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Quality Assurance Plan for the Molten Salt Reactor Experiment Remediation Project at the Oak Ridge National Laboratory

Phase I—Interim Corrective Measures and Phase II—Purge and Trap Reactive Gases

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ORNL/ER-336

Energy Systems Environmental Restoration Program
ORNL Environmental Restoration Program

Quality Assurance Plan for the Molten Salt Reactor Experiment Remediation Project at the Oak Ridge National Laboratory

Phase I—Interim Corrective Measures and Phase II—Purge and Trap Reactive Gases

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PREFACE

The Quality Assurance Plan described herein responds to the Lockheed Martin Energy Systems, Inc. (Energy Systems) *Quality Program Description* Y/QD-15 Rev. 2 (1995f). See Appendix A in this document and also the *Quality Program Description Implementation Plan* Y/QD-21 Rev. 2 (Energy Systems 1995g). Y/QD-15 applies to Energy Systems central organizations, Defense and Manufacturing (Y-12 Plant), the Environmental Management and Enrichment Facilities business unit, and the Oak Ridge National Laboratory which is managed under Contract No. DE-AC05-840R21400.

Y/QD-15 contains the fifty quality requirement commitments that were adopted as part of Energy Systems response to the Price-Anderson Amendments Act. See the *Price-Anderson Amendments Act (PAAA) Quality Assurance Program Commitments and Implementation Plan* Y/QD-35 Rev. 1 (Energy Systems 1995a).

Y/QD-15 was developed on the premise that the rigor of application of the program should be based on a graded approach to quality commensurate with the identified risk associated with the failure of items, processes, or services as related to the safety of employees or the public, protection of the environment, and achievement of programmatic missions. See Section B of 10 CFR 830.120 and Section 1.3, "Graded Approach," of the accompanying U.S. Department of Energy *Implementation Guide* (DOE 1994).

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ABBREVIATIONS

ACB	auxiliary charcoal bed
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
AVID	Accelerated Vendor Inventory Delivery
CED	Central Engineering Division
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
Energy Systems	Lockheed Martin Energy Systems, Inc.*
ERPS	Environmental Restoration Program Support
ES&H	environment, safety, and health
MSRE	Molten Salt Reactor Experiment
MSRERP	Molten Salt Reactor Experiment Remediation Project
NCR	nonconformance report
NQA-1	Quality Assurance Standards for Nuclear Facilities
OQPI	Office of Quality Programs and Inspection
PAAA	Price-Anderson Amendments Act
P&ED	Plant and Equipment Division
QA	quality assurance
QAP	Quality Assurance Plan
QD	Quality Department (now OQPI)
R&PS	Robotics and Process Systems
WMRA	Waste Management and Remedial Actions
WMRAD	Waste Management and Remedial Action Division

*Prior to June 1995, Martin Marietta Energy Systems, Inc.

EXECUTIVE SUMMARY

This Quality Assurance Plan (QAP) identifies and describes the systems utilized by the Molten Salt Reactor Experiment Remediation Project (MSRERP) personnel to implement the requirements and associated applicable guidance contained in the *Quality Program Description* Y/QD-15 Rev. 2 (Energy Systems 1995f).

This QAP defines the quality assurance (QA) requirements applicable to all activities and operations in and directly pertinent to the MSRERP Phase I—Interim Corrective Measures and Phase II—Purge and Trap objectives. This QAP will be reviewed, revised, and approved as necessary for Phase III and Phase IV activities. This QAP identifies and describes the QA activities and procedures implemented by the various Oak Ridge National Laboratory support organizations and personnel to provide confidence that these activities meet the requirements of this project. Specific support organization (Division) quality requirements, including the degree of implementation of each, are contained in the appendixes of this plan.

INTRODUCTION

This Quality Assurance Plan (QAP) identifies and describes the systems utilized by the Molten Salt Reactor Experiment Remediation Project (MSRERP) personnel to implement the requirements and associated applicable guidance contained in the *Quality Program Description* Y/QD-15 Rev. 2 (Energy Systems 1995f).

This QAP defines the quality assurance (QA) requirements applicable to all activities and operations in and directly pertinent to the MSRERP Phase I—Interim Corrective Measures and Phase II—Purge and Trap objectives. This QAP will be reviewed, revised, and approved as necessary for Phase III and Phase IV activities. This QAP identifies and describes the QA activities and procedures implemented by the various Oak Ridge National Laboratory support organizations and personnel to provide confidence that these activities meet the requirements of this project. Specific support organization (Division) quality requirements, including the degree of implementation of each, are contained in the appendixes of this plan.

Appendix A displays the Energy Systems implementation matrix from Section 2 of Y/QD-15 Rev. 2 (Energy Systems 1995f). It identifies the requirements for Energy Systems compliance and provides a linkage from their source of origin to the implementing Energy Systems implementing procedures.

Enforceable requirements from 10 CFR 830.120 are designated by (PAAA 120-XX**). Price-Anderson Amendments Act (PAAA) applicability is limited to those hardware systems and activities that are specifically identified as nuclear safety related in the Molten Salt Reactor Experiment (MSRE) Facility (Building 7503) authorization basis documents.**

The source documents on which program commitments are based have been coded to indicate their origin. The number 830.120 indicates that the requirement came from the 10 CFR 830.120 rule; a "G" in front of the listing indicates that the requirement came from the associated 830.120 implementation guide. Requirements that stem from U.S. Department of Energy (DOE) Order 5700.6C are similarly indicated.

REQUIREMENTS

Appendix A matrix column, "Y/QD-15 Rev. 2. Program Commitments," displays the quality requirements for this project. The use of the word *shall* denotes a mandatory requirement; the use of the word *should* denotes that the element is recommended guidance for consideration by management in program implementation. **The *shall* requirements must be addressed by all project personnel and support organizations as the requirements apply to their particular activities. Any exception to these requirements must be justified and approved by the project manager.**

Appendixes B through G display matrixes from the primary support organizations for the project. These matrixes contain the ten criteria from 10 CFR 830.120, either in Y/QD-15 (Energy Systems 1995f) format or American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME) Quality Assurance Standards for Nuclear Facilities (NQA-1) format, with an additional column, "Project-Specific Procedures," that identifies the Energy Systems procedures or support organization specific procedures that will be followed to control the quality related activities of the project. If the support organization matrixes contain no project-specific procedure for a given element, the Energy Systems procedure(s) will be used. **Revision of the matrixes will not drive a corresponding revision of this Quality Assurance Plan (QAP) unless newly developed procedures change the current described quality program.**

The matrix approach is an efficient way of identifying the procedures to be followed during the course of the project.

1. CRITERIA 1.0—PROGRAM

1.1 QUALITY POLICY

All Energy Systems MSRERP line management is held responsible for adhering to this QAP by communicating that quality is everyone's responsibility and by developing and implementing procedures with the training required to ensure compliance.

1.2 MANDATORY COMPLIANCE

Overall management responsibility rests with the MSRERP manager. Part of this responsibility is to ensure that activities performed in support of the project provide adequate confidence of satisfactory performance. To provide this assurance, the MSRERP manager has mandated the establishment and conduct of an integrated quality program.

Achieving the objectives described in this plan requires the support of all affected personnel. Adherence to this plan and to applicable implementation procedures and instructions is mandatory for all Energy Systems personnel who perform activities that come under the auspices of this QAP.

1.3 PERFORMANCE OBJECTIVES

The policies and objectives of the MSRERP quality program are

1. to ensure the attainment of the level of quality necessary to accomplish project objectives with the responsibility for the protection of the employees health and safety, protection of the environment, and reliable molten salt facility activities and operations;

2. to ensure that structures, systems, components, etc. designed, procured, fabricated, installed, constructed, and tested for the molten salt facility conform to specified requirements; and

3. to ensure that appropriate QA activities are implemented by or for the MSRERP.

To monitor the achievement of these objectives, the project will track performance indicators. The performance indicators to be tracked include items and activities such as

- unsatisfactory internal audit and surveillance findings,
- commitment action and corrective action status,
- project cost and schedule,
- unsatisfactory external appraisal findings,
- occurrence reporting status, and
- corrective action verifications.

Performance indicators will be monitored by project management and trends evaluated by knowledgeable technical personnel.

1.4 MANAGEMENT RESPONSIBILITY

The MSRERP manager and the project management staff are responsible for the development and implementation of the MSRERP quality program. The project staff, including supporting organizations, implements the quality program in accordance with project management direction and established project procedures. Each member of the project staff is responsible for the quality of the work they perform.

1.5 ROLES AND RESPONSIBILITIES

The MSRERP manager reports to the director for environmental restoration programs. The project manager is responsible for the technical integration and program management; all technical and program planning; contract and project administration; and direction of all MSRERP development, design, procurement, component fabrication, testing efforts, and the quality program.

The manager of the Oak Ridge National Laboratory (ORNL) Office of Quality Programs and Inspection (OQPI) reports to the associate director of operations, environment, safety, and health compliance and is responsible for establishing, maintaining, directing, and managing all QA programs at the ORNL to meet applicable contractual requirements. This position is responsible for ensuring that those programs are implemented throughout the laboratory. The MSRERP QA manager reports administratively to the manager of the ORNL OQPI and programmatically to the MSRERP manager.

1.6 PROJECT ORGANIZATION

The interface relationships between the project and support divisions, Energy Systems, and DOE oversight is shown in Fig.1. **Revision to Fig. 1 may not drive a corresponding revision to this QAP.**

