Hanford Waste Vitrification Plant Quality Assurance Program Description for High-Level Waste Form Development and Qualification

Prepared for the U.S. Department of Energy
Office of Environmental Restoration
and Waste Management

Westinghouse
Hanford Company Richland, Washington

Hanford Operations and Engineering Contractor for the
U.S. Department of Energy under Contract DE-AC06-87RL10930

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Date Published
August 1993

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HANFORD WASTE VITRIFICATION PLANT QUALITY ASSURANCE
PROGRAM DESCRIPTION FOR HIGH-LEVEL WASTE FORM
DEVELOPMENT AND QUALIFICATION

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**HANFORD WASTE VITRIFICATION PLANT PROJECT
POLICY FOR QUALITY ASSURANCE**

The Hanford Waste Vitrification Plant (HWVP) Project Quality Assurance (QA) Program is applied commensurate with the complexity of the product/service and consequence of failure. Controls are based on classifications that range from items very important to safety to non-safety-related items. The controls are in accordance with the requirements of DOE Order 5700.6C, *Quality Assurance* (DOE 1991);¹ DOE/RW-0214, *Quality Assurance Requirements Document for the Civilian Radioactive Waste Management Program* (DOE-OCRWM 1990);² and are consistent with the provisions of ASME NQA-1, *Quality Assurance Program Requirements for Nuclear Facilities* (ASME 1989).³ Classification and levels of control are applied, as appropriate, to ensure that each task is performed correctly the first time to meet requirements.

A prevention-oriented QA program will be maintained and periodically reviewed and verified to ensure that HWVP's products and services for high-level waste form qualification meet requirements and satisfy the customer's contract requirements.

The QA program, as documented in the Westinghouse Hanford Company (WHC) HWVP Quality Assurance Program Description (QAPD), is applicable for functional activities involved in HWVP's items, products, and services. The program provides for prevention of errors as well as for detection and correction of deficiencies. The program includes project elements and procedures that comply with regulatory requirements related to quality.

The QA program implements, through selective and judicious application, the requirements of DOE Order 5700.6C and DOE/RW-0214.

Responsibilities and authority for execution of this policy are detailed in the project quality requirements.

Compliance with the requirements of the WHC HWVP QAPD is mandatory for all HWVP Project personnel.

R. A. Smith, Manager
HWVP Project

¹*Quality Assurance*, DOE Order 5700.6C, U.S. Department of Energy-Headquarters, Washington, D.C.

²*Quality Assurance Requirements Document for the Civilian Radioactive Waste Management Program*, DOE/RW-0214, U.S. Department of Energy-Office of Civilian Radioactive Waste Management, Washington, D.C.

³*Quality Assurance Program Requirements for Nuclear Facilities*, ASME NQA-1, American Society of Mechanical Engineers, New York, New York.

**HANFORD WASTE VITRIFICATION PLANT QUALITY ASSURANCE
PROGRAM DESCRIPTION FOR HIGH-LEVEL WASTE FORM
DEVELOPMENT AND QUALIFICATION**

ABSTRACT

The Hanford Waste Vitrification Plant Project has been established to convert the high-level radioactive waste associated with nuclear defense production at the Hanford Site into a waste form suitable for disposal in a deep geologic repository. The Hanford Waste Vitrification Plant will mix processed radioactive waste with borosilicate material, then heat the mixture to its melting point (vitrification) to form a glass-like substance that traps the radionuclides in the glass matrix upon cooling. The Hanford Waste Vitrification Plant Quality Assurance Program has been established to support the mission of the Hanford Waste Vitrification Plant. This Quality Assurance Program Description has been written to document the Hanford Waste Vitrification Plant Quality Assurance Program.

Under the Nuclear Waste Policy Act of 1982,¹ the U.S. Department of Energy-Office of Civilian Radioactive Waste Management has been designated the national high-level waste repository licensee and the recipient for the canistered waste forms from the waste form producers. The Office of Waste Operations has overall responsibility for producing the canistered waste form, and this responsibility is exercised through the U.S. Department of Energy Environmental Restoration and Waste Management. U.S. Department of Energy local operations offices manage contractor organizations to allow defense waste to be converted to waste forms.

¹Nuclear Waste Policy Act of 1982, 42 USC 10101 et seq.

This document has been prepared in response to direction from the U.S. Department of Energy-Office of Civilian Radioactive Waste Management through the U.S. Department of Energy, Richland Operations Office for a quality assurance program that meets requirements specified by the U.S. Department of Energy. This document provides guidance and direction for implementing a quality assurance program that applies to the total Hanford Waste Vitrification Plant Project. Management of the Hanford Waste Vitrification Plant Project commits to the following with the release of this document.

- Implement the quality assurance program activities for which it is responsible.*
- Review the program periodically and revise it as necessary to keep it current and effective.*

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**HANFORD WASTE VITRIFICATION PLANT QUALITY ASSURANCE
PROGRAM DESCRIPTION FOR HIGH-LEVEL WASTE FORM
DEVELOPMENT AND QUALIFICATION**

INTRODUCTION

This document describes the quality assurance (QA) program for the Hanford Waste Vitrification Plant (HWVP) Project. The purpose of this document is to describe the implementation of the QA requirements for achieving the mission of the HWVP Project in a safe and reliable manner. The mission of the HWVP is to produce waste forms acceptable to the federal repository for defense and civilian high-level radioactive waste. A major aspect of the HWVP Project QA Program is the control of activities that relate to high-level waste (HLW) form development and qualification.

The objectives of this document that relate to achieving the mission are as follows:

- Identify the source documents for QA requirements
- Identify the applicability of those QA requirements to present project functions and activities
- Identify the roles and responsibilities associated with implementation of the applicable QA requirements
- Provide notice to project personnel of the mandatory nature of the requirements described
- Provide project personnel with a description of the system of management controls to achieve, verify, and document quality.

The QA program for the HWVP Project is founded on DOE/RW-0214, *Quality Assurance Requirements Document for the Civilian Radioactive Waste Management Program* (QARD) (DOE-OCRWM 1990), and DOE Order 5700.6C, *Quality Assurance* (DOE 1991).

This document describes the program and planned actions the Westinghouse Hanford Company (WHC) will implement to demonstrate and ensure that the HWVP Project meets the requirements of DOE/RW-0214, DOE Order 5700.6C, and ASME NQA-1, *Quality Assurance Program Requirements for Nuclear Facilities* (ASME 1989). The actions for meeting the requirements of the Waste Acceptance Product Specifications (WAPS) will be implemented under the HWVP Product Qualification Program with the objective of ensuring that the HWVP and its processes comply with the WAPS established by the federal repository.

The HWVP Project Participants (participant) are responsible for a QA program covering the quality requirements applicable to their assigned tasks and for work performed by others in support of those tasks. The WHC QA Program is described in this Hanford Waste Vitrification Plant Quality Assurance Program Description (QAPD) for High-Level Waste Form Development and

Qualification and in participants' QA plans and implementing procedures. The QAPD for the U.S. Department of Energy (DOE), Richland Operations Office (RL) Tank Waste Projects Division, HWVP Project Branch is described in HWVP-89-007, *Hanford Waste Vitrification Plant Vitrification Project Quality Assurance Program Description* (DOE-RL 1989).

The HWVP Project organizational relationships are defined in Figure 1-1. Each of the participating organizations shown in Figure 1-1 has an assigned line manager responsible for the achievement of quality during work performance required by the statement of work (SOW), contract, letter of instruction (LOI), or work order for that participant. Cognizant quality managers report to senior management within their respective organizations, ensuring independence from cost and schedule considerations, and provide direct communication channels with appropriate levels of project management to verify achievement of quality.

1.0 ORGANIZATION

1.1 GENERAL

This section describes the organizational responsibilities and authorities for the HWVP Project and identifies organizational interfaces among the participants. The assignment of responsibilities is based on HWVP Project policy that the line organization achieves quality and the quality organization provides overview to verify the achievement of quality.

Several organizations are involved in the HWVP Project. The design and construction of the HWVP represent an integrated effort by the Owner, the DOE; the Integrating Contractor (IC), WHC; the Architect-Engineer (A-E), Fluor Daniel, Inc (Fluor); the General Construction Contractor (GCC), UE&C-Catalytic Inc. (UCAT); and the Research and Development Contractor (R&DC), Pacific Northwest Laboratory (PNL). A description of each participant's primary responsibilities is contained in the participants' respective QA plans. The involvement of numerous participants underscores the need to effectively integrate activities to reduce or eliminate redundancies. The potential problem of overlap in responsibilities among participants has been addressed by adopting an integrated management team approach for the HWVP Project. An organization chart documenting the interfaces of the participants in this approach is shown in Figure 1-1. Additional charts depicting the organization of the HWVP Project appear in this section (see Figures 1-2 through 1-6). The QA function for the HWVP Project is primarily the responsibility of WHC, with assistance from the A-E, R&DC, and GCC.

Each affected organization is required to identify the QA management position within its organization responsible for the establishment and implementation of its QA program. The following characteristics are required of this QA management position:

- An organizational position at the same or higher organization level as the highest line manager responsible for performing activities affecting quality

Figure 1-1. Hanford Waste Vitrification Plant Project
Organizational Relationships.

Legend:

- Line Management
- Program and Matrix Support
- ▨ Program Guidance
- Project Direction and Reporting

DOE-HQ = U.S. Department of Energy-Headquarters
HWVP = Hanford Waste Vitrification Plant
RL = U.S. Department of Energy, Richland Operations
Office

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- Knowledge and experience in the areas of QA and management
- The authority and responsibility to verify the adequacy and implementation effectiveness of the QA programs of organizations and subtier organizations
- No other duties or responsibilities unrelated to QA that could prevent full attention to QA program matters
- Sufficient freedom from cost and schedule considerations when such considerations oppose quality considerations
- Access to senior management and management at the next higher program organizational level to identify, and obtain resolution of, unresolved quality concerns

Figure 1-2. U.S. Department of Energy, Richland Operations Office/
Hanford Waste Vittrification Plant Project Branch.

PSD = Program Support Division
RL = U.S. Department of Energy, Richland Operations Office
TSB = Technical Support Branch
TWR = Tank Waste Remediation Systems Program Office

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- Review and approval recommendation authority for QA programs and for revising and interpreting those programs.

The specific responsibilities and authorities for interface among the participants are described in the remainder of this section.

1.2 DOE-HEADQUARTERS (HQ)

The DOE-HQ is responsible for establishing major program direction for the HWVP Project. Directives issued by the DOE-HQ are channeled through RL.

1.2.1 RL

The RL is responsible for providing overall management of the HWVP Project. The project objectives to design and construct the plant and to develop and qualify the waste form have been assigned to the RL HWVP Project Branch. As such, RL has total responsibility for the HWVP Project QA Program; the Tank Waste Remediation System (TWRS) Technical Support Branch supports the RL HWVP Project Branch in implementing this responsibility. The RL HWVP Project Branch provides direction and coordination of project activities through WHC.

1.2.2 RL HWVP Project Branch

The RL HWVP Project Branch is responsible for accomplishing the management, administration, and performance of the HWVP Project in accordance with established technical, cost, and schedule baselines. The RL HWVP Project Branch interfaces include other RL divisions, the DOE-HQ, the U.S. Nuclear Regulatory Commission, national waste form production sites, and the HWVP

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Figure 1-3. Westinghouse Hanford Company Hanford Waste Vitrification Plant Project.

A-E = Architect-Engine
 DWPF = Defense Waste Processing Facility
 ESQ = Environmental, Safety, Health, and Quality Assurance
 HWVP = Hanford Waste Vitrification Plant
 TWRS = Tank Waste Remediation System
 WHC = Westinghouse Hanford Company
 WVDP = West Valley Demonstration Project

— Links organization elements to indicate that the upper organization directs the actions of the lower organization, and that the lower organization reports to the upper organization.

- - - Links organization elements to indicate that the lower organization supports the upper organization in a matrixed organization arrangement: the lower organization does not report to the upper organization.

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Figure 1-4. Hanford Waste Vitrification Plant Project
Architect-Engineer--Fluor Daniel, Inc.

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Figure 1-5. Hanford Waste Vitrification Plant Project
General Construction Contractor--UE&C-Catalytic Inc.

Figure 1-6. Hanford Waste Vitrification Plant Project Research and Development Contractor--Pacific Northwest Laboratory.

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Project participating contractors. Additional details regarding the RL HWVP Project Branch organization and functions may be found in the QAPD for the RL HWVP Project Branch, HWVP-89-007.

1.2.3 TWRS Technical Support Branch - RL

The TWRS Technical Support Branch is responsible for supporting the RL HWVP Project Branch in establishing QA policy and requirements for the HWVP Project. The TWRS Technical Support Branch reviews the HWVP QAPD and procedures for concurrence, verifies proper implementation of the HWVP Project QA Program through audits and surveillances, and concurs on project requirement documents that affect quality.

1.2.4 A-E - Fluor

Fluor Daniel, Inc. is responsible for providing A-E services for the HWVP. The WHC HWVP Project (WHC HWVP PROJ) prepares work-authorization documents to establish the scope of engineering activities to be accomplished by Fluor in a specified period of time. As the A-E, Fluor is responsible for preparing and verifying designs that relate to reference conceptual, preliminary, and definitive design phases. In addition, Fluor is responsible for classifying items, components, systems, and structures into safety classes; developing acceptance test specifications; preparing "as-built" drawings/specifications from field changes during construction; and controlling, configuring, and reconciling construction estimates. Furthermore, Fluor has limited Title III inspection responsibilities, as detailed in Section 10.1.

1.2.5 GCC - UCAT

UE&C-Catalytic Inc. is responsible for procuring permanent material and equipment, and performing construction of the HWVP in accordance with the approved design. As the GCC for HWVP, UCAT provides construction and

construction management services. Work-authorization documents establish the scope of GCC construction services. The UCAT is responsible for procuring materials and equipment, performing construction and installation of HWVP systems, performing project control activities, managing subcontractors and suppliers, assisting with the implementation of acceptance test procedures, and performing constructibility reviews. Furthermore, UCAT has limited Title III inspection responsibilities, as detailed in Section 10.1.

1.2.6 R&DC - PNL

Pacific Northwest Laboratory is the R&DC responsible for performing tests and analyses related to technology development as directed by the WHC HWVP Technology group. Also, PNL is responsible for procurement related to technology development, and for the preparation of reports and documentation that support waste form qualification (WFQ), design, permitting, process development, operations, and safety analysis in conjunction with the WHC HWVP Technology group.

1.2.7 WHC Organization

1.2.7.1 IC - WHC. The RL has delegated responsibility for QA and project integration of the HWVP Project to WHC, which is responsible for establishing a project-level management structure and reporting system for the HWVP Project.

1.2.7.2 TWRS Division - WHC. The WHC TWRS Division is the parent organization for the HWVP Project and is responsible for managing the HWVP Project to coordinate it with the other elements of TWRS Projects to effectively integrate the project into the overall Hanford Site waste disposal system. The other elements of the TWRS Division have QA programs that are separate from the HWVP Project QA Program.

1.2.7.3 HWVP Project - WHC. The WHC HWVP PROJ is responsible for providing detailed management of the project. Specifically, the WHC HWVP PROJ is responsible for integrating the efforts of the A-E, GCC, R&DC, Project Engineering, Technology, Construction, Startup and Operations Integration, and TWRS Projects Business Management. The WHC HWVP PROJ is responsible for preparing work authorization documents to describe the specific tasks to be accomplished by the participants. Line managers within the HWVP Project are responsible for participating with QA to determine the extent of QA controls applied to items and activities.

The WHC HWVP Project manager (PM) is responsible for providing direction to the participants and for coordinating their activities. The HWVP Project management is responsible for the detailed planning, development, integration, implementation, and reporting of project activities. The RL has assigned to the WHC HWVP PROJ the daily technical management, coordination, control, integration, QA, and regulatory compliance activities, as well as startup and operations functions. The RL maintains responsibility for these activities. The WHC HWVP PM reports to the manager, TWRS Projects, and is responsible for cost, schedule, performance, and quality of the tasks performed by the HWVP Project staff. The WHC HWVP PM is responsible for review and approval of

selected project documentation submitted by participants and for submittal of documentation to the RL HWVP Project Branch. The WHC HWVP PM will ensure that an overall QA program is developed and implemented for the project.

1.2.7.4 Project Engineering. The HWVP Project Engineering manager reports to the WHC HWVP PM and is responsible for change control and maintenance of WHC-SD-HWV-FDC-001, *Hanford Waste Vitrification Plant Project Functional Design Criteria* (FDC) (Kalia 1990a), and WHC-SD-HWV-DP-001, *Hanford Waste Vitrification Plant Project Technical Data Package* (TDP) (Kalia 1990b); assessing adequacy of design from an engineering, startup, and operational viewpoint; preparing safety analysis reports and environmental permits; and providing formal and informal reviews of the design function.

The HWVP Project Engineering manager also provides technical direction to Fluor for the design effort for the HWVP.

Hanford Waste Vitrification Plant Project Engineering is responsible for providing detailed integration of, and direction to, participant activities. As a functional group within the WHC HWVP PROJ organization, HWVP Project Engineering prepares and administers the work authorization documents for Fluor and UCAT. Project Engineering also is responsible for accomplishing activities related to WHC-SD-HWV-PSAR-001, *Hanford Waste Vitrification Plant Preliminary Safety Analysis Report* (Herborn et al. 1992); development; permitting; engineering liaison; technical design monitoring; control of design monitoring; control of design bases and evaluation of change proposals; and operations analysis.

1.2.7.5 Technology. Technology is responsible for integrating the development of technology to be used in the HWVP. As a functional group within the WHC HWVP PROJ organization, Technology oversees the activities of the R&DC, PNL. Technology has primary responsibility for the integration of technology from plants similar to the HWVP, characterization of feed streams, and preparation of documents/reports relating to WFQ.

The Technology manager reports to the WHC HWVP PM and is responsible for WHC activities that ensure WFQ requirements are met. This includes participating in exchange programs and coordinating activities with the WHC Waste Management Technology group to establish pretreatment characterization, sludge removal, and vitrification requirements schedules.

Technology also provides direction to PNL, which supports the HWVP Project by providing technology for the vitrification process development, equipment adaptation and testing, WFQ, and regulatory compliance activities.

1.2.7.6 Startup and Operations Integration. Startup and Operations Integration is responsible for effecting a smooth and effective transition from the construction phase to the operations phase. As a functional group within the HWVP Project organization, Startup is responsible for managing the various stages of preoperational testing at the HWVP, including the development and implementation of a testing plan. Furthermore, Startup will perform startup planning, testing, and support (including preoperational test procedure development) and provide input to the Operational Readiness Review.

The Startup manager reports to the WHC HWVP PM; responsibilities include preparation of the startup administrative manual and procedures, e.g., test procedure development and control. Also included is design review and establishment of startup personnel training requirements. Startup is responsible for interfacing with construction on startup activities associated with system turnover for preoperational testing.

