOE 5480.4, are not commensurate with the required work load.**

Code: Category III

Compliance Protocol: DOE Order 5480.4 requires the National Fire Protection Association codes to be followed. These codes prescribe the inspection, test, and maintenance frequencies of fire protection associated equipment, etc.

Priority: Energy Systems Risk Weight 133
Tiger Team Action Plan Priority 2

Response: This concern was identified in the 1990 ORNL Self-Assessment. Note: One finding leading to this concern indicated that the "Fire Prevention and Protection Policy" published by DOE-ORO does not comply with DOE policy. DOE-ORO will review its policy on Fire Prevention and Protection and make appropriate changes thereto.

ORNL upgraded most bargaining unit personnel from drivers/dispatchers to the fire protection inspector classification to allow more flexibility in the assignment of resources. Monthly inspectors of buildings and visual monthly inspections of extinguishers, fire doors, valves, and sprinkler systems, etc. are now being conducted as required.

Only inspection and testing schedules for fixed fire protection systems and fire alarm systems are not being met. Recently increased code requirements, along with continuing lab growth, caused schedule slippage.

Root Causes:

Insufficient resources, inadequate management commitment, and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. See action plan for Finding FP.1-1.	
2. DOE-ORO review policy, and make appropriate changes.	10/91

Costs: See Finding FP.1-1.

References: DOE Order 5480.4

Finding No.: FP.1-3 Fire Protection of ORNL Facilities at the Y-12 Plant

Finding Description: **ORNL Fire Protection management does not maintain continuous surveillance over ORNL projects or facilities located at the Y-12 Plant as required by DOE 5480.7.**

Code: Category III

Compliance Protocol: DOE Order 5480.7 requires under section 10.a ". . . that strong, tangible evidence be available attesting to existence of continuing sincere interest by management and employees in minimizing losses from fire and related perils." Further, section 10.f.3 relegates this responsibilities to the appraising office.

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: A review of the findings regarding this concern reveals factual information which includes: (1) a documented, Memorandum of Understanding signed by both site managers is in place which clearly identifies the Y-12 site fire protection engineering and response groups as having responsibility for ORNL facilities at Y-12; (2) the ORNL and Y-12 fire protection managers confer on a regular informal basis, and (3) the Y-12 Fire Protection Engineering Section is staffed by qualified fire protection engineers. Additionally,

- Martin Marietta Energy Systems is the operating contractor for both sites. This is a single contract. This is consistent with the manner in which other ES&H issues are handled at Y-12.
- Both site managers serve as vice presidents in Energy Systems.
- Facility managers at the Y-12 site report to ORNL upper management.
- Facility managers routinely work with the Y-12 site fire protection organization and understand relationships. Any significant identified problems, concerns, etc. are communicated from Y-12 site facility managers through line management at the ORNL site.

A Fire Protection Engineering appraisal performed in April 1990 for the Advanced Toroidal Facility (Building 9201-2) by a registered Fire Protection Engineer, indicates that the existing level of protection is satisfactory to meet the requirements of DOE Order 5480.7. No additional protection is planned.

The fire protection engineering (FPE) appraisal of Bldg. 9201-2 was corrected during the factual review process. In August 1990 facility managers and Y-12 FPE conducted meetings and addressed each issue. Organizations were identified that had responsibility, and all issued were assigned. Minor issues were resolved and completed (~30%); some major issues were already included in line item projects; and others were assigned to programs for funding request.

The PCB-contaminated oils in Bldg. 9204-3, Isotopes Enrichment Facility, were identified in the ORNL Self-Assessment. A management plan to address the issue is in place, and a fire protection engineering appraisal of the facility was conducted in November 1990 by an outside consultant. The appraisal addressed a "Credible Fire Loss" (CFL) and a "Maximum Possible Loss" (MPL), as required by DOE Order 5480.7, which involved oil fires. The CFL addressed a fire with the sprinkler system operational. The MPL scenario excluded automatic and manual control.

Root Cause:

Poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Notify ORNL facility managers at Y-12 and Y-12 Fire Protection Engineering of the specific findings for this concern (Finding FP.1-3) by letter from ORNL management. The purpose of this letter is to refer the findings to the responsible personnel for resolution.	Complete

Costs: No significant costs are associated with this action.

References: DOE Order 5480.7

Finding No.: FP.1-4 Fire Protection Policies Regarding Improved Risk

Finding Description: **The Fire Protection Engineering Section has not developed or implemented comprehensive fire protection policies as mandated by "improved risk" criteria established in DOE 5480.7.**

Code: Category III

Compliance Protocol: DOE Order 5480.7 requires a comprehensive fire protection program to be in place sufficient to attain DOE objectives. Requirements include minimizing potential for the occurrence of a fire, establishing the minimum requirements that will provide an acceptable degree of life safety to DOE and contractor personnel, and establishing minimum requirements for the protection of the public from fire in DOE facilities.

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: This item was identified in the ORNL Protective Services 1990 Self-Assessment. Energy Systems has a written policy procedures manual (8/8/88, number ESH-21) which states that an effective fire protection program shall be in place. This policy procedure flows down to ORNL Standard Practice Procedures (6/6/90, number X-GP-4). Requirements in SOP X-GP-4 include: (1) prohibiting combustible wallboard and combustible acoustical tile or similar materials in the ORNL building program, (2) not allowing rubbish and waste to accumulate in or around buildings, (3) waste and rubbish to be removed from buildings before closing, and (4) inspections that include housekeeping, construction/building materials, smoking and open fires, handling and storage of flammable and combustible liquids and electrical hazards.

Occasionally it is necessary to draw attention to a specific fire protection issue. This is accomplished by publishing an "ORNL Safety Bulletin" which is distributed to the ORNL population. When applicable, specific standards, codes, orders, and laws which govern the specific issue are referenced in the safety bulletin.

Fire protection issues which affect new construction projects and renovations are governed by written DOE orders such as 6430.1A (General Design Criteria) and national consensus standards such as the National Fire Codes and applicable building codes. Standard Operating Procedures are in place which require Engineering and Plant and Equipment Divisions to submit construction specifications and design drawings to fire protection engineering for review.

Comprehensive fire protection policies are in place at ORNL, however, the policies, procedures, and other written requirements are not collectively bound in a single dedicated manual.

Root Cause:

Ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Review and revise ORNL Standard Practice Procedure X-GP-4 for adequate coverage of fire protection issues.	7/91
2. Request the review and revision of Martin Marietta Energy Systems, Inc., Policy Procedure ESH-21 for adequate coverage of fire protection issues.	8/91
3. Request the review and revision of the ORNL Operational Safety Organization's SOP X-60-4 for adequate coverage of fire protection issues.	8/91
4. Request funds for improving fire protection policies as indicated by the review results.	1/92

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	7						7
2	—						
3	—						
4	—						
Status:							
Funded	7						
Requested							
New							$7

References: DOE Order 5480.7

Finding No.: FP.1-5 Facility Reoccupancy Policy

Finding Description: **ORNL does not have a policy that ensures that reoccupancy of excess or surplus facilities is in compliance with DOE 5480.7, DOE 6430.1A, and other applicable Orders and mandatory National Fire Protection Association standards.**

Code: Category III

Compliance Protocol: DOE Order 5480.7 requires minimization for occurrence of fire and maintenance of an acceptable degree of life safety. DOE Order 6430.1A, dated 4/6/89 applies to facilities modified after issuance (Section 0101-1).

Priority: Energy Systems Risk Weight 105
Tiger Team Action Plan Priority 2

Response: ORNL Fire Department Standard Operating Procedure, FP B-17, Plan Review requires both General Engineering and the Plant and Equipment Division (field engineering) to involve Fire Protection Engineering ". . . in the review process very early in the planning stage of all planned buildings, modifications and major processes." FP B-17 is approved (signed) by both General and Field Engineering. The reoccupancy of excess or surplus facilities usually requires significant modifications or renovations. These modifications are reviewed in accordance with FP B-17 for compliance with DOE orders. FP B-17 is serving as an interim reoccupancy policy (fire protection) until a formal ORNL policy is issued.

ORNL does not have a separate policy that addressed reoccupancy of older facilities. Plans are in place for older reactor facilities such as the Graphite Reactor, Building 3001, but do not address action to be taken in the "near term" of one year or less. It should be noted that the Graphite Reactor is of "metal or exposed steel beam" construction and that some interior walls, etc. are of combustible construction installed mostly in the 1940's when the reactor was built. Preliminary decommissioning plans were developed under ORO guidance.

An additional exit has been provided for the basement office module in Building 7503. The additional exit has been provided to meet the intent of the Life Safety Code.

Root Cause:

Inadequate policy

Planned Actions and Schedules:

Item/Description	Completion Date
1. ORNL Standard Practice Procedure X-GP-4 will be reviewed and revised to include a requirement that fire protection engineering must review the reoccupancy of excess or surplus facilities. (See Action Item 1 in FP.1-4 for costs.)	7/91
2. Issue a policy/program for the review of occupancy changes in ORNL facilities by Fire Protection Engineering.	12/91

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	7						7
Status:							
Funded	7						7
Requested							
New							$7

References: DOE Orders 5480.7 and 6430.1A

Finding No.: FP.1-6 Management's Role in Fire Protection

Finding Description: **Upper ORNL management has not shown a continuing sincere interest in resolving significant fire protection issues as required by DOE 5480.7 and has failed to provide a working communication system to remain informed on such matters.**

Code: Category III

Compliance Protocol: DOE Order 5480.7 requires under section 10.a ". . . that strong, tangible evidence be available attesting to existence of continuing sincere interest by management and employees in minimizing losses from fire and related perils." Further, section 10.f.3 relegates this responsibilities to the appraising office.

Priority: Energy Systems Risk Weight 9
Tiger Team Action Plan Priority 3

Response: Many past actions have demonstrated management's commitment to significant fire protection issues. The following are examples of past actions:

- In 1987, multiple Factory Mutual recommendations were resolved by $365K GPP funds.
- In 1988, GPP funding of ~$200K for fire water line extensions and improvements was provided. An additional $200K was provided for a live fire, on-site training tower.
- Also in 1987 and 1988 substantial funds, $200K+ was provided for the 1990, $3.3 million fire protection upgrade line item CDR development. The line item was supported and approved.

In 1989

- $175K of GPE funds were used to replace an aging fire pumper with an 1989 model.
- A pilot, 12-hour rotating shift arrangement was supported and all hourly bargaining unit fire department personnel were upgraded to single classification. These actions were noteworthy and provided flexibility for more work while improving morale.
- A full-time fire training officer slot was authorized and filled.

- A management initiative on OSHA compliance resulted in 54 people being relocated, facilities improved from a life safety perspective, and new facilities provided; all at substantial cost and effort in support of a fire protection engineering recommendation.

- An additional fire protection engineering position was approved and filled in 1990. Approval has been granted to hire one more fire protection engineer in 1991.

The correction for the unresolved 1973 fire protection issue is included in a 1991 Line Item Project entitled "Fire Protection Upgrade - ORNL." Plans to correct all unresolved fire protection issues will continue to be developed.

The items in Finding #3 in the Tiger Team report for Concern FP.1-6 are addressed in other ORNL corrective action plans.

There have been some findings by the Tiger Team which seem to reflect a lack of management interest. A system will be initiated to assist in keeping management informed.

Root Causes:

Inadequate management commitment, inadequate communications, and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Re-evaluate reporting levels to ensure that fire protection engineering reports to an adequate management level.	6/91
2. Issue a procedure to require major fire protection issues to be entered into an ES&H tracking system. Upper management will routinely review items on this tracking system.	3/92
3. Hire an additional fire protection engineer.	10/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2		7					7
3		*					
Status:							
Funded							
Requested		7					
New							$7

*Estimated annual ongoing cost $60K starting in FY 1992.

References: DOE Order 5480.7

Finding No.: FP.2-1 Egress from Bldg. 4500N, Machinery Space

Finding Description: **Adequate means of egress are not provided from the attic and machinery space of Wing No. 4, Bldg. 4500N, as required by the Life Safety Code of the National Fire Protection Association Code No. 101.**

Code: Category II

Compliance Protocol: NFPA 101 Life Safety Code requires occupants to have a clearly defined unobstructed means of egress and that machinery spaces are separated from occupied areas.

Priority: Energy Systems Risk Weight 458
Tiger Team Action Plan Priority 2

Response: Significant work has been conducted to provide occupants a clear, unobstructed means of egress path that is separated from machinery areas. Work accomplished to date includes: relocation of people, removal/relocation of machinery, overhead ducts, pipes, etc. were raised to provide 6 feet 8 inches head clearance, physical arrangement of work areas have been altered, and training sessions on egress and changes have been conducted.

Work currently in progress and nearing completion for one protected means of egress include: one-hour rated partitions are being installed, rated fire doors are being installed.

Work currently in progress for a second protected means of egress includes: relocation of equipment, interferences, etc., in preparation for installation of rated fire barriers to provide a second protected means of egress.

Work is in progress and shall be continued until completed. Funding has been committed.

This area is also protected by an automatic sprinkler system. Employee alerting signals (evacuation alarms which are both manually and automatically initiated), emergency lighting, and approved exit signs are in place.

Root Cause:

Ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Install fire-rated partitions and doors to the northeast stairwell in Wing no. 4, Bldg. 4500N.	Complete
2. Install fire-rated partition and door to the east center stairwell in Wing no. 4, Bldg. 4500N.	Complete
3. Install fire-rated partitions and doors, seal penetrations, and complete one-hour rated enclosure to the south exit of Wing no. 4, Bldg. 4500N.	Complete

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
All	120						120
Status:							
Funded	120						
Requested							
New							
							$120

References: DOE Order 5480.4; NFPA 101

Finding No.: FP.2-2 Egress from Bldg. 4500N, Office Space

Finding Description: ORNL has not provided a second protected means of egress from all of the office space use areas, Wings 1, 2, & 3, of the attics of Bldg. 4500N.

Code: Category II

Compliance Protocol: NFPA 101, Life Safety Code requires adequate means of egress to ensure safety of occupants from fire related causes.

Priority: Energy Systems Risk Weight 458
Tiger Team Action Plan Priority 2

Response: ORNL does not agree with the Category II level, hazard level, and compliance level assigned to this issue.

This finding had previously been identified and due to the concern of management about the safety of people in the attic spaces, many were relocated, fire-rated partitions were added, training was conducted, 80 percent of combustible fuel loading was removed, and new portable office structures purchased. The concern was identified by an internal self-assessment of OSHA compliance which was initiated by ORNL management.

Plans were in place and work orders written to complete the separation of corridors from equipment areas, e.g., fire doors ordered and openings sealed. The plans were accelerated, given high priority, and completed with the exception of minor technical noncompliance clearance items by November 1990. The space has been reviewed by the Fire Protection group using NFPA 101 and determined to be in compliance with the standard. We are confident that occupants are not unduly threatened by a fire event and that safe means of egress has been provided.

This area is also protected by an automatic sprinkler system, employee alerting signals (evacuation alarms which are both manually and automatically initiated), emergency lighting, and approved exit signs are in place.

Root Cause:

Ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
Completed before TSA began:	
1. Relocate people out of attic in Wing 1, 2, and 3 of the attic in Bldg. 4500N.	Complete
2. Add fire-rated partitions where needed in the attic of Bldg. 4500N.	Complete
3. Train occupants to ensure understanding of means-of-egress modifications.	Complete
4. Reduce combustible fuel loading by 80% in the attic to Bldg. 4500N.	Complete
5. Purchase portable office structures to house evacuees from the attic in Bldg. 4500N.	Complete
6. Install fire doors and seal penetrations. Completed after TSA began.	Complete

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)							
Action item	1990	1991	1992	1993	1994	1995	Beyond	Total
1		—						
2		—						
3		—						
4		—						
5	590	—						590
6		17						17
Status:								
Funded	590	17						
Requested								
New								
								$607

References: DOE Order 5480.4; NFPA 101

Finding No.: FP.2-3 Life Safety Code Surveys

Finding Description: **ORNL does not do surveys of all facilities to ensure compliance with requirements of National Fire Protection Association Life Safety Code, NFPA No. 101.**

Code: Category III

Compliance Protocol: DOE Order 5480.7 requires regularly scheduled fire protection engineering surveys for DOE facilities. In addition to other items, these surveys address life safety issues.

Priority: Energy Systems Risk Weight 133
Tiger Team Action Plan Priority 2

Response: This concern was identified in the ORNL Protective Services Department Self-Assessment.

Dedicated life safety surveys were performed at Building 3001, 4500N, and all ORNL Reactor buildings by independent fire protection consulting firms. These surveys were conducted as the result of specific life safety concerns at these facilities. Life safety surveys for other ORNL building are included as part of the internal fire protection engineering survey program.

An inspection criteria has been developed so an independent consulting firm can conduct Life Safety surveys on ORNL facilities. This inspection criteria requires the evaluation of facilities against NFPA-101 and 29 CFR 1910, Subpart E requirements. These surveys are budgeted for FY 1991.

Common path of travel limitations are exceeded in one location in Building 3525. The facility manager is aware of the problem and is investigating methods for providing alternative exits. An additional exit has been provided for basement offices in Building 7503.

Monthly building fire prevention inspections cover only significant life safety issues and are not designed or intended to qualify as an in-depth life safety survey.

DOE Order 5480.4, DOE Order 6430.1A, and ORNL Standard Practice Procedure X-GP-4 identify NFPA standards as mandatory and applicable.

Root Causes:

Insufficient resources, inadequate policy, and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Conduct life safety inspections on 39 high-priority ORNL facilities in accordance with existing inspection criteria documentation.	6/92
2. Request adequate resources to perform fire protection engineering surveys, which include life safety evaluations. (See Action Items 1, 2, 3 and 4 in Finding FP.1-1.)	8/91
3. Issue revised procedures to address Life Safety Code compliance issues.	6/92

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	240						240
2	—						
3	—						
Status:							
Funded	240						
Requested							
New							$240

References: DOE Order 5480.4; DOE Order 5480.7

Finding No.: FP.2-4 Action Plans Regarding Life Safety Code Surveys

Finding Description: **ORNL has not developed an action plan to resolve and close out, within a reasonable period, the life safety issues which were identified in Bldg. 3001, 4500N, and 7900 as a result of Life Safety Code surveys.**

Code: Category III

Compliance Protocol: DOE Order 5480.4 requires the application of the National Fire Protection Association Life Safety Code (NFPA-101) to buildings at DOE sites.

Priority: Energy Systems Risk Weight 56
Tiger Team Action Plan Priority 3

Response: Most life safety improvements have been completed in Building 3001 such as: (1) the evacuation of occupants above the second floor, (2) installation of illuminated exit signs and emergency lighting, (3) securing certain areas of the building to prevent confusion during evacuations and, (4) marking of aisles and routes to building exits. A local occupant notification system (evacuation horns) has been identified as necessary but is yet to be installed.

Most life safety improvements have been completed in the wing attic spaces of Building 4500N. These improvements include: (1) the evacuation of approximately 56 percent of attic occupants, (2) the installation of one-hour fire-rated partitions and corridor walls to provide a protected means of egress for occupants, (3) improvements to emergency lighting, (4) replacement of non-rated doors in separation walls with fire-rated doors, (5) improvements to illuminated exit sign arrangements, and (6) modifications to eliminate low head clearances such as low HVAC ducts and sprinkler system piping. A fire protection line item is funded for this facility which will significantly improve automatic sprinkler protection.

Recommendations from the Life Safety Code Survey for Building 7900 have been prioritized and entered into the Critical Actions and Requirements Tracking System (CARTS) maintained by the Research Reactors Division. The majority of life safety recommendations for this facility are complete. The conversion of the existing pre-action sprinkler system to a wet-pipe system is planned.

Root Causes:

Inadequate policy implementation and inadequate management commitment

Planned Actions and Schedules:

Item/Description	Completion Date
1. Develop an action plan to resolve and close out life safety issues which were identified in Life Safety Code surveys of Buildings 3001, 4500N, and 7900.	6/91

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	5						5
Status:							
Funded							
Requested							
New	5		-				$5

References: DOE Order 5480.4

Finding No.: FP.3-1 ORNL Testing of Fire Equipment

Finding Description: **ORNL has not tested, in accordance with recognized practices, the detection and suppression systems protecting cells and cubicles of Bldg. 7920 to ensure that the devices will function as intended in the event of fire.**

Code: Category II

Compliance Protocol: DOE Order 5480.4 requires NFPA standards be utilized for testing fire protection systems.

Priority: Energy Systems Risk Weight 59
Tiger Team Action Plan Priority 2

Response: This action plan addresses the need to test the fire protection system present in the cubicles and cell tank pits of REDC Bldg. 7920.

Root Cause:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Initiate routine periodic visual examination of hot cell cubicles, compensatory to verification of function of fire detection and suppression systems in cubicles and cell tank pits.	Complete and continuing
2. Test fire detection systems in each cubicle and hot cell tank pit. This action involves opening the hot cells and exposing workers to radiation fields. The work will be performed under an ALARA program, but additional worker exposure is unavoidable.	Complete
3. Issue an operating procedure requiring evaluation of fire protection adequacy as a result of combustible materials which would be introduced into the cubicles or cell tank pits because of use of new unreviewed processes.	Complete
4. Issue an operating procedure for periodic testing of fire detector and suppression system.	6/91
5. Request funds from ER and DP for budgets for Item 6.	Complete

6. Install remotely testable heat-activated devices (HADs) in cubicles and cells, contingent on increased budgets. 9/93

7. Complete necessary piping modifications so full flow testing of cell and cubicle suppression systems can be conducted. 7/91

Costs:

Type of funds: Research Programmatic
Source of funds: ER

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	93						93
3	—						
4	—						
5		140	210				350
6	—						
7	45						45
Status:							
Funded	138						
Requested		140	210				
New							$488

Type of funds: Research Programmatic
Source of funds: DP-GE

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	22						22
3	—						
4	—						
5		60	90				150
6	—						
7	—						
Status:							
Funded	22						
Requested		60	90				
New							$172

References: DOE Order 5480.4, Environmental Protection, Safety and Health Protection Standards, February 26, 1985

Finding No.: FP.3-2 Adequate Documentation of Fire Study

Finding Description: **Documentation provided by ORNL and DOE Headquarters does not support the conclusions that a fire originating in the cells or cubicles of Bldg. 7920 at ORNL would not result in the loss of high-efficiency particulate air filters and an unacceptable radiological release.**

Code: Category II

Compliance Protocol: DOE Order 5480.7 requires that no unwanted releases to the public occur and that an improved risk level of fire protection be maintained.

Priority: Energy Systems Risk Weight 80
Tiger Team Action Plan Priority 2

Response: Previous analyses requested by DOE (Refs. 1-2) and accepted by DOE/ORO indicated that a fire originating in the cells or cubicles of Bldg. 7920 at the ORNL would not result in the loss of high-efficiency particulate air filters. The reviewer felt that this analysis was potentially nonconservative. Particular emphasis was placed by the reviewer on understanding the impact of a fire in the vessel off-gas (VOG) fiberglass reinforced epoxy duct work. An evaluation of the magnitude of radiological release to the environment in the event of a filter failure has not been made. This action plan addresses the need to document an independent expert analysis of the impact of a fire in the vessel off-gas (VOG) ducts of REDC Bldg. 7920.

Root Causes:

Ambiguous requirements or expectations and inadequate communications

Planned Actions and Schedules:

Item/Description	Completion Date
1. Review credible accident scenarios in VOG duct work in Bldg. 7920 cells using independent ventilation and fire protection experts.	Complete
2. Estimate maximum credible radionuclide release assuming filter failure.	Complete
3. Submit to DOE/ORO Fire Protection and DOE/HQ-EH fire scenario(s) and fire modeling methods and maximum release assumptions for concurrence.	9/91

4. Complete fire impact analysis and radiological release impact analysis. 3/92

Costs:

Type of funds: Research programmatic
Source of funds: DP-GE

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	—						
4	45						45
Status:							
Funded							
Requested	45						
New							$45

Type of funds: Research programmatic
Source of funds: ER

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	—						
4	105						105
Status:							
Funded							
Requested	105						
New							$105

References: Letter from K. W. Sommerfeld to J. A. Lenhard, "ORNL Fire Protection Appraisal Recommendation 8301, Positive Ventilation Systems," January 20, 1984

Norman J. Alveres, "Analysis of Fire and Smoke Threat to Off-Gas HEPA Filters in a Transuranium Processing Plant," Lawrence Livermore National Laboratory, unpublished, (March 1988)

Finding No.: FP.3-3 Design Basis Fires Review Program

Finding Description: **ORNL does not have a review program to ensure that design basis fires within nuclear facilities site-wide will not result in an unacceptable release of radioactivity to the environment, as required by DOE 5480.7.**

Code: Category III

Compliance Protocol: DOE Order 5480.7 establishes the objective of having no threats to the public health and welfare.

Priority: Energy Systems Risk Weight 58
Tiger Team Action Plan Priority 2

Response: This concern was identified in the ORNL Protective Services Department Self-Assessment.

The Safety Analysis Report (SAR) for Building 7920 is currently under revision. Fires in cubicles or cells will receive in-depth analysis and the report revised as necessary to reflect conclusions. A major effort is currently active to perform maintenance and testing on the fire protection system for cells and cubicles. Once complete, a detailed operating and testing procedure will be developed for these fire protection systems.

ORNL does not have an on-going hazards analysis program. An on-going fire protection engineering survey program is in place, but surveys are currently behind schedule. Consideration is being given to expanding the engineering survey program so that it qualifies as a fire hazards analysis program.

Fire Protection Engineering does not currently review SARs, when requested, Fire Protection Engineering provides technical expertise to SAR efforts.

Root Causes:

Insufficient resources and inadequate policy

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request the ORNL Operational Safety Organization to review and revise procedures to require Fire Protection Engineering review of Safety Analysis Reports (see Action Item #3 in FP.1-4).	8/91

2. Expand the Fire Protection Engineering Survey Program to qualify as a Fire Hazards Analysis Program as necessary to comply with DOE Order 5480.7. 12/92

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	7						7
2	—						
Status:							
Funded	7						
Requested							
New							$7

References: DOE Order 5480.7

Finding No.: FP.4-1 Adequacy of Fire Protection

Finding Description: **ORNL has not provided in all facilities the level of fire protection which is designed to ensure that fire will not result in unacceptable programmatic impacts as required by DOE 5480.7.**

Code: Category III

Compliance Protocol: DOE Order 5480.7 requires that a maximum credible fire not result in the interruption of a vital program for a period longer than that specified by the Program Senior Official.

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: This concern was identified in the ORNL Protective Services Department Self-Assessment.

A Fire Protection Engineering appraisal performed in April 1990 for the Advanced Toroidal Facility (Building 9201-2) by a registered Fire Protection Engineer, indicates that the existing level of protection is satisfactory to meet the requirements of DOE Order 5480.7. No additional protection is planned.

A Fire Protection Engineering appraisal performed in November 1988 by a fire protection engineering consultant indicates that the level of fire protection in Building 9210 is satisfactory to meet the requirements of DOE Order 5480.7. The building is completely protected with automatic sprinklers and smoke detectors are located in the building air handling systems. No additional protection is planned.

The Cyclotron Room (C-109) in Building 6000 is not provided with automatic fire detection or suppression. Protection for this area will be evaluated and a project initiated to provide necessary protection once the evaluation is complete.

See also Findings FP.1-1 and FP. 1-3.

Root Causes:

Insufficient resources, inadequate policy, and inadequate management commitment

Planned Actions and Schedules:

Item/Description	Completion Date
1. Evaluate and implement fire detection and protection methods for the cyclotron area in Building 6000. Request funding to provide protection as determined by the evaluation.	1/92
2. Issue revised ORNL Standard Practice Procedure X-GP-4 to include guidance on (1) the performance of fire protection engineering surveys as required by DOE Order 5480.7, (2) identifying facilities requiring fire protection upgrades, and (3) the tracking of necessary fire protection upgrades by ORNL management. (See Action Item #1 in FP.1-4.)	7/91

Costs:

Type of funds: Research programmatic

Source of funds: ER-KC

	Estimated costs per fiscal year ($K)[a]						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—	100	400				500
2	—						
Status:							
Funded							
Requested							
New		100	400				$500

[a]Design and installation of protection as determined by the evaluation in Action Item 1, could cost $500K.

References: DOE Order 5480.7

Finding No.: FP.5-1 Fire Protection Systems in Bldg. 4500N

Finding Description: **Some facilities at ORNL are not provided with fire protection systems as required by DOE 5480.7.**

Code: Category III

Compliance Protocol: DOE Order 5480.7 requires the installation of adequate fire protection features to prevent a maximum credible fire from resulting in an unacceptable property loss.

Priority: Energy Systems Risk Weight 60
Tiger Team Action Plan Priority 2

Response: This concern was identified in the ORNL Self-Assessment.

A $3.3 million Line Item (Fire Protection Upgrade - ORNL) is in the design stages and will provide automatic sprinkler protection for most of the unsprinklered areas of Building 4500N. Due to asbestos contamination, the current project is not funded to protect office areas and corridors on the first floor of Wings 1-4 and along the path of ductwork which has a combustible wrapping. ORNL Fire Protection Engineering will provide oversight for this Line Item Project through completion.

Building 4500N is divided into seven separate fire areas by 3-hour fire-rated walls. Openings through these walls are protected by automatic closing fire doors. The above-mentioned $3.3 million Line Item will install smoke detection in the buildings air handling ducts. No fire doors have been removed in the building.

The majority of doors to wings and stairwells in Building 4500N that were previously held open by heat-activated door releases, are now kept closed. A program will be initiated to install smoke-activated door closers on these fire doors.

Root Causes:

Insufficient resources, inadequate policy, and inadequate management commitment

Planned Actions and Schedules:

Item/Description	Completion Date
1. Provide sprinkler systems in unprotected areas of 4500N Main and Wing 5. Also upgrade water supply to Building 6000.	9/93

2. Install smoke detector actuated door closers on second floor fire doors which separate the wings and stairwells from the other parts of Building 4500N. — 12/91

3. Perform "needs assessment" and develop fire-protection management plan. (See Action Item 1 in Finding FP.1-1.) — 8/91

4. Revise SPP X-GP-4. (See Action Item 1 in Finding FP.1-4.) — 7/91

5. Abate asbestos in Wing 1-4 of Building 4500N and to install automatic sprinklers once asbestos contamination is controlled. — 9/96

Costs:

Type of funds: Line-Item
Source of funds: MGPF

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	850	1660	300				2810
2	10						10
5		190			1800		1990
Status:							
Funded	850						
Requested		1660	300				
New	10	190			1800		$4810

References: DOE Order 5480.7

Finding No.: FP.6-1 Physical Fitness Program for Fire Fighters

Finding Description: **ORNL has not implemented a physical fitness program for fire fighters as required by NFPA 1500.**

Code: Category III

Compliance Protocol: NFPA 1500

An NFPA 1500 draft implementation and interpretation plan was issued by DOE-HQ.

Priority: Energy Systems Risk Weight 63
Tiger Team Action Plan Priority 2

Response: ORNL has not received direction from DOE which required a physical fitness program be implemented. ORNL received information in 1988 that direction was forthcoming from the Director of DOE medical programs (Neal Goldenberg, EH-321 to David Howard ORO).

The ORNL on-site Health Division currently determines fitness for assigned tasks.

Action is pending contingent on the development of DOE-wide guidance and implementation instructions.

Root Cause:

Ambiguous requirements or expectations

Planned Actions and Schedules:

None

Costs: Indeterminable until instruction is received.

Finding No.: FP.6-2 Fire Department Staffing Level

Finding Description: **The staffing level of the ORNL Fire Department is not commensurate with the fire risk.**

Code: Category III

Compliance Protocol: NFPA 1500, DOE Order 5480.4

Priority: Energy Systems Risk Weight 83
Tiger Team Action Plan Priority 3

Response: The present minimum response to fire incidents is eight personnel (four fully trained fire fighters including one fire officer, three firemen, and four emergency squad members). All are fully trained in the functions they are expected to perform. As funding permits, response forces will be increased to provide five fully trained fire fighters for structural fire fighting and to meet the testing and maintenance requirements in Finding FP.1-2.

Root Causes:

Ambiguous requirements or expectations and insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Perform a systematic "Needs Assessment" to determine necessary resources for conducting assigned tasks.	Complete
2. Utilize the results of the "Needs Assessment" to issue a fire protection management plan for securing the necessary resources.	Complete
3. Request funding for additional personnel and other necessary resources as justified by the "Needs Assessment." (See Finding FP.1-2.)	8/91
4. Additional full-time fire fighters will be added as funding permits to meet staffing needs in the Fire Department for inspection, testing, and maintenance and to provide five fully trained fire fighters on each shift.	12/92

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
4		*					
Status:							
Funded							
Requested							
New		*					*

*Estimated annual ongoing cost $250K per year. $50K per year for each of the five people required.

References: NFPA 1500 - DOE Implementation Plan

Finding No.: FP.6-3 Prefire Plans for ORNL Facilities

Finding Description: **Prefire plans for ORNL facilities located at the X-10 Site and Y-12 Plant are not developed in accordance with nationally recognized good practice.**

Code: Category III

Compliance Protocol: DOE Order 5480.7 requires plans, procedures, and devices adequate to control credible fires.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: The ORNL Fire Department maintains up-to-date prefire plans for all major buildings at the X-10 site. The Fire Department rotating shift fire officers are responsible for updating the prefire plans. Basic response information is included in the plans. Preplans are updated every 3 years or sooner if the building is modified.

No recognized standard for prefire plans exists. The International Fire Service Training Association (IFSTA) publishes guidelines concerning prefire plans.

The Y-12 site does not currently have updated prefire plans but have action plans in place to update all prefire plans.

Prefire plans are maintained (X-10 site).

As prefire plans come up for review, appropriate IFSTA ideas shall be incorporated into prefire plans (X-10 site).

Root Causes:

Ambiguous requirements or expectations and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue updated prefire plans for Y-12 with full involvement by the uniformed response forces at the Y-12 site.	11/91
2. Issue a Fire Department procedure that establishes a prefire schedule and requires revisions in accordance with recognized good practice.	Complete

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	225						225
2	1						1
Status:							
Funded	1						
Requested							
New	225						$226

References: DOE Order 5480.7

Finding No.: FP.7-1 Fire Protection of Main Computer Centers

Finding Description: **Fire protection in the main computer centers located within Bldg. 4500N is not in compliance with DOE/EP-0108.**

Code: Category III

Compliance Protocol: DOE/EP-0108 contains specific fire protection requirements applicable to essential DOE electronic computer data processing equipment.

Priority: Energy Systems Risk Weight 58
Tiger Team Action Plan Priority 2

Response: This concern was partially identified in the ORNL Protective Services Department Self-Assessment.

The non-indicating type control valve which provides sectional control for the under-floor automatic sprinkler system in Room T-5 at Building 4500S will be replaced with an indicating (OS&Y) type. The existing valve is however chained and locked in the open position an indicating type valve can be glanced at to determine if it is shut or open without further investigation (DOE/EP 0108, Para. 402-1a).

The sliding fire door between Rooms 258 and 270 in the Central Computer Center at Building 4500N will be modified to close when smoke is detected in the area. The doors currently close when fusible links are exposed to heat and melt (DOE/EP 0108, Para. 204-11).

The side-hinged fire door between Rooms 270 and 294 in the 4500N Central Computer Center is a substantially constructed metal door but is not an approved fire door. The existing door will be replaced with an approved fire door (DOE/EP 0108, Para. 204-11).

Plant and Equipment Division has completed an inspection of firewalls in the main computer centers once results are received, a program will be initiated to seal all unsealed penetrations to restore the fire resistive integrity of the walls.

Existing waste containers will be replaced with Underwriters Laboratories (UL) listed waste containers in the main tape storage room (Building 4500N). These containers must be emptied at the end of each shift or at least once each day (DOE/EP 0108, Para. 205-6).

The "Emergency and Disaster Plan for Computing and Telecommunications Division Computer Operations" will be expanded to include the names of specific qualified contractors who are readily available to conduct computer equipment and information storage system salvage operations. Instructions for contacting each contractor will also be included.

Root Causes:

Inadequate policy implementation and insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Replace the non-indicating valve controlling water to under-floor sprinklers in Room T-5 in Building 4500S with an indicating type valve (OS&Y).	Complete
2. Install magnetic hold-open devices, which will release the sliding fire door between Rooms 258 and 270 in the 4500N Central Computer Center when area smoke detectors actuate.	8/91
3. Replace the side-hinged door between Rooms 270 and 294 in the 4500N Central Computer Center with an approved fire door.	8/91
4. Replace standard waste containers in the computer tape storage room with a single, limited-capacity, UL-listed waste receptacle.	Complete
5. Issue a revised "Emergency and Disaster Plan for Computing and Telecommunications Division Computer Operations" to include the names of specific qualified contractors who can conduct computer equipment and information storage system salvage operations.	6/91

Costs: Item 1 labor and material costs are estimated at $1K. Item 2 labor and material costs are estimated at $4K. Item 3 labor and material costs are estimated at $2K. Item 4 material cost is estimated at $1K. Item 5 revision cost is estimated at $2K.

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
All	10						10
Status:							
Funded	1						
Requested							
New	9						$10

References: DOE/EP 0108

Finding No.: FP.7-2 Fire Hazard Analysis and Facility Protection Survey

Finding Description: **ORNL does not have a fire hazard analysis or facility fire protection survey program which complies with DOE 5480.7 par. 10.b (2).**

Code: Category III

Compliance Protocol: DOE Order 5480.7 par. 10.b (2) requires regular self-inspections, tests, fire loss potential reviews and appraisals to identify the nature, location, and severity of fire risks (injuries, dollar loss, programmatic interruption, release of toxic and radioactive materials) as well as to determine adequacy of fire loss control devices and activities.

Priority: Energy Systems Risk Weight 133
Tiger Team Action Plan Priority 2

Response: This concern was identified in the ORNL Protective Services Department Self-Assessment.

A Fire Protection Engineering Survey Program is in place at ORNL. However, these surveys are not conducted at the required frequency due to lack of adequate staff. There are key and highly visible facilities that have not been surveyed. Only a small number of surveys are being performed annually compared to the number required on an annual basis. ORNL management is made aware of fire protection deficiencies identified in the Fire Protection Engineering surveys.

The revised DOE Order 5480.7 which is currently in the proposal stages, requires a more detailed approach to fire protection engineering surveys in the form of a fire hazards analysis. If accepted, the new DOE Order 5480.7 will require an increased amount of time to be devoted to performing this function.

An additional Fire Protection Engineer was hired in May 1990. The impact that the new engineer will have on the group's capability to perform the required fire protection engineering surveys is not currently apparent. Evaluation of the current staff's ability to perform the required work load will continue.

Root Causes:

Inadequate policy, insufficient resources, and inadequate management commitment

Planned Actions and Schedules:

Item/Description	Completion Date
1. See Finding FP.1-1 on needs assessment and Finding FP.4-1 on revision of ORNL Standard Practice Procedure X-GP-4, Fire Prevention and Control.	

Costs: See cost sheets on Findings FP.1-1 and FP.1-4.

References: DOE Order 5480.7

Finding No.: FP.7-3 Fire Protection Oversight

Finding Description: **ORO does not provide a level of fire protection oversight of ORNL as required by DOE 5480.7.**

Code: Category III

Compliance Protocol: DOE Order 5480.7 entitled *Fire Protection* requires an "improved risk" level of fire protection sufficient to attain Department of Energy objectives.

Priority: Energy Systems Risk Weight 58
Tiger Team Action Plan Priority 2

Response: We do not concur with this concern. Though the resources committed by ORO to fire protection oversight activities could be improved, the present level of effort on oversight meets DOE Order 5480.7.

DOE Order 5480.7 does not require that fire protection engineering review or approve facility Safety Analysis Reports. The order does not use the term "safety class system."

Experiments are reviewed by an operational safety committee and peers. Fire protection reviews experiments as requested by the committee. There is no information provided that contends the isobutane used in Building 6000 was unsafe.

Though there is inadequate staff both at ORNL and ORO to review safety analysis reports, all operational requirements, and all procedures, most concerns of substance identified by the Tiger Team, had been previously identified by ORO and/or the Contractor prior to the review. Concerns about fire protection at Building 7920 were identified by ORO.

With few exceptions, i.e., when fire protection reviews have been conducted by outside organizations, ORO has performed annual fire protection surveys of ORNL.

The following actions are ongoing or were preplanned and support our nonconcurrence with this concern.

Root Causes:

Ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Conduct fire protection surveillances every 6 months by ORO.	Ongoing
2. Conduct functional appraisals, including a comprehensive Fire Protection review, every 2 years.	Ongoing
3. Conduct ESH&QA management appraisals at 3-year intervals.	Start June 1992
4. Request additional independent oversight from EH; e.g., Factory Mutual review.	March 1992
5. Request assistance from EH to resolve professional differences of opinion related to fire protection concerns that may arise from such activities as Tiger Team reviews.	Ongoing

Costs: No additional.

References: None

Finding No.: FP.7-4 Review of Documents Affecting Fire Protection

Finding Description: **Safety-related documents affecting fire protection are not always reviewed by Fire Protection Engineering as required by DOE 5480.7.**

Code: Category III

Compliance Protocol: DOE Order 5480.7

Priority: Energy Systems Risk Weight 58
Tiger Team Action Plan Priority 2

Response: The Safety Analysis Report Upgrade Program requires the formation of Facility Safety Evaluation Teams (FSETs) for each facility containing unique hazards. The FSETs are responsible for performing the safety documentation for the facility. The FSETs will consist of operating personnel from the organization responsible for operating the facility and technical representatives such as Systems Safety Engineering (SSE) personnel, hazard specialists such as fire protection, industrial hygiene, and criticality safety. This inclusion of a fire protection specialist aids in providing proper fire protection input into the preparation of the document.

ORNL SPPs place responsibility for ensuring appropriate internal reviews on the Operating Divisions. The SPPs will be revised to provide further specific guidance to ensure that appropriate reviews, such as fire protection, are performed. At present no SSE procedure exists to ensure that safety documentation performed by SSE is reviewed by Fire Protection Engineers. SSE will develop an internal operating instruction that will designate fire protection personnel as a standing reviewer for all safety documentation and where fire protection is an important issue. Key reviewers are required to respond to the transmitted safety document even if they have no comments.

Root Causes:

Inadequate policy, inadequate policy implementation, insufficient resources, and ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue revised SPP X-OS-3 to provide further guidance to operating divisions on internal reviews.	9/91

2. See Finding FP.1-1, which requires the performance of a "Needs Assessment" and the development of a "Fire-Protection Management Plan" for securing necessary resources.

3. See Finding FP.3-3, which addresses the development of a review program requiring Fire Protection Engineering review of safety analysis reports.

Costs: OORS is presently revising SPP-X-OS-3, and no significant addition of funds are required.

Costs associated with this finding are reported under Findings FP.1-1 and FP.3-3.

References: Safety Analysis Report Update Program Overview and Phase I Implementation Plan (Y/CSET-1)

DOE Order 5480.7

Finding No.: FP.7-5 Fire Water Supply System

Finding Description: **A fire water supply meeting the requirements of DOE 5480.7 and DOE 6430.1A has not been provided, and the fire water system is not being supervised and maintained in accordance with recognized good practice.**

Code: Category III

Compliance Protocol: DOE Order 5480.7 and DOE Order 6430.1A

Priority: Energy Systems Risk Weight 58
Tiger Team Action Plan Priority 2

Response: Procedure UT-90-020R is in place; it requires a water reserve of 2,000,000 gallons for fire-fighting purposes should a supply disruption occur.

ORNL has a single water system which provides domestic and fire protection water supplies. The system is gravity fed by reservoirs which are filled by a single 24-inch line from the water treatment plant at Y-12. On-site reservoirs at ORNL have a 6-million gallon capacity. The stored water is located on two ridges on opposite sides of the plant site, with 3 million gallons stored on each ridge.

All control valves for designated fire protection systems are secured or supervised in accordance with DOE guidelines.

All post indicator valves (PIV) and indicating valves (OS&Y) in the ORNL water supply system which are not currently supervised will be locked in the open position.

A maintenance program will be initiated to paint PIV's where needed to aid in visibility and to replace glass windows where needed so that position indicators are readily visible.

The Fire Department will continue to perform required flow tests of fire hydrants in designated locations on an annual basis. These tests are compared to previous tests so that changes or possible water supply obstructions can be identified. The flow tests which are currently conducted are adequate to verify that the required fire flow for a given area is available. Changes to the current testing arrangement are not planned.

ORNL does not currently have any identified "safety class" fire protection systems that require a water supply to survive a Design Base Earthquake as prescribed by DOE Order 6430.1A.

Root Cause:

Ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Examine ORNL Fire Department Standard Operating Procedure FP B-19 (Water Flow Tests) to ensure recognized good practices are incorporated. Necessary procedural revisions, resulting from the examination, will be included.	8/91
2. Secure (lock) all post indicator valves (PIV) and indicating valves that are not currently supervised in the open position.	6/91
3. Paint PIVs that need painting to increase visibility, and replace glass windows where necessary so position indicators are readily visible.	6/92
4. Install a second water supply to ORNL, upgrade a water reservoir, and improve water-distribution systems. These upgrades and additions to the ORNL water system will be designed in accordance with DOE 6430.1A and will receive the necessary DBE review.	9/96

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	7						7
2	—						
3		30					30
Status:							
Funded	7						
Requested							
New		30					$37

Type of funds: Line Item
Source of funds: MGPF

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
4				5,000	10,000	7,000	22,000
Status:							
Funded							
Requested				5,000	10,000	7,000	
New							$22,000

References: DOE Order 5480.7 and DOE Order 6430.1A

3.3.19 Medical Services

Finding No.: MS.1-1 Voluntary Health Examination Program

Finding Description: **The frequency of the voluntary health examination program is not in compliance with DOE 5480.8.**

Code: Category III

Compliance Protocol: DOE Order 5480.8

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: The Health Division suffers from a lack of medical staff and support staff. An increasing number of job classifications and potential exposure situations are required to have annual medical evaluations. To compound the shortage more administrative work (writing procedures and action plans and other activities related to documenting compliance with regulations and requirements) is being required of medical personnel. As a result examinations required by DOE Order 5480.8 are not being conducted at the required frequency.

The Health Division is in the process of recruiting an additional occupational physician. The Health Division is advertising in the Journal of Occupational Medicine and in ACOM Placement Services.

Beyond this addition, recruitment will continue because of the need to replace retiring personnel.

Root Causes:

Inadequate policy implementation and insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Hire an occupational physician to allow implementation of DOE Order 5480.8.	7/91
2. Issue an SPP to specify the required frequency of medical evaluations.	12/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	*						
2	—	15					
Status:							
Funded							
Requested							
New		15					$15

*Estimated annual ongoing costs: $100K starting in FY 1991.

References: DOE Washington Audit of the Occupational Medical (OM) Program at ORNL, September 25, 1989

DOE Order 5480.8, Contractor Occupational Medical Program

Finding No.: MS.2-1 Medical Division Administrative Assistance

Finding Description: **Administrative assistance is not available to the Medical Division to complete the administrative policies and procedures.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 8
Tiger Team Action Plan Priority 3

Response: The Health Division suffers from a lack of medical staff and support staff. By necessity individuals are being assigned multiple duties. More administrative work is being required of medical personnel especially in the completion of the division's polices, practices and procedures.

Root Cause:

Insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request funding for administrative assistant.	8/91
2. Contingent upon funding, hire an administrative assistant to support necessary work.	12/91
3. Issue a plan and schedule to develop necessary policies, practices, and procedures for the Health Division.	3/92

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2		*					
Status:							
Funded							
Requested							
New							$

*Estimated annual ongoing cost: $45K beginning FY 1992.

References: DOE Order 5480.8, Contractor Occupational Medical Program

Finding No.: MS.3-1 Backup Pulmonary Function Testing Personnel

Finding Description: **The backup personnel performing pulmonary function testing have not received National Institute for Occupational Safety and Health approved training as required by DOE 5480.8 and OSHA.**

Code: Category III

Compliance Protocol: DOE Order 5480.8 and OSHA standards

Priority: Energy Systems Risk Weight 408
Tiger Team Action Plan Priority 2

Response: The X-ray technician is responsible for X-rays and PFTs performed in the Health Division. Medical technologists have provided assistance in the performance of PFTs. It has been the belief that formal training of the medical technologists in performing PFTs was not necessary because of on-the-job training given to them by the NIOSH trained X-ray technician.

Medical technologists of the Health Division will receive training in a NIOSH approved training program.

Dr. Henry Glindmeyer, Research Associate Professor in the Department of Medicine and Biomedical Engineering at Tulane University in New Orleans will provide on-site PFT training of medical technologists.

Root Cause:

Inadequate training

Planned Actions and Schedules:

Item/Description	Completion Date
1. Establish contract for on-site training program for PFT training for ongoing qualification of medical technologists.	8/91
2. Conduct NIOSH approved training for PFT personnel.	8/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
2	5						5
Status:							
Funded							
Requested							
New	5						$5

References: DOE Order 5480.8, Contractor Occupational Medical Program

29 CFR 1926.58

Finding No.: MS.3-2 Medical Division Space Allocation

Finding Description: **Space allocation is inadequate for proper functioning of the Medical Division.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: The Health Division has insufficient space for maintaining charts, records, and X-ray files and holding staff conferences. There is no office space available for the additional staff being recruited. There is lack of privacy for patients who are interviewed in the treatment room. The requirements upon and the activities of the Health Division have outgrown its physical resources. Overall ORNL shortage of space has precluded the addition of more space to the Health Division.

There are plans to utilize some of the new decontamination facility (see Finding MS.3-3) as a small amount of storage space. In addition some space would be used temporarily for clerical activity but would immediately revert to use for triage and decontamination functions when needed.

Root Cause:

Insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Evaluate spacing requirements and submit recommendations to the Associate Director of Operations.	Complete
2. Allocate space following approval of recommendations.	7/91

Costs: See Finding MS.3-3

References: DOE Washington Audit of the Occupational Medical (OM) Program at ORNL, September 25, 1989

DOE Order 5480.8, Contractor Occupational Medical Program

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ORNL-6657/V2/R5

NOV 20 1991

428 pgs

Oak Ridge National Laboratory Corrective Action Plan in Response to Tiger Team Assessment

August 1991

Volume 2

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ORNL-6657/V2/R5

Oak Ridge National Laboratory Corrective Action Plan in Response to Tiger Team Assessment

Volume 2

Date Issued: August 23, 1991
(Revision 5)

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U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

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PREFACE TO REVISION 5

The *ORNL Corrective Action Plan in Response to Tiger Team Assessment* presents a complete response to the Tiger Team assessment that was conducted at Oak Ridge National Laboratory (ORNL) and at the U.S. Department of Energy (DOE) Oak Ridge Operations Office (ORO) from October 22, 1990, through November 30, 1990. The action plans have undergone both a discipline review and a cross-cutting review with respect to root cause. In addition, the action plans have been integrated with initiatives being pursued across Martin Marietta Energy Systems, Inc., in response to Tiger Team findings at other DOE facilities operated by Energy Systems. The root cause section is complete and describes how ORNL intends to address the root causes of the findings identified during the assessment.

The action plan has benefitted from a complete review by various offices at DOE Headquarters as well as review by the Tiger Team that conducted the assessment to ensure that the described actions are responsive to the observed problems.

All actions listed in this action plan are contingent upon suitable funding being provided. Action plan schedules for findings listed as "funded" are current best estimates of expected completion. The projected completion dates for actions listed as "requested" or "new" are technically feasible dates based on work scope and available or projected nonfinancial resources. Actual completion dates will depend on when work is authorized and funding is received.

This action plan has been a cooperative effort between ORNL and ORO and is the result of exceptional efforts by many individuals in both organizations to meet a very demanding schedule.

Michael A. Kuliasha
Action Plan Leader

August 23, 1991

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3.4 REACTORS SAFETY AND HEALTH FINDINGS, RESPONSES, AND PLANNED ACTIONS

3.4 REACTORS SAFETY AND HEALTH FINDINGS, RESPONSES, AND PLANNED ACTIONS

Finding discipline	Finding number prefix	Section number
Organization and Administration	ROA	3.4.1
Quality Verification	RQV	3.4.2
Operations	ROP	3.4.3
Maintenance	RMA	3.4.4
Training and Certification	RTC	3.4.5
Auxiliary Systems	RAX	3.4.6
Emergency Preparedness	REP	3.4.7
Technical Support	RTS	3.4.8
Nuclear Criticality Safety	RCS	3.4.9
Security/Safety Interface	RSS	3.4.10
Experimental Activities	REA	3.4.11
Site/Facility Safety Review	RFR	3.4.12
Radiological Protection	RRP	3.4.13
Personnel Protection	RPP	3.4.14
Fire Protection	RFP	3.4.15

3.4.1 Organization and Administration

Finding No.: ROA.1-1 Funding for Maintenance of ORR

Finding Description: **Funding has not been provided to maintain the Oak Ridge Research Reactor in a safe and environmentally favorable state pending final decommissioning of the reactor, as required by DOE 5480.6.**

Code: Category III

Compliance Protocol: DOE Order 5480.6

Priority: Energy Systems Risk Weight 59
Tiger Team Action Plan Priority 2

Response: Field Work Proposals (FWPs) were submitted in April 1989 and April 1990 for maintenance and surveillance costs associated with the Oak Ridge Research Reactor (ORR). Inadequate funds were provided in FY 1989, FY 1990, and FY 1991. ORNL overhead funds have therefore been used to provide adequate maintenance and surveillance activities. The ORR has been maintained in safe shutdown. In addition to the FWPs, correspondence requesting funding and verbal requests at Quarterly Review meetings with DOE program offices have been made.

No surveillance and maintenance funds were requested for FY 1992 because funds for the decommissioning of the reactor were requested for FY 1991 and FY 1992. However, no funds have been provided for this request either. Current estimate is that decommissioning funds will be provided by DOE in FY 1994. This will result in the need for surveillance and maintenance funds for FY 1993.

Root Causes:

Insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Submit written request to DOE restating the need for the required surveillance and maintenance funds.	Complete
2. Submit FY 1993 FWP requesting the required decommissioning funds.	Complete

Costs:

Type of funds: Research Programmatic
Source of funds: ER-AT

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	825	729					1554
2	—						
Status:							
Funded							
Requested	443	490					
New	382	239					$1554

References: FWP ERAT734
FWP ERAT733 (NOEW)

Finding No.: ROA.1-2 Approval of ORR Shutdown Plans

Finding Description: **The Oak Ridge Research Reactor shutdown plan has not been approved by the Manager of the Oak Ridge Operations Office as required by DOE 5480.6.**

Code: Category III

Compliance Protocol: DOE Order 5480.6

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: The decision to permanently shutdown ORR was made July 20, 1987. A preliminary plan for the ORR shutdown was submitted to DOE in September 1987. A detailed Shutdown Program Plan ORNL/RRD/INT-46 was submitted in November 1988.

The Shutdown Program Plan was reviewed and updated and issued in June 1989 (ORNL/RRD/INT-62). On September 19, 1990, Dr. Alvin W. Trivelpiece, Director of ORNL, was notified by N. Anne Davies, Acting Associate Director for Fusion Energy, Office of Energy Research, that the Office of Environmental Restoration plans to take responsibility for the ORR in FY 1993 providing certain requirements are met.

Root Cause:

Inadequate oversight

Planned Actions and Schedules:

Item/Description	Completion Date
1. Review ORR Shutdown Program Plan to ensure it is up to date.	Complete
2. Revise and reissue ORR Shutdown Program Plan if update is required.	5/91
3. Request approval of the previously submitted Oak Ridge Research Reactor Shutdown Program Plan by the Manager of the Oak Ridge Operations Office.	6/91
4. ORO approve the ORR Shutdown Program Plan.	8/91

Costs: Costs for ROA.1-2 are included in ROA.1-1.

References: Oak Ridge Research Reactor Shutdown Program Plan ORNL/RRD/INT-46
Oak Ridge Research Reactor Shutdown Program Plan ORNL/RRD/INT-62

Finding No.: ROA.1-3 Decommissioning Plan for HPRR

Finding Description: A decommissioning plan for the Health Physics Research Reactor has not been approved by the Manager of the Oak Ridge Operations Office.

Code: Category III

Compliance Protocol: DOE Order 5480.6

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: ORNL had not previously received any written directive from ORO regarding HPRR status. However, a memo from Decker to LaGrone dated November 9, 1990, instructed ORO to place HPRR in shutdown, but "...in a manner so as to leave open the possibility of future reassembly and restart...." A more recent memo from Decker to LaGrone dated January 28, 1991, instructed "Energy Systems to proceed with shutdown of the subject reactor." Therefore, a Shutdown Plan, which will contain necessary decontamination and decommissioning actions, is scheduled to address this finding.

Root Cause:

Ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request funding from DOE to prepare a Shutdown Plan.	Complete
2. Submit an HPRR Shutdown Plan to DOE-ORO.	12/91
3. DOE approve HPRR Shutdown Plan.	2/92
4. Prepare HPRR for transfer to surplus facilities in FY 1995.	9/95

Costs: Costs for ROA.1-3 are included in ROA.1-4.

References: None

Finding No.: ROA.1-4 Funds for Maintenance of HPRR

Finding Description: Funds have not been provided to ensure that the needed maintenance and surveillance of the Health Physics Research Reactor will be maintained as required by DOE 5480.6.

Code: Category III

Compliance Protocol: DOE Order 5480.6

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: Field Work Proposals (FWPs) were submitted to DOE requesting $580K in FY 1990, $549K in FY 1991, and $200K in FY 1992 for maintenance and surveillance of the Health Physics Research Reactor (HPRR). In April 1990 FWPs were submitted to both Energy Research (ER) and Nuclear Energy (NE). No funds were provided in FY 1989, FY 1990, or FY 1991. ORNL overhead funds have therefore been used to provide adequate maintenance and surveillance activities. The HPRR has been maintained in safe standby. In addition to the FWPs, correspondence requesting funding and verbal requests at Quarterly Review meetings have been made. If funding is not provided by DOE, needed maintenance and surveillance will be funded from ORNL overhead.

Root Causes:

Insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Reassess maintenance and surveillance costs now that fuel has been removed.	Complete
2. Submit requests to DOE restating the need for the required FY 1991 and FY 1992 funds.	Complete
3. Submit FY 1993 FWP requesting maintenance and surveillance required funds.	Complete

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KP, NE-AF

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	777	119	31	32	34	*	993
Status:							
Funded							
Requested	325						
New	452	119	31	32	34		$993

*Estimated annual ongoing cost: $35K.

References: FWP ERKP155 (NOEW)
FWP NEAF155 (NOEW)

Finding No.: ROA.1-5 Funding for the Bulk Shielding Facility

Finding Description: Funds have not been provided to ensure that the needed surveillance and maintenance of the Bulk Shielding Facility will be provided, as required by DOE 5480.6.

Code: Category III

Compliance Protocol: DOE Order 5480.6

Priority: Energy Systems Risk Weight 60
Tiger Team Action Plan Priority 3

Response: Field Work Proposals (FWPs) were submitted to DOE-ER requesting $430K for FY 1991 and $450K for FY 1992. No funds were provided in FY 1990 or FY 1991. ORNL overhead funds have therefore been used to provide adequate maintenance and surveillance activities. The BSR has been maintained in "operable" status as defined in DOE Order 5480.6, but in a defueled and standby mode. Correspondence and verbal requests at Quarterly Review meetings have been made requesting the funds. If funding is not provided by DOE, needed maintenance and surveillance will be funded from ORNL overhead.

Root Causes:

Insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Submit request to DOE restating the need for required funds.	Complete
2. Submit FY 1993 FWP requesting maintenance and surveillance funds.	Complete

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
2	548	597				*	2986
Status:							
Funded							
Requested	430	450					
New	118	147	575	660	606		$2986

*Estimated annual ongoing costs: $636K starting in FY 1996.

References: FWP ERKCR02

Finding No.: ROA.1-6 Status of the Bulk Shielding Facility

Finding Description: The Bulk Shielding Facility is still classified as an "Operable" reactor; however, it is being maintained as though it were in an extended shutdown mode. It has not been declared in "Standby" or "Shutdown" with an approved plan to maintain the facility in its designated status, as required by DOE 5480.6.

Code: Category III

Compliance Protocol: DOE Order 5480.6

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: A decision on the future of the BSR has been purposely delayed until intentions regarding the future of HPRR were resolved, due to insufficient resources to deal with both issues simultaneously.

BSR is currently in "operable" status as defined in DOE Order 5480.6, but in a defueled and standby mode. A decision to proceed with restart or decommissioning action is expected in June 1991. When such a decision is reached, either a startup plan or a shutdown plan will be provided to DOE-ORO for approval.

Root Cause:

Insufficient resources; there are insufficient resources to implement all phases of DOE Order 5480.6.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Submit an assessment of future program needs in a preliminary schedule and cost projections for available options.	Complete
2. DOE issue guidance on future operational status.	6/91
3. Request funding to prepare appropriate plans.	7/91

Costs: Costs for ROA.1-6 are included in ROA.1-5.

References: None

Finding No.: ROA.1-7 Status of the CEF "W" Cell

Finding Description: The Critical Experiments Facility "W" cell is still classified as an "Operable" reactor; however, it is not being operated and maintained in an operable status, nor has it been declared to be in "Standby" or "Shutdown" with an approved plan to maintain the facility in its designated status, as required by DOE 5480.6.

Code: Category III

Compliance Protocol: DOE Order 5480.6

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: Because there were no pressing operational needs due to available backlog of verified HFIR fresh cores and resources available were dedicated to higher priority projects, actions to utilize the facility were deferred. Actions have been ongoing, however, to develop an alternate, less expensive method to provide a final fresh fuel verification without a full core criticality experiment. Current intentions are to obtain approval of the alternate method and shut down the facility.

A revision to the HFIR Technical Specifications deleting the need for CEF is being prepared for submission in February 1991. RORC approval and submission to DOE is expected in May 1991. DOE approval of the Technical Specifications change will constitute approval of the intent to shut down the CEF. A Shutdown Plan will then be developed and sent to ORO.

Root Cause:

Insufficient resources; there are insufficient resources to implement all phases of DOE Order 5480.6.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Submit HFIR Technical Specifications change to DOE-ORO.	8/91
2. DOE approve Technical Specifications change.	10/91
3. Request funds for preparation of Shutdown Plan from DOE.	1/92
4. Submit a CEF Shutdown Plan to DOE-ORO.	7/92
5. DOE approve CEF Shutdown Plan.	9/92

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	—						
4		80					80
5	—						
Status:							
Funded							
Requested							
New		80					$80

References: None

Finding No.: ROA.1-8 Line Management Responsibilities in RRD

Finding Description: The position descriptions for the Research Reactors Division management do not explicitly assign line management responsibility for the safe operation of reactors, as required by DOE 5480.6.

Code: Category III

Compliance Protocol: DOE Order 5480.6

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: All charters for Research Reactors Division (RRD) line management, down to and including Reactor Operators, have been revised to explicitly state and assign to each individual the responsibility for safe operation of the reactors and to maintain the work place in a safe condition assuring that ES&H policies and work practices are implemented. Emphasis is placed on accident prevention as a part of the daily work plan, and each individual is encouraged to provide leadership in following safe practices.

Root Cause:

Poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue revised charters for RRD line management to explicitly state responsibilities for safe operation of the reactor and for maintaining the work place in a safe condition, assuring that ES&H policies and work practices are implemented.	Complete

Costs: No significant costs associated with this action.

References: None

Finding No.: ROA.1-9 Management Position Descriptions for RRD

Finding Description: **Not all Research Reactors Division management personnel have formal position descriptions.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 4

Response: Position descriptions and charters have been written for the Shift Supervisors, Shift Technical Operators, and Reactor Operators, thus completing the direct line management linkage from Reactor Operators to Director of Reactor Operations.

Root Cause:

Poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue position descriptions and charters for those positions which were not previously written.	Complete

Costs: No significant cost associated with this action.

References: None

Finding No.: ROA.3-1 Program to Increase Safety

Finding Description: There is no active program to stimulate management personnel and staff to increase the level of safety at the Research Reactors Division through goal setting and promoting esprit de corps in achieving safety goals.

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 4

Response: Employee/worker safety both on-the-job and off-the-job is a responsibility of everyone and is repeatedly emphasized in quarterly safety meetings. This program, lab wide, has resulted in on-the-job and off-the-job safety records which are some of the best in the nation for similar operations. Performance indicators were implemented in RRD October 1989. These are plotted and conspicuously posted in several locations monthly to call attention to the level of performance in many important areas of plant operation. Management has been proactive in promoting the performance indicators and they are routinely discussed. The indicator most directly related to safety is the Lost-Time Accident Rate. The goal is stated in the safety industry and ORNL-wide terms of the number of lost-time accidents per 200,000 person-hours worked (100 person-years). The performance indicator goal for the Lost-Time Accident Rate is $\leq$0.04. This goal is not always clear to all personnel who read the performance indicator graph. There is an Energy Systems program to provide safety incentive awards. However, it is based on Laboratory-wide performance and not broken down by facilities or work centers, thus the impact is minimal.

See Finding RQV.1-9.

Root Cause:

Inadequate communications; communications of performance indicators and safety goals are not clearly stated.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Show management's commitment to safety by emphasizing the importance of the safety program and goals at the Division Director's weekly staff meetings.	Complete

2. Provide an appropriate award to division personnel who proactively practice good safety throughout the year.	10/91 and annually thereafter

Costs: None

References: None

Finding No.: ROA.6-1 Performance Evaluations for Safety

Finding Description: **Performance evaluations for management personnel are not always used to enhance individual performance in the area of safety.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: The Performance Planning and Review (PPR) System program, which encompasses monthly and weekly employees, includes a Primary Performance Factor of "Environment, Safety, and Health." The employees are rated on how well they actively practice and promote safe work practices in support of ES&H policies. Each individual must be evaluated on primary Performance Factors. This annual Performance Review process requires the supervisor to evaluate their staff on practices and promotion of safe work practices and to discuss any corrective actions needed.

Root Cause:

Poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Remind all supervisors orally and by distributing a memo to them that during the annual PPR process they must evaluate and discuss with their staff how the individual actively practices and promotes safe work practices in support of Energy Systems ES&H policies. PPR documentation is kept in the employee's personnel field file for three years.	Complete

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	0.4						0.4
Status:							
Funded	0.4						
Requested							
New							$0.4

References: "Performance Planning and Review System" form, Part 2, Section A

Finding No.: ROA.7-1 HFIR Final Safety Analysis Report

Finding Description: **The High Flux Isotope Reactor does not have a Final Safety Analysis Report that meets current DOE requirements, and budget shortfalls have resulted in continued slippage of the completion date.**

Code: Category III

Compliance Protocol: DOE Order 5481.1B (9-23-86), paragraph 4, subparagraphs b. and c. require that "those ongoing DOE operations which can reasonably be expected to have the potential for major on-site or off-site impacts to people or the environment shall be identified and evaluated..." For those operations for which documentation is determined to be inadequate to identify the risk from the operation, the line organization must make necessary arrangements (funds and other resources) to provide adequate safety analyses or obtain an exemption. Safety analyses prepared under these subparagraphs are to be prepared based on current technical criteria.

DOE Order 5480.6 (9-23-86), paragraph 8, subparagraph c. requires that the requirements of DOE Order 5481.1B be met and for new safety analysis reports, the NRC's guidelines on standard format and content of safety analysis reports shall be followed.

Priority: Energy Systems Risk Weight 80
Tiger Team Action Plan Priority 2

Response: This milestone has its origin in the DOE Environment Safety and Health (DOE-EH) Design and Management reviews of the HFIR. A number of other committees have recommended similar or related items, but the fundamental source for the recommendation was the DOE-EH committees. These committees recognized that the response to this recommendation should be carried out in a normal and responsive manner following restart of the reactor. However, as the restart of the reactor progressed, the relative urgency of the recommendation changed, in early 1989, at the direction of DOE-EH. At that time, a list of Key Milestones was created linking completion of many long-term milestones to continued reactor operation.

The Key Milestone for completion of the HFIR FSAR was originally set with the expectation that the final document would be mainly descriptive, except for the new analyses to be generated for the Chapter 15 accident analysis. The original intention was to use much of the old descriptive information – updating it where necessary to include design changes. Over the last 3 years, the scope of information to be included in the FSAR has gradually increased to include all the studies that have been performed by RRD up until now. For example, we would be remiss by not including thermal analysis associated with the long-term decay heat removal problem, the seismic design basis upgrade, and design basis research associated with the PRA – including definition of design basis small break LOCA

where none existed during the original design. In addition to our internal increase in scope, there has been an external increase in scope as the ORNL Office of Operational Readiness and Safety, the Energy Systems safety organization, and the DOE-ORO safety organization have begun to formally define their expectations for standard format, content, scope, and extent of reviews for FSARs. For example, it is clear from these external developments that the HFIR FSAR will require description of a large part of the ORNL-wide utilities information, whereas this information was not planned for inclusion earlier.

In addition to scope changes, the HFIR FSAR has suffered budget cuts that have delayed progress. The budgets that were set in 1987 and frozen since that time have been effectively lowered due to more-urgent/higher-priority items consistently taking RRD staff time away from the FSAR. In addition, funds for subcontracts to support the FSAR have been unavailable since other projects depleted the RRD budget. To be specific, in 1988 the Comprehensive Safety Assessment and Upgrade Program and the "Sparkle" Program depleted the budget; in 1989, the delayed restart and response to the May 5 and 9 events depleted the budget; and in 1990, the Environmental Qualification Program and the Contamination Survey have affected the budget.

Thus, a combination of scope and budgetary problems made it necessary to seek a delay in the FSAR Key Milestone (see Reference 1). The request for the delay and additional funds was made in May 1990. The schedule that was submitted in May was based on a timely receipt of additional funding. The schedule was approved in August 1990. However, additional funds to support the FSAR needs were not available during FY 1990, and only recently was information provided that additional funds would be available during FY 1991.

See action plan in response to Finding RTS.2-2.