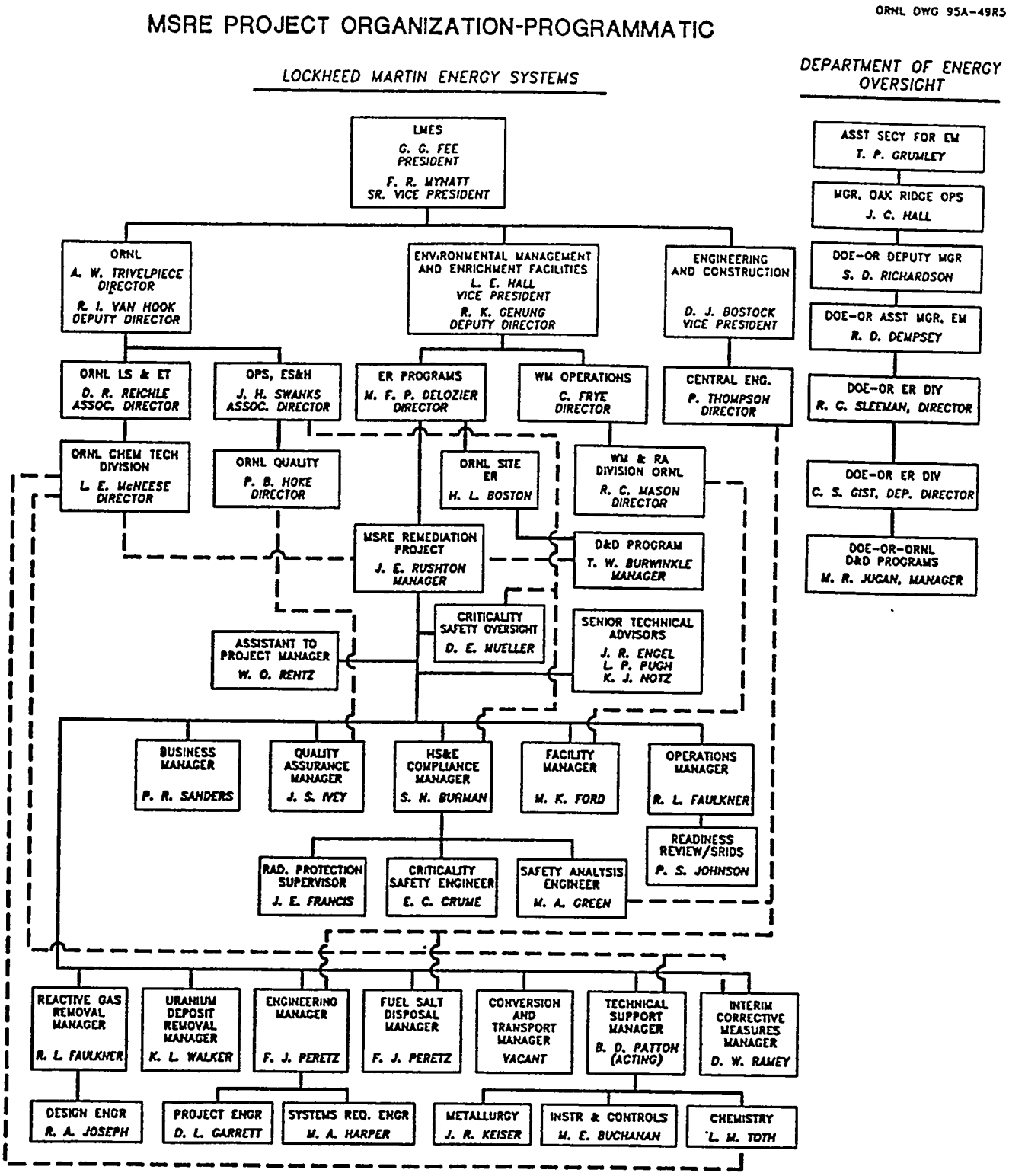

Fig. 1. MSRE Project Organization Chart-Programmatic.

1.7 GENERAL DESCRIPTION OF ROLES AND RESPONSIBILITIES OF SUPPORT ORGANIZATIONS

1. Central Engineering Division (CED): Provides design and construction support for the project. See Appendix B matrix for quality requirements.

2. Waste Management and Remedial Action Division (WMRAD): ER has assigned management and operations of the MSRE Facility to WMRAD. All activities conducted in the MSRE Facility is controlled by the Facility Manager. See Appendix C matrix for quality requirements.

3. Chemical Technology Division: Provides support for testing and experimentation including fabrication of testing and experimental components to be placed in the Facility per approved procedures. See Appendix D matrix for quality requirements.

4. Instrumentation and Controls Division (I&CD): Provides design and/or procurement and implementation of personal computer based monitoring systems to monitor facility instrumentation associated with interim vent and trap operations. See Appendix E for quality requirements.

5. Plant and Equipment Division (P&ED): Provides fabrication activities such as welding, nondestructive testing, etc. to approved drawings, procedures, etc. using certified personnel. See Appendix F for quality requirements.

6. Robotics and Process Systems (R&PS) Division: Provides design, procurement, and fabrication activities, including qualified operators, for remote handling equipment for uranium removal from the facility auxiliary charcoal bed (ACB). The ACB is located in the MSRE Charcoal Bed Cell just south of the facility's vent house. See Appendix G for quality requirements.

NOTE: The support of radiation protection, industrial safety, and criticality safety for the project is addressed in document ORNL/ER-326 entitled, *Health and Safety Plan for the Molten Salt Reactor Experiment Remediation Project at Oak Ridge National Laboratory* (Energy Systems 1995h).

1.8 MATRIX MANAGEMENT AT ORNL

ORNL Standard Practice Procedure X-GP-5 provides guidance for organizations working in the matrix management system and should be utilized as early as possible. Interface working agreements between supporting organizations is of the utmost importance. The need for memoranda of agreement may be eliminated by description in the project management plan.

1.9 PLANNING, SCHEDULING, AND COSTING

Planning, scheduling, and costing for the MSRERP will be managed utilizing an integrated project control system described in the Project Management Plan.

1.10 READINESS REVIEWS

Readiness reviews or assessments will be performed on major work activities having significant safety, reliability, or economic consequences before work commences. See Sects. 9 and 10 of this QAP.

1.11 STOP WORK POLICY

All Energy Systems employees have the authority and responsibility to stop work on the project that is considered to be a serious threat to the safety or health of workers, other personnel, the mission, or to the environment. Planning and scheduling considerations will not override safety considerations when this stop work policy is in effect. When work is stopped due to a hazard/threat to worker safety, health, or the environment, or when a supervisor is notified of a work hazard or threat, the situation and resolution must be documented on form UCN-19937, Employee Concern/Response Program. See "Safety & Health Bulletin" dated April 1995, Issue No. 95-2-Revised (Energy Systems 1995c).

2. CRITERIA 2.0—PERSONNEL TRAINING AND QUALIFICATION

2.1 WORK PERFORMANCE AND TRAINING

The supervisor of personnel working on project activities are responsible for ensuring that personnel are trained and qualified to perform assigned tasks. Training and qualification is completed before personnel are permitted to perform an operation. The supervisor ensures that the required level of competence for the qualified individual is maintained throughout the life of the operation.

Note: In emergency situations, it may not be possible to train personnel for the specific task to be performed. In this situation, the supervisor or engineer in charge of the operation has the responsibility for determining the personnel best qualified to perform the particular task.

2.2 QUALIFICATION REQUIREMENTS

Qualified indicates that personnel have been evaluated with respect to performance-based standards and that documentation issued by their supervisor is available to attest to this fact.

Certified is used to indicate that personnel have met recognized national job performance requirements for a particular function. As a minimum, project personnel are qualified while some personnel, such as those who have met the American Society of Nondestructive Testing Standard SNT-TC-1A, are considered both qualified and certified.

All support organizations utilizing welding or nondestructive testing personnel shall be qualified/certified in accordance with ORNL qualification/certification procedures.

3. CRITERIA 3.0—QUALITY IMPROVEMENT

3.1 MANAGEMENT EXPECTATIONS AND COMMITMENTS

Project management expects and authorizes facility management and project personnel to freely voice concerns and propose solutions pertinent to safety, quality, and any other types of problems that may impact the success of project activities. Project management is committed to a no-fault attitude in dealing with problems that may develop during project activities. Project personnel are required and encouraged to identify problems as a first step in solving them and preventing recurrence. Problem identification is conducted and resulting corrective actions are formulated to effectively address systemic deficiencies, not assign blame to individuals. This approach is crucial to ensure an open atmosphere that fosters the freedom necessary to find problems, fix them, and continue to improve in meeting project needs as identified in facility, technical, programmatic, environmental, safety, health, and quality commitments. Occurrences will be identified, evaluated, reported, corrected, and closed based upon the ORNL occurrence reporting system.

3.2 PROBLEM PREVENTION

Project controls for the prevention of problems consist of work breakdown structure (WBS) planning, task planning, task leader review meetings, task and subtask readiness reviews, system design review meetings, project staff meetings, etc. These activities are designed to define and control work activities to ensure that all requirements are identified, all appropriate actions are specified, acceptable reviews and approvals occur, sufficient documentation is generated, and appropriate oversight is conducted to enable management to assess the adequacy of project controls.

WBS planning is the fundamental element in defining the technical and quality work scopes for the project. Each discrete item or activity is accounted for, and plans are made to accomplish the activity.

Review meetings are conducted by the project to ensure that the facility equipment, and components are designed in accordance with the applicable requirements and that designs meets the needs of the task.

Project-wide reviews, design review meetings, and other project meetings serve as peer/technical reviews for work activities.

3.3 CONTINUOUS IMPROVEMENT

When conditions adverse to quality are detected, they will be documented by means of nonconformance reports, occurrence reports, or assessment reports. All of these reports require a plan for corrective action to prevent recurrence. Depending upon the nature and frequency of the deficiency, follow-up action will be performed to verify implementation of the corrective action by surveillance, inspection, audit, or review.

3.4 NONCONFORMANCES

A nonconformance report (NCR) is evaluated and resolved by the appropriate designer, user, and QA personnel. NCRs generated in supporting divisions shall be resolved within the division with project concurrence. If a nonconforming item or failure is discovered at any time during the design, fabrication, construction, or testing phases of the project, it will be documented and resolved. **All nonconformances generated shall be reported to the project manager and project QA manager.**

4. CRITERIA 4.0—DOCUMENTS AND RECORDS

In accordance with the American National Standards Institute/American Society of Mechanical Engineers Quality Assurance Standards for Nuclear Facilities (ANSI/ASME NQA-1), a *document* is defined as any written or pictorial information describing, defining, specifying, reporting, or certifying activities, requirements, procedures, or results. A *quality assurance record* is a completed document that furnishes evidence of the quality of items and/or activities affecting quality. Quality records include, but are not limited to, drawings, specifications, procedures, operation sheets, supplier certifications, inspection and test reports, nonconformance reports, audit reports, personnel qualifications, computer media used as the primary means of data storage, etc.

4.1 DOCUMENT AND RECORDS STORAGE

All quality assurance documents and records generated during the conduct of MSRERP activities by all project support organizations shall be turned over to the project for storage at the Chemical Technology Division Facility Document Control Center or as designated by the project manager in accordance with approved procedures. QA documents and records should be originals or legible reproduced copies.

All stored documents and records shall be maintained in storage until orders to transfer or destroy are authorized by the cognizant managers of the DOE and the Environmental Restoration Division.

4.2 CORRECTIONS TO DOCUMENTS AND RECORDS

Corrections to records shall be performed by placing a single line through the incorrect item followed by the initials of the person making the correction and the date the correction is made.

5. CRITERIA 5.0—WORK PROCESSES

5.1 CONFIGURATION CONTROL

Procedures WMRA-ERPS-501, "Configuration and Equipment Change Procedure for the Molten Salt Reactor Experiment Facility," and WMRA-ERPS-502, "Molten Salt Reactor Experiment Work Package Preparation,"or approved alternatives shall be utilized to control work and maintain configuration control at the MSRE Facility.

5.2 IDENTIFICATION AND CONTROL OF ITEMS

General use items and laboratory equipment that are adequately labeled or identified by the supplier and stored such that item identity and status are maintained do not require any additional identification controls or markings.

Quality related items that are important for the safe, reliable operations of facility activities shall be properly identified/labeled throughout receipt, processing, storage, shipping, and work activities as applicable. Identification of items shall be maintained by part number, serial number, or other appropriate means, either on the item or on records traceable to the item.

Special environmental conditions shall be provided where necessary to preserve the item or prevent deterioration.

When required, specific identification or traceability of codes, standards, specifications, procurement contracts, etc. shall be ensured by appropriate documents such as drawings, specifications, procurement documents, log books, test records, inspection and examination records, and nonconformance reports.

