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**QUALITY ASSURANCE PROGRAM DESCRIPTION - DWPF
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WESTINGHOUSE SAVANNAH RIVER COMPANY
SAVANNAH RIVER SITE

QUALITY ASSURANCE PROGRAM DESCRIPTION
Defense Waste Processing Facility

SESSION TITLE - INTEGRATED SYSTEMS

CATEGORY #2.8

DOES NOT CONTAIN
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NUCLEAR INFORMATION

Reviewing
Official:

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11/2/92

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**WESTINGHOUSE SAVANNAH RIVER COMPANY
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QUALITY ASSURANCE PROGRAM DESCRIPTION -DWPF

This document describes the Westinghouse Savannah River Company's (WSRC) Quality Assurance Program for Defense Waste Processing at the Savannah River Site (SRS). WSRC is the operating contractor for the U.S. Department of Energy (DOE) at the SRS.

The WSRC Defense Waste Processing Facility is responsible for converting 35 million gallons of High Level Waste into durable, leach resistant, borosilicate glass. The waste form contained in stainless steel canisters, will be shipped to a Federal Repository operated by the DOE office of Civilian Radioactive Waste Management (OCRWM).

The Quality Assurance Program applies to both the qualification and production of high-level waste forms. The end result of the program is to provide confidence that these high-level waste forms may be safely and acceptably used to immobilize the radioactive waste that result from activities at SRS in support of national defense.

The overall DOE Quality Assurance Program for defense waste processing is made up of many constituent programs that are or will be implemented by the many organizations that participate in the work.

The program provides means by which the Quality Assurance Program can be managed so that it achieves its objectives. Subsequent parts of this description will identify the program's objectives, content, and application. It will also describe how the program is structured, managed, and implemented as the Quality Assurance Program for high-level waste form qualification and high-level waste form production.

The following objectives are achieved through developing and implementing the Quality Assurance Program:

- (1) Ensure that the attainment of quality (in accomplishing defense high-level waste processing objectives at the SRS) is at a level commensurate with the government's responsibility for protecting public health and safety, the environment, the

public investment, and for efficiently and effectively using national resources.

- (2) Ensure that high-level waste from qualification and production activities conform to requirements defined by OCRWM. These activities include production processes, equipment, and services; and products that are planned, designed, procured, fabricated, installed, tested, operated, maintained, modified, or produced.

PROGRAM DESCRIPTION

The Quality Assurance Program for defense high-level waste processing applies to a broad scope of activities which WSRC performs for DOE. Subsequent parts of this section are intended to provide identification and understanding of the scope of these activities, and the strategy, for accomplishing them.

The work associated with the qualification and production of the high-level waste form includes the following:

- Testing the waste form and the production process through simulated waste runs to verify basic data produced at the Savannah River Technology Center (SRTC)
- Qualifying acquisition of critical materials; canisters, glass frit, and simulated waste.
- Finalizing the processes for producing and certifying the canister waste form product for final shipment to a Federal Repository.

The qualification work associated with final canister high-level waste form production will be conducted in the Defense Waste Processing Facility (DWPF) of the WSRC Waste Management and Environmental Restoration Division (WM&ER).

Production of final waste form products will include processing operations in which 35 million gallons of defense waste will be transferred from existing tanks, processed, melted with glass frit, and poured into stainless steel canisters. Quality Assurance and Quality Control activities will certify that the vitrified waste meets durability and immobilization requirements and is adequately sealed

in the canister. This work will be carried out in the DWPF and other support facilities at the SRS.

PROJECT STRATEGY

Current production plans for the DWPF include having canistered high level waste forms stored at DWPF until a repository is complete and ready to receive the waste. Radioactive operations will begin in 1994 with a permanent repository not available for several years thereafter. Integrated Water Runs, Cold Chemical Runs, and Qualification Runs will verify that the final waste form meets the product requirements of the Waste Acceptance Specification and the Quality Assurance Requirements of the program.

PROGRAM CONTENT

This Quality Assurance Program covers all waste acceptance process activities associated with qualifying and producing high-level waste forms. It is a composite of all plans and actions to be established and implemented to ensure that quality is achieved in qualifying and producing the high-level waste form.