1.2.7.7 Construction. Westinghouse Hanford Company HWVP Construction is responsible for integrating the work of WHC organizations to provide timely field support for HWVP construction activities, and for interfacing with the GCC, other Hanford Site contractors, and/or outside agencies to promote activities including information exchange, work coordination, and permitting. Furthermore, Construction is responsible for monitoring the GCC's performance and for the resolution of differences in interpretation of the GCC's scope of work.

1.2.7.8 TWRS Projects Business Management. The manager of TWRS Projects Business Management reports to the WHC HWVP PM and is responsible for management of the HWVP Project budget and schedule. As a functional group within the HWVP Project organization, TWRS Projects Business Management is responsible for project administration functions, the preparation of project-level schedules, development and maintenance of the work breakdown structure dictionary, management and accountability of project funds, participation in the processing of changes to the design, development of project reporting systems, and management of project records.

1.2.7.9 WHC HWVP PROJ Interfaces. Hanford Waste Vittrification Plant Project team interfaces at WHC include other WHC departments (such as HWVP Operations), RL, national waste form production sites, HWVP Project participating contractors, consultants, suppliers, and subcontractors. Interfaces among internal and external organizations are documented, and copies of correspondence are maintained by the Document Processing Center (DPC) at WHC. The HWVP Project organization at WHC is displayed in Figure 1-3.

1.2.7.10 WHC - Environmental, Safety, Health, and QA (ESQ) Division. The ESQ Division is responsible for establishing controls to be applied to the HWVP Project to ensure that the RL requirements for safety, QA, and the environment are satisfactorily implemented. As a major division of WHC, ESQ is responsible for developing sitewide policies to implement RL directives concerning the environment, safety, and QA. Furthermore, WHC has delegated authority to ESQ for providing guidance and support to ensure a consistent, sitewide approach for the establishment and implementation of HWVP Project QA programs.

1.2.7.11 Health and Safety Assurance (H&SA) Department. The WHC H&SA Department is responsible for establishing controls to ensure that the RL requirements for health, safety, and fire protection are satisfactorily implemented across the WHC organization. As a department within ESQ, H&SA is independent of line functions and is responsible for providing guidance and support to HWVP through the Waste Remediation Safety Assurance (WRSA) group.

1.2.7.12 WRSA. The WRSA group is responsible for providing independent safety review of the HWVP Project baseline criteria documents, preliminary safety analysis report and final safety analysis report, and safety

assessments. In addition, WRSA is responsible for performing surveillances and appraisals of safety-related HWVP Project activities and for reviewing documentation relating to safety-related project activities (e.g., acceptance test procedures and operating test procedures).

1.2.7.13 QA Department. The WHC QA Department is responsible for establishing HWVP Project controls to ensure that the RL requirements for QA are satisfactorily implemented. Furthermore, the QA organization is responsible for providing guidance and support to the HWVP Project QA group. As a department within WHC ESQ, the QA Department does not report to the line organization.

1.2.7.14 TWRS Projects QA. The WHC TWRS Projects QA manager reports to the TWRS QA manager who reports to the WHC QA Department manager. The WHC TWRS Projects QA manager provides QA support to the WHC HWVP PM, as well as to the WHC PMs for other projects within TWRS Projects. The TWRS Projects QA manager is at an organizational level equal to the WHC TWRS Projects manager. The WHC TWRS Projects QA manager maintains independence from the line organization by reporting functionally to the TWRS QA manager. This organizational structure is separate from the TWRS Division line organization and ensures that the WHC TWRS Projects QA manager has the authority, functional independence, and freedom to access work to verify that activities affecting quality have been properly implemented. In addition, the WHC TWRS Projects QA manager may identify quality problems; initiate, recommend, or provide solutions to quality problems; verify implementation of solutions; and ensure that further processing, delivery, installation, or use is controlled until the problem is corrected.

The TWRS Projects QA group is responsible for developing this HWVP QAPD document, which directs the QA program for the project. The HWVP Project QA Program meets the applicable requirements of ASME NQA-1, including the supplements, complies with DOE/RW-0214 and DOE Order 5700.6C, and is applicable for activities that affect the WFQ or acceptance process. Implementing procedures are used to support each of the applicable quality requirements functions.

The WHC TWRS Projects QA manager is responsible for establishing and implementing the HWVP Project QA Program, which provides for the following:

- Development of the QAPD, which defines the QA program for the project
- Interpretation of QA program requirements for the project
- Review and concurrence with WHC procedures and instructions that affect the HWVP Project QA Program
- Integration and coordination of QA activities for the project
- Reporting to upper management and the RL HWVP Project Branch on the status and adequacy of project QA activities
- Review of the QA programs/plans of the participating contractors and provision for approval recommendations to line management

- Ensurance that quality control (QC) activities are planned and executed
- Identification, reporting, and provision of solutions for quality problems and recognizing and acting on quality trends to avert quality problems
- Review of nonconformance report (NCR) dispositions generated during Title III and construction activities
- Monitoring of the WHC HWVP PROJ activities related to quality (including RL HWVP Project Branch-delegated activities) at WHC, and verifying compliance and effectiveness of the WHC and participants' QA programs through overview activities, which include surveillances, reviews, and audits
- Ensurance that effective corrective action is taken before continuing affected work where serious quality problems have been identified
- Provision for "stop work" authority including criteria and methodology for stopping work and lifting stop work orders/requests, definition of work being stopped, and authorities and responsibilities.

The WHC Quality Compliance Assurance (QCA) group will perform audits of the HWVP Project to provide an independent overview of the quality affecting activities within the project.

The WHC TWRS Projects QA manager position is at an organizational level commensurate with the line managers responsible for accomplishing activities affecting quality. As a manager within ESQ, the TWRS Projects QA manager reports independent of the line managers. The position requires knowledge of, and experience in, quality and management such that the manager can adequately supervise implementation of the program and verify the effectiveness of the QA programs of the organizations and subtier organizations. The scope of the manager's responsibilities and duties include only QA program activities. The TWRS Projects QA manager has sufficient freedom from cost and schedule considerations when opposed to quality considerations.

1.3 DELEGATION OF WORK

The RL HWVP Project Branch is responsible for the overall execution of the HWVP Project but has delegated, through the WHC HWVP PROJ, the responsibility for design to Fluor, procurement and construction activities to UCAT, and development and testing to PNL. Direct responsibility for regulatory compliance and HWVP Project integration has been delegated by the RL HWVP Project Branch to WHC. The delegating organization remains accountable for work that is delegated. Specification of work has been provided by contract, SOW, or LOI as applicable to the participants, which are responsible for the quality of their work. The WHC HWVP PROJ will overview and monitor the quality-related activities to ensure adequacy and acceptability and to verify compliance with project requirements.

1.4 RESOLUTION OF DISPUTES

Each of the participants will have a procedure to address differences of opinion involving project concerns regarding quality. Disputes are to be resolved within each organization, if possible; if unresolvable, they will be elevated progressively to the WHC HWVP PROJ and finally to the RL HWVP Project Branch.

1.5 RESOLUTION OF ALLEGATIONS

Each participant will develop an allegation and quality concern resolution program in conformance with the DOE-Office of Civilian Radioactive Waste Management practice for the resolution of allegations.

1.6 STOP WORK PROVISIONS

Stop work provisions are implemented to preclude violation of safety, quality, or environmental requirements. Stop work provisions identify how stop work orders/requests are issued and lifted.

1.6.1 Conditions for Stop Work

Any one or combination of the following conditions warrants a stop work:

- Work practices, that, if continued, will imminently jeopardize personnel or public health or safety
- Willful violation of quality requirements
- Work practices, that, if continued, will cause significant adverse effect on the environment
- Work practices, that, if continued, will result in an emergency situation that necessitates an emergency response action.

1.6.2 Authorities for Stop Work

Stop work authority is vested in a variety of HWVP Project participant personnel. The highest-ranking HWVP employee of the DOE, WHC, Fluor, UCAT, and PNL have stop work authority for their respective organizations. In addition, the RL HWVP Project Branch manager has the authority to stop the work of any (and all) HWVP Project participant(s). Furthermore, the QA manager of the work-performing participant has the authority to stop the work within the manager's participant organization. In addition, all HWVP Project personnel have the authority to immediately stop work if the observed condition represents an imminent threat to the environment or to the health and/or safety of project personnel or to the public. Any such actions will then be immediately brought to the attention of the appropriate authority to determine if the stop work is to remain in effect.

The actual authority for causing a work cessation is as previously discussed. However, when conditions are observed that may warrant work cessation, the PM or QA manager of the participant performing the work is obligated to investigate. When any participant representative, including overview personnel performing overview activities (i.e., monitoring, surveillance, or audit), observes conditions that may warrant work cessation, the representative is required to notify either the affected PM or QA manager. The notified manager is obligated to immediately investigate the conditions and stop the work if the result of the investigation confirms the need for work cessation.

1.6.3 Stop Work Procedures

The methodology for stopping work and for lifting stop work orders/ requests will be described in procedures generated by each participant. These procedures will require that an exact definition of the work being stopped is described. Furthermore, these procedures will be in accordance with the authorities and responsibilities for stop work as previously identified.

1.6.4 Conditions for Work Resumption

Before work can resume, the stop work action must be dispositioned and verified. The disposition must identify the conditions/occurrences that caused the stop work, the corrective action(s) that must be implemented, and which actions must be taken to release or "lift" the stop work. Readiness to resume work and actions taken to release the stop work must be documented and verified as acceptable before approval to resume work is issued by the affected participant management.

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2.0 QA PROGRAM

2.1 GENERAL

The WHC HWVP Project QAPD complies with the requirements specified in the QARD, DOE/RW-0214 (DOE-OCRWM 1990) and DOE Order 5700.6C, *Quality Assurance* (DOE 1991) that are applicable to HWVP activities. The HWVP Project QA Program consists of this HWVP QAPD (Parts 1 and 2), the participants' QA plans, and implementing procedures. Part 3 of the HWVP QAPD will be developed later as the project moves to the operations phase.

The WHC HWVP Project QA Program, as defined herein, covers activities necessary to prepare for operation such as develop, design, site, construct, purchase, install, test, issue procedures, provide training for operations, etc. This HWVP Project QAPD does not address plant operation.

The WHC HWVP Project QA Program will be revised to address revisions to QA requirements documents as directed by the RL HWVP Project Branch and reviewed periodically to ensure continued compatibility to HWVP Project direction and schedule. This HWVP QAPD will be updated at least annually.

The requirements of DOE/RW-0214 apply to items that have a waste acceptance process activity (WAPA) relationship. The process to select the WAPA-related items will be defined in a WAPA rationale document for the HWVP A-E.

This HWVP QAPD describes the QA requirements that must be implemented for the HWVP Project. The requirements of DOE/RW-0214 have been applied among the participants in accordance with a matrix of responsibilities versus requirements (which is discussed in Section 2.8). The narrative of each section within this HWVP QAPD corresponds to the application of requirements appearing in the matrix.

2.2 QA PROGRAM

The HWVP Project QA Program is founded on requirements from several QA requirements source documents identified in this section. These documents do not constitute a hierarchy, but rather, each has been imposed as an independent source of QA requirements. The HWVP Project QA Program has consolidated the requirements from these documents comprehensively.

The basis of requirements for the HWVP Project QA Program is DOE/RW-0214. This basis is supplemented by DOE Order 5700.6C which has recently been imposed. The requirements of DOE Order 5700.6C will be phased into the Hanford Site's facility-specific QA program plans (including those of HWVP) to allow an orderly sitewide transition to the new DOE Order. In addition, RL has directed that HWVP-89-007, *Hanford Waste Vitrification Plant Vitrification Project Quality Assurance Program Description* (DOE-RL 1989) be used. Furthermore, RLIP 5000.3A, *Occurrence Reporting and Processing of Operations Information* (DOE-RL 1990a), and elements of DOE Order 4700.1, *Project Management System* (DOE 1987), influence the HWVP Project QA Program. The DOE/RW-0214 imposes ASME NQA-1, *Quality Assurance Program Requirements for*

Nuclear Facilities (ASME 1989), and DOE Order 5700.6C does not preclude use of ASME NQA-1. Thus, the requirements applicable to the HWVP Project QA Program can be found in the following documents:

- DOE Order 5700.6C, *Quality Assurance* (DOE 1991)
- RLIP 5000.3A, *Occurrence Reporting and Processing of Operations Information* (DOE-RL 1990a)
- DOE Order 4700.1, *Project Management System* (DOE 1987)
- DOE/RW-0214, *Quality Assurance Requirements Document for the Civilian Radioactive Waste Management Program*, Sections 1 through 19, Appendix B, "Glossary," and Interim Change Notice 4.1 (DOE-OCRWM 1990)
- ASME NQA-1, *Quality Assurance Program Requirements for Nuclear Facilities*, Basic Requirements, supplements, and non-mandatory Appendixes 2A-1 and 2A-3 (ASME 1989)
- HWVP-89-007, *Hanford Waste Vitrification Plant Vitrification Project Quality Assurance Program Description* (DOE-RL 1989).

These six documents comprise the basis of the requirements addressed in the HWVP Project QA Program. Additional requirements are cited in four other documents referenced in DOE/RW-0214; the following documents are imposed either in their entirety or in part, as noted in DOE/RW-0214:

- NUREG-0856-F, *Final Technical Position on Documentation of Computer Codes for High-Level Waste Management* (Silling 1983)
- NUREG-1297, *Peer Review for High-Level Nuclear Waste Repositories: Generic Technical Position* (Altman et al. 1988a)
- NUREG-1298, *Qualification of Existing Data for High-Level Nuclear Waste Repositories: Generic Technical Position* (Altman et al. 1988b)
- NUREG-1318, *Technical Position on Items and Activities in the High-Level Waste Geologic Repository Program Subject to Quality Assurance Requirements* (Duncan et al. 1988).

The appropriate revision or edition of the aforementioned documents is cited in Section 20.0, "References." When the respective documents are cited elsewhere in this HWVP QAPD, the revision status is generally not identified. This is done so that revision of this QAPD can be more easily accomplished when the release status of those documents changes.

2.3 REPORTING INDEPENDENCE OF PERSONNEL

This section identifies how accountability for the achievement of quality is distinguished from accountability for assurance of quality. The line organization is accountable for achieving quality, while the QA organization

is accountable for assuring that quality has been achieved. Because of this distinction in functional accountability between QA and the line organization, and because cost and/or schedule pressures may tempt the line organization to influence the QA organization to accept unsatisfactory work, the QA organization must report (in an organizational sense) independent of the line organization. The requirements for QA reporting independence are described below.

The WHC TWRS Projects QA manager reports independent of the HWVP line organization. The TWRS Projects QA group is part of the WHC ESQ Division, and the flow down of directives occurs as follows:

- WHC division vice-president, ESQ
- WHC department manager, QA
- WHC section manager, TWRS QA
- WHC group manager, TWRS Projects QA.

This organizational arrangement separates the QA personnel from the line organization. The TWRS Projects QA group is matrixed to the HWVP line organization to provide QA support for the project. Because of the matrixed arrangement, the HWVP PM does not have authority to direct the activities of any QA personnel. Thus, QA personnel have the independence, authority, and access to the work area to perform the following.

- Identify problems.
- Initiate, recommend, or provide solutions to conditions adverse to quality.
- Verify implementation of solutions.
- Ensure that further processing, delivery, installation, or use is controlled until proper disposition of the problem is complete.

When organizations other than WHC TWRS Projects QA provide verification, the QA group overviews the activities by surveillance, audit, or review.

2.3.1 Participant Reporting Independence

The reporting independence of WHC TWRS Projects QA personnel is addressed above. For other participants, the respective QA plan describes the reporting independence of its QA personnel.

2.4 PLANNING

The participants' QA programs include provisions for QA program planning to be integrated and coordinated among participating organizations, including the QA organization, to provide consistency and completeness and to avoid duplication of effort.

Participant QA organizations review implementing procedures to verify that quality requirements have been adequately defined and can be effectively implemented. Implementation of the QA program is verified by reviews, surveillances, and audits conducted in accordance with approved procedures using approved plans and/or checklists, documented, and reported to appropriate management. Any deficiencies identified will be processed in accordance with the requirements of Sections 15.0 and 16.0 of this HWVP QAPD, as appropriate.

The HWVP Project activities are planned so that activities affecting quality are accomplished under suitably controlled conditions. The HWVP Project QA Program describes controlled conditions as (1) the use of appropriate equipment, (2) suitable environmental conditions for accomplishing activities, and (3) assurance that prerequisites for activities have been satisfied. The QA program also states the provisions for any special controls, processes, test equipment, tools, and needed skills that are required to attain or verify quality.

Quality Assurance program planning includes the integration and coordination of the individual participants' QA programs by the WHC TWRS Projects QA group. The integration and coordination effort is performed to provide consistency and completeness and to avoid duplication of effort. The following elements are considered when planning the QA program for the HWVP Project:

- Definition of activities
- Selective application of appropriate QA program requirements and procedural controls to items and activities
- Assignment of responsibilities for QA program control and verification activities
- Identification of the specific scientific or technical information to be collected, analyzed, or used
- Identification of applicable technical and QA program management control and verification activities
- Provisions for the identification of required QA records.

2.5 READINESS REVIEWS (RR)

Readiness Reviews are scheduled, planned, performed, and documented for major scheduled or planned quality affecting activities that are critical or complex in nature. In addition, RRs are conducted when significant transitional events in the WAPA occur leading up to, and during, HLW form production. This is to ensure that necessary activities and actions have been satisfactorily completed before subsequent activity initiation is authorized.

One RR has been scheduled during the cold test and startup phase (i.e., a pre-operational readiness assessment) of the HWVP. This RR is required to provide evidence for addressing the following topics:

- Satisfactory completion of work activity prerequisites
- Completion of review for adequacy and appropriateness of detailed technical and QA program administrative procedures
- Suitable completion of personnel training and qualification
- Availability of proper equipment, material, and resources.

Before the aforementioned preoperational RR, lesser reviews occur through the implementation of overview activities such as audits, surveillances, assessments, etc. These lesser reviews are often performed to determine if a particular aspect of HWVP is ready to proceed to the next stage. These lesser reviews are not required to address all four of the topic areas for RRs as previously noted.

2.6 GRADED QA

The graded approach to QA is founded on the concept of judicious application of specific QA requirements to particular activities, items, components, systems, or structures in accordance with the importance of the activity, item, or structure. For installed features of HWVP, three classification schemes are used. Items are classified as to (1) safety class, (2) quality level, and (3) WAPA. There are four safety classifications with six designations (Safety Class 1 [SC-1/SC-1*], Safety Class 2 [SC-2/SC-2*], Safety Class 3 [SC-3], and non-Safety Class 4 [nSC-4]). There are two quality levels (Quality Level 1 [QL-1] and Quality Level 2 [QL-2]). And, there are two categories for WAPA (WAPA-related and non-WAPA-related). The definition for each of these classifications appear in an HWVP Project Procedure.

NOTE: Pacific Northwest Laboratory research and development activities do not result directly in installed features of the HWVP; their activities are classified differently than previously identified.