Root Causes:

(1) Insufficient resources; resources for the HFIR updated SAR have been inadequate due to higher-priority items consuming the RRD budget and RRD staff time. (2) Ambiguous requirements or expectations; changing compliance requirements have increased expectations for the scope and content of the SAR beyond the original basis for the budget request.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Obtain additional FY 1991 funding.	Complete
2. Revise SAR work tasks and planning to achieve timely completion of HFIR SAR, based on resources of Item 1.	Complete

3. Submit revised SAR plan to DOE in the form of re-negotiated Key Milestone Action Plans (see Reference 1) for approval.	Complete
4. Submit funding request for FY 1992 including current FY 1992 budget plus additional $900 K requested in Reference 2.	Complete
5. Perform work as indicated in approved Action Plans of Item 3.	Completion date determined by item 3
6. Provide response to review comments and submit final HFIR SAR.	6 months beyond draft SAR completion date

Costs:

Type of funds: Research Programmatic

Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	25						25
3	10						10
4	—						
5	3500	3400					6900
6	—						
Status:							
Funded	3535						
Requested		2500					
New		900					$6935

References: Letter, J. B. Richard to J. A. Reafsnyder, May 18, 1990, "Modification of Key Milestones Concerning Completion of the Updated High Flux Isotope Reactor (HFIR) Final Safety Analysis Report"

Letter, J. B. Richard to J. A. Reafsnyder, May 4, 1990, "Summary of Additional Funding to Meet New Requirements for HFIR Operations"

Finding No.: ROA.7-2 Updating of Safety Analysis Reports for BSF and PCA

Finding Description: **The Bulk Shielding Reactor and Pool Critical Assembly Safety Analysis Reports do not meet current nuclear standards, as required by DOE 5481.1B.**

Code: Category III

Compliance Protocol: DOE Order 5481.1B (9-23-86), paragraph 4, subparagraphs b. and c. require that "those ongoing DOE operations that can reasonably be expected to have the potential for major on-site or off-site impacts to people or the environment shall be identified and evaluated..." For those operations for which documentation is determined to be inadequate to identify the risk from the operation, the line organization must make necessary arrangements (funds and other resources) to provide adequate safety analyses or obtain an exemption. Safety analyses prepared under these subparagraphs are to be prepared based on current technical criteria.

DOE Order 5480.6 (9-23-86), paragraph 8, subparagraph c. requires that for new Safety Analysis Reports, the Nuclear Regulatory Commission's guidelines on standard format and content of safety analysis reports shall be followed.

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: This concern was generally identified in 1987 by the ORNL Reactor Review and Audit Committee and documented in ORNL/CF-87/30 as requirement 4. [This finding has been tracked by the Research Reactors Division (RRD) commitment tracking system as item BTCREQ-04.] To address the need for updated safety analysis documentation, the Bulk Shielding Reactor (BSR) and Pool Critical Assembly have been included in Energy Systems Safety Analysis Report Update Program. Phase I of that program involves completing a facility hazard screening document for each facility in the program. That commitment for the BSR facility (including the Pool Critical Assembly) is tracked in the RRD tracking system as RRD91-060. The facility hazard screening document will provide an evaluation of the adequacy of existing safety analysis and a preliminary identification of the hazard level of the facility. Work on the hazard screening document for the BSR facility has not begun. Actions planned under the Energy Systems Safety Analysis Report Update Program would ultimately lead to an updated safety analysis report that satisfies the requirements of the DOE order. However, completion of an updated safety analysis report for the BSR is contingent on authorization to proceed with the restart readiness process for the facility. If it is decided to permanently decommission and decontaminate the facility, the safety analysis report will not be updated.

Root Cause:

Insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue Hazard Screening Document.	10/91
2. Request FY 1992 funding.	Complete
3. Contingent upon approval of funding, proceed with phases II and III of Energy Systems Safety Analysis Report Update Program for BSR facility.	FY 1995*
4. Request FY 1993 funding.	Complete

*Note: Detailed schedules for Phases II and III of the Energy Systems Safety Analysis Report Update have not been finalized; however, reference 1 indicates that completion between FY 1995 and FY 1998 is anticipated. A facility-specific schedule for the BSR will be developed following authorization to proceed with the restart readiness process (expected in early FY 1992).

Costs:

Type of funds: Research Programmatic
Source of funds: NE-AF

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	30						30
2	—						
3		75	125	100	100	0	400
4	—						
Status:							
Funded	30						
Requested							
New		75	125	100	100	0	$430**

**Cost of completing updated SAR was based on information from Energy Systems SAR update program indicating that the cost of full SAR is $1.5 million. BSF/PCA estimate was developed recognizing the relative simplicity of facility and existence of a 1960s safety analysis document.

Reference: Y/CSET-1 "Safety Analysis Report Update Program Overview and Phase I Implementation," October 1990

Finding No.: ROA.7-3 Updating of Safety Analysis Report for TSF

Finding Description: **The Tower Shielding Facility Safety Analysis Report does not meet current nuclear standards, as required by DOE 5481.1B.**

Code: Category III

Compliance Protocol: DOE Order 5481.1B (9-23-86), paragraph 4, subparagraphs b. and c. require that "those ongoing DOE operations that can reasonably be expected to have the potential for major on-site or off-site impacts to people or the environment shall be identified and evaluated..." For those operations for which documentation is determined to be inadequate to identify the risk from the operation, the line organization must make necessary arrangements (funds and other resources) to provide adequate safety analyses or obtain an exemption. Safety analyses prepared under these subparagraphs are to be prepared based on current technical criteria.

DOE Order 5480.6 (9-23-86), paragraph 8, subparagraph c. requires that for new Safety Analysis Reports, the Nuclear Regulatory Commission's guidelines on standard format and content of safety analysis reports shall be followed.

Priority: Energy Systems Risk Weight 80
Tiger Team Action Plan Priority 2

Response: This concern was identified in 1987 by the ORNL Reactor Review and Audit Committee and documented in ORNL/ CF-87/211 as requirement 4 and recommendation 4. (These findings have been tracked by the Research Reactors Division (RRD) commitment tracking system as items TTCREQ-04 and TTCREC-04, respectively.) In addition, internal reviews and reviews completed by an independent consultant during the 1988-89 restart readiness process for the Tower Shielding Reactor (TSR) identified the need to update the safety analysis documents. (Refer to action items SAISAR01, SAISAR02, and SAISAR06 in the RRD commitment tracking system.) Essential analyses were updated prior to restart, but not incorporated into the safety analysis documents. It was determined that formal update of the safety analysis documents would be a post-restart action. To address the need for updated safety analysis documentation, the TSR has been included in the Energy Systems Safety Analysis Report Update Program. Phase I of that program involves completing a facility hazard screening document for each facility in the program. That commitment for the TSR facility is tracked in the RRD tracking system as RRD91-062. The facility hazard screening document will provide an evaluation of the adequacy of existing safety analysis and a preliminary identification of the hazard level of the facility. A draft hazard screening document has been completed for the TSR. Actions planned under the Energy Systems Safety Analysis Report Update Program would ultimately lead to an updated safety analysis report that satisfies the requirements of the DOE order. However, completion of an updated safety analysis report for the TSR is contingent on authorization to continue operating the reactor after completion of the current

experimental program and receipt of funds for the update. If it is decided to permanently decommission and decontaminate the facility, the safety analysis report will not be updated.

See Finding RTS.2-2.

Root Cause:

Insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue Hazard Screening Document.	5/91
2. Request funding for completion of Phases II and III in FY 1993 FWP.	Complete
3. Contingent upon approval of continued operation beyond current experimental program and funding, proceed with Phases II and III of Energy Systems Safety Analysis Report Update Program for TSR facility.	FY 1996*

*Note: Detailed schedules for Phases II and III of the Energy Systems Safety Analysis Report Update have not been finalized; however, reference 1 indicates that completion between FY 1995 and FY 1998 is anticipated. A facility-specific schedule for the TSR will be developed following authorization to continue operation beyond current experimental program.

Costs:

Type of funds: Research Programmatic
Source of funds: NE-AF

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	20						20
2	—						
3	—		100	100	50	50	300
Status:							
Funded	20						
Requested							
New			100	100	50	50	$320

References: Y/CSET-1 "Safety Analysis Report Update Program Overview and Phase I Implementation," October 1990

Finding No.: ROA.7-4 Control of Documents

Finding Description: **There is no assurance that controlled documents are kept up to date or that uncontrolled copies of the document do not become working copies.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: An automated computer program has been implemented to track and monitor material transmitted to controlled document holders. Procedures are being revised to reflect how decontrolled copies in the field will be handled.

Root Causes:

Inadequate policy implementation; no formal verification system existed to ensure controlled document holders were returning signed transmittals and maintaining their documents. Poorly defined roles and responsibilities; inadequate understanding of responsibilities and accountability by controlled copy holders.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Initiate system to issue and track material transmitted to controlled copy holders.	Complete
2. Conduct initial formal quarterly audit of approximately 10% of controlled copy holders.	Complete
3. Identify and initiate implementation of corrective actions to resolve any audit findings.	Complete
4. Revise existing procedures to reflect practice of quarterly audits and correction of findings.	5/91

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	21						21
2	5	5					10
3	1	0.5					1.5
4	0.2						0.2
Status:							
Funded	27.2						
Requested		5.5					
New							$32.7

References: ORNL/RRD/INT-12 RRAP 3.1

Finding No.: ROA.7-5 Procedures

Finding Description: **Because many procedures have deficiencies, and procedures are not always followed, management cannot ensure the highest level of safe reactor operations, as required by DOE 5480.6.**

Code: Category III

Compliance Protocol: DOE Order 5480.6

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response:

- Overall improvements in procedures for operating reactors have received significant emphasis in the reactor restart programs. Continuing actions from these programs are acknowledged to remain outstanding. The procedures, however, have been accepted as adequate to support safe operations.

- Individual deficiencies with procedures have been identified on an ongoing basis and actions have been and continue to be taken to improve them. When deficiencies are noted they are addressed. This process generally involves revision followed by review by the Plant Operations Review Committee (PORC), which review is supportive of safe operation.

- The operator training and certification program is performance based and produces qualified operators who are able to operate the reactors safely with existing procedures. Such also emphasizes requirements for procedure compliance and processes for correcting any procedure deficiency noted.

  Procedures are normally written for operational consideration with implementation by qualified personnel; therefore, all acceptance criteria are not explicitly listed in most procedures.

- Several of the concerns regarding procedural deficiencies are recommended good practices and, as such, lack of deficiency correction does not infer lack of safety of operations.

  Our conservative approach in regards to personnel protection, safety, and hazards assessments has resulted in some cases where procedures were considered deficient because they were overly restrictive. These errors have been in the direction of safe operation and not ones which would result in a reduced level of safety of operation.

  In some cases the cited procedural deficiency did not reflect current or past practices, both of which were more conservative in regards to safe operation of the facility.

- Our Quality Assurance program, which is conducting surveillance of procedures and procedural compliance, is considered by many to be one of the best of DOE reactors and as such supportive of safe operations.

- There have been extensive independent reviews and appraisals associated with the reactor restart programs, including specific review of the adequacy procedures, none of which have questioned the safety of reactor operations.

- Periodic walk-throughs by management personnel at all levels are made both during operation and outages toward maintaining an acceptable level of safe operations.

- Revisions of procedures, experimental program changes, and physical modifications which could have safety implications are conducted through formalized, effective programs.

- Continuing procedure improvement initiatives are a part of our pursuit of excellence programs, and specific actions are being carried out as documented in the Integrated Resource Management System.

Root Causes:

Ambiguous requirements or expectations and insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Review Reactor Technical Safety Assessment in the Tiger Team Report and recent RORC reports for any underlying or pervasive concerns that could indicate less than required levels of safe operation.	Complete
2. Senior management review all findings referenced in Concern 4.5.2.1.2 (Finding OA.7-5) for applicability to and impact on the issue.	Complete
3. Complete actions identified in the action plans addressing the following findings as scheduled: QV.1-3, 2-2, 7-1; OP.2-1, 2-2, 2-3, 3-1, 3-2; EP.7-2; TS.3-1, 3-3; EA.3-1, 4-1; and RP.2-3.	
4. Complete actions identified in the action plans addressing the following findings as scheduled after funding is provided: QV.1-4, 1-5; OP.3-3; MA.8-1; EP.6-1, 7-2; and TS.2-1.	

Costs: No significant additional costs associated with these actions not already included in referenced actions.

References: None

Finding No.: ROA.8-1 Substance Abuse Program

Finding Description: **The substance abuse program at ORNL is not well understood by all management and staff.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 4

Response: The Laboratory will address this concern through the review and revision, as necessary, of fitness for duty policies and procedures and through employee training.

Root Cause:

Insufficient resources; the Laboratory has been operating for some time on limited resources. Thus, items not mandated by requirements have been given a lower priority.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Complete a 2.5-hour drug awareness training course for managers. (See Finding OA.8-1.)	Complete
2. Develop a fitness-for-duty policy to integrate all elements of the program into a single policy.	6/91

Costs: To be accomplished with existing resources.

References: None

3.4.2 Quality Verification

Finding No.: RQV.1-1 RRD Quality Assurance Program Manual

Finding Description: **The Research Reactors Division Quality Assurance Program Manual is out of date and does not address current organization. The important responsibilities for identification on nonconforming conditions of individual employees at all levels are not identified.**

Code: Category III

Compliance Protocol: ANSI/ASME NQA-1 Basic Requirement 1 states in part: "Organizational structure, functional responsibilities, levels of authority, and lines of communication for activities affecting quality shall be documented."

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: QA-RRD-15-100, Rev. 3, "Nonconformance Identification, Control and Documentation," states that RRD staff is responsible to identify nonconforming items. Also, all staff working for RRD have to take GEAT training which outlines the individual's responsibility to report nonconforming conditions per the Occurrence Reporting System (ORS).

This same condition was identified as Finding 1 on September 18, 1990, during ORNL Audit X-90-0297.

Root Cause:

Ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue revised Attachment "A" and other applicable portions of RRD QA Manual QA-RRD-1-100, Rev. 0.	11/91

Costs: None significant.

References: None

Finding No.: RQV.1-2 Management Assessment of RRD

Finding Description: Management is not conducting verification and self-assessment as required by the Research Reactors Division quality assurance program and DOE 5700.6B.

Code: Category III

Compliance Protocol: NQA-1, Basic Requirement 2 states in part: "Management of these organizations implementing the QA Program or portions thereof, shall regularly assess the adequacy of that part of the program for which they are responsible and shall assure its effective implementation." Also, QA-RRD-2-103 requires "a semiannual assessment and the ORNL QA Program as practiced within the RRD."

Priority: Energy Systems Risk Weight 50
Tiger Team Action Plan Priority 3

Response: Deviation Request X-91-RR-0013 has been approved and issued to defer assessment and reporting of QA program adequacy and effectiveness. Management is conducting verification and self-assessments by the following methods: 1) Facility Inspection Program, 2) Operational Technical Specification Surveillance (STP), 3) Providing evaluators for conducting QA surveillances, 4) Providing staff from RRD to perform as auditors on internal audits, 5) Calculations/design verifications by peers, 6) management overview and scrutiny involving quality investigation determination and investigation depth/adequacy, and 7) hosting multiple outside reviews of RRD programs and their adequacy. Because of the mentioned verification processes/self-assessments, the intent of NQA-1, Basic Requirement 2 is being met.

Root Cause:

Inadequate management approach

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue and implement revised procedure QA-RRD-2-103, "Assessment and Reporting of QA Program Adequacy and Effectiveness," to reflect the new RRD Self-Assessment Process. This is an alternate action already specified on the Deviation Request cited above.	12/91

Costs: None significant.

References: Deviation Request X-91-RR-0013 and RRD Procedure QA-RRD-2-103.

Finding No.: RQV.1-3 Implementing RRD Procedures

Finding Description: **Personnel do not always follow procedures or interpret them correctly, resulting in noncompliance with Research Reactors Division requirements. This concern has been repeatedly identified on Quality Surveillance Summary reports.**

Code: Category III

Compliance Protocol: Best practices dictate that procedures be as clearly written and as unambiguous as practicable.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: The reviewer indicated that many Research Reactors Division procedures lack clarity, details, and information. Several procedures reviewed have numerous references to other procedures which make them difficult to follow.

Difficulties with the procedures have been recognized and steps have been and are being taken to improve the procedures. When deficiencies are noted they will be addressed, revised, and reviewed by the Plant Operations Review Committee (PORC). Specific actions on specific procedures have been identified and are documented in action plans for the following Findings: OP.2-3, OP.3-2, OP.3-3, OP.4-2, MA.8-1, TS.2-1, and TS.3-2.

Root Causes:

Inadequate policy implementation

Planned Actions and Schedules:

Specific actions to review, correct, and upgrade procedures have been identified in Findings OP.2-3, OP.3-2, OP.3-3, OP.4-2, MA.8-1, TS.2-1, and TS.3-2.

Item/Description	Completion Date
1. Reemphasize to all personnel in staff meetings and in writing the importance of always following procedures.	Complete
2. Enter action plans into Integrated Resource Management System and track progress to ensure that the above action plans are completed as scheduled, resulting in improved procedures.	10/91

Costs: None significant.

References: None

Finding No.: RQV.1-4 Thoroughness of Procedures

Finding Description: Procedures lack adequate detail — they do not specify what is to be done in response to specific items or failures as required by basic requirement 5 of ANSI/ASME NQA-1.

Code: Category III

Compliance Protocol: NQA-1, "Basic Requirement" Section 5, "Instructions, Procedures, and Drawings" - "Activities affecting quality shall be prescribed by and performed in accordance with documented instructions, procedures, or drawings of a type appropriate to the circumstances. These documents shall include or reference appropriate quantitative or qualitative acceptance criteria for determining that prescribed activities have been satisfactorily accomplished." OR 5700.6B (11/22/89) paragraph 6 (Contractor Requirement) Item 6 - "ANSI/ASME NQA-1 is the required standard for ORO program."

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: Finding QV.1-4 was not addressed in the RRD self-assessment report of October 1990. However, in April of 1990, RRD completed a 2-year review of 44 manuals/procedures (memo, H. A. Glovier to Dr. Martin McBride, April 30, 1990). To ensure consistency and a quality review, these documents were reviewed using formal guidelines and criteria which were issued specifically for the review. The review format is based on knowledgeable personnel completing a review of assigned procedures; therefore, the amount of detail necessary for a procedure to be adequate can be very subjective.

Root Cause:

Ambiguous requirements or expectations; detailed acceptance criteria have not been routinely incorporated into procedures or establish as a requirement for procedures.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request funding for this action plan and action plan RQV.1-5. Funding for this action covered under Finding RQV 1-5.	Complete

2. Obtain additional support for completing already identified revisions to the procedures/manuals being used by RRD.	3 months after funding has been provided
3. Incorporate revisions into procedures/manuals and improve the details on acceptance criteria (amount of detail necessary for adequate procedures).	6 months after support is obtained
4. Issue formal guidelines and criteria, including standard forms to document the results of the two-year and annual reviews. Issue revised procedures to reflect current review requirements.	3/92
5. Clearly assign priorities to personnel performing procedure reviews; additional manpower will be required to incorporate improvements to procedures as they are identified by the users or reviewers.	6 months after funding has been provided

Costs: Funding covered in Finding RQV 1-5

References: ANSI/ASME NQA-1
DOE Order 5700.6B
RRAP-1.5
Memo from H.A.Glovier to Dr. Martin McBride dated April 30,1990

Finding No.: RQV.1-5 Revision of Procedures

Finding Description: **Procedures are revised without analysis and coordination to ensure conformance with other similar programs or procedures.**

Code: Category III

Compliance Protocol: NQA-1, "Basic Requirements", Section 6, "Document Control"- "The preparation, issue and change of documents that specify quality requirements or prescribe activities affecting quality shall be controlled to assure that correct documents are being employed. Such documents, including changes thereto, shall be reviewed for adequacy and approved for release by authorized personnel."

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: Finding QV.1-5 is a new finding and was not addressed in the RRD self-assessment report of October 1990. RRAP-1.5, "Preparation, Review, and Revision of Procedures" contains in Section 6 (Reviews and Approvals) and Section 7 (Revisions) requirement for the revision of procedures used by RRD. However, procedures are revised and issued on a continuous basis. When procedures are issued before a review of similar programs can be conducted, minor differences are expected. This is sometimes necessary to implement timely improvements. Limited resources have sometimes prevented requested revisions to supporting procedures being completed in a timely fashion.

Root Cause:

Insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request funding for this action plan.	Complete
2. Issue revised RRAP-1.5 to document the review of other similar programs or procedures that are affected by a proposed revision.	3 months after action plan has been accepted

3. Increase staffing to provide for timely analysis of revisions to procedure when required by the review process. — 6 months after funding has been provided

4. Audit procedure review process to ensure appropriate analysis and coordination with other programs or procedures. — 6 months after staffing obtained

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3		*					
4	—						
Status:							
Funded							
Requested							
New							$*

*Estimated annual ongoing cost: $100K starting in FY 1992.

References: ANSI/ASME NQA-1
RRAP-1.5

Finding No.: RQV.1-6 Frequency of RRD QA Audits

Finding Description: **Audits performed by Research Reactors Division Quality Assurance are infrequent, requiring extended periods to evaluate total quality program effectiveness.**

Code: Category III

Compliance Protocol: QA-RRD-18-100, "Administration and Conduct of Quality Assurance Audits," Requirement Items A & B state in part: "A documented audit program shall be established to verify compliance with all aspects of the QA program and to determine its effectiveness. Audits shall be planned and scheduled at a frequency commensurate with the risk of the activity being considered for audit."

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: QA-RRD-18-100, "Administration and conduct of Quality Assurance Audits," does not specify a certain frequency of audits, rather it states in part: "Audits shall be scheduled at a frequency commensurate with the risk of the activity being considered for audit." Quality program effectiveness is being looked at on a continual basis by a variety of tools. Within the past 2 years, approximately ten external audits or committee reviews have been conducted. Additionally, four internal audits and approximately 200 QA surveillances (which supplement the audit program) have been completed. Because of this, RRD management and the RRD QA Manager have determined that the established frequency of internal audits has been more than adequate. If, at some point in the future, the frequency of external audits/reviews is reduced, the number of internal audits/surveillances will be increased. In addition to the external audits (approximately five per year) for the Research Reactors Division, four internal audits are scheduled, and an 18-element NQA-1 based audit (conducted by ORNL Quality Assurance) is scheduled for each operating reactor for 1991. These audits are to be supplemented (not replaced) by approximately 60 QA surveillances. This is deemed adequate for assessing the RRD QA program.

A similar finding to this concern was previously identified in May 1990, audit E-90-0002, Finding 2.

Root Cause:

Ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Conduct RRD QA audits as approved and scheduled.	12/91

Costs: None significant.

References: Procedure QA-RRD-18-100, "Administration and Conduct of QA Audits" NQA-1, Supp. 18S-1, Paragraph 2

Finding No.: RQV.1-7 Method of Questioning in RRD QA Audits

Finding Description: **Research Reactor Divisions Quality Assurance audits have generic questions that are answered with no objective evidence or method of sampling, evaluation, or determination.**

Code: Category III

Compliance Protocol: Good practice not followed; QA-RRD-18-100, Section 200.1 states in part: "Checklists should include the parent requirement, the necessary verification activity, and the required objective evidence."

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: While it is generally a preferred audit technique to indicate the objective evidence or method of sampling, evaluation, or determination in the comments/remarks section of the audit checklist, the checklist is primarily a guide to ensure that nothing is overlooked, as well as a convenient place to indicate the determination of "satisfactory," "unsatisfactory," or "not applicable." NQA-1 Supp. 18S-1 does not require that the audit checklist be maintained as a quality record, instead NQA-1 Supp. 18S-1 states: "Audit records shall include audit plans, audit reports, written replies, and the record of completion of corrective action." The RRD QA procedure for audits, QA-RRD-18-100, "Administration and Conduct of Quality Assurance Audits," section 200.1 states in part: "Checklists should include the parent requirement, the necessary verification activity, and required objective evidence." Emphasis is placed on the word "should," which according to the guidelines of NQA-1 is a recommendation. Furthermore, only qualified and certified lead auditors and auditors conduct audits at RRD, which by virtue of their training and demonstrated proficiency are required to obtain and maintain their qualifications. Many RRD audit and surveillance checklists do have the remarks sections annotated where applicable as deemed appropriate by the auditors.

Root Cause:

Ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue memo to inform auditors performing audits at RRD of the Tiger Team concern, i.e., document the objective evidence or method of sampling or acceptability determination in the comments/remarks section of the audit checklist.	Complete
2. Issue revised RRD-QA-18-100 to respond to Energy Systems proposed audit procedure change.	6/91

Costs: None.

References: None

Finding No.: RQV.1-8 RRD Corrective Action Program

Finding Description: Many corrective action items are closed without the corrective action process required by DOE 5700.6B. The Research Reactors Division corrective action program does not ensure correction and prevent recurrence of identified deficiencies.

Code: Category III

Compliance Protocol: DOE Order 5700.6B requires that the causes of significant deficiencies be identified and corrected to prevent recurrence. This finding deals with nonsignificant deficiencies; therefore, it is considered to be best management practice.

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: The formality and the discipline of implementing corrective actions for reported deficiencies is acknowledged to have been inadequate in regard to the application of NQA-1, the identification of root causes, and the follow-up action needed to ensure the effectiveness of the corrective actions. Some improvements, to the extent permitted by available resources, have been implemented.

As part of RRD's evaluation of reported deficiencies, root causes will be identified, documented, and resolved in a more formal manner toward prevention of recurrences of the deficiencies. Improvements to RRD's corrective action program are addressed in this action plan.

Root Cause:

Insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request funding for this action plan.	Complete
2. Evaluate the corrective action process and determine and document the type of analysis necessary (including formal root cause analysis) to appropriately identify corrective actions.	3/92
3. Issue revised supporting procedures as necessary to reflect the formal requirements for analysis and appropriate correction of the cause of the problem.	3/92

4. Conduct additional training of personnel involved in corrective actions/reporting on various types of analyses (root cause, MORT, etc.).	180 days after funding is provided
5. Increase staffing level to support the analysis necessary to demonstrate compliance with applicable requirements (1 FTE).	180 days after funding is provided and qualified personnel are available

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	—						
4		30	30				60
5		85	85				170
Status:							
Funded							
Requested							
New		115	115				$230

References: RRD's Administrative Procedure Manual: RRAP-1.8 (Reviews, Audits, Trend Analysis, and Reporting); and draft RRAP-3.5.1 (Critiques for Reported Events)

Finding No.: RQV.1-9 Conflicting Goals in RRD

Finding Description: **The Research Reactors Division management's stated performance expectation is not consistent with published performance goals.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 4

Response: The Performance Indicator Program, as outlined in RRAP-1.8.4, has been implemented for approximately one year. At the onset of its implementation, we planned to review the indicators and their goals for applicability and appropriateness. One of the goals already identified as needing change is the goal for "Number of Unplanned Automatic Trips While Critical." As in this case, some of our performance indicators were patterned after those used in the commercial nuclear industry, e.g., there would be great consequences for scrams at a commercial reactor, possibly on the order of millions of dollars a day. Therefore, a goal of zero would be appropriate. On the other hand, scrams for a research reactor are in a more conservative direction, and may typically result in a few days of delay in operation over a year. Using data from past experience, we are revising the near term goal for this indicator to be 1 per quarter for FY 1991. This was reflected in the October Performance Indicators.

A new task group has been assigned to investigate the cause of scrams during our safety system testing.

Root Causes:

Ambiguous requirements or expectations and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Complete the review of all RRD Performance Indicators for necessary improvements.	Complete
2. Issue revised RRAP-1.8.4, updating indicators and goals, as appropriate, and include a provision to review the goals annually.	Complete

3. Issue revised Charter of Responsibility, Accountability, and Authority for the Director of Reactor Operations to reflect applicable rather than all commercial practices in continuing improvements and the pursuit of excellence. 5/91

Costs:

Type of funds: Research Programmatic

Source of funds: ER KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1–3	10						10
Status:							
Funded	10						
Requested							
New							$10

References: Research Reactors Administrative Procedure RRAP-1.8.4, "Performance Indicator Reporting and Tracking"

Finding No.: RQV.1-10 Data Base Trending System

Finding Description: **Some important quality-related information is not input into the trend and quality verification feedback system, and is not utilized to identify conditions adverse to quality or improve item/process quality as required by DOE 5700.6B.**

Code: Category III

Compliance Protocol: DOE Order 5000.3A, Section B, Item C(2) utilization states in part: "Each Facility Manager should adopt the use of trending and analysis of this information for early indications of deteriorating conditions."

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: It is true that all information from a variety of sources, Deviation Requests, audit reports, surveillance reports, Occurrence Reports, etc. is not entered into the ESQIS system.

The concern for trending nonconformances has been previously identified by RRD audit I-88-028, which is still open with trending of NCRs utilizing ESQIS currently in-process.

Trending of RRD QA surveillance data has been in effect since early 1989, and is being accomplished on a quarterly basis.

X-GP-13 requires entry of all Occurrence Reports into the ESQIS. The Occurrence Reporting System (ORS) has only recently been implemented (since August 1990) with ESQIS originally established to assign numbers. The ESQIS program for accepting notification reports was instituted September 1, 1990, with ESQIS program for accepting 10-day and final reports updated on October 7, 1990. Training on data input was accomplished in September and October 1990. Some earlier Occurrence Reports have not been input to ESQIS because the computer program was not ready to accept the information and training had not been completed. Because the ORS is a relatively new program as mentioned above, procedures have not yet been developed to trend event data.

A similar finding to this concern was previously identified in Audit E-90-0002, Finding 33.

Root Causes:

Inadequate policy implementation and insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request funding to permit evaluations in Actions 2, 3, and 4.	Complete
2. Evaluate various other types of reports for applicability to trending and ascertain if the identity of conditions adverse to quality or improvement to item/process can be achieved or is worth pursuing. Document this activity by report.	Two months after funding is available
3. Develop and revise procedures to address applicable recommendations of the evaluation/report in Action 2.	Six months after funding is available.
4. Issue revised RRAP-3.5 for inclusion of trending requirements for ORS data.	Six months after funding is available

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2			10				10
3			10				10
4			10				10
Status:							
Funded							
Requested							
New			30				$30

References: None

Finding No.: RQV.1-11 Occurrence Reporting System

Finding Description: **The new occurrence reporting system and its lack of interface with the nonconformance reporting system have allowed deficient conditions to go unreported, resulting in noncompliance with DOE 5700.6B and DOE 5000.3.**

Code: Category III

Compliance Protocol: DOE Order 5700.6B requires NQA-1 which requires Basic Requirement 15 that states in part: "Controls shall provide for identification, documentation, ... of nonconforming items, ..." DOE Order 5000.3A, purpose states in part: "To establish a system for reporting of operations information related to DOE-owned or operated facilities and processing of that information to provide for appropriate corrective action in accordance with the policy set forth ....."

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 4

Response: ORNL/RRD staff have been documenting nonconformances and deficiencies on either nonconformance reports or the new occurrence report forms. Before the occurrence report came along, the now defunct Quality Event or Operations Event Report, Unusual Occurrence Report, Quality Investigation Report, was used. In the case of the Health Physics area the Radiological Awareness Report was used. If a nonconformance condition (needing technical disposition and control) was warranted from this variety of reports the issue has been escalated or referred to the nonconformance system.

RRD strongly disagrees that events or nonconforming items/activities have simply gone unreported because of some confusion on the interfacing of the new Occurrence Reporting System procedure with the nonconformance procedures in effect. Also, the existing procedure QA-RRD-15-100, "Nonconformance Identification, Control and Documentation," Section 7.2 (Evaluation of Nonconformances) requires the QAS to determine the reportability of the event under RRAP-3.5, "Event Reporting."

Root Cause:

Ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request funding for Action Items 3 and 4.	Complete

2. Issue guidance on the type of report to initiate for (i.e., nonconformance reports versus occurrence reports and vice versa) and emphasize the importance of problem identification. Ensure that personnel understand their responsibilities and methodology to identify nonconforming conditions.	6/91
3. Evaluate issued occurrence reports to determine if nonconformance reports should have been initiated and if an NCR was needed, prepare and obtain technical disposition as necessary if the occurrence report did not address.	Two months after funding is received
4. Evaluate procedural interfaces between nonconformance and occurrence reporting for appropriateness and compliance with DOE Order 5700.6B (NQA-1) and DOE Order 5000.3A and issue revised procedures as required.	One month after funding is received

Costs:

Type of funds: Research Programmatic

Source of funds: ER

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	1						1
3,4		10					10
Status:							
Funded	1						
Requested							
New		10					$11

References: None

Finding No.: RQV.2-1 Justification of Procurement Deviations

Finding Description: **Deviations that have not been justified circumvent the intent of the Quality Assurance plan, resulting in questionable material and equipment. This does not meet the requirements of DOE 5700.6B.**

Code: Category III

Compliance Protocol: ANSI/ASME NQA-1; NQA-1 Supplement 15S-1, par. 4.4 states in part: "Disposition such as use-as-is, reject, repair, or rework of nonconforming items shall be identified and documented."

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: The examples (penciled records, erasures, etc.) pertinent to the Hafnium Sleeve job are dated several years ago for the fabrication and the RRD or the ETD (division responsible for this job) program was not quite as disciplined as it is currently due to changes made within the past several years. Reviews were done by outside committees and these types of findings had been previously identified in the "older" documentation, which has since been determined acceptable for this older work. Recognizing past deficiencies, RRD instituted a "fitness-for-use" or package audit review by the RRD QAS. Any questions on the appropriateness of documentation completion are addressed prior to the item being "certified for use." The older packages particularly have proved to be a challenge, only in rare occasions would requirements of current RRD program be "back-fit" on an old subcontractor or fabricator. That type of a back-fit would have to be for when the quality of the item is in jeopardy or suspect.

Deviations in the RRD program are not considered as nonconforming since they are reviewed/approved and have logical cause provided before the departure is permitted. Considered as a design change permission, deviation requests to remove the requirements for certified material or the deletion of a drawing note were reviewed by the appropriate technical parties. At the time, their signatures were considered adequate documented justification. These changes were not made to circumvent or to compromise quality. Many times the QAS was involved with the changes and they weren't pressured by cost or scheduling. The formal QAS review should have identified any improprieties if the quality had been in jeopardy or suspect from the deviation. Also, it must be mentioned that other means (testing/checking) was provided to assure with high confidence the material requirements were being met for deviations MFE-330J-1-10 and MFE-60J-1-3 as well as 12673-1.

The concern relating to the PU-4B pressurizer clutch was addressed in the work package prior to installation. The clutch was procured during the mid 1980's "old

program" and the concern had been recognized by the Task Leader and the work package was adjusted to correct the anomaly.

Magnetic clutch excessive shaft run-out being discovered after placement in HFIR was a management decision based on risk that the unit was acceptable for use without run-out measurements prior to placement.

Root Causes:

Ambiguous requirements or expectations, inadequate training, and inadequate management approach

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request funding to permit evaluation in Action 6.	Complete
2. Review similar ETD Fabrication Packages and where penciled or erasures have been identified, make a copy and attach it to the original to "base-line" the document this review has taken into account the source or appropriateness of entries or changes made to these packages.	Complete
3. Provide training to Task Leaders emphasizing importance of proper documentation completion.	6/91
4. Add disposition justification to NCR 330J-1-11.	Complete
5. Revise other NCRs at ETD and add justification where missing or inappropriate.	Complete
6. Evaluate RRD NCR program and determine if revisions are needed to assure consistent application of justification on NCRs, if revisions are required, issue revised appropriate procedures and train affected staff.	One month after funding is available

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	5						5
4	—						
5	—						
6	1		20				21
Status:							
Funded	5						
Requested	1						
New			20				$26

References: None

Finding No.: RQV.2-2 Purchase Order and Quality Requirements

Finding Description: **Purchase order and quality requirements are not enforced, resulting in item noncompliance and failure to meet the requirements of DOE 5700.6B and basic requirement 8 of ANSI/ASME NQA-1.**

Code: Category III

Compliance Protocol: DOE Order 5700.6B, par. 9 and NQA-1 are being violated. NQA-1 Basic Requirement 8 states in part: "Controls shall be established to assure that only correct and accepted items are used or installed. Identification shall be maintained on the items or in documents traceable to the items, or in a manner which assures that identification is established and maintained."

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: This concern is based on the PU-4B, Magnetic Clutch Procurement Package. The particular example cited was for a procurement dating back into the mid-1980s. No current samples were identified. Since that time, RRD has hired a Material Control Supervisor to coordinate procurements of reactor material. An internal audit (X-90-0297) performed in September 1990, by independent auditors identified a positive observation which cited improvements made in the "process on the procurement system, including the handling, storage, inspection, tagging, and documentation of received materials and equipment." Also, internal audit I-89-022, was performed in January 1990, which covered "procurement document control" and no findings of this nature were identified.The particular concern relative to the PU-4B magnetic clutch was corrected in the work package prior to final installation.

Root Cause:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Complete internal audit on receiving inspection process; the audit includes an assessment of purchase orders and applicable quality requirements to determine if the purchase order and/or applicable quality requirements are being adhered to.	Complete

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	6						6
Status:							
Funded	6						
Requested							
New							$6

References: Internal Audit X-90-0297, "Quality Audit of HFIR"
Internal Audit X-89-022, "Procurement Document Control"

Finding No.: RQV.3-1 Adequacy of Inspections

Finding Description: Receiving and pre-installation inspections do not consistently verify critical attributes before installation.

Code: Category III

Compliance Protocol: NQA-1, Basic Requirement No. 7 states that "The procurement of items and services shall be controlled to assure conformance with specified requirements," and Basic Requirement No. 8 states that "Controls shall be established to assure that only correct and accepted items are used or installed."

Priority: Energy Systems Risk Weight 6
Tiger Team Action Plan Priority 3

Response: The specific item identified in the findings had been purchased in 1986. Our procurement and receiving inspection activities have been enhanced considerably since that time. A material control engineer has been hired and has implemented a tracking system for procurement activities. New procedures that address procurement and issue of materials are in draft form. A material-receiving procedure will be developed which will incorporate results of a currently ongoing RRD internal audit of receiving.

Root Causes:

Inadequate policy implementation and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue new procurement, material issue, and receiving procedures for RRD.	12/91
2. Issue revised existing Maintenance Procedure, RRD-M-1.6 to add on the work package preparation checklist a line for pre-installation requirements.	5/91

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	25	5					30
2	2						2
Status:							
Funded	27						
Requested		5					
New							$32

References: Research Reactors Maintenance Procedure RRD-M-1.6, "Preparing and Processing a Maintenance Work Package"

Finding No.: RQV.3-2 Documentation of "Use-As-Is" Classification

Finding Description: **Items identified as nonconforming by receiving or pre-installation inspections are not dispositioned and justified for "use as is," as required by Research Reactors Division procedures and DOE 5700.6B.**

Code: Category III

Compliance Protocol: NQA-1 Supplement 15S-1, par. 4.4 states in part: "The disposition such as use-as-is ... shall be identified and documented .... Technical justification for acceptability of a nonconforming item dispositioned use-as-is shall be documented."

Priority: Energy Systems Risk Weight 0
Tiger Team Action Plan Priority 3

Response: The finding was in relation to the RRD Inspection Plan and Dimensional Certification Report for which an approved Engineering Specification (RRD-JS-24, "Specification for Dimensional Inspection") has been in place. This specification permits the Task Leader, with QA oversight and concurrence (by signature), to approve generally minor dimensional anomalies while the work is in-process without the need for a formal nonconformance report per RRD-QA-15-100. The QA oversight is the check and balance for minor dimensional anomalies being accepted by the Task Leader. The finding states that "only the signature of the engineer is required." This is not the case as pointed out above.

Also, in the case of major fabrications that are covered by a fabrication package, the package has to undergo QAS certification-for-use review (i.e. package audit/review). At this time, if there are any questions as to the nature of a minor dimensional acceptance that may appear to need a formal NCR, the matter would be resolved before the item's acceptance and certification-for-use.

The Task Leaders do not and have not just arbitrarily accepted these minor dimensional anomalies. They evaluate the effect the minor out-of-tolerance has, any tolerance build-ups, items final use, and functional fit. These considerations, because of the extremely minor nature of the dimensional anomalies encountered, are informally done (usually without documentation). DOE Order 5700.6B requires that line management be responsible for the achievement of quality. It has been determined that the acceptance of minor dimensional deficiencies by the Task Leader with QA concurrence IS NOT a compromise to quality achievement.

Because the items produced at ORNL facilities for RRD use are not mass produced (RRD only requires very limited quantities and most are highly customized) trending of these minor dimensional anomalies is not an issue that would provide any value added. P&E at one time kept track of inspection efficiency/shop supervisor efficiency and no appreciable benefits were derived other than to ascertain that over the period a 95% to 98% accuracy of

conformance was achieved for items produced. Therefore, the process was discontinued.

The idea that a trend from these data would identify machine variation, isn't correct because a multitude of machines and different locations at ORNL are used to produce the limited quantities and customized items for RRD.

Root Cause:

Ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request funding to permit evaluation in Action 2.	Complete
2. Perform a documented review of a sample of Dimensional Certification Reports over the past year to see if more than just minor dimensional anomalies have been accepted without a formal nonconformance per QA-RRD-15-100 or without QA concurrence signature.	1 month after funding is available
3. Prepare nonconformance reports and provide justification for use-as-is dispositions, as necessary if review in Item 2 above indicates abuse of procedure for minor dimensional anomalies.	2 months after funding is available
4. If Item 2 indicates abuse of established procedure for accepting minor dimensional anomalies, then train appropriate personnel to the requirements.	4 months after funding is available

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2		10					10
3		1					1
4		10					10
Status:							
Funded							
Requested							
New		21					$21

References: RRD-QA-15-100, "Nonconformance Identification, Control and Documentation"
Engineering Specification, RRD-JS-24, "Specification for Dimensional Inspection."

Finding No.: RQV.4-1 Documentation of Acceptance Inspections

Finding Description: **Measuring and test equipment found out of tolerance cannot be traced to previous inspection usage as required by ANSI/ASME NQA-1, Section 12S-1-3.2.**

Code: Category III

Compliance Protocol: NQA-1, Section 12S-1-3.2

Priority: Energy Systems Risk Weight 6
Tiger Team Action Plan Priority 3

Response: This finding is similar to Finding QV.4-2, Measurement and Test Equipment Traceability and QV.4-4, Determining Effects of Out-of-Tolerance Equipment.

Similar findings were identified in Audit E-90-002, Finding 6, dated May 1990, and ORNL Audit PE-89-001 in May 1989.

The approved response to both earlier audits was to continue the method currently used to "verify accuracy prior to use." This verification is documented on the Dimensional Inspection form per RRD Engineering Specification for Dimensional Inspection, JS-24. This issue will be reevaluated for acceptability.

The corrective action intended to conduct an independent evaluation of the ORNL Calibration Program and implement recommendations from the evaluation. See planned actions, schedule, and cost information for Findings QV.4-4 and QV.4-2.

Root Cause:

Ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Perform and document an independent reevaluation of current practices of "verifying for accuracy prior to use."	6/91

Costs: The costs associated with this finding are reported under Findings QV.4-4 and QV.4-2.

References: None

Finding No.: RQV.4-2 Measurement and Test Equipment Calibrations

Finding Description: Measuring and test equipment calibrations are not always traceable to the National Institute of Standards and Technology, as required by ANSI/ASME NQA-1, Section 12-5-3.1.

Code: Category III

Compliance Protocol: ANSI/ASME NQA-1, 12-S1, par. 3.1 states in part: "M&TE shall be calibrated, adjusted, and maintained at prescribed intervals or, prior to use, against equipment having known valid relationships to nationally recognized standards."

Priority: Energy Systems Risk Weight 50
Tiger Team Action Plan Priority 3

Response: See Finding RQV.4-4. A similar finding to this concern was previously identified in May 1990, audit E-90-0002, Finding 6.

Root Cause:

Inadequate policy implementation

Planned Actions and Schedules:

Finding RQV.4-2 is fully addressed by actions listed in Finding RQV.4-4.

Costs: The costs associated with this finding are reported under Finding RQV.4-4.

References: DOE Order 5700.6 and ANSI/ASME NQA-1

Finding No.: RQV.4-3 Use of Uncontrolled and Uncalibrated Instruments

Finding Description: **Critical measurements for acceptance and operability are made using uncontrolled and uncalibrated instruments, contrary to basic requirement 12 of ANSI/ASME NQA-1.**

Code: Category III

Compliance Protocol: ANSI/ASME NQA-1, Basic Requirement 12 states in part: "M&TE used for activities affecting quality shall be controlled and at specified periods calibrated and adjusted to maintain accuracy within necessary limits."

Priority: Energy Systems Risk Weight 50
Tiger Team Action Plan Priority 3

Response: The micrometer mentioned in the findings has calibration records with it demonstrating that the instrument is within tolerance; therefore, if any measurements might have been performed with it, they would have been satisfactory. Besides the issue of whether the micrometer could be repeatably calibrated, the contention of the auditor during interviews was that the "crack" in the anvil of the micrometer could have possibly scratched the surface of the item it was measuring. This is a valid concern and therefore the micrometer was taken out of service. P&E Management Staff at RRD was asked if it was likely that the micrometer in question had been used for any "acceptance" readings on parts, items, etc. In response it was stated that with the given work performed in the RRD shop was unlikely, but not impossible, that the micrometer was used for acceptance measuring as the majority of that measuring/gaging is performed at Bldg. 2525. Therefore, the one sample of this micrometer is an isolated case that has not affected quality. Since the micrometer has been taken out-of-service, no further action is planned regarding this one micrometer.

A similar finding to this concern was previously identified in May 1990, audit E-90-0002, Finding 6.

Root Cause:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Calibrate the four devices that were found out-of-calibration frequency and/or were not included in the calibration program. Evaluate any anomalies found during the calibration.	6/91
2. Request that facility managers determine if similar conditions to this concern exist elsewhere and if so, evaluate the M&TE for inclusion into Calibration Program. If calibrations are required, evaluate "as-found" readings in accordance with procedures in the event that anomalies or unexpected results cast doubt on past readings from these devices.	12/91
3. Ensure that when M&TE is utilized for acceptance testing, the identification of the device will be recorded within job documentation to provide "use traceability" or the device will be "verified for accuracy" and documented just prior to and after use.	9/91

Costs: No significant costs associated with actions outlined.

References: ANSI/ASME NQA-1

Finding No.: RQV.4-4 Determining Effects of Out-of-Tolerance Equipment

Finding Description: **Out-of-tolerance conditions of measuring and test equipment are not identified and evaluated to determine impact on previous measurements, as required by ANSI/ASME NQA-1, Section 12S-1-3.2.**

Code: Category III

Compliance Protocol: NQA-1, Section 12S-1-3.2 states in part: "When M&TE is found to be out of calibration, an evaluation shall be made and documented of the validity of previous inspections or test results and of the acceptability of items previously inspected or tested." 12S-1-3.1 also states in part: "M&TE shall be calibrated, adjusted, and maintained at prescribed intervals or prior to use..."

Priority: Energy Systems Risk Weight 50
Tiger Team Action Plan Priority 3

Response: I&C technicians are required to perform the calibrations and report the results to the supervisor, who in turn initiates evaluation actions in the case of out-of-tolerance conditions.

It can and has been demonstrated that out-of-calibration devices are evaluated for impact on previous measurements, as by reference to samples such as: an 9/18/90, 10/22/90, and an early 1990 "out-of-tolerance notification" memo from I&C representatives to Maintenance Manager and QER-X-89-RR-0058. The P&E metrology lab's method of choice is to do a performance check on the device (M&TE) before the device is used. Thus, confidence is gained that the device is within it's "tolerance range." Also, the need for evaluating impact on past items measured with the device or the need for M&TE identification numbers to be included on Dimensional Inspection reports is eliminated. This was the method of choice as depicted in the current RRD Engineering Specification for Dimensional Inspection. This method requires less paperwork, and "tracking" and demonstrates a proactive approach to eliminating a problem device before it is used, rather than finding a problem with it some time later after the item might have been used in a nonretrievable or critical application. This was an agreed-upon response to a past audit on this same subject, which was subsequently audited several times with no concerns raised regarding how this activity is being performed.

See response to Finding QV.4-2 for outside consultants scheduled to evaluate M&TE program for appropriateness. A similar finding to this concern was previously identified in May 1990, audit E-90-0002, Finding 6. Also, ORNL audit dated May 24, 1989, audit PE-89-001 identified similar conditions and the approved corrective action to the audit observation, is the process currently in use: "Inspection equipment verified for accuracy prior to use."

Root Cause:

Ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request funding to perform Item 3.	Complete
2. List transfer standards on the calibration form, as agreed to by P&E Calibration Supervisor.	Complete
3. Contract with a consultant from Martin Marietta (Denver DOD Contractor) to evaluate the ORNL Calibration Program and provide recommendations for improvements.	12/92

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
3			60				60
Status:							
Funded							
Requested							
New			60				$60

References: None

Finding No.: RQV.5-1 Justification of Deviations and Nonconformances

Finding Description: Some deviations and nonconformances are accepted without justification that meets the requirements of ANSI/ASME NQA-1, Section 15S-1-4.4.

Code: Category III

Compliance Protocol: DOE Order OR 5700.6B Section 6.6 requires the judicious and selective use of ANSI/ASME NQA-1 as the national consensus standard to be used for ORO programs. ANSI/ASME NQA-1 Supplement Section 15S-1 4.4 requires documented technical justification for the acceptability of nonconforming items dispositioned repair or use-as-is.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 4

Response: The RRD Quality Assurance (QA) Procedure, RRD-15-100, "Nonconformance Identification, Control, and Documentation" Section 6.4 requires a completed justification for each nonconformance written. RRD QA procedure RRD-3-102, "Control of Design Related Deviations" Section 100.5 requires a completed justification for each deviation written. RRD Administrative Procedure RRAP 3.2 Section 7.9 requires written justification for all design related deviations.

RRD Job Specification RRD-JS-24, "Specification for Dimensional Inspection" Section 6 allows the Engineering Task Leader, with the concurrence of the Quality Assurance Representative, to accept out-of-tolerance dimensions of a minor nature without the issuance of a nonconformance report. The out-of-tolerance dimensions are circled on the dimension report and the acceptance indicated by a dated signature of the task leader and QA department representative. This dimensional inspection practice has been questioned by many other review committees at HFIR (such as, Audit E-90-002 and Audit PE 89-001), but consistently found to be acceptable as applied. The deviation and/or nonconformance report number is typically referenced on the Drawing Change Notice (DCN) form under the section labeled "References." The procedure for drawing control, RRAP 3.2-3, "Administration of RRD Engineering Design Drawings" does not specifically specify the reference of deviation and/or nonconformance report numbers on the DCN.

Documented training has been conducted for RRD personnel on the above problems.

Root Cause:

Ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue a memo to reemphasize the need to justify nonconformance and deviation rationale per existing RRD procedures.	5/91
2. Issue revised RRD Procedure RRAP 3.2.3 to require reference to deviations and nonconformances on Drawing Change Notices.	5/91
3. Issue revised RRD Specification RRD-JS-24 to require justification on dimensional inspection reports for use-as-is dispositions.	5/91
4. Train RRD personnel on procedure and specification revisions.	6/91

Costs:

Type of funds: Research Programmatic

Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	3						3
3	—						
4	—						
Status:							
Funded	3						
Requested							
New							$3

References: RRD Administrative Policies and Procedures Manual, ORNL/RRD/INT-12
RRD Quality Assurance Procedures Manual, ORNL/RRD/INT-26
RRD Engineering Specifications Manual, ORNL/RRD/INT-37, Vol. 4

Finding No.: RQV.5-2 Trending of Nonconforming Items

Finding Description: **Items that do not meet design requirements are accepted in "use-as-is" dispositions without identification or trending as nonconforming as required by DOE 5700.6B.**

Code: Category III

Compliance Protocol: DOE Order 5700.6B; NQA-1 Supplement 15S-1, par. 4.4 states in part: "The disposition such as use-as-is .... shall be identified and documented .... Technical justification for acceptability of a nonconforming item dispositioned use-as-is shall be documented.

Priority: Energy Systems Risk Weight 51
Tiger Team Action Plan Priority 3

Response: The concern for trending nonconformances has been previously identified by RRD Audit I-88-028, which is still open with trending of NCRs utilizing ESQIS currently in-process. See Findings RQV.1-10, RQV.2-1, and RQV.3-2.

Root Causes:

Ambiguous requirements or expectations, inadequate policy implementation, and inadequate training

Planned Actions and Schedules:

Finding is fully addressed by actions listed in response to Findings RQV.1-10, RQV.2-1, and RQV.3-2.

Costs: Covered under other findings indicated above.

References: None

Finding No.: RQV.5-3 Identification and Storage of Parts and Material

Finding Description: **Parts and material are not stored as required by controlling procedures of American Welding Society (AWS)/ASME Code, and are not identified as acceptable or unusable.**

Code: Category III

Compliance Protocol: NQA-1, Basic Requirement 9, Processes affecting quality of items or services shall be controlled; and Basic Requirement 8, Controls shall be established to assure that only correct and accepted items are used or installed.

Priority: Energy Systems Risk Weight 50
Tiger Team Action Plan Priority 3

Response: The material found improperly stored or improperly identified was located near one of the Plant and Equipment (P&E) fabrication shops. Fabrication of parts for RRD at other facilities, such as the P&E Machine Shop (Building 7012) are governed by the material specifications originated in RRD. P&E Division has in place appropriate procedures for control of material for special processes. The spare parts and material program in RRD is establishing the controls necessary for implementing a good program. An action plan to implement a system for providing spare parts for safety-related and critical equipment for RRD reactor facilities has been established previously.

Root Cause:

Insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Review the P&E procedures on the welding program with the welding supervisors and document the review.	Complete
2. Make any revisions necessary to the P&E procedures after review is complete.	5/91
3. Request additional funding for Material Control and Procurement Group to carry out planned actions to implement the spare parts and material program.	Complete
4. Initiate hiring of additional support for Material Control and Procurement Group for support of HFIR and B reactors.	Funding plus 4 months

5. Perform inventory of all HFIR spare parts in storage as initial spare parts requirements.	Funding plus 10 months
6. Issue a spare parts stock list for HFIR safety-related and critical spare parts.	10/91
7. Initiate implementation of a reactor materials and spare parts inventory system to ensure that sufficient quantities of reactor spare parts are kept on hand.	Funding plus 15 months
8. Issue a spare parts stock list for B reactors safety-related and critical spare parts.	12/91
9. Incorporate B reactors into the materials and spare parts inventory system.	Funding plus 17 months

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	—						
4		*					
5	—						
6	20	10					30
7	—						
8		20					20
9	—						
Status:							
Funded	20						
Requested		30					
New							$50

*Estimated annual ongoing cost: $110K starting in FY 1992.

References: Plant and Equipment Division Procedures:
F-WELD-1.1, "Welding Program"
F-WELD-5.3, "Control of Welding Filler Metal"

Finding No.: RQV.5-4 Evaluating Unreviewed Safety Questions

Finding Description: Some modifications are performed to portions of the plant with analyzed accident impact without evaluation of the possibility of an unreviewed safety question as required by DOE 5480.5.

Code: Category III

Compliance Protocol: DOE Order 5480.5, Section 9h requires that each contractor provide for objective and independent review of proposed modifications to nuclear facilities and equipment having safety significance.

Priority: Energy Systems Risk Weight 50
Tiger Team Action Plan Priority 3

Response: The Research Reactors Division (RRD) Facility Modification Control Procedures met this requirement for significant facility modifications, but did not adequately provide documented evidence of an objective safety review analysis for minor modifications. These deficiencies in the RRD Facility Modification Control procedures have been documented in both the October 1990 RRD Self-Assessment under the Technical Support Section and the RRD Self-Assessment Supplemental Section on Configuration Management. The RRD Administrative Procedure RRAP 3.2, Rev. 5 was revised and approved by the RRD Plant Operations Review Committee (PORC) on October 26, 1990, correcting the deficiencies noted in Finding QV.5-4. The PORC decided not to implement the RRAP 3.2, Rev. 5 changes until training on the revisions could be completed. RRAP 3.2, Rev. 5 went into effect after completion of training sessions conducted on November 6, 1990, and November 9, 1990. The RRD-DCC began the process of issuing RRAP 3.2, Rev. 5 in the RRD controlled procedures RRAP manual as of November 20, 1990.

Related TSA concerns are found in Findings TS.3-1, TS.3-3, and FR.1-2.

Root Cause:

Poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue revised RRD Facility Modification Control procedures to require an independent and objective review and safety analysis for both major and minor design modifications.	Complete

2. Train RRD Design, Safety Analysis, and QA personnel on these revisions in the modification control procedures. Complete

Costs: None significant.

References: RRD Administrative Policies and Procedures Manual, ORNL/RRD/INT-12

Finding No.: RQV.6-1 Inspection Reports

Finding Description: **Inspection reports are not completed correctly and do not indicate important measuring and test equipment used, as required by ANSI/ASME NQA-1, Sections 10 and 12.**

Code: Category III

Compliance Protocol: NQA-1, Sections 10 and 12. NQA-1, Basic Requirement 10, "Inspection" and 12 "Control of M&TE." Basic requirement 10 states in part: "Inspection results shall be documented." Basic requirement 12, Supp. 12S-1 states in part: "When M&TE is found out to be out of calibration, an evaluation .... and the validity of previous .... results and of the acceptability of items previously inspected/tester shall be made."

Priority: Energy Systems Risk Weight 51
Tiger Team Action Plan Priority 3

Response: The findings relating to measuring and test equipment are addressed collectively in the response and action plans to Finding RQV.4-2. Adequacy of inspection report completion for the example involving brazing inspection reports are herein addressed; however, associated findings involving special processes are addressed in the response and action plans for Finding RQV.7-1.

Procedures were in place to ensure a program of inspection and special process control; however, incomplete inspection reports and inappropriate procedures were identified for the hafnium sleeve/capsule job that pertained to brazing:

1) An inspection report has been prepared by the technician that was cognizant of quality workmanship that went into the brazing operation.
2) Before the item was accepted, several type leak tests were performed to verify integrity of the brazing process and leak tightness.
3) On 11/09/90, ETD issued correspondence requesting the P&E division to develop brazing procedures for future. See Findings RQV.4-4, RQV.7-1, and RQV.7-2.

Root Cause:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request funds to prepare procedures for materials, qualifications, inspections, and processes involving brazing operations used and ORNL facilities. Actions: 2 and 3, below.	Complete
2. Issue qualified procedures for brazing operations used at ORNL facilities that include at least the following: material appropriateness, qualifications for brazing operators and inspectors, and inspection techniques.	6 months after funding is available
3. Train and qualify operators and inspectors for newly developed procedures involving brazing.	7 months after funding is available

Costs:

Type of funds: Research Programmatic

Source of funds: NE-AF

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2			15				15
3			15				15
Status:							
Funded							
Requested							
New			30				$30

References: Response and actions to Findings QV.4-4, QV.7-1, and QV.7-2

Finding No.: RQV.7-1 Control of Special Process Material

Finding Description: Special process material is not controlled as required by ORNL Research Reactors Division procedures and American Welding Society (AWS)/ASME Codes.

Code: Category III

Compliance Protocol: No specific section or requirement was cited to the above codes other than: "AWS/ASME." However, NQA-1, Basic Requirement 9, "Special Processes" states in part: "Processes affecting quality of items or services shall be controlled. Special processes that control or verify quality, such as those used in welding ... shall be performed ... using qualified procedures per specified requirements."

Priority: Energy Systems Risk Weight 50
Tiger Team Action Plan Priority 3

Response: Programs and procedures are in use at ORNL/RRD/ETD to control special processes. However, specific individual deficiencies with brazing procedures, stitch weld inspection, wrong heat number, and atmospheric exposure for coated electrodes indicate more attention to detail is required.

Many of the specific deficiencies noted have already been corrected or better documented within the fabrication file.

On 11/9/90, ETD issued correspondence requesting the P&E division to develop welding procedures (five processes, three for brazing and two for welding).

Concerning the atmospheric exposure of coated electrodes, weld procedures that apply to the use of coated electrodes are being revised to specify the limits for atmospheric exposure; also, the impact on items prior to the discovery are limited because 100% visual inspection and approximately a 5% Radiographic inspection has been performed on welds utilizing coated electrodes of concern and generally these type of electrodes are used on low carbon steels in which hydrogen induced cracking is not too much of a concern. However, for alloy steels in certain applications this could be a concern.

A similar audit finding to this concern was identified in May 1990, Audit 90-0002, Finding 19.

Root Cause:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. For brazing procedure development, see Finding QV.6-1.	
2. Evaluate other (if any) in-practice ORNL welding/brazing processes and determine extent of undeveloped qualified procedures and develop qualified procedures for material such as those mentioned in the ETD 11/9/90 correspondence to P&E. If unapproved weld procedure materials have been utilized, prepare NCR and evaluate on a case-by-case basis.	6/91
3. Revise existing program or issue revised procedures to comply with applicable codes/standards to specify exposure limits for coated electrodes.	Complete
4. Instruct applicable people, i.e., weld operators, inspectors, supervision of the new requirements for atmospheric exposure of coated electrodes.	Complete
5. Evaluate and document worst case scenarios for the adequacy of quality related welding performed at ORNL using coated electrodes that may have had excessive moisture content in coating.	6/91
6. Issue memo to instruct P&E that all welding is to be performed to written and approved procedures appropriate to the circumstances and that if procedures are not in-place or do not exactly fit the circumstances; either 1) revise existing procedures to include the circumstances prior to the work, 2) develop new procedures to address the situation prior to the work, or 3) prepare and obtain approval of a deviation request to allow the situation, prior to the departure.	6/91

Costs:

Type of funds: Research Programmatic
Source of funds: NE-AF

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
2	10						10
3	10						10
4	10						10
5	5						5
6	5						5
Status:							
Funded							
Requested							
New	40						$40

References: Deviation Request TS 0012/90

Finding No.: RQV.7-2 Special Process Procedures

Finding Description: Special process procedures are used outside allowable critical parameters allowed by ASME Code and ORNL/Research Reactors Division procedures.

Code: Category III

Compliance Protocol: See Finding QV.7-1.

Priority: Energy Systems Risk Weight 50
Tiger Team Action Plan Priority 3

Response: See response to Finding QV.7-1. A similar audit finding to this concern was identified in May 1990, Audit E-90-0002 Finding 19.

Root Cause:

See Finding QV.7-1.

Planned Actions and Schedules:

See Action Plans to Finding QV.7-1, "Control of Special Process Material."

Costs: Planned actions will be performed with existing funds.

References: None

3.4.3 Operations

Finding No.: ROP.2-1 Deficiencies in HFIR Operating Instructions

Finding Description: **High Flux Isotope Reactor operating instructions do not include all Technical Specification limits on reactor operations.**

Code: Category III

Compliance Protocol: Best management practices require that all Technical Specification limitations be reflected in operating procedures.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: The responsibility for the generation and revision of all HFIR operating procedures was recently (October 1990) assumed by the HFIR Operations Section of RRD. This should allow for more efficient handling of procedure revisions as required and assure that the overall revision of the manual is completed as scheduled.

The need to revise the HFIR Operating Procedures Manual has been recognized from early in the restart effort. Because of the large number of restart issues and concerns, RRD management made a deliberate decision to perform an overall revision on a long-term basis so that resources could be focused on restart-related issues. Revisions to specific procedures within the manual were performed to reflect changes in the system and identified deficiencies.

The inclusion of all technical specification requirements (limits) in the operating procedures will enhance our current practices which include biennial detailed training (of certified operators) and the requirement that an official, controlled copy of the technical specifications be available in the HFIR control room. Spelling out technical specification limits in each procedure will lessen the likelihood that the operating crew will be required to "break-out" the technical specification manual, and will also serve as a reminder that a particular operation will or might affect a technical specification. It is rather important that additions to the Operating Manual be accomplished in a manner which will facilitate later revisions, particularly when technical specification changes are effected.

Root Causes:

Insufficient resources and inadequate policy; lack of knowledgeable staff and a conflict between ORNL records control practices and RRD need for quick revisions has slowed adoption of this best management practice. (Lack of personnel and inadequate records management system.)

Planned Actions and Schedules:

Item/Description	Completion Date
1. Hire additional engineering staff to assist with procedure review/preparation.	Complete
2. Review the Operating Manual to find obvious omissions of technical specification references.	Complete
3. Correct the obvious omissions found in Item 2, including those specified in the 1990 ORNL TSA Review (Tiger Team Report).	Complete
4. Complete a detailed biennial review of the operating procedures to ensure compatibility with the Technical Specifications as specified in the Research Reactors Administrative and Policies Procedures Manual (RRAP-1.5, Sect. 8).	6/91
5. Correct the omissions, or make additions to the operating procedures as found necessary in Item 4.	9/91
6. See Action Item ROP.3-1 regarding steps being taken to resolve the conflict between operational needs and ORNL records control practices.	

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	39						39
4	—						
5	—						
6	—						
Status:							
Funded	39						
Requested							
New							$39

References: Finding 4.5.2.3.1 (OP.3-1, HFIR Operating Manual)
Finding 4.5.2.2.1 (QV.1-4)
Finding 4.5.2.2.1 (QV.1-5)

Finding No.: ROP.2-2 Technical Specifications at HFIR

Finding Description: **High Flux Isotope Reactor Technical Specifications do not always define the criteria by which a system or component can be determined to be operable.**

Code: Category III

Compliance Protocol: DOE Order 5480.6, "Safety of Department of Energy-Owned Reactors," provides guidance for the establishment of technical specifications for DOE reactors. This requires compliance with 20 CFR 50.36 and subsequently ANSI 15.1 ANSI 15.1-1982, "Development of Technical Specifications for Research Reactors," is specified by DOE Order 5480.4 as the governing requirement for format and content of technical specifications for DOE-owned reactors.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: The HFIR Technical Specifications provide a general definition for operability, and in those instances where specific technical criteria are necessary for reactor safety, they are clearly specified; however the specific criteria for each individual piece of equipment are usually defined in the Operating Procedures or Surveillance Test Procedures. The TSA (Tiger Team) Operations reviewer determined that many of the operability criteria specified were either inadequate or open ended. Resolution of this finding will involve revision to the Operating Procedures, Surveillance Test Procedures, and eventually the Technical Specifications.

The HFIR Operations staff was assigned the responsibility for the generation and revision of all HFIR operating procedures in October 1990. Agreements have been made between HFIR Operations and the Research Reactors Division Document Control Center which will allow revisions, additions, and deletion of operating procedures to be accomplished more efficiently than in the past. Revisions to resolve this finding will be incorporated in the appropriate procedures as HFIR operations resources allow.

Revisions to the HFIR Technical Specifications are to be negotiated between the RRD Compliance Section and DOE-ORO.

Root Causes:

Insufficient resources and inadequate policy; a recommended good practice that has not been implemented due to limited knowledgeable staff available to revise operating procedures, surveillance test procedures, and technical specifications.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Identify and document HFIR Technical Specifications that require operability to be defined.	6/91
2. Review the HFIR Technical Specifications and determine if more explicit operability criteria should be defined. Prepare a report of the review findings.	6/91
3. Identify the enabling procedures (Operating Procedure, Surveillance Test Procedure, etc.) for each identified Technical Specification.	7/91
4. Issue a revision of the appropriate procedures to ensure that criteria for operability is defined in each.	9/91
5. Submit initial revision to the HFIR Technical Specifications to include more explicit operability criteria if determined appropriate in Step 2. The issuance of the draft DOE Order 5480.22, "Technical Specifications and Operational Safety Requirements," will impact this process and could extend the completion date.	12/91

Costs:

Type of funds: Research Programmatic

Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	1.2						1.2
2	8.4						8.4
3	2.0						2.0
4	16.8						16.8
5	25.0	8.4					33.4
Status:							
Funded	53.4						
Requested		8.4					
New							$61.8

References: DOE Order 5480.6, "Safety of Department of Energy-Owned Reactors"
DOE Order 5480.4, "Environmental, Safety, and Health Protection Standards"
ANSI-15.1-1982, "Development of Technical Specifications for Research Reactors"

Finding No.: ROP.2-3 Ambiguities in HFIR Operating Instructions

Finding Description: **Ambiguous operating instructions hinder the ability of High Flux Isotope Reactor supervisors and managers to adhere to facility policies regarding reactor operations.**

Code: Category III

Compliance Protocol: Best management practices require that procedures be unambiguous and as clearly written as practicable.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: The need to revise the HFIR Operating Procedures Manual has been recognized from early in the restart effort. Because of the large number of restart issues and concerns, RRD management made a deliberate decision to perform an overall revision on a long-term basis so that resources could be focused on restart-related issues. Revisions to specific procedures within the manual were performed to reflect changes in the system and identified deficiencies.

The responsibility for the generation and revision of all HFIR operating procedures was recently (October 1990) assumed by the HFIR Operations Section of RRD. This should allow for more efficient handling of procedure revisions as required and assure that the overall revision of the manual is completed as scheduled. The Research Reactors Administrative Policies and Procedures Manual provides for biennial review of all operating procedures, a process designed to keep procedures in agreement with technical specifications as well as the plant configuration.

Root Cause:

Insufficient resources; the shortage of knowledgeable personnel to revise and update procedures coupled with rapidly changing practices which require more specific procedures.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Hire additional engineering staff to assist with procedure review/preparation.	Complete
2. Review outstanding requests for procedure revision to identify areas of ambiguous instructions. Document the review.	6/91

3. Issue revisions of those procedures identified in Step 2, including those identified in the 1990 ORNL TSA Review (Tiger Team Report). 6/91

4. Complete and document the biennial review of the operating procedures as specified in the Research Reactors Administrative Policies and Procedures Manual. 9/91

5. Issue revised procedures and complete necessary corrections or revisions as determined in Step 4. 12/91

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	55						55
4	—						
5	—						
Status:							
Funded	55						
Requested							
New							$55

References: None

Finding No.: ROP.2-4 HFIR Shift Check Sheets

Finding Description: **Pertinent information needed to diagnose off-normal trends in High Flux Isotope Reactor operation does not always come to the attention of the shift supervisor when reviewing shift check sheets.**

Code: Category III

Compliance Protocol: INPO Good Practice, OP-204, INPO 85-017, Rev. 1, "Guidelines for the Conduct of Operations at Nuclear Power Stations," provides guidelines for the performance of operations checks which are accepted by the nuclear industry.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: This concern was previously expressed in an October 1990 internal review. Instructions were transmitted to the Operations staff on how to flag check sheet readings which are out of specification and equipment which is out of service. Also, the check sheets are currently being revised to provide explicit tolerances for each reading.

