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*Encl. to letter to
J. Kennedy from
D. Vieth. 11/30/84*

**Nevada
Nuclear
Waste
Storage
Investigations**



A U.S. DOE PROJECT

UNCONTROLLED

**NEVADA NUCLEAR WASTE STORAGE
INVESTIGATIONS
QUALITY ASSURANCE PLAN**

UNCONTROLLED

**UNITED STATES DEPARTMENT OF ENERGY
NEVADA OPERATIONS OFFICE
LAS VEGAS, NEVADA**

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UNITED STATES DEPARTMENT OF ENERGY
NEVADA OPERATIONS OFFICE
LAS VEGAS, NEVADA

PREFACE

This document is the third revision of the Nevada Nuclear Waste Storage Investigations Project Quality Assurance Plan (NVO-196-17). It contains minor revisions for clarification of the plan. These revisions are indicated by a line with the number 3 in the left hand margin. Minor editorial changes are not indicated. NVO-196-17 (Rev. 3) supersedes NVO-196-17 (Rev. 2).

NEVADA NUCLEAR WASTE STORAGE
INVESTIGATIONS

QUALITY ASSURANCE PLAN
REVISION 3

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SIGNATURE PAGE



NNWSI PROJECT MANAGER



QAD DIRECTOR 10-26-84

Effective Date: November 1, 1984

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS

QUALITY ASSURANCE PLAN

REVISION 3

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NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS

QUALITY ASSURANCE PLAN

Revision 3

INTRODUCTION

The Nevada Nuclear Waste Storage Investigations (NNWSI) Project was established by the Department of Energy-Nevada Operations Office (DOE/NV) to evaluate planned and systematic actions to provide sufficient information to expand the public's confidence in the suitability of a geologic repository site and its subsystems and components for high-level radioactive waste isolation. The location of the potentially acceptable geologic repository site under evaluation is on and adjacent to the Nevada Test Site (NTS). This evaluation includes all systems, structures, and components important to safety for the design, construction, and characterization of barriers important to high-level waste isolation and to related activities.

It is possible that the results of these investigations will support an NRC licensing decision and assess risks to public health and safety; therefore, a quality assurance (QA) plan is essential to specify the method of control for the quality aspects of the work. The program must conform to the criteria of the Code of Federal Regulations, Title 10, Part 50, Appendix B (10CFR50, Appendix B) and NV Order 5700.6A. The Quality Assurance Plan (QAP) presented herein describes in general terms how the criteria of 10CFR50, Appendix B and NV Order 5700.6A are being applied to the entire NNWSI Project. A detailed description of the criteria applicable to each investigative phase of the project is contained in individual Quality Assurance Program Plans (QAPPs) prepared by each organization responsible for directing and/or conducting an assigned task.

The Waste Management Project Office - Nevada Operations Office (WMPO) has been assigned responsibility for administrating and coordinating the NNWSI Project activities. The WMPO requires each Participating Organization and the NTS Support Contractors (through the Nevada Test Site Office) to prepare and submit a QAPP that covers their task activities. Essentially, a compendium of these

plans could be considered to be the NNWSI Project QAP, but such a compendium would be difficult both to use and to interpret because of the many-faceted aspects of the project. Therefore, this QAP brings together the essential aspects of the QA criteria elements into one document which is intended to be selectively applied depending upon the complexity and relative importance of the investigation being conducted. All QAPPs prepared by the NNWSI Project Participating Organizations and NTS Support Contractors shall meet the requirements set forth in this plan.

Participating Organizations contributing the majority of effort on the NNWSI Project include:

- Lawrence Livermore National Laboratory (LLNL)
- Los Alamos National Laboratory (LANL)
- Sandia National Laboratories (SNL)
- Science Applications, Inc. (SAI)
- United States Geological Survey (USGS)
- Westinghouse Electric Corporation, Waste Technology
Services Division (W/WTSD)

NTS Support Contractors are also supporting site activities and will develop QAPPs for their operations. They include:

- Fenix & Scisson, Inc. (F&S)
- Holmes & Narver, Inc. (H&N)
- Reynolds Electrical and Engineering Company, Inc. (REECO)

POLICY

The Nevada Operations Office and the Waste Management Project Office consider quality assurance an essential element of all NNWSI Project activities. Quality assurance programs for the NNWSI Project are based upon NV Order 5700.6A; 10CFR60, Subpart G; 10CFR50, Appendix B; and the 1983 issue of the ANSI/ASME NQA-1 standard as modified by Appendix C of this plan. ANSI/ASME NQA-1, as modified, will be used by the WMPO/QA Support Contractor to evaluate the QAPPs of the Participating Organizations and of the NTS Support Contractors. It is recognized that not all criteria of these documents are applicable in every case, and this will be reflected in the review process.

The WMPO will apply an approach to quality assurance which recognizes the importance of radiological safety related and non-radiological safety related NNWSI activities. This approach is designed to ensure that each activity is assigned a level of quality that is consistent with the relative impact and/or importance to the project with regard to DOE concerns, public health and safety, and/or the Nuclear Regulatory Commission (NRC) licensing process.

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Quality Level I activities are defined as radiological health and safety related activities involving items or activities that are important to both safety and/or waste isolation and that are associated with the ability of a nuclear waste repository to function in a manner that prevents or mitigates the consequences of a process or event that could cause undue risk to the radiological health and safety of the public. Items important to safety are those engineered structures, systems, and components essential to the prevention or mitigation of an accident that could result in a radiation dose either to the whole body or to any organ of 0.5 rem or greater either at or beyond the nearest boundary of the unrestricted area at any time until the completion of the permanent closure of the repository. Items important to waste isolation are those barriers which must meet the criteria that address long-term performance of the engineered and natural barriers to prevent the release of radionuclides from the site to the accessible environment after permanent closure. The criteria for items important to safety and waste isolation are found in 10CFR60, 40CFR191, and 40CFR190.

Quality Level II activities are defined as those activities related to the systems, structures, and components which require a level of quality sufficient to provide for reliability, maintainability, public and worker non-radiological health and safety, and other operational factors that would have an impact on DOE and WMPO concerns, and the environment.