The HWVP Project QA Program describes the QA requirements that are active during the design and construction phases of the HWVP. In addition, the program provides for those active requirements to be applied selectively to achieve a graded approach. An HWVP Project Procedure has been developed to identify the classification schemes and to relate the QA requirements source documents that apply to each classification. The methodology used to determine the QA requirements and procedural controls selected for specific items, components, systems, structures, and activities is described as follows.

- Identify items, components, systems, and structures that are candidates for control by the HWVP Project QA Program. These are listed in the Preliminary Safety Equipment List. Activities that are to be controlled are the WAPA-related activities that will be listed in a WFQ program plan. The A-E marks design output documents to indicate

the classifications (i.e., safety class, quality level, and WAPA relationship) of the items, components, systems, and structures described in the design output documents.

- Select the QA requirements (and their degree of application) that are appropriate for each candidate item, component, system, structure, and activity based on the following considerations:
 - Consequence of failure
 - Importance of data
 - Complexity of function
 - Reliability of process
 - Reproducibility of results
 - Uniqueness of product
 - Degree of functional product demonstration
 - Degree of standardization
 - History of quality
 - Impact on schedule or cost to replace in the event of failure
 - Necessity of special controls or processes
 - Significance to licensing process
 - Impact on meeting safety or environmental requirements.

The classification by the A-E of items, components, systems, and structures into safety classes and quality levels is a prerequisite for a graded QA program and provides compliance with NUREG-1318 requirements. Classifying activities as WAPA-related also is a prerequisite. The methodology developed to identify those items, components, systems, structures, and activities to which the QA program applies, and to selectively apply the QA program requirements and controls, will be described in a waste form compliance plan for the HWVP. This methodology will ensure that the HWVP Project QA Program is applied to items, components, systems, and structures important to radiological safety and waste isolation.

2.7 POLICY STATEMENT

The implementation of the HWVP Project QA Program and implementing procedures or instructions is mandatory. This HWVP QAPD includes a policy statement (signed by the HWVP PM) that establishes the mandatory nature of the HWVP Project QA Program. In addition, the management of each participant organization is required to formally declare its commitment to implement the QA program activities for which it is responsible.

2.8 QA REQUIREMENTS MATRIX

A matrix will be developed (and published separately from this HWVP QAPD) to demonstrate how the requirements of DOE/RW-0214 are distributed and/or shared among participants. This matrix will identify the QAPD section and implementing procedures/instructions that relate to specific requirements of DOE/RW-0214. This matrix will be updated quarterly: the update will identify additions, deletions, and changes in titles or designators of procedures, but

the revision status of the listed procedures will not be indicated (users of the matrix will be advised to use the most current edition of listed procedures).

2.9 PERSONNEL SELECTION, INDOCTRINATION, TRAINING, AND QUALIFICATION

The HWVP Project personnel who will perform activities affecting quality will receive appropriate indoctrination and training in accordance with DOE/RW-0214; DOE Order 5700.6C; and ASME NQA-1, Supplements 2S-1 through 2S-4, and Appendixes 2A-1 and 2A-3, prior to performing work. This training includes personnel who conduct inspections and test activities to verify conformance of items to specified requirements for the purpose of acceptance, and to demonstrate that items will perform satisfactorily in service. This indoctrination and training ensure that personnel achieve and maintain suitable proficiency. Indoctrination and training are verified by the audit, surveillance, and trend program. Non-inspection or test personnel are not required to comply with paragraphs 2.7 and 2.8 of Supplement 2S-1 of ASME NQA-1.

A systematic approach to the determination of applicable indoctrination and training of personnel who perform activities affecting quality is implemented with consideration of the following.

Job Evaluation

- Management analyzes every job position to determine its quality affecting task responsibilities. Position descriptions identify job duties that include the quality affecting responsibilities of the position. Minimum personnel qualification standards (including minimum education and experience requirements) are established as a recognized standard for each position. Supervisors evaluate and assess the need for additional indoctrination and training as assignments, positions, and procedures change.

Personnel Selection

- Personnel assigned to perform quality affecting activities are required to have education, experience, and training commensurate with the functions associated with the work. A documented evaluation of the candidate's qualifications against the requirements is made. Relevant education and experience must be verified.

Determination of Indoctrination and Training

- Management of each participant will identify the qualification requirements, training needs, and proficiency maintenance requirements of personnel who perform quality affecting activities.

Documentation for training and qualification programs includes the objective, content of the program, attendees, and date of attendance. Training and qualification records are required to comply with the DOE System

80 requirements, and they are collected and maintained as privileged records in accordance with the *Privacy Act of 1974*.

2.10 SURVEILLANCE

Surveillance of work in progress is a means to verify the correct performance of quality affecting activities or the correct use of items.

Surveillance is a type of independent assessment, which is defined in Section 18.0 of this document. For HWVP, the term 'surveillance' pertains to an oversight activity performed by an oversight group, such as QA, while the term 'technical surveillance' pertains to the monitoring performed by WHC HWVP Project Engineering on released design media to verify that the design output addresses the design input (i.e., HWVP FDC and HWVP TDP). Other means of verification, such as audit, inspection, and review, are discussed elsewhere in this document. The remainder of this section is devoted to describing the requirements that pertain to surveillance performed by oversight groups.

Surveillance of activities affecting quality is planned, performed, documented, and reported to the management of the organization responsible for the performance of the activity under surveillance. Surveillances are conducted to accomplish the following objectives.

- Verify the quality of work in progress.
- Identify and document actual and potential deficiencies and deviations and promote prompt corrective action by cognizant management responsible for performing the work.
- Verify timely implementation of corrective action associated with surveillances.

Personnel selected to perform surveillances are required to be knowledgeable in the topic of the surveillance and independent of direct responsibility for performance of the activity to be surveilled. Selected project activities are surveilled in accordance with prescribed procedures. Surveillance personnel are trained for their assignments, but formal qualification is not required. Surveillance results are documented in a report to affected management, and the report is required to address, at a minimum, the following:

- Date of surveillance
- Description of the activity or item under surveillance
- Persons conducting the surveillance
- Persons contacted during the surveillance
- Requirements for the item or activity upon which the surveillance is based
- Deficiencies identified during the surveillance

- Identification of measuring and test equipment (M&TE) used to perform the surveillance
- Summary of actions taken during the surveillance to correct deficiencies on the spot.

Deficiencies noted during the surveillance are tracked to ensure the timely completion of corrective action as well as closure. Data relating to deficiencies are input into the quality tracking and trending system to aid in identifying recurrent or common problems.

The WHC TWRS Projects QA group is responsible for overseeing the activities of the other participants through the surveillance process. The results of these surveillances will be documented and reported to the organization overseeing and to project management. Any deficiencies noted will be corrected by the responsible organization and the deficiency tracked to verify the adequacy of the corrective action and its implementation.

2.11 MANAGEMENT ASSESSMENTS

A management assessment is an evaluation conducted by management of its own performance in implementing the QA program. This evaluation is performed in a planned and controlled manner to provide management with insight about the accomplishment of their responsibilities for achieving quality.

Management assessment of the participants' portion of the HWVP Project QA Program will be conducted at least annually by each participant's management or by designees who are independent of the participant's QA organization.

Assessments are conducted to evaluate the following:

- Effectiveness of QA program implementation
- Adequacy of planning and procedural controls
- Effectiveness of the nonconformance and corrective action systems
- Adequacy of organizational structure and staffing to implement the QA program
- Adequacy of the indoctrination and training program
- Adequacy of QA management information tracking, evaluation, and reporting system
- Opportunities for improvement in quality
- Compliance to the waste acceptance specification (WAS) and/or the WAPS.

Results of the management assessment will be documented, and identified deficiencies will be processed in accordance with the requirements of Section 16.0 of this document. Opportunities for improving quality also will be documented.

2.12 QA PROGRAM MANAGEMENT - INFORMATION REPORTING AND TRACKING

Hanford Waste Vitrification Plant Project participant organizations are required to report, disseminate, and track quality-related management information. A monthly report is prepared by each participant for submittal to the participant's management and to the management of the next higher organizational level. The types of quality-related management information that are reported and tracked are as follows:

- A summary of deficiencies in the QA program that require immediate corrective action, and a discussion of corrective actions that are being implemented
- Other significant events such as the issuance of stop work orders, solutions to vendor problems, changes in key personnel, etc.
- Audits performed and results
- NCR status and corrective action status
- Progress on implementing the elements of DOE/RW-0214
- Trending information.

A description of the quality reporting and trending program is provided in Section 16.0 of this document.

2.13 QA CONTROLS

The QA program is implemented by management, QA staff, and line organization personnel at each of the participant organizations. The functional line organizations are responsible for the accomplishment of quality, and line managers supervising the work will ensure that specified quality is achieved. Responsible managers will review the status and line performance of their QA programs to determine acceptability of product quality, programmatic compliance, and implementation effectiveness and to resolve quality problems.

3.0 DESIGN CONTROL

3.1 GENERAL

The design of non-WAPA-related items for the HWVP is controlled as defined in Basic Requirement 3 of ASME NQA-1, *Quality Assurance Program Requirements for Nuclear Facilities* (ASME 1989) and criterion 6 of DOE Order 5700.6C, *Quality Assurance* (DOE 1991). The design of WAPA-related items for the HWVP is controlled by DOE/RW-0214, *Quality Assurance Requirements Document for the Civilian Radioactive Waste Management Program* (DOE-OCRWM 1990). Applicable design inputs are appropriately specified in a timely basis and correctly translated into design documents. Design interfaces are identified and controlled. Design adequacy is verified by persons other than those who designed the item. Design changes, including field changes, are governed by control measures commensurate with those applied to the original design. The requirements of Supplement 3S-1 also apply as clarified and amplified by DOE/RW-0214, Section 3 and Appendix B, paragraph 3, for WAPA-related design.

3.2 DESIGN INPUT

Design inputs consist of applicable DOE Orders; the HWVP FDC; national standards; and Hanford Site Standards. These are controlled by WHC through the HWVP FDC and HWVP TDP. The input is accepted by the HWVP Project at WHC and transmitted to Fluor, which has responsibility for the design. Changes to the design input are formally controlled by a change control process.

Fluor Daniel, Inc. is responsible for maintaining a design guide current with the HWVP TDP and HWVP FDC. The design guide is an internal procedural document, not an input source document. Design inputs (HWVP FDC and HWVP TDP) are specified by the WHC HWVP PROJ and approved by the RL HWVP Project Branch and the WHC HWVP PROJ, respectively, in a timely basis to permit the design to be carried out correctly by Fluor and to provide a consistent basis for making design decisions, verifying the design, and evaluating design changes.

3.3 DESIGN PROCESS

The design is carried out in accordance with Fluor plans and procedures. Adequacy of design output documents is ensured by Fluor and WHC HWVP PROJ reviews. The applicable quality standards are specified as design input and their adequate application verified through reviews. If changes are made from the quality standards, they are reviewed and approved by the HWVP A-E prior to affecting the change. Documentation and control of the changes are accomplished through the change control system. The suitability of application of materials and components is ensured during the Fluor and WHC HWVP PROJ reviews. Information derived from experience, as set forth in reports or other documentation, is available to cognizant design personnel. The final design is related to design input to allow documentation of verification and to ensure identification of the assemblies or components that are part of the design. Off-the-shelf items may be used whenever practical. Off-the-shelf items used in safety-class systems require identification and

additional documented inspection, testing, or verification to ensure that they are suitable for their intended use. Fluor design verifications consider the applicability of off-the-shelf items and verify that the off-the-shelf items will perform their intended function and meet design requirements. The design is sufficiently documented such that design verification can be accomplished by a technically qualified person without recourse to the originator.

3.3.1 Design Analyses

Design analyses are performed by Fluor in accordance with written procedures and instructions. The methods are verified before use. Design analysis documents are prepared by Fluor in such a manner as to be legible, reproducible, and controlled to ensure retrievability. The format, identification, content, and documentation of the analyses are controlled by written instructions and procedures. The analyses are verified by supervisory personnel and independent verifiers to ensure methods, assumptions, and references are correct and that both analysis and verification are performed by qualified personnel. The use of computer programs is controlled to ensure that only validated and verified codes are used, and then only when approved for use on the project. Task leaders must approve software used for design. Changes to codes are controlled to prevent unauthorized modification and to ensure that the effect on previously performed analyses are verified when approved changes are accomplished. Computer programs must be verified to indicate that they produce valid results for the limits of each variable used. The programs must produce valid solutions for the physical problem associated with specific applications.

Design calculations are identified by subject (including structure, system, or component to which the calculation applies), originator, reviewer and date, or by other means whereby the calculations are retrievable.

Design analysis documentation meets the requirements of ASME NQA-1, Supplement 3S-1, paragraph 3.1.

3.3.2 Design Verification

Safety-class and WAPA-related designs are verified in accordance with Fluor written instructions and procedures by independent qualified personnel. The adequacy of the design is verified by means of design reviews, alternate calculations, or qualification tests as specified in a systems engineering management plan. These verifications are to be performed in a timely manner and before release for procurement, manufacture, construction, fabrication, or use in other design activities. In those cases where unverified design information is to be used in other design activities, the unverified portion of the design is identified and controlled. Results of the applied verifications and methods are documented. Computer programs are verified by appropriate documented testing. In all cases, verification, including operability tests, will be completed prior to placing the system, facility, or item into service. Comments requiring resolution, as well as the resolutions, are documented and maintained as QA records.

The verification process is controlled by procedures developed and implemented by Fluor. These procedures require that the following items are addressed:

- Identification of the reviewers
- Specification of the area or features to be reviewed and verified
- Documentation of the methods used for resolving comments
- Establishment of the criteria for determining the appropriate method for verification
- Definition of the extent of documentation required to perform the verification or validation
- Definition of the responsibilities of persons performing verification or validation.

The results of design verification are documented with the identification of the verifier and the method used indicated. Design verification is performed by any competent individual or group within, or external to, Fluor's organization other than those who performed the original design. This verification may be performed by the supervisor of the person who originated the design, provided the supervisor did not specify a singular design approach or rule out certain design considerations; establish the design input used in the design; or, is the only individual in the organization competent to perform the verification.

3.3.2.1 Extent of Design Verification. The extent of design verification has been established as required by a systems engineering management plan and is based on a graded QA approach related to safety class and importance to WAPA. The verification considers degree of standardization, complexity of design, state of the art, and similar proven designs. The change management system requires an evaluation of design verification of all proposed design changes such that the effect on overall design is considered before incorporation of any changes.

The applicability of standard or previously proven designs is verified for each application to ensure it meets design inputs. Known problems affecting these designs and their effects on other features are considered. The original design and associated verification are documented and referenced in the files of subsequent application of the design. Where changes to previously verified design are made, verification includes evaluation of the effects on any design analysis (upon which the design is based) that are affected by the change to the previously verified design.

3.3.2.2 Methods. The acceptable design verification methods are design reviews, alternate calculations, or qualification tests. A combination of one or more of the three methods will be applied to the HWVP design.

3.3.2.2.1 Design Reviews. Design reviews are conducted by Fluor. These reviews include an interdisciplinary check along with independent verification of selection of design inputs, incorporation of the inputs into the design,

reasonableness of design outputs, interfacing organization verification requirements, and evaluation of assumptions and design methodology. These reviews ensure that design inputs were correctly selected, and that assumptions are adequate and reasonable. Assumptions are documented such that subsequent reverifications may be made when the detailed design is completed. Necessary verification requirements for interfacing organizations are specified in supporting procedures.

The WHC is evaluating the design for operability, adequacy of QA requirements, compliance with the HWVP FDC and HWVP TDP, and compatibility with Hanford Site practices and standards.

3.3.2.2.2 Alternate Calculations. Alternate calculations may be used to verify portions of the design when appropriate and when the other methods of design verification are not practical. Verification will involve examination of the appropriateness of the methods used, proper coverage of the analysis, validity of the assumptions and input data, any computer program used, and the reasonableness of the results.

3.3.2.2.3 Qualification Tests. Qualification tests are performed to demonstrate the adequacy of the design to meet specifications in the HWVP FDC. Test results will be documented and evaluated by Fluor. Modifications to systems as a result of test evaluations are controlled and evaluated to ensure consistency with a Waste Form Qualification Report (WQR). Qualification testing includes the following, as applicable.

- The test configuration is clearly defined and documented.
- Testing demonstrates adequacy of performance under design conditions.
- Operating modes and environmental conditions are considered in determining the most adverse conditions.
- Only those features specified are verified.
- Results are documented and evaluated to ensure that test requirements have been met.
- Modifications are documented and modified items retested to verify satisfactory performance.
- Scaling laws are established and verified for model or mock-up testing; results are subject to error analysis before use in the final design.

3.4 CHANGE CONTROL

Changes to final designs, changes resulting from disposition of NCRs, and field changes are controlled and subject to verification measures commensurate with the original design (see Section 15.0 of this document). These change control measures also apply to the nonconformance dispositions of "use-as-is" and "repair." These dispositions are required to be approved by Fluor and are

controlled through the review and approval process. "As-built" drawings and specifications are prepared by Fluor to incorporate all the approved changes to the baseline design to accurately represent the constructed facility. The impact of design changes on procedures and training is required to be evaluated. The control measures ensure that the design analysis for the structure, system, or component is still valid. Changes are approved by the same affected groups that reviewed and approved the original design documents. The individuals who review and approve the changes are required to have demonstrated competence in the specific design area of interest and to have an adequate understanding of the requirements and intent of the original design.

3.4.1 Impact of Design Changes

Design changes are evaluated as required by the baseline change control procedure to determine possible need for modifying procedures, verifying the change, or retraining personnel. The changes are communicated to affected groups so necessary actions can be taken.

3.4.2 Design Deficiency Control

For incorrect design that results in a significant design change, Fluor is required to review and modify the design process and verification procedure to preclude further instances of significantly incorrect designs. Instances of deficiencies in approved design and design information documents are to be documented, and corrective action is to be taken as described in Section 16.0 of this document.

3.5 INTERFACE CONTROL

Design interfaces within the HWVP Project will be limited. Fluor Daniel, Inc. is responsible for performing and managing all direct project plant designs and reviews. Internal (interdisciplinary) controls are accomplished in accordance with Fluor's approved procedures. Designs provided by suppliers will be evaluated by Fluor in the submittal review process. This single-point control by Fluor provides assurance that interfaces are controlled within one organizational management system.

Transmittal of information across organizational interfaces is controlled. Transmittals identify status of information, action required, or approval. Informal transmittal of design information is followed by a controlled document.

3.6 DOCUMENTATION AND RECORDS

Design documentation and records, which provide evidence that the design and verification processes were accomplished in accordance with the requirements of ASME NQA-1, DOE Order 5700.6C, and DOE/RW-0214, are collected, maintained, and stored in accordance with Fluor's approved procedures. Fluor Daniel, Inc. is responsible for maintaining control of design records until detailed design is completed and records are formally dispositioned and

transferred to the DPC, which is operated by WHC. The records to be collected and maintained are delineated in HWVP-89-002, *Hanford Waste Vittrification Plant Project Management Plan* (DOE-RL 1990b), and records lists. The records include the final drawings and specifications as well as supporting documents identifying important steps in the design, verification data, and sources (if inputs to the final design).