Root Causes:

Inadequate management approach and insufficient resources; this good practice has not been implemented due to limited knowledgeable staff available to revise operating procedures.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Revise all check sheets to provide explicit tolerances.	Complete
2. Issue revised ORNL/RRD/INT-12/V2, *Research Reactors Division Administrative Policies and Procedures Manual,* RRAP-3.12, "Conduct of Operations" to incorporate a standard methodology for flagging out-of-tolerance checks.	10/91

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	4						4
2	4						4
Status:							
Funded	8						
Requested							
New							$8

References: INPO Good Practice OP-204, INPO 85-017, Rev. 1, "Guidelines for the Conduct of Operations at Nuclear Power Stations"

Finding No.: ROP.2-5 HFIR Reactor Log

Finding Description: **The High Flux Isotope Reactor reactor log lacks detail and accountability for entries.**

Code: Category III

Compliance Protocol: The HFIR log should contain the detail and format currently accepted in the nuclear industry. Revisions to the reactor log format have been made within the last two years based on INPO good practices.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 4

Response: The current reactor log format will be reviewed against current industry good practices and upgrade made to improve detail and accountability. Reactor shift supervisors will be counseled on the need for more detail in their logs.

Root Causes:

Inadequate management approach and insufficient resources; this good practice has not been implemented due to limited knowledgeable staff available to revise operating procedures and provide detailed guidance to shift personnel concerning log book entries.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Evaluate and document current log-taking practices against industry good-practice guidelines.	6/91
2. Revise and issue RRD procedures ORNL/RRD/INT-12/V2, *Research Reactors Division Administrative Policies and Procedures Manual,* RRAP-3.12, "Conduct of Operations," and ORNL/TM-1168, *High Flux Isotope Reactor Operating Manual* to reflect the changes generated by the evaluation.	10/91
3. Train HFIR Operations staff on the new log-taking practices.	12/91

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	2						2
2	4						4
3	12						12
Status:							
Funded	18						
Requested							
New							$18

References: INPO Good Practice, OP-204, INPO 85-017, Rev. 1, "Guidelines for the Conduct of Operations at Nuclear Power Stations"

INPO Good Practice, OP-201, INPO 84-008, "Shift Relief and Turnover"

Finding No.: ROP.2-6 HFIR Crew Communications

Finding Description: **High Flux Isotope Reactor crew communications are informally structured, thus decreasing the likelihood of reliable human performance, especially under degraded and stressful conditions.**

Code: Category III

Compliance Protocol: Shift crew communication should be clear, concise, and complete to assure for safe and reliable operation.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: Training sessions have been held with the HFIR Operating shift crews to enhance their communication and team skills. "Repeat back" communication is used by most shifts; however, not on a consistent basis. Further guidance and training is required to improve shift crew communication and organization.

Root Cause:

Insufficient resources; this good practice has not been implemented due to limited knowledgeable staff available to revise operating procedures and provide detailed guidance to shift personnel concerning crew communications.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Review and document commercial nuclear industry practices for shift crew organization and communication.	6/91
2. Evaluate and document current crew communication practices against industry good practices and identify specific needs.	7/91
3. Revise and issue RRD procedures ORNL/RRD/INT-12/V2, *Research Reactors Division Administrative Policies and Procedures Manual,* RRAP-3.12, "Conduct of Operations," and ORNL/TM-1168, *The High Flux Isotope Reactor Operating Manual*) to reflect the changes generated by the evaluation.	10/91
4. Train HFIR Operations Staff on the new communication practices.	12/91

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	2						2
2	4						4
3	12						12
4	—						
Status:							
Funded	18						
Requested							
New							$18

References: INPO Good Practice, OP-204, INPO 85-017, Rev. 1, "Guidelines for the Conduct of Operations at Nuclear Power Stations"

Finding No.: ROP.3-1 HFIR Operating Manual

Finding Description: **The prolonged review and approval process for the High Flux Isotope Reactor Operating Manual delays the implementation of effective and accurate instructions for safe operation of the facility.**

Code: Category III

Compliance Protocol: The procedure review and approval process should assure that all operating procedures have received an appropriate level of review and are issued for use in a timely manner.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: Although the review process for HFIR procedures is a lengthy one, the instructions provided for use by operating personnel were kept up to date by use of the temporary change process (SOIs). The instructions used by individuals operating the facility were accurate and posed no problem in respect to safe operations of the facility.

Revision 6 of the HFIR Operating Manual was initiated into the review process in March 1990. This revision was finally issued for use in October 1990. Most of this delay is attributed to the review and approval process required for an ORNL/TM document. Documents issued under the ORNL/TM format are typically single-issue reports for external consumption. The HFIR Operating Manual is a "living" document which is used only by Energy Systems or DOE personnel. Action was begun before the Technical Safety Appraisal to convert the HFIR Operating Manual to an internal document. Temporary measures have already been instituted to allow quick revision until the conversion can be effected.

Root Cause:

Inadequate policy; this good practice has not been implemented due to a conflict between ORNL records control policies and RRD needs. RRD priorities and resource distribution precluded dealing with this situation in a timely manner.

Planned Actions and Schedules:

Item/Description	Completion Date
1. For purposes of revision, treat the HFIR Operating Manual as an RRD internal document until a full conversion of the manual to the RRD internal format can be made.	Complete

2. Convert the HFIR Operating Manual to an RRD internal document. 12/91

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	20	7					27
Status:							
Funded	20						
Requested		7					
New							$27

References: None

Finding No.: ROP.3-2 Use of HFIR Procedures

Finding Description: **The operator is not always directed to necessary procedures containing instructions for events which degrade from normal to off-normal and then to emergency conditions.**

Code: Category III

Compliance Protocol: Best management practices require that the operator be directed to necessary procedures as needed.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: The need to revise the HFIR Operating Procedures Manual has been recognized from early in the restart effort. Because of the large number of restart issues and concerns, RRD management made a deliberate decision to perform an overall revision on a long-term basis so that resources could be focused on restart-related issues. Revisions to specific procedures within the manual were performed to reflect changes in the system and identified deficiencies.

The responsibility for the generation and revision of all HFIR operating procedures was recently (October 1990) accepted by the HFIR Operations Section of the RRD. This should allow more efficient handling of procedure revisions as required and assure that the overall revision of the manual is completed as scheduled.

Root Causes:

Insufficient resources and ambiguous requirements or expectations; insufficient personnel to adequately review procedures for degradation instructions, plus unclear (changing) expectations.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Review and document the off-normal and emergency procedures to determine if there are other areas of immediate concern.	5/91
2. Correct the omissions noted during the 1990 TSA Review (Tiger Team Report) and any others revealed by Step 1 above.	6/91

3. Complete and document the biennial review of the operating procedures as specified in the Research Reactors Administrative Policies and Procedures Manual. 6/91

4. Issue revised procedures to incorporate necessary corrections or revisions as determined in Step 3. 9/91

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	4.5						4.5
2	9						9
3	9						9
4	18						18
Status:							
Funded	40.5						
Requested							
New							$40.5

References: None

Finding No.: ROP.3-3 Preparation and Review of HFIR Operating Procedures

Finding Description: **The HFIR administrative process governing preparation and review of operating procedures does not ensure implementation of high-quality procedures.**

Code: Category III

Compliance Protocol: DOE Order 5480.19(7-9-90), Chapter XVI - "Operations Procedures", Section B - "Procedures are a key factor affecting operator performance. Appropriate attention should be given to writing, reviewing, and monitoring operations procedures to ensure the content is technically correct and the wording and format are clear and concise..."; Section C - "Administrative procedures and/or writers' guides should direct the development and review process for procedures."

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 4

Response: This is a new concern, it was not addressed in the RRD self-assessment report of October 1990. The administrative requirements for conducting reviews of operating procedures presently exists in RRD procedures, RRAP 3.1.6 and RRAP 3.1.7.

Root Cause:

Insufficient resources, within RRD, procedures are typically written or reviewed by personnel who will use the procedure. Since procedure writers as a separate working group do not exist within RRD, the need for a formal writers' guide has not been recognized as a best management practice.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request funding to complete required actions.	Complete
2. Develop and implement the use of a writers' guide.	4 months after funding is provided
3. Provide increased management attention in the form of more frequent audits and evaluations by the compliance section. Additional personnel may be required for the increased oversight function.	3 months after funding is approved

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2		50	30				80
3		10	110				120
Status:							
Funded							
Requested							
New		60	140				$200

References: DOE Order 5480.19
RRAP 3.1.6
RRAP 3.1.7

Finding No.: ROP.4-1 Tagging Procedures

Finding Description: **Multiple tags with similar or identical functions complicate the controls placed on equipment removed from service and can unnecessarily delay the return to service of equipment designed for safe plant operations.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: The HFIR has instituted a tagout system designed to ensure both personnel protection and system status controls. In order to ensure that all tags within the HFIR facilities are current and tracked, Division policy is that an operations tag be placed in addition to any other tag. This sometimes results in more than one type or style of tag being attached to a device in order to perform a single function. Although this can be cumbersome, it does serve to ensure that plant system status is known to the operations staff on duty while assuring personnel safety.

Actions are ongoing to consolidate the Energy Systems, ORNL, and HFIR lockout/tagout procedures and actions are planned to address the administrative tagout procedure at a corporate level. These actions will define the process to be used at all Energy Systems operated facilities including definition of the types and styles of authorized tags. The resultant procedures will adequately address the stated concern. See Finding MA.2-1.

Root Causes:

Inadequate policy implementation, inadequate management approach, and unclear requirements; each of the Energy Systems sites has been operated in an autonomous manner and the various divisions at ORNL have also operated largely independently. Because personnel are interchanged between sites at ORNL, a multiplicity of tags propagated, which contributed to this situation.

Planned Actions and Schedules:

See Finding MA.2-1.

Costs: No significant costs are associated with the action listed.

References: None

Finding No.: ROP.4-2 Records of HFIR Equipment

Finding Description: Incomplete records of temporary alterations to High Flux Isotope Reactor equipment indicate a lack of attention to this administrative process, which would help to ensure personnel and plant safety.

Code: Category III

Compliance Protocol: The lifted lead and jumper control system should assure that the configuration of the plant remains approved and documented.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: This concern is related to the HFIR lifted lead and jumper log which is implemented through ORNL/RRD/INT-12/V2, *Research Reactors Division Administrative Policies and Procedures Manual,* RRAP-3.11, "Safety Work Permits and Temporary Tagging Procedure." This procedure was being revised at the time that this concern was noted. This revision is intended to simplify the lifted lead and jumper process and will consolidate it into the current tagout process. An Energy Systems PIP team is also currently working on standardizing the tagging process throughout the Corporation.

Root Causes:

Insufficient resources and inadequate management approach; this good practice has not been adequately implemented due to confusing ORNL procedures and inadequate instruction of personnel.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue a revised ORNL/RRD/INT-12/V2, *Research Reactors Division Administrative Policies and Procedures Manual,* RRAP-3.11, "Safety Work Permits and Temporary Tagging Procedures," to simplify the lift-lead and jumper process and to clarify the instructions to the Operations staff.	6/91
2. Implement the revised to RRAP-3.11 and train the Operations staff.	7/91

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	2						2
2	12						12
Funded	14						
Requested							
New							$14

References: INPO Good Practice, OP-204, INPO 85-017, Rev. 1, "Guidelines for the Conduct of Operations at Nuclear Power Stations"

3.4.4 Maintenance

Finding No.: RMA.1-1 Control of Maintenance Support

Finding Description: **Maintenance support for the B reactors is not under the control of the manager of the B reactors.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 0
Tiger Team Action Plan Priority 4

Response: Inclusion of the B Reactors in the RRD Maintenance Program has not formally been documented or specifically identified in Program procedures. While not formally recognized, the B Reactors Maintenance Program is supported by a Coordinator dedicated to support the B Reactors Plant Manager, while administratively reporting to the RRD Maintenance Manager.

Root Cause:

Inadequate management approach

Planned Actions and Schedules:

Item/Description	Completion Date
1. Prepare a report to evaluate existing organizational effectiveness and management approach to determine if changes are required.	Complete
2. Issue revised RRD Maintenance Program RRD/INT-42/ Volume 1 as necessary to reflect any changes in roles, responsibilities, accountability, and/or management approach.	5/91

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

Action item	Estimated costs per fiscal year ($K)						Total
	1991	1992	1993	1994	1995	Beyond	
1	2						2
2	1						1
Status:							
Funded	3						
Requested							
New							$3

References: *RRD Maintenance Program*, RRD/INT-42/Volume 1

Finding No.: RMA.2-1 Torquing of Equipment Bolting

Finding Description: **Failure of equipment can occur due to improper torquing of equipment bolting.**

Code: Category III

Compliance Protocol: Good Engineering Practice requires proper torquing of equipment bolting for strength and stiffness.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 4

Response: This finding was the result of observation of installation of a pressurizer pump magnetic clutch assembly. The observed torquing of the mounting bolts was during initial installation. Final torquing of the mounting bolts is performed after final alignment which requires installation of shims. General Engineering Specifications are provided for the High Flux Isotope Reactor, which provide minimum torquing requirements to develop maximum strength of the joint, and not the maximum stiffness, which is the purpose of the mounting bolts for the clutch assembly.

No torquing requirements were defined in drawings or recommended in the vendor manual. Torquing after the final alignment is difficult to define because of shim variations. Current practice is to torque to the maximum extent practical.

The inspection of torque wrenches in the 7910 Shop area indicated some torque wrenches did not have calibration tags on them. As a general practice, not all torque wrenches require calibration. All critical torque measurements are made with calibrated torque wrenches; however torque wrenches are also used in applications where it is desirable, but not a necessity, to obtain an indication of torque. Any requirements for calibrated torque wrenches is documented in work package instructions in accordance with NQA-1.

Maintenance Program RRD/INT-42, Volume 1, Procedure RRD-M-1.6, does not specify consideration of torque requirements as a part of the checklist for preparing work package instructions or require the identification of torque wrenches as maintenance and test equipment (M&TE) used in completing critical work package instructions. The need for general revision to Maintenance Program procedures was noted during the RRD internal biennial review of procedures in May 1990 and in the Beckman Review conducted in July 1990. Revision has not been completed due to a lack of funding and personnel and higher priority work for available personnel. Additional priority for procedure revision will be provided with the addition of a new maintenance engineer in February 1991.

See Finding RMA.4-1.

Root Cause:

Insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue revised Procedure RRD-M-1.6 to include torquing requirements and data requirements in the checklist for the work package preparation. Also see Finding RMA.4-1.	5/91

Costs:

Type of funds: Research Programmatic

Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	2						2
Status:							
Funded	2						
Requested							
New							
							$2

References: RRD/INT-42, Volume 1, Procedure RRD-M-1.6, *Preparation of Work Packages*

Finding No.: RMA.2-2 Unsafe Conditions at the B Reactor Facilities

Finding Description: Unsafe conditions and the potential for the release of hazardous materials exist at the B reactor facilities.

Code: Category III

Compliance Protocol: DOE Orders 5483.1A and 4330.4

Priority: Energy Systems Risk Weight 356
Tiger Team Action Plan Priority 2

Response: Critical systems such as primary cooling systems, criticality and flux alarms, and building services do receive the maintenance required to keep them in a safe condition. Lower priority was given to neatness and OSHA-related items. Maintenance work plans will be written for each B reactor and an independent review performed of each plan from a safety aspect.

See Findings RMA.3-1 and RPP.3-1.

Root Cause:

Insufficient resources

Planned Actions and Schedules:

This Finding is fully addressed by actions listed in Findings RMA.3-1 and RPP.3-1.

Costs: See Findings RMA.3-1 and RPP.3-1.

References: Findings RPP.3-1 and RMA.3-1.

Finding No.: RMA.3-1 Maintenance of B Reactor Areas

Finding Description: The B reactor maintenance areas are not being maintained in a clean and orderly condition in accordance with 29 CFR 1910 and DOE 4330.4, attachment 2, and present potential hazards ranging from release of contaminated materials to personal injury.

Code: Category III

Compliance Protocol: 29 CFR 1910 and DOE Order 4330.4 attachment 2.

Priority: Energy Systems Risk Weight 403
Tiger Team Action Plan Priority 2

Response: Critical systems such as primary cooling systems, criticality and flux alarms, and building services do receive the maintenance required to keep them in a safe condition. Lower priority was given to neatness and OSHA-related items.

See Finding RPP.3-1.

Root Causes:

Insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request funding from DOE.	Complete
2. Improve housekeeping in the TSF maintenance shop as follows.	5/91
• Install new lights.	
• Remove/repair old test equipment.	
• Make safety signs consistent with 29 CFR 1910.	
3. Remove lead bricks from the BSR reactor room.	Complete
4. Remove rusting and untagged slings from the TSF storage shed.	Complete

5. Provide load capacity and date of latest preventative maintenance inspection for the TSF fork lift and hoist vehicle.	5/91
6. Clean, paint, and organize the B reactor pump houses, storage buildings, and storage areas.	8 months after funding available
7. Write upgraded maintenance work plans for the B Reactors, perform a safety review on them, and implement them.	1 month after funding available
8. Remove excess and contaminated equipment from storage areas at the TSF and ORR.	4 months after funding available

Costs:

Type of funds: Overhead

Source of funds: Overhead

Action item	Estimated costs per fiscal year ($K)						Total
	1991	1992	1993	1994	1995	Beyond	
1	—						
2 TSF	10						10
3 BSR	5						5
4 TSF	2						2
5 TSF	5						5
6 TSF				60			60
6 ORR				60			60
6 BSR				60			60
7 TSF	*			—			
7 BSR	*						
7 ORR	*						
7 HPRR	*						
8 TSF					50		50
8 ORR			25	25			50
Status:							
Funded	22						
Requested							
New			25	205	50		$302

*Estimated annual ongoing cost: $60K starting in FY 1991.

References: Finding RPP.3-1

Finding No.: RMA.3-2 Inspection of RRD Maintenance Activities

Finding Description: **Facilities and equipment inspections are not always provided for Research Reactors Division maintenance activities.**

Code: Category III

Compliance Protocol: DOE Order 5480.6, "Safety of Department of Energy-Owned Nuclear Reactors," requires in part that ANS 3.1, Section 6.3 (Training Program) be implemented for training of maintenance personnel.

29 CFR 1910.179, *Occupational Safety and Health Standards for General Industry* specifies overhead crane inspection and marking requirements.

Priority: Energy Systems Risk Weight 8
Tiger Team Action Plan Priority 3

Response: (1) DOE Order 5480.6 specifies in part that a training program be established to enhance the skills, knowledge and ability personnel to perform job assignments. (TC.5-1, TC.5-2). The ORNL Plant and Equipment (P&E) Division or the Instrumentation and Controls (I&C) Division do not have adequate training facilities or programs to meet the requirements of this order. This concern was identified in the RRD self-assessment report of October 1990. ORNL Training, P&E Division Training, and I&C Division Training have developed plans and requested funding to meet the requirements of DOE Order 5480.6, but have not received DOE approval or funding. Action plans for this finding are in action plans for TC.5-1 and TC.5-2.

(2) Within RRD, adequate facilities for storage and handling of contaminated tools and controlled laydown and staging areas are not available. This concern was previously identified in 1988, and plans are being implemented for provision of temporary facilities. Lack of adequate funding has delayed providing temporary facilities and equipment.

(3) Long-range plans include the construction of a new RRD maintenance facility, currently planned in the FY 1991 ARIMS Project.

(4) Appropriate equipment inspection and tagging is not performed in accordance with 29 CFR 1910.179 because of inadequate ORNL Quality Department and Safety Department procedures. This concern is being addressed in WS.4-3.

Root Causes:

Inadequate policy and insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Establish ORNL, P&E Division, and I&C Division training programs to meet DOE Order 5480.6. (See Action Plans for Findings TC.5-1 and TC.5-2.)	
2. Provide temporary adequate facilities and equipment for handling contaminated tooling and controlled laydown, staging areas, and spare parts storage if funding is available. (See cost estimate below.)	6/91
3. Provide new maintenance facility from $2.7 million funding in the FY 91 ARIMS Project.	10/92
4. Revise ORNL Quality Procedures for equipment inspection and testing. (See Action Plan for Finding WS.4-3.)	

Costs:

Type of funds: Research Programmatic

Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	90	20					110
3	100						100
4	—						
Status:							
Funded							
Requested							
New	190	20					$210

Type of funds: Capital
Source of funds: ER-ARIMS (91-KC-4)

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
3	2700						2700
Status:							
Funded	2700						
Requested							
New							$2700

References: None

Finding No.: RMA.4-1 Oversight by Maintenance Supervisors

Finding Description: Lack of oversight and monitoring of work in progress by maintenance supervisors could lead to incorrect maintenance activities and equipment damage.

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: Oversight and control of maintenance activities is provided by Plant and Equipment (P&E) and Instrumentation and Controls (I&C) Division supervision and RRD Maintenance management personnel. Formal control of maintenance activities is provided by written instructions developed by the Maintenance Engineer and Coordinator. Oversight and monitoring of maintenance activities has been hindered by a lack of resources in the RRD Maintenance budget to provide additional personnel in the P&E, I&C, and RRD Maintenance Management group. This concern was cited in the RRD self-assessment report of October 1990. An additional Maintenance Engineer is funded in the FY 91 budget and is being hired. Workload and effectiveness of work control of P&E, I&C supervision, and the RRD maintenance management group will be evaluated by the Maintenance manager every 6 months to determine if additional resources are required.

Root Cause:

Insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Hire Maintenance Engineer to help provide oversight and monitoring of maintenance activities.	Complete
2. Review and document workload and effectiveness of work control every 6 months to determine if additional resources are required.	6/91
3. Request funding for any additional resources identified in 2 above.	6/91

Costs: Estimated annual ongoing cost: $120K starting in FY 1991.

References: None

Finding No.: RMA.5-1 Maintenance at Shut Down Reactors

Finding Description: **Unsafe conditions, release of hazardous and contaminated materials, and/or personal injury can result from the lack of maintenance at shut down reactors; this situation is not consistent with the requirements of DOE 5480.6.**

Code: Category III

Compliance Protocol: DOE Order 5480.6

Priority: Energy Systems Risk Weight 403
Tiger Team Action Plan Priority 2

Response: Critical systems such as primary cooling systems, criticality and flux alarms, and building services do receive the maintenance required to keep them in a safe condition. Lower priority was given to neatness and OSHA-related items. A maintenance work plan will be written for each shut down reactor and a review performed to assure safety and compliance with DOE 4330.4

See Finding RMA.3-1.

Root Causes:

Insufficient resources and ambiguous requirements or expectations

Planned Actions and Schedules:

See Finding RMA.3-1.

Costs: Costs are reported under Finding RMA.3-1.

References: Finding RMA.3-1

Finding No.: RMA.8-1 Deficient Procedural Information

Finding Description: **Improper corrective or preventive maintenance may be performed as a result of deficient procedural information.**

Code: Category III

Compliance Protocol: Best management practices require procedures to contain adequate information.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: Adequate qualified personnel to develop and review instructions and procedures is necessary to provide fully detailed procedures. A lack of funding and personnel resources has not permitted development of the desired level of instructions and procedures. An additional Maintenance Engineer is being hired.

See Finding RMA.4-1.

Root Cause:

Insufficient resources

Planned Actions and Schedules:

This finding is fully addressed by actions listed in Finding RMA.4-1.

Costs: Costs covered under Finding RMA.4-1.

References: None

3.4.5 Training and Certification

Finding No.: RTC.1-1 Position Task Analyses

Finding Description: **Position task analyses are not provided for senior reactor operators and reactor operators, as required by DOE 5480.6, Section 8e(1)(d)1.**

Code: Category III

Compliance Protocol: DOE Order 5480.6, Section 8e(1)(d) states:

"Position Task Analysis. A position task analysis shall be conducted by the operating contractor as necessary for operating personnel to define the tasks performed by the person in each position, and to identify the required training, in conjunction with education and experience, necessary to provide assurance that the tasks can be effectively performed. The position task analysis should include normal and emergency duties and place emphasis on the role played by each member of an operating organization in assuring safe plant operation. The position task analysis shall support the selection of requirements of ANS 3.1 and any supplemental requirements appropriate to the position."

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: A task analysis shall be performed on each task as outlined in the HFIR Training Program Accreditation Plan.

Root Cause:

Insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Obtain accreditation funding to complete position task analyses.	Complete
2. Based upon task support material, it will be determined and documented which of the tasks selected for training require further analysis.	
a. Reactor operator	9/91
b. Senior reactor operator	2/92

3. Perform task analysis of selected tasks, including conditions; standards; references; special tools; knowledge; and skills.
   a. Reactor operator 3/92
   b. Senior reactor operator 6/92

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	0	0					
2	80						80
3	210						210
Status:							
Funded	290						
Requested							
New							$290

References: DOE Order 5480.6
ANS 3.1
TPAP (10/90 Draft)

Finding No.: RTC.1-2 Class B Reactor Training Plan

Finding Description: The Class B reactor training plan has not been approved by OR.

Code: Category III

Compliance Protocol: DOE Order 5480.6 specifies training requirements for Class B reactor personnel.

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 4

Response: While not specifically required by the order, a Class B reactor training plan had been prepared and submitted in March 1990 to ORO for approval. The reactor training program was thoroughly reviewed prior to reactor startup in December 1989.

Root Cause:

Inadequate management approach; the review of the plan had been delayed due to emphasis on higher priority staff work.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Review the draft training plan and provide comments to the contractor (DOE/ORO).	Complete
2. Prepare management plan, self-assessment process, and tracking system for site office activities.	Complete
3. Obtain DOE concurrence to withdraw the Class B reactor training plan.	Complete

Costs: No significant costs are associated with the actions outlined.

References: None

Finding No.: RTC.1-3 Instructors for Maintenance Training

Finding Description: Maintenance skill job training does not have qualified instructors.

Code: Category III

Compliance Protocol: DOE orders and ANS 3.1 require the analysis, design, development, conduct and evaluation of performance-based training programs for maintenance personnel who are assigned to support Category "A" Reactor facilities.

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: Finding RTC.1-3 is addressed in Finding TC.1-3

Planned Actions and Schedules:

Actions for this finding are addressed in Finding TC.1-3.

Costs: Funding for actions are included in Finding TC.1-3.

References:

DOE Order 5480.6,	"Safety Of Department of Energy-Owned Reactors
ANSI/ANS 3.1	Draft 1980, "Selection, Qualification and Training of Personnel for Nuclear Power Plants"
DOE Order 5480.18	"Accreditation of Performance-Based Training for Category A Reactors"
DOE Order 5480.XX	Draft 3/90 "Personnel Selection, Qualification and Training Requirements"

Finding No.: RTC.2-1 Examinations for Operator and Reactor Supervisor Training

Finding Description: **Examinations are not given in a manner accepted by nuclear industry. The written examinations given soon after a lecture do not examine retained knowledge.**

Code: Category III

Compliance Protocol: DOE Order 5480.6 Section 8.e.(1)(d)3a states:

"Annual retraining and reexamination programs covering abnormal plant procedures and emergencies shall be required. Retraining and reexamination programs meeting all other requirements of ANS 3.1, Section 5 shall be scheduled on a biennial basis. Examination content shall be varied from test to test."

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 4

Response: Training and examinations are developed using a systematic approach to Performance Based Training. Exams are developed using questions based on specific learning objectives. The examinations are reviewed for content and comprehensiveness by an independent instructor, the RRD Training Manager, and the HFIR Plant Manager. The current examination program for operators and supervisors is in full compliance with all applicable regulations affecting certification. Annual retraining and reexamination programs are administered. Biennial retraining and reexaminations including written, oral, operating, and scenarios are given. Written examinations are given on selected categories throughout the 2-year period, which is allowed by DOE Order 5480.6, DOE Order 5480.XX (Draft of 3/15/90), and U.S. Department of Energy Safety Guide 830.55 (Draft of 7/26/90). Based on the length of the course, 10–15 weeks may elapse between the examination and coverage of particular objectives.

Root Cause:

Ambiguous requirements or expectations

Planned Actions and Schedules:

Actions have been completed.

Costs: None

References: DOE Order 5480.6
ANSI/ANS 3.1 (1980 Draft)
DOE Order 5480.XX (03/15/90 Draft)
DOE Safety Guide 830.55 (07/26/90 Draft)

Finding No.: RTC.4-1 General Employee Access Training

Finding Description: General Employee Access Training does not meet all requirements of DOE 5480.11.

Code: Category III

Compliance Protocol: DOE Order 5480.11, Paragraph 9.o(1) requires all occupational workers who may enter a controlled area at a DOE facility shall receive an orientation in radiation safety within one month of their initial assignment to, and prior to, potential exposure to radiation at that facility. Retraining shall be provided when there are significant changes to radiation protection policies and procedures which affect general plant employees and should be provided every two years. The level of training is to be commensurate with the employee's job assignment with the initial orientation including, but not limited to:

a. The risk of low-level occupational radiation exposure, including cancer and genetic effects;
b. The risk of prenatal radiation exposure;
c. Basic radiation protection concepts;
d. DOE and Company radiation protection policies and procedures;
e. Employer and management responsibilities for radiation safety;
f. Emergency procedures.

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: The General Employee Access Training Program has been revised to include the risk of low-level occupational radiation exposure, including cancer and genetic effects; the risk of prenatal radiation exposure; employee and management responsibilities for radiation safety; and, emergency procedures.

Root Cause:

Ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Revise lesson plan to be more specific about risks of low-level radiation exposure.	Complete

2. Direct instructors to discuss the risk of pre-natal radiation exposure regardless of whether females are present.	Complete
3. Revise lesson plan to include employee and management responsibilities for radiation safety.	Complete
4. Revise lesson plan to ensure the audience was informed that the film titled "The HFIR Safety and Security Plan", contains an error in the fire fighting procedure, which is used as a training experience.	Complete
5. Reviewed DOE Order 5480.11 to ensure all training requirements have been incorporated.	Complete

Costs: No significant costs are associated with the actions outlined.

References: DOE Order 5480.11

Finding No.: RTC.5-1 Maintenance Personnel Training Program

Finding Description: A training program for maintenance skills has not been provided and implemented for maintenance personnel, as required by DOE 5480.6.

Code: Category III

Compliance Protocol: DOE Order 5480.6

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: Finding RTC.5-1 is fully addressed by actions listed in Finding TC.5-1.

Costs: Funding for actions are included in Finding TC.5-1.

References:

DOE Order 5480.6,	"Safety Of Department of Energy-Owned Reactors
ANSI/ANS 3.1	Draft 1980, "Selection, Qualification and Training of Personnel for Nuclear Power Plants"
DOE Order 5480.18	"Accreditation of Performance-Based Training for Category A Reactors"
DOE Order 5480.XX	Draft 3/90 "Personnel Selection, Qualification and Training Requirements"

Finding No.: RTC.5-2 Training Facilities for Maintenance Personnel

Finding Description: **Adequate classroom and training devices have not been provided for maintenance personnel.**

Code: Category III

Compliance Protocol: Current standards for conduct of performance-based training and qualification programs require that adequate facilities and equipment be provided to allow for the proper training of maintenance personnel on equipment.

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: Finding RTC.5-2 is fully addressed in actions listed in Finding TC.5-2.

Planned Actions and Schedules:

Actions in Finding RTC.5-2 are contained in Finding TC.5-2.

Costs: Funding for actions are included in Finding TC.5-2.

References:

DOE Order 5480.6	"Safety Of Department of Energy-Owned Reactors"
ANSI/ANS 3.1	Draft 1980, "Selection, Qualification and Training of Personnel for Nuclear Power Plants"
DOE Order 5480.18	"Accreditation of Performance-Based Training for Category A Reactors"
DOE Order 5480.XX	Draft 3/90 "Personnel Selection, Qualification and Training Requirements"

Finding No.: RTC.10-1 Training for Managers, Supervisors, and Technical Staff

Finding Description: **A skill training program for managers, supervisors, and technical staff as required by DOE 5480.6 has not been provided and implemented.**

Code: Category III

Compliance Protocol: DOE Order 5480.6, Section 8.e.(1)(a) states:
"American Nuclear Society (ANS) Standard 3.1, "Selection, Qualification and Training of Personnel for Nuclear Power Plants" (10/80 Draft), shall be the basis for qualification and training requirements for reactor personnel for Category A reactors. The requirements of ANS 3.1 are to be followed to the extent that they are appropriate for the facility or operation being considered. Paragraphs 8e(1)(a) through 8e(1)(d), contain interpretations of, or variations from, ANS 3.1 requirements."

ANS 3.1, Sections 5.3.1 and 5.3.2 outline training requirements for managers, supervisors and technical personnel as follows:

Training for Managers and Supervisors.
"Specialized training for each individual in this category shall be based upon an analysis of the individual's background, abilities and responsibilities and the effect his area of responsibility could have on overall plant safety. Training shall be provided to compensate for deficiencies identified by comparing the individual's experience and knowledge to the task analysis. The programs may include assignment of the individuals to operating reactors and/or simulators, involvement in plant design, and participation in the programs listed in Section 5.2.1.8. Construction and startup may be utilized as necessary to complete the training."

Training for Professional Technical Personnel.
"Training shall be provided to compensate for deficiencies identified by comparing the individual's experience and knowledge to the task analysis. The required training of these professional-technical personnel can be implemented by involvement in related training programs. These training programs may include assignment at operating reactors and/or simulators, and at vendors facilities. The training shall be for periods of time sufficient to develop the proficiency required for safety and competent supervision and performance."

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: The need for training programs for managers, supervisors, and technical support staff was previously identified in the initial Self Evaluation Report. Programs will be developed and implemented for these positions.

Root Cause:

Insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Develop general training requirements using analysis of position requirement and available DOE, INPO, and industry guidance.	9/91
2. Develop a training matrix to establish specific training requirements per each position.	4/92
3. Update the training program matrix annually, based on feedback from supervisors, training requirements, and DOE orders.	9/92

NOTE: The Training Program Accreditation Plan (TPAP) noted that the Technical Support Staff Training Program will be implemented, evaluated and maintained using existing staff. When TPAP was written, there was a full complement of 15 training personnel plus two subcontractors. At present, the Training and Procedures Staff has one person on loan to another division and no subcontractors assigned to the staff due to budget reductions.

Costs:

Type of funds: Research Programmatic

Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1		134					134
2	—						
3	—						
Status:							
Funded							
Requested		134					
New							$134

References: DOE Order 5480.6 Section 8.e.(1)(a)
ANS 3.1 Sections 5.3.1 and 5.3.2
TPAP (10/90 Draft)
DOE Order 5480.XX

3.4.6 Auxiliary Systems

Finding No.: RAX.2-1 Resin Carryover in Resin Regenerative System

Finding Description: **The fluid from the resin regenerative system is not monitored for activity by Research Reactors Division as it leaves the ion exchanger, and there is resin carryover.**

Code: Category III

Compliance Protocol: There is no current requirement relative to monitoring the LLLW stream; however, good practice dictates the reduction of resin carryover.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 4

Response: Improvements in the liquid low-level waste (LLLW) system have been in the planning stage for the last year. A new direction that RRD has decided to implement is to eliminate LLLW. This will be accomplished primarily by converting to a dry resin disposal system and no longer regenerating resins.

Root Causes:

Ambiguous requirements or expectations and insufficient resources; this good practice has not been implemented due to funding and priority considerations. A modification is currently being planned and funded to allow compliance with the proposed FFA which would preclude the need for a monitor and would eliminate resin carryover.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Design new resin disposal system.	8/91
2. Install new resin disposal system.	1/92

Costs:

Type of funds: ERWM Programmatic
Source of funds: EM-ADS350

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	200						200
Status:							
Funded	200						
Requested							
New							$200

Type of funds: Capital
Source of funds: GPP-EM

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
2		1200					1200
Status:							
Funded							
Requested		1200					
New							$1200

References: Draft Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

Resource Conservation and Recovery Act (RCRA)

Finding No.: RAX.3-1 Contamination of the HFIR Pool

Finding Description: **If the europium source in the HFIR pool is not removed or protected, the acid may etch out more europium to further increase contamination in pool.**

Code: Category III

Compliance Protocol: Best management practices would dictate that the source of the contaminant be moved prior to final clean-up efforts.

Priority: Energy Systems Risk Weight 1
Tiger Team Action Plan Priority 4

Response: This concern was previously addressed during the preparation of Action Plans (11/89) dealing with the clean-up of the contamination in the HFIR storage pools. The previously developed plan includes: (1) removal of the leaking control plates to a burial or storage site; and (2) clean-up of the solids in the pool by use of a pool vacuum-cleaner system and/or other appropriate methods. These steps will remove the source of europium before the addition of acid to the pool.

Root Cause:

Inadequate communications; the Tiger Team member did not recognize that scheduled activities addressed this concern.

Planned Actions and Schedules:

Item/Description	Completion Date
1. The source of the europium will be removed from the pool prior to reducing the pH of the water for decontamination purposes. This concern is provided for in the action plan prepared in November of 1989 (see RRD CARIS item 91-105, Remove Europium Contamination from Reactor Storage Pools).	Complete

Costs: No significant cost associated with action listed.

References: Letter, H. R. Fair to M. H. McBride, July 9, 1990, Subject: Verification of HFIR Award Fee Milestone 90-09, "Implement Program to Reduce Radiation Exposure from Pool Heat Exchangers"

Finding No.: RAX.4-1 HFIR Spent Fuel Cask Not Approved by DOE

Finding Description: **Possibility of fission product contamination due to cladding failure resulting from long-term storage can impact ALARA (as low as reasonably achievable).**

Code: Category III

Compliance Protocol: 10 CFR 71, "Packaging and Transfer of Radioactive Material," and USNRC Reg. Guide 7.9, Safety Analysis Reports for Packaging (SARP), are required for containers used for fuel movement. The HFIR SARPs for fresh and spent fuel required revision to comply with NRC requirements which were adopted as DOE policy.

Priority: Energy Systems Risk Weight 1
Tiger Team Action Plan Priority 2

Response: The SARP (Docket No. 9861) for the new HFIR Spent Fuel Cask has been undergoing review and revision for 3 years. Responses to several rounds of questions (Q0-Q3) have been submitted to reviewers for approval prior to the certification. As of December 1, 1990, there were 34 items remaining to be resolved for DOE approval.

Root Causes:

Ambiguous requirements or expectations; changing DOE review processes that evolved over a 3-year time span, no structured closure process has been defined. Inadequate management approach: management systems were not effective in elevating problem areas and schedule slippages to upper management for timely resolution.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Document the NE organization and organization interface responsibilities for SARP review and approval on ORO reactors.	Complete
2. Coordinate with senior managers in ORO, NE, EH, and Energy Systems to obtain resolution on outstanding issues and project realistic dates for SARP certification and cask fabrication.	Complete
3. Analyze impact on HFIR operation schedule and document options to DOE senior management.	Complete

4. Evaluate fundings requirements to complete SARP approval and request funding. 5/91

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	5						5
3	5						5
4	—						
Status:							
Funded	10						
Requested							
New							$10

References: None

3.4.7 Emergency Preparedness

Finding No.: REP.2-1 HFIR Emergency Preparedness Planning

Finding Description: **The High Flux Isotope Reactor (HFIR) emergency preparedness planning does not conform to the requirements of DOE 5500.5 and draft DOE 5500.3A in that the required top-level Hazards Assessment has not been performed for emergency planning purposes, a HFIR Emergency Planning Zone has not been specified, Emergency Action Levels have not been appropriately specified, and the HFIR and ORNL plans are not coordinated.**

Code: Category III

Compliance Protocol: DOE Order 5500.5 and draft DOE Order 5500.3A. Draft DOE Order 5500.3A states that "the size of the EPZ (Emergency Planning Zone) and the extent of special planning and procedures required for a facility is determined by the hazards assessment." A hazards assessment was performed some 25 years ago, based on "many extremely conservative assumptions." In addition, potential external hazards to the control room were not included in the original assessment.

Priority: Energy Systems Risk Weight 85
Tiger Team Action Plan Priority 3

Response: A hazards analysis is currently in progress which may be used as a baseline upon which to perform a more comprehensive hazards assessment. Once the hazards assessment is complete, the EPZ may be defined.

Root Cause:

Insufficient resources; the hazards assessment has been partially completed in the process of developing the Facility Safety Analysis Report and the Probabilistic Risk Assessment. Changing priorities coupled with limited resources have delayed this action for a period of approximately three years.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request FY 1993 funds to complete Items 4, 5, and 6.	Complete
2. Perform site hazards identification study.	4/91
3. Complete the ORNL hazards consequence assessment.	6/92
4. Define the HFIR Emergency Planning Zone.	10/92

5. Issue revised Emergency Action Levels (EALs). 10/92

6. Issue revisions to affected procedures. 3/93

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	—						
4			12.5				12.5
5			37.5				37.5
6			50				50
Status:							
Funded							
Requested							
New			100				$100

References: HFIR Probabilistic Risk Assessment

Finding No.: REP.3-1 Training of Designated Emergency Responders

Finding Description: **Minimum training requirements for designated emergency responders are not specified and their training is not tracked, which is contrary to the requirements of DOE 5500.5 and draft DOE 5500.3A.**

Code: Category III

Compliance Protocol: DOE Order 5500.3A (Draft of 11-22-88) Section 10.c (11) (a) states the following:

"Training programs shall be established for onsite emergency management and response personnel, including those involved in emergency communications, and shall provide for: an organization of qualified personnel, to include replacement personnel; retraining of qualified personnel to ensure retention of proficiency in all areas of responsibility; instruction in the application of emergency plans and procedures; and periodic drills and exercises."

DOE Order 5500.3A (11/22/88 Draft), Section 11, states the following:

"Auditable records shall be maintained of the training required and the training satisfactorily completed. Records shall meet the requirements of DOE Order 5500.7A."

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: Minimum training requirements for emergency response personnel will be established and all personnel required to attend this training will be identified. A data base will be developed to ensure information is readily retrievable. A similar activity is in progress at the ORNL level (see Finding EP.3-1).

Root Cause:

Ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Identify minimum training requirements for emergency response and management personnel.	Complete
2. Determine personnel required to attend training.	Complete
3. Develop data base for tracking emergency response training.	5/91

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	0.9						0.9
2	0.3						0.3
3	1.8						1.8
Status:							
Funded	3.0						
Requested							
New							$3.0

References: DOE Order 5500.5 and DOE Order 5500.3A (11/22/88 Draft)

Finding No.: REP.5-1 HFIR Stack Radiological Effluent Monitors

Finding Description: **Because the HFIR stack radiological effluent monitors are not in compliance with DOE Order 5500.5 at 6.a.(1) and (3), these monitors could fail due to saturation during an emergency.**

Code: Category II

Compliance Protocol: DOE Order 5500.5 at 6.a(1) and (3)

Priority: Energy Systems Risk Weight 50
Tiger Team Action Plan Priority 2

Response: This is a new concern. The 7900 area stack does have stack monitoring instrumentation; however, this instrumentation is intended for normal monitoring and will saturate with almost any abnormal release to the atmosphere via this path. During the emergency response planning process, the RRD assumed for accident analysis purposes that the noble gas portion of the entire core fission product inventory is released through the stack whenever core damage occurs. This assumption is the most conservative possible, and as a result, mandates overly restrictive response actions. Such assumptions and actions based thereon have the potential to unnecessarily concern the general public.

Root Causes:

Inadequate policy and ambiguous requirements or expectations

Planned Actions and Schedules:

	Item/Description	Completion Date
Immediate		
	1. Evaluate the capabilities of the K-25 Site emergency response field survey team as an interim solution. This team could be dispatched to the site to perform ground-level monitoring. Release rates could then be calculated from this data. The evaluation indicates that the capabilities of the team are insufficient to completely fulfill this need; however, the team is available to us in a standby mode for other emergency needs.	Complete

2. Evaluate the use of in-plant monitoring to determine core-melt fraction.	Complete
a. Primary coolant sampling at primary sample sink.	
b. Portable radiation detection equipment to determine core-melt fraction based on local dose rates near main coolant lines.	
3. Evaluate the feasibility of external duct radiation measurements during emergency conditions to determine release activity.	Complete
4. Request FY 1991 funding for interim activities.	Complete
5. Obtain any equipment necessary for implementation of activities identified by Immediate Items 2 and 3 above. This action assumes any additional equipment required is readily available on site or commercially.	5/91
6. Issue and implement interim emergency procedures as determined by Immediate Items 2, 3, and 4 above. This should address the concern until a permanent solution is achieved.	5/91

Near-Term

7. Present funding options and associated safety and programmatic impacts for DOE approval.	5/91
8. Perform design study (including evaluation of commercially available systems and cost-benefit analysis) to identify suitable instrumentation for permanent stack accident monitoring system, contingent on availability of funding. This estimate assumes that commercially-available equipment will meet the requirements specified or that commercially available equipment can be easily modified to meet these requirements. In the event that new equipment must be designed and/or fabricated, the schedule and costs will be revised to reflect these activities.	5/91
9. Request DOE approval of intended permanent stack accident monitoring system.	5/91
10. Submit revised FY 1992 FWP to implement the results of Near-Term Items 7 and 8 above.	5/91

Long-Term

11.	Initiate procurement of specified equipment, contingent upon availability of funding.	10/91
12.	Complete installation of equipment.	6/92
13.	Complete the RRD Design Change Memorandum process to design, procure, install, and document system specified in Near-Term Item 7 above.	8/92
14.	Issue RRD procedures and train personnel as necessary to place permanent stack monitoring system in operation.	9/92

Costs:

Type of funds: Research Programmatic

Source of funds: ER KC-03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	3						3
2	12.5						12.5
3	12.5						12.5
5	15						15
6	25						25
7	0						0
8	75						75
9	6.25						6.25
10	6.25						6.25
Status:							
Funded	3						
Requested	65						
New	87.5						$155.5

Type of funds: Capital Equipment
Source of funds: ER KC-03

Action item	Estimated costs per fiscal year ($K)						Total
	1991	1992	1993	1994	1995	Beyond	
8		75					75
11		12.5					12.5
12		250					250
13		150					150
14		75					75
Status:							
Funded							
Requested							
New		562.5					$562.5

References: None

Finding No.: REP.5-2 Emergency Resources

Finding Description: Contrary to the requirements of DOE 5500.5 and draft DOE 5500.3A, emergency resources do not completely provide for emergency radiological environmental monitoring, personnel accountability, sampling of High Flux Isotope Reactor (HFIR) building air, protection of emergency ventilation systems for emergency operations centers, external sampling of HFIR building air and water, and for remote monitoring of HFIR building dose rates.

Code: Category III

Compliance Protocol: DOE Order 5500.5 and draft DOE Order 5500.3A. No radiological emergency monitoring teams have been designated or have participated in exercises for response at the HFIR for at least two years. Remote sampling capabilities for air and process water do not exist. Automated sitewide personnel accountability for the fenced area immediately surrounding the 7900 area has not been implemented.

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: This finding was noted in the October 1990 self-assessment report. Actions are ongoing to address several of the individual components of this finding to include (1) a hazards assessment to help define necessary protection to the Emergency Operation Center and (2) a memorandum of understanding has been executed with the K-25 Site to provide a trained radiological and environmental monitoring team until ORNL can establish and equip a dedicated team.

Root Causes:

Insufficient resources and ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Establish a radiological and environmental monitoring team for at the ORNL site. (See Laboratory Action Plan EP.5-1.)	Complete
2. Complete the hazards assessment to define the protection necessary for inhabitability of the area(s) used as emergency control centers. This assessment will also be used to define the appropriate remote monitoring requirements.	6/92

3. Modify the remote readout of the HFIR building high-range radiation detector to add a scale. — Complete

4. Issue revised calibration procedure for the high-range radiation monitor to reflect the proper ranges of calibration sources. — 8/91

5. Evaluate the cost(s)/benefit(s) associated with an automated 7900 area personnel accountability system. — 6/91

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	0.2						0.2
4	12.5						12.5
5	5.8						5.8
Status:							
Funded	18.5						
Requested							
New							$18.5

References: HFIR Probabilistic Risk Assessment

Finding No.: REP.6-1 Emergency Assessment and Notification Procedures

Finding Description: **Procedures for emergency assessment and notification do not meet the requirements of DOE 5500.5 and draft DOE 5500.3A.**

Code: Category III

Compliance Protocol: DOE Order 5500.5 and draft DOE Order 5500.3A. Although guidelines are available for classifying emergencies, they are in a separate document.

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: The RRD classification guidelines will be revised and the corresponding Protective Action Guidelines (PAGs) developed based on the hazards assessment upon its completion. Past practice has dictated that any accident in which core damage is a potential, is treated as a total core melt scenario. Although this is a conservative approach in respect to personnel protection, the approach could cause unnecessary public reactions.

Root Causes:

Insufficient resources, inadequate policy, and ambiguous requirements or expectations; a lack of funding for performance of the hazards assessment and an overly conservative approach to accident analysis at the HFIR.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request FY 1993 funds to complete actions below.	Complete
2. Define the Emergency Planning Zone (see action plan for Finding EP.2-1).	
3. Based on preliminary SAR results, issue interim EALs.	2/92
4. Issue revised Emergency Action Level (EAL) procedures and include PAGs.	10/92
5. Issue procedures to estimate core damage based on available data.	2/93
6. Issue revised Emergency Operating Procedures.	4/93

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	—						
4			50				50
5			50				50
6	—						
Status:							
Funded							
Requested							
New			100				$100

References: HFIR Probabilistic Risk Assessment

Finding No.: REP.7-1 HFIR Emergency Preparedness Planning

Finding Description: **Personnel protection procedures do not effectively minimize personnel exposure to hazardous materials during emergencies, as required by DOE N5500.5 and draft DOE 5500.3A.**

Code: Category III

Compliance Protocol: DOE Order N5500.5 and Draft DOE Order 5500.3A

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: Planning for emergencies at the HFIR has been patterned after that for commercial nuclear power plants. As a result, the major emphasis of the HFIR personnel protection policies have followed those of the commercial industry which is evacuation of all nonessential personnel as soon as possible after a significant event.

Root Causes:

Inadequate policy implementation and ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue an ORNL procedure regarding the storage and availability for use of potassium iodide (KI) during a radiological emergency.	6/91
2. Based on preliminary SAR results, issue interim PAGs.	2/92
3. Issue protective action guides which include the sheltering-in-place option. This is to be performed by the ORNL Central Emergency Preparedness Organization as part of Finding EP.6-1.	8/92
4. Issue revised emergency and health physics procedures to incorporate changes necessary to ensure adequate sampling of the HFIR building air in emergency conditions. This review is dependent upon the hazards assessment scheduled to be completed in June 1992.	10/92
5. Review the Laboratory analytical sampling procedures to	10/91

evaluate the use of silver-zeolite filters for detection of iodines in release gases.

6. Issue revisions to Laboratory analytical sampling procedures as dictated by Item 4. 8/91

7. Review the Emergency Response Plan and relocate the assembly point if necessary. This action is also dependent upon the Laboratory-wide hazards assessment scheduled to be complete by June 1992. 8/92

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	1						1
2	2						2
3	2	2					4
4	1						1
5	1						1
6	1	1					2
7	—						
Status:							
Funded	8						
Requested		3					
New							$11

References: None

3.4.8 Technical Support

Finding No.: RTS.1-1 Technical Support for RRD Tasks

Finding Description: **Technical support for key Research Reactors Division tasks is excessively impacted by changing workloads.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: This is a previous finding in the 1990 RRD self-assessment supplemental FY 1991 report. Staffing increases were identified in the RRD budget submittal as described below.

On May 4, 1990, a supplemental budget submittal (Ref. 1) requested $1.8 M above President's Budget for technical support to allow work to progress on key long-term technical items (such as the SAR) as well as on high-priority technical issues resulting from routine operation of the reactor.

In September 1990 additional justification for supplemental budget increases for technical support was submitted to DOE (Ref. 2).

In November 1990 DOE worked to identify additional funds for technical support.

In September–November 1990, RRD Reactor Technology Section actively recruited five additional replacement staff based on the current President's Budget. These additional staff will assist in leveling the workloads. See Finding ROA.7-1.

Root Cause:

Insufficient resources; inadequate level of staffing in the RRD Reactor Technology Section to respond to the large number of unexpected issues

Planned Actions and Schedules:

Item/Description	Completion Date
1. DOE make available additional FY 1991 funding to provide subcontractors support.	Complete
2. Based upon above funding, procure matrix organization services (ETD, C&TD, Energy Systems Engineering) to provide baseload technical support for long-term items (such as the SAR), allowing RRD staff to attack unpredicted short-term operational problems.	Complete
3. Request long-term funding commitment to support two additional FTEs.	Complete
4. When funding is received, hire two additional Reactor Technology staff members.	3 months following receipt of funding

Costs:

Type of funds: Research Programmatic

Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	*a*						
2	—	*					
3	—						
4	—						
Status:							
Funded							
Requested							
New							$

*Estimated annual ongoing cost: $330K starting in FY 1992.

[a]Costs for Action Item 1 are contained in Finding ROA.7-1 Action Item 5 costs.

References: Letter, A. W. Trivelpiece to J. A. Reafsnyder, May 4, 1990, "Summary of Additional Funding to Meet New Requirements for HFIR Operations"

Letter, A. W. Trivelpiece to J. A. Reafsnyder, September 27, 1990, "Request for Additional Funding to Meet Requirements for HFIR Operations"

Finding No.: RTS.1-2 Backup for RRD Staff

Finding Description: Staffing actions in the technical support groups at the Research Reactors Division have not ensured sufficient backup in specific key technical positions.

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 6
Tiger Team Action Plan Priority 3

Response: Research Reactors Division (RRD) has been aware that several of its key people are reaching retirement age. Active recruiting of backup key staff members has been in progress. In one case, such a backup slot has been filled. An open slot is available to hire an individual to understudy the individual currently providing HFIR fuel procurement and engineering support.

Root Causes:

Insufficient resources; inadequate funding prior to FY 1990 and scarcity of appropriately qualified individuals since that time

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request FY 1993 funding.	Complete
2. Initiate recruitment of candidates with appropriate qualifications to back up key positions.	6/91

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1			*				
2	—						
Status:							
Funded							
Requested							
New							$

*Estimated annual ongoing cost: $160K starting in FY 1993.

References: None

Finding No.: RTS.2-1 Consistency of Technical Specifications and Procedures

Finding Description: **The Technical Specifications and the related surveillance test procedures are not consistent, particularly with regard to acceptance criteria, and are not in full compliance with DOE 5480.6.**

Code: Category III

Compliance Protocol: DOE Order 5480.6, Safety of DOE-Owned Nuclear Reactors, requires that each DOE-owned reactor shall have a Technical Specification document meeting the Code of Federal Regulations (CFR), Title 10, Part 50.36.

DOE Order 5480.4, Environmental Protection, Safety, and Health Protection Standards, requires that Technical Specifications comply with the mandatory standard ANS 15.1-1982 (Development of Technical Specifications for Research Reactors).

10 CFR 50.36(c)(3) requires that surveillance requirements ensure that the necessary quality of systems and components is maintained.

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: Improvements in Surveillance Test Procedures (STPs) and/or Technical Specifications are addressed in this action plan. The criteria for system operability and test acceptance shall be reviewed and explicitly defined where appropriate, and the documents will be reviewed to ensure full compliance with DOE Order 5480.6, subparagraph 8.(d)1. This DOE order requires Technical Specifications similar to those required for comparable facilities licensed by the NRC and yet provide the flexibility necessary for experimental activities.

Root Cause:

Inadequate management approach; the process of putting all requirements in procedure form with established acceptance criteria acceptable to all reviewers significantly expands the amount of detail considered necessary for adequate procedures. Procedures are normally written for operational consideration with implementation by qualified personnel; therefore, all acceptance criteria have not been explicitly listed in most procedures.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request funding to complete required actions.	Complete
2. Review HFIR Technical Specifications and Surveillance Test Procedures to ensure appropriate system-operability criteria and testing-acceptance criteria are explicitly defined and consistent between the two documents.	7/91
3. Issue revised HFIR Surveillance Test Procedures to ensure full compliance with requirements stipulated in the Technical Specifications and that acceptance criteria are appropriately defined.	4/92
4. Submit a revision to the HFIR Technical Specifications to DOE to correct any noted inconsistency.	6/92
5. Initiate a review of TSR Technical Specifications and STPs with the goal of issuing revised documentation contingent upon approval of continued operation beyond current experimental program and funding. See Action Plan for ROA.7-3.	6 months after DOE decision for continued TSF operation

Costs:

Type of funds: Research Programmatic

Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	30	10					40
4		10					10
5	—	—					
Status:							
Funded							
Requested							
New	30	20					$50

References: None

Finding No.: RTS.2-2 Safety Analysis Reports for the HFIR and TSF

Finding Description: The safety analysis reports for the High Flux Isotope Reactor and Tower Shielding Facility are not in compliance with subparagraph 8.C of DOE 5480.6 with regard to format and content.

Code: Category III

Compliance Protocol: HFIR

DOE Order 5481.1B (9-23-86), paragraph 4, subparagraphs b. and c. require that "those ongoing DOE operations which can reasonably be expected to have the potential for major on-site or off-site impacts to people or the environment shall be identified and evaluated..." For those operations for which documentation is determined to be inadequate to identify the risk from the operation, the line organization must make necessary arrangements (funds and other resources) to provide adequate safety analyses or obtain an exemption. Safety analyses prepared under these subparagraphs are to be prepared based on current technical criteria.

DOE Order 5480.6 (9-23-86), paragraph 8, subparagraph c. requires that the requirements of DOE Order 5481.1B be met and for new safety analysis reports, the NRC's guidelines on standard format and content of safety analysis reports shall be followed.

TSF

DOE Order 5481.1B (9-23-86), paragraph 4, subparagraphs b. and c. require that "those ongoing DOE operations that can reasonably be expected to have the potential for major on-site or off-site impacts to people or the environment shall be identified and evaluated..." For those operations for which documentation is determined to be inadequate to identify the risk from the operation, the line organization must make necessary arrangements (funds and other resources) to provide adequate safety analyses or obtain an exemption. Safety analyses prepared under these subparagraphs are to be prepared based on current technical criteria.

DOE Order 5480.6 (9-23-86), paragraph 8, subparagraph c. requires that for new Safety Analysis Reports, the Nuclear Regulatory Commission's guidelines on standard format and content of safety analysis reports shall be followed.

Priority: Energy Systems Risk Weight 80
Tiger Team Action Plan Priority 2

Response: HFIR

A combination of scope and budgetary problems made it necessary to seek a delay in the FSAR Key Milestone as described in detail in Reference 1. The request for the delay and additional funds was made in May 1990. The schedule that was submitted in May was based on a timely receipt of additional funding. The schedule was approved in August 1990. However, additional funds to support the FSAR needs were not available during FY 1990, and only recently has an indication been made that additional funds would be available during FY 1991. We are currently in the process of responding to the information that the funds requested for FY 1991 will be made available in the near future.

See Finding ROA.7-1.

TSF

This concern was generally identified in 1987 by the ORNL Reactor Review and Audit Committee and documented in ORNL/CF-87/211 as requirement 4 and recommendation 4. (These findings have been tracked by the Research Reactors Division (RRD) commitment tracking system as items TTCREQ-04 and TTCREC-04, respectively.) In addition, internal reviews and reviews completed by an independent consultant during the 1988-89 restart readiness process for the Tower Shielding Reactor (TSR) identified the need to update the safety analysis documents. (Refer to action items SAISAR01, SAISAR02, and SAISAR06 in the RRD commitment tracking system.) Essential analyses were updated prior to restart, but not incorporated into the safety analysis documents. It was determined that formal update of the safety analysis documents would be a post-restart action. To address the need for updated safety analysis documentation, the TSR has been included in the Energy Systems Safety Analysis Report Update Program. Phase I of that program involves completing a facility hazard screening document for each facility in the program. That commitment for the TSR facility is tracked in the RRD tracking system as RRD91-062. The facility hazard screening document will provide an evaluation of the adequacy of existing safety analysis and a preliminary identification of the hazard level of the facility. A draft hazard screening document has been completed for the TSR. Actions planned under the Energy Systems Safety Analysis Report Update Program would ultimately lead to an updated safety analysis report that satisfies the requirements of the DOE order. However, completion of an updated safety analysis report for the TSR is contingent on authorization to continue operating the reactor after completion of the current experimental program and receipt of funds for the update. If it is decided to permanently decommission and decontaminate the facility, the safety analysis report will not be updated.

See Finding ROA.7-3.

Root Causes:

HFIR
(1) Insufficient resources; resources for the HFIR updated SAR have been inadequate due to higher-priority items consuming the RRD budget and RRD staff time. (2) Ambiguous requirements or expectations; changing compliance requirements have increased expectations for the scope and content of the SAR beyond the original basis for the budget request.

TSF
Insufficient resources

Planned Actions and Schedules:

HFIR

Planned actions and schedules are contained in Finding ROA.7-1.

TSF

Planned actions and schedules are contained in Finding ROA.7-3.

Costs: HFIR—Costs are contained in Finding ROA.7-1.
TSF—Costs are contained in Finding ROA.7-3.

References: HFIR

1. Letter, J. B. Richard to J. A. Reafsnyder, May 18, 1990, "Modification of Key Milestones Concerning Completion of the Updated High Flux Isotope Reactor (HFIR) Final Safety Analysis Report"

2. Letter, J. B. Richard to J. A. Reafsnyder, May 4, 1990, "Summary of Additional Funding to Meet New Requirements for HFIR Operations"

TSF

1. Y/CSET-1 "Safety Analysis Report Update Program Overview and Phase I Implementation," October 1990

Finding No.: RTS.3-1 "Facility Design Modifications"

Finding Description: **Procedure RRAP-3.2, Rev. 4, "Facility Design Modifications," is not in compliance with DOE 5480.6, with respect to the requirement for independent and objective review and safety analysis. In addition, no approved procedures for reviewing and documenting temporary facility changes are given.**

Code: Category III

Compliance Protocol: DOE Order 5480.6, Section 8,G,8,a requires that the contractor provide for objective and independent review of proposed modifications to plant and equipment having safety significance.

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: The Research Reactors Division (RRD) Facility Modification Control Procedures met this requirement for significant facility modifications, but did not adequately provide documented evidence of an objective safety review analysis for minor modifications or address temporary modifications. These deficiencies in the RRD Facility Modification Control procedures have been documented in both the October 1990 RRD Self-Assessment under the Technical Support Section and the RRD Self-Assessment Supplemental Section on Configuration Management. The RRD Administrative Procedure RRAP 3.2, Rev. 5 was revised and approved by the RRD Plant Operations Review Committee (PORC) on October 26, 1990, correcting the deficiencies noted in Finding TS.3-1. The PORC decided not to implement the RRAP 3.2, Rev. 5 changes until training on the revisions could be completed. RRAP 3.2, Rev. 5 went into effect after completion of training sessions conducted on November 6, 1990, and November 9, 1990. The RRD-DCC began the process of issuing RRAP 3.2, Rev. 5 in the RRD controlled procedures RRAP manual as of November 20, 1990.

Related TSA concerns are found in Findings TS.3-3, QV.5-4, and FR.1-2.

Root Cause:

Inadequate management approach

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue revised RRD Facility Modification Control procedures to (1) require an independent and objective review and safety analysis for all (both major and minor) design modifications, and (2) document procedures for the approval and analysis of temporary modifications.	Complete
2. Train RRD Design, Safety Analysis, and QA personnel on these revisions in the modification control procedures.	Complete

Costs: None significant

References: RRD Administrative Policies and Procedures Manual, ORNL/RRD/INT-12

Finding No.: RTS.3-2 "Configuration Control of Plant Design Modification"

Finding Description: **Procedure RRAP 3.2, Rev. 5, "Configuration Control of Plant Design Modification," is excessively long and complex to the extent that its usefulness is limited.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 4

Response: RRAP 3.2, Rev. 4 was extensively revised on October 26, 1990, to incorporate findings recommended by (1) the ORNL Reactor Operations Review Committee (RORC) 1990 Annual Review of HFIR, and (2) the RRD Self-Assessment Report of October 1990.

Part of the overall length of RRAP 3.2 is attributable to an effort to make the procedure more user friendly. This effort at procedure useability includes (1) a two page table of contents to direct the user to the applicable section of the procedure, and (2) a four page attachment which outlines the steps required to approve a modification from original initiation to operational readiness and closure. The author of the procedure (RRD Design Group Manager/Configuration Control Manager) is the individual responsible for the effectiveness of procedure RRAP 3.2, Rev. 5.

Related TSA concerns are found in Findings TS.3-1, TS.3-3, FR.1-2, and QV.5-4.

Root Cause:

Inadequate management approach

Planned Actions and Schedules:

Item/Description	Completion Date
1. Review procedure RRAP 3.2, Rev. 5 six months after its issuance to determine if the procedure is being used effectively to adequately control modifications to the facilities operated by the Research Reactors Division. This review will be conducted by the RRD Configuration Control Board, the RRD Quality Assurance Group, and the DOE site office. If it is determined that RRAP 3.2 Rev. 5 is not effective, then each organization will submit revision recommendations to the RRD Plant Operations Review Committee for approval.	5/91

Costs:

Type of funds: Research Programmatic

Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	1.4						1.4
Status:							
Funded	1.4						
Requested							
New							$1.4

References: RRD Administrative Policies and Procedures Manual, ORNL/RRD/INT-12

Finding No.: RTS.3-3 Drawing Changes for the HFIR

Finding Description: **There are no procedural means to ensure that the required level of review and safety analysis has been performed on drawing changes during the post High Flux Isotope Reactor restart drawing as-built program. This is not in compliance with subparagraph 8.g.(8) of DOE 5480.6.**

Code: Category III

Compliance Protocol: DOE Order 5480.6, Section 8.g.(8),a requires that the contractor provide for objective and independent review of proposed modifications to plant and equipment having safety significance.

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: The Research Reactors Division (RRD) Facility Modification Control Procedures met this requirement for significant facility modifications (Design Change Memos), but did not adequately provide documented evidence of an objective safety review analysis for minor modifications and drawing changes [Design Change Notices (DCNs)]. These deficiencies in the RRD Facility Modification Control procedures have been documented in both the October 1990 RRD Self-Assessment under the Technical Support Section and the RRD Self-Assessment Supplemental Section on Configuration Management. The RRD Administrative Procedure RRAP 3.2, Rev. 5 was revised and approved by the RRD Plant Operations Review Committee (PORC) on October 26, 1990, correcting the deficiencies noted in Finding TS.3-3. The PORC decided not to implement the RRAP 3.2, Rev. 5 changes until training on the revisions could be completed. RRAP 3.2, Rev. 5 went into affect after completion of training sessions conducted on November 6, 1990, and November 9, 1990. The RRD-DCC began the process of issuing RRAP 3.2, Rev. 5 in the RRD controlled procedures RRAP manual as of November 20, 1990.

Related TSA concerns are found in Findings TS.3-1 and QV.5-4.

Root Cause:

Inadequate management approach

Planned Actions and Schedules:

Item/Description	Completion Date
1. Revise the RRD Facility Modification Control procedures to (1) require an independent and objective review and safety analysis for all (both major and minor) design modifications, and (2) to require a review and approval signature by a member of the RRD Safety Analysis Group of all drawing changes (DCNs).	Complete
2. Train RRD Design, Safety Analysis, and QA personnel on these revisions in the modification control procedures.	Complete
3. Perform a documented safety analysis review of each drawing change (DCN) that was not part of a design change memo for all drawing changes since the May 1989 HFIR restart.	06/91

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	15						15
Status:							
Funded	15						
Requested							
New							$15

References: RRD Administrative Policies and Procedures Manual, ORNL/RRD/INT-12

Finding No.: RTS.4-1 Equipment Performance Tracking

Finding Description: **Equipment performance tracking is done by several groups but is not compiled, trended, and analyzed by any single organization to produce an integrated result.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 4

Response: The need for equipment performance monitoring and trending as it relates to the maintenance program was previously identified in 1988 as a result of the Comprehensive Safety Appraisal and Upgrade Program (CSAUP) for the High Flux Isotope Reactor (HFIR). This was documented as Findings 7.5.3.2 through 7.5.3.4 in ORNL/RRD/INT-39, June 1988. In response to those findings, the maintenance systems were upgraded to collect more complete information related to equipment performance. However, equipment performance data and evaluation needs have not been comprehensively identified. Currently, trending and evaluation of data collected is done on a case-by-case basis by the maintenance organization, Reactor Technology Section, and operations organization.

Root Causes:

Inadequate communications and insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Identify equipment performance data needs.	1/92
2. Assign overall responsibility for equipment performance tracking to single organization.	1/92
3. Develop and implement data collection for information not currently available.	7/92
4. Develop and implement evaluation program.	1/93

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1		30					30
2	—						
3		30					30
4			15				15
Status:							
Funded							
Requested		60					
New			15				$75

References: None

Finding No.: RTS.5-1 Environmental Impact

Finding Description: **The NEPA review and approval sequence by DOE is not done in a sufficiently expeditious fashion to ensure prompt resolution of problems.**

Code: Category III

Compliance Protocol: DOE Order 5440.1C

Priority: Energy Systems Risk Weight 390
Tiger Team Action Plan Priority 2

Response: In general, receipt of categorical exclusion determinations (CXDs) needed for research reactor activities have been issued and distributed expeditiously. However, the delay of distribution of the cited CXD for Modification to the Secondary Cooling Tower at the HFIR was traced to handling of the CXD after approval by DOE. Streamlining of NEPA coordination is being addressed in response to Finding NEPA/CF-1.

Root Cause:

Inadequate communications

Planned Actions and Schedules:

Item/Description	Completion Date
1. Strengthen tracking of ongoing NEPA actions by including NEPA status in periodic (normally weekly) interface meetings between the DOE reactor site office and the ORNL Research Reactors Division.	Complete

Costs: None

References: None

Finding No.: RTS.7-1 Reactor Engineering Function at the HFIR and TSF

Finding Description: The reactor engineering function at the High Flux Isotope Reactor and Tower Shielding Facility is not defined.