Safety-related and critical application items shall be verified to be correctly identified and suitable for use prior to release for use.

Processes shall be established and implemented to control samples taken from the MSRE and ensure their traceability. See Sect. 5.5, "Analysis and Testing."

5.3 HANDLING, STORING, AND SHIPPING

Access shall be controlled to facilities where items are used, maintained, or stored to prevent loss or inadvertent mishandling.

5.4 CALIBRATION AND MAINTENANCE OF MONITORING AND DATA COLLECTION EQUIPMENT

Measuring and testing equipment (MTE) used to obtain test or experimental data or to verify the conformance of an item to established requirements will be controlled and included in a program

of periodic calibration. The responsibility for those programs rests with the support organizations using the equipment.

All MTE requiring calibration will be labeled to identify its calibration status. When any MTE is not labeled due to size, location, or surface restrictions, the MTE will be identified and the user will maintain documentation equivalent to the label.

When project MTE is found to be out of calibration, the appropriate task manager will be notified. They will determine and document the effects of the error on the project test, analysis, or item certification data since the last calibration.

The Instrumentation and Controls Division performs the majority of MTE calibrations for the project. See Appendix E matrix for project specific procedures used for control and calibration of MTE.

5.5 ANALYSIS AND TESTING

One of the major project elements covers analysis and testing of processes and conditions within the MSRE to promote the safe removal of uranium and fuel salt from the system. This element will include corrosion tests and evaluations, annealing data evaluation, and postulation of a UF_6 formation mechanism. Uranium distribution mapping, sampling of the atmosphere in the drain tank cell, and understanding of the chemical reactions that could occur in the auxiliary charcoal bed are also part of this element. The results from the analysis and testing will have a major impact on phases III and IV of the project. Analysis and testing activities shall be defined, controlled , verified, and documented. These activities shall be conducted in accordance with written procedures and documented evidence of results.

6. CRITERIA 6.0—DESIGN

Many of the requirements pertinent to design control are applicable to facility activities, but are within the purview of the CED. Therefore the Facility Manager is dependent upon a design system which he/she only utilizes, but does not fully control. The Facility Manager is responsible to ensure that facility design activities applicable to items and systems pertinent to safety are identified, controlled, and verified.

Items or systems that affect safety related attributes of MSRE facility, in most cases, are specifically identified in the facility's safety basis documentation. Design control requirements pertinent to safety related items and systems explicitly do not apply to non-safety related, routine facility alterations, procurement of non-safety related items, or other activities that have no safety implications associated with their conduct or completion. The facility manager is responsible for making these judgements relative to planned activities. In practice, these judgements are made with the help of other facility personnel, subject matter experts, and other personnel.

The CED performs the majority of design engineering management for the project. See Appendix B matrix for a listing of procedures used for project activities.

6.1 COMPUTER SOFTWARE

"ORNL Standard Practice Procedure" X-QA-8 (Energy Systems 1993) and/or "Energy Systems Standard" ESS-QA-19.0 (Energy Sytems 1992) shall be followed to ensure quality of software development, procurement, implementation, and utilization activities.

6.2 ORNL QUALITY VERIFICATION DECAL

A quality verification decal shall be placed on applicable drawings as the method of listing requirements or controls for items procured, fabricated, constructed, and/or tested by or for the MSRERP. The procedure to be used to meet this requirement is "ORNL Standard Practice Procedure" X-QA-11 (Energy Systems 1995b).

7. CRITERIA 7.0—PROCUREMENT

The need for and the extent of application of the requirements of this element shall be determined at the time the purchase requisition, Accelerated Vendor Inventory Delivery (AVID) order, or Stores order is prepared and processed. Drawings, specifications, etc. will define most of the item requirements necessary to be reflected in procurement documents. However, the AVID system should not be considered for items or services having rigorous quality or safety attributes associated with them.

Project support organizations will procure the majority items and/or services for project activities. See Appendix A matrix under 2.7 "PROCUREMENT" for requirements that must be met.

8. CRITERIA 8.0—INSPECTION AND ACCEPTANCE TESTING

Throughout the phases of the project it is necessary to ensure that the product is manufactured as designed and complies with the safety, quality, and performance requirements. This is accomplished by the review, inspection, and acceptance of material, and procedures to perform the operation. **Records generated during these activities shall be maintained in accordance with the requirements of element 2.4 of Y/QD-15 and Section 4.0 of this QAP.**

8.1 INSPECTION AND TESTING ACTIVITIES

Inspection and testing activities pertinent to the project and facility are primarily applicable to the devices and instruments that may affect or have significance to safety. These devices and instruments, primarily used for operations and process monitoring, are specifically identified in the facility safety basis documents. Inspection and acceptance testing activities pertinent to devices and instruments identified in the safety documents are performed by support organizations such as I&CD, OQPI, etc. These organizations maintain procedures establishing acceptance and performance criteria as well as the records for the initial testing, maintenance, and periodic calibration of facility devices and instruments. These support organizations are also responsible for generating the purchase documentation associated with the devices and instruments that are not directly purchased by facility personnel.

Product types and attributes for safety-significant purchases are usually mandated on a site-wide basis by oversight groups such as the Health Physics Instrumentation Committee for radiation monitoring equipment.

Facility and project support personnel are responsible to establish calibration intervals and to review calibration results to ensure that equipment and associated items are performing at a level necessary to support intended work activities.

9. CRITERIA 9.0—MANAGEMENT ASSESSMENT

The senior management on the MSRERP consists of the project manager and the responsible technical managers. They routinely assess the effectiveness of the project's quality program through their involvement in the project on a day-to-day basis. They interact at the highest level of the project to achieve an integrated project management team; and also interact with the technical support organizations directing their areas of responsible management.

9.1 PROJECT MANAGEMENT ASSESSMENT ACTIVITIES

The MSRERP management self-assessment information is derived from the following project activities:

1. Program coordination efforts in which the project manager is involved in the overall coordination of project activities.

2. Project status reporting in which the project manager receives and responds to status reports for the overall project. These reports may include finance, construction, quality assurance, research and development tasks, project status reports to DOE and ORNL. These reports provide information to be used in assessing where the project is in relation to established goals and milestones.

3. Project performance indicators, and project performance objectives prepared by the project manager and management staff that identify project progress in relation to established milestones and performance criteria set by the DOE and ORNL.

4. Project-level QA assessments that provide the project manager with information about the overall progress of the project organization in identifying and implementing administrative control systems, quality of work performed, and areas in which improvement is necessary.

5. Twice weekly meetings that provide a high-level assessment of activity plans. This information provides the project manager with an assessment of project capability and initiative in meeting requirements.

6. Peer/technical reviews performed at a high level, particularly for project design features or design concept feasibility. These assess the project's ability to address technical issues in arriving at an adequate design for the facility. The project manager receives this information and translates it into an assessment of project capability.

7. Major project reviews consisting of ORNL directorate reviews, ORNL reviews of project costs, schedules, and Energy Systems project status reviews.

8. Project-wide readiness assessments consisting of readiness to start major project activities. These assessments are conducted in accordance with Energy Systems-level procedures for the operational readiness process.

9.2 PROJECT DISCIPLINE ASSESSMENTS

The MSRERP discipline self-assessment information is derived from the following project activities:

1. Task readiness reviews conducted to determine the ability of the task participants to start a particular operation.

2. QA assessments of ongoing work activities (such as design review meetings) to inform project management of the adequacy of the management controls applicable to the work activity. Surveillance is used as a monitoring method to evaluate in-process work, review corrective action completion status and effectiveness, and review documents and records pertinent to items or activities.

3. Project task leaders meetings that provide regular progress reporting, problem reporting, and adequacy assessments of tests either ongoing or proposed.

4. Project deviation reporting by line personnel to identify problems to line management for correction. This takes the form of occurrence reporting, nonconformance reporting, audit and surveillance reporting, etc.

9.3 SURVEILLANCE AND AUDIT SCHEDULE

Project management assesses project performance and relative project position within Energy Systems through the review of reports prepared by Energy Systems, ORNL, or support organizations such as the following:

1. QA reports of corrective action status, corrective action tracking, and trending of conditions adverse to quality are prepared by support organizations.

2. Lessons Learned, provided by Energy Systems, provide management with information and experiences from other Energy Systems organizations by which project management can assess their operations and avoid making similar errors.

3. Occurrence reporting, including the Energy Systems Action Management System, provides project managers with problem and corrective action information status.

4. Project cost and schedule reports provide ORNL and project management with status assessments of the project. These reports are prepared as required by DOE and laboratory management.

10. CRITERIA 10.0—INDEPENDENT ASSESSMENT

Independent assessments of the project consist of two distinct types: (1) assessments under the control of the project but performed by organizations and personnel that are independent of the activities being assessed, and (2) assessments not controlled by the project and performed by outside organizations.

10.1 PROJECT-INITIATED INDEPENDENT ASSESSMENTS

The following activities are project-initiated independent assessments of project performance and quality program effectiveness:

1. Project-organized peer reviews conducted by technically qualified personnel who are independent of the project assess the adequacy of project decisions, design bases, and progress in meeting stated performance objectives.

2. Project readiness reviews conducted by independent reviewers in accordance with Energy Systems procedures supply management with assessments of project readiness to proceed with selected activities.

3. ORNL ES&H assessments of the project provide both ORNL and the project with information regarding the adequacy of ES&H initiatives. Assessment findings could result in the application of documented corrective measures by the project for improvement.

4. ORNL QA audits provide both ORNL and project management with information about the project's implementation of ORNL QA policies.

5. Senior Review Board chartered by the MSRERP to review the project's management control systems and overall technical process.

6. Independent Technical Review Board chartered by the project to review technical discoveries and concur with the technical direction of proposed project tasks.

10.2 EXTERNAL ORGANIZATION ASSESSMENTS

The following activities are independent assessments of project performance and quality program effectiveness initiated by organizations that exercise overview of the project:

1. DOE Headquarters ES&H Assessment Team assessments. This team provides project with high-level oversight information for use in correcting any project shortcomings.

2. Assessments by regulatory agencies such as the Tennessee Department of Environment and Conservation and U.S. Environmental Protection Agency.

3. Defense Nuclear Facility Safety Board on-going assessment of MSRERP activities in response to board recommendations.

4. Energy Systems corporate assessments provides reviews and evaluations of overall project performance in ES&H and QA initiatives.

10.3 INDEPENDENT ASSESSMENT PERSONNEL

All of the independent assessments are performed by personnel independent of the work activity and are performed to notify Energy Systems, ORNL, and project management about the adequacy and effectiveness of project activities. External assessments are performed by appropriate personnel who have no direct connection with the project and are deemed by their sponsors to be technically qualified to assess the areas assigned.