3 | Quality Level III activities are defined as those activities not classified as Quality Levels I or II.

Site characterization activities including, but not limited to geologic, hydrologic, and seismic data gathering, shall utilize the same approach to quality as described above. Since site characterization involves research, development, and investigative activities, it is necessary to adapt the criteria to fit the content of the work environment. The site characterization activities shall be conducted in accordance with approved procedures to assure the validity of the data supporting the resulting conclusions.

The NNWSI Participating Organizations and NTS Support Contractors shall base their respective QAPPs on the requirements set forth in this QAP. The programmatic quality assurance requirements for Quality Level I activities shall be based on NV Order 5700.6A; 10CFR60, Subpart G; 10CFR50, Appendix B; and ANSI/ASME NQA-1, including the mandatory supplemental requirements as modified by Appendix C. Once applicable quality criteria have been determined to apply to a Level I activity, all requirements under those criteria must be applied to the activity. For Quality Level II activities, the programmatic quality assurance requirements shall be based on ANSI/ASME NQA-1 basic requirements. The extent to which the basic requirements are to be applied to a task shall be determined by the Participating Organizations based on the relative importance of the activity. Quality Level III activities require the use of

3 | good engineering, laboratory, and quality practices utilizing existing participant administrative and quality procedures.

In order to establish the quality level of the various project activities, each NNWSI Participating Organization shall generate a Quality Assurance Procedure which will define the method of controlling and documenting the level of quality to be applied to the NNWSI Project tasks, or parts thereof, for which they are responsible. The procedure shall include methods for change control of assigned quality levels, and requirements for documentation of the following as a minimum:

- o Persons or organizational unit responsible for determining the quality level.
- o Criteria for determining level of quality assurance to be applied.
- o Technical justification for the quality level selected.
- o Person(s) or organizational unit providing an independent review and approval of the assigned quality level.
- o The quality level selected for application to the respective activities, and which of the criteria (18 point criteria) will be applicable.

The document designating the above shall be sent to WMPO for approval prior to the start of the activity. During the WMPO review and approval of the document indicating the applicable quality level, WMPO may direct that the Participating Organization change the quality level of the activity.

PURPOSE AND SCOPE

This Quality Assurance Plan describes the overall quality assurance requirements for the NNWSI Project under which the quality assurance programs of the WMPO, individual Participating Organizations, and NTS Support Contractors are to operate. The details of how each of these groups will meet the QA criteria may differ among Participating Organizations and NTS Support Contractors. Those details are given in the QAPPs listed in Appendix A. It is the purpose of this QAP to provide guidance to the NNWSI Project Participating Organizations and Support Contractors to assure a common approach to meeting the quality requirements to be applied to NNWSI Project activities and to describe the duties and responsibility of each of the participants and their interface with WMPO.

3 | Quality Level I activities will provide the basis for the NRC to approve a license for the Department of Energy (DOE) to receive and possess source, special nuclear, and by-product material at the geologic repository. This will involve NRC inspection and enforcement. Level I Quality Assurance control and documentation must be applied to activities, including data collection, investigation, analysis, design, construction, fabrication or operation when they are specifically concerned with the protection of the public's health and safety with respect to a radiological hazard. To keep radionuclides out of man's environment, a high-level radioactive waste repository will utilize engineered systems, structures, and components to contain the waste and ensure the short-term safety. The repository also will utilize the earth to afford long-term isolation. Within this context, Quality Level I must be applied for near-term safety as well as long-term isolation as per the following:

- o Where radiological safety is dependent on the analysis, design, construction, fabrication and operations of man-made structures, systems and components essential to the prevention of an accident that could result in a radiation dose either to the whole body or to any organ of 0.5 rem or greater at or beyond the nearest boundary of the unrestricted area at any time until the completion of the permanent closure of the repository.

- o Where field and laboratory data, and subsequent analysis serves as the basis for making the determination that the intrinsic and perturbed geologic, hydrologic and geochemical environment is capable of providing long-term waste isolation based on the radionuclide release criteria as specified in 40CFR191 to the controlled area.

Level II Quality Assurance control and documentation shall be applied to the NNWSI Project activities, and items that are specifically concerned with non-radiological operation of the repository. The HLW repository will utilize engineered systems, structures, and components which must be designed, constructed, fabricated, tested and operated to meet the performance objectives during the operational phase, and to minimize the non-radiological hazard to the public and repository worker. Additionally, activities that have a major impact on project costs or schedules that could delay the achievement of DOE/GRD milestones must be appropriately controlled. Therefore, Quality Level II must be applied to activities and items in the following manner:

- o Where activities or items involve engineered systems, structures, or components that are essential to the operational phase of the repository which impact public and worker non-radiological occupational health and safety.
- o Where activities or items involve the operational reliability and maintainability of engineered items.
- o Where activities and items could have or which could effect cost or schedule impacts that could delay or cause a DOE/GRD program milestone to slip.
- o Where activities are concerned with evaluating alternative solutions, materials, or conceptual designs prior to the final selection for use in the high-level waste repository.

Quality Level II activities may have equal importance as Quality Level I; however, except when used to support a Level I activity as indicated below, they neither support the licensing efforts nor are they subject to NRC

inspection and enforcement. In most cases, activities controlled in accordance with a Quality Level II program cannot subsequently be used to support Level I activities, unless it can be substantiated that the quality requirements equivalent to those which would have been applied to a Quality Level I activity were implemented, or a technical justification process is applied consisting of the following:

- o Documented technical justification for use in a Level I activity (including a detailed description of the Quality Level II controls applied to the activity).
- o A documented technical review of the information/data by two independent qualified peers.
- o A statement of verification by the original investigator (when possible) regarding the validity of the data.
- o Written concurrence by the Technical Project Officer responsible for the activity.
- o WMPO Director review and approval.

Level III activities are such that they have no major function in the design, operation, and characterization of the repository, but they require good practices for the intended use. Those activities controlled in accordance with a Quality Level III program cannot subsequently be used to support Level I activities.