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 4

Response: New concern

Root Cause:

Poorly defined roles and responsibilities; lack of clear functional description in staff charters

Planned Actions and Schedules:

Item/Description	Completion Date
1. Reorganize Reactor Technology Section, and issue position charters to specifically identify a reactor engineering function and roles and responsibilities.	Complete

Costs: No significant costs are associated with the action.

References: None

3.4.9 Nuclear Criticality Safety

Finding No.: RCS.1-1 Management of Criticality Safety Program

Finding Description: **Research Reactors Division management is not providing the oversight to ensure a comprehensive criticality safety program that is in compliance with DOE 5480.5.**

Code: Category III

Compliance Protocol: DOE Order 5480.6 (9-23-86) Section 8.h., *Fissile Material Storage and Handling Facilities and Operations Located Within a Reactor Facility.* "The requirements of DOE Order 5480.5 shall be applied as appropriate to fissile material storage handling facilities and operations within a reactor facility."

DOE Order 5480.5 (9-23-86) Section 9. *Contractor Independent Review and Appraisal System.* "Each contractor to whom this Order is made applicable shall establish and maintain an internal safety review system for nuclear facilities which:

a. Functions primarily in an advisory capacity to line organization, reporting to a designated official at a level of management sufficiently high to take necessary corrective action. (Safety is a line responsibility; neither review nor subsequent approval releases line management from its responsibility for the safety of people and equipment).

b. Is clearly defined and delineated in writing (e.g., purposes, objectives, functions, authority, responsibility, composition, quorum, meeting frequency, and reporting requirements.

c. Can be audited by contractor management and by DOE. The performance of the system shall be recorded in sufficient detail to permit contractor management and DOE to evaluated its effectiveness. Actions taken on any recommendations resulting from reviews, audits, inspections, appraisals, and surveillance shall be included in these records.

d. Provides technical competence in the areas being reviewed. Each review, except that described in subparagraph 9i, below, shall be carried out by persons whose technical disciplines cover the range of technical fields encountered in performing a safety review. Safety considerations are to be treated in the breadth and depth necessary to identify potential hazards and to evaluate the risks.

e. Provides for group discussions between reviewers on all but the more routine matters.

f. Provides an independent determination of whether a proposed activity involves an unreviewed safety question, violation of a Criticality Safety Limit, Operational Safety Requirement, or any matter for which approval is required.

g. Provides an appraisal of the overall operation of each facility at least annually. The majority of the individuals performing the appraisal shall be independent of the operation being appraised. It shall include, but not be limited to, applicable areas listed in subparagraph 9h, below.

h. Provides for objective and independent review of:

(1) Proposed modifications to nuclear facilities and equipment having safety significance, and safety analyses thereof.

(2) Proposed experiments and operations having safety significance.

(3) Administrative, operating (normal and abnormal), maintenance, repair, testing, quality assurance, and emergency procedures and significant changes thereto.

(4) Organization and staffing.

(5) Standards, Nuclear Criticality Safety Limits, Operational Safety Requirements, and changes thereto.

(6) Nuclear facility safety training programs, including the initial and subsequent qualification and verification requirements and procedures for criticality safety.

(7) Unusual occurrences, including those referred to as incidents, operating anomalies, and violations of Nuclear Criticality Safety Limits or Operational Safety Requirements.

(8) The physical condition of the nuclear facilities.

(9) The accuracy and completeness of record keeping and documentation.

(10) Facility operations against its safety analysis.

(11) Facility operational compliance with the requirements of this Order.

i. Is reviewed by contractor management for adequacy of performance at least every 3 years."

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: Research Reactors Division (RRD) has depended upon the annual review by the ORNL Criticality Review Committee for assurance of compliance with the requirements of DOE Order 5480.5.

Root Causes:

(1) Inadequate management approach; RRD relied on the annual review by the ORNL Criticality Review Committee to provide the needed assurance of compliance with DOE Order 5480.5, and the knowledge that a creditable criticality accident at its facilities was not probable. (2) Insufficient resources; current RRD staffing levels prevented a higher priority to be given to Criticality Safety audits.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request funding to complete required actions.	Complete
2. Increase staffing to allow performance of the oversight requirements of DOE Order 5480.5.	90 days after funding
3. Revise Research Reactors Division Administrative Policies and Procedures, RRAP-2.7, Nuclear Criticality Safety Program, to reflect the requirements of oversight within DOE Order 5480.5.	60 days after staffing increase

Costs:

Type of funds: Research Programmatic

Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	*						
Status:							
Funded							
Requested							
New							$

*Estimated new annual ongoing cost: $20K beginning in FY 1991.

References: None

Finding No.: RCS.1-2 Timely Resolution of Criticality Safety Issues

Finding Description: Criticality safety issues are not being handled on a timely basis.

Code: Category III

Compliance Protocol: Best Management Practice dictates that all action items be addressed and corrected in a timely and cost effective manner as determined by line management.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: Items on the Critical Actions and Requirements Tracking System (CARTS) are scheduled based on the Technical Evaluation Group's (TEG) evaluation of the risk associated with the item. The purpose of the TEG is to provide a mechanism and process to systematically evaluate, using the collective expertise of the committee, the importance, risks and/or benefits of issues and commitments related to the Research Reactors Division's responsibilities with regard to the operation of the reactors and other functions. This evaluation provides a basis for prioritizing, scheduling, and ultimately resource planning for each activity.

Root Causes:

(1) Inadequate management approach; the TEG process has established a formal program for prioritizing all significant concerns or recommendations within RRD; scheduling is based on resources and priority considerations that are line management responsibilities. (2) Insufficient resources; limited resources can and do result in prolonged schedules that may be considered an untimely response by reviewers.

Planned Actions and Schedules:

Item/Description	Completion Date
1. The RRD Radiation Control Officer will review the present Criticality Safety CARTS items to determine if priorities should be changed.	6/91
2. Revise the Research Reactors Division Administrative Policies and Procedures, RRAP-2.7 (Nuclear Criticality Safety Program) to require the checking on status of outstanding/incomplete Criticality Safety items on CARTS as part of the biannual (every 6 months) audit.	5/91
3. Request additional resources if required to complete items with the priority determined in item 1.	7/91

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	25						25
Status:							
Funded							
Requested							
New	25						$25

References: None

Finding No.: RCS.5-1 Criticality Alarm Systems

Finding Description: **The criticality alarm systems at High Flux Isotope Reactor, Bulk Shielding Reactor, and Health Physics Research Reactor do not meet all requirements of ANSI/ANS-8.3-1986.**

Code: Category III

Compliance Protocol: ANSI/ANS-8.3-1986 ("Criticality Accident Alarm System"), Section 4 (General Principles), Item 4.1.1:

"Alarm systems shall be provided wherever it is deemed that they will result in a reduction in total risk. Consideration shall be given to hazards that may result from false alarms."

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response:

1. Due to the very low risk of accidental criticality and the personnel shielding provided by the HFIR and BSR fuel storage pools, these two facilities are not provided with criticality alarms. Radiation alarms ("monitrons") are installed, however, to warn of other radiation hazards.

2. During recent criticality safety audits, a commitment was established to document the technical justification for not providing criticality alarms in these two facilities, or alternately, to show that the existing alarms satisfy the current requirements for criticality alarms. An initial justification for exemption was prepared in July 1989, addressing only the HFIR, with subsequent concurrence from the Laboratory Criticality Safety Committee Chairman (Ref. 1). This exemption was not subsequently approved by Laboratory safety officials, however, nor did it include the BSR storage pool. A revised justification has subsequently been provided and approved, addressing both the HFIR and BSR storage pools. Without approved exemptions at the time of the Tiger Team inspection, however, the Concern was based on the assumption that criticality alarms are required for these facilities, together with the finding that the existing radiation alarms, intended for other purposes, do not meet all current standards for criticality alarms.

3. This situation was recognized in Appendix CS to the RRD self-assessment (extracted from the audit report of the Criticality Safety Committee), which states that "Documentation exist to justify no alarm system for the current [HFIR] situation." The BSR and HPRR were not addressed, however.

Root Cause:

Ambiguous requirements or expectations; (a) HFIR and BSR: Delay in documentation and Laboratory approval of exemption from criticality alarm requirements. (b) HPRR: Final upgrading of criticality alarm system delayed due to shortage of resources and uncertainty regarding future use of this facility.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Revise the technical justification for exempting both the HFIR and BSR fuel storage facilities from requirements for a criticality alarm system and obtain approval from appropriate Laboratory criticality safety officials.	Complete
2. Ship the HPRR core to the Y-12 Plant for storage.	Complete

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	10						10
2	—						
Status:							
Funded	10						
Requested							
New							$10

References: Memo, J. T. Thomas to D. H. Cook, July 20, 1989, "Criticality Alarm at HFIR"

Memo, M. W. Kohring to H. A. Glovier, November 28, 1990, "Justification For and Approval of Not Requiring Criticality Alarm Systems in the HFIR and BSR Facilities"

Finding No.: RCS.5-2 Distribution of Nuclear Accident Dosimeters

Finding Description: **Nuclear accident dosimeters are not supplied in conformance with DOE 5480.5 and 5480.11 in areas that require criticality alarm systems.**

Code: Category III

Compliance Protocol: DOE Order 5480.5 and 5480.11

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: ORNL does not supply Nuclear Accident Dosimeters as required by DOE Orders 5480.5 and 5480.11, Section 9.q.3. This concern was previously stated in the Radiation Protection Program Appraisal (RPPA) of the Oak Ridge Complex conducted during 1989.

Following the RPPA, a corrective action plan was approved which specified that a common NAD be developed for the Oak Ridge, Tennessee, and Paducah, Kentucky, facilities operated by Energy Systems. A NAD committee was chartered to identify potential NAD devices and to determine the most-feasible device for use at the Energy Systems sites. Following a detailed study, the currently used beta-gamma and neutron personnel dosimeters were selected for testing to determine applicability.

Results from the measurements of neutron and high gamma doses at accidental levels with the personnel dosimeters, using in-house NIST-traceable sealed gamma and neutron radiation sources, demonstrated the dosimeters' capability as a NAD. A follow-up test with a fast-burst reactor was conducted in November 1990. The data from the test are currently under evaluation. Preliminary review of the data indicates that the dosimeters are able to respond well to all the conditions tested. Testing of the dosimeters and evaluation of the results are currently being documented in a technical basis document. A program implementation plan has been developed to ensure that the requirements of the DOE Orders 5480.5 and 5480.11 are met. The NAD program is scheduled to be completed by April 1991. Continued studies are scheduled to improve the accuracy of the dosimeter readings.

See Finding RP.5-1.

Root Causes:

Inadequate policy implementation and insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Complete the technical basis document for the NAD program.	Complete
2. Determine present locations where criticality alarms are required to ensure that these areas are supplied with NADs.	Complete
3. Develop and issue procedures for processing NADs and for field retrieval by Radiation Protection personnel in the event of an accident.	Complete
4. Train Centralized External Dosimetry System personnel and field health physicists to implement the NAD procedures.	Complete
5. Issue a Radiation Safety Bulletin specifying the new NAD policy.	Complete
6. Implement the NAD program.	Complete

Costs:

Type of funds: Overhead[a]
Source of funds: Overhead

Action item	Estimated costs per fiscal year ($K) 1991	1992	1993	1994	1995	Beyond	Total
1	17						17
2	5						5
3	16						16
4	9						9
5	1						1
6	7						7
Status:							
Funded	55						
Requested							
New							
							$55

Estimated annual ongoing cost: $16K for annual retrieval and annealing of dosimeters, beginning in FY 1992.

[a]Funding is in addition to the sitewide program in Finding RP.5-1.

References: DOE Orders 5480.5 and 5480.11

Finding No.: RCS.5-3 Performance of Criticality Drills

Finding Description: Criticality drills are not being performed in all applicable areas of the Research Reactors Division, and in some cases the drills are not initiated by the criticality alarms as required by ANSI/ANS-8.3-1986, Sec. 7.3, and DOE 5480.5 par. 11C(3)(g).

Code: Category III

Compliance Protocol: ANSI/ANS-8.3-1986, Sec 7.3, and DOE Order 5480.5 para. 11C(3)(g) are being violated. Evacuation drills are being conducted at each facility; however, the HFIR and BSR facilities do not have criticality alarms making it impossible to initiate a drill using this alarm.

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response:

1. Criticality alarms do not exist for the HFIR or BSR. Justification for not requiring these alarms is outlined in the referenced attachment.

2. The HPRR fuel is being moved from the site; therefore, no criticality alarm will be required at that site after December 1990. Since no criticality alarms will be required at any RRD site after December 1990, no requirement to initiate an evacuation with a criticality alarm will exist.

See Finding CS.5-2.

Root Cause:

Ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Obtain justification for not requiring criticality alarms systems in the HFIR and BSR facilities.	Complete
2. Remove the remaining HPRR fuel.	Complete

Costs: Costs are included in Finding RCS.5-1.

References: Letter, M. W. Kohring to H. A. Glovier, November 28, 1990, "Justification for and Approval of Not Requiring Criticality Alarm Systems in the HFIR and BSR Facilities"

3.4.10 Security/Safety Interface

Finding No.: RSS.1-1 New Safeguards and Security Elements

Finding Description: No system is in place to ensure that designs for new or modified safeguards and security elements of site facilities are reviewed and approved by both safety and security site organizations.

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: While all new and modified ORNL facilities are reviewed for safety, no specific system exists to ensure that safeguards and security elements are reviewed. This deficiency will be corrected by the development and implementation of an Energy Systems–ORNL Engineering Procedure EP-E-16, "Safeguards and Security Planning," assigning duties and responsibilities.

Root Causes:

Inadequate policy, ambiguous requirements or expectations, and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Develop draft of procedure.	Complete
2. Implement final procedure.	10/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	20	20					40
Status:							
Funded							
Requested							
New	20	20					$40

References: None

Finding No.: RSS.3-1 Analyses to Determine Appropriate Weapons

Finding Description: No analyses have been performed to determine what weapons can be used safely at the ORNL site, as stipulated by DOE 5480.16, Chapter II, 2.j. and OR 5480.16, Chapter II, 2.j.

Code: Category III

Compliance Protocol: DOE Order 5480.16, Chapter II, 2.j and OR 5480.16, Chapter II, 2.j

Priority: Energy Systems Risk Weight 105
Tiger Team Action Plan Priority 2

Response: This deficiency was identified in the ORNL Self-Assessment and a mitigation and correction plan has been developed. The plan included both interim and permanent fixes.

Root Causes:

Inadequate policy implementation and ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Involve the safety department in all security patrol drills and exercises.	Complete
2. Identify major hazards in response plans.	Complete
3. Identify consultant group capable of performing appraisals and audits.	Complete
4. Conduct audits and appraisals using outside consultants to provide an analysis of the safe use of weapons at ORNL.	10/92

Costs:

Type of funds: Overhead
Source of funds: Overhead

Action item	Estimated costs per fiscal year ($K)						Total
	1991	1992	1993	1994	1995	Beyond	
1	—						
2	—						
3	—						
4		40					40
Status:							
Funded							
Requested							
New		40					$40

References: None

Finding No.: RSS.4-1 Safety Appraisals and Audits for Firearms

Finding Description: **Martin Marietta Energy Systems, Inc., does not conduct formal firearms safety appraisals and audits of the ORNL internal security operations, as required by DOE 5480.16, Chapter III, 1.b.**

Code: Category III

Compliance Protocol: DOE Order 5480.16, Chapter III

Priority: Energy Systems Risk Weight 105
Tiger Team Action Plan Priority 3

Response: Energy Systems has an established corporate-wide Firearms Safety Committee that provides oversight and performs reviews and appraisals of appropriate activities. This oversight function will be strengthened by instituting a site-specific committee. The charter of the ORNL committee will require a system of continuing oversight and formal firearms safety appraisals and audits that shall become a permanent part of the ORNL Security Patrol annual self-assessment.

Root Causes:

Inadequate policy implementation and ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Establish Energy Systems Firearms Safety Committee.	Complete
2. Establish contract with appropriate consultants.	4/92
3. Establish ORNL Firearms Safety Committee.	10/91
4. Complete audit.	10/92

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	*						
3	—						
4	—						
Status:							
Funded							
Requested							
New							$

*Estimated annual ongoing cost: $10K starting in FY 1991.

References: None

3.4.11 Experimental Activities

Finding No.: REA.1-1 Safety Overview of Bldg. 7900

Finding Description: **The HFIR Operations Section does not have a formal program for safety overview of all areas of Bldg. 7900, including experimental areas, to monitor compliance with safety requirements and overall facility safety interactions.**

Code: Category III

Compliance Protocol: Best Management Practices dictate a need for an auditable safety oversight program of all areas within the 7900 building.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: This concern was noted in the Research Reactors Division's (RRD) self-assessment report of October 1990. It was never RRD's intent or belief that the original Memoranda of Understanding with the Solid State Physics Division (SSD) and the Analytical Chemistry Division (ACD) would relieve RRD of the overall safety inspection responsibilities for the General Purpose Neutron Activation Analysis Facility (GPNAAF) or the Beam Room. Both SSD and ACD perform and document their independent Quarterly Safety Inspection of the Beam Room and GPNAAF respectively.

The RRD *Facility Inspection Program (FIP)* provides for the performance and documentation of monthly inspections of all RRD areas of responsibility including the Beam Room and GPNAAF in building 7900 by salaried employees (engineers of various disciplines, reactor supervisors, trainers, etc.). The FIP provides for quarterly inspections and documentation by the Division Director of an RRD facility or area. The FIP provides for the quarterly inspection and documentation by Section Heads of their areas. The FIP provides for weekly inspections and documentation by the Facility Managers of their facilities. The FIP provides for the monthly inspection and documentation by the Division Safety Officer/Radiation Control Officer (DSO/RCO) of all RRD facilities. The primary look of the FIP is toward housekeeping, but health and safety standards as well as radiological ALARA concerns are viewed.

RRD has in the past established a number of administrative controls which are administered though an RRD Experiment Coordinator. RRD has established pre-training requirements for visiting experimenters. This training is conducted by the host division (SSD or ACD) but RRD has input and review privilege of the training plans. Both the Beam Room and GPNAAF are under the radiological control and review of the Reactors Complex Radiation Protection Leader and the RRD Radiation Control Officer. All maintenance in the Beam Room and

GPNAAF is performed by and under the supervision of the RRD maintenance organization.

Root Causes:

(1) Poorly defined roles and responsibilities; it is difficult to share responsibilities for safety when each line organization is charged with this responsibility. One must depend on each line of division management at the laboratory to enforce the requirements of a particular administrative control. (2) Insufficient resources; the RRD staffing level is based on providing only infrequent surveillance of activities performed by other divisions in the Beam Room. Normally the Beam Room is the only experimental area where 24-hour manned experiments will take place.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue revised Research Reactors Division Administrative Polices and Procedures Manual (RRAP) to incorporate the Facility Inspection Program	Complete
2. Increase surveillance of the experimental areas by RRD and support divisions line management as specified in the revised RRAP.	5/91
3. Request funding to complete required actions.	Complete
4. Increase RRD staffing level to assist in the surveillance of the experimental areas.	90 days after funding is provided

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	—						
4			*				
Status:							
Funded							
Requested							
New							$

*Estimated annual ongoing cost: $100K beginning in FY 1993.

References: None

Finding No.: REA.3-1 Updating of Research Reactors Experimenters' Guide

Finding Description: The Research Reactors Experimenters' Guide is not being maintained current in its description of facilities and requirements.

Code: Category III - Best Management Practice

Compliance Protocol: None

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 4

Response: This is a new concern. Some sections of the document have become out-dated due to the design changes and new procedural requirements implemented during the extended 1986 reactor shutdown. A new document that is up-to-date will be issued as a controlled document within the RRD. This document will be distributed to established ORNL experimental groups currently using the reactors and to other prospective experimenters as the need arises.

Root Cause:

Insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue an RRD Administrative Policy and Procedure that establishes the requirements for a controlled RRD internal manual entitled "Research Reactors Division Experimenters' Guide." This procedure will define the format and contents of the manual, as well as establish responsibilities for review and upkeep of the manual.	09/91
2. Develop applicable manual contents and issue draft version of "Research Reactor Division Experimenters' Guide" for comment.	02/92
3. Issue revised Research Reactors Division Experimenters' Guide.	05/92

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	20						30
3	—	10					
Status:							
Funded	20						
Requested		10					
New							$30

References: None

Finding No.: REA.3-2 Verification of Reactor Experiment Calculations

Finding Description: **ORNL does not have a clearly defined set of requirements, and implementing system, for verification of safety-related reactor experiment calculations.**

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 0
Tiger Team Action Plan Priority 3

Response: This is a new concern. Review Committee (RERC/RORC) methods of operation require that all safety-related experiment calculations be independently reviewed and such reviews for operating experiments have been made. The scope of the review and a standard implementation system, however, are not defined. The RRD Reactor Technology Section has recently issued a procedure (RTP-1) to address the preparation, review, validation, and handling of safety related calculations. Applicable RRD procedures related to experiment reviews and approval (RRAP 5.3, 5.4) will be revised to define the term safety-related calculations for experiments and to require that safety-related experiment calculations be done in accordance with RTP-1. The Experimenter's Guide will also be updated to require that safety-related calculations be performed in accordance with RTP-1. Established ORNL experimental groups performing experiments at the reactor will be trained in the requirements of RTP-1.

Root Cause:

Inadequate policy

Planned Actions and Schedules:

Item/Description	Completion Date
1. Train ORNL experimental groups on Procedure RTP-1.	08/91
2. Define the term safety-related calculation as it applies to reactor experiments.	08/91
3. Draft a new section to the "Experiment Information and Safety Analysis Form for Experiments in the ORNL Research Reactors" (the Experiment Review Questionnaire) entitled "Safety-Related Calculations." This section will define the term safety-related and list all calculations that are considered safety-related.	12/91

4. Issue revised the RRD Experimenter's Guide to include the definition of safety-related calculations and to reflect the requirements of RTP-1. 12/91

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	8						8
4		2					2
Status:							
Funded	8						
Requested		2					
New							$10

References: None

Finding No.: REA.4-1 Control of Potential Personnel Exposure

Finding Description: High Flux Isotope Reactor Operating Procedure 5.1, Part 5.1.4.2, and draft Procedure 5.1, Rev. 1, permit relinquishing of spectrometer angle limit lock keys to experimenters, thus diluting the control over potential personnel exposure to high Beam Room radiation levels. Neither procedure specifies steps for safely restoring the system to its normal operating configuration.

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 8
Tiger Team Action Plan Priority 3

Response: This is a new concern. The cited procedures do not reflect current or past practice. The keys to the spectrometer angle limit lock are currently and have always remained in the custody of the reactor shift supervisor and are not relinquished to the experimenter. The cited procedures will be revised to reflect this practice. In addition, a new section(s) will be added to the High Flux Isotope Reactor Operating Procedure 5.1 to address the steps necessary to safely move the main beam room spectrometer shield past the angle limit lock and for restoring the shield back to its normal operating configuration. RRAP 5.1 will also be revised to include the procedure for restoring the shield to its normal operating position.

Root Cause:

Inadequate communications

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue revised HFIR operating procedure 5.1 to address possession of the spectrometer angle limit lock keys and work with the spectrometer shield.	08/91
2. Revise RRAP 5.1 in a similar manner to be consistent with HFIR Operating Procedure 5.1.	10/91

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	5						5
2	—						
Status:							
Funded	5						
Requested							
New							$5

References: None

3.4.12 Site/Facility Safety Review

Finding No.: RFR.1-1 Training for Unreviewed Safety Question Determinations

Finding Description: **Instructional material and formal courses are not available to train new personnel to perform Unreviewed Safety Question Determinations, as required by DOE 5480.6, Section 8.g.(6).**

Code: Category III

Compliance Protocol: DOE Order 5480.6, Section 8.g.(6) requires that Unreviewed Safety Question (USQ) Determinations be performed. It is good practice to implement a training program that supports this requirement.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: A recommended good practice has not been implemented due to limited application of results, qualified staff with low turnover reducing the need to establish a documented training module on this topic, and lack of funding.

Root Causes:

Inadequate management approach and insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request funding from DOE for this action plan.	Complete
2. Incorporate existing approach for performing USQ into a formal lesson plan.	90 days after funding is provided
3. Review and document approach at other selected facilities for training on USQ.	90 days after funding is provided
4. Revise Item 2 per the best "lessons learned" obtained from Item 3.	90 days after funding is provided

5. Conduct training for selected RRD personnel in accordance with the formal lesson plan. Incorporate training requirement for selected new personnel and also retraining for selected RRD personnel.	180 days after funding is provided
6. Transmit lesson plan on USQ to training department at the laboratory for consideration for incorporation in their training requirements.	120 days after funding is provided

Costs:

Type of funds: Research Programmatic

Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	3						3
3	1						1
4	1						1
5	15	5					20
6	—						
Status:							
Funded							
Requested							
New	20	5					$25

References: None

Finding No.: RFR.1-2 Review Board for Nuclear Safety Assessments

Finding Description: A review board is not currently in place to judge whether a Nuclear Safety Assessment is required for proposed new or modified reactor activities.

Code: Category III

Compliance Protocol: Best Management Practice

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 4

Response: The Research Reactors Division (RRD) Facility Modification Control Procedures met this requirement for significant facility modifications but did not adequately provide documented evidence of an objective safety review analysis for minor modifications. These deficiencies in the RRD Facility Modification Control procedures have been documented in both the October 1990 RRD Self-Assessment under the Technical Support Section and the RRD Self-Assessment Supplemental Section on Configuration Management. The RRD Administrative Procedure RRAP 3.2, Rev. 5 was revised and approved by the RRD Plant Operations Review Committee (PORC) on October 26, 1990, correcting the deficiencies noted in Finding FR.1-2. The PORC decided not to implement the RRAP 3.2, Rev. 5 changes until training on the revisions could be completed. RRAP 3.2, Rev. 5 went into effect after completion of training sessions conducted on November 6, 1990, and November 9, 1990. The RRD-DCC began the process of issuing RRAP 3.2, Rev. 5 in the RRD controlled procedures RRAP manual as of November 20, 1990.

A Nuclear Safety Assessment Review is currently required per RRAP 1.5 for all new and revised procedures. The latest revision (Rev. 3) of RRAP 1.5 has been in effect since October 25, 1989.

Other related TSA concerns include Findings TS.3-1, TS.3-3, and QV.5-4.

Root Cause:

Inadequate management approach

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue revised RRD Facility Modification Control procedures to (1) require an independent and objective review and safety analysis for both major and minor	Complete

design modifications, and (2) establish a RRD Configuration Board.

2. Train RRD Design, Safety Analysis, and QA personnel on these revisions in the modification control procedures. — Complete

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

Action item	Estimated costs per fiscal year ($K) 1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	37						37
Status:							
Funded	37						
Requested							
New							$37

References: RRD Administrative Policies and Procedures Manual, ORNL/RRD/INT-12

Finding No.: RFR.4-1 New Format for Written Reports

Finding Description: The new format for organizing the written reports of the Reactor Operations Review Committee Annual Safety Appraisals complicates validation that the reports meet the requirements of DOE 5480.6, Section 8.g.(8).

Code: Category III

Compliance Protocol: DOE Order 5480.6, Section 8.g.(8)

Priority: Energy Systems Risk Weight 1
Tiger Team Action Plan Priority 4

Response: It is good management practice to make reports amendable to audits against standards (DOE Orders) in a convenient manner.

Root Cause:

Inadequate policy

Planned Actions and Schedules:

Item/Description	Completion Date
1. Provide an index between the recently completed Reactor Operations Review Committee (RORC) reviews for 1990 and DOE Order 5480.6	Complete
2. Revise the guidelines for report preparation format for internal Laboratory appraisals to require an index between the items reviewed and the requirements of DOE Orders 5480.5, 5480.6, and 5482.1B. This will be included in the ORNL Appraisal Program Manual.	1/92
3. Issue revised ORNL Appraisal Program Manual.	5/92

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	1						1
2		1					1
3		—					
Status:							
Funded							
Requested							
New	1	1					$2

References: DOE Orders 5480.5, 5480.6, 5482.1B

3.4.13 Radiological Protection

Finding No.: RRP.3-1 Source Control

Finding Description: **Radioactive source inventories and leak testing records are not complete for all accountable sources, as required by DOE Order 5480.11**

Code: Category III

Compliance Protocol: DOE Order 5480.11

Priority: Energy Systems Risk Weight 50
Tiger Team Action Plan Priority 3

Response: ORNL's Radiation Source Control Program has added significantly to the control and accountability of radioactive sources at the Laboratory. On April 10, 1990, the "ORO Radiation Source Control Policy" was issued; it specifies the requirements that ORNL is required to comply with by January 1, 1991. Energy Systems has issued ESH-11 to specify requirements for the implementation of the policy.

Office of Environmental and Health Protection personnel are currently initiating a program to become compliant with ESH-11 and the ORO policy. ORNL Health Physics Procedure RP 2.14, "Radioactive Source Control," is currently under revision to specify requirements of the policy. The *Radiation Protection and Radiation Monitoring Standard Operating Procedures Manual,* Procedure 02-50-55, "Surveying Sealed and Unsealed Radioactive Sources," was issued on September 29, 1990, to provide the technical guidance for the leak testing of radioactive sources. In addition, self-paced training program modules are being developed for each individual responsible for radiation source control.

Research Reactors Division (RRD) needs to emphasize the need for source registration to all its members. The Division will conduct an inspection of all its operations to identify and register all sources that are not presently registered, but that meet the criteria of *Health Physics Manual Procedure,* RP-2.14, "Registry of Radioactive Material and Sealed Sources." The Radiation Protection personnel who are dedicated to RRD will provide the support needed to ensure that all identified sources are leak-tested, properly identified, properly stored, and posted.

RRD will train its personnel in the requirements of radioactive source control, as training materials become available from the Office of Environmental and Health Protection's, Technical Resources and Training Section.

Response to Finding RP 3-3 specifies the corrective actions developed to implement the ORNL Radioactive Source Control Program.

Root Causes:

Inadequate policy implementation, inadequate oversight, inadequate training, and poorly defined roles and responsibilities.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Based on the requirements of *Health Physics Manual Procedure,* RP-2.14, "Radioactive Source Control", conduct a review of compliance for RRD facilities and operations and identify the deficiencies needing correction. Complete source inventory and review of leak-testing records.	6/91
2. Complete corrective actions to correct identified deficiencies.	9/91

Costs: Funding listed is in addition to the sitewide program in Finding RP.3-3.

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	7						7
2	12						12
Status:							
Funded	19						
Requested							
New							$19

References: None

Finding No.: RRP.3-2 Radioactive Source Inventories

Finding Description: **There is no active program at the reactor sites to reduce the inventory of unneeded sources.**

Code: Category III

Compliance Protocol: Best Management Practice. Maintaining an inventory of sources required for operation should require appropriate disposal of unneeded sources.

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 4

Response: DOE Order 5480.11 makes no reference to source inventories or leak testing of those sources or records of the same. The DOE ORO Radioactive Source Control Policy, with which ORNL is required to be in compliance by January 1, 1991, references DOE Order 5480.11 but only in regards to posting and labeling of radioactive material. The DOE ORO Radioactive Source Control Policy, Table 1, lists those radionuclides and activity levels at which registry and inventory is required.

The Cs-137 sources found at HFIR were exempt from inventory controls because they were below the activity levels required by Table 1 of the DOE ORO Radioactive Source Control Policy.

This concern is related to Finding RP.3-1 because it deals with the radioactive source control program.

Root Cause:

Ambiguous requirements or expectations - The newly written DOE ORO Radioactive Source Control Policy, which is currently under review by DOE, has not been fully implemented, and no program exists to ensure a reduction in unneeded sources.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Leak check the two large Co-60 sources located in building 3095 or place a hold tag on the sources requiring testing before use. (The two sources were properly labeled on the date of discovery.) Evaluate sources for appropriate disposal and document results.	Complete

2. Fully implement the DOE ORO Radioactive Source Control Policy.

   a. Ensure sources are properly listed on inventory. 6/91

   b. Maintain source listing according to actual need. Properly dispose of unnecessary sources. 9/91

3. Institute an inventory reduction program for sources which are no longer needed. Unnecessary sources will be stored or disposed of in accordance with Laboratory requirements. 9/91

4. Issue revised ORNL Health Physics Manual procedure RP-2.14 to agree with the DOE-ORO Radioactive Source Control Policy. 7/91

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	0.2						0.2
2	1.0						1.0
3	3.0						3.0
4	0.5						0.5
Status:							
Funded	4.7						
Requested							
New							
							$4.7

References: None

Finding No.: RRP.4-1 Posting of Radiological Conditions

Finding Description: Current postings do not always adequately inform the worker of the radiological conditions in a posted area, as required by DOE 5480.11.

Code: Category III

Compliance Protocol: DOE Order 5480.11

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: Additional radiological survey maps have been posted at the entrances to and in the radiological areas at HFIR. There is no Very High Radiation Area roped off at HFIR as indicated in the TSA findings. There is a High Radiation Area roped off at HFIR in the first floor water wing. Additional survey maps of the area have been posted in the immediate area of the boundary.

Root Cause:

Ambiguous requirements or expectations for information required for posted areas

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue revised RRD Health Physics Procedure RRD-HP-3, "General Guidance to Radiation Protection Personnel at the HFIR Facility" to be more specific in the location and the degree of posting and to include all RRD facilities.	7/91
2. Request funding for Item 3.	5/91
3. Purchase digital alarming dosimeters.	7/91

Costs:

Type of Funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
3	20	5					25
Status:							
Funded							
Requested							
New	20	5					$25

References: None

Finding No.: RRP.4-2 Radiological Controls in the Experiment Area

Finding Description: The radiological controls in the experiment area of the beam room at the High Flux Isotope Reactor do not preclude inadvertent exposure of personnel to the neutron beam.

Code: Category III

Compliance Protocol: DOE Order 5480.11 (12-21-88), Section 9.k.(2)(a) *Posting for External Radiation.* "The access to any area where an individual can at anytime during normal operations receive a dose equivalent greater than 5 mrem (50 microsieverts) in 1 hour at 30 centimeters from the radiation source or any surface through which radiation penetrates shall be posted ..."

Priority: Energy Systems Risk Weight 6
Tiger Team Action Plan Priority 2

Response: Pretraining of personnel, administrative controls, and experienced supervision are used in conjunction with indicating lights to preclude inadvertent exposure of personnel to the neutron beam. Level of possible exposure and restricted access do not justify engineering controls.

Root Cause:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Improve the signs at the neutron beams to indicate the presence of "Open Beam when the Red Light is Lit — Very High Radiation Area in the Beam."	5/91
2. Measure and document exposure rates in the neutron beams.	7/91
3. Based on results of Item 2 above, determine design and any engineering required.	10/91
4. Experimenters review design to ensure that controls do not preclude any science.	11/91
5. Install controls.	10/92

Costs: None significant.

References: None

Finding No.: RRP.8-1 Instruments

Finding Description: No program or procedures are in place to ensure that portable and fixed emergency instruments meet the requirements of ANSI N320, N323, and N42.17C.

Code: Category III

Compliance Protocol: None

Priority: Energy Systems Risk Weight 50
Tiger Team Action Plan Priority 3

Response: This finding addresses the same issue as Finding RP.8-4. See response to Finding RP.8-4.

Root Causes:

Inadequate policy implementation and inadequate resources

Planned Actions and Schedules:

This concern is fully addressed by actions listed in response to Finding RP.8-4.

Costs: Cost is reported in Finding RP.8-4.

References: DOE Order 5480.11
DOE/EH 0135
ANSI N320
PNL-SA-13346/CONF-840774

Finding No.: RRP.10-1 Control of Low-Level Contamination

Finding Description: **Current contamination and radiation monitoring capabilities and policies are not adequate to prevent the spread of low-level radioactive contamination outside of controlled areas.**

Code: Category III

Compliance Protocol: DOE Order 5480.11 (12-21-88) Section 9.g.(4)(c) "*Personnel and Personal Property Contamination Monitoring* shall be provided, as appropriate, and used immediately prior to or after exits from radiological areas established to control surface or airborne radioactive contamination. If monitoring is performed after the exit, appropriate controls shall be implemented to prevent the loss of control of contamination."

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: This is a previously identified noncompliance. Background radiation in many areas prevents the monitoring for contamination immediately prior to or after the exit from a contamination area. Shielding booths and additional personnel contamination friskers have been requested. Very high source of contamination exists in the reactor pool and associated systems. Action to remove the source from the reactor pool and decontaminate the associated systems has been requested.

Root Cause:

Insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Obtain four shielded frisking booths and install at contamination area exits.	6/92
2. Obtain four additional personnel contamination friskers to be used in conjunction with the shielded frisking booths.	6/92
3. Remove Europium source from the reactor pool and decontaminate the associated systems, as previously planned.	10/91

4. Improve the training of radiation workers who work with contamination. — Complete

5. Improve availability and quality of protective clothing and self-monitoring radiation dosimeters. — 8/91

6. Inform personnel of the standing practice that personnel who knowingly violate the basic safety precaution will be subject to positive discipline. — 8/91

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
2	—						
3	—						
4	—						
5	20	5					25
Status:							
Funded	20						
Requested		5					
New							$25

Type of funds: Capital
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1		60	5				65
Status:							
Funded							
Requested							
New		60	5				$65

References: None

Finding No.: RRP.10-2 Waste Minimization

Finding Description: Waste minimization, through surveillance and proper segregation of contaminated material, is not effectively performed.

Code: Category III

Compliance Protocol: Best Management Practice

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: Recent emphasis on control of contamination with a concurrent tightening of limits and an improvement in detection instruments and techniques has resulted in the necessity to change the methods of handling protective garments, and other potentially contaminated items. As these practices become stabilized and new protective clothing is procured, then emphasis on the minimization of waste will be returned to its former higher level. This concern or finding has been recognized previously.

Also see Finding WM/BMPF-2.

Root Causes:

Inadequate management approach and ambiguous requirements or expectations; recent policy changes relative to contamination control resulted in a lag in practices leading to waste minimization.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Review practices and procedures to find areas requiring improvement aimed at waste minimization and document review.	6/91
2. Train and certify appropriate division members, including all ROs and SROs, as low-level waste generators.	6/91
3. Initiate practices for contamination control and waste segregation as appropriate, based on the training scheduled above.	6/91

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	7						7
2	9						9
3	9						9
Status:							
Funded	25						
Requested							
New							$25

References: None

Finding No.: RRP.11-1 Addressing ALARA Issues

Finding Description: As low as reasonable achievable (ALARA) issues are not always being reviewed and addressed when Radiation Work Permits and Posted Regulations are issued.

Code: Category III

Compliance Protocol: DOE Order 5480.11 (12-21-88) Section 8.b. *As Low as Reasonably Achievable (ALARA).* "An approach to radiation protection to control or manage exposures (both individual and collective to the workforce and general public) as low as social, technical, economic, practical, and public considerations permit. As used in this Order, ALARA is not a dose limit but a process, which has the objective of dose levels as far below applicable limits of the Order as reasonably achievable."

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: Radiation Work Permits and Posted Regulations are part of the ALARA process. Due to the concern for ALARA within the Research Reactors Division facilities and in particular the High Flux Isotope Reactor (HFIR), radiation work permits (RWP) and/or Posted Regulations (PR) are written for many jobs which might not normally be required by ORNL Health Physics procedures. This is done in an effort to document as much as possible the dose received at our facilities. The result is that many RWPs and PRs are written and our percentage of documented dose is increased which is in keeping with ALARA. The present review process for ALARA issues is considered adequate since it contains the following elements:

(a) The RWP and/or Posted Regulation is written by the Radiation Protection Technician.

(b) The RWP and PR are reviewed by the Reactors Complex Radiation Protection Leader.

(c) The RWPs and PRs and their collective dose are documented in the Monthly Radiation Protection Reports.

(d) The RWPs and PRs all have had low exposures associated with them. In fact the exposures documented in the majority of our RWPs would not have required that an RWP be issued for the activity.

See Finding RP.11-1.

Root Cause:

Ambiguous requirements or expectations; there was no demonstrated need for the review of the RWPs and/or PRs by personnel outside of the present review process, such as the ORNL Reactors ALARA engineer.

Planned Actions and Schedules:

Item/Description	Completion Date
1. RRD Radiation Control Officer (RCO) review monthly those post work (completed) RWPs with a collective dose of 10 mrem or more. RRD RCO make those or any other post work RWPs available to the ORNL Reactors ALARA engineer for review and comment as he/she may desire.	Complete
2. Submit ALARA plans for unusual, non-routine, potentially high exposure jobs to the ORNL Reactors ALARA engineer for review.	Complete
3. Revise Research Reactors Division Administrative Policies and Procedures Manual, procedure RRAP-2.2, Radiation Protection to establish the requirement of Action 1 and 2.	6/91

Costs: None significant

References: None

3.4.14 Personnel Protection

Finding No.: RPP.1-1 Review of RRD

Finding Description: **Documented periodic internal appraisals, audits, or assessments of Research Reactors Division activities and facilities by professional industrial hygiene and industrial safety personnel have not been performed, as required in DOE 5480.10.**

Code: Category III

Compliance Protocol: DOE Order 5480.10

Priority: Energy Systems Risk Weight 0
Tiger Team Action Plan Priority 2

Response: During the first quarter of CY 1991, individual Industrial Hygiene Section professionals will be assigned to provide oversight for particular divisions. Once these assignments have been made, periodic assessments of industrial hygiene concerns at Research Reactors Division facilities will be scheduled, the assessments will be conducted, and the results will be documented.

In addition, the ORNL Safety Manual will be revised to reflect current DOE, OSHA, and industry requirements (see PP.2-1, Item 5).

Root Causes:

Inadequate oversight, poorly defined roles and responsibilities, and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Assign Industrial Hygiene Section staff members to provide oversight for particular divisions (see Finding RPP.4-1).	Complete
2. Develop schedule for periodic assessments of RRD facilities and operations by Industrial Hygiene and Industrial Safety. Assessments will be based on established roles and responsibilities covering all RRD facilities.	6/91
3. Begin periodic assessments, including appropriate documentation.	6/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	4						4
2	2						2
3	11	*					11
Status:							
Funded	17						
Requested							
New							$17

*Estimated annual ongoing cost: $30K beginning FY 1992.

References: DOE Order 5480.10

Finding No.: RPP.2-1 ORNL Safety Manual

Finding Description: **The ORNL Safety Manual has not been maintained as a controlled document and does not reflect current DOE, OSHA, or industry consensus requirements.**

Code: Category III

Compliance Protocol: ANSI/ASME NQA-1, Quality Assurance Program Requirements for Nuclear Facilities

Energy Systems ESS.6.1, Document Control

ORNL X-ESH-6, ORNL ES&H Procedures Control System

ORNL QA-L-6-100, Document control

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 2

Response: This action plan is designed to correct this deficiency. The ORNL Safety Manual will be maintained as a controlled document. All present procedures will be reviewed and revised, as needed, to reflect current DOE, OSHA, and industry consensus requirements. New procedures will be created, as appropriate, to ensure that industrial safety requirements are documented and are made available to ORNL line management.

See Action Plan PP.2-1.

Root Causes:

Inadequate policy, inadequate policy implementation, and insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Send current table of contents and controlled document to manual holders to sign verifying that they presently possess the manual assigned to them and that the manuals are up-to-date.	3/91

Costs: See Action Plan PP.2-1

References: DOE Orders 5480.4 and 5483.1A

Finding No.: RPP.2-2 Safety Personnel Involvement with Safety Work Permits

Finding Description: **Involvement of professional industrial safety personnel in the issue of safe work permits is not required by ORNL procedures and documentation.**

Code: Category III

Compliance Protocol: Best Management Practice

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: There is no requirement under the present administrative controls system for an industrial safety professional to review or approve safety work permits (SWPs). Not having an independent review of SWPs increases the probability of an accident or mishap as a result of not having a trained professional review the work being proposed. The decision to have an independent review of the SWP by industrial hygiene personnel is made by the maintenance coordinator or facility manager.

Due to the number of industrial safety and industrial hygiene personnel on the Laboratory staff and the sheer volume of SWPs which are generated on a daily basis, it may not be prudent to have a member of the two staffs review every SWP. However, a systematic process is warranted to ensure that certain types of work proposals are reviewed by trained professionals.

Root Cause:

Inadequate policy

Planned Actions and Schedules:

Item/Description	Completion Date
1. Evaluate the existing SWP procedure with respect to required reviews by industrial hygiene and industrial safety personnel. Revise the procedure to include a process by which line management can objectively determine which SWPs require independent reviews by safety professionals.	6/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	5						5
Status:							
Funded	5						
Requested							
New							$5

References: None

Finding No.: RPP.2-3 Updating of RRD Manuals

Finding Description: ORNL policy and procedures do not ensure that the Research Reactors Division is using the most recent edition of safety and health program manuals, as required by NQA-1.

Code: Category III

Compliance Protocol: Best Management Practice

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 3

Response: The current Laboratory system does provide a procedure (SPP-X-AD-1) for divisions, such as RRD, to provide input during the document review cycle before final document approval. The procedure calls for all Standard Practice Procedures to be distributed for review to the divisions before they are approved for implementation to ensure, at a Laboratory level, that procedures that are generated receive a consistent technical or administrative review and do not represent a conflict unresolvable with other division requirements. This procedure has not always been consistently followed.

ORNL does have a Measurements Assurance group who maintains a database and regulates controlled copies of procedures to ensure that the most recent edition is utilized.

Integrated administrative systems and controls for providing comprehensive guidance is the subject of the action plan in response to Finding MF-2, while the flowdown of ES&H policies and requirements is the topic of the action plan for Finding OA.1-1. The other issues raised in this finding are resolved by the actions included in those findings.

Root Cause:

Poorly defined roles and responsibilities; the procedure review process cycle by originators of laboratory manuals is not always adequate.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Submit an RRD letter to the originators of the ORNL Health Physics Manual, Safety Manual, and Procedures for Industrial Hygiene Programs Manual indicating the need to receive a draft of generated procedures for concurrence before they are formally approved and issued for use within ORNL.	Complete
2. RRD request that ORNL management remind document originators to comply with the review process in SPP X-AD-1 (Administration of ORNL Procedures) for functional, discipline or multiple-division operating procedures.	Complete
3. Conduct QA audit.	11/91

Costs: None significant

References: ORNL Standard Practice Procedures Manual SPP-X-AD-1

Finding No.: RPP.2-4 ORNL Hoisting and Rigging Equipment

Finding Description: **The hoisting and rigging equipment at ORNL does not conform to current OSHA requirements as documented in 29 CFR 1910 or to the DOE Hoisting and Rigging Manual.**

Code: Category III

Compliance Protocol: 29 CFR 1910 and the DOE Hoisting and Rigging Manual

Priority: Energy Systems Risk Weight 405
Tiger Team Action Plan Priority 2

Response: ORNL Safety Manual Section IS-7.1 requires: the frequent, periodic inspection and load testing per OSHA and DOE H&R Manual; the Engineering division to be responsible for design evaluation/review and procurement and installation of equipment; the P&E division to be responsible for modification and maintenance that complies with the engineering standards; and the periodic inspection and load tests to be performed by the QE&I personnel. The detailed requirements of OSHA and the DOE H&R Manual are to be found in the QE&I Procedures, SSI 220 through SSI 229. These procedures control the actions of the QE&I personnel. Individual operating divisions such as P&E and RRD will have to address the responsibility for frequent inspection and special lifts to meet the intent of IS 7.1.

Root Cause:

Inadequate policy implementation; incomplete flowdown policy standards fail to ensure appropriate control for hazardous operations.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue revised QE&I Procedures to include all the requirements of OSHA and the applicable sections of DOE H&R Manual.	5/91
2. Issue revised IS 7.1 to require all the requirements of 29 CFR 1910.179 and the applicable parts of the DOE H&R Manual.	11/91
3. Conduct formal presentations to relevant divisions on the updates to the Safety Manual and the QE&I Inspection Procedures.	12/91

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC 03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	2						2
2	2						2
3	4	*					4
Status:							
Funded	8						
Requested							
New							$8

*Estimated annual ongoing costs: $4K beginning in FY 1992.

References: ORNL Safety Manual

Finding No.: RPP.3-1 Industrial Safety at TSF

Finding Description: ORNL has not effectively controlled industrial safety hazards at the Tower Shielding Facility (TSF). Conditions observed were not in compliance with 29 CFR 1910.

Code: Category II

Compliance Protocol: DOE Order 5483.1A (6-22-83) Section 1 (Purpose) "To establish requirements and procedures to assure that occupational safety and health standards prescribed pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, and the DOE Organization Act of 1977, provide occupational safety and health protection for DOE contractor employees in Government-owned contractor-operated (GOCO) facilities which is consistent with the protection afforded private industry employees by the occupational safety and health standards promulgated under the Occupational Safety and Health Act of 1970 (OSHA), Public Law 91-596."

Priority: Energy Systems Risk Weight 356
Tiger Team Action Plan Priority 2

Response: While this is not a new concern, it was not previously considered to represent a significant concern due to the restricted access to the facility, the training of assigned personnel and the good safety record achieved at the facility. ORNL will implement a program to upgrade control of industrial safety hazards at the Tower Shielding Facility. This program will consist of remedial actions for currently identified hazards and enhanced control to preclude future safety hazards from occurring.

Also see Finding RMA.3-1.

Root Causes:

Inadequate management approach and insufficient resources

Planned Actions and Schedules:

	Item/Description	Completion Date
Immediate		
	1. Remove tripping hazards or provide temporary caution signs against hazard.	Complete
	2. Correct the improper stacking of paraffin shielding blocks.	Complete
	3. Remove the improperly engineered fixed ladder.	Complete
	4. Correct poor housekeeping in the storage shed on the pad and remove all uninspected choker cables.	Complete
	5. Implement a second maintenance day per week to remedy immediate concerns as a temporary measure.	Complete
Near Term		
	6. Contain exposed asbestos material.	Complete
	7. Inspect chokers, hoists and cranes.	Complete
	8. Correct the National Electric Code violations.	Complete
	9. Improve housekeeping on the outside pad and storage areas as follows: • Identify tripping hazards on the pad with yellow and black paint. • Separate material in the Butler Building by marked aisles. Move tanks of hazardous material away from the control aisle to prevent puncture by the forklift.	Complete
	10. Install permanent caution barriers to prevent tripping on the tower lifting cable. (Interim abatement measure is in #1 above.)	5/91
	11. Plan, arrange for, schedule, and commence continuing routine industrial safety oversight inspections. (Interim abatement measure for #13 below.)	5/91

12.	Transmit revised budgets to DOE for the increased FY-92 and subsequent costs of completing long term items and controlling industrial safety hazards at the TSF on a continuing basis. Include experiment disposal costs.	Complete
13.	Issue RRD Safety Plan to include requirement for ES&H industrial safety personnel to conduct and document periodic walkthroughs of site facilities.	10/91

Long Term

14.	Remove all exposed asbestos-containing materials.	9/93

Costs:

Type of funds: Research Programmatic
Source of funds: NE AF20

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	0.5						0.5
2	0.5						0.5
3	1.0						1.0
4	—						
5	—						
6	1						1
7	2						2
8	26						26
9	10						10
10	5						5
11	—						
12	—						
13	—						
14			50				50
Funded	46						
Requested							
New			50				$96

References: Also see Action Plan for Finding RMA.3-1 Maintenance of B Reactor Areas

Finding No.: RPP.3-2 Carcinogens in RRD Facilities

Finding Description: **Carcinogens present in Research Reactors Division facilities are not being managed in accordance with DOE 5480.10.**

Code: Category III

Compliance Protocol: DOE Order 5480.10

Priority: Energy Systems Risk Weight 50
Tiger Team Action Plan Priority 2

Response: Findings leading to this concern were addressed in the ORNL self-assessment report of October 1990. ORNL issued Industrial Hygiene Procedure (IHP)-13, "ORNL Chemical Carcinogen Control Program" on October 8, 1990. This procedure went through an RRD PORC Review meeting on November 2 and 5, 1990, and was endorsed for use with the following recommendation: "Due to the numerous requirements for supervisors, Health Physicists, Division Safety Officer and others, its recommended that Industrial Hygiene develop an index of requirements against job assignments to assist personnel in the performance of their responsibilities. This index would assist the training department in determining training requirements and it would assist new personnel in identifying their responsibilities in a concise document." See Finding IH.5-2.

Root Cause:

Insufficient resources; limited resources has resulted in incomplete implementation of DOE Order 5480.10.

Planned Actions and Schedules:

Item/Description	Completion Date
1. Complete a current inventory of all chemical carcinogens used or stored at RRD facilities. (A chemical inventory was requested in a memo dated October 23, 1990 to the RRD Director, this action to be completed by January 4, 1991.)	Complete
2. Provide Industrial Hygiene Section with copies of inventory, and request that they can identify and document existing and potential occupational carcinogen hazards.	2/91
3. Request funding for this action plan to manage RRD carcinogens.	4/91

4. Properly label identified carcinogens. 2/91
5. Post identified regulated areas. 2/91
6. Develop and complete job-specific carcinogen training for appropriate personnel. 8/91
7. Perform periodic audits for compliance with carcinogen control program. 10/91
8. Issue emergency procedures for accidental releases or spills of chemical carcinogens. 12/91

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	—						
4	—						
5	—						
6	—						
7	—						
8		20	20				40
Status:							
Funded							
Requested							
New		20	20				$40

References: IHP-13, "ORNL Chemical Carcinogen Control Program"

Finding No.: RPP.3-3 ORNL Electrical Program

Finding Description: ORNL has not formulated a program to prevent the recurrence of OSHA electrical safety and National Electrical Code compliance deficiencies.

Code: Category III

Compliance Protocol: DOE Order 5483.1A requires compliance with Subpart J of 29 CFR 1910 and the National Electrical Code.

Priority: Energy Systems Risk Weight 55
Tiger Team Action Plan Priority 3

Response: Correction of existing electrical OSHA deficiencies is being addressed in Findings WS.4-4, WS.4-5, and WS.4-6. This action plan addresses prevention of additional electrical OSHA noncompliances through improved craft and supervisory training and more effective inspection of electrical work.

Root Causes:

Inadequate training and inadequate management commitment

Planned Actions and Schedules:

Item/Description	Completion Date
1. Provide craft and supervisor initial training on necessity for full compliance to electrical OSHA requirements and need for excellences in job performance. (See Finding MA.2-2, Action 7.)	Complete
2. Expand current electrical OSHA inspection program from two jobs per month to 20 percent of new electrical installation jobs each month. Noted deficiencies will be scheduled for correction or documented for acceptable usage.	Complete
3. Train two engineers in electrical OSHA inspection.	6/91
4. Provide basic electrical OSHA training to all electrical crafts and supervisory personnel. (see Finding WS.4-4, Action 7.)	
5. Revise "Oak Ridge National Laboratory, Conformance Plan for Occupational Safety and Health Administration Subpart S" to document prevention program.	9/91

6. Initiate annual refresher training for electrical crafts and supervisors emphasizing code changes and problems detected by inspections. 6/92

Costs:

Type of funds: Overhead

Source of funds: Division Administration

Action item	Estimated costs per fiscal year ($K) 1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	—						
3	3						3
4	—						
5	—						
6		*					
Status:							
Funded	3						
Requested							
New							$3

*Estimated annual ongoing cost: $8K, beginning FY 1992.

References: Subpart J, 29 CFR 1910, National Electrical Code

Finding No.: RPP.4-1 RRD Monitoring Program

Finding Description: **A periodic monitoring program for chemical, physical, and biological stresses at Research Reactors Division activities has not been developed or implemented, as required by DOE 5480.10.**

Code: Category III

Compliance Protocol: DOE Order 5480.10

Priority: Energy Systems Risk Weight 53
Tiger Team Action Plan Priority 2

Response: This finding was based on several related findings, which said:

- A database of surveillance measurements on physical, chemical, and biological monitoring at Research Reactors Division (RRD) facilities was not available.
- Safety and industrial hygiene professional staff were not making and documenting periodic walkthroughs or assessments at RRD facilities before 1990.
- Available personnel sampling data did not provide sufficient information to meet ANSI requirements for monitoring of respirator usage.

Measurements of physical, chemical, and biological monitoring are currently available in either database or hard-copy form. Air sampling data are available on the OHIS system or the MUMPS database. High-noise sources/areas are also entered into a database. Biological monitoring data are contained in a hard-copy file. The "building" files associated with RRD facilities contain other physical data.

Industrial Hygiene staff have been conducting walkthrough surveys and assessments as part of the Comprehensive Facility Survey. More detailed assessments will be conducted by the industrial hygiene staff member who is assigned to the RRD (see corrective action item 1 below). Specific actions related to routine and special monitoring are described in the action plan for IH.4-1. Other corrective actions planned to address these findings are listed below.

Root Causes:

Inadequate oversight and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Assign Industrial Hygiene Section staff members to provide oversight for particular divisions. (Same action item as contained in Finding RPP.1-1 Action Plan)	4/91
2. Establish a field surveillance schedule to ensure that a monitoring program is appropriately implemented for divisions.	10/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	4						4
2	47	*					47
Status:							
Funded	51						
Requested							
New							
							$51

*Estimated annual ongoing cost: $52K starting in FY 1992.

References: DOE Order 5480.10

Finding No.: RPP.5-1 HAZCOM Program at RRD

Finding Description: ORNL has not implemented a hazards communication program that fulfills all requirements of 29 CFR 1910.1200 or 29 CFR 1910.1450.

Code: Category III

Compliance Protocol: 29 CFR 1910.1200 and 1910.1450

Priority: Energy Systems Risk Weight 353
Tiger Team Action Plan Priority 2

Response: This finding was based on several related findings.

- While an inventory of chemicals was present in most Research Reactors Division (RRD) facilities visited, these inventories were incomplete in each case.
- Some laboratory areas within RRD facilities were observed to contain listed carcinogens or suspect carcinogens. These areas were not posted in accordance with requirements in DOE Order 5480.10.
- Material Safety Data Sheets were not available for many of the chemicals present at the time of the appraisal.
- Policy for obtaining Material Safety Data Sheets was inconsistent. In some cases, the sheets were present in notebooks located in the work area. In other cases, they were available on a central computer data base or through the central Laboratory ES&H Division Office.
- Training of personnel concerning workplace hazards was incomplete. Some employees indicated that they had not had any formal hazards communication training or job-specific training; other training (supervisor training) had not been developed.

On September 12, 1990, the Industrial Hygiene Section issued procedure IHP-01, "ORNL Hazard Communication Program," which was designed to address the requirements of OSHA's HAZCOM regulation. Many of these findings will be corrected once additional staff members are hired for administration of the HAZCOM program. See also the responses to Finding Nos. 4.5.1.15.2 (PP.5-1) and 4.5.1.17.2 (IH.6-1).

Root Causes:

Insufficient resources and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Assign two additional staff members to conduct HAZCOM surveillance [see response to Finding 4.5.1.17.2 (IH.6-1)].	3/91
2. Compile a complete chemical inventory for all ORNL divisions [see response to Finding 4.5.1.17.2 (IH.6-1)].	3/91
3. Issue SOPs for HAZCOM surveillance of areas throughout the Laboratory [see response to Finding 4.5.1.17.2 (IH.6-1)].	5/91
4. Begin HAZCOM surveillance throughout ORNL [see response to Finding 4.5.1.17.2 (IH.6-1)].	6/91
5. Issue an informational bulletin emphasizing the importance of MSDSs and how to access them [see response to Finding 4.5.1.17.2 (IH.6-1)].	3/91

Costs: See the cost summary for Finding IH.6-1.

References: 29 CFR 1910.1200
29 CFR 1910.1450
DOE Order 5480.10

3.4.15 Fire Protection

Finding No.: RFP.1-1 Organization and Administration of Fire Protection Program

Finding Description: **The Fire Protection organization and administration necessary for the effective implementation and control of the fire protection program are not in place, as required by DOE 5480.7.**

Code: Category III

Compliance Protocol: DOE Order 5480.7

Priority: Energy Systems Risk Weight 5
Tiger Team Action Plan Priority 2

Response: This item was earlier identified on a DOE-ORO Multi-Disciplinary Appraisal in April 1990. A search for an acceptable data tracking system was initiated immediately involving contacts with all energy systems facilities and review of multiple mainframe and pc-based systems. The final selection was a recently modified, pc-based system called "Evaluation Database System" (EDS).

The EDS program has been installed on the Fire Protection computer hard disk, however, the final selection and setup of program format is not complete.

Completion of this program will involve selection and programming of the database management format, selection and programming of multiple report formats, selection and programming of specified records to be sorted and generated as printed reports and the initial installation/follow-up of all report data to be tracked on the data base. In addition, personnel assigned to input and maintain records will need to be trained on use of the system.

The EDS program for tracking data shall be completed as planned, providing an appropriate system for tracking fire protection activities, fire protection deficiencies, the completion of recommendations or findings, fire protection engineering surveys, and fire protection system inspections.

Root Causes:

Inadequate policy implementation and insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Design a data base management system for EDS.	9/91
2. Complete programming of EDS data base management system.	1/92
3. Train designated personnel for system operation.	2/92
4. Implement EDS data base system.	6/92

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2		3					3
3		3					3
4	—						
Status:							
Funded							
Requested							
New		6					$6

References: Evaluation Database System Documentation (EDS), FD-EDS-90, 5/31/90

Finding No.: RFP.4-1 Sprinkler System in Bldg. 7902

Finding Description: The Research Reactors Division is operating a wooden cooling water tower (Bldg. 7902) that is protected with a sprinkler system whose design is not in accordance with NFPA 13, DOE 5480.7, and 5480.4.

Code: Category III

Compliance Protocol: NFPA 13, DOE Order 5480.7, and DOE Order 5480.4

Priority: Energy Systems Risk Weight 53
Tiger Team Action Plan Priority 2

Response: A comprehensive fire analysis of HFIR was performed on May 26, 1989, by Professional Loss Control, Inc., to evaluate the HFIR facility for compliance with DOE Orders 6430.1A and 5480.7. At this time, the deficiency of the dry pipe sprinkler protection system at the cooling tower was identified. A major fire protection upgrade was planned and budgeted, which included the cooling tower upgrade, but due to escalating cost the cooling tower upgrade was delayed.

Root Cause:

Insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request additional funds.	Complete
2. Contingent upon receipt of funding, design new piping system.	11/92
3. Contingent upon receipt of funding, install new piping system.	7/93

Costs:

Type of funds: Capital—ARIMS
Source of funds: ER-KC03

Action item	Estimated costs per fiscal year ($K)						Total
	1991	1992	1993	1994	1995	Beyond	
1	—						
2			200				200
3			600				600
Status:							
Funded							
Requested							
New			800				$800

References: NFPA 13, DOE Order 5480.7, and DOE Order 5480.4.

Finding No.: RFP.4-2 Smoke Detection Systems at the HFIR

Finding Description: The High Flux Isotope Reactor has no smoke detection systems in the control rooms and certain critical areas, contrary to NFPA 72-E, "Automatic Smoke Detectors."

Code: Category III

Compliance Protocol: NFPA 72-E

Priority: Energy Systems Risk Weight 50
Tiger Team Action Plan Priority 3

Response: A comprehensive fire analysis of HFIR was performed on May 26, 1989, by Professional Loss Control, Inc., to evaluate the HFIR facility for compliance with the DOE Orders 6430.1A and 5480.7. At this time, the fire detection system was found to be out of compliance with NFPA 72-E. Since this time a major fire protection upgrade has been planned, developed, and scheduled with primary funding to be supplied through the Accelerator Reactor Improvements and Modification (ARIMS) program. This upgrade involves a number of modifications to the piping system and the alarm system including a new smoke detection system.

Upon detecting conditions indicative of fire—smoke, heat, sprinkler, waterflow, or actuation of manual alarm devices—the new fire alarm control equipment will (1) automatically notify building occupants and HFIR operations personnel that a fire emergency exists; (2) automatically notify ORNL emergency response personnel of the emergency; (3) identify the cause of location of the alarm condition through annunciators; and (4) automatically perform appropriate fire and smoke control functions to protect evacuating personnel and essential equipment.

The existing preaction system will be converted to a wet-pipe system and additional sprinklers and piping will be provided in areas that currently do not meet present fire codes. See Finding RFP.4-3.

Root Cause:

Insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Redesign the HFIR fire alarm system, including smoke detection in the control room and critical areas.	11/91
2. Bid, award, and install alarm system.	3/93

Costs:

Type of funds: Capital—ARIMS
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	250	100					350
2		250	100				350
Status:							
Funded	250						
Requested		350	100				
New							
							$700

References: NFPA 72-E

Finding No.: RFP.4-3 Use of Preaction-Type Sprinklers

Finding Description: ORNL uses slower, preaction-type sprinklers instead of the faster, wet-type automatic sprinklers, contrary to NFPA 13.

Code: Category III

Compliance Protocol: NFPA 13

Priority: Energy Systems Risk Weight 53
Tiger Team Action Plan Priority 2

Response: A comprehensive fire analysis of HFIR was performed on May 26, 1989, by Professional Loss Control, Inc., to evaluate the HFIR facility for compliance with the DOE Orders 6430.1A and 5480.7. At this time, the fire detection system was found to be out of compliance with NFPA 72-E. Since this time a major fire protection upgrade has been planned, developed, and scheduled with primary funding to be supplied through the Accelerator Reactor Improvements and Modification (ARIMS) program. This upgrade involves a number of modifications to the piping system and the alarm system.

The existing preaction system will be converted to a wet-pipe system and additional sprinklers and piping will be provided in areas that currently do not meet present fire codes. See Finding RFP.4-2 for related TSA concerns.

Root Cause:

Insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Design HFIR fire protection piping upgrade.	12/91
2. Install and perform acceptance test of new piping system.	2/93

Costs:

Type of funds: Capital—ARIMS
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	175	50					225
2		140	135				275
Status:							
Funded	175						
Requested		190	135				
New							
							$500

References: NFPA 72-E

Finding No.: RFP.7-1 Diking and Fire-Resistant Enclosures at the HFIR

Finding Description: The HFIR oil storage reservoir and hydraulic power unit for elevator operations, and transformer area (Bldg. 7901) have no approved diking and fire-resistant enclosure, as required by NFPA 30.

Code: Category III, Compliance

Compliance Protocol: The HFIR oil storage reservoir and hydraulic power unit for the 7900 elevator and the transformers near Building 7901 are not in compliance with NFPA 30.

Priority: Energy Systems Risk Weight 51
Tiger Team Action Plan Priority 2

Response: These deficiencies in the fire protection of the HFIR transformer area (Bldg. 7901) and the HFIR elevator oil reservoir and hydraulic power unit were documented in the *Fire Hazards Analysis of High Flux Isotope Reactor (HFIR)* dated May 26, 1989, by Professional Loss Control, Inc. (PLC). Section 4.6 of the *Fire Hazard Analysis* did not require automatic sprinkler protection for the transformer area. The transformers are separated from Building 7901 by a blank 12" concrete block wall which is considered to be adequate by PLC. Direct thermal radiation due to fire causing damage from one transformer to another is prevented by blank fire walls between transformers. Per PLC's analysis, the adjacent beam tube bridge structure is adequately protected from fire damage until such time as the ORNL Fire Department can respond with hose streams. Without confinement for any oil which may be discharged from transformers, other unprotected steel columns may be exposed to potential fire damage.

A report titled *DOE Oak Ridge Operations ESH & QA Appraisal Oak Ridge National Laboratory* and dated April 1990 identified the need to replace the oil-filled transformers located at the HFIR with dry type transformers or separate the transformers from air intakes and provide improved diking and drainage. In addition, the report stated that the transformers should be provided with automatic sprinkler protection. This finding was also documented by the ORNL Fire Protection Engineering group on August 30, 1990, in a report entitled *Expected Completion Dates For ORNL Fire Protection Self-Assessment Items.*

The requirement for providing diking for the Building 7901 transformers was also documented in the October 1990 Research Reactors Division (RRD) Self-Assessment Report.

The need for installation of diking for oil-filled transformers or replacement of the oil-filled transformers with dry type transformers has been recognized by ORNL. Line item projects for fiscal years 1994 and 1995 are being prepared for submission.

As part of the planned action, an evaluation of transformer diking versus replacement of the transformers with dry type transformers will be performed.

Root Cause:

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	15						15
3	—	80					80
4	15						15
5		50					50
Status:							
Funded							
Requested	30	10					
New		120					$160

References: Research Reactors Division (RRD) Self-Assessment Report, October 1990

Fire Hazard Analysis (FHA) of High Flux Isotope Reactor, dated May 26, 1989

DOE Oak Ridge Operations ESH & QA Appraisal ORNL, April 1990

Finding No.: RFP.7-2 Potential Fire Hazards at the HFIR

Finding Description: At the High Flux Isotope Reactor, a number of areas do not comply with NFPA 101, "Life Safety Code Standard."

Code: Category III

Compliance Protocol: NFPA 101

Priority: Energy Systems Risk Weight 50
Tiger Team Action Plan Priority 2

Response: The following fire protection deficiencies were documented in the *Fire Hazards Analysis of the High Flux Isotope Reactor (HFIR)*, dated May 26, 1989, by Professional Loss Control, Inc. (PLC).

- A 45-kVA transformer and electrical conduits are located in a stairwell designated as an exit.
- A door frame located at 102(B) is not a labeled door frame according to NFPA 101, "Life Safety Code Standard."
- The HFIR heating, ventilating, and air conditioning system equipment room is not totally separated from the remainder of the facility.

The issue of the unlabeled door frame, located at room 102(B) was also documented in a report titled *Research Reactors Division Self-Assessment Report*, dated October 1990. This report stated the following about this finding by the 1989 FHA:

> "The justification and relevance of replacing the unlabeled door frame to Room No. 102 and adding fire dampers in rooms 102, 102A, 102B, and 105B is not clearly defined."

The self-assessment further states that:

> "An engineering evaluation should be prepared by the ORNL Fire Protection Engineering Staff to assess the need for replacement of the door frame in room No. 102, and the addition of fire dampers in rooms 102, 102A, 102B, and 105B is actually needed. An engineering justification or reliance on "equivalent" protection instead of the specified hardware changes will be adequate, if it can be shown the existing structure satisfies the degree of protection required."

