LOCKHEED MARTIN

ENVIRONMENTAL RESTORATION PROGRAM

ORNL/ER-355

Molten Salt Reactor Experiment Facility (Building 7503) Standards/Requirements Identification Document Adherence Assessment Plan at Oak Ridge National Laboratory, Oak Ridge, Tennessee

ENERGY SYSTEMS ER

MANAGED BY
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FOR THE UNITED STATES
DEPARTMENT OF ENERGY

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Energy Systems Environmental Restoration Program

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APPROVALS

Molten Salt Reactor Experiment Facility
(Building 7503)
Standards/Requirements Identification
Document Adherence Assessment
at Oak Ridge National Laboratory,
Oak Ridge, Tennessee

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Date

PREFACE

This document was prepared in response to the *Department of Energy Implementation Plan in Response to Defense Nuclear Facilities Safety Board Recommendation 90-2*, Revision 5, November 1994. This document was prepared under Activity Data Sheet 3701, Work Breakdown Structure element number 1.4.12.6.2.01.

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ABBREVIATIONS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
D&D	decontamination and decommissioning
DOE	U. S. Department of Energy
DNFSB	Defense Nuclear Facilities Safety Board
ER	Environmental Restoration (Program)
ES&H	Environmental Safety and Health
H&S	Health and Safety (Organization)
MSRE	Molten Salt Reactor Experiment
ORNL	Oak Ridge National Laboratory
ORO	Oak Ridge Operations
PAAA	Price Anderson Act Amendment
QA	quality assurance
S/RID	standards/requirements identification document
WM	Waste Management (Program)

EXECUTIVE SUMMARY

This is the Phase 2 (adherence) assessment plan for the Building 7503 Molten Salt Reactor Experiment (MSRE) Facility standards/requirements identification document (S/RID). This document outlines the activities to be conducted from FY 1996 through FY 1998 to ensure that the standards and requirements identified in the MSRE S/RID are being implemented properly. This plan is required in accordance with the *Department of Energy Implementation Plan for Defense Nuclear Facilities Safety Board Recommendation 90-2*, November 9, 1994, Attachment 1A. This plan addresses the major aspects of the adherence assessment and will be consistent with Energy Systems procedure QA-2.7 "Surveillances."

1. PURPOSE

This is the Phase 2 assessment for the Molten Salt Reactor Experiment (MSRE) Facility (Building 7503) standards/requirements identification document (S/RID). This document outlines the activities that will be conducted from FY 1996 through FY 1998 to ensure that the standards and requirements identified in the MSRE S/RID are being implemented properly. The assessments will continue annually as part of the Oak Ridge National Laboratory's (ORNL's) internal assessment program. This plan is required in accordance with the *Department of Energy Implementation Plan for Defense Nuclear Facilities Safety Board Recommendation 90-2*, November 9, 1994, Attachment 1A. Fig. 1 below clarifies the distinction between Phase 1 (administrative documentation ensuring applicable requirements are included and examined in implementing command media) and Phase 2 (compliance documentation verifying work operations based on implementing command media) assessments.

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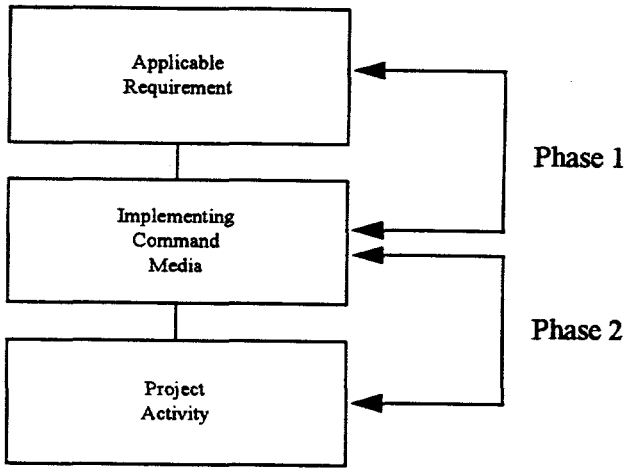

Fig. Phase 1 (administrative) and Phase 2 (adherence) assessments.