3.7 TECHNICAL REVIEWS

Technical reviews are performed by Fluor when the information or document under review is within the state of the art and is based on accepted standards, criteria, principles, and practices. These reviews are used when documents, activities, material, or data require technical evaluation for applicability, correctness, adequacy, completeness, and ensurance that established requirements are satisfied. Such reviews are performed by individuals with sufficient technical knowledge of the area being reviewed, and results are documented. The questions identified above by a design review are answered by performing a technical review.

Technical reviews of major activities, such as seismic design reviews, are based on predetermined requirements, industry standards, or common scientific, engineering, and industry practice. Reviews are performed by a qualified, independent organization and will evaluate the design approach, the lateral force resisting system, and the design detailing in accordance with UCRL-15910, *Design and Evaluation Guidelines for DOE Facilities Subject to Natural Phenomena Hazards, Interim* (Kennedy et al. 1990).

3.8 PEER REVIEWS

Peer reviews will be conducted for designs based on unproven assumptions or new technologies developed for the HLW processes and products that have not been previously demonstrated as effective. These reviews will be conducted in accordance with the approach provided in NUREG-1297, *Peer Review for High-Level Nuclear Waste Repositories: Generic Technical Position* (Altman et al. 1988a).

A plan for implementing peer reviews will be developed by Fluor. Included in this plan will be provisions for instructions and procedures in accordance with Section 5.0 of this document.

3.9 CONTROL OF EXPERIMENTS AND DEVELOPMENTAL ACTIVITIES

Pacific Northwest Laboratory, as the R&DC, will conduct and control the experiments and developmental activities of the waste form process and products. This work is conducted under a QA program that has been reviewed and approved by, and receives oversight from, the WHC HWVP PROJ.

3.9.1 Experiments and Developmental Activities

The experiments and developmental activities are controlled to ensure developed data are suitable for use, and documentation is sufficient to certify that an independent reconstruction of the activities can be performed and activities evaluated.

3.9.2 Minimum Controls for Experiments and Developmental Activities

The controls exercised by PNL include clearly defined responsibilities for initiating the activities. Personnel conducting these activities are selected and qualified to perform the assigned work. The qualifications are appropriately documented. Work will be conducted to approved test plans, procedures, or documented instructions, as applicable. The WHC participates in the review and approval of test plans before the start of work. The results of experiments are reviewed, evaluated, or subjected to peer review, as appropriate, and results are documented. The plans and procedures specify the responsibility for preparation and processing of records and documentation. Tests performed on pilot-plant scale model are evaluated for scaling laws. Experiments and developmental activity are monitored by means of audits and surveillances.

3.9.3 Documentation

While in process, experiments and developmental activity are documented on a daily basis and maintained in a retrievable form in accordance with approved PNL internal procedures.

3.9.4 Experimental and Development Records Control

The records developed as a result of experiments or developmental activities related to WAPA are produced and maintained by the responsible investigators until completion of the task. These records are collected quarterly, verified by technical personnel, reviewed by the PNL QA organization, and transmitted to the DPC, which is operated by WHC. These activities and the contents of the records packages are controlled by PNL test plans and QA procedures, which comply with the requirements of DOE/RW-0214 and Appendix B of that document.

Experimental and development records identify directly, or by reference, the following:

- Purpose of the experiment or development activity
- Persons initiating the activity
- Persons performing the activity
- Equipment, materials, and procedures used sufficiently to allow a skilled person to reproduce the results

- Original records of data or facsimiles of the originals
- Records signed by persons performing the activity
- Summaries, reports, or evaluations of the activities or their results, which are used for WAPA and that clearly reference the experimental records.

3.9.5 Qualification of Data of Indeterminate Quality

The requirements for qualification of data of indeterminate quality from DOE/RW-0214 do not apply to HWVP for the reason described at the end of this section.

Data of indeterminate quality occur when data are collected under a QA program that does not meet either DOE/RW-0214, 10 CFR 60, 10 CFR 71, or 10 CFR 72: this includes data that were collected before DOE/RW-0214 was issued. Data of indeterminate quality must be qualified in order for them to be used. Qualification of such data is required when all of the following three conditions are met:

- The data are WAPA-related
- The data were not collected under the auspices of a QA program meeting the requirements of DOE/RW-0214, 10 CFR 60, 10 CFR 71, or 10 CFR 72
- A license for operation of HWVP is required.

Because a license for HWVP operation is not required, the third condition will never occur. The requirements for qualification of data of indeterminate quality do not apply.

3.9.6 Modification Control

Items and activities that are essential to the canistered waste form certification and acceptance are controlled to ensure that only approved modifications are made. Controls include the identification of applicable WAS requirements, a listing of documentation and procedures that are maintained under control, and provisions for assessing the need for requalification resulting from the modification. Modification control procedures include control of change proposals, change review and approval, change implementation, and change incorporation and issuance of changed documents and records.

3.10 COMPUTER SOFTWARE CONTROL

Computer software use for ASME NQA-1-controlled activities comply with Section 11.6 of this document. For activities affecting WAPA, refer to Section 19.0 for applicable requirements.

4.0 PROCUREMENT DOCUMENT CONTROL

4.1 GENERAL

The provisions by which the WHC TWRS Projects QA group will provide overview of participant procurement activities are discussed in this section. The WHC HWVP PROJ and each participant will have a system in place for procurement document control that meets the requirements of ASME NQA-1, *Quality Assurance Program Requirements for Nuclear Facilities*, Basic Requirement 4 and its supplement (ASME 1989), as amplified by DOE/RW-0214, *Quality Assurance Requirements Document for the Civilian Radioactive Waste Management Program* (DOE-OCRWM 1990) for activities that affect the waste acceptance process (WAP). For procurement of non-WAPA-related items, the requirements of DOE Order 5700.6C, *Quality Assurance* (DOE 1991) apply. The applicability of WAPA quality requirements is determined by an evaluation methodology and the Fluor requirements documents. Procurement document control procedures contained in the HWVP Project QA Program at WHC and procurement control documents comply with these requirements.

4.2 PROCUREMENT DOCUMENT PROCESS

The HWVP Project QA Program controls the process of developing and using procurement documents to ensure that requirements for quality are formally communicated to vendors of items and services. UE&C-Catalytic Inc. has been given responsibility for management and administration of construction subcontracts and procurement of material and equipment. Specific procurement document control implementation requirements are addressed in the UCAT QA plan. Fluor Daniel, Inc. will provide the applicable technical requirements to UCAT for inclusion into the procurement document. Review of the procurement document is accomplished by UCAT to ensure that all appropriate requirements are addressed. The procurement document is then controlled so that subsequent changes to the document are subjected to the same level of review as the original. After review, the procurement document is approved and released to the vendors. Any changes to the procurement documents after release are approved in the same manner as the original approval. The WHC HWVP PROJ will provide overview and monitoring of procurement activities to ensure procedural document adequacy and control implementation.

Suppliers will have QA programs consistent with the requirements contained in the procurement documents.

4.3 DOCUMENT CONTENTS

Procurement documents contain the following requirements necessary to ensure quality of procured items and services (as appropriate):

- An SOW, which details the scope of activities to be performed
- Technical requirements with necessary references to specific drawings, specifications, codes, standards, regulations, procedures, or instructions, including revisions. Appropriate test, inspection,

and acceptance requirements are provided for evaluation of the supplier's performance

- The supplier is required to have a documented QA program that implements the appropriate criteria for its activity, as described in the procurement document. In addition, the supplier is required to invoke the appropriate requirements on any suppliers that support this project. When deemed appropriate, the supplier may work under the umbrella of the purchaser's QA program provided the scope of the activity is sufficiently addressed. When this condition exists, the procurement documents will specify which portions of the purchaser's QA program apply
- Suppliers are required to provide access to their facilities and records for inspections/audits by the purchaser or purchaser's authorized representative
- Documentation of submittal requirements to be submitted for information, review, or approval and when they are to be submitted; retention time and disposition requirements for any quality records the supplier must keep
- A system to identify, report, and control nonconformances
- Identification of spares and replacement parts, and necessary supporting documentation, if required by the procurement document.

Procurement documents require that departure from specified requirements be documented and submitted to the procuring organization for evaluation and disposition.

4.4 PROCUREMENT DOCUMENT REVIEWS

Procurement documents are reviewed by UCAT's technical and QA organization representatives to ensure that all applicable technical and QA program requirements are incorporated. These reviews are documented to provide objective evidence of satisfactory reviews before award of a contract, purchase order, or other work-authorizing document. Changes recommended as a result of bid evaluation or precontract negotiation are reviewed and approved in the same manner as the original procurement document and incorporated before award. The review of changes includes criteria listed in Section 4.2 as well as any additional or modified design criteria, and analysis of exceptions by the vendor. Reviews are performed by personnel who have access to relevant information and who adequately understand the intent and requirements of the procurement document.

4.5 PROCUREMENT DOCUMENT CHANGE CONTROL

The HWVP Project QA Program provides for the control of procurement documents by procedures written specifically for procurement document control. The procedure identifies the responsibilities of individuals and addresses the controls applied through the various phases of the life of a procurement

document. A procurement document comes under control when it is initially released for review. Every change to the procurement document subsequent to initial release for review is subject to the review and approval process commensurate with the original document. The performance of the review and approval process is documented for each change. These changes are reviewed by QA and technical personnel.

4.6 QA OVERVIEW OF PROCUREMENT/CONTRACT ACTIVITIES

The WHC TWRS Projects QA group will verify by surveillance, audits, and reviews that participants' procurement document control is performed in accordance with approved procedures. Participants are responsible for appropriate procurement control of their subcontractors; however, WHC TWRS Projects QA retains an overview function.

The WHC TWRS Projects QA group will perform periodic audits/surveillances of UCAT and other participants involved in programmatic procurement activities to assess that the following criteria have been met.

- A system has been established that provides for the establishment of procedures that delineate the preparation, review, approval, and control of procurement documents.
- Procedures have been established for the review of procurement documents to determine that QA requirements are identified where appropriate.
- Organizational responsibilities, including involvement of QA, are described for the following:
 - Procurement planning
 - Preparation, review, and approval
 - Bid evaluation
 - Review and acceptance of supplier's QA programs.

The WHC TWRS Projects QA group will perform audits, surveillances, or reviews of selected procurement documents to ensure the following.

- Procuring documents specify QA program requirements for contractors, subcontractors, and consultants commensurate with their scope of work.
- Documented reviews of procurement documents have been accomplished.
- The procurement document specifies the right of access at each procurement stage.
- Technical requirements, design bases, codes, standards, and regulatory specifications have been addressed.
- Procurement documents adequately address the appropriate documentation submittals for approval by the purchaser.

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- Procurement document changes have been subjected to the same review requirements as required of the originals.

5.0 INSTRUCTIONS, PROCEDURES, AND DRAWINGS

5.1 GENERAL

The HWVP Project activities affecting quality are prescribed by, and performed in accordance with, plans, procedures, drawings, and instructions. The need for instructions, drawings, and procedures defining work performed in support of the HWVP Project are identified and selected from existing documents, or prepared, approved, and issued. The HWVP Project QA Program and associated procedures meet the requirements of ASME NQA-1, *Quality Assurance Program Requirements for Nuclear Facilities*, Basic Requirement 5 (ASME 1989); DOE Order 5700.6C, *Quality Assurance* (DOE 1991); and DOE/RW-0214, *Quality Assurance Requirements Document for the Civilian Radioactive Waste Management Program* (DOE-OCRWM 1990).

5.2 RESPONSIBILITIES

Participant activities that affect quality are prescribed by, and performed in accordance with, documented instructions, procedures, plans, or drawings. Controlled documents delineate documents to be generated as a result of implementation. These documents are to be designated as QA records. These procedures and instructions contain quantitative and qualitative acceptance criteria, as appropriate. The WHC HWVP PROJ is responsible for ensuring that each organization has sufficient procedures to properly implement its respective QA plans. In addition, TWRS Project Administration and Technical Support has developed project-specific integrating procedures (project procedures) that describe how the efforts of the HWVP Project participant organizations are integrated for procedural functions involving multiple participants. The HWVP Project participants are required to adhere to the project procedures. The WHC HWVP PROJ also is responsible for review and acceptance of selected project procedures including QA/QC procedures: reviews of these selected QA/QC procedures occur during oversight activity (surveillance, audit, assessment, etc.), and acceptance is indicated in documentation for the oversight activity.

5.3 PROCEDURE SYSTEM

Procedures used by HWVP Project participants can be categorized by their origin and extent of application.

- Company-level procedures are those that apply to the parent organization of the HWVP Project participant organization as well as potentially to the participant's HWVP organization. Further, company-level procedures for one HWVP Project participant do not apply to any other HWVP Project participant. For instance, the parent organization of WHC HWVP PROJ is WHC. The procedures the WHC HWVP PROJ borrows from WHC to govern project-specific activities are regarded as company-level procedures: Fluor Daniel, Inc. cannot use a WHC company-level procedure because WHC's procedure has been written to apply only to WHC performance.

- Project-specific procedures are those that apply only to the HWVP Project because either (1) the requirement(s) that spawn the project-specific procedure are not common to the participant's parent organization, or (2) the need for careful interfacing among HWVP Project participants necessitates an integrated approach to the procedural task. For instance, company-level procedures were not developed to address the requirements of DOE/RW-0214, so there are instances where company-level procedures are not adequate for HWVP Project use. Also, some procedural topics require partial accomplishment by several participants in order to effectively perform the entire task, so company-level procedures (which are not scoped to apply to more than one participant) are not appropriate.

Project-specific procedures are developed and used when company-level procedures are too limited in application, when they do not fully address project-specific requirements, or when there is significant interfacing among multiple participant organizations to effectively accomplish the procedural task. Unlike company-level procedures, project-specific procedures are not applicable outside the HWVP Project.

Project-specific procedures can be further subdivided into internal procedures and integrating procedures.

- Internal procedures are used when the activity addressed by the procedure is either (1) implemented only by one of the participants, or (2) implemented commonly among the participants.

An example of a topic of an internal procedure that is implemented only by one participant is design verification: Fluor has sole responsibility for accomplishment of design verification and its requirements are project-specific because DOE/RW-0214 adds unique requirements for design verification.

An example of a topic of an internal procedure that is implemented commonly among participants is document control: all HWVP Project participant organizations are required to establish systems for control of documents they generate, and DOE/RW-0214 requirements for document control are unique. In this instance, each of the HWVP Project participants internally implement the same project-specific requirements.

- Integrating procedures are used when the activity addressed by the procedure requires significant interfacing among two or more participants in order to effectively accomplish the procedural task.

An example of a topic of an integrating procedure is change control: potentially, all of the HWVP Project participants have a role in initiating, processing, and approving an HWVP Change Request.

Participant organizations develop, implement, and maintain procedures commensurate with their scope for the HWVP. In general, participants utilize company-level procedures whenever possible. Project-specific procedures are developed and used to supplement the company-level procedures of a participant. There is no order of precedence among procedures: a company-level procedure (if adopted for use at HWVP by a particular participant organization) does not supersede a project-specific procedure on the same topic (and vice-versa). Also, an internal, project-specific procedure does not supersede an integrating procedure; however, an integrating procedure may require a participant to develop and/or use an internal procedure (or even a company-level procedure) within specific limitations as defined in the integrating procedure. The procedures that HWVP Project participants use to implement the requirements of DOE/RW-0214 are delineated in the DOE/RW-0214 QA implementation matrix (prepared and issued separately from this HWVP QAPD). The effective date for each procedure is indicated on the procedure itself.

5.4 REVIEWS

Independent reviews of instructions, procedures, and drawings are performed by the originating organization to ensure technical adequacy and inclusion of quality requirements, and to verify correct translation of design requirements. The preparation, issuance, and change of these documents is reviewed and controlled by the originating organization to ensure that correct and approved documents are being used in the workplace.

5.5 QA VERIFICATION

Verification that current issues of documents are available in the workplace will be made through periodic surveillance, audit, and review. Verification also will consist of independent reviews by the originating participants to ensure that documents are technically adequate and include the appropriate quality requirements.

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6.0 DOCUMENT CONTROL

6.1 GENERAL

The HWVP Project participants will develop and implement procedures that ensure the program documents affecting quality are prepared, revised, reviewed, approved, and issued in a prescribed and controlled manner.

6.2 DOCUMENT CONTROL SYSTEM

An integrated document control system for the design and construction phases of the project is in place. This system provides a single focus (i.e., HWVP Project management) for document control practices for all participants. The document control system provides for the following activities:

- Documentation of the control system
- Identification of documents to be controlled
- Identification of the distribution for specific documents
- Identification of the assignment of responsibility for preparing, reviewing, approving, and issuing documents
- Review of documents for adequacy, completeness, and correctness prior to their approval and issuance
- Resolution of mandatory comments prior to approval and issuance of the document
- Documentation and maintenance of review comments and their resolution
- Timely replacement of obsolete or superseded documents at work areas
- Consistent means for identifying the revision status of controlled documents
- Special approval and issuance requirements for minor changes to documents (i.e., editorial changes that do not change how work is done or the results of work), including who can approve the changes.

Participant documents, which specify quality requirements or prescribe activities affecting quality, are controlled. This control applies during preparation, distribution, and modification to ensure that correct documents are available for use when and where needed.

Documents requiring control will be reviewed for adequacy and approved by authorized personnel for release and use. Quality Assurance personnel will review documents that prescribe quality affecting activities to confirm that appropriate QA requirements are included. Each participant that prepares controlled documents will have a procedure that interfaces with the project

document control system and establishes the measures for review and approval of documents. These measures include identification of responsibility for review and approval of documents. Changes to documents that affect how the work is done, or results of the work, will require review and approval by the same organizations that reviewed and approved the original document.

Reviewing organizations will have access to background information or data upon which to base their approval.

6.3 ISSUANCE, DISTRIBUTION, AND STORAGE

Document issuance and distribution will be controlled to ensure that correct, applicable, and current documents are available to the personnel performing work activities. Approved procedures delineate the responsibility and authority for such releases.

Procedures for issuance and distribution address the following:

- Identification and marking of documents
- Provisions for controlled documents that are released prior to verification or approval; such provisions include identifying the document as unverified or unapproved, describing the basis for pre-approval release, identifying the unverified portion(s) of the document, and authorizing the release through specific signature approval
- Use of receipt acknowledgment document transmittal forms
- Maintenance of controlled document distribution lists
- Marking, removal, or destruction of obsolete or superseded controlled documents
- Maintenance of an index that provides revision status for controlled documents.

Controlled document recipients are responsible for acknowledging document receipt; ensuring that the latest authorized documents are in use; and marking, destroying, or returning obsolete or superseded documents.

The WHC TWRS Projects QA group will ensure adequate control of documents by periodic review, surveillance, and audit of participants' document control practices.