The following was also documented in the RRD Self-Assessment Report and by ORNL Fire Protection Engineering.

- Conduits and piping penetrate through existing fire walls.

The following was documented in a report titled *DOE Oak Ridge Operations ESH & QA Appraisal Oak Ridge National Laboratory*, dated April 1990.

- The HFIR air conditioning ducts are not equipped with smoke detectors or fire dampers.

Root Causes:

Ambiguous requirements or expectations and insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Request funding.	Complete
2. Complete the design for the removal of the 45 KVA transformer and associated conduits in stairwell in order to conform with NFPA 101.	2/92
3. Prepare an engineering evaluation to assess the need for replacement of the door frame in room No. 102, and the addition of fire dampers in rooms 102, 102A, 102B, and 105B is actually needed. An engineering justification or reliance on "equivalent" protection instead of the specified hardware changes will be adequate if it can be shown the existing structure satisfies the degree of protection required.	4/92
4. Complete the design to provide total separation of the HFIR HVAC equipment room from the remainder of the facility.	6/92
a. Non-labeled (not fire-rated) doors are provided at the opening to the HVAC Equipment Room.	
b. Ducts penetrating the walls to the HVAC Equipment Room are not provided with rated fire dampers.	
c. Pipe openings through the walls of the HVAC Equipment Room are not sealed.	

5.	Complete the design of the fire penetration seals needed to properly seal conduit and piping penetrations through existing fire walls.	7/91
6.	Complete the design for smoke detectors or fire dampers in HFIR air conditioning ducts.	4/93
7.	Complete installation of the 45-kVA transformer and associated conduit relocation.	12/92
8.	Complete installation of the corrective action/design for Action 3.	11/92
9.	Complete installation of the design for separation of the HFIR HVAC equipment room from the remainder of the facility.	4/93
10.	Complete installation of the proper sealing of conduit and piping penetrations through existing fire walls.	12/91
11.	Complete installation of the design to install smoke detectors or fire dampers in HFIR air conditioning ducts.	12/93

Costs:

Type of funds: Research Programmatic
Source of funds: ER-KC03

Action item	Estimated costs per fiscal year ($K) 1991	1992	1993	1994	1995	Beyond	Total
1	—						
2	3	2					5
3	1	3					4
4	1	5					6
5	4						4
6		2	2				4
7	2	7					9
8		10	9				19
9		15	12				27
10	6	4					10
11		15	8	5			28
Status:							
Funded	17						
Requested		19	10				
New		44	21	5			$116

References: Fire Hazards Analysis of the High Flux Isotope Reactor (HFIR), dated May 26, 1989

Research Reactors Division Self-Assessment Report, dated October 1990

DOE Oak Ridge Operations ESH & QA Appraisal ORNL, dated April 1990

3.5 MANAGEMENT FINDINGS, RESPONSES, AND PLANNED ACTIONS

3.5 MANAGEMENT FINDINGS, RESPONSES, AND PLANNED ACTIONS

Finding No.: MF-1 ES&H Goals and Objectives

Finding Description: **The organizational goal of ES&H compliance has not been supplemented with subordinate goals at all levels of the organization which are understood and, therefore, "owned."**

Code: Best Management Practice

Compliance Protocol: None

Priority: Energy Systems Risk Weight 99
Tiger Team Action Plan Priority 3

Response: The responsibility for establishing ES&H specific standards and requirements begins with the Central ES&H organization to provide both compliance and consistency across all Energy Systems. The actions listed will be executed in the context of Energy Systems guidance on policy, procedure, and specific requirements.

Improvements will be made in the way ORNL translates the overall Laboratory goals and objectives for ES&H to specific actions that are expected of all staff members. This action plan and the interrelated action plans noted address those improvements.

A hierarchy of goals will be defined that identifies specific, attainable, and measurable objectives appropriate for each level in the organization. The Performance Planning and Review System, the Position Charter policy, and regular staff meetings will be modified and used to formally establish these goals with appropriate interactive review and approval. These formal mechanisms will provide opportunities for improved self-assessment, monitoring, and control of attainment of ES&H goals. Existing and improved communication systems at the Laboratory (e.g., training courses, safety meetings, newsletters) will be used to foster two-way communication and provide positive reinforcement for attainment of mutually developed goals.

Root Cause:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue consistent, ORNL-wide ES&H goals that stress specific, positive, attainable, and measurable objectives and are applicable in hierarchical fashion for the specific position of each laboratory staff member.	6/91
2. Issue policies and procedures for implementation of position charters, organization charters, and committee charters, which include guidelines for the incorporation of ES&H accountability and authority (see Finding MF-4).	
3. Communicate established goals to bargaining unit employees so as to ensure full understanding of ES&H goals that are applicable to their work places and functions. Involve the union's health and safety representatives in communications efforts and fully utilize the company/union contracts' safety and health provisions.	6/91
4. Reorient the monthly ORNL Health and Safety Council, Joint Labor/Management Safety Committee, and regular divisional safety meetings into broader ES&H meetings in order to communicate the Laboratory's broader goals.	6/91
5. Issue an SPP to implement a consistent practice for self-assessment monitoring, line management control, and independent ES&H oversight of planning and attainment of specific ES&H goals by all staff.	9/91

Costs: Costs for actions listed are included in Findings OA.1-4, OA.3-1, MF-3, MF-2, MF-4, MF-5, and MF-6.

References: Environmental Safety and Health Program Action Plan for Martin Marietta Energy Systems, Y/MS-0001, January 1991

Finding No.: MF-2 ES&H Management Systems

Finding Description: **Neither MMES nor ORNL have developed integrated ES&H administrative systems and controls that provide comprehensive guidance, or controls that ensure consistent application.**

Code: Best Management Practice

Compliance Protocol: None

Priority: Energy Systems Risk Weight 102
Tiger Team Action Plan Priority 3

Response: ORNL intends to strengthen its management approach by using a framework modeled after the Institute of Nuclear Power Operations (INPO) Guidelines for Conduct of Operations and as required in DOE Order 5480.19. Conduct of Operations is a management system designed to develop authority, responsibility, and accountability at all levels of an organization. Key elements of the Conduct of Operations philosophy are that individuals take "ownership" for their activities and that management be routinely visible in the workplace to observe and assist where feasible.

In addition, Energy Systems and ORNL recognize the need for a management plan which provides guidance and direction for implementing a cohesive ES&H program. Energy Systems will develop a strategic plan encompassing program goals and objectives; the role to be played by Energy Systems; independent oversight, roles, responsibilities, and authorities; program elements; and reporting. The strategic plan will be a living document updated annually. ORNL will develop an implementing or operational plan to implement the strategic plan. Energy Systems will formalize administration, systems, and controls for the review of ES&H activities and requirements, and their conversion into Energy Systems documents. Policies are being developed in a draft ESH-25, Energy Systems Environmental Safety and Health Policy Statement Procedure. This Policy Procedure will supplement other policy and procedure activities that are currently being formalized within Energy Systems.

See Findings MF-1 and OA.1-1.

Root Causes:

Inadequate policy and inadequate policy implementation

Planned Actions and Schedules:

	Item/Description	Completion Date
1.	Initiate Conduct of Operations training for all Laboratory personnel to be completed by 7/91.	Complete
2.	Complete Energy Systems Comprehensive Environmental Review.	Complete
3.	Enter ESH-25, Energy Systems Environmental Safety and Health Policy Statement Procedure into the Energy Systems review/approval process.	3/91
4.	Issue Draft of Energy Systems ES&H Strategic Plan.	Complete
5.	Issue Draft of ORNL ES&H Implementation Plan.	6/91
6.	Issue Energy Systems ES&H Strategic Plan.	9/91
7.	Approve and issue ESH-25, Energy Systems Environmental Safety and Health Policy Statement Procedure.	9/91
8.	Issue ORNL ES&H Implementation Plan.	12/91

Costs:

Type of funds: Overhead
Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
2–4	150	*					150
5	70						70
6	—						
7	—						
8	—						
Status:							
Funded	220						
Requested							
New							$220

*Estimated annual ongoing cost: $100K starting in FY 1992.

Type of funds: Overhead
Source of funds: Division Administration

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	1500						1500
Status:							
Funded	1500						
Requested							
New							$1500

References: Environmental Safety and Health Program Action Plan for Martin Marietta Energy Systems, Y/MS-0001, January 1991

Finding No.: MF-3 Quality Assurance

Finding Description: ORNL has not fully implemented a comprehensive quality assurance program to ensure the accomplishment of ES&H goals and objectives.

Code: Compliance

Compliance Protocol: DOE Order 5700.6B AND ANSI/ASME NQA-1

Priority: Energy Systems Risk Weight 126
Tiger Team Action Plan Priority 3

Response: The Energy Systems Quality Director establishes QA policy, ensures flowdown for NQA-1 and other DOE requirements, and performs oversight audits of ES&H programs at ORNL. Energy Systems Policy Procedures, GP-5, "Quality Assurance Program," and GP-7, "Quality," establish line management responsibility for quality achievement and for documentation and implementation of QA programs. The policy and standards at the Energy Systems level are systematically being upgraded to provide better and more specific guidance across Energy Systems.

QA assistance and guidance is provided to the operating divisions by the ORNL Quality Department staff of QA Specialists, or by the QA Coordinators who are appointed and trained to provide QA support in their divisions.

The QA program at ORNL has made considerable progress in the past several years due, in large part, to the High Flux Isotope Reactor experience, which forced acceleration of the implementation of NQA-1.

Some traditional QA roles had become fragmented at ORNL over the past years. On December 1, 1990, ORNL management acted to consolidate several QA roles in the Quality Department. A Quality Assurance Audit Program Manager was named with responsibility for planning and conducting independent technical audits and assisting line management in the areas of surveillances, corrective action reporting, and tracking, occurrence reporting, lessons-learned, and root cause analysis activities. Placement of all these activities in one area will provide ORNL Management with a single system for ensuring that all corrective actions are tracked and trended, and that their closure is verified.

In addition, other activities are planned to strengthen the ORNL QA Program and enhance its ability to aid Management in the accomplishment of ES&H goals and objectives. Job offers have been extended to fill existing vacancies created by movement of QA personnel to the line organization. Funding is being requested for two auditors to assure that an aggressive audit and surveillance schedule is implemented in 1991. Three additional QA Specialists will be hired to replace the part-time QA Coordinators currently being utilized in the research and development areas. The QA Specialists will also work with their division

management to identify requirements and create lists of procedures needed for ES&H support and other important activities. These lists will include personnel responsible for procedure development and prioritized completion dates for each procedure.

The actions described above will enable the line organization to establish a comprehensive QA program which will ensure the accomplishment of their ES&H goals and objectives.

Both configuration management and document control issues are addressed by the performance of Finding MF-3, Action 6. The action requires an assessment of the adequacy of quality affecting procedures. Where deficiencies exist, a procedure development schedule will be prepared.

Adequate independence of staff activities is ensured by the multiple levels of oversight. For example, reviews are conducted at the division, site, and corporate levels by a variety of functional disciples, i.e., quality, safety, environmental, and technical.

Pursuit of Actions 2 and 4 is a high priority and will be initiated upon distribution of available funds. One full-time auditor has already been hired.

Root Cause:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Establish Quality Audit Program Manager position with responsibility for audits, surveillance, corrective actions, occurrence reporting, and lessons-learned.	Complete
2. Hire two auditors (see Finding QV.1-4, Item 3).	
3. Issue Laboratory directive requiring division managers to (a) establish a procedure development schedule and update it quarterly and (b) perform assessments of the implementation and effectiveness of their QA programs.	Complete
4. Hire three QA Specialists to replace the QA Coordinators in the R&D divisions (see Finding QV.1-1).	9/91
5. Complete implementation of the CY 91 Audit/Surveillance schedule.	12/91

6. Division managers issue procedures development schedules and QA program assessments. 7/91

7. Analyze QA staffing needs (see QV1-1, Action Item 2).

8. Request funds for QA staffing needs (see QV1-1, Action Item 3).

Costs: All costs have been identified on Findings FR.6-1, QV.1-4, and QV.1-1.

References: DOE Order 5700.6B and ANSI/ASME NQA-1

Finding No.: MF-4 Human Resources

Finding Description: **ORNL management has not communicated personal ES&H responsibility and accountability throughout all levels of the organization by incorporating ES&H elements and criteria into job descriptions and employee performance evaluation systems, and by ensuring that appropriate training is provided to perform the ES&H responsibilities.**

Code: Best Management Practice

Compliance Protocol: None

Priority: Energy Systems Risk Weight 99
Tiger Team Action Plan Priority 3

Response: ORNL will address this management finding through a combination of developing and implementing appropriate new policies and procedures. ES&H goals, responsibilities, and accountabilities will be addressed in the following documents: (1) the Roles and Responsibilities Charters (R&R), and (2) the Performance Planning and Review System (PPR). Establishing the goals and accountabilities in the R&R Charters and the PPRs should ensure that every employee is aware of his/her ES&H responsibilities. Energy Systems does not utilize individual job descriptions for all positions, but the combination of the new R&R and PPR thoroughly addresses this. We will also provide new or improved employee training based on the Laboratory-wide Training Needs Overview assessment now in progress. This assessment is based on DOE regulations and directives. Management will identify tasks and related training.

Root Causes:

Inadequate communications, ambiguous requirements or expectations, and inadequate management commitment

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue policies and procedures for implementation of position charters, organization charters, and committee charters, which will include guidelines for the inclusion of appropriate ES&H accountabilities and authorities. (See Finding OA.1-5 and MF-1)	6/91
2. Instruct implementing managers and supervisors in the development of charters which will address requirements and expectations.	7/91

3. Develop and approve charters for all applicable staff members. — 9/91

4. Verify these charters are in place by division audits. — 10/91

5. As an interim step, ORNL management will issue a directive to all persons who conduct employee performance evaluations to include a section in their 1991 planning on ES&H. — Complete

6. Include implementation of ES&H performance and goals in the performance evaluation and conduct training for managers and supervisors. — 8/91

7. Update training for Division Environmental Protection Officers to incorporate periodic retraining in new or revised ES&H requirements, standards, and implementation guidelines. — 9/91

8. Conduct training needs assessment (see Finding TC.1-1 Action Items 3–6).

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1–4	44	*					44
5, 6	22	*					22
7	22	*					22
Status:							
Funded							
Requested							
New	88						$88

*Estimated annual ongoing cost: Items 1–4, $14K; Items 5 and 6, $9K; Item 7, $13K.

References: None

Finding No.: MF-5 Independent Oversight Systems

Finding Description: **Independent ES&H oversight at ORNL is not consistent with DOE requirements or current industry practices, nor is management sufficiently involved in or informed of the status of key ES&H activities.**

Code: Compliance

Compliance Protocol: DOE Orders 5480.5, 5480.6, 5482.1B and 5-1 Memorandum, "Guidance on Environment, Safety, and Health (ES&H) Self-Assessment," dated July 31, 1990

Priority: Energy Systems Risk Weight 135
Tiger Team Action Plan Priority 2

Response: DOE Orders 5480.5 and 5480.6 require the contractor to establish an independent safety review and appraisal system for nuclear and reactor facilities.
DOE Order 5482.1B requires a multidiscipline functional appraisal system for the contractor's environmental, safety, and health (ES&H) programs. All three orders specify the requirements for performing periodic facility and program appraisals which include, as a minimum, functional area reviews spelled out in the orders.

Energy Systems recognized the need for enhanced independent and line oversight of all ES&H Quality functions in early 1988 and established a new policy and approval in late 1988 (GP-13). Starting in 1989, the Quality Director of Energy Systems has led an integrated multidiscipline audit team (much like the Tiger Team) composed of consultant and independent Energy Systems technical experts to each site each year. Likewise, the Martin Marietta Corporation has commissioned the Vice President of Quality to lead MMC teams to perform broad integrated technical audits of the sites on a biannual basis. These Martin Marietta Corporation—Energy Systems—level technical audits are responsive to the above compliance protocol. However, they only "calibrate" the status of compliance and a stronger internal audit and surveillance program is needed at ORNL to provide more frequent reinforcement of requirements and feedback to management on the current status. This need was recognized in 1989 as applicable across all five sites within Energy Systems, and a coordinated effort was launched. The detailed Energy Systems action plan can be found in Y/QD-6 Rev. 1, (action plan for Evaluations) pp. 24–26. This action plan considers audits and surveillances, reporting of problems, the corrective action system, tracking and trending of problems, and a lessons-learned system.

ORNL is in the process of strengthening the internal oversight process per the Finding MF-5 response. See also the action plan for Finding SA-1 for the self-assessment program upgrade including the independent appraisal function and enhanced management involvement.

ORNL instituted a program built around individual review teams called director's review committees (DRCs) in the late 1950s. Presently, there are eleven such committees which are chartered to focus their reviews on a specific operational group of facilities or activities. These independent committees also review safety documentation. The Laboratory has recognized and has identified ways to improve the internal appraisal system by (1) reorganizing reviews based on appropriate ESH functional areas, (2) drawing on necessary ESH, QA, and technical experts as necessary (including DRC members) and ensuring that these appraisers are independent of the reviewed facilities, (3) requiring more direct involvement of senior Laboratory managers in the activities of the internal appraisal programs, and (4) improving the formality of these evaluations with respect to reporting of review results, tracking and trending of corrective actions, and training of appraisers. The secretary of energy's memorandum, "Guidance on Environmental, Safety, and Health (ES&H) Self-Assessment," dated July 31, 1990, details the expectations of the Self-Assessment program which includes the independent oversight systems. The upgraded ORNL independent appraisal program will be implemented beginning in January 1992 and will be fully functional by the end of CY 1992.

Root Causes:

Inadequate management commitment, lack of clear policy, inadequate implementation of existing procedures, poorly defined roles and responsibilities, and lack of training for appraisers

Planned Actions and Schedules:

Item/Description	Completion Date
1. Evaluate existing Laboratory review functions against DOE Orders, ANSI Standards, and other directives to determine shortcomings and develop an approach to implement an effective multidisciplined internal appraisal system. Present proposal to Laboratory management.	Complete
2. Categorize and prioritize all Laboratory facilities and determine types and frequency of appraisals required.	7/91
3. Prepare draft Laboratory Standard Plant Procedure (SPP) which clearly defines procedures for independent internal appraisals, roles and responsibilities of appraisers and appraisees, comprehensive scope for appraisal coverage, appraisal protocols, and requirements for independence of appraisers.	7/91
4. Develop and issue internal appraisal schedule for CY 1992.	9/91

5. Issue SPP to reflect improvements to Laboratory Internal Appraisal program. 11/91

6. Develop and initiate training program for those designated personnel who will participate in the Laboratory Internal Appraisal program. 12/91

7. Conduct triennial appraisal of improved Internal Appraisal program. 11/92

Costs:

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
1	20						20
2	3						3
3	20						20
4	—						
5	*	3					3
6		20					20
7			31				31
Status:							
Funded	43						
Requested							
New		23	31				$97

*Estimated annual ongoing cost: $15–25K for appraiser training beginning in FY 1992.

References: DOE Orders 5480.5, 5480.6, and 5482.1B

S-1 Memorandum, "Guidance on Environmental, Safety and Health (ES&H) Self-Assessment," dated July 31, 1990

Environmental Safety and Health Program Action Plan for Martin Marietta Energy Systems, Y/MS-0001, January 1991

Finding No.: MF-6 ORNL Tracking ES&H Issues to Closure

Finding Description: ORNL does not have comprehensive, integrated systems that provide management with timely and accurate information to make well-informed decisions on ES&H issues arising from reviews such as audits, assessments, and appraisals as well as occurrence reporting.

Code: Best Management Practice

Compliance Protocol: None

Priority: Energy Systems Risk Weight 105
Tiger Team Action Plan Priority 2

Response: ORNL has not had a comprehensive integrated system that promotes the analysis, tracking, trending, and lessons learned sharing across all sites. This was recognized in 1989 and an Energy Systems–wide team initiated development of the Energy Systems Action Management System (ESAMS). The first major element incorporating the DOE Order 5000.3A reports is due in April 1991. The system will incorporate internal and external audit findings and lessons learned by the end of 1991.

The prioritization process has not yet been developed or proceduralized by Energy Systems or ORNL. The process has been piloted on concerns from the DOE Headquarters Quality Verification Inspection, Martin Marietta Corporate Audit, and DOE Headquarters Tiger Team as well as all corrective actions at RRD. It will be refined, proceduralized, and implemented across ORNL.

An organizational announcement was issued on December 1, 1990, creating the position of Quality Audit Program Manager. This position consolidates the ORNL auditing and surveillance program, the occurrence reporting system, (including lessons-learned), and the corrective action program in one office. Once all data associated with the individual programs is combined in the Energy Systems Action Management System (ESAMs), ORNL will have an integrated system.

The ESAMS system will be available for managers at all levels to query the system for a variety of reports.

With respect to establishing a system for tracking progress and closure of corrective actions, periodic reports to the ES&H Coordination Committee and issuance of monthly performance indicators are planned.

The closure process for corrective actions is described in current Laboratory QA procedures.

Root Cause:

Inadequate management approach and inadequate roles and responsibilities

Planned Actions and Schedules:

	Item/Description	Completion Date
1.	Develop a risk-based prioritization process for consistent application across Energy Systems, issue it for use.	Complete
2.	Charter an Energy Systems Board to develop and oversee the risk prioritization process.	Complete
3.	Issue instructions for the use of the Risk Matrix and risk prioritization process.	9/91
4.	Provide training modules for use for training users of the risk prioritization process.	9/91
5.	Consolidate responsibility for corrective action tracking, occurrence reporting, and audits and surveillances (see Finding QV.1-6).	Complete
6.	Initiate merger of all ORNL action tracking systems into a common database (ESAMS).	12/91
7.	Issue an SPP establishing the corrective action tracking system for ORNL.	9/91
8.	Incorporate the requirements of the Energy Systems prioritization process in an SPP that establishes the ORNL prioritization process.	9/91
9.	Use the data and features of ESAMS to analyze for lessons learned and for problem causes and issue a quarterly report to management summarizing the critical few ES&H issues at ORNL.	1/92
10.	Establish system for tracking progress and closure of corrective actions resulting from Tiger Team and other sources.	Complete

Costs: Activities are to be accomplished with existing staffing. Some additional expense funding is required for modification of existing database programs, new hardware, and ongoing database support.

Type of funds: Overhead

Source of funds: Overhead

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
3	15						15
4	15						15
6	30	*					30
7	40	*					40
8	25	*					25
9	187	334	175				696
Status:							
Funded							
Requested							
New	312	334	175				$821

*Estimated annual ongoing cost: $70K starting in FY 1992.

References: Findings QV.1-6 and FR.6-1

Finding No.: MF-7 ORNL ES&H Interfaces with Onsite External Groups

Finding Description: MMES and ORNL have not established uniform ES&H policies and procedures across the Oak Ridge Reservation, nor clearly defined and fully documented the ES&H roles and responsibilities for critical organizational interfaces with host sites, onsite contractors, subcontractors, guests, visitors, and users.

Code: Best Management Practice

Compliance Protocol: None

Priority: Energy Systems Risk Weight 539
Tiger Team Action Plan Priority 3

Response: ORNL agrees with deficiencies cited in Finding MF-7. ORNL began addressing the problem of training for visitors, users, and subcontractors in July 1990 and began the preparation of a video and procedures, and began clarifying responsibilities. Training for construction subcontractors has been ongoing and is conducted by the Office of Environmental and Health Protection.

The interface with other external groups onsite needs upgrading.

Root Causes:

Inadequate policy, inadequate policy implementation, inadequate training, and poorly defined roles and responsibilities

Planned Actions and Schedules:

Item/Description	Completion Date
1. Initiate training for onsite construction subcontractors.	Complete
2. ORNL–Y-12 Memorandum of Understanding (MOU) (see Finding OA.1-5).	
3. Determine need for, and establish if appropriate, an MOU delineating Environmental, Safety, and Health Staff responsibilities of ORNL and K-25 for ORNL organizations at K-25.	10/91
4. Guest/visitor training video (see Finding TC.1-1).	
5. Energy Systems—M.K. Ferguson interface (see Finding OA.1-3).	

Costs: Cost is for updating of training materials and for administering the training. Item 1 is an ongoing chargeback item to contractor.

References: None

Finding No.: MF-8 ES&H Review of Work for Others

Finding Description: **The ES&H aspects of Work for Others proposals are not receiving sufficient review by ORNL and DOE prior to proposal submission to the funding agency.**

Code: Best Management Practice

Compliance Protocol: None

Priority: Energy Systems Risk Weight 33
Tiger Team Action Plan Priority 3

Response: ORO will ensure that ES&H concerns are reviewed before acceptance of work.

Root Cause:

Inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Modify Proposal Information Form to address ES&H issues.	Complete
2. Add a staff member from the assistant manager for environment, safety, and quality organization as a permanent member on the ORWFO committee.	Complete
3. Energy Systems will initiate a review of proposal information forms to ensure that ES&H concerns are considered adequately.	7/91

Costs: Review will be accomplished within existing resources.

References: None

Finding No.: MF-9 Contractual Matters

Finding Description: The prime contract between DOE and MMES does not fully embody terms and conditions which reflect DOE priorities for ES&H performance, and which legally bind the contractor to full implementation of DOE's ES&H initiatives.

Code: Best Management Practice

Compliance Protocol: None

Priority: Energy Systems Risk Weight 40
Tiger Team Action Plan Priority 2

Response: While the contract does not explicitly state that the contractor must follow DOE orders, the Statement of Work (Article 2 of the contract), as originally formed in April 1984 and more recently amended in Modification M039, states that

> "...The Contractor undertakes and promises to manage, operate and maintain said plants and facilities, and to perform said work and services, upon the terms and conditions herein provided and in accordance with such directions and instructions not inconsistent with this contract which DOE may deem necessary or give to the Contractor from time to time..."

This provision of the Statement of Work has been interpreted by ORO with the authority to give Energy Systems the direction to follow any applicable order or initiative regarding ES&H or any other matter.

The new contract for the five-year extension include a DOE orders clause under which the language of the contract is more explicit regarding contractor compliance with DOE orders that are applicable to it. Other ES&H related clauses were added and the Safety and Health clause was modified to include environmental concerns.

The Agreement in Principle (AIP) has been forwarded to HQ for review and authority to proceed. The Federal Facilities Agreement (FFA) is being negotiated.

Root Cause:

Ambiguous requirements or expectations

Planned Actions and Schedules:

Item/Description	Completion Date
1. Incorporate Price-Anderson Amendments Act of 1988, Oversight Responsibility clause, and the Agreement regarding RCRA Permits into the contract.	Complete
2. Incorporate other ES&H coverage into the contract with five-year extension.	Complete
3. Execute the AIP.	5/91
4. Execute the FFA.	9/91

Costs: No significant additional costs are associated with the actions outlined.

References: Y-12 Tiger Team Action Plan for Finding 6.5.6

Finding No.: MF-10 DOE Directive System

Finding Description: DOE's communication of ES&H directives (Orders, Secretary of Energy Notices, and Memoranda of Understanding) does not provide guidance or specific instructions to the contractor or provides differing instructions depending on the program sponsor.

Code: Best Management Practice

Compliance Protocol: None

Priority: Energy Systems Risk Weight 119
Tiger Team Action Plan Priority 3

Responses: A number of major ES&H compliance guidance documents have been prepared by ORO to help assure consistent compliance with DOE Orders and regulatory requirements. These documents cover topics such as spill reporting, contamination control, SAR preparation, and asbestos removal requirements.

Some problems remain in communicating DOE's expectations to the contractor in a timely manner. These problems include inconsistencies in directives and other guidance received from HQ. Lack of a formal system for contracting officers' representatives to communicate requirements and for contractors to document implementation issues, lack of a central collection and control system for all types of ES&H compliance guidance, and insufficient specificity in guidance. Additionally, there is a need for improvement in transmitting draft documents to contractors for comments in a timely manner, to the extent possible given deadlines established by HQ. These issues have been identified in other Tiger Team and task force reviews, and ORO has already drafted an action plan for their resolution.

Root Causes:

Lack of consistent guidance from HQ and lack of sufficient resources to perform adequate development and coordination of local guidance and to develop control systems.

Planned Actions and Schedules:

All findings have already been addressed in an ORO action plan requested by the Secretary of Energy by memo dated August 31, 1990, and submitted to Headquarters for approval on January 11, 1991.

Item/Description	Completion Date
1. Inventory and establish a central control file in ORO of all the compliance guidance issued to date by all ORO organizations in the ES&H and QA areas.	Complete
2. Establish an ORO procedure on issuance and control of changes to compliance guidance in order to ensure issuance in a timely and consistent manner to all contractors at all sites.	Complete
3. Assess need for improvement in ORO's procedure for distribution of directives, DOE orders and supplements to ORO and contractors.	Complete
4. Establish Compliance Guidance Coordination Team.	Complete
5. Develop a structured Energy Systems process for accountability of requirements.	Complete
6. Complete implementation of Item 2.	6/91

Costs: Costs to automate Action Item #1 include $250,000 requested for FY 1991 to procure a computerized document storage and retrieval system, which would provide the following information on-line: (1) all permits for all ORO plants; (2) all DOE and ORO Orders; (3) all HQ and ORO guidance memoranda; (4) all applicable ES&H Federal and State regulations. Additional money for equipment and/or enhanced support services are planned for FY 1993.

Approximately two additional FTE are needed for FY 1991, and three more for FY 1992, to improve the quality of ES&H guidance to all ORO contractors. These needs were identified and validated in the MAPS survey of manpower needs of ORO in May 1990. ORO has received additional staffing allocations for FY 1991, and initial recruitment has begun.

References: Memorandum, LaGrone to EH-1, January 11, 1991

RPPA Management Issue on Policy/Standards and Procedures/Instructions

Finding No.: MF-11 ORO Oversight Systems

Finding Description: **The inability of OR to perform its full oversight role has resulted in slower than desired implementation of ORNL's ES&H program.**

Code: Best Management Practice

Compliance Protocol: None

Priority: Energy Systems Risk Weight 58
Tiger Team Action Plan Priority 3

Response: ORO previously acknowledged the need to improve ES&H oversight ORO-wide in a September 28, 1990, memorandum to EH-1 which provided draft action plans. Those plans called for preparation of site specific self-assessment program plans and procedures to address deficiencies in a comprehensive manner. They also described previous actions taken to improve the program, including the diversion of resources from other ORO activities and the request for additional resources from Headquarters. XSO has ES&H surveillance procedures in place, but lacks adequate staff to fully implement these procedures. The AMESQ organization is reorienting its mission to be more responsive to oversight needs of line organization. An XSO self-assessment plan will be prepared and implemented. Since the 1990 HQ manpower assessment, the XSO has requested six additional FTE and eight additional FTE in FY 1992 and FY 1993, respectively. Revised allocations have been received for FY 1991 and recruiting is underway. Extensive training programs have been developed and additional XSO procedures are being written and implemented.

The AMERWM has also previously acknowledged the need to provide additional oversight at ORNL. AMERWM currently provides one man-year of onsite presence. The FY 1991 staffing plan to headquarters requests one additional FTE for ORNL onsite staffing. In the interim AMERWM is reallocating existing staff to provide additional onsite support. AMERWM is also negotiating a technical support contract that will provide oversight assistance to DOE.

Root Causes:

Ambiguous requirements or expectations and insufficient resources

Planned Actions and Schedules:

Item/Description	Completion Date
1. Issue AMESQ specific self-assessment program plan.	Complete
2. Implement reorientation for S&HD organization.	Complete

3. Implement 1.5 FTE level oversight of ORNL reactor facilities by AMESQ.	Complete
4. XSO will provide self-assessment plan to ER-1 for review and approval.	6/91
5. XSO fill FY 1991 revised level of allocated positions.	9/91
6. XSO request FY 1993 position allocation.	Complete
7. XSO complete basic surveillance training.	10/91
8. AMERWM Self-Assessment plan complete.	Complete
9. Implement 2.5 FTE level of oversight of ORNL AMERWM activities.	10/91

Costs: No significant costs are associated with the actions listed.

References: None

Finding No.: MF-12 Contract Award Fee Process

Finding Description: The contract award fee process, as implemented at ORNL by ORO, has not provided the appropriate incentives to MMES to accomplish the enhanced ES&H performance required by DOE.

Code: Best Management Practice

Compliance Protocol: None

Priority: Energy Systems Risk Weight 20
Tiger Team Action Plan Priority 3

Response: ORO considers the mid-range (numerical score of 80) to be the level of performance expected of a fully performing CPAF contractor. ORNL consistently performed above this level in the ES&H area from Second Half FY 1985 through First Half FY 1989. Currently, 65 percent of the available award fee for ORNL is allocated to ES&H related activities. ORO considers this to be a significant incentive to the contractor to enhance performance in the ES&H area. Notwithstanding problems to be resolved (as noted in the MF-12 Finding quotes of previous award fee determination letters), the overall ORNL rating is being achieved during a time of strict environmental compliance.

ORO considers all criteria in the Award Fee Determination Plan (AFDP) to be important. Weighing individual criteria would result in some criteria carrying an insignificant weight which could act as a disincentive to the contractor. Additional measurable ES&H criteria have been incorporated into the AFDP. The ability to measure progress is the responsibility of the DOE line management for ORNL. ORO staff organizations also have criteria with which they assess ORNL performance. All of the expectations and goals required of ORNL are addressed to ORNL during the monthly Performance Evaluation Committees (PEC) meetings mandated by the AFDP. Past meetings did not adequately consider all expectations and goals. ORNL will submit to DOE additional measurable criteria in August.

Headquarters (HQ) has been involved in the process to create and review performance criteria during preparation of the AFDP. With regard to HQs involvement in the award fee determination process, ORO has invited HQ personnel to attend all PEC and Award Fee Board meetings. There is close coordination between the Award Fee Coordinator at ORO and all Program Offices at HQ. Those Program Offices have provided input to the PEC and have identified PEC coordinators for ORNL. Draft Management Agreements, which include HQ participation in the PEC process, have been prepared and transmitted.

ORO feels the award fee process is properly structured and executed with a proper mix of line management personnel, oversight personnel, and senior management involved in the process. Recognizing improvement is always possible, ORO feels the contractor is responsive and making good progress in all areas. Furthermore, we feel this progress is a result of the overall CPAF "environment and attitude" ORO has structured and projected. ORO feels this attitude does create incentive for ORNL.

Root Cause:

Ambiguous requirements or expectations and inadequate communications

Planned Actions and Schedules:

Item/Description	Completion Date
1. Identify and prepare additional measurable performance criteria.	Complete
2. Clarify ORO ES&H expectations and incorporate new measurable criteria into Second Half FY 1991 AFDP.	Complete
3. Add HQs input to the Second Half FY 1991 award fee determination plan.	Complete
4. Implement management agreements with HQ concerning active participation in the award fee process.	9/91
5. Establish Departmental ES&H goals, expectations, and measurement criteria, with ORNLs input for each 6-month evaluation period beginning with first half FY 1992.	9/91

Costs: No significant costs are associated with the actions listed.

References: None

3.6 SELF-ASSESSMENT FINDINGS, RESPONSES, AND PLANNED ACTIONS

3.6 SELF-ASSESSMENT FINDINGS, RESPONSES, AND PLANNED ACTIONS

Finding No.: SA-1 The ORNL Self-Assessment Process

Finding Description: **The ORNL self-assessment process is not institutionalized and lacks many elements of an effective self-assessment program.**

Code: Best Management Practice

Compliance Protocol: DOE Memorandum from the Secretary of Energy, Guidance on Environment, Safety, and Health Self-Assessment, July 31, 1990.

Priority: Energy Systems Risk Weight 138
Tiger Team Action Plan Priority 3

Response: ORNL has previously recognized the need for a more structured self-assessment program. Although many of the key elements of a sound self-assessment program exist, several components required by the Secretary of Energy's guidance are lacking or require strengthening. Examples of existing, ongoing assessment activities are the following: (1) Laboratory Director Review Committee reviews, (2) QA audits and surveillances, (3) operational readiness reviews, (4) safety inspections, (5) the award fee process, (6) division advisory committee technical reviews, (7) the Performance Improvement Process results, (8) the Occurrence Reporting System, and (9) corrective action tracking and trending. The ORNL assessment activities are supplemented by Energy Systems ES&H and QA audits and appraisals and in-depth INPO-type evaluations. Even though many of the critical program elements are in place, no program plan or focal point exists to ensure that these elements result in a program that is responsive to all regulatory, DOE, and contractor requirements and at the same time is effective in assessing our operations.

Prior to the Secretary of Energy's guidance, efforts were begun in 1988 to carefully evaluate the status of the radiation protection program, resulting in a Radiation Protection Program Plan. The plan utilized the Technical Safety Appraisal performance objectives and criteria as a key for this self-assessment activity. Numerous improvements have been made since that time. ORNL performed an overall self-assessment and divisional self-assessments in the summer of 1990. This assessment effort was based on a thorough review of all self-assessments performed at other DOE facilities. The addition of individual division assessments was an ORNL innovation we believe added to the process. All of these assessments provide a basis on which to build a comprehensive ongoing ES&H self-assessment program. This program will become an integral part of the overall ORNL ES&H strategic planning.

This action plan describes the means for further developing and implementing a comprehensive, institutionalized, and mature program. Such a program will be developed and will incorporate the eleven elements, and performance objectives and criteria provided by the Secretary's guidance. In addition, it will be based on appropriate DOE orders, ANSI standards, Total Quality Management principles, and the Malcolm Baldrige Quality Award Criteria.

Our approach will be one of benchmarking. This will involve evaluation and implementation of the best assessment methods available, e. g., methods used by the ORNL Metals and Ceramics Division, the ORNL Steam Plant, the organizations that have participated in the Y-12 Plant Pathfinder Program, and other nuclear and high-technology organizations.

The following action plan describes the steps needed to formally document the self-assessment process, develop and conduct training, conduct divisional and plant-level assessments, analyze performance, assess the program, and report to upper management. This action plan will enable ORNL to meet the challenge as reported by the ORNL Tiger Team: "The continuing challenge to Martin Marietta and ORNL management is to *sustain this process of self-assessment, while using it, not as a means into itself, but as the means to direct aggressive management action* toward correction of the concerns, findings, and root causes identified during the self-assessment process."

Root Causes:

Inadequate policy and inadequate policy implementation

Planned Actions and Schedules:

Item/Description	Completion Date
1. Evaluate self-assessment program successes and failures at ORNL facilities, other Martin Marietta facilities, other comparable DOE facilities, and other outside organizations. Define a comprehensive program scope and focus based on the evaluation and develop a draft program charter.	6/91
2. Develop draft self-assessment program plan, incorporating Tiger Team performance objectives from Secretary of Energy's guidance of July 31, 1990.	6/91
3. Issue draft SPP(s) based on program plan, including specified authorities, responsibilities, planning requirements, and requirements for developing performance indicators.	7/91

4.	Develop and initiate implementation of tracking, trending, root cause analysis, and lessons learned programs. These actions are described in Findings MF-6, QV. 1-3, QV. 1-4, QV. 1-6, and FR. 6-1.	
5.	Submit program plan to DOE for approval.	10/91
6.	Initiate implementation of interim self-assessment program based on program plan.	10/91
7.	Issue final SPP(s) contingent upon DOE approval of program plan.	1/92
8.	Initiate quarterly status reports to upper management on divisional and overall plant performance.	1/92
9.	Develop and initiate training program on how to perform self-assessments.	12/91
10.	Identify and initiate training of line personnel in root cause analysis. (Note: this is in addition to the ~100 QA and line staff members already trained in root cause.)	12/91
11.	Conduct independent triennial appraisal of new program. See Finding MF-5.	

Costs:

Type of funds: Overhead
Source of funds: Overhead

Action item	Estimated costs per fiscal year ($K) 1991	1992	1993	1994	1995	Beyond	Total
1	35						35
2	14						14
3	15						15
4	—						
5		—					
6		*					
7		—					
8		—					
9		—					
11		—					
Status:							
Funded	57						
Requested							
New	7						$64

*Estimated annual ongoing cost: $488K starting in FY 1992.

Type of funds: Overhead

Source of funds: Division Administration

	Estimated costs per fiscal year ($K)						
Action item	1991	1992	1993	1994	1995	Beyond	Total
6		*					
10		9	*				
Status:							
Funded							
Requested							
New		9					$9

*Estimated annual ongoing costs: $666K for Item 6 beginning in FY 1992 and $5K for Item 10 beginning in FY 1993.

References: Secretary of Energy Guidance on Environment, Safety, and Health (ES&H) Self-Assessment; July 31, 1990

4. SUMMARY OF PLANNED ACTIONS, SCHEDULES, AND COSTS

4. SUMMARY OF PLANNED ACTIONS, SCHEDULES, AND COSTS

4.1 KEY FINDINGS AND ACTIONS

The Tiger Team identified 12 Category II findings and highlighted a number of key findings in management and environmental areas. These key issues were also amplified in the Secretary of Energy's memorandum transmitted with the draft Tiger Team report to various DOE offices. ORNL was directed to pay special attention to management issues, self-assessment, contamination spread, waste minimization, quality verification, and safety programs. Key actions completed, under way, or planned to respond to these issues are summarized in this section.

The action plan outlines an aggressive series of actions, many of which have been already completed, to mitigate the present risks associated with each finding as well as long-term actions designed to address the root cause of the problem. Of the 12 Category II concerns identified by the Tiger Team, actions to resolve 2 have already been completed, 5 more will be completed before the end of FY 1991, 3 will be completed in FY 1992, 1 in FY 1993, and 1 in FY 1994. In those cases that require extensive action over an extended period, such as correcting serious electrical deficiencies in ORNL's 306 buildings, actions are being prioritized to address the most serious problems first.

The Tiger Team noted in Finding SA-1 that ORNL has not institutionalized its self-assessment process and that the current process lacks many of the elements of an effective self-assessment program. The action plan prepared to respond to that finding outlines a plan to fully implement a continuous self-assessment process combined with periodic independent external review that meets all the criteria for an effective self-assessment program.

Virtually all contamination spread from ORNL occurs through runoff from waste sites or permitted releases within the White Oak Creek drainage basin. To control the latter, the Process Waste Treatment Plant was modified in 1986 to reduce low-level liquid waste volume by 80%. A zeolite ion exchange project is scheduled for FY 1992 to remove cesium-137 from process wastewater discharges. Removal of sediments that are impacting the hydraulic performance of flow-monitoring structures is a key concern in the assurance of quality of surface water flow data, which are essential to monitoring liquid radioactive releases. Additional funding is being requested to complete time-critical removal of contaminated sediment transport to address this issue.

Another possible path is to deep aquifers along pathways created by abandoned, unplugged wells. Corrective actions focus is mainly on ensuring that plugging and abandonment is carried out in instances where potential exists for contaminant spread along boreholes and poorly constructed or poorly maintained wells. A groundwater program coordinator has been appointed to provide a central focus for all groundwater activities at ORNL. Funds are being requested to accelerate previously planned projects to maintain, characterize, and remediate potential paths for groundwater contamination. These actions, together with the other actions outlined in the action plan, provide an aggressive start to addressing this long-term problem.

With regard to waste minimization, nonhazardous scintillation cocktails are being used wherever possible. ORNL has instituted an aluminum-recycle program, and efforts are under way to develop a comprehensive waste-minimization program.

Management is fully committed to an effective and comprehensive quality verification program. Energy Systems has instituted a total quality management program, led by senior management. A Quality Assurance Audit Program Manager was named effective December 1, 1990. A central tracking system, called the Energy Systems Action Management System, is currently under development to provide tracking of actions resulting from all audits at Energy Systems sites. An Integrated Resource Management System is also being developed to assist in prioritizing actions and managing resources.

The action plan describes numerous actions proposed to improve safety programs in industrial hygiene, fire protection, radiation protection, and hazards communication. The Tiger Team cited insufficient resources in a number of findings related to safety programs, and discussions are continuing with DOE Headquarters to identify options for funding these activities to bring them into compliance. In the meantime, efforts are continuing to make the best use of available resources.

Martin Marietta Corporation is also playing an active role in improving ES&H performance at Energy Systems facilities. The Energy Systems board of directors, chaired by Tom Young, the President of Martin Marietta Corporation, meets bimonthly and provides top management review of Energy Systems operations with special attention to performance deficiencies in ES&H. Technical and management assistance is provided to Energy Systems by other parts of Martin Marietta Corporation through an interdivisional operating directive. Recent ES&H-related assistance provided by Martin Marietta Corporation to Energy Systems includes planning assistance for the Y-12 technical audit; calibration standards and measuring; analysis, development, and implementation of plant performance objectives; and environmental task force assistance. In addition, ORNL is using the knowledge base and experience of Martin Marietta Corporation and other Energy Systems sites in developing its self-assessment process. Technical audits are performed by Martin Marietta Corporation for all Martin Marietta businesses. A pre-Tiger Team audit was conducted at ORNL during 1990. During 1991, eleven audits are scheduled, including three at Energy Systems installations. Finally, the Corporate Environmental Management group has established a local office in Oak Ridge, Tennessee, with two full-time staff members. The activities of this group include reviewing ongoing environmental programs relative to compliance with applicable federal, state, and local regulations.

ORNL's response to its acknowledged management deficiencies is to firmly establish ES&H as an integral part of the mission of the Laboratory and to apply the same rigor to meeting ES&H laws and requirements as is applied to scientific laws and requirements. Energy Systems and ORNL management have developed the following approach to establishing and maintaining excellence in ES&H. This approach envisions seven key elements:

- Strategic plan for ES&H: a strategic plan for ES&H is under development to provide vision and coherence to ES&H activities. It will integrate with the strategic plan being developed Energy Systems-wide.

- Goals and structure: institutional goals will be established and roles and responsibilities will be clearly defined and utilized in performance planning and review.

- Conduct of Operations: uniformity of management approach and formality of operations will be strengthened by the implementation of Conduct of Operations throughout ORNL.

- Surveillance: effective and independent oversight of ES&H performance will be established, and adequate technical assistance will be provided. The oversight and technical assistance roles will be managed to avoid conflicts of interest.

- Measurement: performance goals will be established, and tracking and trending systems will be implemented.

- Self-assessment: a continuous self-assessment process combined with periodic independent external review that meets all the criteria for an effective self-assessment program will be implemented.

- Total quality management: a philosophy of continuous improvement and dedication to excellence will serve as the umbrella under which elements are defined and implemented.

4.2 TOTAL ES&H ACTIVITIES

Actions to respond to the Tiger Team Assessment represent only part of ORNL's ES&H activities. ES&H improvements started long before the Tiger Team arrived, and substantial resources have already been spent or committed to correct known problems. By definition, Tiger Team findings cover deficiencies only in the activities that were assessed. Underway activities that the Tiger Team found sufficient are not the subject of findings but must be continued until the problem is fully resolved. Also, most Tiger Team findings are narrowly drawn. For example, the majority of ORNL's facilities were constructed during a time when asbestos was a common material of construction. ORNL has committed substantial resources to its asbestos control program, and consequently there are no findings of a general nature that capture the cost of this long-recognized, expensive activity. Rather, two findings relate to specific aspects of the asbestos program, one on controlling the use of new asbestos-containing materials (Finding WS.3-1) and one on designation of the asbestos disposal area (Finding A/BMPF-4). Consequently, Tiger Team costs must be considered in the context of ORNL's total ES&H requirements.

ORNL is the oldest and largest of DOE's multiprogram R&D laboratories, with an estimated replacement cost in the range $7–10 billion. About 63% of ORNL's facilities were constructed before 1960. DOE capital expenditures to upgrade and replace facilities have been a small fraction of normal industrial practice. The buildings, utilities, and equipment have now aged to the point where substantial increases in maintenance costs and decreases in reliability are being experienced for systems and facilities supporting R&D efforts, and many facilities have not been upgraded to current health and safety standards. The low capital-expenditure rate has been

highlighted to DOE as a major institutional issue for many years. The Tiger Team concurred, citing insufficient resources in two of its nine root causes. Combined with the unique environmental-contamination problems at ORNL related to its original participation in the Manhattan Project, ORNL has accumulated a substantial ES&H legacy.

Table 4.1 shows a summary of the estimated cost to bring ORNL into compliance with current ES&H laws, regulations, orders, and standards. Entries in the table listed as "to be determined" have not had work scope and cost estimates completed, but most are known to represent substantial additional costs. The planning effort to support this action plan has made a substantial contribution toward developing a comprehensive strategic plan for all ES&H activities at ORNL.

The total estimated cost of ES&H requirements at ORNL to meet DOE's goal of full compliance with all ES&H laws and regulations is on the order of $1.5 billion. It is highly unlikely that this large amount of money will be available over any near-term planning horizon. Consequently, prioritization is absolutely necessary to ensure that the most important problems are addressed first. Implementation will require careful allocation of available funding to achieve the best results with limited resources and to weigh Tiger Team actions against other ES&H needs.

4.3 TIGER TEAM RESOURCE REQUIREMENTS

Table 4.2 shows a summary of the estimated costs for all actions required to fully address the findings of the ORNL Tiger Team assessment. The table shows a fiscal year (FY) breakdown of costs by type of cost and by funding source. The table also summarizes what portion of the funding listed is funded, requested, or new by year and funds category.

All actions listed in this action plan are contingent upon suitable funding being provided. The schedules for actions listed as funded are current best estimates of expected completion. The projected completion dates for actions listed as requested or new are technically feasible dates based on work scope and available or projected resources. Actual completion dates will depend on when work is authorized and funding received.

A number of key conclusions can be drawn from Table 4.2. As stated above, the current estimate for bringing ORNL into compliance with current ES&H laws, regulations, orders, and standards is on the order of $1.5 billion. Actions related to the Tiger Team assessment total approximately $739 million. The majority of action plan cost, $457 million, is in three findings related to environmental restoration and waste management:

- SW/BMPF-4, Unrepaired Leaks from Wastewater Sewer Systems ($229 million);
- GW/BMPF-5, Inadequate Characterization of Hydrogeologic Regime ($168 million); and
- GW/BMPF-1, Inadequate Well and Borehole Abandonment ($60 million).

Table 4.1. Approximate Total ES&H Cost Summary (in millions of dollars)

	FY91	FY92	FY93	FY94	FY95	Beyond	Total
Total ES&H Cost	>111.3	>167.7	>270.4	>210.2	>307.5	>487.5	>1554.6
Tiger Team-Related Costs							
One-Time Costs	61.6	88.0	160.3	105.7	119.1	138.2	672.9
Annual Ongoing Costs	0.7	8.0	12.4	14.1	14.3	>16.3	>65.8
Subtotal	62.3	96.0	172.7	119.8	133.4	>154.5	>738.7
ES&H-Related Portion of Other Costs							
Overhead	35.7	37.3	39.0	40.7	42.6	TBD	>195.3
Operating Legacy Cost	TBD	TBD	TBD	TBD	TBD	TBD	TBD
GPP	2.5	4.8	15.0	TBD	TBD	TBD	>22.3
MGPF	0.0	1.1	16.4	18.2	40.0	333.0	408.7
Line Items	0.0	TBD	TBD	TBD	TBD	TBD	TBD
Waste Management	10.8	28.5	27.3	31.5	91.5	TBD	>189.6
Subtotal	>49.0	>71.7	>97.7	>90.4	>174.1	>333.0	>815.9

Table 4.2. ORNL Corrective Action Plan Cost Summary (in millions of dollars)

Description	FY91	FY92	FY93	FY94	FY95	Beyond	Total	Funded	Requested	New
Overhead										
Overhead	7.5	4.1	0.6	0.4	0.1	0.1	12.8	5.8	1.0	6.0
Division	1.7	1.1	0.1	0.0	0.0	0.0	2.9	1.3	1.0	0.6
Subtotal	9.2	5.2	0.7	0.4	0.1	0.1	15.7	7.1	2.0	6.6
Program										
EM	28.8	47.1	52.2	46.3	46.8	89.7	310.9	24.8	283.9	2.2
ER	10.2	14.3	13.2	6.3	0.7	0.0	44.7	6.2	21.1	17.4
NE	1.0	0.1	0.3	0.2	0.2	0.0	1.8	1.0	0.0	0.8
Subtotal	40.0	61.5	65.7	52.8	47.7	89.7	357.4	32.0	305.0	20.4
Capital										
EM	0.5	9.6	4.4	4.0	4.0	4.0	26.5	0.5	26.0	0.0
ER	0.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0
GPP	0.7	3.7	5.8	1.0	1.0	0.0	12.2	0.7	5.5	6.0
GPE	0.1	0.0	0.2	0.0	0.0	0.0	0.3	0.0	0.1	0.2
Subtotal	1.3	14.3	11.4	5.0	5.0	4.0	41.0	1.2	31.6	8.2
Line item										
EM	7.1	4.6	15.9	26.5	39.1	35.0	128.2	7.1	121.1	0.0
ER	3.1	0.5	61.7	3.0	6.0	2.4	76.7	3.1	31.9	41.7
MGPF	0.9	1.9	4.9	18.0	21.2	7.0	53.9	0.9	51.0	2.0
Subtotal	11.1	7.0	82.5	47.5	66.3	44.4	258.8	11.1	204.0	43.7
Subtotal one-time costs	61.6	88.0	160.3	105.7	119.1	138.2	672.9	51.4	542.6	78.9
Funded	51.4	0.0	0.0	0.0	0.0	0.0	51.4			
Requested	5.5	73.1	105.1	104.4	116.4	138.1	542.6			
New	4.7	14.9	55.2	1.3	2.7	0.1	78.9			
Annual ongoing costs	0.7	8.0	12.4	14.1	14.3	>16.3	>65.8			
Tiger Team subtotal	62.3	96.0	172.7	119.8	133.4	>154.5	>738.7			
Other ES&H costs	>49.0	>71.7	>97.7	>90.4	>174.1	>333.0	>815.9			
Total ES&H costs	>111.3	>167.7	>270.4	>210.2	>307.5	>487.5	>1554.6			

All three findings had been identified previously and are included in the current Environmental Restoration and Waste Management 5-year plan. Next to the Office of Environmental Restoration and Waste Management, the Office of Energy Research, as the major funding sponsor of R&D at ORNL, experiences the greatest programmatic cost associated with new ES&H requirements.

Of the total estimated cost of $739 million, only $78.9 million is new costs that had not been previously identified and submitted to DOE for funding. As actions are completed, ongoing costs necessary to support the improvements in the future grow to around $16 million per year.

Of the total estimated cost of $62.3 million in FY 1991 needed to be fully responsive to the Tiger Team assessment, consisting of both one-time and ongoing costs, almost $51 million is already funded. These activities include Tiger Team–related activities that were already under way prior to the Tiger Team assessment as well as new tasks resulting from the Tiger Team assessment that have been funded in lieu of lower priority tasks and represent a substantial commitment of overhead and programmatic funds to ES&H activities. Of the $11 million shortfall for FY 1991, roughly $5 million is needed to initiate high-priority activities to move toward compliance with ES&H laws, regulations, orders, and standards.

A detailed summary of the estimated cost for each finding is included in Appendix B. Appendix C contains a summary of actions, schedules, and costs for each finding, while Appendix D lists existing and new projects that fall within the scope of DOE's *Environmental Restoration and Waste Management Five-Year Plan.*

APPENDIX A

ORNL RISK PRIORITIZATION SYSTEM

APPENDIX A: ORNL RISK PRIORITIZATION SYSTEM

A.1 BACKGROUND

In the past, ORNL has reacted to internal and external assessments by developing individual actions plans that address the findings, observations, and concerns (requirements) of the auditors. The internal organization that coordinated the assessment would typically send the requirements from the assessment to the personnel or divisions responsible for addressing them. These people would write a corrective action or actions with a proposed schedule for completion. A record of these measures would be put into a local data base created to track that assessment.

In recent years, however, the number of different sources of requirements and required actions has increased so much that individual assessments and their required actions cannot be evaluated without reference to other reports. Energy Systems and ORNL are developing a process that will enable personnel to consolidate and coordinate their responses to assessments. This process will utilize risk-based prioritization and a central tracking organization to correct deficiencies in operations more efficiently and effectively.

Several problems have resulted from the present system.

- Numerous data bases around the Laboratory track similar information but are not coordinated. The Quality Audit Program, which maintains the most comprehensive data base, must manually consolidate the status of findings and actions from each data base to report the overall status.

- Often, the requirement identified had already been identified in earlier assessments. Having uncoordinated responses to assessments forced personnel to spend much of their time completing the necessary paperwork several times for the same action. The individual had to recognize duplication in developing the corrective action and coordinate the schedules and cost estimates.

- With no estimate of how important each requirement was, the person responsible would attempt to develop schedules for completion that were not based on the risks. Resources would often be diverted from old corrective actions to newer ones, with consequent slippages in completion dates. These slippages left large numbers of open and overdue action items.

The Research Reactor Division (RRD) was the first to recognize the problems and the first to develop a system to resolve them. They created a technical evaluation group that prioritized all actions using a single prioritization matrix and the Integrated Resource Management Systems (IRMS), which consolidated all requirements into a single tracking and scheduling system. As new requirements arose, schedules were adjusted based on priority and required resources. The system provided a single, DOE-approved method for managing corrective actions and other demands on RRD resources.

This system was so successful that other organizations within ORNL and Energy Systems applied it to their operations. For example, the Chemical Technology Division (CTD) used a similar process in developing an upgrade program for their division. Unfortunately, budget changes in 1990 drastically altered their Isotopes Program's structure and mission, requiring a review of work done to date and a redirection of efforts. The RRD system has also been used in the Uranium Enrichment Performance Improvement Program (UEPIP). This system has been expanded greatly to incorporate Tiger Team results from Paducah and Portsmouth as well as overall budget planning.

A.2 METHODOLOGY

The Energy Systems Risk Matrix is shown in Table A.1. It was developed through consolidation of earlier matrices already in use in Energy Systems (RRD, CTD, Y-12, and UEPIP). Each weight in the matrix represents the weight given to the consequence category times the representative probability of its occurrence. The weights were assigned based on analysis by Tenera, a consulting firm instrumental in the development of the previous systems, and by an Energy Systems five-plant risk matrix board.

If the consequences of a given finding are in more than one category, then the total weight of the finding is the sum of the applicable weights. As a finding increases in seriousness, its weight increases in magnitude. A finding with weight of 450, for example, is much more serious than one with a weight of 5. The highest weights in the matrix are in the Public Health and Safety section, with Immediate Loss of Life/Impairment assigned 10,000 points. The lowest consequence category is Loss of Investment <$1 million, which is assigned a value of 1. The values used are based on research from commercial industry and insurance statistics, consolidating separate factors for the relative cost, extent, and unwillingness to accept risks.

The categories are divided into five main sections, representing different aspects of any deficiencies. Within each grouping are varying levels of seriousness. Human health is covered in two sections, with the public ranked higher than site personnel because of the involuntary nature of the public's risk. Environmental Protection is divided into excessive or moderate to low-level impacts on the ecological system. The fourth section includes regulatory impacts, deficiencies in good management practices and impacts that could cause public outcry. Business performance issues are rated based on cost factors or impacts on mission performance. Table A.1 presents some additional detail on each of the consequences.

The averted risk values given in the matrix for probabilities A, B, C, and D reflect the multiple for the weight. Table A.2 gives a qualitative description of the probability factors. Probability A (1.0) represents an existing fact or expected failure within the next couple of years. Probability B (0.1) represents either failure over the life of the activity (up to 20 years) or that the system has errors that could lead to failure. Probability C (0.01) represents a possible but not expected occurrence or reliability in the range of typical mechanical systems. Probability D (0.0001) represents a very unlikely event during the plant lifetime or a system with a reliability in the range of typical large-scale systems.

Table A.1. Martin Marietta Energy Systems, Inc., Risk Matrix

	Consequence	Probability per year			
		A 1	B 0.1	C 0.01	D 1.E-04
	PUBLIC HEALTH AND SAFETY				
1.	Loss of life/impairment	10,000	1,000	100	1
2.	Excessive exposure and/or injury	500	50	5	0.05
3.	Moderate to low-level exposure	50	5	0.5	0.005
	ENVIRONMENTAL PROTECTION				
4.	Excessive damage to the ecological system	300	30	3	0.03
5.	Moderate to minor damage to ecological system	40	4	0.4	0.004
	SITE PERSONNEL SAFETY				
6.	Loss of life/immediate impairment	5000	500	50	0.5
7.	Significant injury requiring hospitalization with significant lost time or exposure > occupational limits	250	25	2.5	0.025
8.	Exposure near limits (20–100%) or loss time injury requiring medical treatment	25	2.5	0.25	0.003
9.	Minor injury requiring first aid or exposure <20% of limits	5	0.5	0.05	5E-04
	REGULATORY COMPLIANCE AND EXTERNAL CONFIDENCE				
10.	Noncompliance with law	350	35	3.5	0.035
11.	Noncompliance with DOE orders or issues which have been or could be identified as high-level audit findings	50	5	0.5	0.005
12.	Issues that have caused or could cause major public protest or outcry (other than 10, 11)	30	3	0.3	0.003
13.	Significant deviation from good practice or Energy Systems directives	5	0.5	0.05	5E-04

Table A.1. Martin Marietta Energy Systems, Inc., Risk Matrix

	Consequence	Probability per year			
		A 1	B 0.1	C 0.01	D 1.E-04
	BUSINESS PERFORMANCE OR ECONOMIC CONCERNS				
14.	Serious negative impact on site mission accomplishment [>180 days of Vital Program Interruption (VPI)]	250	25	2.5	0.025
15.	Loss of investment (>$25M/annual cost>$5M/opportunity lost>$25M)	50	5	0.5	0.005
16.	Moderate negative impact on mission (VPI 30–180 days)	25	2.5	0.25	0.003
17.	Loss of investment ($5–25M/annual cost $1-5M/opportunity lost $5–25M)	15	1.5	0.15	0.002
18.	Loss of investment ($1–5M/annual cost<$1M/opportunity lost $1–5M)	3	0.3	0.03	3E-04
19.	Loss of investment (<$1 M)	1	0.1	0.01	1E-04

Table A.2. Consequence List for Energy Systems Modifications

Number		Averted Consequence
I.	Public Health and Safety:	Radiological, hazardous material releases, or other occurrences that could result in: 1. Loss of life/disablement in the surrounding population 2. Excessive exposure or serious injury to the population 3. Moderate to low-level, measurable exposure or minor injury to the population
II.	Environmental Protection:	Radiological, hazardous material releases, or other occurrences that could result in: 4. Excessive damage to the ecological system (cleanup costs exceed $1 million) 5. Moderate to minor damage to the ecological system (reportable releases with cleanup costs from $10,000 to $1 million)
III.	Site Personnel Safety:	Occupational radiation or hazardous material exposure to workers or accident that could result in: 6. Loss of life or immediate disablement including loss of limb or organ or immediate dehabilitating radiation or hazardous material exposure effects 7. Serious overexposures or serious lost time injury requiring extensive hospital recuperation 8. Exposure that is near to above limits (20%–200%), contaminated wound or injury that requires emergency room treatment 9. Exposures from 1–20 percent of yearly limits, significant removable skin contamination, or minor injury that requires first aid
IV.	Regulatory Compliance and External Confidence:	Configurations, incidents, or lack of management controls that could result in: 10. Noncompliance with a state, federal, or local law or regulation 11. Noncompliance with DOE order or issues that have been identified as high-level audit findings by external regulators 12. Issues that have caused or could cause major public protest or outcry

Table A.2. Consequence List for Energy Systems Modifications

Number		Averted Consequence
		13. Significant deviation from good practice or Energy Systems directive or moderate to low-level audit findings or external concerns
V.	Business Performance or Economic Concerns:	Situations or incidents that could cause:
		14. Significant negative impact on site mission accomplishment [vital program interruption (VPI) over 180 days]
		15. Major loss of investment, increased production cost, or lost opportunity to reduce production cost (>$25 million)*
		16. Moderate negative impact on mission (30–180 days VPI)
		17. Moderate loss of investment, increased production cost, or lost opportunity to reduce production cost (from >$5 to $25 million)*
		18. Loss of investment, increased product cost, or loss opportunity to reduce production cost (from $1 to $5 million)*
		19. Low loss of investment, increased product cost, or lost opportunity to reduce production cost (below $1 million)*

*The value used for increased production cost or lost opportunity to reduce production cost should be integrated over the number of years of applicability.

A.3 PILOT PROGRAM

A pilot program was initiated in June 1990 to develop a resource management system at ORNL. Three external audits were chosen to be prioritized using a draft version of the Energy Systems Risk Matrix. For each audit, a risk prioritization committee (RPC) was formed from ORNL personnel familiar with issues identified in the audit. They used professional judgement and input from experts in specific areas of ORNL to estimate the consequences and probabilities. After the first prioritization committee finished its work, committees were formed subsequently with a core of personnel from the old committee and additional personnel from the different divisions identified within the audits. The subsequent formation of committees provided a method both to keep consistency among the audits and to train more people in the use of the system.

For the Pilot Program, one of the existing PC-based data bases at ORNL was modified to include prioritization fields. The data base chosen, the Evaluation Data Base Systems (EDS), is the most comprehensive at ORNL, containing the results of 450 previous audits and surveillances. It was designed to be used by ORNL's Quality Department for its quality auditing function and includes external and internal audits, appraisals, and surveillances.

A.4 MANAGEMENT'S PRIORITIZATION OF TOP ISSUES

Before the Tiger Team's arrival, ORNL management developed a list of major concerns facing the Laboratory. These concerns were identified in the ORNL self-assessment and were individually prioritized by the Tiger Team Steering Committee, both as an education tool for themselves and to further understand the relative risk of their major concerns.

As a further check on the validity of the process, the top external findings identified from the pilot program were compared with the management-defined major issues. All findings over 150 points were contained in the management concerns. The major distinction was that the external concerns were generally more specific to a certain location or program, while the management concerns were more global.

A.5 TIGER TEAM PRIORITIZATION ACTIVITIES

Once the draft of the Tiger Team findings and concerns was made available, a risk prioritization committee was established to rank them. The site-wide TSA findings were reviewed over a 2-day period following the TSA closeout, while the environmental and management concerns were prioritized during the final week. The RRD technical evaluation group prioritized the reactor TSA findings with the Energy Systems matrix, as they now do with all of their requirements. Figures A.1 through A.5 show the relative breakdown of points for each subteam's findings and the total set of findings.

The corrective actions for the Tiger Team findings are being evaluated. As a first step, it is assumed that the actions fully alleviate the concerns of the finding, and extra weight is not given to actions resolving multiple findings. The weight may then be divided by the estimated cost of the action to determine a benefit/cost ratio. This value can be used to determine relative rankings.

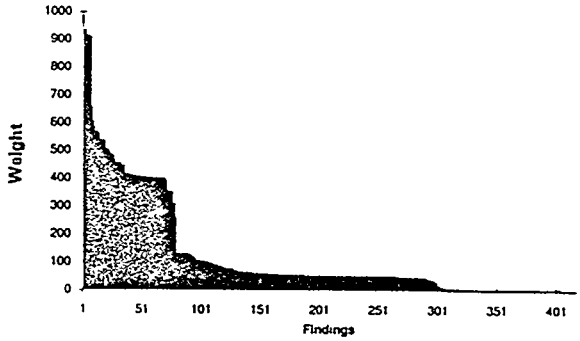

Fig. A.1. Total ORNL Tiger Team findings.

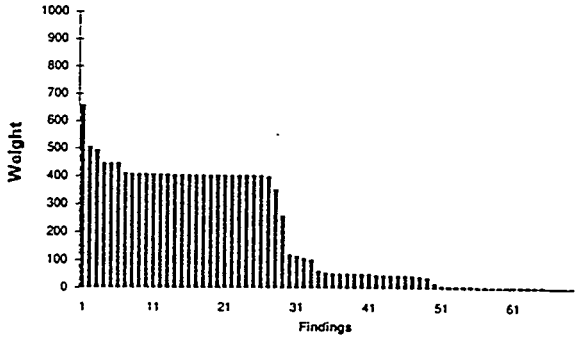

Fig. A.2. Environmental Tiger Team findings.

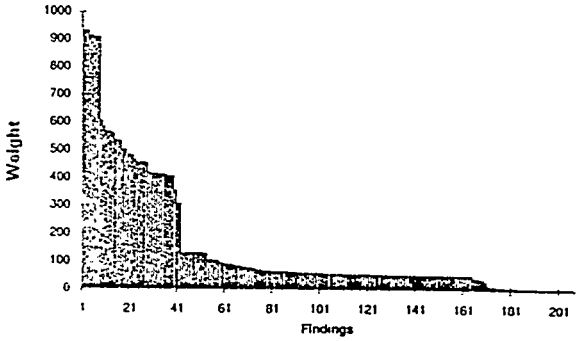

Fig. A.3. Sitewide TSA Tiger Team findings.

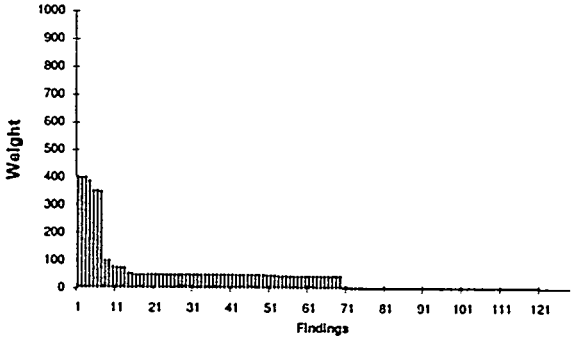

Fig. A.4. Reactor TSA Tiger Team findings.

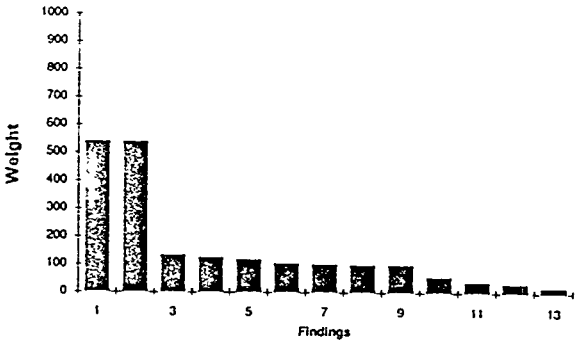

Fig. A.5. Management Tiger Team findings.