2. BACKGROUND

The U.S. Department of Energy (DOE) has established the Standards/Requirements Program to identify appropriate environmental, safety, and health (ES&H) and quality standards and requirements for selected sites, facilities, and activities, and to assess the status of implementation of those standards/requirements. The ES&H and quality requirements are documented in S/RIDs for each of these

selected sites, facilities, and activities. The purpose of the MSRE S/RID is to identify the standards and requirements that are necessary and sufficient to provide an adequate level of protection to workers, the public, and the environment. Organizations responsible for implementation of the requirements develop and propose the S/RIDs, and DOE reviews and approves the documents. Approval of the S/RID constitutes a determination of adequacy. The status of compliance with each of the requirements included in an S/RID is determined by performing implementation assessments.[1]

Implementation involves two phases: (1) the requirements must be addressed in the implementing documents (e.g., policies, procedures, engineering drawings, training materials, safety analysis reports, etc.) of the site, facility, or activity; (2) the actions and conditions at the site, facility, or activity must be consistent with the specifications in the implementing command media. A standards/requirements implementation assessment is the systematic process for identifying and resolving noncompliances with an S/RID. A complete implementation assessment must include both phases of implementation to ensure compliance. Phase 1 assessments involve the review and evaluation of the implementing documents to determine whether they specify the actions and conditions necessary for compliance with each requirement. Phase 1 was completed in December 1995. Phase 2 assessments involve the continuing review of activities and conditions to determine whether they adhere to the implementing documents. Confidence in compliance potential is evidence of properly planned and scheduled Phase 2 assessments.[2]

The MSRE S/RID and the Phase 1 assessment are contained in *Environmental Restoration Facility Standards/Requirements Identification Document and Phase 1 Assessment for Building 7503 Molten Salt Reactor Experiment Facility, Oak Ridge National Laboratory, Oak Ridge, Tennessee*, ORNL/ER-344, December 1995.

3. ORGANIZATIONAL ROLES AND RESPONSIBILITIES

DOE-Oak Ridge Operations (ORO) and Energy Systems/Energy Research are the primary participants in the MSRE Remediation Project. Their roles are described briefly below.[3]

- **DOE-ORO.** Responsible for the overall management of the Environmental Restoration Program (ER) and oversight of Energy Systems/Energy Research and other prime-contractors activities.
- **Energy Systems/Energy Research.** As the DOE prime management and operating contractor, responsible for the integration and general management of ER. This role includes the coordination of all work performed by Energy Systems/Energy Research, its subcontractors, other DOE prime contractors, independent reviewers, and outside specialty assistance in the execution of the MSRE Remediation Project. In addition, Energy Systems/Energy Research performs the following primary functions:
  - — technical investigations, tests and evaluations, and technical analyses;
  - — systems engineering, design, and installation/construction;

[1]Standards/Requirements Identification Document Development and Approval Instruction, DOE, September 1994, page 1.

[2]Standards/Requirements Implementation Assessment Instruction, DOE, September 1994, page 1.

[3]*Environmental Restoration Facility S/RID and Phase 1 Assessment for Building 7503 Molten Salt Reactor Experiment Facility-Oak Ridge National Laboratory*, ORNL/ER-344, Lockheed Martin Energy Systems, Oak Ridge, Tennessee, December 1995. Chapter 7

  - facility operation and maintenance;
  - interim corrective measures;
  - operation of remedial systems;
  - waste management;
  - regulatory and administrative compliance;
  - surveillance and maintenance (S&M); and
  - project management and project control.

- **Jacobs Engineering Group**. As the DOE technical support contractor, Jacobs Engineering Group supports the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) documentation requirements.

3.1 DOE ORGANIZATION

Fig. 2 depicts the overall ER organizational structure and interfaces. The DOE assistant secretary for Environmental Management has assigned programmatic responsibilities to the deputy assistant secretary for ER. The deputy assistant secretary for ER performs the following functions:

- provides programmatic and technical direction to DOE-ORO through the DOE Headquarters (DOE-HQ) program manager,
- reviews and approves program implementation plans, and
- assesses the status and quality of program implementation.

The deputy assistant secretary for ER has delegated direct management of ER to the manager, DOE-ORO, who has delegated this authority to the assistant manager for Environmental Management. The DOE-ORO director, Environmental Restoration Division, reports to the assistant manager for Environmental Management. DOE-ORO provides management oversight, such as safety review, quality assurance (QA), budget guidance, project management, procurement, security, legal and environmental compliance review, and coordination with DOE-HQ. DOE-ORO also provides the interface with the regulators, U.S. Environmental Protection Agency and the Tennessee Department of Environment and Conservation, through the Environmental Restoration Division.

The assistant manager for Environmental Management is responsible for setting policy for DOE-ORO and ensuring coordination among ER, the Waste Management Program, and all other functions and programs at DOE-ORO.

As the DOE OR-1 project manager, the director of DOE-ORO, Environmental Restoration Division, has overall responsibility and authority for planning and execution and is also the contracting officer's representative for ER activities within Energy Systems, except engineering and construction activities.

The assistant manager for Construction and Engineering manages all design and construction activities. This manager verifies the accuracy of the cost, schedule, and progress reporting of contractors and their subcontractors, works closely with DOE-ORO, Environmental Restoration Division, and establishes control systems to provide early warning of problems affecting regulatory commitments and cost or schedule status.