6.4 REVIEW AND APPROVAL

Documents requiring control are reviewed for adequacy and approved by authorized personnel for release and use. Each participant that prepares controlled documents has a procedure that interfaces with the project document control system and that establishes the measures for review and approval of documents. These measures include identification of personnel authorized to

review and approve documents. These personnel include QA personnel when the controlled document contains or implements QA requirements. The organization that prepares the document will determine the appropriate level of review and approval for the document. Evidence of approval (i.e., signatures) is required on the controlled documents. Changes to documents are required to be reviewed and approved by the originating organization and in the same manner as the original documents. This will include access to background data or information upon which to base the review.

6.5 DOCUMENT RETIREMENT, RECALL, OR TRANSFER

The HWVP Project QA Program provides for the retirement, recall, or transfer of controlled documents. After a quality affecting activity has been satisfactorily completed, the requirements document for that activity may be retired or canceled to reduce the quantity of documents that are tracked for control. Documents that describe activities that are temporarily suspended may be recalled to prevent inadvertent accomplishment of activities. When individuals change job functions or leave the HWVP Project, the controlled documents issued to them are retired, if appropriate, or transferred to other individuals. In the case of document retirement, recall, or transfer, the HWVP Project QA Program requires that sufficient notice in writing be given to controlled copy holders and that records are maintained for the change in distribution status. Specific requirements for document retirement, recall, or transfer are addressed in procedures.

6.6 MAJOR AND MINOR CHANGES

The HWVP Project QA Program provides for an expedited means to release changes or revisions to documents when those changes are minor in character. Changes that are editorial in nature (i.e., those that do not alter work results or affect how work is accomplished) do not require the same level of review and approval as major changes. The definitions for major and minor changes are provided in HWVP Project participant internal procedures; authorized personnel are designated to determine whether changes are minor. The procedure that governs issuance of controlled documents also describes the measures implemented to release minor changes.

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7.0 CONTROL OF PURCHASED ITEMS AND SERVICES

7.1 GENERAL

This section describes the controls applied to the purchase of items and services that affect quality. Implementation of these controls ensures conformance with specified requirements. As appropriate, these controls provide for source evaluation and selection, evaluation of objective evidence of quality furnished by the supplier, source inspection, audit, and examination of items or services upon delivery or completion.

7.2 RESPONSIBILITIES AND INTERFACES

The responsibility for procurement of items and services for plant construction and equipment/systems has been delegated to UCAT. Pacific Northwest Laboratory has been delegated responsibility for procurement of items and services necessary to support research and development activities. Each participant will implement a QA system that complies with the procurement criteria of DOE Order 5700.6C, *Quality Assurance* (DOE 1991), and for WAPA-related procurements, the requirements of DOE/RW-0214, *Quality Assurance Requirements Document for the Civilian Radioactive Waste Management Program* (DOE-OCRWM 1990) apply as well.

7.3 CONTROL OF PURCHASED ITEMS AND SERVICES

Procurement activities are performed by participants in accordance with documented procedures to ensure a systematic approach is used in procurement processes. Procurement of computer software that supports waste form process activities will be in accordance with Section 19.0 of this HWVP QAPD. Procedures take into consideration, as a minimum, the following activities.

7.3.1 Procurement Planning

The HWVP Project QA Program requires that procurement activities be planned and documented at the earliest practical time to provide appropriate interfaces ensuring compatibility and uniformity to the procurement process. Planning should include, as a minimum, what is to be accomplished, how it will be accomplished, who will accomplish it, and when it is to be accomplished. Procedures that control the procurement process address the following:

- Procurement documents and their preparation, review, and release
- Selection of procurement sources
- Bid evaluation and award
- Supplier performance evaluation
- Control of supplier-generated documents

- Inspections, source and/or receiving
- Control of changes to procurement documents for items and services
- Material identification and control
- Acceptance of items and services
- Corrective action
- Quality assurance records.

7.3.2 Procurement Source Selection

The selection of suppliers is based on evaluation of their capability to provide items and services in accordance with the requirements of the procurement documents prior to contract award. These evaluations will be documented and include one or more of the following:

- The supplier's history on past contracts for providing identical or like items that perform satisfactorily in service; the supplier's history must also reflect current capability
- Assessment of the supplier's current quality records supported by documented qualitative and quantitative information that can be objectively evaluated
- Assessment of the supplier's technical and quality capabilities by direct evaluation of the facilities, personnel, and implementation of the QA program.

7.3.3 Proposal Evaluation

Proposal evaluations will be performed by individuals or organizations that have the necessary expertise to make decisions for technical considerations, QA requirements, personnel, and supplier past performance. Evaluation will include a determination of the extent of conformance to procurement documents. All contract negotiations will be complete and documented, including resolution of unacceptable quality conditions prior to award of contract. Proposal evaluation considers the following:

- Technical considerations
- Quality assurance requirements
- Supplier's personnel
- Supplier's production capability
- Supplier's past performance
- Supplier's QA program
- Alternates
- Exceptions.

7.3.4 Supplier Performance Evaluation

Evaluation of supplier's performance throughout the life of the contract is planned and documented. These verifications are initiated as early as practical to establish compliance to program requirements.

Evaluation methods include review of supplier's plans and procedures, source surveillance inspections, audits, receipt inspections, nonconformances, dispositions, waivers, and corrective actions. This documentation will be utilized to determine the effectiveness of the supplier's QA program.

Evaluation activities include the following:

- Establishing an understanding of the provisions and specifications of the procurement documents
- Requiring the supplier to identify methods used to meet procurement document requirements
- Reviewing supplier documentation generated or processed during activities, fulfilling procurement requirements
- Providing necessary change information
- Controlling information exchange between the purchaser and the supplier
- Establishing the extent of source surveillance and inspection activities.

Procurement documents require the supplier to accomplish the requirements stated and to verify that requirements have been met. Verification conducted by the purchaser does not relieve the supplier of responsibility for verification of quality achievement.

The extent of verification activities, including planning, is a function of the relative importance, complexity, and quantity of the items or services procured. The supplier's quality performance also affects the extent of verification activities. The safety classification of an item is the major influence on the extent of verification activities. Qualified personnel who are assigned to check, inspect, audit, or witness the activities of suppliers will accomplish verification activities.

The performance of verification activities is recorded. Source surveillances and inspections, audits, receiving inspections, nonconformances, dispositions, waivers, and corrective actions are documented. This documentation is evaluated to determine the effectiveness of the supplier's QA program. The manner of documentation is described in procedures.

7.3.5 Control of Supplier-Generated Documents

Supplier-generated documents are controlled, handled, and approved in accordance with the methods established in the procurement document and the

purchaser's program requirements. Document submittal requirements are delineated in the procurement specifications. The WHC TWRS Projects QA group audits these documents as necessary to provide assurance of procurement requirement compliance. Document verification provides for evaluation of technical, inspection, and test data against acceptance criteria.

Changes to procurement documents of procured items and services are communicated to suppliers in the procurement specifications. These changes are evaluated in the same manner and with the same criteria as the original documents.

7.3.6 Acceptance of Items and Services

Suppliers' QA programs will ensure that before offering the item or service for acceptance, the supplier will verify compliance with procurement requirements. When required by code, regulation, or contract requirement, documentary evidence that items conform to procurement documents is required to be available at the project before installation or use.

Four methods for acceptance have been established and can be utilized either individually or in combination as follows:

1. Evaluation of suppliers' certificates of conformance for services or items to ensure validity and authenticity of documentation and results. The following criteria must be met.
 - a. The certificate must identify the purchased material or equipment, such as by purchase order number.
 - b. The certificate must identify the specific procurement requirements met by the purchased material or equipment, such as codes, standards, and other specifications, in a manner that clearly establishes conformance to procurement requirements.
 - c. The certificate must identify any procurement requirements that have not been met along with an explanation and the means for resolving the nonconformances.
 - d. The certificate is signed or otherwise authenticated by a person who is responsible for the supplier's QA function as described in the purchaser's or supplier's QA program.
 - e. The certification system is described in the supplier's QA program. The supplier has procedures to prepare certificates of conformance and review and approve the certificates for submittal to the purchaser. The purchaser has procedures for review of submitted certificates of conformance.
 - f. A means to verify the validity of supplier certificates is provided by the purchaser. The effectiveness of the certification system is verified by audits or by independent inspections or tests of items. The verification is conducted at intervals commensurate with the supplier's past quality performance.

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2. Source inspection/surveillance, post-installation inspection. Source inspection is performed at intervals consistent with the importance and complexity of the item or service. It is implemented to monitor, witness, or observe activities in process. Source verification also is implemented in accordance with purchaser plans for performance of inspections, examinations, or tests at predetermined points. The procurement document provides the purchaser with the ability to perform verifications in the supplier's facility. Upon purchaser acceptance of an item or service by source verification, documented evidence of acceptance of the item or service is furnished to the receiving destination, as well as to the purchaser and supplier.
3. Receiving inspection. Purchased items are inspected upon receipt to verify conformance to specified requirements. The extent of the receiving inspection is influenced by the demonstrated quality performance of the supplier and by the source verification and audit activities that have been previously performed for the procurement. Procedures for the conduct of receiving inspection are established to ensure that objective evidence is available to verify such features as proper configuration; identification; dimensional, physical, and other characteristics; freedom from shipping damage; and cleanliness. Receiving inspection is coordinated with review of supplier-generated documentation when procurement documents require such documentation to be furnished before receiving inspection. Detailed requirements for receiving inspection include inspection planning, inspection performance, and records of receiving inspection. Receipt inspection records identify characteristics inspected and objective evidence of the results, inspection criteria, identification of applicable drawings, specifications or procedures, and identification of material and test equipment used during the receipt.
4. Post-installation testing. When post-installation testing is used, requirements and acceptance documentation are mutually established by the purchaser and supplier. The requirements and acceptance documentation are specified in the procurement document.

In the case of procurement of services, the purchaser may accept the service by any or all of the following methods:

- Technical verification of data produced
- Surveillance and/or audit of the activity
- Review of objective evidence for conformance to the procurement document requirements, such as certifications and stress reports.

7.3.7 Control of Nonconformances

The HWVP Project QA Program requires that procedures be developed for the disposition of items and services that do not meet procurement requirements.

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The requirements for these methods are delineated in an HWVP Project procedure for NCRs.

The project procedure provides for the following:

- Evaluation of nonconforming items and services
- Submittal of nonconformances by supplier to purchaser as directed in procurement documents. These submittals are required to identify the supplier-recommended disposition and technical justification. Deviations from requirements of the procurement document or from purchaser-approved supplier documents are to be documented and submitted to the purchaser for approval of the recommended disposition for the following conditions:
 - Technical or material requirement violations
 - Violations of requirements in supplier documents
 - Nonconformances that cannot be corrected by original work process or by rework
 - Items that do not conform to the original requirement even though the item can be restored to a condition such that the capability of the item to function is unimpaired
- Purchaser disposition of supplier recommendations and corrective action
- Verification of disposition implementation
- Records maintenance of nonconformances.

7.4 VERIFICATION

Each participant's QA program identifies its implementing procedures and provides for verification of procurement document control according to ASME NQA-1, *Quality Assurance Program Requirements for Nuclear Facilities* (ASME 1989); DOE Order 5700.6C; and DOE/RW-0214.

The WHC TWRS Projects QA group verifies conformance to procedures and plans for control of purchased items and services by periodic surveillances and audits.

8.0 IDENTIFICATION AND CONTROL OF ITEMS

8.1 GENERAL

This section describes the controls necessary to ensure that only correct and accepted items are used and installed. As appropriate, these controls provide the necessary identification on items or in documents to ensure traceability and that identification is established and maintained. The HWVP Project QA Program complies with the requirements as specified in ASME NQA-1, *Quality Assurance Program Requirements for Nuclear Facilities* (ASME 1989).

Each of the participants and subcontractors/suppliers to the UCAT and PNL will be responsible for implementing appropriate portions of the HWVP Project system for identification and control of items.

8.2 IDENTIFICATION METHODS

8.2.1 Item Identification

Items of production (i.e., batch, lot, component, or part) are identified from the initial receipt and fabrication of the item through installation and use. This identification relates an item to an applicable design or other pertinent specifying document.

8.2.2 Physical Identification

Physical identification is used to the maximum extent. If physical identification is not practical or is insufficient, then measures will be established to control the item by physical separation, procedural control, or other approved appropriate means.

8.2.3 Markings

Markings, when used, are applied using materials and methods that provide a clear and legible identification and will not affect the function or service life of the item. Markings are transferred to each part of the item prior to subdivision. Caution will be observed to prevent the obliteration by any surface treatment or coatings.

8.3 TRACEABILITY

The HWVP Project QA Program provides identification and traceability control. Specific identification traceability requirements that originate from codes, standards, or other specifications are observed. Examples of such requirements include markings to indicate the following: (1) the heat, batch, lot, part, or serial number; (2) the specified inspection, test, or other records; and (3) the identification or traceability of the item to an applicable specification and/or grade of material.

8.4 LIMITED LIFE OR SHELF LIFE ITEMS

Items that have a limited calendar or operating life, cycles, or shelf life are controlled to preclude the use of such items after these dates have expired.

8.5 MAINTENANCE OF IDENTIFICATION

The HWVP Project QA Program provides for the control of item identification during storage. These controls are consistent with the planned duration and conditions of storage. The controls include the following:

- Provisions for maintenance or replacement of markings and identification records damaged during handling or due to aging
- Protection of identification on items subject to excessive deterioration resulting from environmental exposure
- Provisions for updating existing plant records.

8.6 VERIFICATION

The WHC TWRS Projects QA group verifies participants' conformance to item identification and control of procedures and plans by surveillance and scheduled audits, as applicable.

9.0 CONTROL OF PROCESSES

9.1 GENERAL

This section describes measures established to control special processes such as production, welding, cleaning, testing, etc., and to ensure that they are accomplished by qualified personnel using written procedures qualified in accordance with applicable codes, standards, specifications, or other special requirements. Also described are those measures that ensure qualification of special processes, personnel performing special processes, and equipment are kept current and record files thereof are maintained.

9.2 PROCESS CONTROL

The term "process" is defined herein as "a method of accomplishing a number of operations or steps that produce a result or product that conforms to an established specification."

Processes will be controlled by approved instructions, procedures, drawings, checklists, travelers, or other appropriate means. These means ensure that process parameters will be controlled, documented, and verified to provide a record of process compliance.

9.3 SPECIAL PROCESSES

The term "special process" as used herein means "a process--the results of which are highly dependent on the control of the process or the skill of the operators, or both--and in which the specified quality cannot be readily determined by inspection or test of the product." Specifically, all processes involving high-level radioactive waste are special processes.

Special processes require qualification of personnel, equipment, and/or procedures. Each special process will be performed in accordance with instructions or procedures that include or reference qualification requirements. The qualified procedures or instructions identify the information and conditions necessary to accomplish the process, including proper equipment, controlled parameters, proper environmental conditions, calibration requirements, personnel qualifications, and acceptance criteria. In cases where existing codes and standards do not cover a special process, or where quality requirements specified for an item exceed those of existing codes or standards, the requirements for qualification of personnel, equipment, or procedures will be specified or referenced in the qualified procedures/instructions. The qualification and performance of special processes are controlled, documented, and verified to provide a record of process compliance. The QA personnel of each participant will monitor the development and implementation of special process qualification activities through inspections, reviews, audits, or surveillances as appropriate to the participant's work scope.

The criteria for designating a process as a special process are as follows:

- If the results of the process are highly dependent on precise control of the process, then the process is a special process, or
- If the results of the process are highly dependent on the skill of the operator, then the process is a special process, or
- If the results of the process are highly dependent on both the skill of the operator and precise control of the process, then the process is a special process, or
- If the specified quality for the end-product of the process cannot be readily determined by inspection or test, then the process is a special process, or
- If the process involves the treatment of high-level radioactive waste, then the process is a special process.

9.4 RESPONSIBILITY

It is the responsibility of affected participants to include in their QA program documents a list of special processes that will be performed by them or for which they are responsible. UE&C-Catalytic Inc. is responsible for controlling processes before construction turnover (i.e., during construction, acceptance testing/inspection). The WHC HWVP PROJ is responsible for controlling processes after construction turnover (i.e., during cold test, hot test, cold start, and hot operations). Pacific Northwest Laboratory is responsible for controlling processes related to its research and development activities.

Each affected participant is responsible for the following:

- Adherence to approved procedures and processes
- Compliance with specified requirements for qualification of personnel, procedures, and equipment
- Development of documentation in accordance with this HWVP QAPD and other applicable requirements.

The following special process activities are to be controlled by affected participants:

- Nondestructive examination processes (radiographic testing, penetrant testing, magnetic particle testing, ultrasonic testing, and visual testing)
- Welding
- Heat treating.

9.5 RECORDS

Records relating to the qualification of special processes, qualification of personnel and equipment, and the performance of the process/special process are in accordance with Section 17.0 of this HWVP QAPD.

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10.0 INSPECTION

10.1 GENERAL

This section describes the controls for inspections required of the HWVP Project to verify conformance of items or activities to specified requirements. This section applies to both WAPA-related and non-WAPA-related items except for parts of subsections 10.4 and 10.7 that are specifically delineated.

Construction inspections, control practices, characteristics to be inspected, and methods to be employed are described in the UCAT work procedures and inspection planning documents. Inspection activities and results are documented. The WHC TWRS Projects QA organization is responsible for monitoring UCAT construction inspection activities by audit and surveillance.

Title III inspection activity is divided between Fluor and UCAT. Fluor Daniel, Inc. performs Title III inspection of construction activities performed directly by UCAT forces, while UCAT performs Title III inspections of work performed by its subcontractors. Acceptance inspections are planned, performed, and documented. The requirements described in Section 10.6 of this document for final inspections control Title III inspection activities.

The requirements of ASME NQA-1, *Quality Assurance Program Requirements for Nuclear Facilities* (ASME 1989), Basic Requirement 10 and Supplement 10S-1; DOE Order 5700.6C, *Quality Assurance* (DOE 1991); and DOE/RW-0214, *Quality Assurance Requirements Document for the Civilian Radioactive Waste Management Program* (DOE-OCRWM 1990), will be met with the following amplifications.

10.2 PERSONNEL

Inspection of completed work is performed by persons other than those responsible for accomplishing or supervising the work being inspected.

Only qualified inspection personnel are utilized for inspection assignments. Activities performed by uncertified personnel engaged in on-the-job training are verified by a qualified inspector.

10.3 HOLD POINTS

Mandatory inspection hold points beyond which work cannot proceed are specified in the UCAT work procedures or in final inspection planning documents.

Hold points may be waived only with prior approval by the management of the organization imposing the hold point. Waiver approval will be recorded by the approval authority prior to continuation of work.

10.4 INSPECTION PLANNING

Planning for first-line inspection activities is performed by UCAT. Planning for final inspection activities is performed by Fluor and UCAT as part of their Title III inspection responsibilities. Inspection plans include provisions for hold points and description of methods, characteristics, and acceptance criteria. Inspection results will be recorded by the inspection personnel.