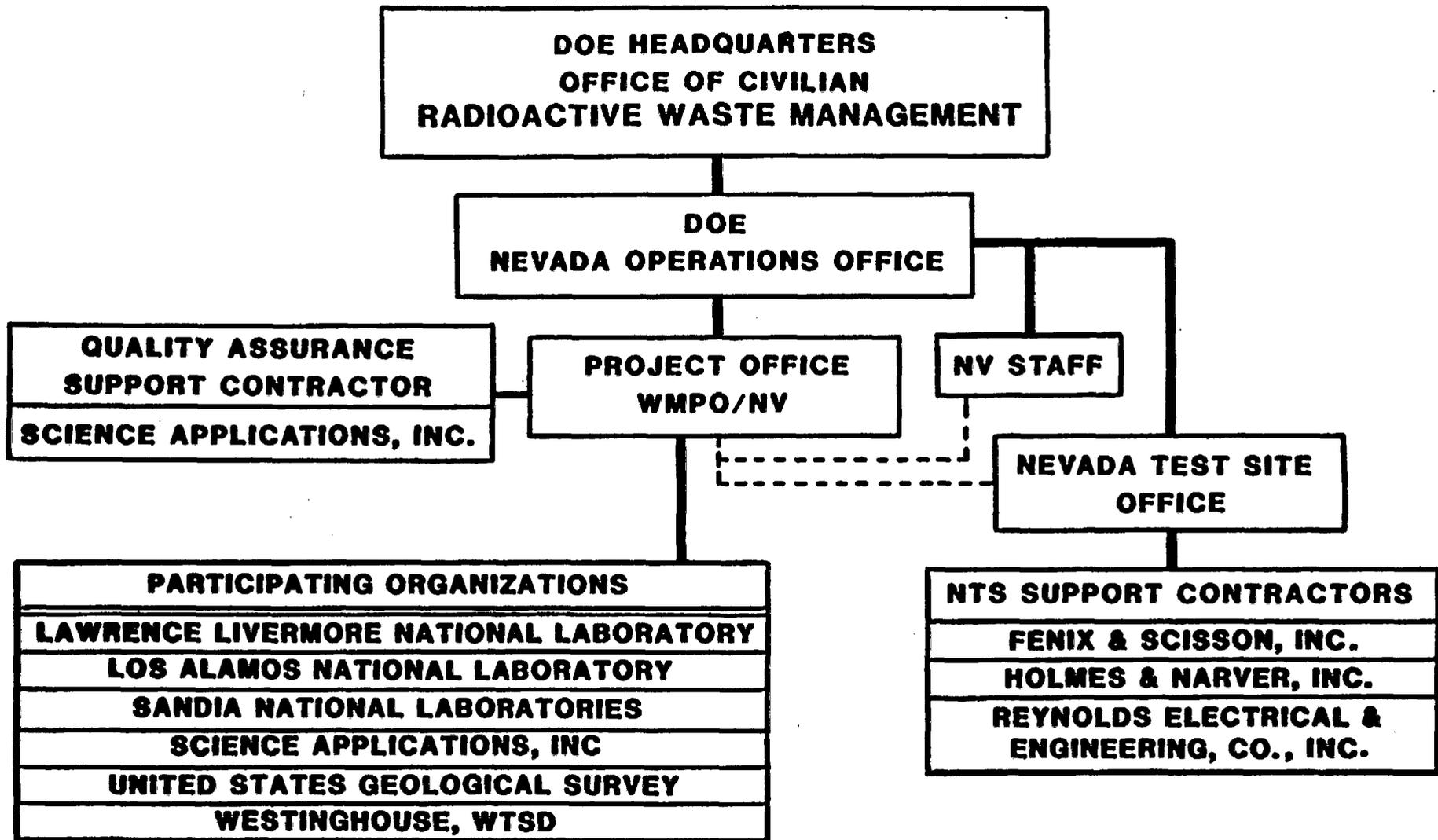
1.0 ORGANIZATION

- 1.1 This section describes general organization responsibilities and interfaces within the NNWSI Project. The NNWSI Project Work Breakdown Structure provides the detailed technical responsibilities of each Participating Organization and NTS Support Contractor; and a definitive description of the quality assurance responsibilities are contained in the QAPPs of the individual organizations listed in Appendix A.

- 1.2 The DOE Headquarters, Office of Civilian Radioactive Waste Management (OCRWM) provides programmatic and policy guidance to assure that adequate NNWSI Project Quality Assurance programs are established, implemented, and maintained. The OCRWM has assigned the DOE Nevada Operations Office with the responsibility for the implementation of the technical and quality assurance requirements.

- 1.3 The Department of Energy/Nevada (DOE/NV) Manager has the ultimate organizational responsibility for the NNWSI Project in the Nevada Operations Office. The Waste Management Project Office (WMPO) has been established within the DOE/NV organization for the management of the project. The WMPO operates as a part of the DOE Nevada Operations Office (DOE/NV) under the programmatic direction of the DOE Headquarters Office of Civilian Radioactive Waste Management. In matters of Department policy, DOE/NV interfaces and cooperates with DOE/OCRWM in establishing a consistent quality assurance approach for accomplishing the objectives of the National Waste Terminal Storage Program.

The DOE/NV utilizes a matrix management organizational concept to support the WMPO. The administrative responsibility, authority, and accountability for DOE/NV personnel supporting the NNWSI Project remains with the respective DOE/NV organizational element, while the functional responsibility and accountability of NNWSI Project personnel is to the WMPO. For simplicity, the NNWSI Project organization chart on Figure 1 shows all DOE/NV as one organizational element, and highlights only those DOE/NV organizational elements that have a major role in the matrix management



——— DOE/NV & Project Participant - Administrative Responsibility, Authority, & Accountability
 - - - - - DOE/NV Matrix - Functional Responsibility & Accountability

FIGURE 1. NNWSI PROJECT ORGANIZATION

organizational structure of the NNWSI Project, i.e., WMPO, Nevada Test Site Office (NTSO), and other DOE/NV staff.