Currently, cost estimates have not been sufficiently reviewed to ensure that all estimates are consistent. Any ranking done would not be a reliable indicator.

This rank cannot be the sole determinant of scheduling priorities. Tiger Team priorities (Level 1, 2, 3, or 4) have been assigned to each finding. Levels 1 and 2 must receive increased attention, despite a high cost, especially if they were determined to be Category II findings during the Tiger Team visit. Also, other Energy Systems organizations using this process have found that benefit/cost ratios are a good measure for capital projects, but that the risk weight by itself is often a better determinant for actions funded by expense funds. Analysis of actions must utilize all three methods for management to make the best decisions on overall priorities.

APPENDIX B

SUMMARY OF CORRECTIVE ACTION PLAN COSTS

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: A/BMPF-1 PRIORITY: 3 RISK WEIGHT: 45 INADEQUATE STACK EMISSION MONITORING AND TEST PROCEDURES FOR NESHAP COMPLIANCE										
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: A/BMPF-2 PRIORITY: 4 RISK WEIGHT: 1 LACK OF VERIFYING DOCUMENTATION TO DEMONSTRATE COMPLIANCE WITH AIR PERMIT CONDITIONS										
ALL	110	0	20	21	22	23	24	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	110	0	20	21	22	23	24			
FINDING NUMBER: A/BMPF-3 PRIORITY: 4 RISK WEIGHT: 1 LACK OF CONSISTENT INSTALLATION OF STACK SAMPLING, MONITORING, AND ALARM SYSTEMS FOR RADIOACTIVE RELEASES --										
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: A/BMPF-4 PRIORITY: 4 RISK WEIGHT: 1 DEFICIENT ASBESTOS WASTE DISPOSAL MANAGEMENT										
1	1	1	0	0	0	0	0	OVERHEAD	Y-12 OVERHEAD	FUNDED
TOTALS:	1	1	0	0	0	0	0			
FINDING NUMBER: A/CF-1 PRIORITY: 2 RISK WEIGHT: 448 EXCURSIONS ABOVE AIR PERMIT LIMITS										
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: A/CF-2 PRIORITY: 3 RISK WEIGHT: 5 HIGH EFFICIENCY PARTICULATE AIR (HEPA) TESTING PROGRAM DEFICIENCIES										
1	2	2	0	0	0	0	0	PROGRAM	ER-KC	FUNDED
1,2	10	0	2	2	2	2	2	PROGRAM	ER-KC	ONGOING
2	2	2	0	0	0	0	0	PROGRAM	ER-KC	FUNDED
TOTALS:	14	4	2	2	2	2	2			
FINDING NUMBER: A/CF-3 PRIORITY: 2 RISK WEIGHT: 400 ABSENCE OF STATE AIR PERMITS FOR RADIONUCLIDE SOURCES										
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: A/CF-4 PRIORITY: 2 RISK WEIGHT: 55 AMBIENT AIR MONITORING DEFICIENCIES										
1	10	10	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	15	15	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
4	40	0	40	0	0	0	0	OVERHEAD	OVERHEAD	NEW

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
TOTALS:	65	25	40	0	0	0	0			
FINDING NUMBER: A/CF-5		PRIORITY: 2		RISK WEIGHT:		55	EFFLUENT STACK SAMPLING AND MONITORING DEFICIENCIES			
3	15	15	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
4	3000	0	0	3000	0	0	0	CAPITAL	GPP-ER	NEW
4	200	0	200	0	0	0	0	OVERHEAD	OVERHEAD	REQUESTED
6	627	0	0	0	200	209	218	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	3842	15	200	3000	200	209	218			
FINDING NUMBER: A/CF-6		PRIORITY: 3		RISK WEIGHT:		5	LACK OF CONTROL ROOM OPERATOR TRAINING IN STACK RELEASE EMERGENCY PROCEDURES			
2	2	2	0	0	0	0	0	PROGRAM	ER-KC	FUNDED
TOTALS:	2	2	0	0	0	0	0			
FINDING NUMBER: AX.1-1		PRIORITY: 2		RISK WEIGHT:		570	REMEDIAL PROGRAM FOR AUXILIARY SYSTEMS			
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: AX.1-2		PRIORITY: 2		RISK WEIGHT:		55	CONFIGURATION CONTROL SYSTEM FOR AUXILIARY SYSTEMS			
3	20	20	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
3	465	0	85	89	93	97	101	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	485	20	85	89	93	97	101			
FINDING NUMBER: AX.2-1		PRIORITY: 2		RISK WEIGHT:		56	NO IMPLEMENTATION OF THE WASTE MINIMIZATION POLICY			
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: AX.3-1		PRIORITY: 3		RISK WEIGHT:		6	ENERGY SYSTEMS POLICY PROCEDURE ON WASTE MANAGEMENT			
1-2	15	15	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	15	15	0	0	0	0	0			
FINDING NUMBER: AX.4-1		PRIORITY: 2		RISK WEIGHT:		56	FISSILE MATERIAL STORAGE HANDLING ACTIVITIES			
1	3	3	0	0	0	0	0	PROGRAM	EM-ADS387	REQUESTED
2	5	5	0	0	0	0	0	PROGRAM	EM-ADS387	REQUESTED
3	68	68	0	0	0	0	0	PROGRAM	EM-ADS387	REQUESTED
4	4	4	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
4	4	4	0	0	0	0	0	PROGRAM	DP-GE	NEW
5	25	0	25	0	0	0	0	PROGRAM	ER-	NEW
TOTALS:	109	84	25	0	0	0	0			
FINDING NUMBER: AX.4-2		PRIORITY: 2		RISK WEIGHT:		55	BUILDING 3027 STORAGE VAULT OPERATIONS			
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: AX.5-1		PRIORITY: 2		RISK WEIGHT:		63	GASEOUS EFFLUENT DISCHARGES			
3	50	50	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
4	30	30	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
5	10	10	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	90	90	0	0	0	0	0			
FINDING NUMBER: AX.6-1		PRIORITY: 3		RISK WEIGHT:		5	BACKUP POWER DIESEL GENERATORS			
1	1	1	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2	2	2	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	3	3	0	0	0	0	0			
FINDING NUMBER: CS.1-1		PRIORITY: 2		RISK WEIGHT:		60	NUCLEAR CRITICALITY SAFETY TRAINING PROGRAM			
1	15	15	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
1	23	0	0	7	0	8	8	OVERHEAD	OVERHEAD	ONGOING
2	40	0	40	0	0	0	0	OVERHEAD	OVERHEAD	NEW
3	25	0	0	25	0	0	0	OVERHEAD	OVERHEAD	NEW
TOTALS:	103	15	40	32	0	8	8			
FINDING NUMBER: CS.1-2		PRIORITY: 2		RISK WEIGHT:		55	OVERSIGHT AND SUPPORT FUNCTIONS			
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: CS.1-3		PRIORITY: 2		RISK WEIGHT:		55	ORNL CRITICALITY SAFETY PROGRAM			
3	10	10	0	0	0	0	0	OVERHEAD	DIVISION	NEW
4	50	50	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
4	465	0	85	89	93	97	101	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	525	60	85	89	93	97	101			
FINDING NUMBER: CS.1-4		PRIORITY: 2		RISK WEIGHT:		55	NUCLEAR CRITICALITY SAFETY PROGRAM DOCUMENTATION			
4	10	0	10	0	0	0	0	OVERHEAD	OVERHEAD	NEW
5	10	0	10	0	0	0	0	OVERHEAD	OVERHEAD	NEW

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
TOTALS:	20	0	20	0	0	0	0			
FINDING NUMBER: CS.3-1		PRIORITY: 2		RISK WEIGHT:		55		SAFETY ANALYSIS DOCUMENTATION REQUIREMENTS		
4	558	0	276	282	0	0	0	OVERHEAD	OVERHEAD	NEW
5	15	0	0	15	0	0	0	OVERHEAD	OVERHEAD	NEW
TOTALS:	573	0	276	297	0	0	0			
FINDING NUMBER: CS.4-1		PRIORITY: 2		RISK WEIGHT:		55		REVIEW OF NUCLEAR CRITICALITY SAFETY ANALYSES		
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: CS.4-2		PRIORITY: 2		RISK WEIGHT:		55		DISSEMINATION OF NUCLEAR CRITICALITY SAFETY GUIDANCE		
4	8	0	8	0	0	0	0	OVERHEAD	OVERHEAD	NEW
4	22	0	0	5	5	6	6	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	30	0	8	5	5	6	6			
FINDING NUMBER: CS.4-3		PRIORITY: 2		RISK WEIGHT:		55		NUCLEAR CRITICALITY SAFETY REMEDIAL ACTION PLAN		
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: CS.5-1		PRIORITY: 2		RISK WEIGHT:		55		EMERGENCY RESPONSE PLAN		
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: CS.5-2		PRIORITY: 2		RISK WEIGHT:		55		CRITICALITY ALARM SYSTEM EVACUATION DRILLS		
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: CS.5-3		PRIORITY: 2		RISK WEIGHT:		58		CRITICALITY ALARM SYSTEMS		
2	2	2	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	2	2	0	0	0	0	0			
FINDING NUMBER: EA.2-1		PRIORITY: 2		RISK WEIGHT:		69		ORNL POLICY REGARDING INDEPENDENT SAFETY REVIEWS		
1	8	8	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2	15	15	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	2	0	2	0	0	0	0	OVERHEAD	OVERHEAD	NEW

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
TOTALS:	25	23	2	0	0	0	0			
FINDING NUMBER: EA.3-1			PRIORITY: 2		RISK WEIGHT:		69	GUIDANCE ON INTERNAL SAFETY REVIEWS		
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: EA.3-2			PRIORITY: 2		RISK WEIGHT:		55	DOCUMENTATION OF SAFETY REVIEWS OF EXPERIMENTAL PLANS		
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: EA.4-1			PRIORITY: 3		RISK WEIGHT:		6	RANDOM SAFETY SURVEILLANCES		
2	35	0	35	0	0	0	0	OVERHEAD	OVERHEAD	NEW
2	158	0	0	37	39	40	42	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	193	0	35	37	39	40	42			
FINDING NUMBER: EP.1-1			PRIORITY: 2		RISK WEIGHT:		109	ACCIDENT CONSEQUENCE ASSESSMENT		
ALL	75	15	5	55	0	0	0	PROGRAM	ER-AT EP	REQUESTED
ALL	157	0	0	0	50	52	55	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	232	15	5	55	50	52	55			
FINDING NUMBER: EP.1-2			PRIORITY: 3		RISK WEIGHT:		11	EMERGENCY PREPAREDNESS RECOMMENDATIONS		
1	28	0	5	5	6	6	6	OVERHEAD	OVERHEAD	ONGOING
2	25	25	0	0	0	0	0	PROGRAM	ER-AT EP	NEW
TOTALS:	53	25	5	5	6	6	6			
FINDING NUMBER: EP.1-3			PRIORITY: 2		RISK WEIGHT:		69	FACILITY HAZARDS INFORMATION		
1	2	2	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2	20	20	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	3	3	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
4	5	5	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
5	10	0	10	0	0	0	0	PROGRAM	ER-AT EP	REQUESTED
5	42	0	0	10	10	11	11	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	82	30	10	10	10	11	11			
FINDING NUMBER: EP.1-4			PRIORITY: 2		RISK WEIGHT:		66	ANALYSIS OF EMERGENCY PREPAREDNESS		
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: EP.2-1			PRIORITY: 2	RISK WEIGHT:		56	CLASSIFICATION OF EMERGENCY EVENTS			
ALL	10	10	0	0	0	0	0	PROGRAM	ER-AT EP	REQUESTED
TOTALS:	10	10	0	0	0	0	0			
FINDING NUMBER: EP.2-2			PRIORITY: 2	RISK WEIGHT:		106	ADEQUACY OF ORNL EMERGENCY PLANS			
1	18	18	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2	2	2	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
4	20	0	20	0	0	0	0	PROGRAM	ER-AT EP	REQUESTED
TOTALS:	40	20	20	0	0	0	0			
FINDING NUMBER: EP.3-1			PRIORITY: 3	RISK WEIGHT:		7	TRAINING FOR EMERGENCY SITUATIONS			
1-4	314	0	0	0	100	105	109	OVERHEAD	OVERHEAD	ONGOING
1-4	10	10	0	0	0	0	0	PROGRAM	ER-AT EP	REQUESTED
5-6	50	0	50	0	0	0	0	PROGRAM	ER-AT EP	NEW
7	50	0	50	0	0	0	0	PROGRAM	ER-AT EP	NEW
8	100	0	0	100	0	0	0	PROGRAM	ER-AT EP	NEW
TOTALS:	524	10	100	100	100	105	109			
FINDING NUMBER: EP.3-2			PRIORITY: 3	RISK WEIGHT:		7	SPILL RESPONSE TRAINING			
1	274	0	50	52	55	57	60	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	274	0	50	52	55	57	60			
FINDING NUMBER: EP.4-1			PRIORITY: 3	RISK WEIGHT:		7	EMERGENCY PREPAREDNESS EXERCISES			
ALL	471	0	0	0	150	157	164	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	471	0	0	0	150	157	164			
FINDING NUMBER: EP.4-2			PRIORITY: 3	RISK WEIGHT:		6	DRILL PLANNING			
1-3	10	10	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
1-3	54	0	10	10	11	11	12	OVERHEAD	OVERHEAD	ONGOING
4	5	5	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	69	15	10	10	11	11	12			
FINDING NUMBER: EP.5-1			PRIORITY: 2	RISK WEIGHT:		68	EMERGENCY MONITORING OF RELEASES			
2	10	10	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	50	50	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	547	0	100	105	109	114	119	OVERHEAD	OVERHEAD	ONGOING
5	15	15	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
6	15	15	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	637	90	100	105	109	114	119			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: EP.5-2			PRIORITY: 2		RISK WEIGHT:		56	REGIONAL RADIOLOGICAL EVENT		
1-5,7	471	0	0	0	150	157	164	OVERHEAD	OVERHEAD	ONGOING
2	5	0	5	0	0	0	0	PROGRAM	ER-AT EP	REQUESTED
3	5	0	5	0	0	0	0	PROGRAM	ER-AT EP	REQUESTED
4	10	0	10	0	0	0	0	PROGRAM	ER-AT EP	NEW
5	100	0	100	0	0	0	0	PROGRAM	ER-AT EP	NEW
6	200	0	0	200	0	0	0	CAPITAL	GPE-ER	NEW
7	100	0	0	100	0	0	0	PROGRAM	ER-AT EP	NEW
TOTALS:	891	0	120	300	150	157	164			
FINDING NUMBER: EP.6-1			PRIORITY: 2		RISK WEIGHT:		56	PROTECTIVE ACTION GUIDES/EMERGENCY ACTION LEVELS		
ALL	25	25	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
ALL	274	0	50	52	55	57	60	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	299	25	50	52	55	57	60			
FINDING NUMBER: EP.7-1			PRIORITY: 2		RISK WEIGHT:		130	PERSONNEL ACCOUNTABILITY SYSTEMS		
1	50	50	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
1-4	137	0	25	26	27	29	30	OVERHEAD	OVERHEAD	ONGOING
2	10	10	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	5	0	5	0	0	0	0	PROGRAM	ER-AT EP	NEW
4	15	0	15	0	0	0	0	PROGRAM	ER-AT EP	NEW
TOTALS:	217	60	45	26	27	29	30			
FINDING NUMBER: EP.7-2			PRIORITY: 2		RISK WEIGHT:		133	EMERGENCY NOTIFICATION SYSTEMS		
1	2	2	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2	410	410	0	0	0	0	0	CAPITAL	GPP-ER	FUNDED
3	8	8	0	0	0	0	0	PROGRAM	ER-AT EP	REQUESTED
ALL	274	0	50	52	55	57	60	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	694	420	50	52	55	57	60			
FINDING NUMBER: FP.1-1			PRIORITY: 2		RISK WEIGHT:		133	RESOURCES OF FIRE PROTECTION ENGINEERING SECTION		
2	2	2	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
4	596	0	60	125	131	137	143	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	598	2	60	125	131	137	143			
FINDING NUMBER: FP.1-2			PRIORITY: 2		RISK WEIGHT:		133	FIRE DEPARTMENT RESOURCES AND WORK LOAD		
ALL	274	0	50	52	55	57	60	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	274	0	50	52	55	57	60			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: FP.1-3			PRIORITY: 2		RISK WEIGHT:		55	FIRE PROTECTION OF ORNL FACILITIES AT THE Y-12 PLANT		
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: FP.1-4			PRIORITY: 2		RISK WEIGHT:		55	FIRE PROTECTION POLICIES REGARDING IMPROVED RISK		
1	7	7	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	7	7	0	0	0	0	0			
FINDING NUMBER: FP.1-5			PRIORITY: 2		RISK WEIGHT:		105	FACILITY REOCCUPANCY POLICY		
2	7	7	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	7	7	0	0	0	0	0			
FINDING NUMBER: FP.1-6			PRIORITY: 3		RISK WEIGHT:		9	MANAGEMENT'S ROLE IN FIRE PROTECTION		
2	7	0	7	0	0	0	0	OVERHEAD	OVERHEAD	REQUESTED
3	329	0	60	63	66	68	72	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	336	0	67	63	66	68	72			
FINDING NUMBER: FP.2-1			PRIORITY: 2		RISK WEIGHT:		458	EGRESS FROM BUILDING 4500N, MACHINERY SPACE		
ALL	120	120	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	120	120	0	0	0	0	0			
FINDING NUMBER: FP.2-2			PRIORITY: 2		RISK WEIGHT:		458	EGRESS FROM BUILDING 4500N, OFFICE SPACE		
1-6	607	607	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	607	607	0	0	0	0	0			
FINDING NUMBER: FP.2-3			PRIORITY: 2		RISK WEIGHT:		133	LIFE SAFETY CODE SURVEYS		
1	240	240	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	240	240	0	0	0	0	0			
FINDING NUMBER: FP.2-4			PRIORITY: 3		RISK WEIGHT:		56	ACTION PLANS REGARDING LIFE SAFETY CODE SURVEYS		
1	5	5	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
TOTALS:	5	5	0	0	0	0	0			
FINDING NUMBER: FP.3-1			PRIORITY: 2		RISK WEIGHT:		59	ORNL TESTING OF FIRE EQUIPMENT		
2	93	93	0	0	0	0	0	PROGRAM	ER-KC	FUNDED
2	22	22	0	0	0	0	0	PROGRAM	DP-GE	REQUESTED
5	350	0	140	210	0	0	0	PROGRAM	ER-KC	REQUESTED

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
5	150	0	60	90	0	0	0	PROGRAM	DP-GE	REQUESTED
7	45	45	0	0	0	0	0	PROGRAM	ER-KC	FUNDED
TOTALS:	660	160	200	300	0	0	0			
FINDING NUMBER: FP.3-2 PRIORITY: 2 RISK WEIGHT: 80 ADEQUATE DOCUMENTATION OF FIRE STUDY										
4	105	105	0	0	0	0	0	PROGRAM	ER-KC	REQUESTED
4	45	45	0	0	0	0	0	PROGRAM	DP-GE	REQUESTED
TOTALS:	150	150	0	0	0	0	0			
FINDING NUMBER: FP.3-3 PRIORITY: 2 RISK WEIGHT: 58 DESIGN BASIS FIRE REVIEW PROGRAM										
1	7	7	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	7	7	0	0	0	0	0			
FINDING NUMBER: FP.4-1 PRIORITY: 2 RISK WEIGHT: 55 ADEQUACY OF FIRE PROTECTION										
1	500	0	100	400	0	0	0	PROGRAM	ER-KC	NEW
TOTALS:	500	0	100	400	0	0	0			
FINDING NUMBER: FP.5-1 PRIORITY: 2 RISK WEIGHT: 60 FIRE PROTECTION SYSTEMS IN BUILDING 4500N										
1	850	850	0	0	0	0	0	LINE ITEM	MGPF	FUNDED
1	1960	0	1660	300	0	0	0	LINE ITEM	MGPF	REQUESTED
2	10	10	0	0	0	0	0	LINE ITEM	MGPF	NEW
5	1990	0	190	0	0	1800	0	LINE ITEM	MGPF	NEW
TOTALS:	4810	860	1850	300	0	1800	0			
FINDING NUMBER: FP.6-1 PRIORITY: 2 RISK WEIGHT: 63 PHYSICAL FITNESS PROGRAM FOR FIRE FIGHTERS										
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: FP.6-2 PRIORITY: 3 RISK WEIGHT: 83 FIRE DEPARTMENT STAFFING LEVEL										
4	1367	0	250	261	273	285	298	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	1367	0	250	261	273	285	298			
FINDING NUMBER: FP.6-3 PRIORITY: 3 RISK WEIGHT: 5 PRE-FIRE PLANS FOR ORNL FACILITIES										
1	225	225	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
2	1	1	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	226	226	0	0	0	0	0			
FINDING NUMBER: FP.7-1 PRIORITY: 2 RISK WEIGHT: 58 FIRE PROTECTION OF MAIN COMPUTER CENTERS										
ALL	9	9	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
ALL	1	1	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	10	10	0	0	0	0	0			
FINDING NUMBER: FP.7-2		PRIORITY: 2		RISK WEIGHT: 133				FIRE HAZARD ANALYSIS AND FACILITY PROTECTION SURVEY		
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: FP.7-3		PRIORITY: 2		RISK WEIGHT: 58				FIRE PROTECTION OVERSIGHT		
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: FP.7-4		PRIORITY: 2		RISK WEIGHT: 58				REVIEW OF DOCUMENTS AFFECTING FIRE PROTECTION		
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: FP.7-5		PRIORITY: 2		RISK WEIGHT: 58				WATER SUPPLY SYSTEM		
1	7	7	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	30	0	30	0	0	0	0	OVERHEAD	OVERHEAD	NEW
4	22000	0	0	0	5000	10000	7000	LINE ITEM	MGPF	REQUESTED
TOTALS:	22037	7	30	0	5000	10000	7000			
FINDING NUMBER: FR.1-1		PRIORITY: 3		RISK WEIGHT: 6				ORGANIZATION AND IMPLEMENTATION OF SAFETY REVIEW SYSTEM		
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: FR.2-1		PRIORITY: 2		RISK WEIGHT: 60				REVIEW OF SAFETY QUESTIONS AND TOPICS		
2	15	0	15	0	0	0	0	OVERHEAD	OVERHEAD	NEW
TOTALS:	15	0	15	0	0	0	0			
FINDING NUMBER: FR.3-1		PRIORITY: 2		RISK WEIGHT: 63				SHORTCOMINGS OF THE SAFETY REVIEW SYSTEM		
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: FR.4-1		PRIORITY: 2		RISK WEIGHT: 98				MANAGEMENT RESPONSE TO SAFETY COMMITTEE RECOMMENDATIONS		
2	15	15	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
TOTALS:	15	15	0	0	0	0	0			
FINDING NUMBER: FR.4-2 PRIORITY: 4 RISK WEIGHT: 1 ANNUAL FACILITY APPRAISALS										
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: FR.5-1 PRIORITY: 3 RISK WEIGHT: 5 TRIENNIAL APPRAISAL										
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: FR.6-1 PRIORITY: 2 RISK WEIGHT: 55 INDUSTRY LESSONS LEARNED										
1	15	15	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2	21	21	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
2	465	0	85	89	93	97	101	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	501	36	85	89	93	97	101			
FINDING NUMBER: GW/BMPF-1 PRIORITY: 2 RISK WEIGHT: 50 INADEQUATE WELL AND BOREHOLE ABANDONMENT										
10	14860	0	0	2860	3000	3000	6000	PROGRAM	EM-ADS329	REQUESTED
10	250	250	0	0	0	0	0	PROGRAM	EM-ADS329	NEW
11	1302	0	102	1200	0	0	0	PROGRAM	EM-ADS333	REQUESTED
12	20977	0	0	0	0	1800	19177	PROGRAM	EM-ADS333	REQUESTED
13	250	250	0	0	0	0	0	PROGRAM	EM-ADS333	NEW
13	14856	0	2182	1830	3788	4656	2400	PROGRAM	EM-ADS333	REQUESTED
2	15	15	0	0	0	0	0	PROGRAM	EM-ADS332	FUNDED
3	10	10	0	0	0	0	0	PROGRAM	EM-ADS0322AB	FUNDED
4	110	0	110	0	0	0	0	PROGRAM	EM-ADS033	NEW
5	190	0	190	0	0	0	0	PROGRAM	EM-ADS329	REQUESTED
6	50	50	0	0	0	0	0	PROGRAM	EM-ADS332	FUNDED
6	90	0	90	0	0	0	0	PROGRAM	EM-ADS329	REQUESTED
7	220	0	120	100	0	0	0	PROGRAM	EM-ADS329	REQUESTED
7	50	50	0	0	0	0	0	PROGRAM	EM-ADS332	FUNDED
8	402	402	0	0	0	0	0	PROGRAM	EM-ADS332	FUNDED
8	6390	0	6390	0	0	0	0	PROGRAM	EM-ADS332	REQUESTED
9	90	0	50	40	0	0	0	PROGRAM	EM-ADS329	REQUESTED
TOTALS:	60112	1027	9234	6030	6788	9456	27577			
FINDING NUMBER: GW/BMPF-2 PRIORITY: 1 RISK WEIGHT: 50 INADEQUATE MONITORING WELL AND BOREHOLE INVENTORY, SECURITY, AND MAINTENANCE										
2	40	40	0	0	0	0	0	OVERHEAD	ENERGY SYSTEMS	REQUESTED
3	50	50	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
5	150	0	150	0	0	0	0	PROGRAM	EM-ADS311AA	REQUESTED
5	1497	0	0	350	366	382	399	PROGRAM	EM-ADS311AA	ONGOING

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
TOTALS:	1737	90	150	350	366	382	399			
FINDING NUMBER: GW/BMPF-3 PRIORITY: 2 RISK WEIGHT: 50 CROSS-CONTAMINATION BETWEEN AQUIFERS AND STRATA										
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: GW/BMPF-4 PRIORITY: 2 RISK WEIGHT: 50 NO CUSTODIAN FOR UNUSED WELLS										
3	672	100	105	109	114	119	125	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	672	100	105	109	114	119	125			
FINDING NUMBER: GW/BMPF-5 PRIORITY: 2 RISK WEIGHT: 117 INADEQUATE CHARACTERIZATION OF THE HYDROGEOLOGIC REGIME										
2	75	75	0	0	0	0	0	OVERHEAD	ENERGY SYSTEMS	FUNDED
2	75	75	0	0	0	0	0	PROGRAM	EM-ADS413	FUNDED
3	75	75	0	0	0	0	0	OVERHEAD	ENERGY SYSTEMS	FUNDED
3	75	75	0	0	0	0	0	PROGRAM	EM-ADS413	FUNDED
4	100	0	100	0	0	0	0	OVERHEAD	ENERGY SYSTEMS	REQUESTED
4	100	0	100	0	0	0	0	PROGRAM	EM-ADS413	REQUESTED
5	125	0	125	0	0	0	0	OVERHEAD	ENERGY SYSTEMS	REQUESTED
5	125	0	125	0	0	0	0	PROGRAM	EM-ADS413	REQUESTED
6	17796	17796	0	0	0	0	0	PROGRAM	EM-ADS363,324,325	FUNDED
6	149511	0	26670	27650	26367	26733	42091	PROGRAM	EM-ADS363,324,325	REQUESTED
TOTALS:	168057	18096	27120	27650	26367	26733	42091			
FINDING NUMBER: GW/CF-1 PRIORITY: 2 RISK WEIGHT: 507 INADEQUATE HYDROGEOLOGIC CHARACTERIZATION AT SWSA 6										
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: GW/CF-2 PRIORITY: 2 RISK WEIGHT: 405 INADEQUATE IMPLEMENTATION OF WELL PURGING PROCEDURES AT SWSA-6										
4	1	1	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
4	5	0	1	1	1	1	1	OVERHEAD	OVERHEAD	ONGOING
5	2	2	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
5	10	0	2	2	2	2	2	OVERHEAD	OVERHEAD	ONGOING
6	2	2	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
6	10	0	2	2	2	2	2	OVERHEAD	OVERHEAD	ONGOING
7	5	5	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
7	28	0	5	5	6	6	6	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	63	10	10	10	11	11	11			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: IH.2-1			PRIORITY: 2	RISK WEIGHT:			68	DOCUMENTATION OF PROCEDURES BY INDUSTRIAL HYGIENE		
2	43	43	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
4	181	181	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
4	126	126	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
4	1269	0	852	417	0	0	0	PROGRAM	ER-AT IH	NEW
4	285	0	0	0	91	95	99	OVERHEAD	OVERHEAD	ONGOING
5	15	15	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
7	11	11	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
8	3	3	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	1933	379	852	417	91	95	99			
FINDING NUMBER: IH.2-2			PRIORITY: 4	RISK WEIGHT:			90	IMPLEMENTATION OF INDUSTRIAL HYGIENE REVIEWS		
1	2	0	2	0	0	0	0	OVERHEAD	OVERHEAD	REQUESTED
2	11	11	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
4	5	5	0	0	0	0	0	OVERHEAD	OVERHEAD	REQUESTED
4	99	0	18	19	20	21	21	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	117	16	20	19	20	21	21			
FINDING NUMBER: IH.3-1			PRIORITY: 2	RISK WEIGHT:			458	PERSONNEL PROTECTIVE EQUIPMENT		
2	2	2	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
4	7	7	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
8	7	7	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	16	16	0	0	0	0	0			
FINDING NUMBER: IH.4-1			PRIORITY: 2	RISK WEIGHT:			60	SURVEILLANCE OF INDUSTRIAL HYGIENE MONITORING		
2	435	0	435	0	0	0	0	PROGRAM	ER-AT IH	NEW
TOTALS:	435	0	435	0	0	0	0			
FINDING NUMBER: IH.5-1			PRIORITY: 2	RISK WEIGHT:			455	HEARING CONSERVATION PROGRAM		
2	2	2	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
3	7	7	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
4	7	7	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
5	12	0	12	0	0	0	0	OVERHEAD	OVERHEAD	NEW
5	56	0	0	13	14	14	15	OVERHEAD	OVERHEAD	ONGOING
6	1	1	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
6	5	0	1	1	1	1	1	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	90	17	13	14	15	15	16			
FINDING NUMBER: IH.5-2			PRIORITY: 2	RISK WEIGHT:			418	CHEMICAL CARCINOGEN PROGRAM		
2	2	2	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	15	15	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
4	7	7	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
5	7	7	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
6	7	7	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
7	2	2	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
8	7	7	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
TOTALS:	47	47	0	0	0	0	0			

FINDING NUMBER: IH.5-3 PRIORITY: 1 RISK WEIGHT: 913 CONFINED SPACE ENTRY

10	43	43	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
10,14	580	0	106	111	116	121	126	OVERHEAD	OVERHEAD	ONGOING
14	78	78	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
5	176	176	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
6	7	7	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	884	304	106	111	116	121	126			

FINDING NUMBER: IH.5-4 PRIORITY: 2 RISK WEIGHT: 415 RESPIRATORY PROTECTION PROGRAM

1	44	0	44	0	0	0	0	OVERHEAD	DIVISION	NEW
1,2,4	419	0	8	96	100	105	110	OVERHEAD	DIVISION	ONGOING
2	7	7	0	0	0	0	0	OVERHEAD	DIVISION	FUNDED
4	7	7	0	0	0	0	0	OVERHEAD	DIVISION	FUNDED
5	7	7	0	0	0	0	0	OVERHEAD	DIVISION	FUNDED
6	28	28	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
6	169	0	31	32	34	35	37	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	681	49	83	128	134	140	147			

FINDING NUMBER: IH.5-5 PRIORITY: 2 RISK WEIGHT: 408 SANITATION AND POTABLE WATER PROGRAM

1	7	7	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
1	120	0	22	23	24	25	26	OVERHEAD	OVERHEAD	ONGOING
3	2	0	2	0	0	0	0	OVERHEAD	OVERHEAD	REQUESTED
TOTALS:	129	7	24	23	24	25	26			

FINDING NUMBER: IH.5-6 PRIORITY: 2 RISK WEIGHT: 80 ERGONOMICS PROGRAM

1	15	15	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
2	295	44	46	48	50	52	55	OVERHEAD	OVERHEAD	ONGOING
3	15	0	15	0	0	0	0	OVERHEAD	OVERHEAD	NEW
TOTALS:	325	59	61	48	50	52	55			

FINDING NUMBER: IH.6-1 PRIORITY: 2 RISK WEIGHT: 422 HANDLING, STORAGE, AND LABELING OF CHEMICALS

1	85	85	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
1	963	0	176	184	192	201	210	OVERHEAD	OVERHEAD	ONGOING
2	55	55	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
4	66	0	66	0	0	0	0	OVERHEAD	OVERHEAD	NEW

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
4	1129	0	0	264	276	288	301	OVERHEAD	OVERHEAD	ONGOING
5	2	2	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
6	14	14	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	2314	156	242	448	468	489	511			

FINDING NUMBER: IWS/BMPF-1 PRIORITY: 3 RISK WEIGHT: 10 INFORMALITY OF OPERATIONS IN THE ENVIRONMENTAL RESTORATION PROGRAM (ERP)

NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			

FINDING NUMBER: IWS/BMPF-2 PRIORITY: 3 RISK WEIGHT: 7 PROCEEDING WITHOUT APPROVED PLANS

NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			

FINDING NUMBER: IWS/BMPF-3 PRIORITY: 3 RISK WEIGHT: 42 LACK OF ADEQUATE PLANNING FOR FEDERAL FACILITY AGREEMENT ACTIVITIES

NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			

FINDING NUMBER: IWS/BMPF-4 PRIORITY: 3 RISK WEIGHT: 50 INCOMPLETE EVOLUTION OF CONTINUOUS RELEASES

NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			

FINDING NUMBER: IWS/CF-1 PRIORITY: 2 RISK WEIGHT: 410 INADEQUATE INVENTORY AND IDENTIFICATION OF INACTIVE WASTE SITES

1-2	25	25	0	0	0	0	0	PROGRAM	EM-ADS322	FUNDED
TOTALS:	25	25	0	0	0	0	0			

FINDING NUMBER: IWS/CF-2 PRIORITY: 2 RISK WEIGHT: 495 LACK OF FORMAL NATURAL RESOURCES DAMAGE ASSESSMENT NOTIFICATION

NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			

FINDING NUMBER: IWS/CF-3 PRIORITY: 2 RISK WEIGHT: 405 INCOMPLETE DISTRIBUTION OF EPCRA REPORTS

NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			

FINDING NUMBER: MA.1-1 PRIORITY: 3 RISK WEIGHT: 41 ORNL LACKS POLICY/PROCEDURE IN REMOVING EQUIPMENT FROM SERVICE

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
5	1	1	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	1	1	0	0	0	0	0			
FINDING NUMBER: MA.2-1 PRIORITY: 1 RISK WEIGHT: 917 ORNL LACKS EFFECTIVE LOCKOUT/TAGOUT SYSTEM										
1	12	12	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2	190	190	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	443	66	69	72	75	79	82	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	645	268	69	72	75	79	82			
FINDING NUMBER: MA.2-2 PRIORITY: 2 RISK WEIGHT: 86 PLANT MAINTENANCE PERSONNEL										
1-4	655	655	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
5	100	100	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
6	25	25	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
6	82	0	15	16	16	17	18	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	862	780	15	16	16	17	18			
FINDING NUMBER: MA.5-1 PRIORITY: 2 RISK WEIGHT: 567 GENERAL FACILITY AND POST-WORK INSPECTIONS WER NOT BE USED										
4	25	5	20	0	0	0	0	OVERHEAD	OVERHEAD	NEW
5	2462	0	450	470	491	514	537	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	2487	5	470	470	491	514	537			
FINDING NUMBER: MA.5-2 PRIORITY: 2 RISK WEIGHT: 58 FUNDAMENTAL ASSESSMENTS OF FACILITIES										
1	5	5	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
4	30	0	30	0	0	0	0	OVERHEAD	OVERHEAD	NEW
ALL	1094	0	200	209	218	228	239	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	1129	5	230	209	218	228	239			
FINDING NUMBER: MA.6-1 PRIORITY: 2 RISK WEIGHT: 570 P&E DIVISION PREVENTIVE MAINTENANCE										
3	10	10	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
5	5	0	5	0	0	0	0	OVERHEAD	OVERHEAD	REQUESTED
6	1367	0	250	261	273	285	298	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	1382	10	255	261	273	285	298			
FINDING NUMBER: MA.8-1 PRIORITY: 3 RISK WEIGHT: 42 MAINTENANCE PROCEDURES										
1	1	1	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2	3	3	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	547	0	100	105	109	114	119	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	551	4	100	105	109	114	119			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: MF-1			PRIORITY: 3	RISK WEIGHT:	99	ES&H GOALS AND OBJECTIVES				
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: MF-10			PRIORITY: 3	RISK WEIGHT:	119	DOE DIRECTIVE SYSTEM				
ALL	250	250	0	0	0	0	0	PROGRAM	ER-AT	REQUESTED
TOTALS:	250	250	0	0	0	0	0			
FINDING NUMBER: MF-11			PRIORITY: 3	RISK WEIGHT:	58	ORO OVERSIGHT SYSTEMS				
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: MF-12			PRIORITY: 3	RISK WEIGHT:	20	CONTRACT AWARD FEE PROCESS				
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: MF-2			PRIORITY: 3	RISK WEIGHT:	102	ES&H MANAGEMENT SYSTEMS				
1	1000	0	1000	0	0	0	0	OVERHEAD	DIVISION	REQUESTED
1	500	500	0	0	0	0	0	OVERHEAD	DIVISION	FUNDED
2-4	150	150	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2-4	547	0	100	105	109	114	119	OVERHEAD	OVERHEAD	ONGOING
5	70	70	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	2267	720	1100	105	109	114	119			
FINDING NUMBER: MF-3			PRIORITY: 3	RISK WEIGHT:	126	QUALITY ASSURANCE				
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: MF-4			PRIORITY: 3	RISK WEIGHT:	99	HUMAN RESOURCES				
1-4	44	44	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
1-4	77	0	14	15	15	16	17	OVERHEAD	OVERHEAD	ONGOING
5-6	22	22	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
5-6	49	0	9	9	10	10	11	OVERHEAD	OVERHEAD	ONGOING
7	22	22	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
7	72	0	13	14	14	15	16	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	286	88	36	38	39	41	44			
FINDING NUMBER: MF-5			PRIORITY: 2	RISK WEIGHT:	135	INDEPENDENT OVERSIGHT SYSTEMS				
1	20	20	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2	3	3	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
3	20	20	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
5	3	0	3	0	0	0	0	OVERHEAD	OVERHEAD	NEW
5	110	0	20	21	22	23	24	OVERHEAD	OVERHEAD	ONGOING
6	20	0	20	0	0	0	0	OVERHEAD	OVERHEAD	NEW
7	31	0	0	31	0	0	0	OVERHEAD	OVERHEAD	NEW
TOTALS:	207	43	43	52	22	23	24			

FINDING NUMBER: MF-6 PRIORITY: 2 RISK WEIGHT: 105 ORNL TRACKING ES&H ISSUES TO CLOSURE

3	15	15	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
4	15	15	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
6	45	45	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
7	40	40	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
8	25	25	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
9	696	187	334	175	0	0	0	OVERHEAD	OVERHEAD	NEW
ALL	382	0	70	73	76	80	83	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	1218	327	404	248	76	80	83			

FINDING NUMBER: MF-7 PRIORITY: 3 RISK WEIGHT: 539 ORNL ES&H INTERFACES WITH ONSITE EXTERNAL GROUPS

X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			

FINDING NUMBER: MF-8 PRIORITY: 3 RISK WEIGHT: 33 ES&H REVIEW OF WORK FOR OTHERS

NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			

FINDING NUMBER: MF-9 PRIORITY: 2 RISK WEIGHT: 40 CONTRACTUAL MATTERS

NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			

FINDING NUMBER: MS.1-1 PRIORITY: 2 RISK WEIGHT: 55 VOLUNTARY HEALTH EXAMINATION PROGRAM

1	672	100	105	109	114	119	125	OVERHEAD	OVERHEAD	ONGOING
2	15	0	15	0	0	0	0	OVERHEAD	OVERHEAD	NEW
TOTALS:	687	100	120	109	114	119	125			

FINDING NUMBER: MS.2-1 PRIORITY: 3 RISK WEIGHT: 8 MEDICAL DIVISION ADMINISTRATIVE ASSISTANCE

2	246	0	45	47	49	51	54	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	246	0	45	47	49	51	54			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: MS.3-1			PRIORITY: 2		RISK WEIGHT: 408			BACKUP PULMONARY FUNCTION TESTING PERSONNEL		
2	5	5	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
TOTALS:	5	5	0	0	0	0	0			
FINDING NUMBER: MS.3-2			PRIORITY: 3		RISK WEIGHT: 55			MEDICAL DIVISION SPACE ALLOCATION		
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: MS.3-3			PRIORITY: 2		RISK WEIGHT: 62			DECONTAMINATION FACILITIES		
1	280	280	0	0	0	0	0	CAPITAL	GPP-ER	FUNDED
2	920	0	920	0	0	0	0	CAPITAL	GPP-ER	REQUESTED
TOTALS:	1200	280	920	0	0	0	0			
FINDING NUMBER: NEPA/BMPF1			PRIORITY: 3		RISK WEIGHT: 10			LACK OF ENVIRONMENTAL IMPACT ASSESSMENT FOR ORNL CONTINUING OPERATIONS		
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: NEPA/CF-1			PRIORITY: 2		RISK WEIGHT: 658			INEFFICIENT DOE NEPA IMPLEMENTATION PROCEDURES		
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: NEPA/CF-2			PRIORITY: 2		RISK WEIGHT: 405			PROJECT IMPLEMENTATION WITHOUT COMPLETED NEPA PROCESS		
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: OA.1-1			PRIORITY: 2		RISK WEIGHT: 69			FLOWDOWN OF POLICIES		
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: OA.1-2			PRIORITY: 2		RISK WEIGHT: 58			DOE ORDERS		
5	1	1	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
6	75	75	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
ALL	44	0	8	8	9	9	10	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	120	76	8	8	9	9	10			
FINDING NUMBER: OA.1-3			PRIORITY: 2		RISK WEIGHT: 539			ROLES AND RESPONSIBILITIES FOR ES&H		
NONE	0	0	0	0	0	0	0			NONE

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: OA.1-4		PRIORITY: 2		RISK WEIGHT: 488				ES&H REQUIREMENTS ACCEPTANCE BY DIVISIONS		
2	275	275	0	0	0	0	0	OVERHEAD	DIVISION	NEW
TOTALS:	275	275	0	0	0	0	0			
FINDING NUMBER: OA.1-5		PRIORITY: 2		RISK WEIGHT: 539				ROLES, RESPONSIBILITIES INVOLVING ES&H NOT CLEARLY DEFINED		
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: OA.1-6		PRIORITY: 2		RISK WEIGHT: 65				NO UNIFORM SAFETY REQUIREMENTS AT X10 AND Y12		
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: OA.3-1		PRIORITY: 2		RISK WEIGHT: 64				ORNL HAS NOT ESTABLISHED COMPREHENSIVE ES&H GOALS FOR FACILITIES		
2	15	15	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
2	82	0	15	16	16	17	18	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	97	15	15	16	16	17	18			
FINDING NUMBER: OA.6-1		PRIORITY: 3		RISK WEIGHT: 58				REQUIREMENTS FOR JOB DESCRIPTIONS		
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: OA.6-2		PRIORITY: 3		RISK WEIGHT: 58				PPR SYSTEM		
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: OA.7-1		PRIORITY: 3		RISK WEIGHT: 5				CENTRALIZED SYSTEM FOR CONTROL OF SAFETY DOCUMENTS		
1	4	4	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2	4	0	4	0	0	0	0	OVERHEAD	OVERHEAD	REQUESTED
TOTALS:	8	4	4	0	0	0	0			
FINDING NUMBER: OA.7-2		PRIORITY: 2		RISK WEIGHT: 130				STORAGE FACILITIES AT ORNL FOR RECORDS		
1	18	18	0	0	0	0	0	OVERHEAD	OVERHEAD	REQUESTED
2	7	0	7	0	0	0	0	OVERHEAD	OVERHEAD	NEW

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
TOTALS:	25	18	7	0	0	0	0			
FINDING NUMBER: OA.8-1		PRIORITY: 2		RISK WEIGHT:		87	SITE WIDE TRAINING FOR DRUG/ALCOHOL USE/BEHAVIOR			
1	14	14	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
1	26	0	6	6	7	0	7	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	40	14	6	6	7	0	7			
FINDING NUMBER: OP.3-1		PRIORITY: 2		RISK WEIGHT:		55	ORNL LACKS STANDARDIZED POLICY FOR OPERATING PROCEDURES			
1	11	11	0	0	0	0	0	OVERHEAD	ENERGY SYSTEMS	NEW
2	20	0	20	0	0	0	0	OVERHEAD	ENERGY SYSTEMS	NEW
2	22	0	0	5	5	6	6	OVERHEAD	ENERGY SYSTEMS	ONGOING
3	12	0	12	0	0	0	0	OVERHEAD	ENERGY SYSTEMS	NEW
4	7	0	7	0	0	0	0	OVERHEAD	ENERGY SYSTEMS	NEW
TOTALS:	72	11	39	5	5	6	6			
FINDING NUMBER: OP.4-1		PRIORITY: 3		RISK WEIGHT:		56	FACILITY STATUS DISPLAYS			
2	756	756	0	0	0	0	0	OVERHEAD	DIVISION	FUNDED
TOTALS:	756	756	0	0	0	0	0			
FINDING NUMBER: OP.4-2		PRIORITY: 1		RISK WEIGHT:		917	LOCKOUT/TAGOUT SYSTEMS AT ORNL			
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: OP.7-1		PRIORITY: 2		RISK WEIGHT:		67	SHIFT WORKERS AT ORNL			
3	5	5	0	0	0	0	0	OVERHEAD	DIVISION	FUNDED
3	629	0	115	120	126	131	137	OVERHEAD	DIVISION	ONGOING
TOTALS:	634	5	115	120	126	131	137			
FINDING NUMBER: OP.8-1		PRIORITY: 3		RISK WEIGHT:		5	GENERALLY ACCEPTED TERMINOLOGY			
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: OP.8-2		PRIORITY: 2		RISK WEIGHT:		56	ALARM PANELS			
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: OP.8-3		PRIORITY: 2		RISK WEIGHT:		56	LACK OF UNIFORMITY IN CONVEYING INFORMATION TO PERSONNEL			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
1	10	10	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	15	0	15	0	0	0	0	OVERHEAD	OVERHEAD	NEW
5	67	0	0	67	0	0	0	OVERHEAD	DIVISION	NEW
TOTALS:	92	10	15	67	0	0	0			

FINDING NUMBER: PP.1-1 PRIORITY: 2 RISK WEIGHT: 505 RESOURCES FOR WORKPLACE MAINTENANCE

1	6	6	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
10	8	0	8	0	0	0	0	OVERHEAD	OVERHEAD	REQUESTED
12	40	40	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
13	12400	0	0	1000	3000	6000	2400	LINE ITEM	ER-AT	REQUESTED
3	4	4	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	5	5	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
4	2	2	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
5	1	1	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
6	10	10	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
9	2297	0	425	444	464	479	485	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	14773	68	433	1444	3464	6479	2885			

FINDING NUMBER: PP.2-1 PRIORITY: 2 RISK WEIGHT: 505 ORNL HEALTH AND SAFETY PROGRAM

4-5	1258	0	0	140	461	153	504	OVERHEAD	OVERHEAD	ONGOING
5	280	0	280	0	0	0	0	OVERHEAD	OVERHEAD	NEW
TOTALS:	1538	0	280	140	461	153	504			

FINDING NUMBER: PP.2-2 PRIORITY: 2 RISK WEIGHT: 415 WORKPLACE EXPSOURE MONITORING AND MEDICAL RECORDS

1	61	0	61	0	0	0	0	PROGRAM	ER-AT IH	REQUESTED
2	15	15	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	2	2	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
4	46	46	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	124	63	61	0	0	0	0			

FINDING NUMBER: PP.3-1 PRIORITY: 2 RISK WEIGHT: 68 HEALTH AND SAFETY CONCERNS

1	15	15	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
TOTALS:	15	15	0	0	0	0	0			

FINDING NUMBER: PP.3-2 PRIORITY: 2 RISK WEIGHT: 68 ORNL CONSTRUCTION OVERSIGHT PROGRAM

2	7	7	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	7	7	0	0	0	0	0			

FINDING NUMBER: PP.5-1 PRIORITY: 2 RISK WEIGHT: 418 HAZARD COMMUNICATION PROGRAM DEFICIENCIES

1	3	3	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
2	7	7	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	10	10	0	0	0	0	0			
FINDING NUMBER: PP.5-2 PRIORITY: 3 RISK WEIGHT: 13 HEALTH AND SAFETY PROGRAM DEFICIENCIES										
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: PP.5-3 PRIORITY: 2 RISK WEIGHT: 133 EXPLOSIVES SAFETY PROGRAM										
4	7	7	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
5	10	0	10	0	0	0	0	OVERHEAD	OVERHEAD	NEW
5	12	0	0	3	3	3	3	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	29	7	10	3	3	3	3			
FINDING NUMBER: PP.5-4 PRIORITY: 3 RISK WEIGHT: 5 IMPLEMENTATION OF INDUSTRIAL SAFETY PROGRAM										
3	15	15	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
TOTALS:	15	15	0	0	0	0	0			
FINDING NUMBER: PT.1-1 PRIORITY: 2 RISK WEIGHT: 534 FINANCE MATERIALS DIVISION STAFF										
ALL	1024	133	163	170	178	186	194	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	1024	133	163	170	178	186	194			
FINDING NUMBER: PT.1-2 PRIORITY: 2 RISK WEIGHT: 93 PACKAGING AND TRANSPORTATION PROCEDURES										
1	15	15	0	0	0	0	0	OVERHEAD	OVERHEAD	REQUESTED
2	75	75	0	0	0	0	0	OVERHEAD	OVERHEAD	REQUESTED
ALL	262	0	48	50	52	55	57	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	352	90	48	50	52	55	57			
FINDING NUMBER: PT.1-3 PRIORITY: 2 RISK WEIGHT: 93 PACKAGING AND TRANSPORTATION PROCEDURAL DOCUMENTS										
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: PT.1-4 PRIORITY: 2 RISK WEIGHT: 133 ORNL ONSITE TRANSPORTATION MANUAL										
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: PT.1-5 PRIORITY: 3 RISK WEIGHT: 5 CROSSOVER PACKAGING AND TRANSPORTATION RESPONSIBILITIES										
NONE	0	0	0	0	0	0	0			NONE

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: PT.1-6 PRIORITY: 3 RISK WEIGHT: 45 TRANSPORTATION PROGRAM										
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: PT.12-1 PRIORITY: 2 RISK WEIGHT: 414 HANDLING AND STORAGE OF HAZARDOUS MATERIALS										
1	100	100	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2	150	0	150	0	0	0	0	OVERHEAD	OVERHEAD	NEW
3	125	0	125	0	0	0	0	OVERHEAD	OVERHEAD	NEW
4	58	0	58	0	0	0	0	OVERHEAD	OVERHEAD	REQUESTED
5	94	0	94	0	0	0	0	OVERHEAD	OVERHEAD	NEW
6	50	0	50	0	0	0	0	OVERHEAD	OVERHEAD	NEW
7	150	75	75	0	0	0	0	OVERHEAD	OVERHEAD	NEW
8	5	5	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
TOTALS:	732	180	552	0	0	0	0			
FINDING NUMBER: PT.12-2 PRIORITY: 3 RISK WEIGHT: 8 PLANNING OF RADIOACTIVE MATERIALS PACKAGING NEEDS										
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: PT.12-3 PRIORITY: 3 RISK WEIGHT: 5 ABSENCE OF ONSITE TRANSFER PLAN										
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: PT.12-4 PRIORITY: 3 RISK WEIGHT: 5 CONFLICTING CONTAMINATION LIMITS										
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: PT.2-1 PRIORITY: 2 RISK WEIGHT: 133 HAZARDOUS MATERIALS TRANSPORTATION INFORMATION										
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: PT.3-1 PRIORITY: 3 RISK WEIGHT: 5 DIVISIONAL QA PACKAGING AND TRANSPORTATION PROCEDURES										
1	10	10	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2	5	0	5	0	0	0	0	OVERHEAD	OVERHEAD	NEW
2	28	0	5	5	6	6	6	OVERHEAD	OVERHEAD	ONGOING

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
TOTALS:	43	10	10	5	6	6	6			
FINDING NUMBER: PT.3-2			PRIORITY: 2	RISK WEIGHT: 30				TRANSPORTATION PROGRAM AUDITS		
1	9	9	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	9	9	0	0	0	0	0			
FINDING NUMBER: PT.6-1			PRIORITY: 2	RISK WEIGHT: 487				ONSITE TRANSPORT OF WASTE		
1	15	15	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
1	642	0	150	157	164	0	171	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	657	15	150	157	164	0	171			
FINDING NUMBER: PT.6-2			PRIORITY: 3	RISK WEIGHT: 5				LOW-LEVEL WASTE BOTTLE TESTING		
1	10	10	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	10	10	0	0	0	0	0			
FINDING NUMBER: PT.6-3			PRIORITY: 3	RISK WEIGHT: 40				INCONSISTENCY OF REGULATORY TERMINOLOGY		
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: PT.8-1			PRIORITY: 2	RISK WEIGHT: 58				SAFETY STANDARDS FOR VEHICLE IDENTIFICATION		
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: PT.8-2			PRIORITY: 2	RISK WEIGHT: 87				UNNECESSARY TRANSPORT OF HAZARDOUS MATERIALS		
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: PT.8-3			PRIORITY: 2	RISK WEIGHT: 133				ONSITE TRANSFERS OF HAZARDOUS MATERIALS		
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: PT.9-1			PRIORITY: 3	RISK WEIGHT: 5				CENTRAL FILE FOR OFFSITE SHIPPING DOCUMENTS		
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: PT.9-2			PRIORITY: 1	RISK WEIGHT: 607				TRAFFIC HAZARDS ON BETHEL VALLEY ROAD		
1-2	20	20	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	5	5	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
6	350	0	350	0	0	0	0	OVERHEAD	OVERHEAD	NEW

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
TOTALS:	375	25	350	0	0	0	0			
FINDING NUMBER: QA/BMPF-1 PRIORITY: 3 RISK WEIGHT: 9 QA/QC DEFICIENCIES IN THE MMES/ORNL ENVIRONMENTAL SAMPLING PROGRAMS										
7	235	0	235	0	0	0	0	PROGRAM	ER-AT EC	NEW
7	1006	0	0	235	246	257	268	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	1241	0	235	235	246	257	268			
FINDING NUMBER: QA/CF-1 PRIORITY: 2 RISK WEIGHT: 55 STANDARD OPERATING PROCEDURES DEFICIENCIES FOR SOME MMES/ORNL PROJECTS										
2	2	2	0	0	0	0	0	PROGRAM	ER-KC	FUNDED
2-3	22	0	4	4	4	5	5	PROGRAM	ER-KC	ONGOING
3	2	2	0	0	0	0	0	PROGRAM	ER-KC	FUNDED
TOTALS:	26	4	4	4	4	5	5			
FINDING NUMBER: QA/CF-2 PRIORITY: 3 RISK WEIGHT: 5 DEFICIENCIES WITH THE MMES ENVIRONMENTAL SURVEILLANCE PROCEDURES QUALITY CONTROL PROGRAM MANUAL										
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: QV.1-1 PRIORITY: 2 RISK WEIGHT: 60 RESOURCES TO APPLY QA FUNCTIONS										
4	85	85	0	0	0	0	0	PROGRAM	ER-KC	NEW
4	1396	0	255	267	279	291	304	PROGRAM	ER-KC	ONGOING
TOTALS:	1481	85	255	267	279	291	304			
FINDING NUMBER: QV.1-2 PRIORITY: 2 RISK WEIGHT: 63 LINE ORGANIZATIONS ARE NOT IMPLEMENTING THE QA PROGRAM										
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: QV.1-3 PRIORITY: 2 RISK WEIGHT: 55 QA DEPARTMENT AUDIT PROGRAM										
3	57	57	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
3	931	0	170	178	186	194	203	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	988	57	170	178	186	194	203			
FINDING NUMBER: QV.1-4 PRIORITY: 2 RISK WEIGHT: 55 INTERNAL AUDITS/SURVEILLANCES ARE INFREQUENTLY PERFORMED										
X-REF'	0	0	0	0	0	0	0	X	X	X

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: QV.1-5			PRIORITY: 2	RISK WEIGHT:			56	QA PLANS AND MANUALS DO NOT REFLECT SPECIFIC DOE REQUIREMENTS		
1	60	60	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
1	20	0	20	0	0	0	0	OVERHEAD	OVERHEAD	NEW
2	15	15	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	95	75	20	0	0	0	0			
FINDING NUMBER: QV.1-6			PRIORITY: 2	RISK WEIGHT:			94	CORRECTIVE ACTIONS ARE UNTIMELY AND INEFFECTIVE		
3	12	0	12	0	0	0	0	OVERHEAD	DIVISION	NEW
TOTALS:	12	0	12	0	0	0	0			
FINDING NUMBER: QV.2-1			PRIORITY: 2	RISK WEIGHT:			82	PROCUREMENT CONTROLS		
1	1	1	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
6	5	5	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
7	1	1	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
8	2	0	2	0	0	0	0	OVERHEAD	OVERHEAD	NEW
TOTALS:	9	7	2	0	0	0	0			
FINDING NUMBER: QV.3-1			PRIORITY: 2	RISK WEIGHT:			59	PROVISIONS FOR RECEIVING/INSTALLATION		
2	7	0	7	0	0	0	0	OVERHEAD	OVERHEAD	NEW
TOTALS:	7	0	7	0	0	0	0			
FINDING NUMBER: QV.4-1			PRIORITY: 2	RISK WEIGHT:			5	CALIBRATION FACILITIES		
1	12	12	0	0	0	0	0	CAPITAL	GPE-ER	NEW
2	5	5	0	0	0	0	0	OVERHEAD	DIVISION	NEW
TOTALS:	17	17	0	0	0	0	0			
FINDING NUMBER: QV.4-2			PRIORITY: 2	RISK WEIGHT:			56	CALIBRATIONS PROGRAM		
3	3	3	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	3	0	3	0	0	0	0	OVERHEAD	OVERHEAD	NEW
TOTALS:	6	3	3	0	0	0	0			
FINDING NUMBER: QV.5-1			PRIORITY: 2	RISK WEIGHT:			61	SAFETY-RELATED HARDWARE AND MATERIALS		
1	12	0	12	0	0	0	0	OVERHEAD	OVERHEAD	REQUESTED
1	30	30	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2	30	0	30	0	0	0	0	OVERHEAD	OVERHEAD	REQUESTED
3	188	0	188	0	0	0	0	OVERHEAD	OVERHEAD	REQUESTED
4	75	0	75	0	0	0	0	OVERHEAD	OVERHEAD	REQUESTED

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
TOTALS:	335	30	305	0	0	0	0			
FINDING NUMBER: QV.6-1		PRIORITY: 2		RISK WEIGHT:		62	QUALITY RELATED INSPECTIONS			
1	4	4	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2	7	7	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	2	0	2	0	0	0	0	OVERHEAD	OVERHEAD	NEW
TOTALS:	13	11	2	0	0	0	0			
FINDING NUMBER: QV.7-1		PRIORITY: 2		RISK WEIGHT:		58	SPECIAL PROCESS TRAINING			
1	50	50	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
1	437	0	80	84	87	91	95	OVERHEAD	OVERHEAD	ONGOING
2	6	6	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	493	56	80	84	87	91	95			
FINDING NUMBER: RAD/CF-1		PRIORITY: 2		RISK WEIGHT:		55	INADEQUATE RADIOLOGICAL DOSE ASSESSMENT			
1	6	6	0	0	0	0	0	OVERHEAD	OVERHEAD	REQUESTED
2	12	12	0	0	0	0	0	OVERHEAD	OVERHEAD	REQUESTED
3	12	12	0	0	0	0	0	OVERHEAD	OVERHEAD	REQUESTED
ALL	82	0	15	16	16	17	18	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	112	30	15	16	16	17	18			
FINDING NUMBER: RAD/CF-2		PRIORITY: 2		RISK WEIGHT:		65	INADEQUATE RADIOLOGICAL POSTINGS			
1	16	16	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2	8	8	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	225	0	0	225	0	0	0	PROGRAM	ER-AT RP	NEW
TOTALS:	249	24	0	225	0	0	0			
FINDING NUMBER: RAD/CF-3		PRIORITY: 2		RISK WEIGHT:		58	UNMONITORED DECONTAMINATION LAUNDRY DISCHARGES			
1	15	0	15	0	0	0	0	PROGRAM	ER-AT RP	NEW
1	22	0	0	5	5	6	6	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	37	0	15	5	5	6	6			
FINDING NUMBER: RAD/CF-4		PRIORITY: 2		RISK WEIGHT:		55	INADEQUATE CALIBRATION OF RADIOLOGICAL MONITORS			
5	10	10	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
5	28	0	5	5	6	6	6	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	38	10	5	5	6	6	6			
FINDING NUMBER: RAX.2-1		PRIORITY: 4		RISK WEIGHT:		5	RESIN CARRYOVER IN RESIN REGENERATIVE SYSTEM			
1	200	200	0	0	0	0	0	PROGRAM	EM-ADS350	FUNDED
2	1200	0	1200	0	0	0	0	CAPITAL	EM-GPP	REQUESTED

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
TOTALS:	1400	200	1200	0	0	0	0			
FINDING NUMBER: RAX.3-1		PRIORITY: 4		RISK WEIGHT:		1	CONTAMINATION OF THE HFIR POOL			
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RAX.4-1		PRIORITY: 2		RISK WEIGHT:		1	HFIR SPENT FUEL CASK NOT APPROVED BY DOE			
2	5	5	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
3	5	5	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
TOTALS:	10	10	0	0	0	0	0			
FINDING NUMBER: RCS.1-1		PRIORITY: 3		RISK WEIGHT:		55	MANAGEMENT OF CRITICALITY SAFETY PROGRAM			
3	135	20	21	22	23	24	25	PROGRAM	ER-KC03	ONGOING
TOTALS:	135	20	21	22	23	24	25			
FINDING NUMBER: RCS.1-2		PRIORITY: 3		RISK WEIGHT:		5	TIMELY RESOLUTION OF CRITICALITY SAFETY ISSUES			
3	25	25	0	0	0	0	0	PROGRAM	ER-KC03	NEW
TOTALS:	25	25	0	0	0	0	0			
FINDING NUMBER: RCS.5-1		PRIORITY: 3		RISK WEIGHT:		55	CRITICALITY ALARM SYSTEMS			
1	10	10	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
TOTALS:	10	10	0	0	0	0	0			
FINDING NUMBER: RCS.5-2		PRIORITY: 2		RISK WEIGHT:		55	DISTRIBUTION OF NUCLEAR ACCIDENT DOSIMETERS			
1	17	17	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2	5	5	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	16	16	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	88	0	16	17	18	18	19	OVERHEAD	OVERHEAD	ONGOING
4	9	9	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
5	1	1	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
6	7	7	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	143	55	16	17	18	18	19			
FINDING NUMBER: RCS.5-3		PRIORITY: 3		RISK WEIGHT:		55	PERFORMANCE OF CRITICALITY DRILLS			
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: REA.1-1		PRIORITY: 3		RISK WEIGHT:		5	SAFETY OVERVIEW OF BLDG. 7900			
4	428	0	0	100	105	109	114	PROGRAM	ER-KC03	ONGOING

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
TOTALS:	428	0	0	100	105	109	114			
FINDING NUMBER: REA.3-1		PRIORITY: 4		RISK WEIGHT:		5	UPDATING OF RESEARCH REACTORS EXPERIMENTER'S GUIDE			
2	20	20	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
3	10	0	10	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
TOTALS:	30	20	10	0	0	0	0			
FINDING NUMBER: REA.3-2		FRIORITY: 3		RISK WEIGHT:		0	VERIFICATION OF REACTOR EXPERIMENT CALCULATIONS			
3	8	8	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
4	2	0	2	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
TOTALS:	10	8	2	0	0	0	0			
FINDING NUMBER: REA.4-1		PRIORITY: 3		RISK WEIGHT:		8	CONTROL OF POTENTIAL PERSONNEL EXPOSURE			
1	5	5	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
TOTALS:	5	5	0	0	0	0	0			
FINDING NUMBER: REP.2-1		PRIORITY: 3		RISK WEIGHT:		85	HFIR EMERGENCY PREPAREDNESS PLANNING			
4	13	0	0	13	0	0	0	PROGRAM	ER-KC03	NEW
5	38	0	0	38	0	0	0	PROGRAM	ER-KC03	NEW
6	50	0	0	50	0	0	0	PROGRAM	ER-KC03	NEW
TOTALS:	101	0	0	101	0	0	0			
FINDING NUMBER: REP.3-1		PRIORITY: 3		RISK WEIGHT:		55	TRAINING OF DESIGNATED EMERGENCY RESPONDERS			
1	1	1	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
3	2	2	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
TOTALS:	3	3	0	0	0	0	0			
FINDING NUMBER: REP.5-1		PRIORITY: 2		RISK WEIGHT:		50	HFIR STACK RADIOLOGICAL EFFLUENT MONITORS			
1	3	3	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
10	6	6	0	0	0	0	0	PROGRAM	ER-KC03	NEW
11	13	0	13	0	0	0	0	CAPITAL	ER-KC03	NEW
12	250	0	250	0	0	0	0	CAPITAL	ER-KC03	NEW
13	150	0	150	0	0	0	0	CAPITAL	ER-KC03	NEW
14	75	0	75	0	0	0	0	CAPITAL	ER-KC03	NEW
2	13	13	0	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
3	13	13	0	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
5	15	15	0	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
6	25	25	0	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
8	75	75	0	0	0	0	0	PROGRAM	ER-KC03	NEW
8	75	0	75	0	0	0	0	CAPITAL	ER-KC03	NEW
9	6	6	0	0	0	0	0	PROGRAM	ER-KC03	NEW

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
TOTALS:	719	156	563	0	0	0	0			
FINDING NUMBER: REP.5-2 PRIORITY: 3 RISK WEIGHT: 55 EMERGENCY RESOURCES										
4	13	13	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
5	6	6	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
TOTALS:	19	19	0	0	0	0	0			
FINDING NUMBER: REP.6-1 PRIORITY: 3 RISK WEIGHT: 55 EMERGENCY ASSESSMENT AND NOTIFICATION PROCEDURES										
4	50	0	0	50	0	0	0	PROGRAM	ER-KC03	NEW
5	50	0	0	50	0	0	0	PROGRAM	ER-KC03	NEW
TOTALS:	100	0	0	100	0	0	0			
FINDING NUMBER: REP.7-1 PRIORITY: 3 RISK WEIGHT: 55 HFIR EMERGENCY PREPAREDNESS PLANNING										
1	1	1	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
2	2	2	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
3	2	2	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
3	2	0	2	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
4	1	1	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
5	1	1	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
6	1	1	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
6	1	0	1	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
TOTALS:	11	8	3	0	0	0	0			
FINDING NUMBER: RFP.1-1 PRIORITY: 2 RISK WEIGHT: 5 ORGANIZATION AND ADMINISTRATION OF FIRE PROTECTION PROGRAM										
2	3	0	3	0	0	0	0	OVERHEAD	OVERHEAD	NEW
3	3	0	3	0	0	0	0	OVERHEAD	OVERHEAD	NEW
TOTALS:	6	0	6	0	0	0	0			
FINDING NUMBER: RFP.4-1 PRIORITY: 2 RISK WEIGHT: 53 SPRINKLER SYSTEM IN BLDG 7902										
2	200	0	0	200	0	0	0	LINE ITEM	ER-KC ARIMS	NEW
3	600	0	0	600	0	0	0	LINE ITEM	ER-KC ARIMS	NEW
TOTALS:	800	0	0	800	0	0	0			
FINDING NUMBER: RFP.4-2 PRIORITY: 3 RISK WEIGHT: 50 SMOKE DETECTION SYSTEMS AT THE HFIR										
1	250	250	0	0	0	0	0	LINE ITEM	ER-KC ARIMS	FUNDED
1	100	0	100	0	0	0	0	LINE ITEM	ER-KC ARIMS	REQUESTED
2	350	0	250	100	0	0	0	LINE ITEM	ER-KC ARIMS	REQUESTED
TOTALS:	700	250	350	100	0	0	0			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: RFP.4-3		PRIORITY: 2		RISK WEIGHT:		53	USE OF PREACTION-TYPE SPRINKLERS			
1	175	175	0	0	0	0	0	LINE ITEM	ER-KC ARIMS	FUNDED
1	50	0	50	0	0	0	0	LINE ITEM	ER-KC ARIMS	REQUESTED
2	275	0	140	135	0	0	0	LINE ITEM	ER-KC ARIMS	REQUESTED
TOTALS:	500	175	190	135	0	0	0			
FINDING NUMBER: RFP.7-1		PRIORITY: 2		RISK WEIGHT:		51	DIKING AND FIRE-RESISTANT ENCLOSURES AT THE HFIR			
2	15	15	0	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
3	80	0	80	0	0	0	0	PROGRAM	ER-KC03	NEW
4	15	15	0	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
5	10	0	10	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
5	40	0	40	0	0	0	0	PROGRAM	ER-KC03	NEW
TOTALS:	160	30	130	0	0	0	0			
FINDING NUMBER: RFP.7-2		PRIORITY: 2		RISK WEIGHT:		50	POTENTIAL FIRE HAZARDS AT THE HFIR			
10	6	6	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
10	4	0	4	0	0	0	0	PROGRAM	ER-KC03	NEW
11	20	0	15	0	5	0	0	PROGRAM	ER-KC03	NEW
11	8	0	0	8	0	0	0	PROGRAM	ER-KC03	REQUESTED
2	3	3	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
2	2	0	2	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
3	1	1	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
3	3	0	3	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
4	1	1	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
4	5	0	5	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
5	4	4	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
6	4	0	2	2	0	0	0	PROGRAM	ER-KC03	REQUESTED
7	2	2	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
7	7	0	7	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
8	19	0	10	9	0	0	0	PROGRAM	ER-KC03	NEW
9	27	0	15	12	0	0	0	PROGRAM	ER-KC03	NEW
TOTALS:	116	17	63	31	5	0	0			
FINDING NUMBER: RFR.1-1		PRIORITY: 3		RISK WEIGHT:		5	TRAINING FOR UNREVIEWED SAFETY QUESTION DETERMINATIONS			
2	3	3	0	0	0	0	0	PROGRAM	ER-KC03	NEW
3	1	1	0	0	0	0	0	PROGRAM	ER-KC03	NEW
4	1	1	0	0	0	0	0	PROGRAM	ER-KC03	NEW
5	20	15	5	0	0	0	0	PROGRAM	ER-KC03	NEW
TOTALS:	25	20	5	0	0	0	0			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: RFR.1-2			PRIORITY: 4	RISK WEIGHT:		5	REVIEW BOARD FOR NUCLEAR SAFETY ASSESSMENTS			
2	37	37	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
TOTALS:	37	37	0	0	0	0	0			
FINDING NUMBER: RFR.4-1			PRIORITY: 4	RISK WEIGHT:		1	NEW FORMAT FOR WRITTEN REPORTS			
1	1	1	0	0	0	0	0	PROGRAM	ER-KC	NEW
2	1	0	1	0	0	0	0	PROGRAM	ER-KC	NEW
TOTALS:	2	1	1	0	0	0	0			
FINDING NUMBER: RMA.1-1			PRIORITY: 4	RISK WEIGHT:		0	CONTROL OF MAINTENANCE SUPPORT			
1	2	2	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
2	1	1	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
TOTALS:	3	3	0	0	0	0	0			
FINDING NUMBER: RMA.2-1			PRIORITY: 4	RISK WEIGHT:		5	TORQUING OF EQUIPMENT BOLTING			
1	2	2	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
TOTALS:	2	2	0	0	0	0	0			
FINDING NUMBER: RMA.2-2			PRIORITY: 2	RISK WEIGHT:		356	UNSAFE CONDITIONS AT THE B REACTOR FACILITIES			
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RMA.3-1			PRIORITY: 2	RISK WEIGHT:		403	MAINTENANCE OF B REACTOR AREAS			
2	10	10	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	5	5	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
4	2	2	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
5	5	5	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
6	180	0	0	0	180	0	0	OVERHEAD	OVERHEAD	NEW
7	405	60	63	66	69	72	75	OVERHEAD	OVERHEAD	ONGOING
8	100	0	0	25	25	50	0	OVERHEAD	OVERHEAD	NEW
TOTALS:	707	82	63	91	274	122	75			
FINDING NUMBER: RMA.3-2			PRIORITY: 3	RISK WEIGHT:		8	INSPECTION OF RRD MAINTENANCE ACTIVITIES			
2	110	90	20	0	0	0	0	PROGRAM	ER-KC03	NEW
3	100	100	0	0	0	0	0	PROGRAM	ER-KC03	NEW
3	2700	2700	0	0	0	0	0	LINE ITEM	ER-KC ARIMS	FUNDED
TOTALS:	2910	2890	20	0	0	0	0			
FINDING NUMBER: RMA.4-1			PRIORITY: 3	RISK WEIGHT:		5	OVERSIGHT OF MAINTENANCE SUPERVISORS			
1	806	120	125	131	137	143	150	PROGRAM	ER-KC03	ONGOING