Inspection planning specifically for WAPA-related items will include criteria for the following: when inspections will be performed; identification of required drawings, specifications, or procedures with revisions; and necessary measuring or test equipment with accuracy requirements.

Recognized approved sampling practices will be used for preparation of sampling inspections for acceptance.

10.5 IN-PROCESS INSPECTION

In-process inspection of construction is utilized by UCAT to the maximum extent possible and for monitoring activities where proper verification of product quality is required.

Monitoring of process methods, equipment, and personnel will be used when advantageous or direct inspection is impossible. Inspection and process monitoring are provided when control is inadequate without both.

When a combination of process control and inspection are used to verify quality, they are performed in a manner to ensure control of the process and quality of the item for the duration of the process.

Controls are established and documented to establish inspection points during the process or construction.

10.6 FINAL INSPECTIONS

Final inspections by Fluor or UCAT to accept work include a records review of inspection results and the resolution of nonconformances identified in previous inspections.

Final inspections provide documented conclusions regarding acceptability of the item to requirements, including completeness, markings, calibration, adjustments, protection, or other applicable characteristics.

Quality records are reviewed for adequacy and completeness if not previously examined.

Final acceptance is documented in inspection records and approved by authorized personnel.

Modifications, repairs, or replacements accomplished after final inspection are reinspected or tested as required.

10.7 RECORDS

Records will identify, as a minimum, the following:

- Item inspected
- Date of inspection
- Identity of the inspector
- Type of observation
- Results or acceptability
- Reference to action taken for nonconformances
- Identification of inspection procedure.

In addition to the aforementioned items, inspection records for WAPA-related items will identify the following:

- Characteristics inspected and evidence of results
- Traceability to acceptance criteria or traceability to reference documents used to determine acceptance
- M&TE used.

10.8 INTERFACE

UE&C-Catalytic Inc. provides necessary source and receipt inspection services.

UE&C-Catalytic Inc. performs in-process inspections during the portion of the HWVP Project prior to construction turnover of plant items, components, and/or systems for acceptance by the government. Planning, execution, personnel qualification, and documentation for in-process inspections will be accomplished by UCAT. Inspection planning documents for in-process inspection and work packages of construction activities performed by UCAT are provided to Fluor so that Title III inspection hold points can be included when appropriate. Overview of UCAT and Fluor inspection activities are conducted by the WHC TWRS Projects QA group.

Fluor Daniel, Inc. and UCAT divide the responsibilities for performance of Title III inspections, as indicated in Section 10.1. Fluor Daniel, Inc. and UCAT will perform final inspections at the point of turnover of plant items, components, and/or systems by UCAT for acceptance by the government. Upon acceptance of the item, component, or system by the appropriate Title III inspection agent (Fluor or UCAT), WHC assumes custody for the DOE. Items, components, and/or systems determined to not meet acceptance criteria at the point of construction turnover are corrected through UCAT (or through the UCAT subcontractor responsible for the item, component, or system). The WHC TWRS Projects QA organization will overview the Title III inspection activities of Fluor and UCAT.

The appropriate Title III inspection agent (Fluor or UCAT) is responsible for providing complete validated documentation packages for acceptance inspections for review by WHC. After review, the packages are processed as QA records.

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11.0 TEST CONTROL

11.1 GENERAL

This section provides a description of the activities and controls for test control at the HWVP Project. Test requirements and acceptance criteria for inclusion in the procurement and construction specifications are prepared by Fluor. These tests are executed to provide verification of conformance to requirements. Detailed test plans and/or acceptance test procedures are prepared by UCAT and vendors/subcontractors in accordance with the requirements of the procurement and construction specifications.

Test plans and procedures identify characteristics to be tested and methods to be used. These detailed test plans and/or acceptance test procedures will be reviewed by Fluor.

Pacific Northwest Laboratory conducts verification tests to provide data for Fluor.

All tests are conducted using approved procedures and/or detailed test plans and trained personnel. Data collected as a result of these tests are reviewed and evaluated for acceptability.

11.2 TEST REQUIREMENTS

Test requirements and acceptance criteria are provided or approved by the organization responsible for the design or use of the software to be tested, unless otherwise designated. Required tests, including applicable verification tests, hardware integration tests, and in-use tests, are planned, controlled, and documented. The items and characteristics to be inspected and the inspection methods to be employed for each item are specified in inspection planning documents. The characteristics to be tested are determined from the design of the item. The test methods selected for a specific item are appropriate to the characteristics to be inspected. Tests are executed in accordance with plans, and results are documented. Testing for the purpose of accepting an item or service is performed by personnel other than those who performed or directly supervised the work being tested.

11.3 TEST PROCEDURES

UE&C-Catalytic Inc. is responsible for the planning and control of construction testing activities. Test planning provides for when a test is to be performed and identification of mandatory hold points. Test procedures include or reference test objectives and provisions for ensuring that prerequisites for the given test have been met, adequate instrumentation (precision and accuracy) is available and used, necessary monitoring is performed, and suitable environmental conditions are maintained.

Test procedure prerequisites include applicable requirements for calibrated instrumentation, proper equipment, trained personnel, the condition of the equipment and item to be tested, suitable environmental conditions, and provisions for data collection.

Potential sources of uncertainty or error will be identified in test plans and procedures, including affected parameters, which are controlled. Precision and accuracy requirements are identified in test procedures.

11.4 TEST RESULTS

Test results are documented by the participant performing the test, and results are evaluated by Fluor to ensure that test requirements have been satisfied.

11.5 TEST RECORDS

Test records include items tested, date of test, tester or data recorder, results and acceptability, acceptance criteria, type of observation, action taken for deviations, and person(s) evaluating test results.

11.6 COMPUTER PROGRAM TESTING

Commercially available or specially developed computer software used for activities not related to WAPA complies with the following requirements. Refer to Section 19.0 of this document for applicable requirements for computer software affecting WAPA.

11.6.1 Test Requirements for Computer Programs

Test requirements and acceptance criteria for computer programs are based on applicable design or other pertinent technical documents and provided or approved by the organization responsible for the program design or use. Tests such as verification and hardware integration tests are controlled through specific testing procedures.

Verification tests are conducted to demonstrate the capability of the computer to produce valid results for test problems that encompass the range of permitted usage for the program. Acceptable means for verifying a computer program include the following:

- Hand calculations
- Calculations using comparable proven programs
- Empirical data and information from technical literature.

For programs that are to be used for operational control, testing is accomplished to demonstrate that required performance is acceptable. The complexity of the computer program determines the number of verification tests to be performed for a program or individual module of the program. If a series of verification tests is used, then testing will verify a correct

translation between stages and that the individual modules work properly. Verification testing achieves its purpose by establishing that test requirements are satisfied and the computer program produces a valid result for its intended use.

11.6.2 Test Procedures for Computer Programs

Test procedures for computer programs specify the following, as applicable:

- Required tests and test sequence
- Required ranges of input parameters
- Identification of the stages at which testing is required
- Criteria for establishing test cases
- Requirements for hardware integration
- Anticipated output values
- Acceptance criteria
- Reports, records, standard formatting, and conventions.

11.6.3 Test Results for Computer Programs

Results of verification tests for computer programs are documented, and the results are evaluated by a competent individual who is not directly involved in the development or testing of the computer program. The purpose of the evaluation is to ensure independently that test requirements have been satisfied. Requirements and qualifications for competency of the evaluator are documented.

11.6.4 Test Records for Computer Programs

Test records for verification tests of computer programs are prepared by the organization responsible for conducting the tests. Records of verification tests identify the following:

- Version of computer software tested
- Computer hardware used
- Test problems and procedures
- Results and acceptability
- Action taken in connection with any deviations noted
- Name and qualifications of the individual evaluating the test results.

11.7 INTERFACE

UE&C-Catalytic Inc. controls all construction testing by procedures that are conducted using approved test plans and trained personnel.

Pacific Northwest Laboratory is responsible for conducting tests for development of process technology in accordance with test plans that are reviewed and approved by WHC. Test results will be provided in accordance with the requirements of PNL's LOI or SOW.

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Westinghouse Hanford Company is responsible for overseeing PNL testing, construction, and the UCAT test activities. Inspection/surveillance will be controlled by procedures and conducted using approved test plans and checklists. The TWRS Projects QA group is responsible for conducting audits and surveillances of test activities and documentation, as assisted by the WHC QCA organization, described in Section 1.2.4.14 and Figure 1-3.

Test reports are provided to the WHC HWVP PROJ for tests performed.

The WHC HWVP PROJ provides completed test reports/records to the DPC for processing and retention as QA records.

12.0 CONTROL OF M&TE

12.1 GENERAL

This section describes the activities and controls of M&TE for the HWVP Project.

Each organization responsible for using M&TE will have controlled procedures for calibration and control of that equipment. Any M&TE used for acceptance testing or verification is subject to these controls, which provide for calibration and adjustment at specified intervals to maintain accuracy within necessary limits.

12.2 SELECTION

Selection of M&TE is controlled to ensure proper type, range, accuracy, and tolerance to determine conformance to requirements. The basis for selection of appropriate M&TE is the design documents, which drive the selection by citing either the specific M&TE needed or the attributes to be measured or tested. If the design documents cite specific M&TE (either by direct specification or by reference to a measurement/test standard), then the selection is already accomplished. But if the design documents cite the attributes to be measured or tested, then only that M&TE which is appropriate for those attributes can be selected.

12.3 CALIBRATION

Calibration will be performed using certified equipment of known relationship to a nationally accepted standard or to a documented calibration basis. Calibration, adjustment, and maintenance will be conducted on prescribed intervals or prior to use. Calibration is not required for devices such as rulers, tape measures, levels, and others if normal commercial equipment provides adequate accuracy. Calibration is not required for measuring or testing devices if the results of the measurement or test are not used to accept or reject the item or test. Equipment is marked to indicate calibration status.

Calibration standards should have greater accuracy than the equipment or standards that are being calibrated. Calibration standards of the same accuracy may be used if they can be shown to be adequate for the requirements, and the basis for acceptance is documented and authorized by responsible management. Calibration standards are cited in calibration procedures: approval of these procedures by management constitutes acceptance of the standards.

12.4 CONTROL

The method and frequency of M&TE calibration will be based on the equipment or instrument type, stability characteristics, required accuracy, intended use, or other applicable conditions.

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For M&TE found to be out of calibration, an evaluation of the validity of previous inspections and test results is made and documented as well as the acceptability of any items inspected or tested using the suspect M&TE.

Equipment that is out of calibration is tagged, segregated, and not used until it has been recalibrated. Any M&TE consistently found to be out of calibration is either repaired or replaced.

A calibration is performed if the accuracy of equipment is suspect.

The M&TE is handled and stored to provide for protection and to maintain accuracy.

12.5 RECORDS

Records of calibration and repair, including "as found" condition, are maintained. Equipment is tagged to indicate calibration status and to provide traceability to calibration records. The WHC TWRS Projects QA group will ensure adequacy of project M&TE control through periodic surveillance and audit of participant activities.

13.0 HANDLING, STORAGE, AND SHIPPING

13.1 GENERAL

The responsibility for developing procedures and instructions and implementing the requirements for handling, storage, and shipping rests with PNL and UCAT. As appropriate, PNL or UCAT will delegate these requirements to their suppliers and subcontractors.

13.2 REQUIREMENTS

The need for special equipment (such as containers, shock absorbers, and accelerometers) and special protective environments (such as inert atmosphere, moisture content, and temperature levels) is considered and specified in the preparation of documents, and their existence is verified.

13.3 INSTRUCTIONS/PROCEDURES

UE&C-Catalytic Inc. and PNL, their suppliers, and subcontractors establish work, shipping, inspection instructions, and drawings and specifications as necessary to prevent damage and preserve items used in the HWVP facilities.

The tasks associated with handling, marking, and labeling of items are conducted in accordance with approved procedures, instructions, drawings, specifications, or other documents applicable to the activities being performed.

13.4 TOOLS AND EQUIPMENT

Special handling and lifting equipment and tools are utilized and controlled, as specified in approved documents, to ensure safe and adequate handling. Tools and equipment are inspected and tested at specified intervals in accordance with procedures to verify that the tools and equipment are adequately maintained.

13.5 OPERATORS

Operators of special handling and lifting equipment will be experienced or trained in the use of that equipment.

13.6 MARKING

Instructions for marking and labeling as required to adequately identify, maintain, preserve, and indicate the presence of special environments or controls are addressed in instructions and/or procedures.

13.7 QA/INSPECTION

Each participant will conduct surveillances and audits of its handling, storage, and shipping activities to verify compliance to this HWVP QAPD, the participant's respective QA program, and the applicable documents relating to those activities.

The WHC TWRS Projects QA group ensures project control of handling, storage, and shipping by periodic surveillance and audit of participant activities.

13.8 CONTROL AND ARCHIVAL OF SAMPLES

This section provides amplification for the control and archival of samples used for WFQ or for certification of canistered waste forms. This documentation and other forms of evidence necessary to demonstrate integrity of samples are collected and maintained as QA records and include the following:

- Custodial accountability, including auditable records of transfers
- Identification of samples to be used (number, size, origin, or other characteristics)
- Location and time the samples are to be taken or prepared
- Location and method for maintenance, analysis, and use of the results
- Packing, packaging, and handling
- Retrievability and traceability
- Locating, storing, and monitoring
- Procedures for sample taking or preparation
- Logging and labeling or otherwise identifying
- Treatment of data and results.

14.0 INSPECTION, TEST, AND OPERATING STATUS

14.1 GENERAL

Status indicators are used to segregate accepted items from those that are nonconforming or awaiting inspection or test. The status of inspection and test activities is identified either on the items or in documents traceable to the items. This status-indicator process ensures that items not passing the required inspections or tests are not inadvertently installed, used, or operated. Status indicators, such as physical location, tags, markings, shop travelers, stamps, inspection records, or other suitable means, are used and maintained. This section describes the controls that are applied in the use of status indicators for inspection, test, and operations through the use of tags and stamp markings. The development of proposed deviations in the sequence of activities to perform required inspections and tests of components, systems, and structures is governed by procedure, and proposed deviations are required to be documented, reviewed, and approved in the same manner as the document that describes the original sequence of inspection or test. As appropriate, these indicators provide the necessary assurance that required inspections and tests have been performed.

14.2 RESPONSIBILITIES AND INTERFACES

Responsibility for control of inspection, test, and operating status before construction turnover (i.e., during plant construction, procurement of plant equipment, and acceptance testing) has been delegated to UCAT. UE&C-Catalytic Inc. is responsible for the application and removal of status indicators for construction activities. Following construction turnover, the WHC HWVP Startup and Operations Integration group has responsibility for statusing until plant operations begin, at which time WHC HWVP Operations will assume this responsibility. Pacific Northwest Laboratory has been delegated responsibility for statusing of material, instruments, and equipment associated with research and development activities.

One system of tags, labels, or shop travelers is used for construction activities of the project. Pacific Northwest Laboratory uses its internal statusing system for the research and development activities performed for the HWVP. Hold tags are applied and removed by authorized personnel. Tags will be removed by the personnel who placed the tag, when possible. UE&C-Catalytic Inc. is responsible to administer the status indicator system until construction/system turnover to WHC. UE&C-Catalytic Inc. administers a lock and tag system to control operating status until the system has been turned over to HWVP Project personnel at WHC. The WHC HWVP Startup and Operations Integration group will administer a lock and tag status control system after construction turnover and before WHC HWVP Operations assumes custody of the plant.

14.3 VERIFICATION

| The WHC TWRS Projects QA group will overview the project inspection, test, and operating status through surveillances and audits, as applicable.

15.0 CONTROL OF NONCONFORMING ITEMS

15.1 GENERAL

This section describes the activities and controls for reporting nonconforming equipment or conditions at the HWVP Project.

The NCR procedures are used to promote consistency, timeliness of problem resolution, and processing of the necessary documentation. Participant activities are controlled by procedures. All participants can initiate an NCR.

Items that do not conform to specified requirements, or whose conformance is indeterminate, are documented on an NCR and controlled to prevent inadvertent installation or use. Controls for nonconformances are provided for notification of affected organizations and for identification, documentation, evaluation, segregation (when practical), and disposition. Nonconformances are tracked to closure to ensure that approved dispositions are properly implemented. The verification of corrective action is documented. All personnel associated with the HWVP Project are responsible for documenting nonconformances and for seeking resolution.

15.2 IDENTIFICATION

Nonconforming items are identified by marking, tagging, or other methods that do not adversely affect the item. Identification is required to be legible and recognizable. The form of identification selected is required to not adversely affect the end use of the item. When identification of nonconforming items is not practical, the container, package, or segregated storage is provided.

15.3 SEGREGATION

Nonconforming items are segregated by placing them in an identified and designated hold area, when practical, until disposition is complete.

When segregation is not practical or impossible because of size, weight, or access limitations, other precautions are employed to preclude use of a nonconforming item.

15.4 DISPOSITION

Documentation is required to adequately identify and describe the nonconformance. Nonconforming characteristics are reviewed and dispositions of items are proposed and approved in accordance with approved procedures. These procedures specify the responsibility and authority for evaluation and disposition of nonconformances. Personnel who perform evaluations to approve dispositions are required to be competent in the specific area they are evaluating, have adequate understanding of the requirements, and have access to pertinent background information. Each organization identifies, in writing,

the personnel (by job title) who are authorized to evaluate and approve (by signature) proposed NCR dispositions.

Control of further processing, delivery, installation, or use of a nonconforming item is affected pending resolution of NCRs.

Dispositions such as "use-as-is," "reject," "repair," or "rework" are identified and documented by signature of the person authorized to accept the disposition.

Technical justification for the acceptability of a nonconformance dispositioned "repair" or "use-as-is" is documented. Nonconformances to design requirements dispositioned "use-as-is" or "repair" are subject to design controls commensurate with those applied to the original design.

Repaired or reworked items are reexamined to original requirements unless new requirements have been established.

The disposition of "reject" means that the nonconforming item is scrapped and replaced with a conforming item. Scrapped items/materials are controlled or destroyed to prevent inadvertent installation or use in the HWVP.

"As-built" records, where applicable, are changed to reflect the accepted deviation including identification of the NCR and identification of the records in the NCR.

Recommended disposition may allow for conditional release of nonconforming items for further processing or assembly. Conditional release of NCRs will be used only for unusual circumstances and must not create a situation that will obstruct or hinder the resolution of the nonconforming condition. Examples of unusual circumstances include, but are not limited to, the following conditions: (1) unacceptable consequences due to excessive schedule delays; (2) results in high cost of equipment (related or unrelated to the nonconforming item); (3) physical interferences that result if installed at a later time.

In addition, the following criteria for a conditional release will be met.

- Those responsible for approval of the NCR agree with conditional release.
- The nonconforming characteristic is not rendered inaccessible for implementation of the disposition or for reinspection.
- Control of the nonconforming item and its documentation is maintained until the approved disposition for the nonconformance has been acceptably implemented and verified.