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Appendix A

Y/QD-15 MATRIX

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
2.1 PROGRAM **2.1.1 Introduction** (a) Management systems should be developed to ensure safe, reliable products and services that meet or exceed the customer's requirements, needs, and expectations.	G-830.120.IV.1.1	
(b) (**PAAA 120-1**) A written QAP (program description) SHALL be developed, implemented, and maintained.	830.120 (c)(1)(i)	
(c) (**PAAA 120-2**) The written program SHALL describe the organizational structure, functional responsibilities, levels of authority, and interfaces for those managing, performing, and assessing the work.	830.120 (c)(1)(i)	
(d) (**PAAA 120-3**) The written program SHALL describe management processes, including planning, scheduling, and resource considerations.	830.120 (c)(1)(i)	
(e) Methods should be established for managing, performing, and assessing the adequacy of work, including work assigned to parties outside the organization.	G-830.120.IV.1.1	
(f) The scope and depth of the controls for a specific activity should be applied in a graded manner based on factors such as the level of risk and complexity of products or services involved.	G-830.120.IV.1.3	

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
(g) Documented readiness reviews and assessments should be performed on major work activities or on work having significant safety, reliability, or economic consequences before work commences.	5700.6C Attachment I, Sect. II.A.1.j	OP-551
(h) The requirements of 10 CFR 830.120, DOE Order 5700.6C, national standards and consensus documents, and other unique quality requirements should be translated into general guidance and Energy Systems policies and procedures. This Quality Program Description, when combined with other policies and procedures, constitutes the Energy Systems Quality Program.		
2.1.2 Responsibilities (a) Management should retain the primary responsibility and accountability for the scope and implementation of the management system.	G-830.120.IV.1.2	
(b) Each individual in the organization should be responsible for achieving quality in his or her activities.	G-830.120.IV.1.2	
(c) Every employee SHALL have the right, obligation, and authority to ``stop work" if imminent risks to safety, environment, or mission are identified. The employee should notify responsible management of the discrepant conditions so that remedial action can be taken.	5700.6C Attachment I, Sect. II.A.1.k	

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
2.2 PERSONNEL TRAINING AND QUALIFICATION **2.2.1 Introduction** (a) A fundamental requirement for effective accomplishment of any mission is that personnel be capable of performing their assigned tasks. Qualification and training programs should ensure that the required capabilities are achieved and maintained by personnel. Management should determine that personnel are suitably qualified to accomplish their assigned tasks. This determination is accomplished before personnel are allowed to perform the work for which they are being qualified. Required training should be identified for a particular task or category of job.	G-830.120.IV.2.1 G-830.120.IV.2.3	ESS-TQ-105
(b) (**PAAA 120-4**) Personnel SHALL be trained and qualified to ensure that they are capable of performing their assigned work.	830.120 (c)(1)(ii)	ESS-TQ-105
(c) (**PAAA 120-5**) Organizations SHALL address training and qualification of personnel.	G-830.120.IV.2.2	ESS-TQ-105
(d) (**PAAA 120-7**) Personnel SHALL be provided continuing training to ensure that job proficiency is maintained.	830.120 (c)(1)(ii)	ESS-TQ-105
(e) The development of training programs and the conduct of training should be the responsibility of line management. Training programs should be conducted according to Energy Systems training organization policies and procedures.	G-830.120.IV.2.2	ESS-TQ-105

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
2.2.2 Training Plans		
(a) (**PAAA 120-6**) Training plans SHALL be prepared for appropriate classes of personnel.	G-830.120.IV.2.5	ESS-TQ-105
(b) The content of training plans should prepare personnel to perform the job.	G-830.120.IV.2.5	ESS-TQ-105
2.2.3 Instructors		
(a) Instructors should possess adequate technical knowledge, experience, and instructional skills.	G-830.120.IV.2.6	ESS-TQ-105
2.2.4 Training		
(a) Training should provide knowledge of the work processes and methods to accomplish assigned tasks.	G-830.120.IV.2.4	ESS-TQ-105
(b) Lesson plans and other training materials should be consistently developed, reviewed by subject matter experts, approved, controlled, and used.	G-830.120.IV.2.4	ESS-TQ-105
(c) The effectiveness of the training program should be continually evaluated to ensure that the training objectives are accomplished. The evaluations should be made based on examination results, employee feedback, and the observations of the performed work. The results of these evaluations should be used as the basis for improving the training program.	G-830.120.IV.2.4	ESS-TQ-105

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
2.3 QUALITY IMPROVEMENT **2.3.1 Introduction** **Quality improvement is a key business strategy for Energy Systems. It should emphasize problem detection and prevention and continuous improvement.**	**830.120 (c)(1)(iii)** **G-830.120.IV.3.1** **G-830.120.IV.3.2**	**ES-QA-1.0** **ESS-QA-16.0** **QA-16.1** **ESS-QA-18.0** **ESP-QA-18.1** **QA-18.2** **QA-18.3** **GP-6** **GP-14** **GP-17** **GP-18** **GP-41**
2.3.2 Problem Detection and Prevention **(a) (**PAAA 120-8**) Processes to detect and prevent quality problems SHALL be established and implemented.**	**830.120 (c)(1)(iii)**	**ES-QA-1.0** **ESS-QA-16.0** **QA-16.1** **QA-16.2** **QA-16.3** **ESS-QA-18.0** **ESP-QA-18.1** **QA-18.2** **QA-18.3** **GP-5.2** **GP-14** **GP-17** **GP-18**
(b) Personnel SHALL have the freedom and responsibility to identify nonconforming items, activities, and deficient procedures without fear of reprisal or recrimination.	**G-830.120.IV.3.1**	**ES-QA-1.0**

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
(c) (**PAAA 120-9**) Items, services, and processes that do not meet established requirements SHALL be identified, controlled, and corrected according to the importance of the problem and the work affected.	830.120 (c)(1)(iii)	ESS-QA-15.0 QA-15.1 ESS-QA-16.0 QA-16.1 QA-16.2 QA-16.3 ESS-QA-16.4 ESS-QA-18.0 ESP-QA-18.1 QA-18.2 QA-18.3 GP-14 GP-17 GP-18
(d) (**PAAA 120-10**) Correction SHALL include identifying the causes of problems and working to prevent recurrence.	830.120 (c)(1)(iii)	ESS-QA-16.0 QA-16.1 QA-16.2 QA-16.3 ESS-QA-16.4 QA-16.5 GP-5.2
(e) (**PAAA 120-11**) Item characteristics, process implementation, and other quality-related information SHALL be reviewed and the data analyzed to identify items, services, and processes needing improvement.	830.120 (c)(1)(iii)	ESS-QA-16.0 QA-16.1 QA-16.2 ESS-QA-16.4 QA-16.5 GP-5.2
(f) For disposition of nonconforming items, the organization that conducted the original review or that assigned it to another designated qualified organization SHALL document the justification for use.	5700.6C Attachment I, Sect. II.A.3.g.	ESS-QA-15.0 QA-15.1

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
(g) Repaired, reworked, or replacement items SHALL be installed and tested according to the original requirements or approved alternatives.	5700.6C Attachment I, Sect. II.A.3.h.	ESS-QA-15.0 QA-15.1
(h) Personnel who analyze or dispose of nonconforming items and activities SHALL be technically qualified and have pertinent background data available for their information and use.	5700.6C Attachment I, Sect. II.A.3.i.	ESS-QA-15.0 QA-15.1
2.3.3 Continuous Improvement		
(a) Quality improvement should be based on the premise that work activities can be planned, performed, measured, and improved. Management is responsible for building a culture in which improvement is continuous and an integral part of the organization.	G-830.120.IV.3.1	GP-20 GP-41
(b) Management policy for continuous improvement should be documented and communicated to the organization. The responsibility for improvement rests with each individual and organizational element and cannot be delegated to a particular person or group within the organization.	G-830.120.IV.3.1	GP-6 GP-20 GP-41
(c) Process performance should be evaluated using assessments and performance indicators to identify improvement opportunities or required adjustments.	G-830.120.IV.3.1 G-830.120.IV.3.2	ESS-QA-18.0 ESP-QA-18.1 QA-18.2 QA-18.3 GP-5.2 GP-14 GP-17 GP-18

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
2.4 DOCUMENTS AND RECORDS		
2.4.1 Introduction		
(a) Documents and records should be required to manage, perform, and assess work.	G-830.120.IV.4.1	IO-101 IO-201
(b) (PAAA 120-12**) Management SHALL identify any documents that must be controlled and records that must be generated.**	G-830.120.IV.4.1	IO-201 IO-101
2.4.2 Documents		
(a) Documents should be prepared, reviewed, approved, issued, used, and revised to prescribe processes, specify requirements, or establish design.	G-830.120.IV.4.2	IO-201
(b) (PAAA 120-13**) A document control process SHALL establish requirements, including preparation, review, approval, issuance, use, and revision requirements, to release documents for distribution, identify recipients, specify actions to be taken with existing documents when revisions are released for distribution or documents are canceled, and identify unique revisions and copies.**	G-830.120.IV.4.2	IO-201
(c) Documents that are controlled within the document control program should be clearly identified.	G-830.120.IV.4.1	IO-201
2.4.3 Records		
(a) (PAAA 120-14**) Records SHALL be specified, prepared, reviewed, approved, and maintained.**	830.120 (c)(1)(iv)	IO-101

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
(b) A record contains information that is retained for its expected future value. Records should be sufficient to support technical and regulatory decisions.	G-830.120.IV.4.3	IO-101
(c) (**PAAA 120-15**) The records system SHALL include provisions for retention, protection, preservation, changing, traceability, accountability, and retrievability of records.	G-830.120.IV.4.3	IO-101
(d) Stored records should be protected from damage, loss, and deterioration.	G-830.120.IV.4.3	IO-101
(e) Records to be retained should be identified by line management within each specific procedure that generates a quality record.		IO-101 MS-42-WG, Rev. 2
(f) The records management system should provide criteria for records retention and disposition.	G-830.120.IV.4.3	IO-101
2.5 WORK PROCESSES A work process includes activities involved in performing defined tasks to achieve an objective. Work process activities include planning, scheduling, accounting, project management, design, analysis, fabrication, procurement, construction, installation, testing, operation, modification, maintenance, and decommissioning.	G-830.120.IV.5.1	

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
2.5.1 Introduction		
(a) (**PAAA 120-16**) Work SHALL be performed to established technical standards and administrative controls using approved instructions, procedures, or other appropriate means.	830.120 (c)(2)(i)	ESS-QA-5.0 ESS-QA-9.0 ESS-OP-1
(b) (**PAAA 120-17**) The manager SHALL clearly identify authorities, responsibilities, and interfaces, both internal and external, regarding the work process in appropriate work process documents.	G-830.120.IV.5.4	ESS-OP-1
(c) Policies, procedures, goals, plans, and any other information affecting a process should be clearly communicated to the personnel working within that process.	G-830.120.IV.5.4	ESS-OP-1
(d) Work-related instructions, procedures, and other forms of direction should be developed, verified, validated, and approved by technically competent personnel.	5700.6C Attachment I, Sect. II.B.1.a	
(e) Workers should be retrained to new conditions if the work process is changed.	G-830.120.IV.5.2	ESS-OP-1
2.5.2 Identification and Control of Items		
(a) (**PAAA 120-18**) Items SHALL be identified and controlled to ensure their proper use.	830.120 (c)(2)(i)	ESS-QA-8.0
(b) Items, including consumables, should be identified, maintained, and controlled to prohibit the use of incorrect, deteriorated, damaged, or unidentified items.	G-830.120.IV.5.4	ESS-QA-8.0