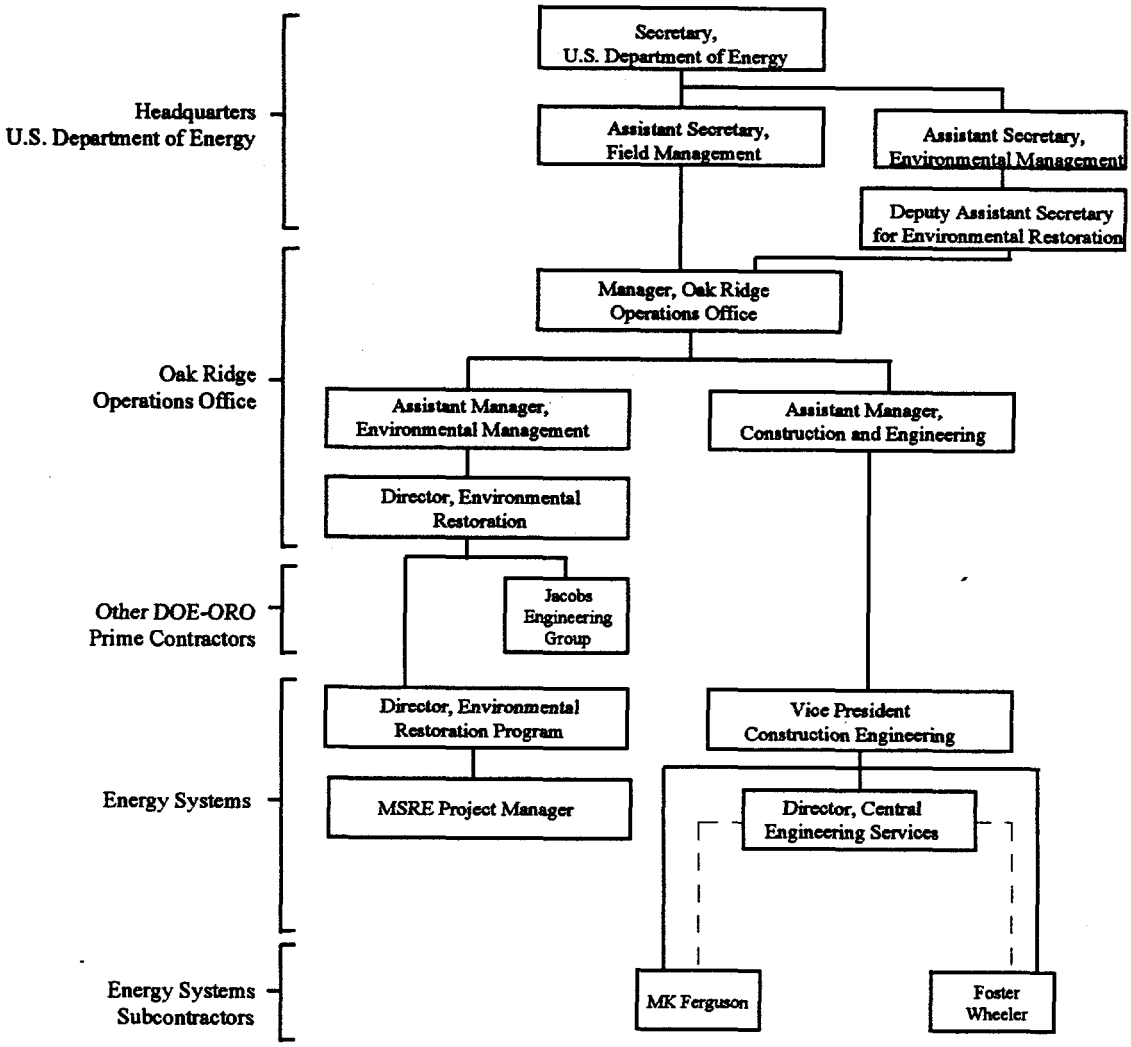

Fig. 2. Molten Salt Reactor Experiment organizational responsibilities and interfaces.

3.2 ENERGY SYSTEMS ORGANIZATION

ER has overall responsibility for environmental restoration activities, including D&D. Responsibility for the MSRE Remediation Project has been assigned to the D&D manager at the Oak Ridge National Laboratory (ORNL). Energy Systems has established an MSRE Remediation Project Office to execute the project. Design and construction support is provided to the project office through Central Engineering Services. The organization structure for the project office is depicted in Fig. 3.