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
TOTALS:	806	120	125	131	137	143	150			
FINDING NUMBER: RMA.5-1 PRIORITY: 2 RISK WEIGHT: 403 MAINTENANCE AT SHUT-DOWN REACTORS										
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RMA.8-1 PRIORITY: 3 RISK WEIGHT: 5 DEFICIENT PROCEDURAL INFORMATION										
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: ROA.1-1 PRIORITY: 2 RISK WEIGHT: 59 FUNDING FOR MAINTENANCE OF ORR										
1	933	443	490	0	0	0	0	PROGRAM	ER-AT	REQUESTED
1	621	382	239	0	0	0	0	PROGRAM	ER-AT	NEW
TOTALS:	1554	825	729	0	0	0	0			
FINDING NUMBER: ROA.1-2 PRIORITY: 3 RISK WEIGHT: 55 APPROVAL OF ORR SHUTDOWN PLANS										
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: ROA.1-3 PRIORITY: 3 RISK WEIGHT: 5 DECOMMISSIONING PLAN FOR HPRR										
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: ROA.1-4 PRIORITY: 3 RISK WEIGHT: 55 FUNDS FOR MAINTENANCE OF HPRR										
3	325	325	0	0	0	0	0	PROGRAM	ER-KP	REQUESTED
3	668	452	119	31	32	34	0	PROGRAM	ER-KP	NEW
3	35	0	0	0	0	0	35	PROGRAM	ER-KP	ONGOING
TOTALS:	1028	777	119	31	32	34	35			
FINDING NUMBER: ROA.1-5 PRIORITY: 3 RISK WEIGHT: 60 FUNDING FOR THE BULK SHIELDING FACILITY										
2	880	430	450	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
2	2106	118	147	575	660	606	0	PROGRAM	ER-KC03	NEW
2	636	0	0	0	0	0	636	PROGRAM	ER-KC03	ONGOING
TOTALS:	3622	548	597	575	660	606	636			
FINDING NUMBER: ROA.1-6 PRIORITY: 3 RISK WEIGHT: 55 STATUS OF THE BULK SHIELDING FACILITY										
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: ROA.1-7			PRIORITY: 3	RISK WEIGHT:		55	STATUS OF THE CEF "W" CELL			
4	80	0	80	0	0	0	0	PROGRAM	ER-KC03	NEW
TOTALS:	80	0	80	0	0	0	0			
FINDING NUMBER: ROA.1-8			PRIORITY: 3	RISK WEIGHT:		55	LINE MANAGEMENT RESPONSIBILITIES IN RRD			
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: ROA.1-9			PRIORITY: 4	RISK WEIGHT:		5	MANAGEMENT POSITION DESCRIPTIONS FOR RRD			
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: ROA.3-1			PRIORITY: 4	RISK WEIGHT:		5	PROGRAM TO INCREASE SAFETY			
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: ROA.6-1			PRIORITY: 3	RISK WEIGHT:		5	PERFORMANCE EVALUATIONS FOR SAFETY			
1	1	1	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
TOTALS:	1	1	0	0	0	0	0			
FINDING NUMBER: ROA.7-1			PRIORITY: 2	RISK WEIGHT:		80	HFIR FINAL SAFETY ANALYSIS REPORT			
2	25	25	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
3	10	10	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
5	3500	3500	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
5	2500	0	2500	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
5	900	0	900	0	0	0	0	PROGRAM	ER-KC03	NEW
TOTALS:	6935	3535	3400	0	0	0	0			
FINDING NUMBER: ROA.7-2			PRIORITY: 2	RISK WEIGHT:		55	UPDATING OF SAFETY ANALYSIS REPORTS FOR BSF AND PCA			
1	30	30	0	0	0	0	0	PROGRAM	NE-AF	FUNDED
3	400	0	75	125	100	100	0	PROGRAM	NE-AF	NEW
TOTALS:	430	30	75	125	100	100	0			
FINDING NUMBER: ROA.7-3			PRIORITY: 2	RISK WEIGHT:		80	UPDATING OF SAFETY ANALYSIS REPORT FOR TSF			
1	20	20	0	0	0	0	0	PROGRAM	NE-AF	FUNDED
3	300	0	0	100	100	50	50	PROGRAM	NE-AF	NEW
TOTALS:	320	20	0	100	100	50	50			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: ROA.7-4			PRIORITY: 3		RISK WEIGHT:		5	CONTROL OF DOCUMENTS		
1	21	21	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
2	5	5	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
2	5	0	5	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
3	1	1	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
3	1	0	1	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
TOTALS:	33	27	6	0	0	0	0			
FINDING NUMBER: ROA.7-5			PRIORITY: 2		RISK WEIGHT:		55	PROCEDURES		
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: ROA.8-1			PRIORITY: 4		RISK WEIGHT:		5	SUBSTANCE ABUSE PROGRAM		
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: ROP.2-1			PRIORITY: 3		RISK WEIGHT:		5	DEFICIENCIES IN HFIR OPERATING INSTRUCTIONS		
3	39	39	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
TOTALS:	39	39	0	0	0	0	0			
FINDING NUMBER: ROP.2-2			PRIORITY: 3		RISK WEIGHT:		5	TECHNICAL SPECIFICATIONS AT HFIR		
1	1	1	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
2	8	8	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
3	2	2	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
4	17	17	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
5	25	25	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
5	8	0	8	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
TOTALS:	61	53	8	0	0	0	0			
FINDING NUMBER: ROP.2-3			PRIORITY: 3		RISK WEIGHT:		5	AMBIGUITIES HFIR OPERATING INSTRUCTIONS		
3	55	55	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
TOTALS:	55	55	0	0	0	0	0			
FINDING NUMBER: ROP.2-4			PRIORITY: 3		RISK WEIGHT:		5	HFIR SHIFT CHECK SHEETS		
1	4	4	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
2	4	4	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
TOTALS:	8	8	0	0	0	0	0			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: ROP.2-5		PRIORITY: 4	RISK WEIGHT:		5	HFIR REACTOR LOG				
1	2	2	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
2	4	4	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
3	12	12	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
TOTALS:	18	18	0	0	0	0	0			
FINDING NUMBER: ROP.2-6		PRIORITY: 3	RISK WEIGHT:		5	HFIR CREW COMMUNICATIONS				
1	2	2	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
2	4	4	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
3	12	12	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
TOTALS:	18	18	0	0	0	0	0			
FINDING NUMBER: ROP.3-1		PRIORITY: 3	RISK WEIGHT:		5	HFIR OPERATING MANUAL				
2	20	20	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
2	7	0	7	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
TOTALS:	27	20	7	0	0	0	0			
FINDING NUMBER: ROP.3-2		PRIORITY: 3	RISK WEIGHT:		5	USE OF HFIR PROCEDURES				
1	5	5	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
2	9	9	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
3	9	9	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
4	18	18	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
TOTALS:	41	41	0	0	0	0	0			
FINDING NUMBER: ROP.3-3		PRIORITY: 4	RISK WEIGHT:		5	PREPARATION AND REVIEW OF HFIR OPERATING PROCEDURES				
2	80	0	50	30	0	0	0	PROGRAM	ER-KC03	NEW
3	120	0	10	110	0	0	0	PROGRAM	ER-KC03	NEW
TOTALS:	200	0	60	140	0	0	0			
FINDING NUMBER: ROP.4-1		PRIORITY: 3	RISK WEIGHT:		5	TAGGING PROCEDURES				
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: ROP.4-2		PRIORITY: 3	RISK WEIGHT:		5	RECORDS OF HFIR EQUIPMENT				
1	2	2	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
2	12	12	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
TOTALS:	14	14	0	0	0	0	0			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: RP.1-1		PRIORITY: 2		RISK WEIGHT:		68	ACCOMPLISHING ES&H COMPLIANCE			
1	23	23	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
2	2	2	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
3	10	10	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
4	10	10	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
5	11	11	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
6	6	6	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
7	4	4	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
TOTALS:	66	66	0	0	0	0	0			
FINDING NUMBER: RP.1-2		PRIORITY: 2		RISK WEIGHT:		95	ES&H COMPLIANCE STAFF			
1	8	8	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
3	4984	0	500	1048	1095	1145	1196	OVERHEAD	DIVISION	ONGOING
4	51	51	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
5	20	20	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
TOTALS:	5063	79	500	1048	1095	1145	1196			
FINDING NUMBER: RP.1-3		PRIORITY: 2		RISK WEIGHT:		73	MANAGEMENT OVERSIGHT			
2	107	107	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2	876	0	160	167	175	183	191	OVERHEAD	OVERHEAD	ONGOING
3	36	36	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
TOTALS:	1019	143	160	167	175	183	191			
FINDING NUMBER: RP.10-1		PRIORITY: 2		RISK WEIGHT:		77	POSITIVE CONTROL OF CONTAMINATION			
3	30	0	30	0	0	0	0	PROGRAM	ER-AT RP	REQUESTED
TOTALS:	30	0	30	0	0	0	0			
FINDING NUMBER: RP.10-2		PRIORITY: 2		RISK WEIGHT:		73	CONSISTENCY OF RADIATION PROTECTION POLICIES			
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RP.10-3		PRIORITY: 2		RISK WEIGHT:		58	CONTROL OF LAUNDRY WASTEWATER			
3	54	0	10	10	11	11	12	OVERHEAD	OVERHEAD	ONGOING
3	7	7	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
5	250	0	250	0	0	0	0	CAPITAL	GPP-ER	REQUESTED
TOTALS:	311	7	260	10	11	11	12			
FINDING NUMBER: RP.10-4		PRIORITY: 3		RISK WEIGHT:		13	REQUIREMENTS FOR LAUNDRY CONTAMINATION CONTROL			
1	15	15	0	0	0	0	0	PROGRAM	ER-AT RP	REQUESTED
2	8	8	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	40	0	40	0	0	0	0	CAPITAL	GPE-ER	REQUESTED

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
4	16000	0	0	2600	8000	5400	0	LINE ITEM	MGPF	REQUESTED
TOTALS:	16063	23	40	2600	8000	5400	0			
FINDING NUMBER: RP.11-1 PRIORITY: 2 RISK WEIGHT: 63 MANAGEMENT SUPPORT FOR ALARA										
1	2227	0	0	510	533	557	627	OVERHEAD	OVERHEAD	ONGOING
2	2	2	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
3	1	1	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
4	15	0	15	0	0	0	0	PROGRAM	ER-AT RP	NEW
TOTALS:	2245	3	15	510	533	557	627			
FINDING NUMBER: RP.12-1 PRIORITY: 2 RISK WEIGHT: 65 OCCUPATIONAL EXPOSURE RECORDS PROGRAM										
1	47	0	47	0	0	0	0	PROGRAM	ER-AT RP	NEW
TOTALS:	47	0	47	0	0	0	0			
FINDING NUMBER: RP.12-2 PRIORITY: 2 RISK WEIGHT: 60 REPORTING OF DOSIMETRY DATA										
1	15	15	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
2	27	0	5	5	5	6	6	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	42	15	5	5	5	6	6			
FINDING NUMBER: RP.12-3 PRIORITY: 2 RISK WEIGHT: 108 CONTROL OF OCCUPATIONAL EXPOSURE RECORDS										
1	225	0	225	0	0	0	0	PROGRAM	ER-AT RP	NEW
2	30	0	30	0	0	0	0	PROGRAM	ER-AT RP	NEW
4	127	0	127	0	0	0	0	PROGRAM	ER-AT RP	NEW
4	123	0	0	23	24	51	25	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	505	0	382	23	24	51	25			
FINDING NUMBER: RP.3-1 PRIORITY: 2 RISK WEIGHT: 73 ORNL POSTING AND CONTAMINATION PROGRAM										
1	5	5	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
2	23	23	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
TOTALS:	28	28	0	0	0	0	0			
FINDING NUMBER: RP.3-2 PRIORITY: 3 RISK WEIGHT: 8 CONTAMINATION CONTROL PROGRAM										
1	21	0	21	0	0	0	0	OVERHEAD	DIVISION	NEW
1	1019	0	0	238	249	260	272	OVERHEAD	DIVISION	ONGOING
2	32	32	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
TOTALS:	1072	32	21	238	249	260	272			
FINDING NUMBER: RP.3-3 PRIORITY: 3 RISK WEIGHT: 16 SOURCE CONTROL PROGRAM										
3	17	17	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
4	21	21	0	0	0	0	0	PROGRAM	ER-AT RP	NEW

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
4	38	0	7	7	8	8	8	OVERHEAD	DIVISION	ONGOING
TOTALS:	76	38	7	7	8	8	8			

FINDING NUMBER: RP.3-4 PRIORITY: 3 RISK WEIGHT: 6 X-RAY GENERATING MACHINE POLICY AND REQUIREMENTS

5	6	0	2	0	0	2	2	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	6	0	2	0	0	2	2			

FINDING NUMBER: RP.3-5 PRIORITY: 3 RISK WEIGHT: 6 ACCELERATOR POLICY REQUIREMENTS AND OVERSIGHT

X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			

FINDING NUMBER: RP.3-6 PRIORITY: 2 RISK WEIGHT: 63 MATERIAL CLEARANCE

1	2	2	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
10	2	2	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
11	1200	0	1200	0	0	0	0	CAPITAL	GPP-ER	NEW
12	115	115	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
12	958	0	175	183	191	200	209	OVERHEAD	OVERHEAD	ONGOING
13	15	15	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
14	40	0	40	0	0	0	0	PROGRAM	ER-AT RP	NEW
2	15	15	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
3	17	17	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
5	5	5	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
6	1	1	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
8	5	5	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
9	75	75	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
TOTALS:	2450	252	1415	183	191	200	209			

FINDING NUMBER: RP.3-7 PRIORITY: 2 RISK WEIGHT: 65 DOCUMENTATION OF RADIATION HAZARDS

3	15	15	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
TOTALS:	15	15	0	0	0	0	0			

FINDING NUMBER: RP.5-1 PRIORITY: 2 RISK WEIGHT: 55 PERSONNEL NUCLEAR ACCIDENT DOSIMETERS

1	57	57	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	31	31	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
4	14	14	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
5	1	1	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	103	103	0	0	0	0	0			

FINDING NUMBER: RP.5-2 PRIORITY: 3 RISK WEIGHT: 10 DIRECT-READING DOSIMETERS

1	6	6	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
2	11	11	0	0	0	0	0	PROGRAM	ER-AT RP	REQUESTED
TOTALS:	17	17	0	0	0	0	0			
FINDING NUMBER: RP.6-1			PRIORITY: 2	RISK WEIGHT:		63	AIR SAMPLES			
1	23	0	23	0	0	0	0	OVERHEAD	OVERHEAD	NEW
2	8	0	8	0	0	0	0	OVERHEAD	OVERHEAD	NEW
3	75	75	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
5	15	0	15	0	0	0	0	OVERHEAD	OVERHEAD	NEW
6	18700	0	0	18700	0	0	0	LINE ITEM	ER-AT	REQUESTED
TOTALS:	18821	75	46	18700	0	0	0			
FINDING NUMBER: RP.6-2			PRIORITY: 3	RISK WEIGHT:		5	TIMELINESS OF AIR SAMPLING PROGRAM			
1	23	0	23	0	0	0	0	PROGRAM	ER-AT RP	NEW
2	33	0	25	8	0	0	0	PROGRAM	ER-AT RP	NEW
TOTALS:	56	0	48	8	0	0	0			
FINDING NUMBER: RP.6-3			PRIORITY: 3	RISK WEIGHT:		8	SURVEYING PERSONNEL FOR CONTAMINATION			
1	57	57	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
2	30	30	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
3	70	0	70	0	0	0	0	PROGRAM	ER-AT RP	NEW
TOTALS:	157	87	70	0	0	0	0			
FINDING NUMBER: RP.7-1			PRIORITY: 2	RISK WEIGHT:		58	INTERNAL RADIATION DOSIMETRY PROGRAM			
1	80	0	80	0	0	0	0	PROGRAM	ER-AT RP	NEW
3	285	0	285	0	0	0	0	PROGRAM	ER-AT RP	NEW
5	112	0	112	0	0	0	0	PROGRAM	ER-AT RP	NEW
5	345	20	325	0	0	0	0	CAPITAL	ER-KC ARIMS	NEW
6	70	0	70	0	0	0	0	PROGRAM	ER-AT RP	NEW
7	41000	0	0	41000	0	0	0	LINE ITEM	ER-AT	NEW
TOTALS:	41892	20	872	41000	0	0	0			
FINDING NUMBER: RP.7-2			PRIORITY: 2	RISK WEIGHT:		58	IN VIVO CALIBRATIONS			
2	12	0	12	0	0	0	0	PROGRAM	ER-AT RP	NEW
3	15	0	15	0	0	0	0	PROGRAM	ER-AT RP	NEW
5	7	7	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
TOTALS:	34	7	27	0	0	0	0			
FINDING NUMBER: RP.8-1			PRIORITY: 2	RISK WEIGHT:		61	RADIATION PROTECTION INSTRUMENT PROGRAM			
1	15	15	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
2	15	0	15	0	0	0	0	PROGRAM	ER-AT RP	REQUESTED
3	675	0	675	0	0	0	0	PROGRAM	ER-AT RP	REQUESTED

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
TOTALS:	705	15	690	0	0	0	0			
FINDING NUMBER: RP.8-2 PRIORITY: 2 RISK WEIGHT: 56 APPROVAL OF RADIATION PROTECTION INSTRUMENTS										
1	2	2	0	0	0	0	0	PROGRAM	ER-AT RP	REQUESTED
2	6	6	0	0	0	0	0	PROGRAM	ER-AT RP	REQUESTED
3	33	33	0	0	0	0	0	PROGRAM	ER-AT RP	REQUESTED
4	20	20	0	0	0	0	0	PROGRAM	ER-AT RP	REQUESTED
5	225	0	225	0	0	0	0	PROGRAM	ER-AT RP	NEW
TOTALS:	286	61	225	0	0	0	0			
FINDING NUMBER: RP.8-3 PRIORITY: 2 RISK WEIGHT: 56 TESTING OF SAFETY RELATED INSTRUMENTS										
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RP.8-4 PRIORITY: 2 RISK WEIGHT: 58 HIGH RANGE RADIATION PROTECTION INSTRUMENTATION										
3	400	0	400	0	0	0	0	PROGRAM	ER-AT RP	REQUESTED
4	118	0	118	0	0	0	0	PROGRAM	ER-AT RP	REQUESTEI
TOTALS:	518	0	518	0	0	0	0			
FINDING NUMBER: RP.8-5 PRIORITY: 4 RISK WEIGHT: 5 RADIATION PROTECTION INSTRUMENTATION PROGRAM										
1	30	30	0	0	0	0	0	PROGRAM	ER-AT RP	NEW
TOTALS:	30	30	0	0	0	0	0			
FINDING NUMBER: RPP.1-1 PRIORITY: 2 RISK WEIGHT: 0 REVIEW OF RRD										
1	4	4	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2	2	2	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	11	11	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	164	0	30	31	33	34	36	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	181	17	30	31	33	34	36			
FINDING NUMBER: RPP.2-1 PRIORITY: 2 RISK WEIGHT: 55 ORNL SAFETY MANUAL										
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RPP.2-2 PRIORITY: 3 RISK WEIGHT: 5 SAFETY PERSONNEL INVOLVEMENT WITH SAFETY WORK PERMITS										
1	5	5	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	5	5	0	0	0	0	0			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: RPP.2-3 PRIORITY: 3 RISK WEIGHT: 5 UPDATING OF RRD MANUALS										
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RPP.2-4 PRIORITY: 2 RISK WEIGHT: 405 ORNL HOISTING AND RIGGING EQUIPMENT										
1	2	2	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
2	2	2	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
3	4	4	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
ALL	22	0	4	4	4	5	5	PROGRAM	ER-KC03	ONGOING
TOTALS:	30	8	4	4	4	5	5			
FINDING NUMBER: RPP.3-1 PRIORITY: 2 RISK WEIGHT: 356 INDUSTRIAL SAFETY AT TSF										
1	1	1	0	0	0	0	0	PROGRAM	NE-AF20	FUNDED
10	5	5	0	0	0	0	0	PROGRAM	NE-AF20	FUNDED
14	50	0	0	50	0	0	0	PROGRAM	NE-AF20	NEW
2	1	1	0	0	0	0	0	PROGRAM	NE-AF20	FUNDED
3	1	1	0	0	0	0	0	PROGRAM	NE-AF20	FUNDED
6	1	1	0	0	0	0	0	PROGRAM	NE-AF20	FUNDED
7	2	2	0	0	0	0	0	PROGRAM	NE-AF20	FUNDED
8	26	26	0	0	0	0	0	PROGRAM	NE-AF20	FUNDED
9	10	10	0	0	0	0	0	PROGRAM	NE-AF20	FUNDED
TOTALS:	97	47	0	50	0	0	0			
FINDING NUMBER: RPP.3-2 PRIORITY: 2 RISK WEIGHT: 50 CARCINOGENS IN RRD FACILITIES										
8	40	0	20	20	0	0	0	PROGRAM	ER-KC03	NEW
TOTALS:	40	0	20	20	0	0	0			
FINDING NUMBER: RPP.3-3 PRIORITY: 3 RISK WEIGHT: 55 ORNL ELECTRICAL PROGRAM										
3	3	3	0	0	0	0	0	OVERHEAD	DIVISION	FUNDED
5	44	0	8	8	9	9	10	OVERHEAD	DIVISION	ONGOING
TOTALS:	47	3	8	8	9	9	10			
FINDING NUMBER: RPP.4-1 PRIORITY: 2 RISK WEIGHT: 53 RRD MONITORING PROGRAM										
1	4	4	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2	47	47	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2	284	0	52	54	57	59	62	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	335	51	52	54	57	59	62			
FINDING NUMBER: RPP.5-1 PRIORITY: 2 RISK WEIGHT: 353 HAZCOM PROGRAM AT RRD										
X-REF'	0	0	0	0	0	0	0	X	X	X

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RQV.1-1 PRIORITY: 3 RISK WEIGHT: 55 RRD QUALITY ASSURANCE PROGRAM MANUAL										
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RQV.1-10 PRIORITY: 3 RISK WEIGHT: 55 DATA BASE TRENDING SYSTEM										
2	10	0	0	10	0	0	0	PROGRAM	ER-KC03	NEW
3	10	0	0	10	0	0	0	PROGRAM	ER-KC03	NEW
4	10	0	0	10	0	0	0	PROGRAM	ER-KC03	NEW
TOTALS:	30	0	0	30	0	0	0			
FINDING NUMBER: RQV.1-11 PRIORITY: 3 RISK WEIGHT: 5 OCCURRENCE REPORTING SYSTEM										
2	1	1	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
3	5	0	5	0	0	0	0	PROGRAM	ER-KC03	NEW
4	5	0	5	0	0	0	0	PROGRAM	ER-KC03	NEW
TOTALS:	11	1	10	0	0	0	0			
FINDING NUMBER: RQV.1-2 PRIORITY: 3 RISK WEIGHT: 50 MANAGEMENT ASSESSMENT OF RRD										
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RQV.1-3 PRIORITY: 3 RISK WEIGHT: 5 IMPLEMENTING RRD PROCEDURES										
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RQV.1-4 PRIORITY: 3 RISK WEIGHT: 55 THOROUGHNESS OF PROCEDURES										
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RQV.1-5 PRIORITY: 3 RISK WEIGHT: 55 REVISION OF PROCEDURES										
3	547	0	100	105	109	114	119	PROGRAM	ER-KC03	ONGOING
TOTALS:	547	0	100	105	109	114	119			
FINDING NUMBER: RQV.1-6 PRIORITY: 3 RISK WEIGHT: 55 FREQUENCY OF RRD QA AUDITS										
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: RQV.1-7 PRIORITY: 4 RISK WEIGHT: 5 METHOD OF QUESTIONING RRD QA AUDITS										
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RQV.1-8 PRIORITY: 3 RISK WEIGHT: 55 RRD CORRECTIVE ACTION PROGRAM										
4	60	0	30	30	0	0	0	PROGRAM	ER-KC03	NEW
5	170	0	85	85	0	0	0	PROGRAM	ER-KC03	NEW
TOTALS:	230	0	115	115	0	0	0			
FINDING NUMBER: RQV.1-9 PRIORITY: 4 RISK WEIGHT: 5 CONFLICTING GOALS IN RRD										
1-3	10	10	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
TOTALS:	10	10	0	0	0	0	0			
FINDING NUMBER: RQV.2-1 PRIORITY: 3 RISK WEIGHT: 5 JUSTIFICATION OF PRODCUREMENT DEVIATIONS										
3	5	5	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
6	1	1	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
6	20	0	0	20	0	0	0	PROGRAM	ER-KC03	NEW
TOTALS:	26	6	0	20	0	0	0			
FINDING NUMBER: RQV.2-2 PRIORITY: 3 RISK WEIGHT: 55 PURCHASE ORDER AND QUALITY REQUIREMENTS										
1	6	6	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
TOTALS:	6	6	0	0	0	0	0			
FINDING NUMBER: RQV.3-1 PRIORITY: 3 RISK WEIGHT: 6 ADEQUACY OF INSPECTIONS										
1	25	25	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
1	5	0	5	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
2	2	2	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
TOTALS:	32	27	5	0	0	0	0			
FINDING NUMBER: RQV.3-2 PRIORITY: 3 RISK WEIGHT: 0 DOCUMENTATION OF "USE-AS-IS" CLASSIFICATION										
2	10	0	10	0	0	0	0	PROGRAM	ER-KC03	NEW
3	1	0	1	0	0	0	0	PROGRAM	ER-KC03	NEW
4	10	0	10	0	0	0	0	PROGRAM	ER-KC03	NEW
TOTALS:	21	0	21	0	0	0	0			
FINDING NUMBER: RQV.4-1 PRIORITY: 3 RISK WEIGHT: 6 DOCUMENTATION OF ACCEPTANCE INSPECTIONS										
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: RQV.4-2			PRIORITY: 3		RISK WEIGHT:		50	MEASUREMENT AND TEST EQUIPMENT CALIBRATIONS		
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RQV.4-3			PRIORITY: 3		RISK WEIGHT:		50	USE OF UNCONTROLLED AND UNCALIBRATED INSTRUMENTS		
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RQV.4-4			PRIORITY: 3		RISK WEIGHT:		50	DETERMINING EFFECTS OF OUT-OF-TOLERANCE EQUIPMENT		
3	60	0	0	60	0	0	0	PROGRAM	ER-KC03	NEW
TOTALS:	60	0	0	60	0	0	0			
FINDING NUMBER: RQV.5-1			PRIORITY: 4		RISK WEIGHT:		5	JUSTIFICATION OF DEVIATIONS AND NONCONFORMANCES		
2	3	3	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
TOTALS:	3	3	0	0	0	0	0			
FINDING NUMBER: RQV.5-2			PRIORITY: 3		RISK WEIGHT:		51	TRENDING OF NONCONFORMING ITEMS		
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RQV.5-3			PRIORITY: 3		RISK WEIGHT:		50	IDENTIFICATION AND STORAGE OF PARTS AND MATERIAL		
4	602	0	110	115	120	126	131	PROGRAM	ER-KC03	ONGOING
6	20	20	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
6	10	0	10	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
8	20	0	20	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
TOTALS:	652	20	140	115	120	126	131			
FINDING NUMBER: RQV.5-4			PRIORITY: 3		RISK WEIGHT:		50	EVALUATING UNREVIEWED SAFETY QUESTIONS		
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RQV.6-1			PRIORITY: 3		RISK WEIGHT:		51	INSPECTION REPORTS		
2	15	0	0	15	0	0	0	PROGRAM	NE-AF	NEW
3	15	0	0	15	0	0	0	PROGRAM	NE-AF	NEW
TOTALS:	30	0	0	30	0	0	0			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: RQV.7-1			PRIORITY: 3		RISK WEIGHT:		50	CONTROL OF SPECIAL PROCESS MATERIAL		
2	10	10	0	0	0	0	0	PROGRAM	NE-AF	NEW
3	10	10	0	0	0	0	0	PROGRAM	NE-AF	NEW
4	10	10	0	0	0	0	0	PROGRAM	NE-AF	NEW
5	5	5	0	0	0	0	0	PROGRAM	NE-AF	NEW
6	5	5	0	0	0	0	0	PROGRAM	NE-AF	NEW
TOTALS:	40	40	0	0	0	0	0			
FINDING NUMBER: RQV.7-2			PRIORITY: 3		RISK WEIGHT:		50	SPECIAL PROCESS PROCEDURES		
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RRP.10-1			PRIORITY: 3		RISK WEIGHT:		5	CONTROL OF LOW-LEVEL CONTAMINATION		
1	65	0	60	5	0	0	0	CAPITAL	ER-KC03	NEW
5	20	20	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
5	5	0	5	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
TOTALS:	90	20	65	5	0	0	0			
FINDING NUMBER: RRP.10-2			PRIORITY: 3		RISK WEIGHT:		5	WASTE MINIMIZATION		
1	7	7	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
2	9	9	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
3	9	9	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
TOTALS:	25	25	0	0	0	0	0			
FINDING NUMBER: RRP.11-1			PRIORITY: 3		RISK WEIGHT:		5	ADDRESSING ALARA ISSUES		
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RRP.3-1			PRIORITY: 3		RISK WEIGHT:		50	SOURCE CONTROL		
1	7	7	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2	12	12	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	19	19	0	0	0	0	0			
FINDING NUMBER: RRP.3-2			PRIORITY: 4		RISK WEIGHT:		5	RADIOACTIVE SOURCE INVENTORIES		
2	1	1	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
3	3	3	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
4	1	1	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
TOTALS:	5	5	0	0	0	0	0			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: RRP.4-1			PRIORITY: 3	RISK WEIGHT:		55	POSTINGS OF RADIOLOGICAL CONDITIONS			
3	25	20	5	0	0	0	0	PROGRAM	ER-KC03	NEW
TOTALS:	25	20	5	0	0	0	0			
FINDING NUMBER: RRP.4-2			PRIORITY: 2	RISK WEIGHT:		6	RADIOLOGICAL CONTROLS IN THE EXPERIMENT AREA			
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RRP.8-1			PRIORITY: 3	RISK WEIGHT:		50	INSTRUMENTS			
X-REF'	0	0	0	0	0	0	0 X	X		X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RSS.1-1			PRIORITY: 3	RISK WEIGHT:		55	NEW SAFEGUARDS AND SECURITY ELEMENTS			
2	40	20	20	0	0	0	0	OVERHEAD	OVERHEAD	NEW
TOTALS:	40	20	20	0	0	0	0			
FINDING NUMBER: RSS.3-1			PRIORITY: 2	RISK WEIGHT:		105	ANALYSES TO DETERMINE APPROPRIATE WEAPONS			
4	40	0	40	0	0	0	0	OVERHEAD	OVERHEAD	NEW
TOTALS:	40	0	40	0	0	0	0			
FINDING NUMBER: RSS.4-1			PRIORITY: 3	RISK WEIGHT:		105	SAFETY APPRAISALS AND AUDITS FOR FIREARMS			
2	67	10	10	11	11	12	13	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	67	10	10	11	11	12	13			
FINDING NUMBER: RTC.1-1			PRIORITY: 3	RISK WEIGHT:		55	POSITION TASK ANALYSES			
2	80	80	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
3	210	210	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
TOTALS:	290	290	0	0	0	0	0			
FINDING NUMBER: RTC.1-2			PRIORITY: 4	RISK WEIGHT:		55	CLASS B REACTOR TRAINING PLAN			
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RTC.1-3			PRIORITY: 3	RISK WEIGHT:		55	INSTRUCTORS FOR MAINTENANCE TRAINING			
X-REF'	0	0	0	0	0	0	0 X	X		X
TOTALS:	0	0	0	0	0	0	0			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: RTC.10-1 PRIORITY: 3 RISK WEIGHT: 55 TRAINING FOR MANAGERS, SUPERVISORS, AND TECHNICAL STAFF										
1	134	0	134	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
TOTALS:	134	0	134	0	0	0	0			
FINDING NUMBER: RTC.2-1 PRIORITY: 4 RISK WEIGHT: 5 EXAMINATIONS FOR OPERATOR AND REACTOR SUPERVISOR TRAINING										
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RTC.4-1 PRIORITY: 3 RISK WEIGHT: 55 GENERAL EMPLOYEE ACCESS TRAINING										
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RTC.5-1 PRIORITY: 3 RISK WEIGHT: 55 MAINTENANCE PERSONNEL TRAINING PROGRAM										
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RTC.5-2 PRIORITY: 3 RISK WEIGHT: 55 TRAINING FACILITIES FOR MAINTENANCE PERSONNEL										
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RTS.1-1 PRIORITY: 3 RISK WEIGHT: 5 TECHNICAL SUPPORT FOR RRD TASKS										
2	1806	0	330	345	360	377	394	PROGRAM	ER-KC03	ONGOING
TOTALS:	1806	0	330	345	360	377	394			
FINDING NUMBER: RTS.1-2 PRIORITY: 3 RISK WEIGHT: 6 BACKUP FOR RRD STAFF										
1	685	0	0	160	167	175	183	PROGRAM	ER-KC03	ONGOING
TOTALS:	685	0	0	160	167	175	183			
FINDING NUMBER: RTS.2-1 PRIORITY: 3 RISK WEIGHT: 55 CONSISTENCY OF TECHNICAL SPECIFICATIONS AND PROCEDURES										
3	40	30	10	0	0	0	0	PROGRAM	ER-KC03	NEW
4	10	0	10	0	0	0	0	PROGRAM	ER-KC03	NEW
TOTALS:	50	30	20	0	0	0	0			
FINDING NUMBER: RTS.2-2 PRIORITY: 2 RISK WEIGHT: 80 SAFETY ANALYSIS REPORTS FOR HFIR AND TSF										
X-REF'	0	0	0	0	0	0	0	X	X	X

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RTS.3-1 PRIORITY: 3 RISK WEIGHT: 55 FACILITY DESIGN MODIFICATIONS										
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RTS.3-2 PRIORITY: 4 RISK WEIGHT: 5 CONFIGURATION CONTROL OF PLANT DESIGN MODIFICATION										
1	1	1	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
TOTALS:	1	1	0	0	0	0	0			
FINDING NUMBER: RTS.3-3 PRIORITY: 3 RISK WEIGHT: 55 DRAWING CHANGES FOR THE HFIR										
3	15	15	0	0	0	0	0	PROGRAM	ER-KC03	FUNDED
TOTALS:	15	15	0	0	0	0	0			
FINDING NUMBER: RTS.4-1 PRIORITY: 4 RISK WEIGHT: 5 EQUIPMENT PERFORMANCE TRACKING										
1	30	0	30	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
3	30	0	30	0	0	0	0	PROGRAM	ER-KC03	REQUESTED
4	15	0	0	15	0	0	0	PROGRAM	ER-KC03	NEW
TOTALS:	75	0	60	15	0	0	0			
FINDING NUMBER: RTS.5-1 PRIORITY: 2 RISK WEIGHT: 390 ENVIRONMENTAL IMPACT										
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: RTS.7-1 PRIORITY: 4 RISK WEIGHT: 5 REACTOR ENGINEERING FUNCTION AT HFIR AND TSF										
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: SA-1 PRIORITY: 3 RISK WEIGHT: 138 THE ORNL SELF ASSESSMENT PROCESS										
1	35	35	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
10	9	0	9	0	0	0	0	OVERHEAD	DIVISION	NEW
10	21	0	0	5	5	5	6	OVERHEAD	DIVISION	ONGOING
2	14	14	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	8	8	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	7	7	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
6	2670	0	488	510	533	557	582	OVERHEAD	OVERHEAD	ONGOING
6	3643	0	666	696	727	760	794	OVERHEAD	DIVISION	ONGOING
TOTALS:	6407	64	1163	1211	1265	1322	1382			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: SS.1-1 PRIORITY: 2 RISK WEIGHT: 112 ANALYSIS OF PROTECTIVE FORCE EQUIPMENT										
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: SSB/BMPF-1 PRIORITY: 2 RISK WEIGHT: 108 INADEQUATE RADIOACTIVE CONTAMINATION CONTROL										
1	24	24	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
4	30	0	30	0	0	0	0	OVERHEAD	OVERHEAD	NEW
4	1500	0	1500	0	0	0	0	PROGRAM	EM-	NEW
TOTALS:	1554	24	1530	0	0	0	0			
FINDING NUMBER: SSB/BMPF-2 PRIORITY: 3 RISK WEIGHT: 5 DELAYED BENTHIC DATA ANALYSES AND REPORTING										
1	50	50	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	150	0	150	0	0	0	0	PROGRAM	ER-AT EC	REQUESTED
4	75	0	0	75	0	0	0	PROGRAM	ER-AT EC	REQUESTED
TOTALS:	275	50	150	75	0	0	0			
FINDING NUMBER: SW/BMPF-1 PRIORITY: 3 RISK WEIGHT: 121 INADEQUATE ORNL CROSS-CONNECTIONS STUDY										
1	24	0	24	0	0	0	0	OVERHEAD	OVERHEAD	REQUESTED
2	3900	0	0	3900	0	0	0	PROGRAM	ER-AT EC	NEW
TOTALS:	3924	0	24	3900	0	0	0			
FINDING NUMBER: SW/BMPF-2 PRIORITY: 1 RISK WEIGHT: 103 LIQUID RADIONUCLIDE RELEASES FROM ORNL FACILITIES										
1	110	110	0	0	0	0	0	PROGRAM	EM-ADS350,366	FUNDED
2	110	0	45	35	30	0	0	PROGRAM	EM-ADS350,366	REQUESTED
2	1000	0	1000	0	0	0	0	CAPITAL	EM-ADS366	REQUESTED
3	75	0	75	0	0	0	0	OVERHEAD	OVERHEAD	NEW
4	75	0	75	0	0	0	0	OVERHEAD	OVERHEAD	NEW
TOTALS:	1370	110	1195	35	30	0	0			
FINDING NUMBER: SW/BMPF-3 PRIORITY: 3 RISK WEIGHT: 6 LACK OF BACKFLOW PREVENTION DEVICES										
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: SW/BMPF-4 PRIORITY: 1 RISK WEIGHT: 49 UNREPAIRED LEAKS FROM WATERWATER SEWER SYSTEMS										
1	5026	5026	0	0	0	0	0	PROGRAM	EM-ADS302,304,378	FUNDED
1	60032	0	6840	16722	11490	8540	16440	PROGRAM	EM-ADS302,304,378	REQUESTED
1	7081	7081	0	0	0	0	0	LINE ITEM	EM-ADS302,304,378	FUNDED
1	121147	0	4647	15900	26500	39100	35000	LINE ITEM	EM-ADS302,304,378	REQUESTED
1	20	20	0	0	0	0	0	PROGRAM	EM-ADS350	FUNDED
1	80	0	40	40	0	0	0	PROGRAM	EM-ADS350	REQUESTED

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
1	500	500	0	0	0	0	0	CAPITAL	EM-ADS350 GPP	FUNDED
1	500	0	100	200	100	100	0	PROGRAM	ER-AT	REQUESTED
2	10	10	0	0	0	0	0	PROGRAM	EM-ADS302,304,378	FUNDED
2	50	0	10	10	10	10	10	PROGRAM	EM-ADS302,304,378	REQUESTED
2	410	0	200	100	80	30	0	PROGRAM	EM-ADS350	REQUESTED
2	1400	0	0	1400	0	0	0	CAPITAL	EM-ADS350 GPP	REQUESTED
3	30	0	0	0	0	30	0	PROGRAM	EM-ADS350	REQUESTED
ALL	21650	0	6650	3000	4000	4000	4000	CAPITAL	EM-ADS349,350,378	REQUESTED
ALL	11000	0	0	2000	5000	4000	0	LINE ITEM	MGPF	REQUESTED
TOTALS:	228936	12637	18487	39372	47180	55810	55450			

FINDING NUMBER: SW/BMPF-5 PRIORITY: 4 RISK WEIGHT: 1 LACK OF CERTIFICATION OF TREATMENT PLANT OPERATORS AND BACKFLOW PREVENTER REPAIRERS

3	6	0	3	3	0	0	0	OVERHEAD	OVERHEAD	NEW
3	3	3	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
4	4	4	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
4	21	0	4	4	4	4	5	OVERHEAD	OVERHEAD	NEW
5	330	0	60	63	66	69	72	OVERHEAD	OVERHEAD	NEW
TOTALS:	364	7	67	70	70	73	77			

FINDING NUMBER: SW/CF-1 PRIORITY: 2 RISK WEIGHT: 448 DISCHARGES NOT INCLUDED ON THE ORNL NPDES PERMIT OR PERMIT RENEWAL

ALL	12	12	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
ALL	90	0	0	0	90	0	0	OVERHEAD	OVERHEAD	NEW
ALL	90	90	0	0	0	0	0	OVERHEAD	DIVISION	NEW
TOTALS:	192	102	0	0	90	0	0			

FINDING NUMBER: SW/CF-2 PRIORITY: 3 RISK WEIGHT: 20 INCONSISTENT LABELING OF ORNL SINKS AND DRAINS

1-2	12	12	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	53	53	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
3	44	0	8	8	9	9	10	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	109	65	8	8	9	9	10			

FINDING NUMBER: SW/CF-3 PRIORITY: 2 RISK WEIGHT: 405 INACCURATE STREAM FLOW MEASUREMENT DEVICES

1	40	40	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2	2	2	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	314	0	0	0	100	105	109	OVERHEAD	OVERHEAD	ONGOING
4	50	0	50	0	0	0	0	CAPITAL	ER-KC	NEW
5	950	0	0	950	0	0	0	CAPITAL	ER-KC	NEW
TOTALS:	1356	42	50	950	100	105	109			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: SW/CF-4 PRIORITY: 2 RISK WEIGHT: 448 NPDES PERMIT EXCEPTIONS										
1	4	4	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2	48	48	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
4	700	0	700	0	0	0	0	CAPITAL	EM-ADS399	REQUESTED
TOTALS:	752	52	700	0	0	0	0			
FINDING NUMBER: SW/CF-5 PRIORITY: 2 RISK WEIGHT: 354 LACK OF NPDES BEST MANAGEMENT PRACTICES PROGRAM PLAN										
ALL	25	25	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	25	25	0	0	0	0	0			
FINDING NUMBER: SW/CF-6 PRIORITY: 2 RISK WEIGHT: 410 DEFICIENCIES OF SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN										
ALL	50	50	0	0	0	0	0	OVERHEAD	DIVISION	FUNDED
TOTALS:	50	50	0	0	0	0	0			
FINDING NUMBER: TC.1-1 PRIORITY: 2 RISK WEIGHT: 358 TRAINING PROGRAMS AT ORNL										
1	14	0	14	0	0	0	0	PROGRAM	ER-AT TC	NEW
10	116	116	0	0	0	0	0	PROGRAM	ER-AT TC	NEW
11	25	0	25	0	0	0	0	PROGRAM	ER-AT TC	NEW
2	29	0	29	0	0	0	0	PROGRAM	ER-AT TC	NEW
2	17	0	0	4	4	4	5	OVERHEAD	OVERHEAD	ONGOING
3,4	44	0	8	8	9	9	10	OVERHEAD	OVERHEAD	ONGOING
3,4	180	80	100	0	0	0	0	PROGRAM	ER-AT TC	NEW
5	42	0	0	10	10	11	11	OVERHEAD	OVERHEAD	ONGOING
7	28	0	5	5	6	6	6	OVERHEAD	OVERHEAD	ONGOING
7,10	34	0	0	8	8	9	9	OVERHEAD	OVERHEAD	ONGOING
8	44	0	8	8	9	9	10	OVERHEAD	OVERHEAD	ONGOING
9	262	0	48	50	52	55	57	OVERHEAD	OVERHEAD	ONGOING
9	5	5	0	0	0	0	0	PROGRAM	ER-AT TC	NEW
TOTALS:	840	201	237	93	98	103	108			
FINDING NUMBER: TC.1-2 PRIORITY: 3 RISK WEIGHT: 37 EXAMINATIONS										
X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: TC.1-3 PRIORITY: 3 RISK WEIGHT: 562 TRAINING STAFFS										
2	2112	0	1035	1077	0	0	0	PROGRAM	ER-AT TC	NEW
2	4787	0	0	1119	1169	1222	1277	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	6899	0	1035	2196	1169	1222	1277			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST		FUND SOURCE	STATUS
FINDING NUMBER: TC.10-1			PRIORITY: 2		RISK WEIGHT:		87	TRAINING FOR SUPERVISORS			
X-REF'	0	0	0	0	0	0	0	X		X	X
TOTALS:	0	0	0	0	0	0	0				
FINDING NUMBER: TC.5-1			PRIORITY: 2		RISK WEIGHT:		588	MAINTENANCE TRAINING PROGRAM			
X-REF'	0	0	0	0	0	0	0	X		X	X
TOTALS:	0	0	0	0	0	0	0				
FINDING NUMBER: TC.7-1			PRIORITY: 3		RISK WEIGHT:		58	TRAINING FACILITIES			
2	295	0	295	0	0	0	0	CAPITAL		GPP-ER	REQUESTED
4	25	0	25	0	0	0	0	CAPITAL		GPP-ER	REQUESTED
5	4000	0	0	2000	1000	1000	0	CAPITAL		GPP-ER	REQUESTED
TOTALS:	4320	0	320	2000	1000	1000	0				
FINDING NUMBER: TC.7-2			PRIORITY: 3		RISK WEIGHT:		58	TRAINING RECORDS STORAGE			
1	22	0	22	0	0	0	0	OVERHEAD		OVERHEAD	NEW
3	78	0	78	0	0	0	0	OVERHEAD		OVERHEAD	NEW
TOTALS:	100	0	100	0	0	0	0				
FINDING NUMBER: TCM/BMPF-1			PRIORITY: 3		RISK WEIGHT:		5	PESTICIDE PROGRAM DEFICIENCIES			
NONE	0	0	0	0	0	0	0				NONE
TOTALS:	0	0	0	0	0	0	0				
FINDING NUMBER: TCM/CF-1			PRIORITY: 2		RISK WEIGHT:		405	PCB WASTES STORED LONGER THAN ONE YEAR			
1	2	2	0	0	0	0	0	PROGRAM		EM-ADS344	FUNDED
3	5	5	0	0	0	0	0	PROGRAM		EM-ADS344	FUNDED
5	8	8	0	0	0	0	0	PROGRAM		EM-ADS344	FUNDED
TOTALS:	15	15	0	0	0	0	0				
FINDING NUMBER: TCM/CF-2			PRIORITY: 2		RISK WEIGHT:		410	DEFICIENCIES WITH THE TSCA ASSUMPTION REQUIREMENTS FOR LIQUID FILLED ELECTRICAL EQUIPMENT			
3	22	22	0	0	0	0	0	OVERHEAD		DIVISION	NEW
5	54	0	10	10	11	11	12	OVERHEAD		DIVISION	ONGOING
TOTALS:	76	22	10	10	11	11	12				
FINDING NUMBER: TCM/CF-3			PRIORITY: 2		RISK WEIGHT:		405	INADEQUATE LABELLING OF EQUIPMENT CONTAINING PCB CAPACITORS			
NONE	0	0	0	0	0	0	0				NONE

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: TCM/CF-4 PRIORITY: 2 RISK WEIGHT: 405 DEFICIENCIES WITH TSCA TEMPORARY STORAGE FACILITY REQUIREMENTS										
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: TCM/CF-5 PRIORITY: 3 RISK WEIGHT: 10 LACK OF HAZARD IDENTIFICATION LABELS FOR SOME CHEMICAL STORAGE TANKS										
NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			
FINDING NUMBER: TCM/CF-6 PRIORITY: 3 RISK WEIGHT: 9 LACK OF SECONDARY CONTAINMENT FOR SOME ABOVEGROUND STORAGE TANKS/CONTAINERS										
1	1000	0	1000	0	0	0	0	CAPITAL	GPP-ER	NEW
2	750	0	0	750	0	0	0	CAPITAL	GPP-ER	NEW
3	80	0	80	0	0	0	0	OVERHEAD	OVERHEAD	NEW
4	21	0	21	0	0	0	0	OVERHEAD	OVERHEAD	NEW
5	5	0	5	0	0	0	0	OVERHEAD	OVERHEAD	NEW
TOTALS:	1856	0	1106	750	0	0	0			
FINDING NUMBER: TCM/CF-7 PRIORITY: 3 RISK WEIGHT: 5 DEFICIENCY WITH TSCA STORAGE FOR DISPOSAL MONITORING POLICY AND STORAGE FOR DISPOSAL POLICY										
3	470	70	73	76	80	84	87	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	470	70	73	76	80	84	87			
FINDING NUMBER: TS.2-1 PRIORITY: 2 RISK WEIGHT: 311 SAFETY ANALYSIS REPORT UPDATE PROGRAM										
1	4	4	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2	2	2	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	6	6	0	0	0	0	0			
FINDING NUMBER: TS.3-1 PRIORITY: 3 RISK WEIGHT: 8 PROCEDURES FOR LOW-COST FACILITY MODIFICATIONS										
1	15	15	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
TOTALS:	15	15	0	0	0	0	0			
FINDING NUMBER: TS.3-2 PRIORITY: 2 RISK WEIGHT: 311 RESOURCE ALLOCATION FOR DRAWINGS UPDATES										
2	15	15	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	1609	1609	0	0	0	0	0	PROGRAM	ER-	FUNDED
3	871	871	0	0	0	0	0	PROGRAM	NE-	FUNDED
3	2780	2780	0	0	0	0	0	PROGRAM	EM-	REQUESTED

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
3	586	586	0	0	0	0	0	PROGRAM	EM-	REQUESTED
TOTALS:	5861	5861	0	0	0	0	0			

FINDING NUMBER: TS.4-1 PRIORITY: 2 RISK WEIGHT: 55 PUBLICATION OF UNUSUAL OCCURRENCE REPORTS

X-REF'	0	0	0	0	0	0	0	X	X	X
TOTALS:	0	0	0	0	0	0	0			

FINDING NUMBER: WM/BMPF-1 PRIORITY: 3 RISK WEIGHT: 5 INADEQUATE ASSESSMENTS OF OFFSITE VENDORS RECYCLING LEAD-ACID BATTERIES AND CIRCUITBOARDS

ALL	10	10	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	10	10	0	0	0	0	0			

FINDING NUMBER: WM/BMPF-2 PRIORITY: 1 RISK WEIGHT: 56 INADEQUATE WASTE MINIMIZATION PROGRAM

1	5	5	0	0	0	0	0	PROGRAM	EM-ADS356	NEW
2	5	5	0	0	0	0	0	PROGRAM	EM-ADS356	NEW
3	10	10	0	0	0	0	0	PROGRAM	EM-ADS350	NEW
3	54	0	10	10	11	11	12	PROGRAM	EM-ADS350	ONGOING
4	10	10	0	0	0	0	0	PROGRAM	EM-ADS349	NEW
4	902	0	165	172	180	188	197	PROGRAM	EM-ADS349	ONGOING
5	902	0	165	172	180	188	197	PROGRAM	EM-ADS356	ONGOING
6	5	0	5	0	0	0	0	OVERHEAD	OVERHEAD	NEW
8	28	0	5	5	6	6	6	PROGRAM	EM-ADS356	ONGOING
TOTALS:	1921	30	350	359	377	393	412			

FINDING NUMBER: WM/CF-1 PRIORITY: 1 RISK WEIGHT: 413 INADEQUATE OPERATION OF MIXED WASTE STORAGE FACILITY

10	30	30	0	0	0	0	0	PROGRAM	EM-ADS348	FUNDED
2	5	5	0	0	0	0	0	PROGRAM	EM-ADS348	FUNDED
5	35	35	0	0	0	0	0	PROGRAM	EM-ADS348	FUNDED
6	2	2	0	0	0	0	0	PROGRAM	EM-ADS348	FUNDED
7	120	120	0	0	0	0	0	PROGRAM	EM-ADS348	FUNDED
8	10	10	0	0	0	0	0	PROGRAM	EM-ADS348	FUNDED
TOTALS:	202	202	0	0	0	0	0			

FINDING NUMBER: WM/CF-10 PRIORITY: 3 RISK WEIGHT: 5 INADEQUATE LEAK DETECTION OF PETROLEUM UNDERGROUND STORAGE TANKS

NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			

FINDING NUMBER: WM/CF-11 PRIORITY: 2 RISK WEIGHT: 408 INADEQUATE HAZARDOUS WASTE DETERMINATION OF SANITARY SEWAGE TREATMENT PLANT SLUDGE

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
1	12	12	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
1	28	0	5	5	6	6	6	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	40	12	5	5	6	6	6			

FINDING NUMBER: WM/CF-12 PRIORITY: 2 RISK WEIGHT: 405 INADEQUATE DAILY INSPECTIONS OF RCRA FACILITIES ON WEEKENDS

NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			

FINDING NUMBER: WM/CF-13 PRIORITY: 2 RISK WEIGHT: 408 INADEQUATE CHARACTERIZATION OF MIXED WASTE IN STORAGE

ALL	8000	0	1000	1000	1000	1500	3500	PROGRAM	EM-ADS352	REQUESTED
TOTALS:	8000	0	1000	1000	1000	1500	3500			

FINDING NUMBER: WM/CF-2 PRIORITY: 2 RISK WEIGHT: 406 IMPROPER OPERATION OF SATELLITE ACCUMULATION AREAS AT ORNL FACILITIES AT Y-12

NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			

FINDING NUMBER: WM/CF-3 PRIORITY: 2 RISK WEIGHT: 406 INADEQUATE HAZARDOUS WASTE ACCUMULATION AND MINIMIZATION AT ORNL BIOLOGY DIVISION AT THE Y-12 PLANT

NONE	0	0	0	0	0	0	0			NONE
TOTALS:	0	0	0	0	0	0	0			

FINDING NUMBER: WM/CF-4 PRIORITY: 1 RISK WEIGHT: 409 LACK OF INTEGRITY ASSESSMENT OF 7860A HAZARDOUS WASTE STORAGE TANK

1	20	20	0	0	0	0	0	PROGRAM	EM-ADS311AA,331	FUNDED
2	107	0	0	25	26	27	29	PROGRAM	EM-ADS311AA,331	ONGOING
TOTALS:	127	20	0	25	26	27	29			

FINDING NUMBER: WM/CF-5 PRIORITY: 2 RISK WEIGHT: 410 INADEQUATE TRAINING FOR ONSITE HAZARDOUS WASTE TRANSPORTERS

1-3	9	9	0	0	0	0	0	PROGRAM	EM-ADS347,348	NEW
4	5	5	0	0	0	0	0	PROGRAM	EM-ADS347,348	NEW
5	9	9	0	0	0	0	0	PROGRAM	EM-ADS347,348	NEW
ALL	67	10	10	11	11	12	13	PROGRAM	EM-ADS347,348	ONGOING
TOTALS:	90	33	10	11	11	12	13			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: WM/CF-6 PRIORITY: 1 RISK WEIGHT: 406 STORAGE OF LAND DISPOSAL RESTRICTED MIXED WASTE										
10	200	0	0	0	0	0	200	PROGRAM	EM-ADS349	ONGOING
10	1150	0	150	300	300	400	0	PROGRAM	EM-ADS349	REQUESTED
4	5	5	0	0	0	0	0	PROGRAM	EM-ADS350	FUNDED
5	10	10	0	0	0	0	0	PROGRAM	EM-ADS350	FUNDED
6	10	10	0	0	0	0	0	PROGRAM	EM-ADS350	FUNDED
7	240	240	0	0	0	0	0	PROGRAM	EM-ADS349	FUNDED
7	275	275	0	0	0	0	0	PROGRAM	EM-ADS350	FUNDED
8	1200	0	500	350	200	100	50	PROGRAM	EM-ADS350	REQUESTED
8	500	0	500	0	0	0	0	PROGRAM	EM-ADS349	REQUESTED
TOTALS:	3590	540	1150	650	500	500	250			
FINDING NUMBER: WM/CF-7 PRIORITY: 1 RISK WEIGHT: 405 INADEQUATE STORAGE OF RADIOACTIVELY CONTAMINATED HAZARDOUS WASTE LEAD										
4	100	100	0	0	0	0	0	PROGRAM	EM-ADS349	FUNDED
5	821	0	150	157	164	171	179	PROGRAM	EM-ADS349	ONGOING
TOTALS:	921	100	150	157	164	171	179			
FINDING NUMBER: WM/CF-8 PRIORITY: 3 RISK WEIGHT: 5 INADEQUATE TRAINING DOCUMENTATION AND PROCEDURES FOR 7507 HAZARDOUS WASTE STORAGE FACILITY										
1	2	2	0	0	0	0	0	PROGRAM	EM-ADS344	FUNDED
2	2	2	0	0	0	0	0	PROGRAM	EM-ADS344	FUNDED
3	3	3	0	0	0	0	0	PROGRAM	EM-ADS344	FUNDED
TOTALS:	7	7	0	0	0	0	0			
FINDING NUMBER: WM/CF-9 PRIORITY: 1 RISK WEIGHT: 405 INADEQUATE TRAINING RECORDS AND INSPECTION RECORDS AT THE 3001 STORAGE CANAL										
1	1	1	0	0	0	0	0	PROGRAM	EM-ADS311AA	FUNDED
2	1	1	0	0	0	0	0	PROGRAM	EM-ADS311AA	FUNDED
3	1	1	0	0	0	0	0	PROGRAM	EM-ADS311AA	FUNDED
3	107	0	0	25	26	27	29	PROGRAM	EM-ADS311AA	ONGOING
4	25	25	0	0	0	0	0	PROGRAM	EM-ADS311AA	FUNDED
TOTALS:	135	28	0	25	26	27	29			
FINDING NUMBER: WS.3-1 PRIORITY: 2 RISK WEIGHT: 468 CONTROL OF ASBESTOS										
1	77	77	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	8	8	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
5	175	0	175	0	0	0	0	OVERHEAD	OVERHEAD	NEW
6	21	0	21	0	0	0	0	OVERHEAD	OVERHEAD	NEW
6	90	0	0	21	22	23	24	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	371	85	196	21	22	23	24			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: WS.4-1		PRIORITY: 1		RISK WEIGHT: 910			MACHINE GUARDING			
1	15	15	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	150	150	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
4	10	0	10	0	0	0	0	OVERHEAD	OVERHEAD	NEW
5	1315	0	405	425	485	0	0	PROGRAM	ER-AT OSHA	REQUESTED
TOTALS:	1490	165	415	425	485	0	0			
FINDING NUMBER: WS.4-2		PRIORITY: 2		RISK WEIGHT: 458			NONCOMPLIANCES OF BUILDING EGRESS			
3	10	10	0	0	0	0	0	OVERHEAD	DIVISION	FUNDED
5	300	0	300	0	0	0	0	OVERHEAD	OVERHEAD	NEW
6	6485	0	625	2830	3030	0	0	PROGRAM	ER-AT OSHA	REQUESTED
TOTALS:	6795	10	925	2830	3030	0	0			
FINDING NUMBER: WS.4-3		PRIORITY: 2		RISK WEIGHT: 483			MACHINERY INSPECTION AND PREVENTATIVE MAINTENANCE			
1	2	2	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2	2	2	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	2	2	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	2	0	2	0	0	0	0	OVERHEAD	OVERHEAD	REQUESTED
3	17	0	0	4	4	4	5	OVERHEAD	OVERHEAD	ONGOING
TOTALS:	25	6	2	4	4	4	5			
FINDING NUMBER: WS.4-4		PRIORITY: 1		RISK WEIGHT: 935			ORNL ELECTRICAL COMPLIANCE			
10	262	262	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
11	5330	0	1350	1945	2035	0	0	PROGRAM	ER-AT OSHA	REQUESTED
2	80	80	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
4	60	60	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
5	10	10	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
7	30	30	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	5772	442	1350	1945	2035	0	0			
FINDING NUMBER: WS.4-5		PRIORITY: 1		RISK WEIGHT: 935			EQUIPMENT AND OPERATIONS AREA			
1	6	6	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
2	1	1	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
3	4	4	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
4	5	5	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
6	14	14	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
7	7	7	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
8	42	42	0	0	0	0	0	OVERHEAD	OVERHEAD	NEW
8	272	0	50	52	54	57	59	OVERHEAD	DIVISION	ONGOING
TOTALS:	351	79	50	52	54	57	59			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: WS.4-6			PRIORITY: 2	RISK WEIGHT: 409				ORNL FIRE PROTECTION		
1	25	25	0	0	0	0	0	OVERHEAD	OVERHEAD	FUNDED
TOTALS:	25	25	0	0	0	0	0			

ACTION PLAN TOTALS:

738751	62294	96044	172759	119782	133374	154498

APPENDIX C

SUMMARY OF ACTIONS, SCHEDULES, AND COSTS

FINDING NUMBER	FINDING DESCRIPTION	COMPLIANCE PROTOCOL	DOE PRIORITY	RISK WEIGHT	BEGIN DATE	END DATE	TOTAL COST
A/BMPF-1	INADEQUATE STACK EMISSION MONITORING AND TEST PROCEDURES FOR NESHAP COMPLIANCE	40 CFR 61.93(B)	3	45	3/91	5/91	0
A/BMPF-2	LACK OF VERIFYING DOCUMENTATION TO DEMONSTRATE COMPLIANCE WITH AIR PERMIT CONDITIONS	NONE	4	1	3/91	12/91	110
A/BMPF-3	LACK OF CONSISTENT INSTALLATION OF STACK SAMPLING, MONITORING, AND ALARM SYSTEMS FOR RADIOACTIVE RELEASES	NONE	4	1	4/91	6/92	0
A/BMPF-4	DEFICIENT ASBESTOS WASTE DISPOSAL MANAGEMENT	NONE	4	1	11/90	DONE	1
A/CF-1	EXCURSIONS ABOVE AIR PERMIT LIMITS	TDHE RULE 1200-3-9	2	448	11/90	7/91	0
A/CF-2	HIGH EFFICIENCY PARTICULATE AIR (HEPA) TESTING PROGRAM DEFICIENCIES	ACP 14	3	5	2/91	10/91	14
A/CF-3	ABSENCE OF STATE AIR PERMITS FOR RADIONUCLIDE SOURCES	TDHE RULE 1200-9-0-.04(4)	2	400	11/90	DONE	0
A/CF-4	AMBIENT AIR MONITORING DEFICIENCIES	DOE 10 CFR 834	2	55	2/91	2/92	65
A/CF-5	EFFLUENT STACK SAMPLING AND MONITORING DEFICIENCIES	DOE 10 CFR 834	2	55	3/91	12/94	3842
A/CF-6	LACK OF CONTROL ROOM OPERATOR TRAINING IN STACK RELEASE EMERGENCY PROCEDURES	SECT. 9, EOP	3	5	11/90	DONE	2
AX.1-1	REMEDIAL PROGRAM FOR AUXILIARY SYSTEMS	DRAFT DOE 4330.XXX	2	570	XREF	XREF	0
AX.1-2	CONFIGURATION CONTROL SYSTEM FOR AUXILIARY SYSTEMS	DOE 5480.5, 5480.6, AND 5480.19	2	55	4/91	12/91	485
AX.2-1	NO IMPLEMENTATION OF THE WASTE MINIMIZATION POLICY	TDHE 1200-1-11-.03, RCRA 3002, AND DOE 5400.3	2	56	XREF	XREF	0
AX.3-1	ENERGY SYSTEMS POLICY PROCEDURE ON WASTE MANAGEMENT		3	6	6/91	10/91	15
AX.4-1	FISSILE MATERIAL STORAGE HANDLING ACTIVITIES	DOE 5480.5	2	56	3/91	3/92	109
AX.4-2	BUILDING 3027 STORAGE VAULT OPERATIONS	DOE 5633.3	2	55	3/91	DONE	0
AX.5-1	GASEOUS EFFLUENT DISCHARGES	DOE 6430.1A	2	63	11/90	9/91	90
AX.6-1	BACKUP POWER DIESEL GENERATORS		3	5	6/91	9/91	3
CS.1-1	NUCLEAR CRITICALITY SAFETY TRAINING PROGRAM	DOE 5480.5, PARS. 8C AND 10	2	60	8/91	10/92	103
CS.1-2	OVERSIGHT AND SUPPORT FUNCTIONS	DOE 5480.5, PAR. 7E	2	55	11/90	DONE	0
CS.1-3	ORNL CRITICALITY SAFETY PROGRAM	DOE 5480.5, PAR. 11C	2	55	11/90	11/91	525
CS.1-4	NUCLEAR CRITICALITY SAFETY PROGRAM DOCUMENTATION	DOE 5480.5, PARS. 8A, 3E, 8J, AND 11C	2	55	6/91	11/91	20
CS.3-1	SAFETY ANALYSIS DOCUMENTATION REQUIREMENTS	ANSI/ANS-8.1-1983	2	55	6/91	12/92	573

FINDING NUMBER	FINDING DESCRIPTION	COMPLIANCE PROTOCOL	DOE PRIORITY	RISK WEIGHT	BEGIN DATE	END DATE	TOTAL COST
		SECT 4.1.4 AND DOE 5480.5, PAR 8A					
CS.4-1	REVIEW OF NUCLEAR CRITICALITY SAFETY ANALYSES	DOE 5480.5, PAR 8A	2	55	XREF	192	0
CS.4-2	DISSEMINATION OF NUCLEAR CRITICALITY SAFETY GUIDANCE	ANSI/ANS-8.1-1983	2	55	3/91	11/92	30
		SECT 4.1.3 AND DOE 5480.5, PAR. 13B(4)					
CS.4-3	NUCLEAR CRITICALITY SAFETY REMEDIAL ACTION PLAN	ANSI/ANS-8.1-1983, PAR. 4.1.5 AND DOE 5480.5, PAR. 8G	2	55	11/90	11/91	0
CS.5-1	EMERGENCY RESPONSE PLAN		2	55	DONE	DONE	0
CS.5-2	CRITICALITY ALARM SYSTEM EVACUATION DRILLS	ANSI/ANS-8.3-1986 AND DOE 5480.5	2	55	11/90	DONE	0
CS.5-3	CRITICALITY ALARM SYSTEMS	ANSI/ANS-8.3-1986 SECTS. 4.3, 4.4.5, 5.4, 6.5 AND DOE 5480.5 PARS. 11C(3)(G) AND 11C(3)(H)	2	58	11/90	6/91	2
EA.2-1	ORNL POLICY REGARDING INDEPENDENT SAFETY REVIEWS		2	69	11/90	10/91	25
EA.3-1	GUIDANCE ON INTERNAL SAFETY REVIEWS	DOE 5480.1B, 5480.5, 5480.10, AND 5483.1A	2	69	XREF	XREF	0
EA.3-2	DOCUMENTATION OF SAFETY REVIEWS OF EXPERIMENTAL PLANS	DOE 5480.1B, 5480.10, 5480.11, AND 5483.1A	2	55	XREF	XREF	0
EA.4-1	RANDOM SAFETY SURVEILLANCES	DOE 5480.1B, 5480.10, 5480.11, AND 5483.1A	3	6	7/91	10/91	193
EP.1-1	ACCIDENT CONSEQUENCE ASSESSMENT	DOE 5500.1A	2	109	11/90	9/92	232
EP.1-2	EMERGENCY PREPAREDNESS RECOMMENDATIONS	DOE 5500.3A	3	11	11/90	DONE	53
EP.1-3	FACILITY HAZARDS INFORMATION	DOE 5500.3A	2	69	6/91	12/91	82
EP.1-4	ANALYSIS OF EMERGENCY PREPAREDNESS	DOE 5500.3A	2	66	6/91	9/93	0
EP.2-1	CLASSIFICATION OF EMERGENCY EVENTS	DOE 5500.2A, N5500.5, AND THE STATE OF TN EMERGENCY PLAN	2	56	11/90	9/91	10