Under the matrix management concept, the Director, WMPO, is the Project Manager for the NNWSI Project. All other DOE/NV organizational elements provide functional support to the NNWSI Project. DOE/NV staff and NTSO personnel become functionally responsible and accountable to the NNWSI Project Manager when their support is requested by the WMPO. These WMPO requests for functional support are transmitted to the appropriate Director/NV, consistent with the administrative relationships established for DOE/NV. These Directors assign personnel under their administrative authority and control to provide the functional matrix support required. DOE/NV Directors are required to identify to the NNWSI Project Manager those personnel under their administrative control who are responsible and accountable for specific NNWSI Project work.

- 1.4 The Waste Management Project Office (WMPO) is programmatically responsible for coordination of the activities of the Participating Organizations and NTS Support Contractors through the issuance of technical and programmatic guidance, technical integration of the project, project planning and documentation, and quality assurance programmatic guidance.

The Director WMPO is ultimately responsible for the NNWSI Project management. Project management encompasses planning activities; establishing goals and objectives, assigning responsibility, and assessing progress toward the attainment of those goals; administration of procurement of materials and services; preparation and issuance of technical guidance; organization and conduct of peer reviews; compliance with laws, regulations and DOE policies; and other administrative duties.

The technical responsibilities of the WMPO focus in two areas, each under the direction of a Branch Chief. The Geological Investigations Branch is responsible for Site Characterization including geology, hydrology, geochemistry, geophysics and administrative support; performance assessment including computer code documentation, analysis, and radionuclide

migration field experiments; drilling operations and borehole testing; quality control; regulatory interface; environmental analysis; and institutional liaison. The Technology Development and Engineering Branch is responsible for systems description, analysis and integration; waste package design and development; design, construction and operation of major test facilities; operational safety; repository engineering including conceptual design, rock mechanics, and borehole sealing; instrument and equipment development; quality control; and exploratory shaft design, construction, and operation.

The quality assurance responsibilities of the WMPO are accomplished with guidance from QAD/NV and support from the Quality Assurance Support Contractor (QASC). These responsibilities of the QASC include development, documentation, administration, and implementation of the NNWSI Project QAP; development and implementation of the WMPO QAPP which delineates the interface responsibilities of WMPO and the QASC. Activities such as participation in QA audits, review of test plans and QA procedures, provision for QA surveillance and policy guidance, and review of the Quality Assurance Program Plans (QAPPs) prepared by the Participating Organizations and NTS Support Contractors shall be supported by the QASC. The overall responsibility to assure that quality is maintained throughout the NNWSI Project is retained by the WMPO.

The WMPO shall review and approve the Participating Organizations' and NTS Support Contractors' QAPPs and supporting Quality Assurance Administrative Procedures prior to their use.

- 1.5 The DOE/NV Staff assists the NNWSI Project Manager by providing reviews, recommendations, and expertise on various aspects of the NNWSI Project in terms of their respective responsibilities as established in accordance with the matrix management approach. The NNWSI Project Manager is responsible for coordinating DOE/NV staff support.

- 1.6 The DOE/NV Quality Assurance Division (QAD) Director provides guidance, surveillance, and audit capability for DOE/NV management; reviews and approves the NNWSI Project QAP and implementing procedures; and is

included as part of the NV staff for the purposes of this document. The QA Division has assigned a Project Quality Manager (PQM) dedicated to support the WMPO activities. The dedicated PQM reports functionally to the Director WMPO. The PQM's support to the Project includes the review of Participating Organizations' and Support Contractors' QAPPs and implementing procedures, assistance with audits, reviews, coordination of the QASC activities and other activities when requested by the NNWSI Project Manager.

- 1.7 The Nevada Test Site Office (NTSO) provides matrix support personnel functionally responsible and accountable to the WMPO and are responsible for field direction and coordination of the NTS Support Contractor operations, including architect-engineering, drilling, mining, construction, and logistical support for work performed at the NTS in accordance with NTS Operating Procedures. The NTSO acts on requests for NTS Support Contractor services submitted by Participating Organizations per NNWSI-SOP-03-01 and provides assistance to other project participants in areas of specialized expertise.
- 1.8 Participating Organizations and NTS Support Contractors are responsible to WMPO for the technical activities assigned to them per the NNWSI Project Work Breakdown Structure. The technical activities are to be accomplished in accordance with the quality requirements in this QAP and their respective QAPPs approved by WMPO.

Interfaces between the WMPO, the Participating Organizations, and the NTS Support Contractors are described in the QAPPs of the respective organizations. From an overall NNWSI Project standpoint, these interfaces are exchanges of technical requirements of work to be performed and liaison until completion of work. Participating Organization and NTS Support Contractor QAPPs describe the methods of conducting inter-organizational interfaces.

Quality assurance personnel across the entire project shall report to management levels such that they have sufficient authority and organizational independence to identify quality problems; to initiate,

recommend, or provide solutions; to verify implementation of solutions; and to stop unsatisfactory work. The organizational structure for executing the quality assurance programs varies from organization to organization, and each one shall be described in the individual organization's QAPP. The Technical Project Officer of the respective Participating Organizations and the Manager of the respective NTS Support Contractors are responsible to the NNWSI Project Manager to ensure that the NNWSI Project activities they are responsible for are performed to a QAPP and procedures consistent with this QAP.

1.8.1 NTS Support Contractors

1.8.1.1 Fenix and Scisson, Inc. (F&S) F&S is the architect-engineer (A-E) for drilling and mining for the NNWSI Project. Responsibilities also include field surveillance and inspection of drilling and mining, and subsurface facilities construction and testing.

1.8.1.2 Holmes and Narver, Inc. (H&N) H&N is the A-E responsible for above-ground facilities. They provide Material Test Laboratory support, site preparation for surface facilities, drilling, including field surveillance and inspection of facility construction.

1.8.1.3 Reynolds Electrical and Engineering Company (REECO) REECO is the prime support contractor providing support for subsurface and surface construction, drilling, and mining. REECO assists in the operation and maintenance of the site facilities and provides procurement activities for the NNWSI Project when requested.