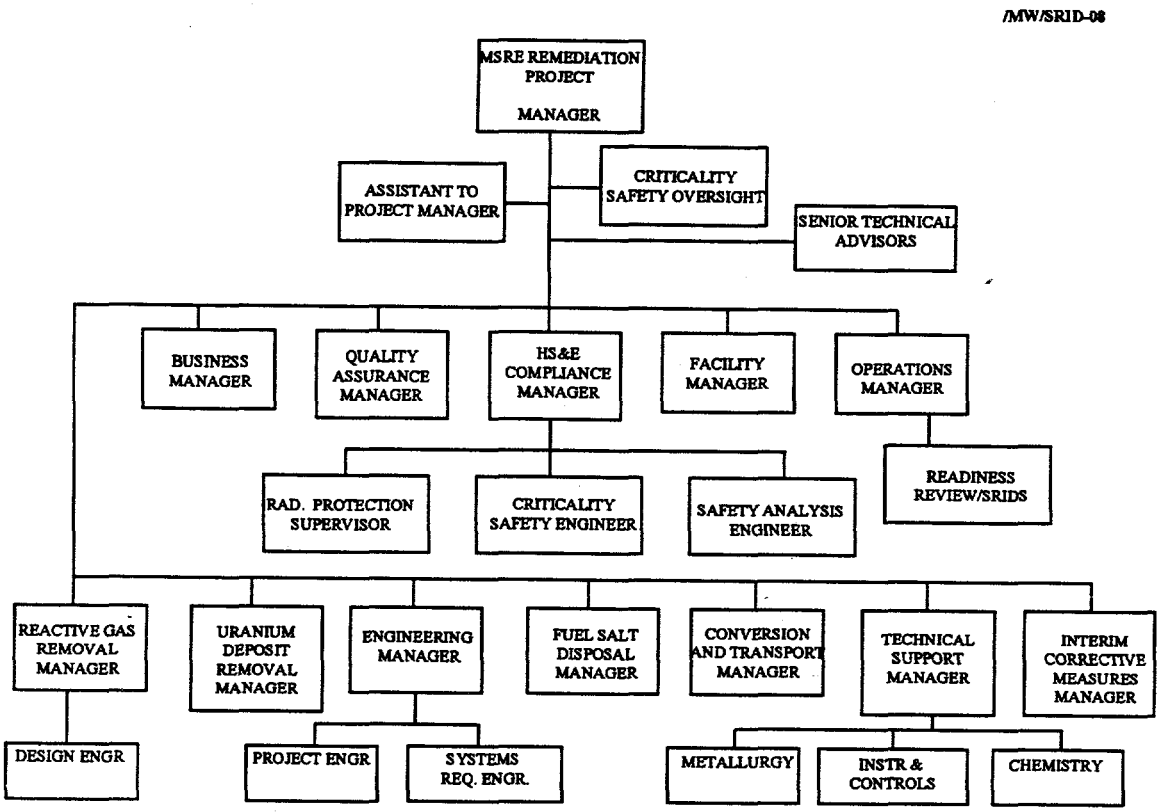

Fig. 3. Molten Salt Reactor Experiment Remediation Project office functional organizational chart.

The manager of the MSRE Remediation Project Office is responsible for the overall successful execution of the project. Organization responsibilities are assigned within the project office as follows:

- **Deputy manager for administration.** Responsible for the execution and coordination of the primary administrative functions in support of the project, including finance, procurement, subcontract administration, and records management.
- **QA.** Responsible for assisting line management to ensure that all aspects of project execution are accomplished according to DOE and Energy Systems QA policies and procedures.
- **Compliance.** Responsible for assisting line management to ensure that the project is accomplished in compliance with legal and administrative requirements governing the remediation of DOE nuclear facilities, including CERCLA; environmental, safety, and health requirements; safeguards and security requirements; and event recording.
- **Facilities manager.** Responsible for preparing the existing MSRE facility to safely support execution of the MSRE Remediation Project, establishing and maintaining a configuration management program for the facility, and safely operating and maintaining the facility during project execution.
- **Technical support manager.** Responsible for conducting tests, evaluations, and associated technical analyses to identify safe and effective technical solutions to MSRE uranium migration concerns.

- **Engineering manager.** Representing Central Engineering Services on the project team, responsible for the economical design, fabrication, procurement, installation, and start up of the technical systems necessary for remediation of MSRE uranium migration.
- **Operations manager.** Responsible for the operation and maintenance of the technical systems installed for remediation of MSRE uranium migration.
- **Waste manager.** Responsible for the safe treatment, storage, minimization, disposal, and certification of all wastes generated as a result of the MSRE Remediation Project.
- **Subproject managers.** Responsible for the successful execution of assigned subprojects, including corrective measures, uranium, and salt subprojects. The subproject managers coordinate the activities of the functional managers, relying upon their resources to accomplish the MSRE mission. They will have direct responsibility and associated resources for project control and systems engineering activities on their respective subprojects.[4]

4. SCOPE

This chapter describes the scope of activities covered in the MSRE S/RID and the adherence assessment.