Action taken to correct nonconformances is required to be verified and the verification documented.

15.5 INTERFACES

Each of the participants (Fluor, PNL, UCAT, and WHC) and subcontractors/suppliers to the UCAT and PNL are responsible for implementing a portion of the HWVP Project nonconformance control system.

The nonconformance control system is designed so personnel from any project organization can initiate an NCR. Nonconformances originating from a subcontractor or supplier will be reported through the procuring organization.

Physical segregation of nonconforming items is the responsibility of the organization that has custody of the item. UE&C-Catalytic Inc. will be the onsite custodian for its subcontractors and suppliers.

In cases where the custodian proposes a disposition of either "use-as-is" or "repair," a written justification must be documented. This justification can be prepared either by the custodian or by Fluor, but in either case, it must be reviewed by Fluor. Fluor Daniel, Inc. is responsible for reviewing the proposed disposition and justification and determining approval, including need for approval by the WHC HWVP PROJ. If Fluor cannot agree with the proposed disposition, it will provide a new disposition and prepare a written justification to explain the change in disposition.

Dispositions approved as "rework" or "reject" will not require evaluation or concurrence by Fluor. Overall adequacy and effectiveness of project nonconformance control will be ensured by periodic review, surveillance, and audit by WHC TWRS Projects QA personnel.

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16.0 CORRECTIVE ACTION

16.1 GENERAL

Each participant will implement a corrective action system that complies with DOE Order 5700.6C, *Quality Assurance* (DOE 1991). For activities that affect waste form development, qualification, and acceptance, the requirements of DOE/RW-0214, *Quality Assurance Requirements Document for the Civilian Radioactive Waste Management Program*, Section 16 (DOE-OCRWM 1990), also will apply.

Conditions adverse to quality are promptly identified, documented, and corrected as soon as practical. The corrective action process applies to the conditions adverse to quality and to significant conditions adverse to quality. A Corrective Action Board (CAB) comprised of WHC senior management personnel has been established to (1) evaluate the significance of HWVP adverse conditions, and (2) ensure effective corrective action by allocation of adequate resources (i.e., time, material, equipment, personnel, procedures, etc). This CAB is convened on a regular basis to evaluate information from adverse condition reports (ACR) for trending purposes.

The organization that detects an adverse condition is responsible for initiating action to document the condition. If the adverse condition involves an item or construction practice that is described by a released design document, then an NCR is initiated and processed in accordance with approved procedures. If the adverse condition is discovered as a result of an audit or surveillance, then an audit finding, audit observation, or inspection/surveillance report is initiated and processed. If the condition is significantly adverse to quality, then a Corrective Action Request (CAR) or stop work order is initiated and processed.

Each of the types of ACRs previously identified can be an integrated ACR if more than one HWVP Project participant organization has collaborated to perform the overview function. When an integrated overview occurs, the lead participant organization tracks and trends the integrated overview according to the lead organization's internal procedure.

The criteria for a significant condition adverse to quality is defined to be any one of the three conditions cited in Section 16.3. In the case of a significant condition adverse to quality, the cause of the condition is determined and corrective action is taken to remedy the immediate problem and to preclude recurrence. The identification, cause, and proposed corrective action for significant conditions adverse to quality are concurred with by WHC TWRS Projects QA and reported to the highest levels of management. Follow-up action is taken by the TWRS Projects QA group to verify satisfactory implementation of approved corrective action within prescribed time limits for all types of adverse conditions.

16.2 TREND ANALYSIS

A trend analysis system and procedures will be developed and implemented by all participants to analyze quality information they generate such as audit reports, surveillance reports, NCRs, CARs, and other deficiency documents for possible adverse quality trends. The WHC TWRS Projects QA organization will summarize and maintain an overall project assessment and reporting of quality trends. Trend analysis will adhere to the following criteria:

- Be performed in a manner and at a frequency that provides for prompt identification of adverse quality trends
- Be reported to affected organizations and participants' project management
- Be performed by the QA organization.

16.3 CORRECTIVE ACTION CRITERIA

Criteria for determining the existence of significant conditions adverse to quality are as follows:

- Imperilment of the uninterrupted progress of the HWVP Project due to an imminent health or safety concern for personnel or the public
- A single, serious breach of requirements (i.e., a single instance of a problem that is determined by the CAB or functional line management to have a serious impact)
- A repeated breach of requirements (i.e., multiple instances of recurring problems for which individual corrective actions have not been effective in precluding repetition).

Procedures for corrective action specify the QA organization's responsibility to concur with proposed corrective action, verify corrective action implementation, and prescribe time limits for closeout of corrective action implementation.

16.4 TRACKING

A tracking system for all deficiencies will be established by WHC TWRS Projects QA personnel to ensure that the deficiencies are appropriately addressed, prioritized, trended, and closed.

16.5 REMEDIAL ACTION

Remedial action is documented and initiated after a deficiency is reported. The following actions are carried out by the responsible organization:

- Concurrence with the remedial action to ensure QA requirements are satisfied
- Followup to verify proper implementation of remedial action
- Closeout of the remedial action in a timely manner.

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17.0 QA RECORDS

17.1 GENERAL

This section describes the activities and controls for maintaining HWVP Project records.

The term "records," used throughout this section, is to be interpreted as QA records as defined in ASME NQA-1, *Quality Assurance Program Requirements for Nuclear Facilities*, Supplement 17S-1 (ASME 1989).

17.2 RECORDS SYSTEM

Each participant has developed a quality records program appropriate for its scope of work.

A records system consistent with the schedule for accomplishing work activities and in compliance with the general requirements of Supplement 17S-1 has been established. This records system is required to be consistent with practices of the National Archives Records Administration and the requirements of DOE System 80 for personnel training and qualification records. The records system has been defined and implemented and it is enforced in accordance with written procedures, instructions, or other documentation.

Records that provide documentary evidence of quality are specified, prepared, and maintained. Measures are established to ensure that records are legible, identifiable, and retrievable. Records are protected against damage, deterioration, or loss. Requirements and responsibilities for records generation, transmittal, evaluation, distribution, retention, maintenance, and disposition are established and documented in procedures. Each participant organization is responsible for generating records that furnish documentary evidence of quality according to scoping statements appearing in work authorizing documents. The description of controls for records only applies to QA records that have been completed. Documentary evidence of quality that is not completed is not subject to the controls described.

17.3 RECORDS ADMINISTRATION

The design specification, procurement documents, test procedures, operational procedures, or other documents specify the records to be generated, supplied, or maintained by or for the owner.

Documents that become records are reviewed for legibility, accuracy, and completeness appropriate to the work accomplished.

17.4 RECORDS VALIDATION

Documents are considered valid records only if they are stamped, initialed, or signed and dated by authorized personnel or otherwise authenticated. This authentication may take the form of a statement by the

responsible individual or organization. Handwritten signatures are not required if the document is clearly identified as a statement by the reporting individual or organization. Authentication (or validation) involves reviewing the document to ensure that the information appearing on the document is accurate and complete, and that the document will receive no more entries unless subjected to a formal change control process. Following validation, the document is regarded as a completed QA record and submitted to the DPC for processing. These records may be originals or reproductions.

17.5 INDEX

The records are indexed in accordance with an indexing system that includes record retention time and location within the record system.

17.6 DISTRIBUTION

The procedures developed and used by the DPC to process QA records specify the distribution, handling, and control appropriate for each record.

17.7 IDENTIFICATION

Records and indexing systems provide sufficient information to permit identification between the record and the item or activity to which it applies.

17.8 CLASSIFICATION

Quality assurance records are classified as "lifetime" or "non-permanent" in accordance with the following criteria.

- Lifetime Records--Lifetime records are those that meet one or more of the following criteria:
 - Those that would be of significant value in demonstrating capability for safe operation
 - Those that would be of significant value in maintaining, reworking, repairing, replacing, or modifying an item
 - Those that would be of significant value in determining the cause of an accident or malfunction of an item
 - Those that provide required baseline data for in-service inspections
 - Those that substantiate development or major decisions involving safety, the environment, etc.
 - Those that evidence conformance to code and specifications

- Those that are required in support of canistered waste form storage in a national repository.
- Non-permanent Records--Non-permanent records are those required to show evidence that an activity was performed in accordance with the applicable requirements but need not be retained for the life of the item because they do not meet the criteria for lifetime records.

17.9 RECORDS RETENTION

Records are retained in accordance with the lifetime and non-permanent classifications previously defined.

- Lifetime records are identified by the DPC for the DOE. Lifetime records directly associated with canistered waste forms will be maintained at a federal records repository while the HLW forms to which the records apply reside at the Hanford Site. When the waste forms are transferred to the HLW repository, the lifetime records will be officially transferred to the federal repository operator of the national HLW repository. Lifetime records that relate to the physical configuration of the HWVP will be maintained at a federal records repository through plant decommissioning.
- Non-permanent records are retained by the federal records repository in accordance with controls established in the repository's internal implementing procedures.

17.10 CORRECTED INFORMATION IN RECORDS

Records are corrected in accordance with procedures that provide for appropriate review or approval by the originating organization. The correction includes the date and identification of the person or organization authorized to make such corrections and a single line drawn through the deleted text.

17.11 RECORDS RECEIPT

Each organization responsible for receipt of records designates a person or organization responsible for receiving the records. The designee is responsible for organizing and implementing a system of receipt control of records for permanent and temporary storage. For the HWVP Project, the DPC (a Hanford Site services function administered by WHC) receives records.

The DPC provides for protection of records against damage or loss during and after receipt. A system for receipt control is established to safeguard records during processing. Incoming documents are logged and their processing is tracked to permit a current and accurate assessment of the status of records during the receiving process.

The control system provides for the following:

- A method for designating the required records
- A method for identifying records received
- Procedures for receipt and inspection of incoming records
- A method for submittal of completed records to the storage facility without unnecessary delay.

Each control system is structured to permit a current and accurate assessment of the status of records during the receiving process.

Records are processed at the DPC for turnover to RL's Records Holding Area for interim storage before long-term storage at a federal records repository. The DPC is not a storage facility; however, while records are being processed they are protected and secured.

17.12 STORAGE, PRESERVATION, AND SAFEKEEPING

A written processing procedure has been prepared for the DPC and responsibility assigned for enforcing the requirements of the procedure. This procedure includes the following:

- A description of the facility
- The filing system to be used
- A method for verifying that the received records are in agreement with the transmittal document and that the records are legible
- A method for verifying that the records are those designated
- The rules governing access to, and control of, records during processing
- A method for maintaining control of, and accountability for, records removed from the facility
- A method for identifying supplemental information and disposing of superseded records to RL's Records Holding Area.

To preclude deterioration of the records while they are being processed at the DPC, the following requirements apply.

- Provisions are made to prevent damage from moisture, temperature, and pressure.
- Records are firmly attached in binders, or placed in folders/envelopes, for preparation for long-term storage in steel file cabinets or in containers on shelving at a federal records repository.

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- Provisions are made for special processed records (such as radiographs, photographs, negatives, microfilm, and magnetic media) to prevent damage from excessive light, stacking, electromagnetic fields, temperature, and humidity.

Measures have been established at the DPC to preclude unauthorized access to records during processing. These measures guard against larceny and vandalism. Measures also are taken to provide for replacement, restoration, or substitution of records lost or damaged during processing.

Records being processed at the DPC are protected in a facility constructed and maintained in a manner that minimizes the risk of damage or destruction from the following:

- Natural disasters such as winds, floods, or fires
- Environmental conditions such as high and low temperatures and humidity
- Infestation of insects, mold, or rodents.

Records maintained by a supplier at the supplier's facility or other location are accessible by the project.

Records accumulated at various locations prior to transfer are accessible to the project directly or through the procuring organization.

Suppliers' non-permanent records are disposed of only after the applicable following conditions are satisfied.

- A code data report is signed or a code symbol stamp affixed for items released for shipment.
- Regulatory requirements are satisfied.
- Operational status permits are satisfied.
- Warranty considerations are satisfied.
- Purchase requirements are satisfied.

Documentation to demonstrate canistered waste form compliance with the WAS, a Waste Form Compliance Plan, and a WQR will be prepared and identified for lifetime retention. The DOE will make copies of these records available to the federal repository operator at the time the national HLW repository is ready to begin accepting canistered waste forms from the waste form producer. The DOE will maintain other QA records as non-permanent records.

Production documentation traceable to the canister will be identified as lifetime quality records that are transferred to the federal repository operator with the canistered waste forms to which they relate.

The DPC uses one-hour, fire-rated, Underwriters Laboratory-approved containers for storage of records during processing. Procedures specify the maximum allowable period before records must be turned over to the RL Records Holding Area.

17.13 INTERFACES

Each of the participants and subcontractors/suppliers to the UCAT and PNL are responsible for implementing portions of the HWVP Project QA Records System as it applies to their work assignments. Specific responsibilities for identifying, preparing, validating, authenticating, logging, indexing, reviewing, classifying, correcting, safekeeping, storing, protecting, transmitting, distributing, retaining, dispositioning, retrieving, maintaining, and tracking records when not in storage are described in controlling procedures. The WHC HWVP PROJ coordinates activity among organizations to effect consistent processing of QA records.

The DPC is responsible for processing records for turnover to DOE facilities for long-term storage. The DPC performs final identification, logging, indexing, review, classification, safekeeping, temporary storage, and protection during processing and transmittal to the RL Records Holding Area. The RL Records Holding Area transfers the records to a federal records repository which provides distribution, retention, retrieval, maintenance, and tracking of QA records.

Quality assurance records will be generated by each of the participants and their subcontractors/suppliers. Personnel in each of these organizations that generate records will prepare, validate, authenticate, and correct the records. Records generated by the project subcontractors/suppliers are transmitted to the DPC through the responsible participant. Other generated records will be transmitted directly to the DPC. Submittal of records is made by formal transmittal.

The DPC processes records according to written procedure(s), which address each of the responsibilities previously identified for the DPC. In addition, the procedure(s) requires incoming records to be reviewed for legibility and traceability to the item or work to which the record applies.

Disposition of non-permanent records will be in accordance with applicable orders, regulations, contract requirements, and participants' organizational policies and procedures.

18.0 AUDITS

18.1 GENERAL

All participants have established requirements for the HWVP Project QA Audit Program to provide independent verification of status, adequacy, compliance, and implementation effectiveness of this QA program and its elements. These independent verifications result in audits and surveillances which comprise the independent assessments conducted for HWVP. Surveillances are addressed separately elsewhere in this document.

Independent assessments are performed by personnel from oversight groups independent of line responsibilities for achievement of quality. These independent assessments are performed by oversight personnel to objectively evaluate compliance to (and effectivity of) requirements. Independent assessments differ from management assessments (discussed elsewhere) in that management assessments evaluate one's own performance.

Section 2.10 describes provisions for surveillances. This section describes provisions for implementing the QA audit program.

18.2 REQUIREMENTS

Planned and scheduled audits are performed to verify compliance with all aspects of the QA program and to determine its effectiveness. These audits are performed in accordance with written procedures or checklists by personnel who do not have direct responsibility for performing the activities being audited. Audit results are documented and reported to, and reviewed by, responsible management. Follow-up action will be taken where indicated. The HWVP Project QA Audit Program complies with ASME NQA-1, *Quality Assurance Program Requirements for Nuclear Facilities*, Supplement 18S-1 (ASME 1989) and the specific amplifications specified in DOE/RW-0214, *Quality Assurance Requirements Document for the Civilian Radioactive Waste Management Program*, Section 18 and Appendix B, paragraph 18 (DOE-OCRWM 1990).

18.3 AUDIT PROGRAM IMPLEMENTATION

Project procedures describe the methods and responsibilities applicable to audit activities to determine compliance with requirements and to assess programmatic compliance and implementation effectiveness of the HWVP Project participants' QA programs. The audit program includes technical and programmatic verifications.

The manager of the WHC TWRS Projects QA group is responsible for the development, implementation, and maintenance of the WHC HWVP Project QA Audit Program. Fluor Daniel, Inc., PNL, and UCAT are responsible for the development, implementation, and maintenance of their respective audit programs and procedures. Participants' audit procedures are reviewed by WHC TWRS Projects QA to ensure that a consistent approach is practiced across the HWVP Project. The WHC QCA section provides overall coordination, training, and records maintenance of all WHC auditing functions. Audit performance

duties are divided between the TWRS Projects QA group and the WHC QCA section. The WHC TWRS Projects QA group plans and conducts audits of the participant organizations' activities. Westinghouse Hanford Company QCA audits the activities of the TWRS Projects QA group, as well as the quality affecting activities of other WHC HWVP Project entities.

Each HWVP Project participant is required to plan and schedule its audit activities and coordinate these schedules with those of the other participants. This coordination of schedules is accomplished through a project procedure to reduce or eliminate scheduling conflicts among the participants and to foster opportunities for joint (or integrated) audit performance. Integrated audits occur when multiple HWVP Project participants collaborate to perform an audit. In such a case, one of the involved participants is designated as the leader of the integrated audit, and the other involved participants provide audit personnel to comprise the integrated audit team. The option of integrated auditing is available for audits of suppliers of the HWVP Project participants, as well as for audits among the participants. Requirements for the planning, performance, reporting, and followup of such integrated audits are described in a project procedure.

18.4 AUDIT PROCESS

Project procedures for audit activities address the accomplishment of the planning and scheduling of audit activities. This is to ensure that program deliverable products and processes are evaluated commensurate with importance to achieving mission objectives or scheduled completion dates assigned to the products or processes. Audits of the implementation effectiveness of the participating contractors' quality programs are performed at least once each year by the WHC TWRS Projects QA group. The WHC QCA's audits of the WHC HWVP PROJ will be performed on a regular basis not to exceed 12 months.

18.5 AUDIT SCHEDULING

The WHC TWRS Projects QA group develops, maintains, and implements for the HWVP Project an audit schedule that covers applicable program elements. Auditing was begun early in the life of the project and is continuing at intervals consistent with the schedule for accomplishing the activities. This schedule is coordinated with the RL HWVP Project Branch to ensure comprehensive overview of all participants. Participants are responsible for conducting audits of their suppliers.

The HWVP Project suppliers' QA programs are evaluated for audit on an annual basis. Supplier audits are performed on a triennial basis, unless an annual evaluation indicates the need for an audit prior to the end of the triennial period. The need to audit a supplier also is evaluated when major changes in contract scope or work methodology occur. Pre-award surveys may serve as the first audit if the scope and conduct of the pre-award survey address contract requirements.

The annual evaluation is documented and addresses review of supplier-supplied documents and records; results of previous source verifications, surveillances, audits, management assessments, and receiving inspections;

operating experience with identical or similar products from the supplier; and results of audits from other sources.

The WHC TWRS Projects QA group audits implementation of affected participants' QA programs at least annually. Audit schedules are prepared annually and adjusted in the event of significant changes in personnel, organization, or QA program.