1.8.2 Participating Organizations

1.8.2.1 Lawrence Livermore National Laboratory (LLNL) LLNL is responsible for the development of an integrated waste package for tuff which includes the definition of the package environment, material development and testing, package design, performance analysis, and testing; the Spent Fuel Test-Climax demonstration experiments; and provides assistance to other project participants in areas of specialized expertise.

- 1.8.2.2 Los Alamos National Laboratory (LANL) LANL is responsible for nuclide migration studies, geochemistry, mineralogy, and petrology studies. LANL acts as the lead technical organization for the Exploratory Shaft which includes planning and design review, construction, technical direction, evaluation, and testing. LANL also provides assistance to other project organizations in areas of specialized expertise.
- 1.8.2.3 Sandia National Laboratories (SNL) SNL is responsible for repository systems development, data management and analysis; systems performance assessment of the repository; conceptual design of the repository; thermal and mechanical properties of the host rock; repository sealing performance requirements, materials evaluation, design, and testing; and provides assistance to other project participants in areas of specialized expertise.
- 1.8.2.4 Science Applications Incorporated (SAI) SAI is responsible for technical and management support services which includes technical and management assistance, advice, and consultation to the NNWSI Project Manager; research and technology development; project and technical management studies; project management system development and project reporting; engineering and technical support for project plans, reports, and presentations; institutional support; strategic planning; and organization of the technical peer review process.
- 1.8.2.5 United States Geological Survey (USGS) USGS is responsible for site geologic characterization including geology, hydrology, geophysical, and geochronology investigations and tectonic, volcanic, and natural seismic studies; acts as lead technical participant for the site characterization drilling activities; is responsible for the operation of the core library facilities at NTS for handling, storing, and distributing material samples and core for the commercial nuclear waste management activities at NTS; and provides assistance to other project participants in areas of specialized expertise.

1.8.2.6 Westinghouse Electric Corporation/Waste Technology Services Division (W/WTSD) W/WTSD is responsible for operation of the Engine Maintenance Assembly and Disassembly (E-MAD) facility; spent fuel handling and packaging tests and demonstrations; surface or near-surface spent fuel storage tests and demonstrations; and provides assistance to other project participants in areas of specialized expertise.

2.0 QUALITY ASSURANCE PROGRAM

- 2.1 The quality assurance program for the NNWSI Project as a whole consists of this QAP and the QAPPs of WMPO, the Participating Organizations, and the NTS Support Contractors. Figure 2 details the hierarchy of Quality Assurance criteria to be applied to the NNWSI Project. All appropriate elements of the 10CFR50, Appendix B criteria and ANSI/ASME NQA-1 requirements, as modified (see Appendix C) and adapted to the NNWSI Project activities shall be addressed in the QAPP for each organization. The QAPPs shall provide for the planning and accomplishment of activities affecting quality under suitable controlled conditions. Controlled conditions include the use of appropriate equipment, suitable environmental conditions for accomplishing the activity, assurance that prerequisites for the given activity have been satisfied, and control for verification of quality activities.
- 2.2 Written procedures will be used to implement the WMPO, Participating Organization and NTS Support Contractor QAPPs. Matrices of procedures referenced to the applicable criteria elements will also be included in each QAPP.
- 2.3 Participating Organizations and NTS Support Contractors shall assure that the applicable elements of 10CFR50, Appendix B and ANSI/ASME NQA-1 are covered in their respective QAPPs. Assurance that the elements have been adequately addressed and effectively implemented will be provided by WMPO with support from the QASC during the review and approval of their respective QAPPs, monitoring and surveillance operations, and regularly scheduled audits of the activities. The Participating Organizations' and NTS Support Contractors' management shall also monitor their respective QAPPs through internal audits to assess the adequacy of the program and assure its effective implementation.
- 2.4 To achieve and maintain proficiency, as necessary, a method will be established to indoctrinate, train, qualify, and certify personnel performing activities affecting quality.