Subsequent parts of the Quality Assurance Program description (QAPD) are intended to identify and provide a general understanding of the quality-assuring activities that make up the Quality Assurance Program; the requirements and bases for those activities; and how those activities are organized and applied to the high-level defense waste processing work at the SRS.

PROGRAM REQUIREMENTS

Quality Assurance Program requirements that are to be applied to high-level waste form qualification and production are contained in the office of Civilian Waste Management upper tier document identified as DOE-OCRWM specification RW-0214, Quality Requirements Document and the following:

- DOE Order 5700.6 Quality Assurance
- DOE Order 5000.3A, Unusual Occurrence Reporting System
- Westinghouse Savannah River Company Quality Assurance Management Plan, WSRC-RP 92-225
- Savannah River Site Quality Assurance Manual, WSRC-1Q

The QAPD is used to ensure that full compliance with all DOE requirements is effected.

TRANSFER OF REQUIREMENTS TO PARTICIPANTS

The Quality Assurance Program activities required of organizations in the WSRC program are specified in contracts or other direction-type documents such as program letters. These contracts include the appropriate quality requirements. Requirements may be specified directly in contract scope of work statements or in program directives; or the appropriate requirement document(s) may be referenced as applicable. Participants may already have programs in accordance to ANSI/ASME NQA-1 or other nationally recognized codes or standards. These programs are recognized to the maximum extent possible as acceptable methods of complying with specified requirements.

PROGRAM ATTRIBUTES

A brief description of the specific attributes of the QAPD is presented below.

- **Organization** - The basic requirements contained in NQA-1 and the supplemental requirements are applied. Additional RW-214 requirements clearly define the responsibilities of the Quality Assurance Manager including independence from the line organization. The Quality Assurance Manager will have no additional duties that could prevent full attention to quality assurance program matters. Specific details are provided for resolution of disputes involving quality issues arising from a difference of opinion at any organizational level. Stop work provisions are clearly specified including the authority and responsibility for stopping unacceptable work.
- **Quality Assurance Program** - The basic requirements contained in NQA-1 and the supplemental requirements are applied. Additional RW-0214 requirements include the application of readiness reviews to major scheduled and planned quality affecting activities that are critical or complex. A graded quality assurance program is defined so that the program is selectively applied to items critical to the Waste Form Compliance Plan. This graded approach to the application of quality requirements is consistent with the guidance provided

in NUREG-1318, "Technical Position on Items and Activities in the High-Level Waste Geologic Repository Program Subject to Quality Assurance Requirements." Additional requirements are included covering the establishment of job position descriptions including the quality -affecting responsibilities of the job. Minimum education, experience, and training-requirements for each job are then established with suitable proficiency maintained through indoctrination and training. The requirement to perform surveillance to assess the quality of items and activities is specified. These surveillances are planned to verify the quality of work in progress. Timely implementation of required corrective actions are to be verified. Independent management assessments by personnel above or outside the quality assurance organization are to be conducted annually to assess the following:

- Adequacy of the organizational structure and staffing to implement the Quality Assurance Program.
- Effectiveness of implementation.
- Adequacy of indoctrination and training
- Effectiveness of the nonconformance and corrective action system
- Adequacy of the quality assurance management information and tracking, evaluation, and reporting system.
- Design Control - The basic requirements contained in NQA-1 and the supplemental requirements are applied. Additional RW-0214 requirements include the documentation and implementation of corrective actions for design deficiencies. Technical reviews of the design are to verify the applicability, correctness, adequacy, completeness, and assurance that the established design requirements were satisfied. Peer reviews are performed in accordance with the guidance provided in NUREG-1297, "Peer Review for High-Level Waste Repositories Generic Technical Position." Controls are included for performing experimental and developmental activities to ensure that the data is suitable for its intended use and that independent reconstruction and evaluation of the work can be