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
(c) Procedures should provide for marking, labeling, and tagging items so that items are traced to supporting documentation and special controls are maintained.	G-830.120.IV.5.4	ESS-QA-8.0
(d) Items such as chemicals, reagents, solvents, petroleum products, asbestos, radioactive materials, and other hazardous materials should be identified and controlled to preclude contamination or damage to the plant and to prevent injury to personnel.	G-830.120.IV.5.4	
2.5.3 Handling, Storing, and Shipping		
(a) (**PAAA 120-19**) Items SHALL be maintained to prevent their damage, loss, or deterioration.	830.120 (c)(2)(i)	ESS-QA-13.0
(b) Procedures and specifications should establish controls for handling, storing, and shipping materials and for providing adequate protection to equipment.	G-830.120.IV.5.4	ESS-QA-13.0
(c) Handling tools and equipment should be used, tested, and routinely inspected in accordance with documented procedures.	G-830.120.IV.5.2 G-830.120.IV.5.4	ESS-QA-13.0
2.5.4 Computer Software Control		
(a) Energy Systems develops and implements computer software programs that can have a significant impact on safe and reliable plant operation, processing of data, or achievement of programmatic missions. Software controls should be based on the importance of the software application.	G-830.120.IV.1.3	ESS-QA-19.0 GP-11 TSC-2

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
(b) Software controls should include verification and validation and configuration management.	G-830.120.IV.6.3	ESS-QA-19.0
2.6 DESIGN 2.6.1 Introduction (a) (**PAAA 120-20**) Items and processes SHALL be designed using sound engineering/scientific principles and appropriate standards.	830.120 (c)(2)(ii)	ESS-QA-3.0
(b) The design management system should be documented and implemented using procedures and engineering standards developed by or compatible with Energy Systems Central Engineering Services.	G-830.120.IV.6.1	ESS-QA-3.0
(c) The design program SHALL provide the design documentation necessary for the maintenance of the configuration of Energy Systems facilities and systems.	G-830.120.IV.6.1	ESS-QA-3.0
(d) (**PAAA 120-21**) A formal design process SHALL be established to provide for control of design inputs, outputs, verification, configuration and design changes, documentation, records, and technical and administrative interfaces.	G-830.120.IV.6.1	ESS-QA-3.0
(e) (**PAAA 120-27**) Systems, structures, and components important to safety SHALL be subject to more stringent operational criteria and verification requirements than those not important to safety.	G-830.120.IV.6.1	ESS-QA-3.0

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
(f) Designs should provide for appropriate inspection, testing, and maintenance to ensure continuing reliability and safety of the system, structure, or component.	G-830.120.IV.6.1	ESS-QA-3.0
(g) The design should consider the expected use and life expectancy of the system, structure, or component in order to address appropriate disassembly and disposal requirements.	G-830.120.IV.6.1	ESS-QA-3.0
2.6.2 Design Input (a) Design inputs should consider such information as design bases, health and safety considerations, expected life cycle, performance parameters, codes and standards requirements, and reliability requirements.	G-830.120.IV.6.2	ESS-QA-3.0
(b) (**PAAA 120-26**) Design work, including changes, SHALL incorporate applicable requirements and design bases.	830.120 (c)(2)(ii)	ESS-QA-3.0
(c) (**PAAA 120-25**) The design process SHALL require that design inputs be technically correct and complete.	G-830.120.IV.6.3	ESS-QA-3.0
2.6.3 Design Process (a) (**PAAA 120-30**) Design interfaces SHALL be identified and controlled.	830.120 (c)(2)(ii)	ESS-QA-3.0
(b) (**PAAA 120-22**) The design process SHALL translate design input into design output documents that are technically correct and meet the end-user's requirements.	G-830.120.IV.6.3	ESS-QA-3.0

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
(c) (**PAAA 120-23**) Aspects critical to the safety or reliability of the designed system, structure, or component SHALL be identified during the design phase.	G-830.120.IV.6.3	ESS-QA-3.0
(d) (**PAAA 120-34**) Computer software used to originate or verify design solutions during the design process for criticality applications SHALL be validated.	G-830.120.IV.6.3	ESS-QA-3.0 ESS-QA-19.0
(e) Computer software used to originate or verify design solutions during the design process SHALL be validated or the status of code validation be identified and documented prior to use.	G-830.120.IV.6.3	ESS-QA-3.0 ESS-QA-19.0
(f) (**PAAA 120-32**) The agency accomplishing the design SHALL verify that design output documents meet design input requirements and that any deviations have been approved and documented.	G-830.120.IV.6.3	ESS-QA-3.0
2.6.4 Design Output (a) Design records should be maintained to support the basis and output of the design process. These records include, as appropriate, the design input basis documents, calculations, approved drawings and their revisions, computer programs, analyses, and test data.	G-830.120.IV.6.4	ESS-QA-3.0 ESS-QA-19.0
(b) (**PAAA 120-24**) The completed design SHALL be recorded in design output documents such as drawings, specifications, test/inspection plans, maintenance requirements, and reports.	G-830.120.IV.6.4	ESS-QA-3.0

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
(c) As-built drawings should be maintained after production or construction to show actual configuration of safety systems.	G-830.120.IV.6.4	ESS-QA-3.0
2.6.5 Design Verification (a) Design verification is a formal documented process to establish that the resulting system, structure, or component will be fit for the intended use. The extent and number of design verifications should be based on a graded approach and depend on the designed product's complexity and importance to project success.	G-830.120.IV.6.5	ESS-QA-3.0
(b) (**PAAA 120-31**) Design verification SHALL be performed by technically knowledgeable persons other than those who performed the design.	G-830.120.IV.6.5	ESS-QA-3.0
(c) (**PAAA 120-33**) Verification and validation work SHALL be completed before approval and implementation of the design.	830.120 (c)(2)(ii)	ESS-QA-3.0
2.6.6 Design Changes (a) (**PAAA 120-28**) Design changes, including field changes and nonconforming items dispositioned ``use-as-is" or ``repair,"SHALL be controlled by measures commensurate with those applied to the original design.	G-830.120.IV.6.6	ESS-QA-3.0
(b) (**PAAA 120-29**) Temporary modifications SHALL receive the same levels of control as the designs of permanent modifications.	G-830.120.IV.6.6	ESS-QA-3.0

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
2.7 PROCUREMENT **2.7.1 Introduction** **(a) Energy Systems has the responsibility for establishing and implementing a procurement process to ensure that procured items and services comply with documented requirements and are fit for intended use. The procurement program SHALL comply with this QPD; Energy Systems policies, standards, and procedures; and the Procurement Division operating manual. Items or services procured from other Martin Marietta corporate entities are also subject to these requirements.**	**830.120 (c)(2)(iii)**	**ESS-QA-4.0**
(b) The stringency of procurement requirements should be commensurate with the application of the purchased items or services.	**G-830.120.IV.7.1**	**ESS-QA-4.0**
(c) (PAAA 120-35**) Procured items and services SHALL meet established requirements and perform as specified.**	**830.120 (c)(2)(iii)**	**ESS-QA-4.0**
(d) The procurement process should be planned and controlled to ensure that the end-user's requirements are accurately, completely, and clearly communicated to the supplier; that the supplier's, designer's, and end-user's requirements are met during the production phase; and that the proper product is delivered on time and maintained until use.	**G-830.120.IV.7.1**	**ESS-QA-7.0** **ESS-QA-4.0**

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
2.7.2 Procurement Documents		
(a) Procurement documents should be reviewed and approved to ensure inclusion of or reference to specifications, standards, and other documents referred to by the design documents and to identify those records to be maintained or submitted.	G-830.120.IV.7.2	ESS-QA-4.0
(b) (**PAAA 120-36**) Procurement documents SHALL clearly state test/inspection requirements and acceptance criteria for safety- related purchased items and services.	G-830.120.IV.7.2	ESS-QA-4.0
(c) Critical parameters and requirements such as submittals, product- related documentation, nonconformance requirements, administrative documentation, personnel or materials qualifications, tests, inspections, and reviews should be clearly specified in the procurement documents.	G-830.120.IV.7.2	ESS-QA-4.0
(d) Procedures should describe the process for the preparation and control of procurement documents, supplier evaluation and selection, supplier performance monitoring, source verification, receiving inspection and testing, and item or service acceptance.	5700.6C Attachment I, Sect. II.B.3.a	ESS-QA-7.0
(e) Procedures should establish requirements and criteria to ensure that the appropriate quality elements have been incorporated into procurement documents.	5700.6C Attachment I, Sect. II.B.3.b G-830.120.IV.7.2	ESS-QA-4.0

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
(f) Commercial-grade item procurement documents should incorporate requirements to ensure that identified critical characteristics have been satisfied for items procured for critical applications.	5700.6C Attachment I, Sect. II.B.3.c	ESS-QA-7.0
2.7.3 Supplier Qualification (a) (**PAAA 120-39**) Suppliers SHALL be evaluated and selected on the basis of specified criteria.	830.120 (c)(2)(iii)	ESS-QA-7.0
(b) Critical application items and services should be identified early in the design and procurement process.	G-830.120.IV.7.3	ESS-QA-7.0
2.7.4 Supplier Monitoring (a) (**PAAA 120-40**) Processes to ensure that approved suppliers continue to provide acceptable items and services SHALL be established and implemented.	830.120 (c)(2)(iii)	ESS-QA-7.0
2.7.5 Inspection (a) (**PAAA 120-37**) The procurement process SHALL include provisions for inspections and tests. Inspections may include the following methods: inspections of materials or equipment at the supplier's plant; receipt inspection of the shipped items; review of objective evidence such as certifications and reports; and verification of testing of items prior to or following shipment.	G-830.120.IV.7.6	ESS-QA-4.0 ESS-QA-7.0

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
(b) (**PAAA 120-38**) Inspection SHALL be adequate to ensure conformance with purchase requirements, including verifying that specified documentation has been provided by the supplier.	G-830.120.IV.7.6	ESS-QA-10.0 ESS-QA-11.0
2.7.6 Nonconformance and Corrective Action (a) Significant nonconformances identified with supplier-furnished items or services should be identified, controlled, and documented according to the Energy Systems nonconformance report system.	5700.6C Attachment I, Sect. II.B.3.g	ESS-QA-7.0
(b) Before releasing critical application items for installation or use, documentation should be available to support the acceptance of the item based on compliance with technical requirements.	5700.6C Attachment I, Sect. II.B.3.g	ESS-QA-7.0
2.7.7 Product Documentation (a) Supplier-generated documents SHALL be accepted through the procurement system and controlled and processed by the end-user organization. These documents may include certificates of conformance, drawings, analyses, test reports, maintenance data, nonconformances, corrective actions, approved changes, waivers, and deviations.	G-830.120.IV.7.7	ESS-QA-4.0 ESS-QA-7.0