4.1 FACILITIES, OPERATIONS AND PROJECTS COVERED

The facilities, operations, and projects (or major subprojects) contained in this plan are those defined as being within the scope of the MSRE S/RID. The MSRE S/RID applies to (1) Reactive Gas Removal Phase (Phase II—Purge and Trap Reactive Gases) activities of the MSRE Remediation Project and (2) S&M activities during the project that are related to Phase II facilities, activities, and materials. The Reactive Gas Removal Phase is designed to remove UF_6 and other reactive gases currently contained in MSRE process equipment and facilities located in Building 7503. Fig. 4 presents a schematic of the MSRE Remediation Project work breakdown structure (WBS). The WBS elements included in the scope of the MSRE S/RID are WBS 5.4—Reactive Gas Removal Systems (and lower level elements of 5.4) and WBS 5.7.9—S&M.[5] Building 7503 is classified as a Category II nuclear radiological facility.

4.2 ASSESSMENT PERIOD

This Phase 2 assessment plan for the MSRE facility covers January 1, 1996, through September 30, 1998 (the end of FY 1998).

Future assessments will be consistent with ORNL's internal assessment program and will be throughout the life cycle of activities covered in the MSRE S/RID. The Phase II—Purge and Trap Reactive Gases activities span from mid-FY 1995 through mid-FY 1999, as shown in the schedule and logic diagram for the MSRE Remediation Project in Fig. 5.

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[4] *U.S. Department of Energy,* op.cit.

[5] *Environmental Restoration Facility Standards/Requirement Identification Document and Phase 1 Assessment for Building 7503 Molten Salt Reactor Experiment Facility, Oak Ridge National Laboratory, Oak Ridge, Tennessee,* ORNL/ER-344, December 1995.