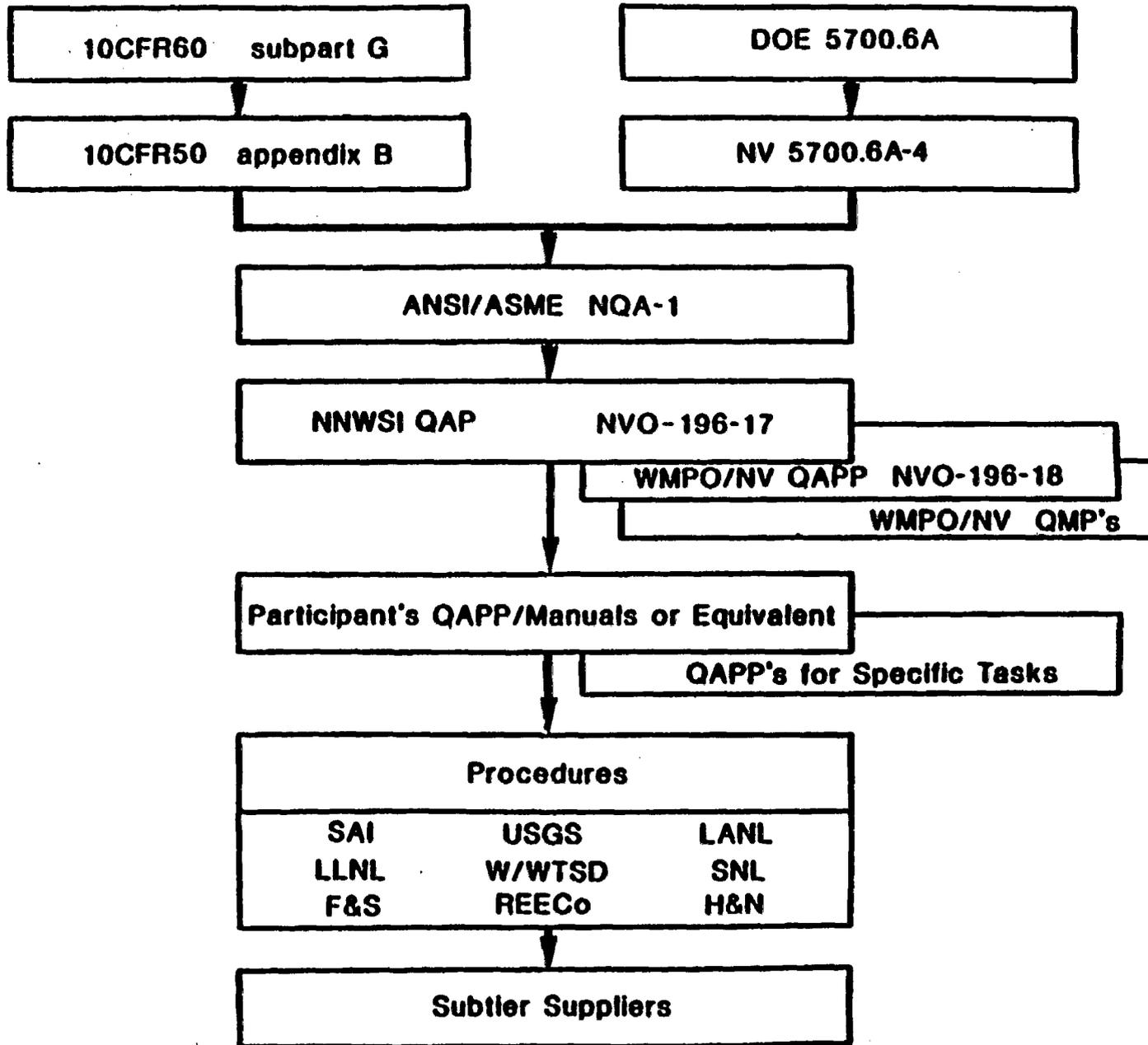


FIGURE 2 CRITERIA FOR QUALITY ASSURANCE

3.0 DESIGN AND SITE INVESTIGATION CONTROL

3.1 Design Control

3.1.1 Design control applies to any information which defines or describes either how and by what means (equipment, methods, etc.) an engineered system, structure or component is to be formulated. Requirements are translated into such controlled documents as criteria letters, drawings, specifications, test plans, instructions, and procedures. All such documentation will be subject to the design control methodology of the organization responsible for that phase of the work to which it is applied. In every case, design verifications will be conducted to verify the adequacy of design to assure appropriate quality assurance requirements are specified, ensure the documentation is identified and controlled, ensure changes are controlled and approved by the originating organizations, and ensure applicable regulations and standards are incorporated.

3 3.1.2 Consideration for the design of structures, systems, and components shall include the design criteria and performance criteria as required by the applicable Code of Federal Regulations (CFR) such as 10CFR20, 10CFR50 Appendix B, 10CFR60, and 40CFR190.

3.1.3 Final design verifications will be conducted and documented for all Quality Level I activities by either the Participating Organization or NTS Support Contractor responsible for the activity. The final design verification shall be completed prior to the approval of the design. The WMPO will participate in the design verification process by the reviews of all Quality Level I final design drawing.

3.2 Site Investigation Control

3.2.1 Site investigation control applies to any information which defines or describes either how or by what means the geologic conditions and ranges of parameters of the natural barriers for the geologic repository are to be characterized. The requirements for site investigations shall be

translated into such controlled documents as criteria letters, drawings, specifications, and procedures.

3.2.2 Prior to the start of a site investigation, the responsible Participating Organization shall develop a plan which will describe the tests and experiments which will be utilized to determine the geologic, hydrologic, geotechnical, or tectonic mean values and range of uncertainties of the natural host formation. The plan shall present sufficient detail to determine whether or not the activities to be conducted, the methods of analyzing the data to be gathered, and the modeling methods will ensure that the end results will provide sufficient information necessary to evaluate the characteristics of the natural barriers against the criteria specified in 10 CFR 191.

3

3.2.3 The responsible Participating Organization shall conduct a technical review on the plan prior to the start of any activities associated with the plan.

3.3 Peer Reviews

3.3.1 Peer reviews shall be conducted or directed by WMPO when there is a unique application of an established or standard practice. The peer review process shall also be used when the activity involves untried practices, when the work exceeds the state of the art, and when new or unusual experimental techniques are used by a Participating Organization or NTS Support Contractor.

3.3.2 Peer reviews shall be performed by individuals which are independent from the originating Participating Organization or NTS Support Contractor. The QASC and QAD/NV will participate in reviews and verifications as requested by the WMPO.

3.4 General

3.4.1 For work done at the NTS by NTS Support Contractors, criteria letters and/or work requests which stipulate specific requirements will be prepared by the organizations in charge of the activity. The criteria letters and/or work requests shall specify any approved documents (procedures, drawings, etc.) by which the activity is to be performed. Criteria letters and/or work requests shall be forwarded to the NTSO (with a copy to the WMPO) to be used to direct the activities for WMPO at the NTS.

3.4.2 The NTS A-E Support Contractors will use the criteria letters and additional inputs, if any, to formulate engineering and construction drawings, specifications, test programs, drilling programs, or other documentation as necessary to accomplish the work. The formulated documents will then become the "design" documents from which the other NTS Support Contractors will perform the activity.

3.4.3 Those NNWSI Project activities which require the use of computer programs, including the design of equipment and facilities, analysis of test data, and shielding analysis, shall utilize, as applicable, the guidelines as set forth in NUREG-0856, Final Technical Position on Documentation of Computer Codes for High Level Waste Management, June 1983.

4.0 PROCUREMENT DOCUMENT CONTROL

- 3
- 4.1 Procurement activities by DOE/NV and Participating Organizations and NTS Support Contractors in support of their tasks will be accomplished according to their written procedures and by their internal groups dedicated to that work. The WMPO requires Participating Organizations and NTS Support Contractors to assure that these groups include applicable regulatory requirements, design bases, and other requirements in their procurement documents to assure that adequate technical and quality assurance requirements are included or referenced.
- 4.2 Participating Organizations and NTS Support Contractors shall meet applicable portions of 10CFR50, Appendix B and ANSI/ASME NQA-1 in their QAPPs, and shall pass this requirement to their subcontractors in their procurement documentation. Quality Assurance Program Plans and documents of subcontractors shall be reviewed and approved by the procuring Participating Organization or NTS Support Contractor. Those which do not adequately define quality assurance requirements, as judged by the QA representative of the participant, are to be corrected prior to the issuance of a purchase order or contract.
- 4.3 Purchase orders to subtier contractors involving Quality Level I activities shall provide for access to the contractors' facilities and quality records by WMPO or their authorized representative.
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- 4.4 Participating Organizations and NTS Support Contractors shall forward a copy of all procurement documents, as issued, to WMPO when the purchase involves Quality Level I items.