- performed. Requirements for acceptance of data or data interpretations that were generated outside of an acceptable QA Program are specified. This data is to be qualified per NUREG-1298 "Qualification of Existing Data for High-Level Waste Repositories." Computer Software that is essential to meeting the waste acceptance criteria is to be controlled.
- Procurement Document Control - The basic NQA-1 requirements and the supplemental requirements are implemented with amplification that procurement documents receive a technical and quality review for adequacy by the responsible organization.
 - Instructions, Procedures, Plans, and Drawings - The basic requirement of NQA-1 apply with additional RW-0214 requirements for an independent review of documents by the responsible organization to assure technical adequacy and the correct translation of design requirements with the inclusion of proper quality assurance provisions.
 - Document Control - The basic requirements of NQA-1 and the supplemented requirements are implemented with the added provision that Quality Assurance will review and concur with controlled documents that contain or implement quality assurance requirements. The document control system also includes the following additional RW-0214 controls.
 - Resolution of review comments when the reviewer considers it mandatory prior to approval and issuance of the document.
 - Documentation and maintenance of review comments and resolution.
 - Development of a controlled documents list
 - Establishment of a receipt acknowledgment system
 - Development of an obsolete or superseded document control system.
 - Control of Purchased Items and Services - The basic requirements of NQA-1 and the supplemental requirements are

applied. Also portions of the supplements from the inspection attribute of NQA-1 are applied as related to receipt inspection. The supplier's quality program needs to be accepted and any noted deficiencies corrected prior to performing quality related work.

- Identification and Control of Materials, Parts and Components - The basic requirements of NQA-1 and the supplemental requirements are applied.
- Control of Processes - The basic requirements of NQA-1 and the supplemental requirements are applied. In addition, per RW-0214 the vitrification production process is treated as special process and controlled by this attribute. A list of special processes is to be maintained with criteria established as to how a determination is made to identify special processes.
- Inspection - The NQA-1 basic requirements and supplemental requirements are applied. Amplification is provided for controls on inspection planning and inspection records.
- Test Control - The NQA-1 basic requirements and supplemental requirements are applied. In addition, per RW-0214 potential sources of uncertainty and error are to be identified in test plans and procedures. Parameters affected by potential sources of uncertainty and error are identified and controlled. Test planning is to provide instructions for mandatory hold points and identify precision and accuracy considerations for measuring and test equipment.
- Control of Measuring and Test Equipment - The basic requirements of NQA-1 and the supplemental requirements are applied. Additional RW-0214 controls to insure that calibration standards have a greater accuracy than the equipment or standards being calibrated are included.

- Handling, Storage, and Shipping - The basic requirements of NQA-1 and the supplemental requirements are applied. Additional RW-0214 requirements for archival of samples is included as follows:

Archival samples used for waste form qualification or for certification of canister waste forms are prepared and controlled as follows:

- a. Sample preparation and use are planned and documented.

The planning identifies the following:

1. What samples are to be used (number, size, origin, or other characteristics).
2. Where and when they are to be taken or prepared.
3. Where and how they are to be kept.
4. Where and how they are to be analyzed.
5. When and how the results are to be used.

- b. Methods and procedures for sample preparation, maintenance, and use as prepared and include the following:

1. Sample taking or preparation.
2. Logging and labeling or otherwise identifying.
3. Packing, packaging, and handling.
4. Locating, storage, and monitoring
5. Retrieval.
6. Analysis.
7. Treatment of data and results.

- Inspection, Test, and Operating Status - The basic requirements of NQA-1 are applied. In addition, per RW-0214, if inspection or test sequences are altered, a controlled method will be provided and documented to insure proper review and acceptance of the sequence changes.
- Control of Nonconforming Items - The basic requirements of NQA-1 and the supplemental requirements are applied. Additional RW-0214 controls are implemented to insure

closure of nonconformances and that the personnel authorized to disposition nonconformances are qualified.

- **Corrective Action** - The basic requirement of NQA-1 are applied. Additional RW-0214 requirements related to adverse quality trends and identification of root cause are also included in the program. Remedial actions are to be documented and initiated after a deficiency has been identified. Quality Assurance follow to insure proper closure of the remedial actions taken is required and documented.
- **Quality Assurance Records** - The basic requirements of NQA-1 and the supplemental requirements are applied. Additional RW-0214 controls are implemented to insure that an acceptable quality records package exists for each canister containing high level waste. Production records for each canister are required to become lifetime records which will be transferred to the Federal Repository Operator with the canister waste forms that they represent.
- **Audits** - The basic requirements of NQA-1 and the supplemental requirements apply. In addition, per RW-0214, the use of technical experts for performing audits is required to evaluate procedures, instructions, techniques and items as well as programmatic compliance. External audits of supplier's are required as a minimum on an annual basis. Criteria are to be provided for not performing these annual audits as required and written justification is to be provided.
- **Computer Software** - A computer software development and control program is developed to be consistent with the documentation guidance contained in NUREG-0856, "Final Technical Position on Documentation of Computer Codes for High-Level Waste Management. The requirements of NUREG-0856 are applied to the development, procurement, modification, maintenance, use, and retirement of all software which is classified as being important to safety, protection of environment and to any software which is essential for meeting the Waste Acceptance Criteria.