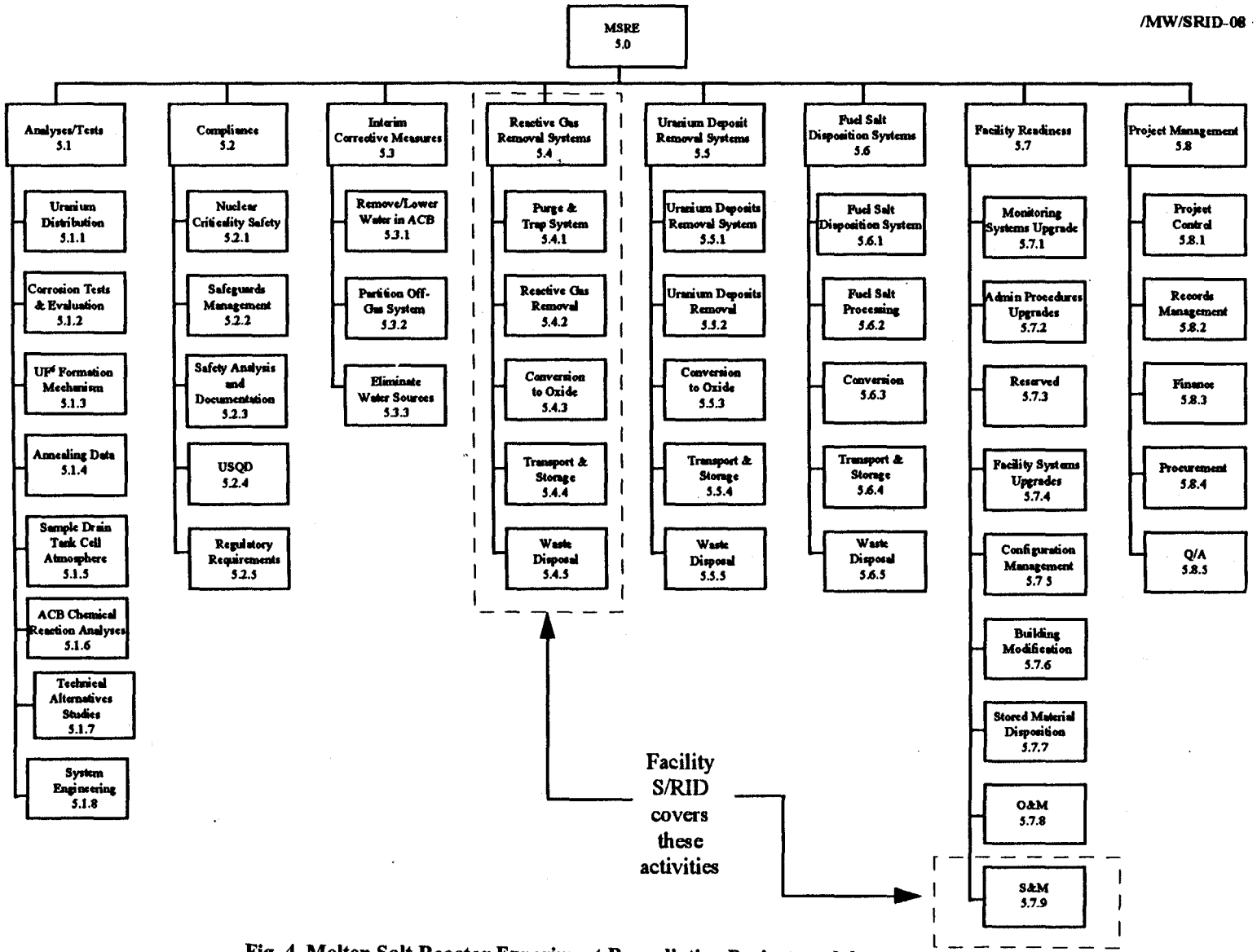

Fig. 4. Molten Salt Reactor Experiment Remediation Project work breakdown structure.

4.3 FUNCTIONAL AREAS

Table 1 lists the 18 functional areas into which the requirement units in the MSRE S/RID are divided.[6] For each functional area, the applicability column in the table (marked "directly applicable," "indirectly applicable," or "not applicable") identifies whether there are requirements that are directly or indirectly applicable to activities within the scope of this assessment plan. Only those functional areas marked "directly applicable" are covered by these assessments.

Those marked as "indirectly applicable" contain requirements that are to be indirectly implemented through the services of outside organizations (i.e., organizations not within the defined scope of the MSRE S/RID, such as radiological protection, fire protection, etc.). The organization or program responsible for implementation, oversight, and adherence assessment for these indirectly applicable requirements is indicated under the heading "Responsible organization."

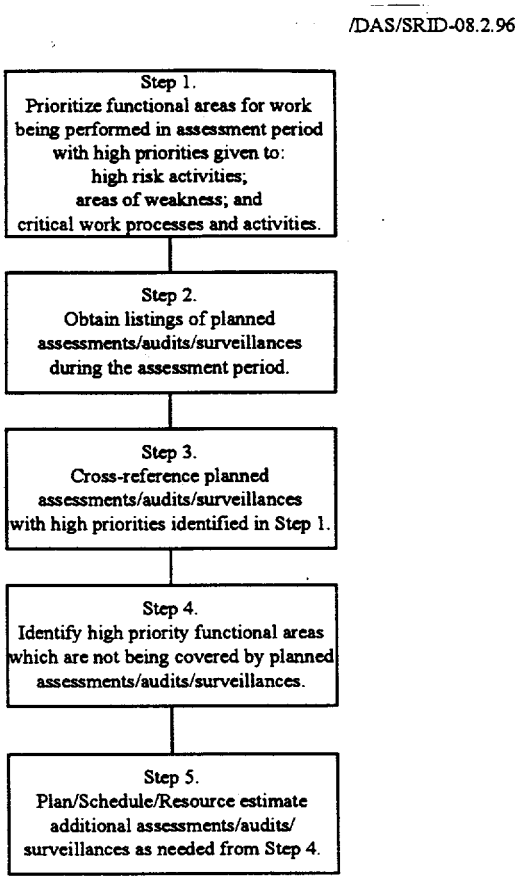

Fig. 5. Phase 2 assessment schedule logic diagram.

[6]U.S. Department of Energy, Oak Ridge Operations Standards Management Program, Implementation Guidance, ORIG 1300.X1A, 7-26-95.

Table 1. Functional areas applicability and responsibility matrix

Functional area	Applicability (indirect, direct, or N/A)	Priority (H,M,L)	Responsible organization	Number of requirement units to assess FY 1996	Number of requirement units to assess FY 1997	Number of requirement units to assess FY 1998
Operations	64 Direct	H	QA/ER	14	14	14
Management Systems	37 Direct	M	QA	13	12	12
Training and Qualification	4 Direct	M	QA	4	—	—
Quality Assurance	42 Direct	H	QA	14	14	14
Maintenance	Indirect	—	P&E	—	—	—
Fire Protection	Indirect	—	Fire Protection	—	—	—
Nuclear Safety	69 Direct	H	H&S	23	23	23
Radiation Protection	20 Direct	H	Radiation Protection	8	8	4
Configuration Management	19 Direct	L	QA	7	6	6
Emergency Preparedness	Indirect	—	Emergency Preparedness	—	—	—
Design Engineering	Indirect	—	Engineering	—	—	—
Occupational Safety and Health	8 Direct	H	H&S	8	—	—
Environmental Restoration	Indirect	—	ER	—	—	—
Waste Management	4 Direct	L	WM	4	—	—
Decontamination and Decommissioning	Indirect	—	D&D	—	—	—
Environmental Protection	Indirect	—	—	—	—	—
Packaging and Transportation	Indirect	—	—	—	—	—
Construction	Indirect	—	—	—	—	—

H, M, and L correspond to 99%, 97%, and 95% confidence levels, respectively.