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
2.8 INSPECTION AND ACCEPTANCE TESTING		
2.8.1 Introduction		
(a) Inspections and tests should be accomplished to verify that physical characteristics and functions of systems, structures, and components are acceptable to the organization that will use the systems, structures, and components.	G-830.120.IV.8.1	ESS-QA-10.0 ESS-QA-11.0
(b) (**PAAA 120-41**) Inspection and testing of specified items, services, and processesSHALL be conducted using established acceptance and performance criteria.	830.120 (c)(2)(iv)	ESS-QA-10.0 ESS-QA-11.0
(c) Inspections and tests should be conducted on activities or items affecting quality to verify conformance with codes, standards, regulatory requirements, procedures, and procurement documents.	G-830.120 IV.8.2	ESS-QA-11.0
(d) Systems, structures, and components requiring inspection and test should be identified early in the design phase.	G-830.120.IV.8.1	
2.8.2 Process		
(a) Inspection and test methods should be established that define the requirements for activities that verify conformance of systems, structures, or components with specified requirements.	G-830.120.IV.8.2	ESS-QA-10.0 ESS-QA-11.0
(b) Inspections and tests should be performed by technically qualified personnel.	G-830.120.IV.8.1	ESS-QA-10.0 ESS-QA-11.0

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
(c) Inspection and test activities should be performed by persons other than those who performed or directly supervised the work being examined.	G-830.120.IV.8.2	ESS-QA-10.0
(d) The inspection and test process should identify the status of systems, structures, and components requiring examination to ensure that failed or untested systems, structures, and components are not used.	G-830.120.IV.8.1	ESS-QA-14.0
(e) The status of inspections and examinations should be identified by documentation and segregation of items and/or tagging to preclude the bypassing of required tests or the use of deficient items or products.	G-830.120.IV.8.1	ESS-QA-14.0
(f) Inspection and test results should be evaluated and verified by authorized personnel to document that all requirements have been satisfied.	G-830.120.IV.8.1 G-830.120.IV.8.2	ESS-QA-10.0 ESS-QA-11.0
(g) (**PAAA 120-42**) Results of inspection and test activities SHALL be documented and retained as quality records.	G-830.120.IV.8.2	ESS-QA-10.0 ESS-QA-11.0
(h) Nonconforming conditions identified during the inspection or examination of completed work SHALL be identified on nonconformance reports and dispositioned in accordance with approved procedures.	G-830.120.IV.8.1 G-830.120.IV.8.2	ESS-QA-14.0 ESS-QA-15.0

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
2.8.3 Control of Measuring and Test Equipment		
(a) (**PAAA 120-43**) Equipment used for process monitoring or data collection and inspections and tests SHALL be calibrated and maintained in accordance with the significance of its function and the quality assurance requirements.	830.120 (c)(2)(iv)	ESS-QA-9.0 ESS-QA-10.0 ESS-QA-11.0 ESS-QA-12.0
(b) The measuring and test equipment program should be established to identify each device and standard and to document the frequency of calibration, calibration accuracy, labeling requirements, and unique identification number.	5700.6C Attachment I, Sect. II.B.4.c	ESS-QA-12.0
(c) The frequency of measuring and test equipment calibration SHALL be based on intended use, stability characteristics, and required accuracy for the application.	5700.6C Attachment I, Sect. II.B.4.c	ESS-QA-12.0
(d) Procedures for testing, retesting, adjusting, and recalibration of measuring and test equipment should be maintained and documented by organizations performing inspection and testing functions.	G-830.120.IV.8.3	ESS-QA-12.0
(e) Measuring and test equipment should be calibrated to accepted standards, including, when applicable, standards traceable to the National Institute of Standards and Technology.	G-830.120.IV.8.3	ESS-QA-12.0
(f) Controlled measuring and test equipmentSHALL be labeled, identified or traceable through the calibration program to identify its calibration status and ensure traceability of test data.	5700.6C Attachment I, Sect. II.B.4.c	ESS-QA-12.0

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
(g) Controlled measuring and test equipment and standards found to be out of calibrationSHALL be identified and documented.	5700.6C Attachment I, Sect. II.B.4.c	ESS-QA-12.0
(h) An investigation SHALL be conducted to evaluate instances where the out-of-tolerance device has been used since the last known calibration to determine any impact on the validity of acquired data and to take appropriate corrective action if necessary.	5700.6C Attachment I, Sect. II.B.4.c	ESS-QA-12.0
2.9 MANAGEMENT ASSESSMENT 2.9.1 Introduction (a) The management assessment program should provide a means for managers at every level to assess the performance of their organizations to determine how well those organizations are meeting customers' requirements and expectations and the organizations' goals and objectives.	G-830.120.IV.9.1	QA-18.2
2.9.2 Responsibility (a) (**PAAA 120-44**) Managers SHALL assess their management processes.	830.120 (c)(3)(i)	QA-18.2
(b) Managers should retain overall responsibility for management assessments. Direct participation by managers is essential to the process.	830.120 (c)(3)(i)	QA-16.1 QA-18.2
(c) Management assessments should be conducted by individuals who have the necessary skills required to evaluate system performance.	5700.6C 9.b(3)(b) 5700.6C Attachment I, Sect. II.A.2.c	QA-2.1

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
2.9.3 Process and Results		
(a) (PAAA 120-45) Problems that hinder the organization from achieving its objectivesSHALL be identified and corrected.	830.120 (c)(3)(i)	QA-18.2
(b) Management assessments should focus on the identification and resolution of both systematic and cultural management issues and problems.	G-830.120.IV.9.3	QA-18.2
(c) Strengths and weaknesses affecting the achievement of organizational objectives should be identified to improve quality.	830.120 (c)(3)(i)	ESS-QA-18.0
(d) Assessments should include strategic planning, organizational interfaces, cost control, use of performance indicators, staff training and qualifications, and supervisory oversight and support.	G-830.120.IV.9.3	ESP-QA-18.1 QA-18.2
(e) Management assessment results should be used as input to the organization's continuous improvement process.	G-830.120.IV.9.4	QA-18.2
2.10 INDEPENDENT ASSESSMENT		
2.10.1 Introduction		
(a) (**PAAA 120-46**) ManagementSHALL establish and implement a method for independent assessment of organizations, programs, and projects in order to evaluate the performance of work processes with regard to requirements and expectations of customers and toward achieving the mission and goals of the organization.	G-830.120.IV.10.1	ESS-QA-18.0 ESP-QA-18.1 QA-2.7

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
(b) The independent assessment process should use a performance-based approach with emphasis on results and with compliance viewed as the baseline.	G-830.120.IV.10.1	
(c) Independent assessments include methods such as inspections, peer and technical reviews, audits, surveillances, or combinations thereof. Surveillances should be defined as specific limited-scope assessments of short duration.	830.120 (c)(3)(ii)	ESS-QA-18.0 QA-2.7 ESS-QA-10.0
(d) Assessments should be conducted on activities that most directly relate to final objectives and emphasize safety, reliability, and product performance.	G-830.120.IV.10.1	ESP-QA-18.1
2.10.2 Performing Organization (a) Independent assessments should be planned and coordinated by the assessing organizations with the organizations to be assessed.		ESP-QA-18.1 QA-2.7
(b) (**PAAA 120-49**) The group performing independent assessments SHALL have sufficient authority and freedom from the line to carry out its responsibilities.	830.120 (c)(3)(ii)	ESS-QA-18.0 ESP-QA-18.1
(c) (**PAAA 120-50**) Persons conducting independent assessments SHALL be technically qualified and knowledgeable in the area assessed.	830.120 (c)(3)(ii)	ESS-QA-18.0 ESP-QA-18.1

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
(d) Personnel performing assessments should not have direct responsibilities in the areas they are assessing and should consider the organizations being assessed as customers for feedback concerning observations of performance.	G-830.120.IV.10.2	ESS-QA-18.0 ESP-QA-18.1 QA-18.2
2.10.3 Process (a) The types and frequencies of independent assessments should be based on the status, complexity, and importance of the activities or processes being assessed.	G-830.120.IV.10.3	ESS-QA-18.0
(b) The criteria used for assessments should describe acceptable work performance and promote improvement of the process or activity.	G-830.120.IV.10.1	ESS-QA-18.0 ESP-QA-18.1 QA-18.2
(c) Personnel performing assessments should focus on improving output quality and process effectiveness by emphasizing continuous improvement methods.	G-830.120.IV.10.3	ESS-QA-18.0 GP-41 GP-12 QA-18.2
(d) The assessor's responsibilities should include evaluating work performance and process effectiveness; identifying abnormal performance and potential problems; finding opportunities for improvement; documenting and reporting results; and verifying satisfactory resolutions of reported problems.	G-830.120.IV.10.3 G-830.120.IV.10.4	ESS-QA-18.0 ESP-QA-18.1
(e) The assessment should be directed toward the requirements of the documented quality program and not toward subjective interpretation of codes and standards.	G-830.120.IV.10.3	MS-165 ESS-QA-18.0

Y/QD-15 REV-2 PROGRAM COMMITMENTS	RELATED SOURCE REQUIREMENT (10 CFR 830.120 or DOE ORDER 5700.6C)	RELATED ENERGY SYSTEMS PROCEDURE or POLICY
(f) (**PAAA 120-47**) The independent assessment process SHALL include verification of the adequacy of corrective actions, including actions identified to prevent recurrence or to otherwise improve performance.	G-830.120.IV.10.3	QA-16.1 QA-16.2 ESS-QA-18.0 QA-18.2
2.10.4 Results (a) (**PAAA 120-48**) Assessment results SHALL be documented, presented to the organization that was assessed, and provided to the appropriate levels of management for review.	G-830.120.IV.10.4	ESS-QA-18.0 ESP-QA-18.1 QA-18.2
(b) Findings identified should be tracked to closure. Actions should be taken to correct the deficiency and to identify the root cause and actions that could be taken to prevent recurrence.	830.120 (c)(1)(iii)	QA-16.1 QA-16.2 ESP-QA-18.1 QA-18.2
(c) Areas of poor or questionable performance should receive increased attention.	G-830.120.IV.10.4	ESS-QA-18.0 ESP-QA-18.1 QA-18.2
(d) Lessons learned from the assessment process should be communicated to other organizations with similar activities or concerns.	G-830.120.IV.10.4	QA-16.3 ESS-QA-18.0 QA-18.2

Appendix B

ENGINEERING DIVISION

PROCEDURE MODULAR PROFILE

QA PROGRAM BASIC ELEMENTS	TO BE APPLIED (Y/N)	IMPLEMENTING ENGR/MMES QA PROCEDURE(S)	PROJECT SPECIFIC PROCEDURES	SEE INDICATED QA PLAN SECTION
1. Organization	Y	ES-QA-1.0 ESS-QA-1.0 EG-A-06 EP-A-11	Project Management Plan	Section 1 - Organization Attachments 1 & 2
2. Quality Assurance Program	Y	Y/QD-15 ESS-QA-1.0 ESP.2.2 ESP-QA-2.4 ESP-QA-2.5 ESP-QA-2.6 ESP-QA-2.7 EP-A-29 EP-A-32 EP-B-31 EP-E-04 EP-E-09 EP-E-10	Y/QD-15 EP-E-04 EP-E-09	Section 2 - Quality Assurance Program
3. Design Control	Y	ESS-QA-3.0 EP-A-12 EP-B-03 EP-B-16 EP-B-22 EP-B-23 EP-B-35 EP-B-36 EP-C-02 EP-C-03 EP-C-04 EP-C-05 EP-C-06 EP-C-07 EP-C-17 EP-C-18 EP-C-20 EP-C-22 EP-C-23 EP-C-25 EP-C-26 EP-C-27 EG-C-29 EP-C-30 EP-C-35 EP-E-02 EG-D-09 EP-E-05 EP-E-07 EP-E-12 EG-E-22 EP-E-23 ES-0.1-2 K/D-5364	EP-B-16 EP-C-03 EP-C-18 EP-C-20 EP-C-21 EP-C-22 EP-C-23 EP-C-25 EP-C-35 EP-E-02 EP-E-07 QA-L-3-101	Section 3 - Design Control