FINDING NUMBER	FINDING DESCRIPTION	COMPLIANCE PROTOCOL	DOE PRIORITY	RISK WEIGHT	BEGIN DATE	END DATE	TOTAL COST
EP.2-2	ADEQUACY OF ORNL EMERGENCY PLANS	DOE 5500.1A	2	106	11/90	12/91	40
EP.3-1	TRAINING FOR EMERGENCY SITUATIONS	DOE 5500.3A	3	7	6/91	12/92	524
EP.3-2	SPILL RESPONSE TRAINING	DOE 5500.3A	3	7	11/90	12/91	274
EP.4-1	EMERGENCY PREPAREDNESS EXERCISES	DOE 5500.3A	3	7	11/90	DONE	471
EP.4-2	DRILL PLANNING	DOE 5500.3A	3	6	11/90	6/91	69
EP.5-1	EMERGENCY MONITORING OF RELEASES	DOE 5500.3A	2	68	11/90	DONE	637
EP.5-2	REGIONAL RADIOLOGICAL EVENT	DOE 5500.1A	2	56	9/91	3/93	891
EP.6-1	PROTECTIVE ACTION GUIDES/EMERGENCY ACTION LEVELS	DOE 5500.3A	2	56	11/90	6/92	299
EP.7-1	PERSONNEL ACCOUNTABILITY SYSTEMS	DOE 5500.3A	2	130	9/91	2/92	217
EP.7-2	EMERGENCY NOTIFICATION SYSTEMS	DOE 5500.3A	2	133	11/90	7/92	694
FP.1-1	RESOURCES OF FIRE PROTECTION ENGINEERING SECTION	DOE 5480.4, 5480.7, AND 6430.1A	2	133	6/91	12/92	598
FP.1-2	FIRE DEPARTMENT RESOURCES AND WORK LOAD	DOE 5480.4	2	133	XREF	XREF	274
FP.1-3	FIRE PROTECTION OF ORNL FACILITIES AT THE Y-12 PLANT	DOE 5480.7	2	55	11/90	DONE	0
FP.1-4	FIRE PROTECTION POLICIES REGARDING IMPROVED RISK	DOE 5480.7	2	55	7/91	1/92	7
FP.1-5	FACILITY REOCCUPANCY POLICY	DOE 5480.7	2	105	7/91	12/91	7
FP.1-6	MANAGEMENT'S ROLE IN FIRE PROTECTION	DOE 5480.7	3	9	6/91	3/92	336
FP.2-1	EGRESS FROM BUILDING 4500N, MACHINERY SPACE	NFPA 101 LIFE SAFETY CODE	2	458	12/90	DONE	120
FP.2-2	EGRESS FROM BUILDING 4500N, OFFICE SPACE	NFPA 101 LIFE SAFETY CODE	2	458	11/90	DONE	607
FP.2-3	LIFE SAFETY CODE SURVEYS	DOE 5480.7	2	133	8/91	6/92	240
FP.2-4	ACTION PLANS REGARDING LIFE SAFETY CODE SURVEYS	DOE 5480.4	3	56	11/90	6/91	5
FP.3-1	ORNL TESTING OF FIRE EQUIPMENT	DOE 5480.4	2	59	11/90	9/93	660
FP.3-2	ADEQUATE DOCUMENTATION OF FIRE STUDY	DOE 5480.7	2	80	11/90	3/92	150
FP.3-3	DESIGN BASIS FIRE REVIEW PROGRAM	DOE 5480.7	2	58	2/91	12/92	7
FP.4-1	ADEQUACY OF FIRE PROTECTION	DOE 5480.7	2	55	7/91	1/92	500
FP.5-1	FIRE PROTECTION SYSTEMS IN BUILDING 4500N	DOE 5480.7	2	60	7/91	9/96	4810
FP.6-1	PHYSICAL FITNESS PROGRAM FOR FIRE FIGHTERS	NFPA 1500	2	63	DONE	DONE	0
FP.6-2	FIRE DEPARTMENT STAFFING LEVEL	NFPA 1500, DOE 5480.4	3	83	6/91	12/92	1367
FP.6-3	PRE-FIRE PLANS FOR ORNL FACILITIES	DOE 5480.7	3	5	6/91	11/91	226
FP.7-1	FIRE PROTECTION OF MAIN COMPUTER CENTERS	DOE/EP-0108	2	58	2/91	8/91	10
FP.7-2	FIRE HAZARD ANALYSIS AND FACILITY PROTECTION SURVEY	DOE 5480.7 10(B)(2)	2	133	XREF	XREF	0
FP.7-3	FIRE PROTECTION OVERSIGHT	DOE 5480.7	2	58	11/90	6/92	0

FINDING NUMBER	FINDING DESCRIPTION	COMPLIANCE PROTOCOL	DOE PRIORITY	RISK WEIGHT	BEGIN DATE	END DATE	TOTAL COST
FP.7-4	REVIEW OF DOCUMENTS AFFECTING FIRE PROTECTION	DOE 5480.7	2	58	9/91	9/91	0
FP.7-5	WATER SUPPLY SYSTEM	DOE 5480.7 AND 6430.1A	2	58	6/91	6/96	22037
FR.1-1	ORGANIZATION AND IMPLEMENTATION OF SAFETY REVIEW SYSTEM	DOE 5480.5, 5480.6, AND 5482.1B	3	6	XREF	XREF	0
FR.2-1	REVIEW OF SAFETY QUESTIONS AND TOPICS	DOE 5480.5 AND 5482.1B	2	60	11/90	12/91	15
FR.3-1	SHORTCOMINGS OF THE SAFETY REVIEW SYSTEM		2	63	XREF	XREF	0
FR.4-1	MANAGEMENT RESPONSE TO SAFETY COMMITTEE RECOMMENDATIONS	DOE 5480.5 AND 5482.1B	2	98	11/90	5/91	15
FR.4-2	ANNUAL FACILITY APPRAISALS		4	1	XREF	XREF	0
FR.5-1	TRIENNIAL APPRAISAL	DOE 5480.5, 5480.6, AND 5482.1B	3	5	XREF	8/91	0
FR.6-1	INDUSTRY LESSONS LEARNED		2	55	11/90	7/91	501
GW/BMPF-1	INADEQUATE WELL AND BOREHOLE ABANDONMENT	NONE	2	50	11/90	9/97	60112
GW/BMPF-2	INADEQUATE MONITORING WELL AND BOREHOLE INVENTORY, SECURITY, AND MAINTENANCE	NONE	1	50	11/90	01/92	1737
GW/BMPF-3	CROSS-CONTAMINATION BETWEEN AQUIFERS AND STRATA	NONE	2	50	XREF	XREF	0
GW/BMPF-4	NO CUSTODIAN FOR UNUSED WELLS	NONE	2	50	11/90	7/92	672
GW/BMPF-5	INADEQUATE CHARACTERIZATION OF THE HYDROGEOLOGIC REGIME	DOE 5400.4, CERCLA, AND NCP[40 CFR 300.430(D)]	2	117	11/90	6/92	168057
GW/CF-1	INADEQUATE HYDROGEOLOGIC CHARACTERIZATION AT SWSA 6	DOE 5400.4, CERCLA, AND 40 CFR 300.430	2	507	8/91	9/91	0
GW/CF-2	INADEQUATE IMPLEMENTATION OF WELL PURGING PROCEDURES AT SWSA-6	MMES-ESP-302-2, TN 1200-1-11.05, AND 40 CFR 265(F)	2	405	11/90	8/91	63
IH.2-1	DOCUMENTATION OF PROCEDURES BY INDUSTRIAL HYGIENE	DOE 5480.10	2	68	6/91	3/93	1933
IH.2-2	IMPLEMENTATION OF INDUSTRIAL HYGIENE REVIEWS		4	90	4/91	6/92	117
IH.3-1	PERSONNEL PROTECTIVE EQUIPMENT	DOE 5480.10 AND 29 CFR 1910.95, .133, .134, AND .252	2	458	3/91	7/92	16
IH.4-1	SURVEILLANCE OF INDUSTRIAL HYGIENE MONITORING	DOE 5480.10	2	60	6/91	9/92	435
IH.5-1	HEARING CONSERVATION PROGRAM	DOE 5480.10 AND 29 CFR 1910.95	2	455	11/90	12/91	90

FINDING NUMBER	FINDING DESCRIPTION	COMPLIANCE PROTOCOL	DOE PRIORITY	RISK WEIGHT	BEGIN DATE	END DATE	TOTAL COST
IH.5-2	CHEMICAL CARCINOGEN PROGRAM	DOE 5480.10 AND 29 CFR 1910 SUBPART Z	2	418	11/90	10/91	47
IH.5-3	CONFINED SPACE ENTRY	29 CFR 1910.146 SECT. (C)(8); ANSI Z117.1, SECTS. 12.2.1, SECT. 13.1; AND OSHA 29 CFR 1910.146 SECT. (G)	1	913	11/90	12/91	884
IH.5-4	RESPIRATORY PROTECTION PROGRAM	DOE 5480.10, ANSI Z88.2, AND 29 CFR 1910.134	2	415	4/91	6/92	681
IH.5-5	SANITATION AND POTABLE WATER PROGRAM	DOE 5480.4; DOE 5480.10; ANSI Z4.1-1988; PUBLIC LAW, CH. 14, PART I; AND TN FSE LAW	2	408	7/91	5/92	129
IH.5-6	ERGONOMICS PROGRAM	DOE 5480.10	2	80	4/91	12/91	325
IH.6-1	HANDLING, STORAGE, AND LABELING OF CHEMICALS	DOE 5480.10, DOE 5480.4, 29 CFR 1900.1200, 29 CFR 1910.145, AND 29 CFR 1910 SUBPART Z	2	422	5/91	06/92	2314
IWS/BMPF-1	INFORMALITY OF OPERATIONS IN THE ENVIRONMENTAL RESTORATION PROGRAM (ERP)	NONE	3	10	2/91	11/91	0
IWS/BMPF-2	PROCEEDING WITHOUT APPROVED PLANS	NONE	3	7	11/90	DONE	0
IWS/BMPF-3	LACK OF ADEQUATE PLANNING FOR FEDERAL FACILITY AGREEMENT ACTIVITIES	NCP 300.615	3	42	DONE	DONE	0
IWS/BMPF-4	INCOMPLETE EVOLUTION OF CONTINUOUS RELEASES	CERCLA 103(F)(2)	3	50	11/90	DONE	0
IWS/CF-1	INADEQUATE INVENTORY AND IDENTIFICATION OF INACTIVE WASTE SITES	40 CFR 300.410 AND 40 CFR 300.420	2	410	3/91	9/91	25
IWS/CF-2	LACK OF FORMAL NATURAL RESOURCES DAMAGE ASSESSMENT NOTIFICATION	DOE 5400.4, CERCLA 104(B), AND EXECUTIVE ORDER 12580	2	495	11/90	9/91	0
IWS/CF-3	INCOMPLETE DISTRIBUTION OF EPCRA REPORTS	40 CFR 370	2	405	11/90	9/91	0

FINDING NUMBER	FINDING DESCRIPTION	COMPLIANCE PROTOCOL	DOE PRIORITY	RISK WEIGHT	BEGIN DATE	END DATE	TOTAL COST
MA.1-1	ORNL LACKS POLICY/PROCEDURE IN REMOVING EQUIPMENT FROM SERVICE		3	41	11/90	10/91	1
MA.2-1	ORNL LACKS EFFECTIVE LOCKOUT/TAGOUT SYSTEM	DOE 5480.19	1	917	3/91	8/91	645
MA.2-2	PLANT MAINTENANCE PERSONNEL		2	86	11/90	9/91	862
MA.5-1	GENERAL FACILITY AND POST-WORK INSPECTIONS WERE NOT BE USED		2	567	11/90	9/91	2487
MA.5-2	FUNDAMENTAL ASSESSMENTS OF FACILITIES	DOE 4330.2C	2	58	9/91	1/92	1129
MA.6-1	P&E DIVISION PREVENTIVE MAINTENANCE		2	570	3/91	12/91	1382
MA.8-1	MAINTENANCE PROCEDURES		3	42	4/91	2/92	551
MF-1	ES&H GOALS AND OBJECTIVES	NONE	3	99	6/91	9/91	0
MF-10	DOE DIRECTIVE SYSTEM	NONE	3	119	11/90	6/91	250
MF-11	ORO OVERSIGHT SYSTEMS	NONE	3	58	1/91	10/91	0
MF-12	CONTRACT AWARD FEE PROCESS	NONE	3	20	1/91	9/91	0
MF-2	ES&H MANAGEMENT SYSTEMS	NONE	3	102	11/90	12/91	2267
MF-3	QUALITY ASSURANCE	DOE 5700.6B AND ANSI/ASME NQA-1	3	126	11/90	12/91	0
MF-4	HUMAN RESOURCES	NONE	3	99	11/90	10/91	286
MF-5	INDEPENDENT OVERSIGHT SYSTEMS	DOE 5480.5, 5480.6, 5482.1B AND 5-1	2	135	5/91	11/92	207
MF-6	ORNL TRACKING ES&H ISSUES TO CLOSURE	NONE	2	105	11/90	1/92	1218
MF-7	ORNL ES&H INTERFACES WITH ONSITE EXTERNAL GROUPS	NONE	3	539	11/90	10/91	0
MF-8	ES&H REVIEW OF WORK FOR OTHERS	NONE	3	33	11/90	7/91	0
MF-9	CONTRACTUAL MATTERS	NONE	2	40	1/91	9/91	0
MS.1-1	VOLUNTARY HEALTH EXAMINATION PROGRAM	DOE 5480.8	2	55	11/90	12/91	687
MS.2-1	MEDICAL DIVISION ADMINISTRATIVE ASSISTANCE		3	8	11/90	3/92	246
MS.3-1	BACKUP PULMONARY FUNCTION TESTING PERSONNEL	DOE 5480.8 AND OSHA STANDARDS	2	408	11/90	8/91	5
MS.3-2	MEDICAL DIVISION SPACE ALLOCATION		3	55	3/91	7/91	0
MS.3-3	DECONTAMINATION FACILITIES	DOE 5480.4	2	62	7/91	12/92	1200
NEPA/BMPF1	LACK OF ENVIRONMENTAL IMPACT ASSESSMENT FOR ORNL CONTINUING OPERATIONS	SEN 15	3	10	11/90	12/91	0
NEPA/CF-1	INEFFICIENT DOE NEPA IMPLEMENTATION PROCEDURES	SEN 15	2	658	1/91	8/91	0
NEPA/CF-2	PROJECT IMPLEMENTATION WITHOUT COMPLETED NEPA PROCESS	SEN 15	2	405	11/90	8/910	0
OA.1-1	FLOWDOWN OF POLICIES		2	69	1/91	12/91	0
OA.1-2	DOE ORDERS		2	58	1/91	4/92	120

FINDING NUMBER	FINDING DESCRIPTION	COMPLIANCE PROTOCOL	DOE PRIORITY	RISK WEIGHT	BEGIN DATE	END DATE	TOTAL COST
OA.1-3	ROLES AND RESPONSIBILITIES FOR ES&H		2	539	12/90	DONE	0
OA.1-4	ES&H REQUIREMENTS ACCEPTANCE BY DIVISIONS		2	488	5/91	10/91	275
OA.1-5	ROLES, RESPONSIBILITIES INVOLVING ES&H NOT CLEARLY DEFINED		2	539	XREF	10/91	0
OA.1-6	NO UNIFORM SAFETY REQUIREMENTS AT X10 AND Y12		2	65	XREF	XREF	0
OA.3-1	ORNL HAS NOT ESTABLISHED COMPREHENSIVE ES&H GOALS FOR FACILITIES		2	64	5/91	5/91	97
OA.6-1	REQUIREMENTS FOR JOB DESCRIPTIONS		3	58	XREF	XREF	0
OA.6-2	PPR SYSTEM		3	58	XREF	XREF	0
OA.7-1	CENTRALIZED SYSTEM FOR CONTROL OF SAFETY DOCUMENTS		3	5	6/91	2/92	8
OA.7-2	STORAGE FACILITIES AT ORNL FOR RECORDS	DOE 5700.68, ANSI/ASME NQA-1, AND NFPA 232	2	130	11/91	1/92	25
OA.8-1	SITE WIDE TRAINING FOR DRUG/ALCOHOL USE/BEHAVIOR		2	87	11/90	5/91	40
OP.3-1	ORNL LACKS STANDARDIZED POLICY FOR OPERATING PROCEDURES	DOE 5480.19	2	55	6/91	2/92	72
OP.4-1	FACILITY STATUS DISPLAYS	DOE 5480.19	3	56	11/90	10/91	756
OP.4-2	LOCKOUT/TAGOUT SYSTEMS AT ORNL	DOE 5480.19	1	917	XREF	XREF	0
OP.7-1	SHIFT WORKERS AT ORNL	DOE 5480.19	2	67	XREF	8/91	634
OP.8-1	GENERALLY ACCEPTED TERMINOLOGY	DOE 5480.19	3	5	XREF	XREF	0
OP.8-2	ALARM PANELS	DOE 5480.19	2	56	6/91	1/92	0
OP.8-3	LACK OF UNIFORMITY IN CONVEYING INFORMATION TO PERSONNEL	DOE 5480.19 AND 29 CFR 1910.145	2	56	3/91	4/93	92
PP.1-1	RESOURCES FOR WORKPLACE MAINTENANCE	29 CFR 1910 AND 1926, AND DOE 5480 AND 5483	2	505	5/91	9/92	14773
PP.2-1	ORNL HEALTH AND SAFETY PROGRAM		2	505	3/91	9/92	1538
PP.2-2	WORKPLACE EXPSOURE MONITORING AND MEDICAL RECORDS	29 CFR 1910 SUBPART C	2	415	6/91	6/92	124
PP.3-1	HEALTH AND SAFETY CONCERNS		2	68	11/90	9/91	15
PP.3-2	ORNL CONSTRUCTION OVERSIGHT PROGRAM	DOE 5480.9	2	68	3/91	9/92	7
PP.5-1	HAZARD COMMUNICATION PROGRAM DEFICIENCIES	29 CFR 1910.1200	2	418	6/91	6/91	10
PP.5-2	HEALTH AND SAFETY PROGRAM DEFICIENCIES		3	13	3/92	9/92	0
PP.5-3	EXPLOSIVES SAFETY PROGRAM	DOE 5480.4 AND 5480.3	2	133	11/90	11/91	29
PP.5-4	IMPLEMENTATION OF INDUSTRIAL SAFETY PROGRAM		3	5	3/91	9/91	15

FINDING NUMBER	FINDING DESCRIPTION	COMPLIANCE PROTOCOL	DOE PRIORITY	RISK WEIGHT	BEGIN DATE	END DATE	TOTAL COST
PT.1-1	FINANCE MATERIALS DIVISION STAFF		2	534	11/90	8/91	1024
PT.1-2	PACKAGING AND TRANSPORTATION PROCEDURES	DOE 5480.3A AND 5480.3	2	93	3/91	12/91	352
PT.1-3	PACKAGING AND TRANSPORTATION PROCEDURAL DOCUMENTS	DOE 5480.3 AND 5480.3A	2	93	XREF	XREF	0
PT.1-4	ORNL ONSITE TRANSPORTATION MANUAL	DOE 5480.3 AND 5480.3A	2	133	11/90	6/91	0
PT.1-5	CROSSOVER PACKAGING AND TRANSPORTATION RESPONSIBILITIES		3	5	11/90	DONE	0
PT.1-6	TRANSPORTATION PROGRAM	HAZARDOUS MATERIALS TRANSPORTATION SAFETY ACT OF 1990	3	45	3/91	DONE	0
PT.12-1	HANDLING AND STORAGE OF HAZARDOUS MATERIALS	29 CFR 1910	2	414	5/91	9/92	732
PT.12-2	PLANNING OF RADIOACTIVE MATERIALS PACKAGING NEEDS	DOE 5480.3 AND 5480.3A	3	8	3/91	8/91	0
PT.12-3	ABSENCE OF ONSITE TRANSFER PLAN	DOE 5480.3 AND 5480.3A	3	5	XREF	XREF	0
PT.12-4	CONFLICTING CONTAMINATION LIMITS	DOE 5480.3	3	5	11/90	DONE	0
PT.2-1	HAZARDOUS MATERIALS TRANSPORTATION INFORMATION	40 CFR 100-177	2	133	4/91	6/92	0
PT.3-1	DIVISIONAL QA PACKAGING AND TRANSPORTATION PROCEDURES		3	5	2/91	12/91	43
PT.3-2	TRANSPORTATION PROGRAM AUDITS		2	30	XREF	XREF	9
PT.6-1	ONSITE TRANSPORT OF WASTE		2	487	11/90	XREF	657
PT.6-2	LOW-LEVEL WASTE BOTTLE TESTING	DOE 5480.3 AND 5480.3A	3	5	11/90	DONE	10
PT.6-3	INCONSISTENCY OF REGULATORY TERMINOLOGY		3	40	11/90	8/91	0
PT.8-1	SAFETY STANDARDS FOR VEHICLE IDENTIFICATION	DOE 5480.3 AND 5480.3A	2	58	XREF	XREF	0
PT.8-2	UNNECESSARY TRANSPORT OF HAZARDOUS MATERIALS	DOE 5480.3 AND 5480.3A	2	87	XREF	XREF	0
PT.8-3	ONSITE TRANSFERS OF HAZARDOUS MATERIALS	DOE N5480.3 AND 5480.3A	2	133	XREF	XREF	0
PT.9-1	CENTRAL FILE FOR OFFSITE SHIPPING DOCUMENTS		3	5	XREF	12/91	0
PT.9-2	TRAFFIC HAZARDS ON BETHEL VALLEY ROAD		1	607	3/91	12/92	375
QA/BMPF-1	QA/QC DEFICIENCIES IN THE MMES/ORNL ENVIRONMENTAL SAMPLING PROGRAMS	NONE	3	9	11/90	11/91	1241
QA/CF-1	STANDARD OPERATING PROCEDURES DEFICIENCIES FOR SOME	DOE ORDER 5700.6B	2	55	1/91	12/91	26

FINDING NUMBER	FINDING DESCRIPTION	COMPLIANCE PROTOCOL	DOE PRIORITY	RISK WEIGHT	BEGIN DATE	END DATE	TOTAL COST
	MMES/ORNL PROJECTS						
QA/CF-2	DEFICIENCIES WITH THE MMES ENVIRONMENTAL SURVEILLANCE PROCEDURES QUALITY CONTROL PROGRAM MANUAL		3	5	2/91	7/91	0
QV.1-1	RESOURCES TO APPLY QA FUNCTIONS	DOE 5700.6B AND ANSI/ASME NQA-1	2	60	6/91	9/91	1481
QV.1-2	LINE ORGANIZATIONS ARE NOT IMPLEMENTING THE QA PROGRAM	DOE 5700.6B AND ANSI/ASME NQA-1	2	63	7/91	9/91	0
QV.1-3	QA DEPARTMENT AUDIT PROGRAM	DOE 5700.6B	2	55	11/90	12/91	988
QV.1-4	INTERNAL AUDITS/SURVEILLANCES ARE INFREQUENTLY PERFORMED	DOE 5700.6B AND ANSI/ASME NQA-1	2	55	11/90	12/91	0
QV.1-5	QA PLANS AND MANUALS DO NOT REFLECT SPECIFIC DOE REQUIREMENTS	DOE 5700.6B AND ANSI/ASME NQA-1	2	56	6/91	12/91	95
QV.1-6	CORRECTIVE ACTIONS ARE UNTIMELY AND INEFFECTIVE	DOE 5700.6B	2	94	7/91	12/91	12
QV.2-1	PROCUREMENT CONTROLS	DOE 5700.6B AND ANSI/ASME NQA-1	2	82	3/91	9/92	9
QV.3-1	PROVISIONS FOR RECEIVING/INSTALLATION	ANSI/ASME NQA-1	2	59	5/91	12/91	7
QV.4-1	CALIBRATION FACILITIES		2	5	7/91	9/91	17
QV.4-2	CALIBRATIONS PROGRAM	DOE 5700.6B AND ANSI/ASME NQA-1	2	56	11/90	1/92	6
QV.5-1	SAFETY-RELATED HARDWARE AND MATERIALS	DOE 5700.6B AND ANSI/ASME NQA-1	2	61	12/91	9/93	335
QV.6-1	QUALITY RELATED INSPECTIONS	DOE 5700.6B AND ANSI/ASME NQA-1	2	62	6/91	3/92	13
QV.7-1	SPECIAL PROCESS TRAINING	ANSI/ASME NQA-1	2	58	6/91	11/91	493
RAD/CF-1	INADEQUATE RADIOLOGICAL DOSE ASSESSMENT	DOE 5400.5, 5700.6B, AND ANSI/ANS 10.3	2	55	3/91	8/91	112
RAD/CF-2	INADEQUATE RADIOLOGICAL POSTINGS	DOE 5480.11, ORNL HPRP 2.3, REV. 1	2	65	3/91	8/91	249
RAD/CF-3	UNMONITORED DECONTAMINATION LAUNDRY DISCHARGES	10 CFR 834 AND DOE 5400.5	2	58	11/90	10/91	37
RAD/CF-4	INADEQUATE CALIBRATION OF RADIOLOGICAL MONITORS	10 CFR 834 AND DOE 5400.5	2	55	2/91	12/93	38
RAX.2-1	RESIN CARRYOVER IN RESIN REGENERATIVE SYSTEM		4	5	8/91	1/92	1400
RAX.3-1	CONTAMINATION OF THE HFIR POOL		4	1	11/90	DONE	0
RAX.4-1	HFIR SPENT FUEL CASK NOT APPROVED BY DOE	10 CFR 71	2	1	1/91	5/91	10

FINDING NUMBER	FINDING DESCRIPTION	COMPLIANCE PROTOCOL	DOE PRIORITY	RISK WEIGHT	BEGIN DATE	END DATE	TOTAL COST
RCS.1-1	MANAGEMENT OF CRITICALITY SAFETY PROGRAM	DOE 5480.6 AND 5480.5	3	55	4/91	3/92	135
RCS.1-2	TIMELY RESOLUTION OF CRITICALITY SAFETY ISSUES		3	5	5/91	7/91	25
RCS.5-1	CRITICALITY ALARM SYSTEMS	ANSI/ANS-8.3-1986	3	55	11/90	DONE	10
RCS.5-2	DISTRIBUTION OF NUCLEAR ACCIDENT DOSIMETERS	DOE 5480.5 AND 5480.11	2	55	DONE	DONE	143
RCS.5-3	PERFORMANCE OF CRITICALITY DRILLS	ANSI/ANS-8.3-1986, SECT. 7.3 AND DOE 5480.5, PARA. 11C(3)(G)	3	55	11/90	DONE	0
REA.1-1	SAFETY OVERVIEW OF BLDG. 7900		3	5	3/91	5/91	428
REA.3-1	UPDATING OF RESEARCH REACTORS EXPERIMENTER'S GUIDE		4	5	3/91	5/92	30
REA.3-2	VERIFICATION OF REACTOR EXPERIMENT CALCULATIONS		3	0	2/91	12/91	10
REA.4-1	CONTROL OF POTENTIAL PERSONNEL EXPOSURE		3	8	2/91	10/91	5
REP.2-1	HFIR EMERGENCY PREPAREDNESS PLANNING	DOE 5500.5 AND DRAFT DOE 5500.3A	3	85	4/91	3/93	101
REP.3-1	TRAINING OF DESIGNATED EMERGENCY RESPONDERS	DOE 5500.3A	3	55	11/90	5/91	3
REP.5-1	HFIR STACK RADIOLOGICAL EFFLUENT MONITORS	DOE 5500.5, 6A(1) AND (3)	2	50	11/90	9/92	719
REP.5-2	EMERGENCY RESOURCES	DOE 5500.5 AND DRAFT DOE 5500.3A	3	55	11/90	6/92	19
REP.6-1	EMERGENCY ASSESSMENT AND NOTIFICATION PROCEDURES	DOE 5500.5 AND DRAFT DOE 5500.3A	3	55	4/91	4/93	100
REP.7-1	HFIR EMERGENCY PREPAREDNESS PLANNING	DOE N5500.5 AND DRAFT DOE 5500.3A	3	55	6/91	10/92	11
RFP.1-1	ORGANIZATION AND ADMINISTRATION OF FIRE PROTECTION PROGRAM	DOE 5480.7	2	5	9/91	6/92	6
RFP.4-1	SPRINKLER SYSTEM IN BLDG 7902	NFPA 13, DOE 5480.7, AND 5480.4	2	53	3/91	7/93	800
RFP.4-2	SMOKE DETECTION SYSTEMS AT THE HFIR	NFPA 72-E	3	50	11/91	3/93	700
RFP.4-3	USE OF PREACTION-TYPE SPRINKLERS	NFPA 13	2	53	12/91	2/93	500
RFP.7-1	DIKING AND FIRE-RESISTANT ENCLOSURES AT THE HFIR	NFPA 30	2	51	4/91	4/92	160
RFP.7-2	POTENTIAL FIRE HAZARDS AT THE HFIR	NFPA 101	2	50	4/91	4/93	116
RFR.1-1	TRAINING FOR UNREVIEWED SAFETY QUESTION DETERMINATIONS	DOE 5480.6, SECT. 8(G)(6)	3	5	10/91	4/92	25

FINDING NUMBER	FINDING DESCRIPTION	COMPLIANCE PROTOCOL	DOE PRIORITY	RISK WEIGHT	BEGIN DATE	END DATE	TOTAL COST
RFR.1-2	REVIEW BOARD FOR NUCLEAR SAFETY ASSESSMENTS		4	5	11/90	DONE	37
RFR.4-1	NEW FORMAT FOR WRITTEN REPORTS	DOE 5480.6, SECT. 8G(8)	4	1	2/91	5/92	2
RMA.1-1	CONTROL OF MAINTENANCE SUPPORT		4	0	2/91	5/91	3
RMA.2-1	TORQUING OF EQUIPMENT BOLTING		4	5	11/90	5/91	2
RMA.2-2	UNSAFE CONDITIONS AT THE B REACTOR FACILITIES	DOE 5483.1A AND 4330.4	2	356	XREF	XREF	0
RMA.3-1	MAINTENANCE OF B REACTOR AREAS	29 CFR 1910 AND DOE 4330.4	2	403	11/90	6/92	707
RMA.3-2	INSPECTION OF RRD MAINTENANCE ACTIVITIES	DOE 5480.6 AND 29 CFR 1910.179	3	8	6/91	10/92	2910
RMA.4-1	OVERSIGHT OF MAINTENANCE SUPERVISORS		3	5	11/90	6/91	806
RMA.5-1	MAINTENANCE AT SHUT-DOWN REACTORS	DOE 5480.6	2	403	XREF	XREF	0
RMA.8-1	DEFICIENT PROCEDURAL INFORMATION		3	5	XREF	XREF	0
ROA.1-1	FUNDING FOR MAINTENANCE OF ORR	DOE 5480.6	2	59	11/90	DONE	1554
ROA.1-2	APPROVAL OF ORR SHUTDOWN PLANS	DOE 5480.6	3	55	3/91	8/91	0
ROA.1-3	DECOMMISSIONING PLAN FOR HPRR	DOE 5480.6	3	5	2/91	9/95	0
ROA.1-4	FUNDS FOR MAINTENANCE OF HPRR	DOE 5480.6	3	55	11/90	DONE	1028
ROA.1-5	FUNDING FOR THE BULK SHIELDING FACILITY	DOE 5480.6	3	60	11/90	DONE	3622
ROA.1-6	STATUS OF THE BULK SHIELDING FACILITY	DOE 5480.6	3	55	3/91	7/91	0
ROA.1-7	STATUS OF THE CEF "W" CELL	DOE 5480.6	3	55	8/91	9/92	80
ROA.1-8	LINE MANAGEMENT RESPONSIBILITIES IN RRD	DOE 5480.6	3	55	11/90	DONE	0
ROA.1-9	MANAGEMENT POSITION DESCRIPTIONS FOR RRD		4	5	11/90	DONE	0
ROA.3-1	PROGRAM TO INCREASE SAFETY		4	5	11/90	10/91	0
ROA.6-1	PERFORMANCE EVALUATIONS FOR SAFETY		3	5	11/90	DONE	1
ROA.7-1	HFIR FINAL SAFETY ANALYSIS REPORT	DOE 5481.1B AND DOE 5480.6	2	80	11/90	9/91	6935
ROA.7-2	UPDATING OF SAFETY ANALYSIS REPORTS FOR BSF AND PCA	DOE 5481.1B AND 5480.6	2	55	3/91	10/95	430
ROA.7-3	UPDATING OF SAFETY ANALYSIS REPORT FOR TSF	DOE 5481.1B AND 5480.6	2	80	3/91	10/96	320
ROA.7-4	CONTROL OF DOCUMENTS		3	5	11/90	5/91	33
ROA.7-5	PROCEDURES	DOE 5480.6	2	55	11/90	XREF	0
ROA.8-1	SUBSTANCE ABUSE PROGRAM		4	5	2/91	6/91	0
ROP.2-1	DEFICIENCIES IN HFIR OPERATING INSTRUCTIONS		3	5	11/90	9/91	39

FINDING NUMBER	FINDING DESCRIPTION	COMPLIANCE PROTOCOL	DOE PRIORITY	RISK WEIGHT	BEGIN DATE	END DATE	TOTAL COST
ROP.2-2	TECHNICAL SPECIFICATIONS AT HFIR	DOE 5480.6	3	5	6/91	12/91	61
ROP.2-3	AMBIGUITIES HFIR OPERATING INSTRUCTIONS		3	5	11/90	12/91	55
ROP.2-4	HFIR SHIFT CHECK SHEETS	INPO 85-017, REV. 1	3	5	2/91	10/91	8
ROP.2-5	HFIR REACTOR LOG		4	5	6/91	12/91	18
ROP.2-6	HFIR CREW COMMUNICATIONS		3	5	6/91	12/91	18
ROP.3-1	HFIR OPERATING MANUAL		3	5	11/90	12/91	27
ROP.3-2	USE OF HFIR PROCEDURES		3	5	5/91	9/91	41
ROP.3-3	PREPARATION AND REVIEW OF HFIR OPERATING PROCEDURES	DOE 5480.19	4	5	4/91	2/92	200
ROP.4-1	TAGGING PROCEDURES		3	5	XREF	XREF	0
ROP.4-2	RECORDS OF HFIR EQUIPMENT		3	5	6/91	7/91	14
RP.1-1	ACCOMPLISHING ES&H COMPLIANCE	DOE 5480.11	2	68	5/91	9/91	66
RP.1-2	ES&H COMPLIANCE STAFF		2	95	8/91	9/92	5063
RP.1-3	MANAGEMENT OVERSIGHT	DOE 5480.11	2	73	11/90	9/91	1019
RP.10-1	POSITIVE CONTROL OF CONTAMINATION	DOE 5480.11	2	77	XREF	1/92	30
RP.10-2	CONSISTENCY OF RADIATION PROTECTION POLICIES		2	73	XREF	1/92	0
RP.10-3	CONTROL OF LAUNDRY WASTEWATER	DOE 5400.5	2	58	3/91	3/92	311
RP.10-4	REQUIREMENTS FOR LAUNDRY CONTAMINATION CONTROL		3	13	9/91	9/95	16063
RP.11-1	MANAGEMENT SUPPORT FOR ALARA	DOE 5480.11 AND THE DOE ALARA MANUAL	2	63	5/91	10/92	2245
RP.12-1	OCCUPATIONAL EXPOSURE RECORDS PROGRAM	DOE 5480.11 AND ANSI N13.6	2	65	12/91	12/92	47
RP.12-2	REPORTING OF DOSIMETRY DATA	DOE 5480.11 AND 5484.1	2	60	11/90	11/91	42
RP.12-3	CONTROL OF OCCUPATIONAL EXPOSURE RECORDS	DOE 5480.11 AND 5484.1, ANSI N13.6, AND ANSI/ASME NQA-1	2	108	6/91	11/92	505
RP.3-1	ORNL POSTING AND CONTAMINATION PROGRAM	DOE 5480.11	2	73	3/91	10/91	28
RP.3-2	CONTAMINATION CONTROL PROGRAM		3	8	6/91	4/92	1072
RP.3-3	SOURCE CONTROL PROGRAM		3	16	3/91	10/91	76
RP.3-4	X-RAY GENERATING MACHINE POLICY AND REQUIREMENTS	ORNL HP MANUAL PROCEDURE 2.8	3	6	11/90	10/93	6
RP.3-5	ACCELERATOR POLICY REQUIREMENTS AND OVERSIGHT	DOE 5482.1B	3	6	XREF	XREF	0
RP.3-6	MATERIAL CLEARANCE	DOE 5480.11 AND 5400.5	2	63	3/91	9/92	2450
RP.3-7	DOCUMENTATION OF RADIATION HAZARDS	DOE 5480.11	2	65	XREF	8/91	15

FINDING NUMBER	FINDING DESCRIPTION	COMPLIANCE PROTOCOL	DOE PRIORITY	RISK WEIGHT	BEGIN DATE	END DATE	TOTAL COST
RP.5-1	PERSONNEL NUCLEAR ACCIDENT DOSIMETERS	DOE 5480.11	2	55	11/90	DONE	103
RP.5-2	DIRECT-READING DOSIMETERS		3	10	3/91	9/91	17
RP.6-1	AIR SAMPLES	DOE 5480.11	2	63	9/91	3/93	18821
RP.6-2	TIMELINESS OF AIR SAMPLING PROGRAM	DOE INTERNAL DOSIMETRY PERFORMANCE STANDARD	3	5	10/91	12/92	56
RP.6-3	SURVEYING PERSONNEL FOR CONTAMINATION		3	8	10/91	12/91	157
RP.7-1	INTERNAL RADIATION DOSIMETRY PROGRAM	DOE 5480.11 AND DOE INTERNAL DOSIMETRY PERFORMANCES STANDARD	2	58	12/91	3/93	41892
RP.7-2	IN VIVO CALIBRATIONS	DOE INTERNAL DOSIMETRY PERFORMANCES STANDARD	2	58	9/91	7/92	34
RP.8-1	RADIATION PROTECTION INSTRUMENT PROGRAM	ANSI N232 REQUIREMENTS	2	61	10/91	3/92	705
RP.8-2	APPROVAL OF RADIATION PROTECTION INSTRUMENTS		2	56	8/91	8/92	286
RP.8-3	TESTING OF SAFETY RELATED INSTRUMENTS	DOE PRESCRIBED STANDARDS	2	56	XREF	XREF	0
RP.8-4	HIGH RANGE RADIATION PROTECTION INSTRUMENTATION	ANSI N320, N323, AND N42.17C	2	58	XREF	6/92	518
RP.8-5	RADIATION PROTECTION INSTRUMENTATION PROGRAM		4	5	11/91	1/92	30
RPP.1-1	REVIEW OF RRD	DOE 5480.10	2	0	4/91	6/91	181
RPP.2-1	ORNL SAFETY MANUAL	ANSI/ASME NQA-1, ESS.6.1, ORNL X-3SH-6, AND ORNL QA-L-6-100	2	55	XREF	5/91	0
RPP.2-2	SAFETY PERSONNEL INVOLVEMENT WITH SAFETY WORK PERMITS		3	5	11/90	6/91	5
RPP.2-3	UPDATING OF RRD MANUALS		3	5	11/90	11/91	0
RPP.2-4	ORNL HOISTING AND RIGGING EQUIPMENT	29 CFR 1910 AND DOE HOISTING AND RIGGING MANUAL	2	405	5/91	12/91	30
RPP.3-1	INDUSTRIAL SAFETY AT TSF	DOE 5483.1A, SECT. 1	2	356	11/90	9/93	97
RPP.3-2	CARCINOGENS IN RRD FACILITIES	DOE 5480.10	2	50	11/90	12/91	40

FINDING NUMBER	FINDING DESCRIPTION	COMPLIANCE PROTOCOL	DOE PRIORITY	RISK WEIGHT	BEGIN DATE	END DATE	TOTAL COST
RPP.3-3	ORNL ELECTRICAL PROGRAM	DOE 5483.1A	3	55	4/91	6/92	47
RPP.4-1	RRD MONITORING PROGRAM	DOE 5480.10	2	53	2/91	4/91	335
RPP.5-1	HAZCOM PROGRAM AT RRD	29 CFR 1910.1200 AND 1910.1450	2	353	3/91	6/91	0
RQV.1-1	RRD QUALITY ASSURANCE PROGRAM MANUAL	ANSI/ASME NQA-1	3	55	11/90	11/91	0
RQV.1-10	DATA BASE TRENDING SYSTEM	DOE 5300.3A, SECT. B, ITEM C(2)	3	55	12/92	4/92	30
RQV.1-11	OCCURRENCE REPORTING SYSTEM	DOE 5700.6B	3	5	6/91	12/92	11
RQV.1-2	MANAGEMENT ASSESSMENT OF RRD	NQA-1	3	50	11/90	12/91	0
RQV.1-3	IMPLEMENTING RRD PROCEDURES		3	5	12/90	10/91	0
RQV.1-4	THOROUGHNESS OF PROCEDURES	NQA-1	3	55	4/91	3/92	0
RQV.1-5	REVISION OF PROCEDURES	NQA-1	3	55	3/91	9/91	547
RQV.1-6	FREQUENCY OF RRD QA AUDITS	QA-RRD-18-100	3	55	11/90	12/91	0
RQV.1-7	METHOD OF QUESTIONING RRD QA AUDITS	QA-RRD-18-100, SECT. 200.1	4	5	11/90	6/91	0
RQV.1-8	RRD CORRECTIVE ACTION PROGRAM	DOE 5700.6B	3	55	1/91	3/92	230
RQV.1-9	CONFLICTING GOALS IN RRD	RRAP-1.8.4	4	5	2/91	5/91	10
RQV.2-1	JUSTIFICATION OF PRODCUREMENT DEVIATIONS	ANSI/ASME NQA-1, NQA-1 SUPPLEMENT 15S-1, PAR. 4-4	3	5	11/90	6/91	26
RQV.2-2	PURCHASE ORDER AND QUALITY REQUIREMENTS	DOE 54700.6B, PAR. 9 AND NQA-1	3	55	11/90	11/90	6
RQV.3-1	ADEQUACY OF INSPECTIONS	NQA-1	3	6	5/91	12/91	32
RQV.3-2	DOCUMENTATION OF "USE-AS-IS" CLASSIFICATION	NQA-1 SUPPLEMENT 15S-1, PAR. 4.4	3	0	4/91	2/92	21
RQV.4-1	DOCUMENTATION OF ACCEPTANCE INSPECTIONS	NQA-1, SECT. 12S-1-3.2	3	6	11/90	6/91	0
RQV.4-2	MEASUREMENT AND TEST EQUIPMENT CALIBRATIONS	ANSI/ASME NQA-1, 12-S1, PAR. 3.1	3	50	XREF	XREF	0
RQV.4-3	USE OF UNCONTROLLED AND UNCALIBRATED INSTRUMENTS		3	50	6/91	12/91	0
RQV.4-4	DETERMINING EFFECTS OF OUT-OF-TOLERANCE EQUIPMENT	NQA-1, SECT. 12S-1-3.2	3	50	3/91	12/92	60
RQV.5-1	JUSTIFICATION OF DEVIATIONS AND NONCONFORMANCES	DOE 5700.6B, SECT. 6.6	4	5	5/91	6/91	3
RQV.5-2	TRENDING OF NONCONFORMING ITEMS	DOE 5700.6B, NQA-1	3	51	XREF	XREF	0

FINDING NUMBER	FINDING DESCRIPTION	COMPLIANCE PROTOCOL	DOE PRIORITY	RISK WEIGHT	BEGIN DATE	END DATE	TOTAL COST
		SUPPLEMENT 15S-1, PAR. 4.4					
RQV.5-3	IDENTIFICATION AND STORAGE OF PARTS AND MATERIAL	NQA-1	3	50	11/90	1/93	652
RQV.5-4	EVALUATING UNREVIEWED SAFETY QUESTIONS	DOE 5480.5, SECT. 9H	3	50	11/90	DONE	0
RQV.6-1	INSPECTION REPORTS	NQA-1	3	51	4/91	5/92	30
RQV.7-1	CONTROL OF SPECIAL PROCESS MATERIAL	NQA-1	3	50	3/91	6/91	40
RQV.7-2	SPECIAL PROCESS PROCEDURES		3	50	XREF	XREF	0
RRP.10-1	CONTROL OF LOW-LEVEL CONTAMINATION	DOE 5480.11	3	5	11/90	6/92	90
RRP.10-2	WASTE MINIMIZATION		3	5	2/91	6/91	25
RRP.11-1	ADDRESSING ALARA ISSUES	DOE 5480.11, SECT. 8B	3	5	2/91	6/91	0
RRP.3-1	SOURCE CONTROL	DOE 5480.11	3	50	6/91	9/91	19
RRP.3-2	RADIOACTIVE SOURCE INVENTORIES		4	5	11/90	9/91	5
RRP.4-1	POSTINGS OF RADIOLOGICAL CONDITIONS	DOE 5480.11	3	55	4/91	7/91	25
RRP.4-2	RADIOLOGICAL CONTROLS IN THE EXPERIMENT AREA	DOE 5480.11, SECT. 9K(2)(A)	2	6	11/90	10/92	0
RRP.8-1	INSTRUMENTS		3	50	XREF	XREF	0
RSS.1-1	NEW SAFEGUARDS AND SECURITY ELEMENTS		3	55	11/90	10/91	40
RSS.3-1	ANALYSES TO DETERMINE APPROPRIATE WEAPONS	DOE 5480.16, CHAPT. II, 2J AND OR 5480.16, CHAPT. II, 2J	2	105	11/90	10/92	40
RSS.4-1	SAFETY APPRAISALS AND AUDITS FOR FIREARMS	DOE 5480.16, CHAPT. III	3	105	11/90	10/92	67
RTC.1-1	POSITION TASK ANALYSES	DOE 5480.6, SECT. 8E(1)(D)	3	55	11/90	6/92	290
RTC.1-2	CLASS B REACTOR TRAINING PLAN	DOE 5480.6	4	55	11/90	DONE	0
RTC.1-3	INSTRUCTORS FOR MAINTENANCE TRAINING	ANS 3.1	3	55	XREF	XREF	0
RTC.10-1	TRAINING FOR MANAGERS, SUPERVISORS, AND TECHNICAL STAFF	DOE 5480.6, SECT. 8E(1)(A)	3	55	9/91	9/92	134
RTC.2-1	EXAMINATIONS FOR OPERATOR AND REACTOR SUPERVISOR TRAINING	DOE 5480.6, SECT. 8E(1)(D)3A	4	5	DONE	DONE	0
RTC.4-1	GENERAL EMPLOYEE ACCESS TRAINING	DOE 5480.11	3	55	11/90	DONE	0
RTC.5-1	MAINTENANCE PERSONNEL TRAINING PROGRAM	DOE 5480.6	3	55	XREF	XREF	0
RTC.5-2	TRAINING FACILITIES FOR MAINTENANCE PERSONNEL		3	55	XREF	XREF	0

FINDING NUMBER	FINDING DESCRIPTION	COMPLIANCE PROTOCOL	DOE PRIORITY	RISK WEIGHT	BEGIN DATE	END DATE	TOTAL COST
RTS.1-1	TECHNICAL SUPPORT FOR RRD TASKS		3	5	11/90	1/92	1806
RTS.1-2	BACKUP FOR RRD STAFF		3	6	4/91	6/91	685
RTS.2-1	CONSISTENCY OF TECHNICAL SPECIFICATIONS AND PROCEDURES	DOE 5480.6, 5480.4, AND 10 CFR 50.36(C)(3)	3	55	4/91	6/92	50
RTS.2-2	SAFETY ANALYSIS REPORTS FOR HFIR AND TSF	DOE 5481.1B AND 5480.6	2	80	XREF	XREF	0
RTS.3-1	FACILITY DESIGN MODIFICATIONS	DOE 5480.6, SECT. 8G(8)(A)	3	55	11/90	DONE	0
RTS.3-2	CONFIGURATION CONTROL OF PLANT DESIGN MODIFICATION	RRAP 3.1, REV. 4	4	5	11/90	5/91	1
RTS.3-3	DRAWING CHANGES FOR THE HFIR	DOE 5480.6, SECT. 8G(8)(A)	3	55	11/90	6/91	15
RTS.4-1	EQUIPMENT PERFORMANCE TRACKING		4	5	1/92	1/93	75
RTS.5-1	ENVIRONMENTAL IMPACT	DOE 5440.1C	2	390	11/90	6/91	0
RTS.7-1	REACTOR ENGINEERING FUNCTION AT HFIR AND TSF		4	5	11/90	DONE	0
SA-1	THE ORNL SELF ASSESSMENT PROCESS	NONE	3	138	6/91	1/92	6407
SS.1-1	ANALYSIS OF PROTECTIVE FORCE EQUIPMENT	DOE 5480.16	2	112	XREF	XREF	0
SSB/BMPF-1	DELAYED BENTHIC DATA ANALYSES AND REPORTING	NONE	3	5	3/91	2/93	275
SSB/CF-1	INADEQUATE RADIOACTIVE CONTAMINATION CONTROL	NONE	2	108	6/91	12/91	1554
SW/BMPF-1	INADEQUATE ORNL CROSS-CONNECTIONS STUDY	NONE	3	121	4/92	9/93	3924
SW/BMPF-2	LIQUID RADIONUCLIDE RELEASES FROM ORNL FACILITIES	NONE	1	103	8/91	5/94	1370
SW/BMPF-3	LACK OF BACKFLOW PREVENTION DEVICES	NONE	3	6	9/91	9/91	0
SW/BMPF-4	UNREPAIRED LEAKS FROM WATERWATER SEWER SYSTEMS	NONE	1	49	11/90	9/95	228936
SW/BMPF-5	LACK OF CERTIFICATION OF TREATMENT PLANT OPERATORS AND BACKFLOW PREVENTER REPAIRERS	NONE	4	1	6/94	12/98	364
SW/CF-1	DISCHARGES NOT INCLUDED ON THE ORNL NPDES PERMIT OR PERMIT RENEWAL	TCA 69-3-108(B)(6)	2	448	6/91	9/94	192
SW/CF-2	INCONSISTENT LABELING OF ORNL SINKS AND DRAINS	ORNL EPA 18.0(6.2.3)	3	20	6/91	12/91	109
SW/CF-3	INACCURATE STREAM FLOW MEASUREMENT DEVICES	ORNL NPDES PERMIT	2	405	6/91	9/93	1356
SW/CF-4	NPDES PERMIT EXCEPTIONS	ORNL NPDES PERMIT NO. TN0002941	2	448	6/91	4/93	752
SW/CF-5	LACK OF NPDES BEST MANAGEMENT PRACTICES PROGRAM PLAN	40 CFR 125.104 AND TN NPDES PERMIT	2	354	3/91	6/91	25
SW/CF-6	DEFICIENCIES OF SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN	40 CFR 112.3	2	410	6/91	9/91	50

FINDING NUMBER	FINDING DESCRIPTION	COMPLIANCE PROTOCOL	DOE PRIORITY	RISK WEIGHT	BEGIN DATE	END DATE	TOTAL COST
TC.1-1	TRAINING PROGRAMS AT ORNL		2	358	11/90	3/92	840
TC.1-2	EXAMINATIONS		3	37	XREF	XREF	0
TC.1-3	TRAINING STAFFS		3	562	4/91	1/92	6899
TC.10-1	TRAINING FOR SUPERVISORS		2	87	12/91	2/92	0
TC.5-1	MAINTENANCE TRAINING PROGRAM	DOE 5480.6 AND DOE 5480.5, 10B(2)	2	588	7/91	6/93	0
TC.7-1	TRAINING FACILITIES		3	58	5/91	10/93	4320
TC.7-2	TRAINING RECORDS STORAGE	ASME NQA-1-1989 AND DOE 1324.2A	3	58	11/91	1/93	100
TCM/BMPF-1	PESTICIDE PROGRAM DEFICIENCIES	NONE	3	5	11/90	9/91	0
TCM/CF-1	PCB WASTES STORED LONGER THAN ONE YEAR	40 CFR PART 761.65(A)	2	405	1/91	DONE	15
TCM/CF-2	DEFICIENCIES WITH THE TSCA ASSUMPTION REQUIREMENTS FOR LIQUID FILLED ELECTRICAL EQUIPMENT	40 CFR 761	2	410	11/90	9/91	76
TCM/CF-3	INADEQUATE LABELLING OF EQUIPMENT CONTAINING PCB CAPACITORS	40 CFR 761.50(A)(4)	2	405	11/90	DONE	0
TCM/CF-4	DEFICIENCIES WITH TSCA TEMPORARY STORAGE FACILITY REQUIREMENTS	40 CFR 761.65(C)(1), 40 CFR 761.65(3), AND 40 CFR 761.50(A)(10)	2	405	11/90	DONE	0
TCM/CF-5	LACK OF HAZARD IDENTIFICATION LABELS FOR SOME CHEMICAL STORAGE TANKS	MMES-ORNL EPM-15.0	3	10	11/90	DONE	0
TCM/CF-6	LACK OF SECONDARY CONTAINMENT FOR SOME ABOVEGROUND STORAGE TANKS/CONTAINERS		3	9	12/91	12/92	1856
TCM/CF-7	DEFICIENCY WITH TSCA STORAGE FOR DISPOSAL MONITORING POLICY AND STORAGE FOR DISPOSAL POLICY	40 CFR PART 761.65(A)	3	5	2/91	6/91	470
TS.2-1	SAFETY ANALYSIS REPORT UPDATE PROGRAM		2	311	2/91	DONE	6
TS.3-1	PROCEDURES FOR LOW-COST FACILITY MODIFICATIONS	DOE 5481.1B AND 5480.5	3	8	6/91	XREF	15
TS.3-2	RESOURCE ALLOCATION FOR DRAWINGS UPDATES		2	311	XREF	10/91	5861
TS.4-1	PUBLICATION OF UNUSUAL OCCURRENCE REPORTS		2	55	XREF	XREF	0
WM/BMPF-1	INADEQUATE ASSESSMENTS OF OFFSITE VENDORS RECYCLING LEAD-ACID BATTERIES AND CIRCUITBOARDS	NONE	3	5	1/91	3/91	10
WM/BMPF-2	INADEQUATE WASTE MINIMIZATION PROGRAM	TDHE 1200-1-11-.03, RCRA 3002, AND DOE	1	56	11/90	6/92	1921

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		5400.3					
WM/CF-1	INADEQUATE OPERATION OF MIXED WASTE STORAGE FACILITY	TDHE 1200-1-11-.05	1	413	11/90	9/91	202
WM/CF-10	INADEQUATE LEAK DETECTION OF PETROLEUM UNDERGROUND STORAGE TANKS	MMES-ORNL SOP EMC-012-01 AND 40 CFR 280	3	5	3/91	9/91	0
WM/CF-11	INADEQUATE HAZARDOUS WASTE DETERMINATION OF SANITARY SEWAGE TREATMENT PLANT SLUDGE	TDHE 1200-1-11-.03	2	408	11/90	3/91	40
WM/CF-12	INADEQUATE DAILY INSPECTIONS OF RCRA FACILITIES ON WEEKENDS	TDHE 1200-1-11-.05(10)(F)	2	405	11/90	DONE	0
WM/CF-13	INADEQUATE CHARACTERIZATION OF MIXED WASTE IN STORAGE	TDHE 1200-1-11-.03 AND .05	2	408	6/92	09/97	8000
WM/CF-2	IMPROPER OPERATION OF SATELLITE ACCUMULATION AREAS AT ORNL FACILITIES AT Y-12	TDHE 1200-1-11.03	2	406	11/90	DONE	0
WM/CF-3	INADEQUATE HAZARDOUS WASTE ACCUMULATION AND MINIMIZATION AT ORNL BIOLOGY DIVISION AT THE Y-12 PLANT	TDHE 1200-1-11-.03 AND TDHE 1200-1-11-.05	2	406	11/90	DONE	0
WM/CF-4	LACK OF INTEGRITY ASSESSMENT OF 7860A HAZARDOUS WASTE STORAGE TANK	TDHE 1200-1-11-.05	1	409	3/91	DONE	127
WM/CF-5	INADEQUATE TRAINING FOR ONSITE HAZARDOUS WASTE TRANSPORTERS	TDHE 1200-1-11-.05(2)	2	410	4/91	10/91	90
WM/CF-6	STORAGE OF LAND DISPOSAL RESTRICTED MIXED WASTE	40 CFR 268.5	1	406	11/90	9/92	3590
WM/CF-7	INADEQUATE STORAGE OF RADIOACTIVELY CONTAMINATED HAZARDOUS WASTE LEAD	TDHE 1200-1-11-.01 THROUGH .09 AND 40 CFR PART 268	1	405	3/91	8/91	921
WM/CF-8	INADEQUATE TRAINING DOCUMENTATION AND PROCEDURES FOR 7507 HAZARDOUS WASTE STORAGE FACILITY	TDHE 1200-1-11-.05	3	5	11/90	6/91	7
WM/CF-9	INADEQUATE TRAINING RECORDS AND INSPECTION RECORDS AT THE 3001 STORAGE CANAL	TDHE 1200-1-11-.05 AND 40 CFR 265.195(C)	1	405	1/91	6/91	135
WS.3-1	CONTROL OF ASBESTOS	29 CFR 1910.1001 AND 29 CFR 1910.1200	2	468	5/91	7/92	371
WS.4-1	MACHINE GUARDING	29 CFR 1910 SUBPART O	1	910	4/91	9/94	1490
WS.4-2	NONCOMPLIANCES OF BUILDING EGRESS	29 CFR 1910 SUBPART E	2	458	3/91	9/94	6795

FINDING NUMBER	FINDING DESCRIPTION	COMPLIANCE PROTOCOL	DOE PRIORITY	RISK WEIGHT	BEGIN DATE	END DATE	TOTAL COST
WS.4-3	MACHINERY INSPECTION AND PREVENTATIVE MAINTENANCE	29 CFR 1910 SUBPARTS F AND N	2	483	5/91	12/91	25
WS.4-4	ORNL ELECTRICAL COMPLIANCE	DOE-PRESCRIBED OCCUPATIONAL SAFETY STANDARDS	1	935	11/90	9/94	5772
WS.4-5	EQUIPMENT AND OPERATIONS AREA	29 CFR 1910.253	1	935	11/90	7/91	351
WS.4-6	ORNL FIRE PROTECTION	29 CFR 1910 SUBPART L	2	409	7/91	8/91	25

APPENDIX D

SUMMARY OF ACTIONS FOR ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT FIVE-YEAR PLAN

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: AX.4-1		PRIORITY: 2		RISK WEIGHT:		56	FISSILE MATERIAL STORAGE HANDLING ACTIVITIES			
1	3	3	0	0	0	0	0	PROGRAM	EM-ADS387	REQUESTED
2	5	5	0	0	0	0	0	PROGRAM	EM-ADS387	REQUESTED
3	68	68	0	0	0	0	0	PROGRAM	EM-ADS387	REQUESTED
TOTALS:	76	76	0	0	0	0	0			
FINDING NUMBER: GW/BMPF-1		PRIORITY: 2		RISK WEIGHT:		50	INADEQUATE WELL AND BOREHOLE ABANDONMENT			
10	14860	0	0	2860	3000	3000	6000	PROGRAM	EM-ADS329	REQUESTED
10	250	250	0	0	0	0	0	PROGRAM	EM-ADS329	NEW
11	1302	0	102	1200	0	0	0	PROGRAM	EM-ADS333	REQUESTED
12	20977	0	0	0	0	1800	19177	PROGRAM	EM-ADS333	REQUESTED
13	250	250	0	0	0	0	0	PROGRAM	EM-ADS333	NEW
13	14856	0	2182	1830	3788	4656	2400	PROGRAM	EM-ADS333	REQUESTED
2	15	15	0	0	0	0	0	PROGRAM	EM-ADS332	FUNDED
3	10	10	0	0	0	0	0	PROGRAM	EM-ADS0322AB	FUNDED
4	110	0	110	0	0	0	0	PROGRAM	EM-ADS033	NEW
5	190	0	190	0	0	0	0	PROGRAM	EM-ADS329	REQUESTED
6	50	50	0	0	0	0	0	PROGRAM	EM-ADS332	FUNDED
6	90	0	90	0	0	0	0	PROGRAM	EM-ADS329	REQUESTED
7	220	0	120	100	0	0	0	PROGRAM	EM-ADS329	REQUESTED
7	50	50	0	0	0	0	0	PROGRAM	EM-ADS332	FUNDED
8	402	402	0	0	0	0	0	PROGRAM	EM-ADS332	FUNDED
8	6390	0	6390	0	0	0	0	PROGRAM	EM-ADS332	REQUESTED
9	90	0	50	40	0	0	0	PROGRAM	EM-ADS329	REQUESTED
TOTALS:	60112	1027	9234	6030	6788	9456	27577			
FINDING NUMBER: GW/BMPF-2		PRIORITY: 1		RISK WEIGHT:		50	INADEQUATE MONITORING WELL AND BOREHOLE INVENTORY, SECURITY, AND MAINTENANCE			
5	150	0	150	0	0	0	0	PROGRAM	EM-ADS311AA	REQUESTED
5	1497	0	0	350	366	382	399	PROGRAM	EM-ADS311AA	ONGOING
TOTALS:	1647	0	150	350	366	382	399			
FINDING NUMBER: GW/BMPF-5		PRIORITY: 2		RISK WEIGHT:		117	INADEQUATE CHARACTERIZATION OF THE HYDROGEOLOGIC REGIME			
2	75	75	0	0	0	0	0	PROGRAM	EM-ADS413	FUNDED
3	75	75	0	0	0	0	0	PROGRAM	EM-ADS413	FUNDED
4	100	0	100	0	0	0	0	PROGRAM	EM-ADS413	REQUESTED
5	125	0	125	0	0	0	0	PROGRAM	EM-ADS413	REQUESTED
6	17796	17796	0	0	0	0	0	PROGRAM	EM-ADS363,324,325	FUNDED
6	149511	0	26670	27650	26367	26733	42091	PROGRAM	EM-ADS363,324,325	REQUESTED
TOTALS:	167682	17946	26895	27650	26367	26733	42091			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: IWS/CF-1 PRIORITY: 2 RISK WEIGHT: 410 INADEQUATE INVENTORY AND IDENTIFICATION OF INACTIVE WASTE SITES										
1-2	25	25	0	0	0	0	0	PROGRAM	EM-ADS322	FUNDED
TOTALS:	25	25	0	0	0	0	0			
FINDING NUMBER: RAX.2-1 PRIORITY: 4 RISK WEIGHT: 5 RESIN CARRYOVER IN RESIN REGENERATIVE SYSTEM										
1	200	200	0	0	0	0	0	PROGRAM	EM-ADS350	FUNDED
2	1200	0	1200	0	0	0	0	CAPITAL	EM-GPP	REQUESTED
TOTALS:	1400	200	1200	0	0	0	0			
FINDING NUMBER: SSB/BMPF-1 PRIORITY: 2 RISK WEIGHT: 108 INADEQUATE RADIOACTIVE CONTAMINATION CONTROL										
4	1500	0	1500	0	0	0	0	PROGRAM	EM-	NEW
TOTALS:	1500	0	1500	0	0	0	0			
FINDING NUMBER: SW/BMPF-2 PRIORITY: 1 RISK WEIGHT: 103 LIQUID RADIONUCLIDE RELEASES FROM ORNL FACILITIES										
1	110	110	0	0	0	0	0	PROGRAM	EM-ADS350,366	FUNDED
2	110	0	45	35	30	0	0	PROGRAM	EM-ADS350,366	REQUESTED
2	1000	0	1000	0	0	0	0	CAPITAL	EM-ADS366	REQUESTED
TOTALS:	1220	110	1045	35	30	0	0			
FINDING NUMBER: SW/BMPF-4 PRIORITY: 1 RISK WEIGHT: 49 UNREPAIRED LEAKS FROM WATERWATER SEWER SYSTEMS										
1	5026	5026	0	0	0	0	0	PROGRAM	EM-ADS302,304,378	FUNDED
1	60032	0	6840	16722	11490	8540	16440	PROGRAM	EM-ADS302,304,378	REQUESTED
1	7081	7081	0	0	0	0	0	LINE ITEM	EM-ADS302,304,378	FUNDED
1	121147	0	4647	15900	26500	39100	35000	LINE ITEM	EM-ADS302,304,378	REQUESTED
1	20	20	0	0	0	0	0	PROGRAM	EM-ADS350	FUNDED
1	80	0	40	40	0	0	0	PROGRAM	EM-ADS350	REQUESTED
1	500	500	0	0	0	0	0	CAPITAL	EM-ADS350 GPP	FUNDED
2	10	10	0	0	0	0	0	PROGRAM	EM-ADS302,304,378	FUNDED
2	50	0	10	10	10	10	10	PROGRAM	EM-ADS302,304,378	REQUESTED
2	410	0	200	100	80	30	0	PROGRAM	EM-ADS350	REQUESTED
2	1400	0	0	1400	0	0	0	CAPITAL	EM-ADS350 GPP	REQUESTED
3	30	0	0	0	0	30	0	PROGRAM	EM-ADS350	REQUESTED
ALL	21650	0	6650	3000	4000	4000	4000	CAPITAL	EM-ADS349,350,378	REQUESTED
TOTALS:	217436	12637	18387	37172	42080	51710	55450			
FINDING NUMBER: SW/CF-4 PRIORITY: 2 RISK WEIGHT: 448 NPDES PERMIT EXCEPTIONS										
4	700	0	700	0	0	0	0	CAPITAL	EM-ADS399	REQUESTED
TOTALS:	700	0	700	0	0	0	0			

ACTION	TOTAL COST	FY91 COST	FY92 COST	FY93 COST	FY94 COST	FY95 COST	BEYOND FY95	TYPE COST	FUND SOURCE	STATUS
FINDING NUMBER: TCM/CF-1			PRIORITY: 2		RISK WEIGHT: 405			PCB WASTES STORED LONGER THAN ONE YEAR		
1	2	2	0	0	0	0	0	PROGRAM	EM-ADS344	FUNDED
3	5	5	0	0	0	0	0	PROGRAM	EM-ADS344	FUNDED
5	8	8	0	0	0	0	0	PROGRAM	EM-ADS344	FUNDED
TOTALS:	15	15	0	0	0	0	0			
FINDING NUMBER: TS.3-2			PRIORITY: 2		RISK WEIGHT: 311			RESOURCE ALLOCATION FOR DRAWINGS UPDATES		
3	2780	2780	0	0	0	0	0	PROGRAM	EM-	REQUESTED
3	586	586	0	0	0	0	0	PROGRAM	EM-	REQUESTED
TOTALS:	3366	3366	0	0	0	0	0			
FINDING NUMBER: WM/BMPF-2			PRIORITY: 1		RISK WEIGHT: 56			INADEQUATE WASTE MINIMIZATION PROGRAM		
1	5	5	0	0	0	0	0	PROGRAM	EM-ADS356	NEW
2	5	5	0	0	0	0	0	PROGRAM	EM-ADS356	NEW
3	10	10	0	0	0	0	0	PROGRAM	EM-ADS350	NEW
3	54.	0	10	10	11	11	12	PROGRAM	EM-ADS350	ONGOING
4	10	10	0	0	0	0	0	PROGRAM	EM-ADS349	NEW
4	902	0	165	172	180	188	197	PROGRAM	EM-ADS349	ONGOING
5	902	0	165	172	180	188	197	PROGRAM	EM-ADS356	ONGOING
8	28	0	5	5	6	6	6	PROGRAM	EM-ADS356	ONGOING
TOTALS:	1916	30	345	359	377	393	412			
FINDING NUMBER: WM/CF-1			PRIORITY: 1		RISK WEIGHT: 413			INADEQUATE OPERATION OF MIXED WASTE STORAGE FACILITY		
10	30	30	0	0	0	0	0	PROGRAM	EM-ADS348	FUNDED
2	5	5	0	0	0	0	0	PROGRAM	EM-ADS348	FUNDED
5	35	35	0	0	0	0	0	PROGRAM	EM-ADS348	FUNDED
6	2	2	0	0	0	0	0	PROGRAM	EM-ADS348	FUNDED
7	120	120	0	0	0	0	0	PROGRAM	EM-ADS348	FUNDED
8	10	10	0	0	0	0	0	PROGRAM	EM-ADS348	FUNDED
TOTALS:	202	202	0	0	0	0	0			
FINDING NUMBER: WM/CF-13			PRIORITY: 2		RISK WEIGHT: 408			INADEQUATE CHARACTERIZATION OF MIXED WASTE IN STORAGE		
ALL	8000	0	1000	1000	1000	1500	3500	PROGRAM	EM-ADS352	REQUESTED
TOTALS:	8000	0	1000	1000	1000	1500	3500			
FINDING NUMBER: WM/CF-4			PRIORITY: 1		RISK WEIGHT: 409			LACK OF INTEGRITY ASSESSMENT OF 7860A HAZARDOUS WASTE STORAGE TANK		
1	20	20	0	0	0	0	0	PROGRAM	EM-ADS311AA,331	FUNDED
2	107	0	0	25	26	27	29	PROGRAM	EM-ADS311AA,331	ONGOING