5. ADHERENCE ASSESSMENT PLANNING

Adherence assessments are continuous processes accomplished over time. These assessments may use existing audits, surveillances, or other strategies to show compliance with standards and requirements of the MSRE S/RID. Adherence assessments follow the establishment of Phase 1 compliance for each functional area or subset of requirements within the MSRE S/RID. The following factors are integral to Phase 2 assessments:

- Phase 1 compliance establishes the basis for conducting Phase 2 assessments;
- Phase 2 assessments measure the degree to which implementing documents are complied with for the site, facility, or activity being assessed;
- the Phase 2 assessment process is part of the ongoing self-assessment process; and
- assessors receive appropriate guidance on effective ways to perform and document these assessments[7].

As shown in Fig. 6, the plan for adherence assessments is composed of five steps. The adherence strategy is to optimize the use of existing assessments and to integrate efforts so as to minimize efforts and get needed data and minimal cost.

5.1 GENERAL PLANNING CRITERIA

Planning is essential to conducting a successful assessment and to the development of a detailed, accurate assessment plan. The following considerations should be included in general planning:

- assessments will be planned and conducted to maximize effective use of resources (e.g., assessment activities should be grouped by tasks, process activities, functional areas, or implementing documents as appropriate);
- high risk activities will be assessed more frequently;
- areas of weakness (e.g. frequent noncompliance) will be addressed more frequently to disclose patterns and trends related to root causes; and
- critical work processes and activities will receive higher assessment priority.[8]

The three priority categories are high, medium, and low. For those functional areas that management designates as high, the appropriate number of requirement units from those functional areas will be chosen to ensure a minimum of 99% confidence in the assessment results. For those functional areas that management designates as medium, the appropriate number of requirement units from those functional areas will be chosen to ensure a minimum of 97% confidence in the assessment results; and for those functional areas that management designates as low, the appropriate number of requirement units from those functional areas will be chosen to ensure a minimum of 95% confidence in the assessment results.

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[7]Standards/Requirements Implementation Assessment Instruction, DOE, September 1994, page 8.

[8]Standards/Requirements Implementation Assessment Instruction, DOE, September 1994, page 8.

5.2 ADHERENCE ASSESSMENT PLAN

This plan is due within 60 days of completion of Phase 1 assessment and will be developed by DOE and contractors for each site, facility, and activity within the scope of the Standards/Requirements Program. This plan identifies the following:

- the specific assessments to be performed;
- assessment schedules;
- the organizations responsible for performing the assessments; and
- estimates of personnel and other resources required.[9]

5.3 SPECIFIC ADHERENCE ASSESSMENTS

Specific assessments will be conducted based on the MSRE S/RID and the Phase 2 assessment plan. These assessments will consider the following:

- the scope of the assessment;
- identification of the assessment team;
- qualification of team members; and
- assessment methodology including definition of assessment objectives and criteria and the process for using "smart sampling."[10]

5.4 INTERNAL ASSESSMENT ACTIVITIES

During this fiscal year, various internal (Energy Systems) assessments unrelated to Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 90-2 will take place. Results of these assessments will be factored into the planned Phase 2 efforts to maximize the use of existing data. These internal assessments will be utilized annually to ensure compliance with the MSRE S/RIDs.

5.5 EXTERNAL ASSESSMENT ACTIVITIES

During this fiscal year, various external (outside Energy Systems) assessments unrelated to DNFSB Recommendation 90-2 will occur. Results of these assessments will be factored into the planned Phase 2 efforts to maximize the use of existing data.

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[9]Standards/Requirements Implementation Assessment Instruction, DOE, September 1994, page 9.

[10]Standards/Requirements Implementation Assessment Instruction, DOE, September 1994, page 9.

5.6 FREQUENCY OF ASSESSMENTS

Assessment activities have been scheduled to ensure that the approved standards and requirements in the MSRE S/RID are reviewed for flowdown and documented as "in compliance" in the implementing command media over a 3-year period.

Assessment activities for the Price Anderson Act Amendment (PAAA) requirements, which are applicable as a consequence of Building 7503 being considered a Category 2 nuclear facility[11] have been scheduled to ensure that they are reviewed for flowdown and documented as "in compliance" in the implementing command media over a 1-year period.