PROCEDURE MODULAR PROFILE

QA PROGRAM BASIC ELEMENTS	TO BE APPLIED (Y/N)	IMPLEMENTING ENGR/MMES QA PROCEDURE(S)	PROJECT SPECIFIC PROCEDURES	SEE INDICATED QA PLAN SECTION
4. *Procurement Document Control*	Y	ESS-QA-4.0 EP-C-22 EP-C-23 EP-C-25 EP-C-27 K/D-5364	ESS-QA-4.0 EP-C-22 EP-C-23 EP-C-25 EP-D-11	Section 4 - Procurement Document Control
5. *Instructions, Procedures, & Drawings*	Y	ESS-QA-5.0 EP-A-01 EP-A-13 EG-C-01 EP-C-03 EP-C-13 EP-C-18 EP-C-35	ESS-QA-5.0 EP-C-30 EP-C-35	Section 5 - Instructions, Procedures, and Drawings
6. *Document Control*	Y	QA-6.0 EP-A-12 EP-A-13 EP-B-16 EP-B-36 EG-C-01 EP-C-13 EP-C-18 EP-C-28 EP-C-35 EG-D-09	QA-6.0 EP-A-12 EP-B-36 EG-C-01 EP-C-28	Section 6 - Document Control Attachment 3
7. *Control of Purchased Items & Services*	Y	ESS-QA-7.0 EP-C-21 EP-D-11 EG-D-12 EG-D-13 EG-D-14 EP-D-20	ESS-QA-7.0 EP-D-11	Section 7 - Control of Purchased Items and Services
8. *Identification & Control of Items*	Y	PRO-8 ESS-QA-8.0 EG-D-01 EP-D-11	ESS-QA-8.0 PRO-8	Section 8 - Identification and Control of Items
9. *Control of Processes*	Y	ESS-QA-9.0 EG-D-01	ESS-QA-9.0	Section 9 - Control of Processes
10. *Inspection*	Y	ESS-QA-10.0 EP-B-36 EG-D-01 EP-E-12 ES-0.4-1	EP-E-12	Section 10 - Inspection

PROCEDURE MODULAR PROFILE

QA PROGRAM BASIC ELEMENTS	TO BE APPLIED (Y/N)	IMPLEMENTING ENGR/MMES QA PROCEDURE(S)	PROJECT SPECIFIC PROCEDURES	SEE INDICATED QA PLAN SECTION
11. Test Control	Y	ESS-QA-11.0 EG-D-01 EP-E-12 ES-0.4-1	EP-E-12 ES-0.4-1 JSP-106	Section 11 - Test Control
12. Control of Measuring & Test Equipment	Y	ESS-QA-12.0 EP-E-12	ESS-QA-12.0 EP-E-12	Section 12 - Control of Measuring and Test Equipment
13. Handling, Storage, & Shipping	Y	ESS-QA-13.0 EP-C-22 EP-C-23 EP-D-11	ESS-QA-13.0	Section 13 - Handling, Storage, and Shipping
14. Inspection, Test, & Operating Status	Y	ESS-QA-14.0 EP-B-46 EP-C-22 EP-D-05	ESS-QA-14.0 EP-E-12	Section 14 - Inspection, Test, and Operating Status
15. Control of Nonconforming Items	Y	ESS-QA-15.0 QA-15.1 EP-D-10	EP-D-10	Section 15 - Control of Nonconforming Items
16. Corrective Action	Y	GP-5.2 ESS-QA-16.0 ESS-QA-16.1 ESS-QA-16.2 ESS-QA-16.3 ESS-QA-16.4	ESS-QA-16.1 ESS-QA-16.2 ESS-QA-16.3 X-GP-13	Section 16 - Corrective Action
17. Quality Assurance Records	Y	ESS-QA-17.0 EP-A-12 EP-B-36 EP-C-25	QA-17.0	Section 17 - Quality Assurance Records Attachment 3
18. Audits	Y	ESS-QA-18.0 ESP-QA-18.1		Section 18 - Audits Attachment 4
19. Software	Y	ESS-QA-19.0 EP-E-11		Section 19 - Software

Appendix C

WASTE MANAGEMENT AND REMEDIAL ACTION DIVISION

Waste Management and Remedial Action Division
WMRAD
Quality Assurance Program Matrix

10CFR 830.120/DOE Order 5700.6C Criteria	ANSI/ASME NQA-1 Element		Energy Systems/ORNL Procedures	Project Specific Procedures
1. Program	2. 1.	QA Program Organization	X-QA-1 ESP-QA-2.6 ESP-QA-2.5 OP-551 Y/QD-35 Y/QD-15	WMRAD-AD-110 QAP-X-93-WMRA-050 QAP-X-93-WMRA-054
2. Personnel Training and Qualification	2.	QA Program	QA-2.1 ESS-TQ-105	WMRAD-AD-110 WMRAD-TR101
3. Quality Improvement	15. 16.	Control of Nonconforming Items Corrective Action	X-QA-9 X-GP-13 QA-16.1 X-QA-3 QA-16.2 QA-16.3	ESS-OP-301
4. Documents and Records	6. 17.	Document Control QA Records	ESS-QA-5.0 X-AD-9 X-AD-7	WMRAD-DMC-102
5. Work Processes	5. 8. 9. 13.	Instructions, Procedures, & Drawings Identification & Control of Items Control of Processes Handling, Storage & Shipping	ESS-QA-8.0 ESS-QA-9.0	500 Series WMRA-SFSM-403-S WMRA-SFSM-407-S WMRA-SFSM-412-S 200 Series
6. Design	3. 19.	Design Control Software QA	ESS-CM-101 ORNL FS-3.3 ESS QA-3.0 X-QA-12 X-QA-11 X-QA-8	WMRA-ERPS-501
7. Procurement	4. 7.	Procurement Document Control Control of Purchased Items & Services	X-GP-16 ESS-QA-7.0 ESS-QA-13.0	SAME
8. Inspection and Acceptance Testing	10. 11. 12. 14.	Inspection Test Control Control of Measuring and Test Equipment Inspection, Test and Operating Status	ESS QA-10.0 ESS QA-11.0 X-GP-8 ESS QA-14.0 X-GP-7 ORNL RP Manual	400 Series
9. Management Assessments	2.	QA Program	ESP-QA-2.5 QA-18.2	WMRAD-AD-110
10. Independent Assessments	18.	Audits	X-QA-7 ESP-QA-2.4 ESP-QA-2.7 X-QA-2	SAME

Appendix D

CHEMICAL TECHNOLOGY DIVISION

Chemical Technology Division
Radiochemical Technology Section
Quality Assurance Program Matrix

10CFR 830.120/DOE Order 5700.6C Criteria	ANSI/ASME NQA-1 Element		Energy Systems/ORNL Procedures	Project Specific Procedures
1. Program	2.	QA Program	X-QA-1 ESP-QA-2.6 ESP-QA-2.5 OP-551	CTD QA-1 CTD QA-2 CTD QA-3
	1.	Organization	Y/QD-35 Y/QD-15	RTS-023
2. Personnel Training and Qualification	2.	QA Program	QA-2.1 ESS-TQ-105	CTD Performance-Based Procedures Training Manual
3. Quality Improvement	15.	Control of Nonconforming Items	X-QA-9	
	16.	Corrective Action	X-GP-13 QA-16.1 X-QA-3 QA-16.2 QA-16.3	
4. Documents and Records	5.	Instructions, Procedures and Drawings	ESS-QA-5.0	RTS-002 ESG-001 RTS-006 CTD ESH-2
	6.	Document Control	X-AD-9	
	17.	QA Records	X-AD-7	
5. Work Processes	8.	Identification & Control of Items	ESS-QA-8.0	
	9.	Control of Processes	ESS-QA-9.0	RTS-011 RTS-026
6. Design	3.	Design Control	ESS-CM-101 ORNL FS-3.3 ESS QA-3.0 X-QA-12 X-QA-11	ESG-001 ESG-002
	19.	Software QA	X-QA-8	
7. Procurement	4.	Procurement Document Control	X-GP-16	
	7.	Control of Purchased Items & Services	ESS-QA-7.0	RTS-011
	13.	Handling, Storage and Shipping	ESS-QA-13.0	
8. Inspection and Acceptance Testing	10.	Inspection	ESS QA-10.0	
	11.	Test Control	ESS QA-11.0	
	12.	Control of Measuring and Test Equipment	X-GP-8	
	14.	Inspection, Test and Operating Status	ESS QA-14.0 X-GP-7 ORNL RP Manual	
9. Management Assessments	2.	QA Program	ESP-QA-2.5 QA-18.2	CTD GEN-1 CTD GEN-2 CTD GEN-3 RTS-023
10. Independent Assessments	18.	Audits	X-QA-7 ESP-QA-2.4 ESP-QA-2.7 X-QA-2	

Appendix E

INSTRUMENTATION AND CONTROLS DIVISION

I&C Division
Quality Assurance Program Matrix
July 26, 1995

10CFR 830.120/DOE Order 5700.6C Criteria	ANSI/ASME NQA-1 Element	Energy Sys./ORNL Procd.	I&C Div. Procd.
1. Program	1. Organization	X-QA-1 ESP-QA-2.6 ESP-QA-2.5 OP-551	QA-IC-1
	2. QA Program	Y/QD-35 Y/QD-15	QA-IC-2
2. Personnel Training & Qualification	2. QA Program	QA-2.1 ESS-TQ-105	QA-IC-2 QA-IC-OP40
3. Quality Improvement	15. Control of Nonconforming Items	X-QA-9	QA-IC-15
	16. Corrective Action	X-GP-13 QA-16.1 X-QA-3 QA-16.2 QA-16.3	QA-IC-16
4. Documents and Records	5. Instructions, Procedures and Drawings	ESS-QA-5.0	QA-IC-5
	6. Document Control	X-AD-9	QA-IC-6
	17. QA Records	X-AD-7	QA-IC-17
5. Work Process	8. Identification and Control of Items	ESS-QA-8.0	QA-IC-8
	9. Control of Processes	ESS-QA-9.0	QA-IC-9
6. Design	3. Design Control	ESS-CM-101 ORNL FS-3.3 ESS-QA-3.0 X-QA-12 X-QA-11	QA-IC-3
	19. Software QA	X-QA-8	QA-IC-19
7. Procurement	4. Procurement Document Control	X-GP-16	QA-IC-4 QA-IC-OP12
	7. Control of Purchased Items and Services	ESS-QA-7.0	QA-IC-7
	13. Handling, Storage, and Shipping	ESS-QA-13.0	QA-IC-13
8. Inspection and Acceptance Testing	10. Inspection	ESS-QA-1o.0	QA-IC-10
	11. Test Control	ESS-QA-11.0	QA-IC-11
	12. Control of Measuring and Test Equipment	X-GP-8	QA-IC-12
	14. Inspection, Test and Operating Status	ESS-QA-14.0 X-GP-7 ORNL RP Manual	QA-IC-14
9. Management Assessments	2. QA Program	ESP-QA-2.5 QA-18.2	QA-IC-2
10. Independent Assessments	18. Audits	X-QA-7 ESP-QA-2.4 ESP-QA-2.7 X-QA-2	QA-IC-18