18.6 AUDIT TEAMS

Audit team leaders are selected before the start of each audit and they are required to be certified lead auditors. Qualifications of lead auditors comply with the requirements of ASME NQA-1, Supplement 2S-3 and Appendix 2A-3. The lead auditor is responsible to organize and direct the audit, coordinate the preparation and issuance of the audit report, evaluate the responses, and ensure that the audit team is prepared prior to the audit.

Members of the audit team are independent with respect to activities they will audit (i.e., no audit team members audit an activity for which they were directly responsible). Management personnel of audited activities are prohibited from participating in the selection of audit team members who will audit their activities.

Collectively, audit team members will have the necessary programmatic and technical expertise in the work being audited by virtue of experience and/or specific, documented orientation or training.

Audit teams may include members from appropriate technical disciplines who will verify adequacy of technical processes employed to ensure validity and correctness of technical work.

The WHC auditor training and qualification programs are administered by the QCA section. Participants' programs will be endorsed by WHC TWRS Projects QA personnel through audit and surveillance. Lead auditors will be certified in accordance with the requirements of their organization's QA program. Formal training for auditor or lead auditor personnel from any of the HWVP Project participant organizations is available through the RL-sponsored Quality Training and Resource Center.

18.7 AUDIT PREPARATION

As a minimum, preparation for individual audits includes the following: preparation of an audit plan and an audit checklist or procedure; study of auditee procedures applicable to the activities to be audited; evaluation of relevant surveillance results; results of previous audits of the same activities; relevant corrective action history; review of trend data; and review of the current status of work.

The audit plan identifies the scope, requirements, audit personnel, activities to be audited, organizations to be notified, applicable documents, schedule, and written procedures or checklists.

The scope of each audit is based on an evaluation of the activities to be audited. The evaluation considers the following:

- Results of previous internal audits
- Results of previous external audits
- Impact of significant changes in personnel, organization, or QA program.

The scope of an audit may include verification of product quality and technical adequacy of work being done as well as programmatic compliance and implementation effectiveness. If personnel with appropriate technical knowledge are assigned as audit team members, they will evaluate technical aspects of processes and acceptability of the quality of products resulting from the process. Technical requirements are selected for audit verification from the governing technical requirements documents and included in audit checklists.

18.8 AUDIT PERFORMANCE

Audit team members perform document reviews, interviews, and other activities described in the audit checklist or procedure under the direction of the audit team leader. Objective evidence is examined, as necessary, to determine if the checklist items are being effectively implemented. Audit team members regularly communicate the status of assigned activities as well as problems and potential problems to the audit team leader. The audit team leader ensures problems that require immediate attention are relayed to the audited organization's representatives in a timely manner. Regular discussions with the audited organization's representatives are held to communicate the status of audit activities and promote effective communication between the auditor and the auditee. Management of the audited organization is actively involved in the audit process commencing with the audit planning phase. Audit performance includes documentation of the evidence examined and conditions observed so that a sound basis exists for reported conclusions.

Results of the audit are presented to the audited organization's representatives by the audit team leader (and team members) in a post-audit conference to complete the audit performance phase.

The audit team assesses the adequacy and effectiveness of the program and reports the results to responsible management for appropriate action.

18.9 AUDIT REPORTING

The audit report contains the following information, as appropriate:

- A description of the audit scope
- Identification of the audit team members
- Identification of personnel contacted during the audit

- A summary of the audit results, including a statement describing the effectiveness of the quality elements audited
- A clear description of each audit finding that will allow the audited organization to understand the finding and take corrective action.

Before transmittal and distribution, the audit report will be signed by the audit team leader and approved by the QA manager of the organization leading the audit. The audit is issued to the audited organization for review, assessment, and appropriate action. Copies of the audit report also are distributed to other affected organizations as well as to upper management of the audited organization.

Audit findings require responses from the affected organization, including specified action dates.

18.10 POST-REPORT ACTION

Management of the affected organization investigates audit findings and determines their root cause(s), schedules corrective action, and notifies (in writing) the auditing organization of actions planned or taken. In most cases, the affected organization will examine other areas of similar activity for related deficiencies. Past work will be evaluated to determine if remedial corrections are required. Audit findings will be tracked to ensure that actions are taken to address, prioritize, and close each finding.

Management of the auditing organization will evaluate the responses to determine the following:

- Adequacy of cause determinations
- Acceptability of commitments for correcting the deficient (and similar) conditions (past and present)
- Acceptability of committed actions to preclude recurrence of the deficient conditions and of the schedule for completing such actions
- Adequacy of the evaluation of impact of the deficient work performed and the generic implications to the program
- Appropriateness of corrective action responsibility assignments.

Followup will be performed by the auditing organization to verify satisfactory implementation of corrective and preventive actions taken to resolve audit findings. Verification of corrective and preventive action implementation will be documented to support closeout of findings.

18.11 AUDIT RECORDS

Audit records include audit plans, audit reports, written replies, and the record of completion of corrective action.

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19.0 COMPUTER SOFTWARE

19.1 GENERAL

Software for the HWVP Project falls into two general categories, WAPA-related and non-WAPA related. The WAPA-related software has some function in meeting the WAPS's. Software not related to WAPA is the balance.

Waste acceptance process activities-related software can be further broken down into two subcategories, process qualification-related and production-related. Process qualification-related software will be the models and algorithms used to qualify the HWVP waste form before actual waste form production begins. Production-related software will collect, manage, and analyze actual production data during HWVP operations. The development of process qualification-related software is the responsibility of WHC HWVP Technology, as supported by PNL. Process qualification-related software will be used during the HWVP cold test phase to qualify the production process. Fluor Daniel, Inc. will develop the software requirements for production-related software, and UCAT vendors will do the actual software development to meet Fluor's requirements. Fluor Daniel, Inc. will then evaluate UCAT vendors' software products to confirm that the software satisfies Fluor's requirements. Production-related software will include models and algorithms to support product qualification. In order to implement the models and algorithms developed by PNL for production-related software, WHC will perform necessary development and/or modifications of the production-related software to install and verify the software on in-plant computer systems. Actual use of production-related software is the responsibility of WHC HWVP Operations.

The HWVP Project participants developing or using computer software programs that affect WAP activities will have approved procedures defining how work will be performed to comply with the requirements of DOE/RW-0214, *Quality Assurance Requirements Document for the Civilian Radioactive Waste Management Program* (DOE-OCRWM 1990) as indicated in this section of the HWVP QAPD.

Computer software used for activities not related to WAPA complies with the requirements of Section 11.6 of this HWVP QAPD.

19.2 REQUIREMENTS

A computer software development and control program has been developed to meet the minimum requirements of DOE/RW-0214, Section 19, and is consistent with the documentation guidance specified in NUREG-0856-F, *Final Technical Position on Documentation of Computer Codes for High-Level Waste Management* (Silling 1983). Computer programs developed and/or modified will be documented in accordance with the applicable elements of NUREG-0856-F.

Affected organizations that implement computer software development activities adhere to a computer software life-cycle model. The relative emphasis placed on each phase of the computer software life cycle depends on the nature, complexity, and importance of the computer software being developed.

The elements of the life-cycle model can be spread among multiple organizations. For example, for HWVP software that collects information useful for certifying waste forms, Fluor may specify the software requirements so that a UCAT vendor can develop the software. In such a case, the product of the UCAT vendor is submitted to Fluor at the end of the development phase for Fluor to accomplish the remainder of the life-cycle model. Thus, affected organizations are those that have responsibilities for accomplishing one or more of the software life-cycle development phases.

The documentation for each phase of the computer software life cycle is reviewed and approved as specified in each affected organization's computer software QA plan (SQAP).

Computer software development requirements will be furnished by the WHC HWVP PROJ to software developers and/or users and will include, as a minimum, the Hanford Site data value standards and the American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE) software standards, such as:

- ANSI/IEEE 729-1983, *Glossary of Software Engineering Technology* (ANSI/IEEE 1983)
- ANSI/IEEE 730-1989, *IEEE Standards for Software Quality Assurance Plans* (ANSI/IEEE 1989)
- ANSI/IEEE 1012-1986, *Software Verification and Validation Plans* (ANSI/IEEE 1986)
- ANSI/IEEE 1058.1-1987, *Software Project Management Plans* (ANSI/IEEE 1987).

19.3 COMPUTER SOFTWARE QA PLAN

Participants using computer software that affects WAP activities describe their computer software development, test, and configuration management systems in their SQAPs and/or procedures. The SQAPs and/or procedures prepared by the participants are submitted to the WHC HWVP PROJ for review and approval. The SQAPs and/or procedures prepared by WHC are submitted to the RL HWVP Project Branch for review and approval. The SQAP is used for the following.

- Provide criteria for application of the requirements of DOE/RW-0214, Section 19, based on the nature, complexity, and importance of the software used to perform analysis.
- Indicate the methods used to develop computer program requirements to translate those requirements into a detailed design and to implement that design in executable code.
- Identify the types of documentation prepared, reviewed, and maintained during computer software design, code implementation, test, and use.

- Describe the methods for managing interfaces involving computer software documentation.
- Identify the methodology for establishing computer software baselines and baseline changes and for tracking changes throughout the life of the computer software.
- Specify the process used for verification of the computer software and validation of models developed or applied to analyses.
- Identify the procedures for reporting and documenting computer software discrepancies (including sources), evaluating impacts of discrepancies on previous calculations, and determining appropriate corrective action.

A computer SQAP is prepared for each computer software development or application effort at the start of the computer software life cycle to identify the following:

- Computer software products to which it applies
- Organizations responsible for computer software quality and their tasks and responsibilities
- Required documentation
- Required computer software reviews.

Both developers and users of WAPA-related software are required to have an SQAP. The content of an SQAP for software development is necessarily greater than the content appropriate for software use. As a minimum, an SQAP for software use must focus on (1) determination of the validity of the software for the intended application, and (2) configuration control of the software.

Some of the in-plant computer systems will have software that is useful for WFQ or waste acceptance (i.e., WAPA-related). A software management plan for in-plant computer systems is under development by the WHC HWVP PROJ for approval by the RL HWVP Project Branch, and it will suffice as the SQAP for the WAPA-related software of those systems.

Standards, conventions, techniques, or methodologies that guide software development have been compliance verified in accordance with approved procedures.

The results of unverified and/or unvalidated software codes may not be used for any activities/processes, etc., that affect WAP activities until verification and validation have been documented and a computer software baseline established. The computer SQAP clearly indicates when developmental codes will be controlled in accordance with this HWVP QAPD.

The SQAP will describe the computer software life-cycle management as specified in DOE/RW-0214, paragraph 19.1.2.

19.4 COMPUTER SOFTWARE VERIFICATION AND VALIDATION

Verification of computer software and model validation are planned and performed before the use of such computer software to perform technical waste form process activities calculations.

The responsible participant develops verification and validation plans that employ methods such as inspection, analysis, demonstration, and test to ensure that the software adequately and correctly performs all intended functions and that it does not perform any function that, either by itself or in combination with other functions, can degrade the entire system.

Verification, validation, and documentation of the final version of the software product--with respect to its intended application--are accomplished by an independent individual or organization (one who did not work on the original computer software) before use for a WAP activity.

19.4.1 Verification

Verification activities are integrated into the software life cycle and verification performed to ensure that software requirements are implemented in the design and that the design is correctly implemented in code. When testing is performed to verify computer software related to WAPA, ASME NQA-1, *Quality Assurance Program Requirements for Nuclear Facilities*, Supplement 11S-2 (ASME 1989) is used except for the following portions of the supplement:

- Section 2.2, "In-Use Tests"
- Section 3, "Test Procedures," item (e) only
- Section 5, "Test Records," Part A, items (3), (4), (5), and (6)
- Section 5, "Test Records," Part B (in its entirety).

19.4.2 Validation

Validation activities are documented and performed to demonstrate that the model, as embodied in the software, is a correct representation of the process or system for which it is intended.

19.5 CONFIGURATION MANAGEMENT

A computer software configuration management system will be established by each participant that develops or uses WAPA-related computer software to ensure positive identification of computer software and control of software baselines and changes. This system includes the following:

- Configuration identification
 - Uniquely identifies each configuration item or version, including identification of the software version in the output, when feasible
 - Identifies changes to configuration items by revision

- Places the configuration item in a relationship with other configuration items
- Directly relates each code version with its associated documentation
- Configuration change control
 - This documentation contains a description of the change(s) as follows:
 - Identification of the originating organization
 - Rationale for the change
 - Identification of affected baselines and computer software configuration items
 - Evidence of evaluation, coordination, and approval

Changes to computer software are subject to the same level of approval, verification, and validation as the original computer software.

- Configuration status accounting
 - The following information is recorded and reported:
 - A listing of the approved configuration identification
 - The status of proposed changes to the configuration
 - The implementation status of approved changes
 - A brief chronology of the software versions, including descriptions of the changes made between versions
 - Information to support the function of configuration identification and configuration control.

19.6 QUALIFICATION OF EXISTING SOFTWARE

Existing software may be qualified for use based on the ability of the software to provide acceptable results for specific applications, and compliance with the requirements of DOE/RW-0214, Section 19.7. Existing software can be accepted for use if the following conditions are met.

- The software is verified and validated.
- A computer software baseline is established.
- Applicable documentation is prepared to support the software in accordance with the provisions of DOE/RW-0214, Section 19.

19.7 DOCUMENTATION

Life-cycle documentation of software specified in the SQAP includes, as a minimum, the following:

- Software requirements specification
- Software design and change documentation (data models, data dictionary)
- Verification and model validation documentation
- User documentation (reference or technical manuals)
- Description of mathematical models and numerical methods
- Code assessment and support
- Continuing documentation and code listings
- Software summary.

Additional documentation also is addressed in the computer SQAP as specified in DOE/RW-0214, paragraph 19.7, items a through e.

19.8 REVIEWS

Reviews of software development activity are performed by participants that develop or use WAPA-related computer software as specified in DOE/RW-0214, paragraph 19.8, as each life-cycle phase is completed. This ensures the completeness and integrity of each development phase. Procedures for reviews identify the participants and their specific responsibilities during the reviews and in the preparation and distribution of the reports.

19.9 DISCREPANCY REPORTING AND CORRECTIVE ACTION

A formal HWVP Project computer software discrepancy reporting and corrective action system will be established. The reporting system will be integrated with the configuration management system to provide current and correct information to software developers and users. Discrepancy reporting and corrective action systems will ensure, as a minimum, the following.

- Defects are documented and corrected.
- Defects are assessed for criticality and impact on previous applications.
- Corrections are reviewed and approved before changes to the software configuration are made.
- Preventive and corrective actions provide for appropriate notification of affected organizations.

- Deficiencies are analyzed for impacts on previous work.
- Deficiencies are documented and controlled in accordance with Section 16.0 of this HWVP QAPD.

19.10 MEDIA CONTROL AND PHYSICAL SECURITY

Procedures that specify measures to physically protect media containing the images of computer software and to prevent their inadvertent damage or degradation will be prepared by each participant that develops or uses WAPA-related computer software.

19.11 ACQUIRED COMPUTER SOFTWARE

Procedures control the transfer of computer software, as applicable. Each participant that acquires WAPA-related software must implement the requirements specified in DOE/RW-0214, paragraph 19.11.

19.12 COMPUTER SOFTWARE APPLICATION

Each participant that develops or uses WAPA-related computer software must apply it correctly. Technical calculations using computer software are performed with computer codes and software operating procedures sufficiently defined to allow independent repetition of the entire computation. Model validation is performed for the specific application of the software. If model validation has not been previously performed, the model will be validated and documented as specified in DOE/RW-0214, paragraph 19.2.

Procedures provide for the following:

- Controlling application of verified software and/or validated models to technical calculations
- Determining which technical calculations are subject to controls
- Documenting and reviewing software applications and analyses
- Ensuring that results are accurate and reproducible
- Identifying or marking record copies of analyses and supporting documentation
- Generating and documenting software used to perform technical calculations
- Conducting independent review and approval to ensure that software is applicable to the problem being solved and that input and assumptions are valid and traceable.

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21.0 GLOSSARY

21.1 ABBREVIATIONS AND ACRONYMS

ACR	adverse condition report
A-E	Architect-Engineer
ANSI	American National Standards Institute
CAB	Corrective Action Board
CAR	Corrective Action Request
DOE	U.S. Department of Energy
DOE-HQ	U.S. Department of Energy-Headquarters
DPC	Document Processing Center
ESQ	Environmental, Safety, Health, and Quality Assurance
FDC	functional design criteria
Fluor	Fluor Daniel, Inc.
GCC	General Construction Contractor
H&SA	Health and Safety Assurance
HLW	high-level waste
HWVP	Hanford Waste Vittrification Plant
IC	Integrating Contractor
IEEE	Institute of Electrical and Electronics Engineers
LOI	letter of instruction
M&TE	measuring and test equipment
NCR	nonconformance report
participant	Project Participant: HWVP-dedicated organization of DOE, WHC, Fluor, UCAT, or PNL
PM	project manager
PNL	Pacific Northwest Laboratory
QA	quality assurance
QAPD	Quality Assurance Program Description
QARD	Quality Assurance Requirements Document
QC	quality control
QCA	Quality Compliance Assurance
R&DC	Research and Development Contractor
RL	U.S. Department of Energy, Richland Operations Office
RR	Readiness Review
SOW	statement of work
SQAP	software quality assurance plan
TDP	technical data package
TWRS	Tank Waste Remediation System
UCAT	UE&C-Catalytic Inc.
WAP	waste acceptance process
WAPA	waste acceptance process activities
WAPS	Waste Acceptance Product Specifications
WAS	waste acceptance specification
WFQ	waste form qualification
WHC	Westinghouse Hanford Company
WHC HWVP PROJ	Westinghouse Hanford Company Hanford Waste Vittrification Plant Project
WQR	Waste Form Qualification Report
WRSA	Waste Remediation Safety Assurance
WVDP	West Valley Demonstration Project

21.2 DEFINITIONS

Quality Affecting Activities. Activities that, if not accomplished, or if incorrectly accomplished, will cause the quality of the product to not meet requirements. This term is synonymous with "activities important to quality."

Activities Important to Quality. Activities that, if not accomplished, or if incorrectly accomplished, will cause the quality of the product to not meet requirements. This term is synonymous with "quality-affecting activities."

Independent Assessment. An assessment performed by personnel from an oversight group independent of line responsibilities for achievement of quality to objectively evaluate compliance to (and effectivity of) requirements. Independent assessments differ from management assessments (defined elsewhere) in that management assessments evaluate one's own performance (and are therefore necessarily less objective and more 'dependent').

Management Assessment. An assessment conducted by management to evaluate its own performance in implementing the quality assurance program. This evaluation is performed in a planned and controlled manner to provide management with insight about the accomplishment of its responsibilities for achieving quality. Management assessments differ from independent assessments (defined elsewhere) in that independent assessments are performed by personnel who are external to (and therefore independent of) the organization performing the work.

Waste Acceptance Process Activities. The activities through which documentation and data are collected and prepared to support compliance with the waste acceptance product specification. This includes activities associated with research and development that are essential to qualification of the waste form: control of materials, equipment, facilities, and processes that are essential to the certification of canistered waste forms.

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