5.7 CONDUCT OF ASSESSMENTS

Specific Phase 2 assessments will be conducted in accordance with written procedures. Conclusions of the assessment will be based on objective evidence.[12]

5.8 ASSESSMENT REPORTS

Assessment documentation will include objective evidence and describe how assessment activities were conducted and how the conclusions were reached. The documentation will correlate the conclusions to the implementing command media. Documentation will be sufficiently detailed to facilitate management review and analysis for trends and patterns.

Specific assessment reports will identify, as a minimum, the following information:[13,14]

- assessment identification number and date of the report;
- name of person(s) performing the review;
- scope of the assessment, including whether at the project or facility S&M level;
- method (audit, surveillance, or self-assessment);
- subject or functional area;
- assessment technique(s) (interview, record review, observation, etc.);
- results linked to implementing command media or requirement unit(s);
- evidence of results (i.e., documents reviewed, activities observed, personnel interviewed, etc.). All requirement units associated with command media assessments (including PAAA requirements for nuclear and radiological facilities) will have adherence evidence documented, both for compliant and noncompliant results.

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[11] 10 CFR 834 and 835.

[12] Standards/Requirements Implementation Assessment Instruction, DOE, September 1994, page 9.

[13] Standards/Requirements Implementation Assessment Instruction, DOE, September 1994, page 10.

[14] Oak Ridge Operations Standards Management Program-Implementation Guidance, ORIG 1300.X1A, 7-26-95.

5.9 PERFORMANCE ANALYSIS AND ISSUES MANAGEMENT

5.9.1 Root Cause

Root cause analysis will be conducted on significant deficiencies to ensure that actions identified will prevent recurrence.

5.9.2 Lessons Learned

Lessons learned will be documented and communicated appropriately.

5.9.3 Performance Indicators and Trending

Performance indicators will be used to track and trend compliance with applicable requirements.

6. ADHERENCE ASSESSMENT SCHEDULE

Table 2 contains the schedule for this assessment for the MSRE S/RID from January 1, 1996, through September 30, 1998. The table contains the following information necessary to complete an assessment:

- the assessment title/identifier;
- the scope or focus (whether a functional area, a statute or order, a WBS element, implementing command media, or some combination of these);
- the type of assessment (internal, ongoing, or external) ;
- the organization responsible;
- the target date for completion; and
- an initial estimate of personnel and other resources required.

7. RESOURCE REQUIREMENTS

The cost estimate to implement this plan is $76,095. Funding will come from ADS 3701.

Table 2. FY 1996 Phase 2 assessment schedule for Molten Salt Reactor Experiment standards/requirement identification document

Assessment title/ identifier	Scope/ focus	Type (internal/ external)	Responsible organization	Target completion date	Resource requirements
Operations	PAAA	internal	QA	Sept. 30, 1996	.3 FTE
Management Systems	Conduct of Operations	internal	QA	Sept. 30, 1998	< .3 FTE
Training and Qualification	Training	internal	MSRE	Sept. 30, 1996	< .1 FTE
Quality Assurance	QA	internal	MSRE	Sept. 30, 1996	.2 FTE
Maintenance	ID	—	—	—	—
Fire Protection	ID	—	—	—	—
Nuclear Safety	Criticality Safety	internal	Safety	Sept. 30, 1998	.3 FTE
Radiation Protection	Radiation Protection	internal	Radiation Protection	Sept. 30, 1998	< .2 FTE
Configuration Management	QA	internal	QA	Sept. 30, 1998	< .2 FTE
Emergency Preparedness	ID	—	—	—	—
Design Engineering	ID	—	—	—	—
Occupational Safety and Health	Safety	internal	Safety	Sept. 30, 1996	< .1 FTE
Environmental Restoration	ID	—	—	—	—
Waste Management	Waste	internal	WM	Sept. 30, 1996	< .1 FTE
Decontamination and Decommissioning	ID	—	—	—	—
Environmental Protection	ID	—	—	—	—
Packaging and Transportation	ID	—	—	—	—
Construction	ID	—	—	—	—

ID—indirects to be addressed during site assessments; FTE—full time employee.

8. ASSESSMENT PERFORMANCE

Acceptable methods to develop objective evidence of adherence will include the following:

- interviews to demonstrate that personnel know and understand the conditions and actions specified by the implementing documents relevant to their responsibilities,
- direct observation of the conditions and the performance of actions specified by the implementing documents, and
- review of records that document prior interviews and direct observations establishing the nature and existence of conditions or activities.

Potential noncompliances to nuclear or radiological safety requirements stemming from PAAA rulings will be screened to determine significance and reportability to DOE.

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