Appendix F

PLANT AND EQUIPMENT DIVISION

Plant and Equipment Division
Quality Assurance Program Matrix

10CFR 830.120/DOE Order 5700.6C Criteria	Energy Systems/ORNL Procedures	Project Specific Procedures
1. Program	X-QA-1 ESP-QA-2.6 ESP-QA-2.5 OP-551 Y/QD-15 Y/QD-35	
2. Personnel Training and Qualification	QA-2.1 ESS-TQ-105	D-1.17 D-1.173 F-1.4 F-1.5 F-WELD-1.7
3. Quality Improvement	X-QA-9 X-GP-13 QA-16.1 X-QA-3 QA-16.2 QA-16.3	
4. Documents and Records	ESS-QA-5.0 X-AD-9 X-AD-7	D-1.12 D-1.125 D-1.174 F-16.1 F-WELD-1.1
5. Work Processes	ESS-QA-8.0 ESS-QA-9.0	D-1.16 F-1.2 F-1.6 F-17.2 F-WELD-1.4 F-WELD-11.1 F-WELD-11.2
6. Design	ESS-CM-101 ORNL FS-3.3 ESS-QA-3.0 X-QA-12 X-QA-11 X-QA-8	
7. Procurement	X-GP-16 ESS-QA-7.0 ESS-QA-13.0	F-1.1 F-12.1 F-WELD-5.3 F-17.2
8. Inspection and Acceptance Testing	ESS-QA-10.0 ESS-QA-11.0 X-GP-8 ESS-QA-14.0 X-GP-7	F-WELD-1.3 F-WELD-11.1 F-WELD-11.2 F-WELD-14.1 F-14.1 to F-14.9
9. Management Assessments	ESP-QA-2.5 QA-18.2	
10. Independent Assessments	X-QA-7 ESP-QA-2.4 ESP-QA-2.7 X-QA-2	

Appendix G

ROBOTICS AND PROCESS SYSTEMS DIVISION

Robotics and Process Systems Division
Applicable Quality Assurance Program Procedures

DOE ORDER, 5700.6C CRITERIA	LMES Y/QD-15 REV 2 PROCEDURE NUMBERS	LMES Y/QD-15 REV 2 PROCEDURE TITLES	RPSD QA PROCEDURE NUMBERS	RPSD QA PROCEDURE TITLES
1. Program	Y/QD-15, Rev. 2	Quality Program Description	Use - Introduction	Introduction
			Use - PQP-RPS-1-2	Potential Problem Analysis
			Use - QA-RPS-2-1	Quality Assurance Planning
	Use - OP-551	Op. Readiness Review		
2. Pers. Training & Qual.	Use - ESS-TQ-105	Training Needs/Program Dev		
			Use - QAS-RPS-2-3	Quality Assurance Education
3. Quality Improvement	ES-QA-1.0	Quality		
	ESS-QA-15.0	Control of NC Items	Use - QA-RPS-4-2	I.D. & Control of NC Items
	Use - ESS-QA-16.0	Corrective Action		
	Use - ESS-QA-16.4	ESAMS		
	Use - QA-15.1	Preparation of NC Reports		
	Use - QA-16.1	Corrective Action Program		
	Use - QA-16.2	Root Cause Analysis		
	Use - QA-16.3	Lessons Learned & Alerts		
	Use - QA-16.5	DOE Performance Indicators		
	Use - QA-18.2	Management Assessment		
	Use - QA-18.3	Audit Prog. for Nuclear Fac.		
	ESS-QA-18.0	Audits & Surv. (Technical)	Use - QAV-RPS-3-5	QA Audits
	Use - ESP-QA-18.1	Independent Assessments		
	Use - GP-5.2	Perf. Indicators & Trends		
	Use - GP-6	Performance Improv Process		
	Use - GP-14	Internal Auditing		
	Use - GP-17	Technical Reviews & Reports		
	Use - GP-18	Technical Audits		
	Use - GP-20	Total Quality Management		
	Use - GP-41	Total Quality Managment		
4. Documents and Records	Use - IO-101	Records Management		
	IO-201	Document Control	Use - QAS-RPS-2-10	Document Control
			Use - QAS-RPS-2-22	Quality Assurance Records
	Use - MS-42-WG, REV 2	MMES Writer's Guide		
5. Work Processes	ESS-QA-5.0	Instructions, proc. & Dwgs	Use - QAS-RPS-2-9	Instr., Proc. & Drawings
	ESS-QA-9.0	Control of Processes	Use - QAS-RPS-2-15	Control of Special Processes
	Use - ESS-OP-1	Std for Conduct of Ops		
	ESS-QA-8.0	ID & Control of Items	Use - QAS-RPS-2-14	ID & Control of Items
	ESS-QA-13.0	Handling, Stor & Shipping	Use - QAS-RPS-2-18	Handling, Stor., & Shipping
	ESS-QA-19.0	Software QA	Use - QAS-RPS-2-19	Software

Robotics and Process Systems Division
Applicable Quality Assurance Program Procedures (continued)

DOE ORDER, 5700.6C CRITERIA	LMES Y/QD-15 REV 2 PROCEDURE NUMBERS	LMES Y/QD-15 REV 2 PROCEDURE TITLES	RPSD QA PROCEDURE NUMBERS	RPSD QA PROCEDURE TITLES
	GP-11	Automated Data Proc. Dev.	Use - QAS-RPS-2-19	Software
			Use - QAS-RPS-2-20	Readiness Review
	TSC-2	ADP Sys. Dev. Methodology	Use - QAS-RPS-2-19	Software
6. Design	ESS-QA-3.0	Design Control	Use - QAS-RPS-2-5	Design Control
			Use - QAS-RPS-2-6	Deviation Control
	ESS-QA-19.0	Software QA	Use - QAS-RPS-2-19	Software
7. Procurement	ESS-QA-4.0	Procurement Documents	Use - QAS-RPS-2-12	Procurement Doc. Control
	ESS-QA-7.0	Control Purch. Itmes & Serv.	Use - QAS-RPS-2-11	Control Purch Items & Serv
	ESS-QA-10.0	Inspection	Use - QAV-RPS-3-1	Inspection
	ESS-QA-11.0	Test Control	Use - QAS-RPS-2-13	Supplier Deviation Request
			Use - QA-RPS-4-7	Supplier Problem Reporting
8. Insp. & Accept. Testing	ESS-QA-9.0	Control of Processes	Use - QAS-RPS-2-15	Control of Special Processes
	ESS-QA-10.0	Inspection	Use - QAV-RPS-3-1	Inspection
	ESS-QA-11.0	Test Control	Use - QAS-RPS-2-16	Test Control
	ESS-QA-12.0	Control Meas & Test Equip	Use - QAS-RPS-2-17	Control Meas. & Test Equip
	ESS-QA-14.0	Inspection Test & Op Status	Use - QAS-RPS-2-21	Insp., Test, & Op. Status
	ESS-QA-15.0	Control of NC Items & Serv.	Use - QA-RPS-4-2	I.D. & Control of NC Items
9. Management Assessments	QA-2.1	Quality Training Program	Use - QAS-RPS-2-3	Quality Assurance Education
	Use - QA-16.1	Corrective Action Program		
	Use - QA-18.2	Management Assessment		
	ESS-QA-18.0	Audits & Surv. (Technical)	Use - QAV-RPS-3-5	QA Audits
			Use - QAV-RPS-3-4	QA Surveillance
	Use - ESP-QA-18.1	Independent Assessments		
10. Independent Assessments	ESS-QA-18.0	Audits & Surv. (Technical)	Use - QAV-RPS-3-5	QA Audits
	Use - ESP-QA-18.1	Independent Assessments		
	QA-2.7	Surveillance	Use - QAV-RPS-3-4	QA Surveillance
	ESS-QA-10.0	Inspection	Use - QAV-RPS-3-1	Inspection
	Use - QA-18.2	Management Assessment		
	Use - GP-41	Total Quality Management		
	Use - GP-12	Drug & Alcohol Policy		
	Use - MS-165	Stds Management Process		
	Use - QA-16.1	Corrective Action Program		
	Use - QA-16.2	Root Cause Analysis		
	Use - QA-16.3	Lessons Learned		

Appendix H

SAFETY & HEALTH BULLETIN

SAFETY AND HEALTH ORGANIZATION

Safety & Health Bulletin

MARTIN MARIETTA ENERGY SYSTEMS, INC., OAK RIDGE, TN · PADUCAH, KY · PORTSMOUTH, OH

Issue No. 95-2-Revised

April 1995

Stop Work Authority

The purpose of this bulletin is to remind all Energy Systems employees, other prime contractors, subcontractors and visitors of stop work authority.

You have the authority and responsibility to stop work on Energy Systems sites that is considered to be a serious threat to the safety or health of workers, other personnel, or to the environment. You are not required to participate in work you believe to be a threat to worker safety or health or to the environment. A hazard or threat can be a physical condition such as bare electrical wires, an unsafe lifting activity, or a more general condition such as pressure to control cost or meet a schedule at the expense of protection.

In work situations where there is imminent danger to the life or health or workers, you should take immediate action to remove workers from the hazard or to eliminate the hazard. An imminent danger situation is any condition or practice which creates a hazard that could reasonably be expected to cause death or serious physical harm to workers unless immediate actions are taken to mitigate the effects of the hazard and/or remove workers from the hazard. Examples of potential imminent danger situations include work on elevated locations without fall protection, entering a confined space without proper equipment or verification that the atmosphere is safe, working on energized electrical equipment without the appropriate personal protective equipment, working too close to rotating equipement, or working under or near suspended loads during lifting operations. If the work supervisor is not present to participate in the immediate action to stop the work, he or she should be notified promptly of the action taken. In other words situations where potential hazards or threats to worker safety, health, or the environment are observed, the supervisor of the work should be notified directly and quickly. You should take the hazard or threat as your problem until you are sure that the supervisor or some other appropriate individual understands the issue and accepts responsibility for resolution.

When work is stopped due to a hazard/threat to worker safety, health, or the environment or when a supervisor is notified of a work hazard or threat, the situation and resolution must be documented on form UCN-19937, Employee Concern/ Response Program. Use of the Employee Concern/Response Program form will ensure prompt and complete resolution of the issue and will allow review for performance trends.

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