5.0 INSTRUCTIONS, PROCEDURES, AND DRAWINGS

- 5.1 All activities affecting quality on the NNWSI Project will be performed utilizing approved instructions, procedures, drawings, or other documents which will include or reference appropriate quantitative or qualitative acceptance criteria. QA administrative procedures or documents provide instructions for implementation and application of this QAP and the Participating Organizations' and NTS Support Contractors' QAPPs. These are issued and controlled by the respective QA organizations and apply to all applicable technical programs. The detailed technical documents will be developed by each organization's technical group, and issued and controlled in accordance with QA administrative procedures. These technical documents contain the instructions for actual performance of the activities which include, but are not limited to, sample gathering, investigation, design, testing, experiments and construction.
- 5.2 Each Participating Organization and NTS Support Contractor is responsible for ensuring that they have approved documentation to perform their assigned tasks prior to implementation. These documents shall be available at the work location. The technical documentation shall have an independent review. In cases involving state-of-the-art test procedures, experiments data acquisition and reduction, and interpretation of results, the Participating Organization or NTS Support Contractor responsible for the activity will assure that an independent Technical review is conducted by qualified personnel to assure confidence in the data obtained.
- 5.3 For Level I activities, a copy of the QA administrative and technical documents shall be sent to WMPO. The administrative QA Procedures will require WMPO review and approval prior to use.
- 5.4 For Level I and II activities, each Participating Organization and NTS Support Contractor shall provide the WMPO with an up-to-date index of all the documents defined in 5.1.

- 5.5 Detailed technical and QA administrative documents for Level I and II activities shall be available for WMPO or QASC review at the location where the activity is performed.
- 5.6 A list of supporting procedures for this QAP is included in Appendix D. These procedures are required to be followed by the Participating Organizations and NTS Support Contractors for NNWSI Project activities.

6.0 DOCUMENT CONTROL

- 6.1 Each of the Participating Organizations and NTS Support Contractors on the NNWSI Project shall have written procedures which describe how they control their quality-related documents and interfaces with other participants (methods and controls for document exchange). These methods must be fully defined in the QAPPs written by these groups for this project and in the procedures referenced therein. To assure adequate quality assurance coverage, all these documents and interface control methods shall include the basic elements of issuance and distribution control and change control of content.
- 6.2 A master list or equivalent document control system shall be established to identify the current revision of instructions, procedures, specifications, drawings, etc. for Quality Level I and II activities. The Participating Organizations and NTS Support Contractors shall provide WMPO with a copy of the current listing as issued.
- 6.3 Each Participating Organization and NTS Support Contractor shall establish a method of controlling their respective QAPPs and implementing procedures to ensure that the latest approved revision is in use by all personnel of the organization performing work on the NNWSI Project.

7.0 CONTROL OF PURCHASED MATERIALS, EQUIPMENT, AND SERVICES

- 7.1 The WMPO has delegated the procurement of materials, equipment, and services to the Participating Organizations and NTS Support Contractors as needed to properly conduct their activities. The procurement of these items and services shall be controlled to assure conformance with specified requirements. The QAPPs of the organizations will define and reference in written procedures, if needed, the method of vendor evaluation and selection, evaluation of quality of furnished items or services, verification of supplier's conformance to specifications, and periodic surveillance of vendors.
- 7.2 WMPO shall perform unannounced surveillances on the activities conducted by the Participating Organizations and NTS Support Contractors. The Participating Organizations and NTS Support Contractors will be contacted by the observer upon entry into the facility. The organizations' management shall provide the observer with the necessary guides, access, documents, etc., that are required in the performance of the surveillance.
- 7.3 When a Participating Organization and/or NTS Support Contractor contracts NNWSI Project activities to another Participating Organization and/or NTS Support Contractor, the contracting organization shall conduct surveillances of the contracted organization. As necessary, the surveillance shall be conducted to determine that the item and activity is being conducted in accordance with the contracting organization's requirements.

8.0 IDENTIFICATION AND CONTROL OF MATERIALS, PARTS, AND COMPONENTS

- 8.1 Materials, parts, and components (including core, cuttings, and other field and laboratory samples) used in the NNWSI Project will be identified and controlled by the user organization or contractor. Their identification and method of control will be documented and this information will be available to the WMPO at the site of work. A procedure, as applicable, for control and identification of material will be part of each individual QAPP.
- 8.2 All Quality Level I and II items will have their identification maintained on the items or on records traceable to the items until consumed, returned or destroyed. Item identification shall be traceable to documents including, but not limited to, logs, test records, inspection documents, and nonconformance reports.

9.0 CONTROL OF PROCESSES

- 9.1 All processes affecting quality of items or services shall be controlled by instructions, procedures, drawings, checklists, or other appropriate means.
- 9.2 When special processes are required to control quality, the use of qualified personnel, equipment, and procedures is necessary. The criteria for qualification of personnel, equipment, and procedures, and the maintenance of the qualification records will be as specified in the Participating Organizations' and NTS Support Contractors' QAPPs. Special process verification methods and criteria will also be documented and retained.
- 9.3 A special process is a process in which the results are highly dependent on either the control of the process or the operations' skill, or both, and in which the specified quality cannot be readily determined by inspection or testing of the item. Examples of special processes include, but are not limited to, welding, nondestructive testing and core sample preparation.
- 9.4 For Level I quality activities, the Participating Organizations and NTS Support Contractors will forward their special process procedures to WMPO for review and approval prior to use.
- 9.5 The Participating Organizations and NTS Support Contractors shall submit to WMPO a current master index of special process procedures for Level II quality activities.