QUALITY ASSURANCE OVERSIGHT AND SUPPORT

To provide independent oversight and support to the quality assurance program described above, the Waste Management and Environmental Restoration (WM&ER) Division at SRS has the Manager of Quality Assurance WM&ER reporting to the Division Vice President/ General Manager at the same level as the DWPF Manager. The Manager, Quality Assurance WM&ER has the responsibility and authority for the following:

- Defining, developing, and maintaining the quality assurance oversight program for the canister waste form qualification and production activities.
- Delegating and assigning to the quality manager of DWPF the responsibility and authority to execute the DWPF quality assurance program, as described above.
- Approving the QAPD and any changes thereto
- Maintaining liaison with the Quality Assurance Department of ESH&QA and other WSRC Quality Managers to ensure that WSRC overall Site Quality Program is consistently applied and complied with for DWPF.

The Manager of Defense Waste Processing Facility Quality Department (DWPF-Q), which is the responsible quality function for DWPF, has oversight responsibility for the DWPF quality assurance program. The DWPF-Q Manager has direct access to responsible management at a level where appropriate action can be affected; has no other duties or responsibilities unrelated to quality assurance; and has sufficient independence from costs and schedules to make unencumbered quality-affecting decisions.

The Manager of DWPF-Q is responsible for and assists the DWPF Manager in the following ways:

- Overseeing and monitoring the quality assurance program; independently measuring and assuring the adequacy and effectiveness of the quality assurance program for canister waste form production and reporting the results to Management.

- Assuring that the DWPF quality assurance program is described in the quality assurance program description (QAPD) and that the DWPF implementing procedures remain in alignment with the QAPD.
- Performing surveillances of waste form production programs and activities executed by the DWPF-PMT.
- Overseeing the activities of SRTC-QS in support of DWPF qualification and production activities to ensure compliance with the QAPD.
- Reviewing and approving DWPF quality assurance implementing procedures and changes and interpretations of them.
- Reviewing the WCP, WQR, and the Glass Product Control Description prior to issuance.
- Issuing Stop Work Orders where conditions adverse to quality require immediate corrective action.

Note that all line management, as well as DWPF-Q personnel, are authorized to stop work to prevent practices adverse to quality or safety. Stop work documents are issued through the DWPF-Q Manager, who administratively controls them.

WSRC High-Level Defense Waste Processing implements the Quality Assurance Program on all activities of high-level defense waste processing in accordance with documented agreements between WSRC and DOE/SR. This includes the broad scope of activities to be performed to qualify the glass form and the process, as well as activities to be performed in high-level waste form production.

PROGRAM RESULTS

The Quality Assurance Department of WSRC ESH&QA Division, which has overview responsibility for the SRS, establishes and implements a systematic overview of quality assurance activities performed by WSRC organizations, including those organizations participating in the high-level defense waste program. This overview includes an appropriate combination of the following:

- Reviewing and approving high-level defense waste processing program participants quality plans.
- Performing surveillance of activities affecting quality to verify compliance with requirements.
- Performing quality assurance audits to verify the adequacy and effectiveness of program management.
- Overseeing programs to assess compliance with the WSRC Quality Assurance Program and DOE QARD RW-0214
- Performing vendor evaluations

These activities are planned and performed in accordance with appropriate procedures. The results are documented and reported to appropriate WSRC management.

DOE, in executing the Owner Program, performs overview functions. The overviews are performed by DOE/Savannah River Field Office, the DOE Office of Waste Operations, and by the Office of Civilian Radioactive Waste Management in its role as licensee of the Federal Repository. These various overviews have not detected any major problems with the documentation and implementation of the QAPD.

SUMMARY

To date the program has been effectively implemented with no major problems. The program will be qualified by DOE and implemented in support of the process qualification and production activities associated with HLW vitrification.

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