10.0 INSPECTION

- 10.1 Individual participant QAPPs shall provide for inspection to be performed in accordance with written procedures by qualified personnel who did not perform the work being evaluated. Qualified personnel include personnel from independent inspection organizations as well as personnel from the same organization if they were not responsible for the actual work being evaluated. It is the function of the QA personnel from the performing organization assigned to an activity to assure that qualified individuals are selected to perform the inspection. The results of all inspection activities will be documented by the inspecting organization.
- 10.2 The one-of-a-kind items of hardware or equipment which are developed and built to support research activities are subject to the inspection controls previously described. The extent of inspection (source or receiving), the inspection procedures, the designation of inspection personnel or organizations, and provisions for monitoring are all considered and applied as necessary to establish design conformance of the item.
- 10.3 Procedures, instructions, or checklists for inspection of Level I quality items or services shall provide the following: identification of activities to be inspected, identification and qualification of personnel performing the inspection, acceptance and rejection criteria, method to document the results of the inspection, and accuracy of the equipment necessary to perform the inspection.
- 10.4 Under the direction of WMPO, the QASC shall conduct unscheduled surveillances of activities performed by the Participating Organizations and NTS Support Contractors.

11.0 TEST/EXPERIMENT CONTROL

11.1 Test Control

11.1.1 Tests shall be conducted to verify conformance of an item to the specified requirements and/or to demonstrate that an item will perform as intended. Tests may also be conducted to demonstrate the validity of conclusions based on experimental data and/or to assess the overall status of an experiment.

11.1.2 Tests shall be planned, executed, and documented when they are required to verify conformance of an item to specified requirements and/or to demonstrate that the item will perform satisfactorily. The characteristic to be tested and test methods to be employed shall be specified. The completed test results shall be documented and conformance with acceptance criteria shall be evaluated.

3 11.1.3 For Quality Level I activities, test procedures will be submitted to WMPO for review and approval. These procedures will define the test and plans for its execution; provide a means of assuring that test prerequisites are met; specify adequate instrumentation and suitable environmental conditions; provide for documentation, evaluation, and retention of test results; and delineate necessary quality assurance provisions.

11.2 Experiment Control

11.2.1 Experiments shall be conducted to establish characteristics or values not previously known and shall be performed under controlled conditions.

11.2.2 Quality Level I and II experiments shall be controlled by the use of logbooks (or other suitable means to provide uniform documentation of the experiment). The experiment logbook shall include but is not limited to the entries listed in paragraph 11.2.2.1 and 11.2.2.2.

11.2.2.1 One-time entries - the following logbook entries are to be made initially and as the experiment changes dictate:

- o The title of the experiment
- o The name of the individual(s) performing the experiment
- o The experiment objectives
- o List of the equipment and materials used
- o Equipment calibration requirements

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11.2.2.2 Daily Entries - the following entries are to be made daily or as appropriate.

- o The date and name of the individual making the entry
- o A description of the experiment element attempted
- o Any conditions which may adversely affect the experiment
- o Identification of samples utilized
- o A brief listing of the results with notation of unexpected results
- o Any deviations to the experiment
- o Interim conclusions reached if appropriate
- o The final results and a summary of the outcome of the experiment which addresses the experiment objectives.

11.2.3 The physical control of completed (or partially completed) logbooks shall be addressed in the organizations document control system.

12.0 CONTROL OF MEASURING AND TEST EQUIPMENT

- 12.1 Calibration methods for measuring and test equipment being used in activities affecting quality shall be addressed in the QAPPs of the Participating Organizations and NTS Support Contractors. Measuring and test equipment are devices or systems used to calibrate, measure, gage, test, or inspect in order either to control, to acquire data to verify conformance to specified requirements, or to establish characteristics or values not previously known.
- 12.2 The basic controls will include a recall system, periodic calibration, records of calibration, and a suitable equipment marking method to indicate calibration status. All measuring and test equipment calibration will be traceable either to the National Bureau of Standards or to other recognized physical standards.
- 12.3 Measuring and test equipment which is of special design for a particular investigative activity will be designed, developed, and manufactured under the control of the Participating Organization or NTS Support Contractor involved. Before using such equipment in an NNWSI Project test or experiment, a complete check-out will be conducted per approved written procedures to assure conformance to specifications and to assure that the equipment is calibrated in accordance with paragraphs 12.1 and 12.2.
- 12.4 When measuring and test equipment is found to be out of calibration, an evaluation shall be made of the validity of previous inspection, test, or experiment results, and of the items previously inspected or tested.

13.0 HANDLING, STORAGE, AND SHIPPING

- 13.1 Written procedures are to be prepared by the responsible Participating Organizations and NTS Support Contractors to delineate the identification, packing, handling, shipping, and storage of both sample and hardware materials involved in their task activity to preclude damage, loss, or deterioration by environmental conditions.

14.0 INSPECTION, TEST, AND OPERATING STATUS

- 14.1 Identification of inspection, test, and operating status is a requirement to be addressed, as applicable, in the QAPPs of the Participating Organizations and NTS Support Contractors. Implementing methods will include systems capable of assuring that activities are completed in a planned sequence to assure that items, or associated data, which have not passed the required inspection and test are not inadvertently used within the Project.
- 14.2 Status will be identified during the conduct of activities through indicators such as physical location and tags, markings, logs, stamps, inspection and verification records, or other suitable means. The method for control and application of status indicators will detail the authority for application and removal of the indicators.
- 14.3 The criterion in the above paragraphs will also apply to research and development activities for operations that include a planned sequence of activities that are to be verified. The criterion will be especially applicable to test or data generation hardware that is fabricated, performance tested or verified in the progress of work.

15.0 NONCONFORMANCES

- 15.1 Nonconformances are characteristics that are contradictory to the specific requirements of the Project having programmatic significance which would adversely affect the performance, reliability, or safety of an activity. All personnel from the Participating Organizations and NTS Support Contractors are responsible for reporting nonconformances in accordance with their QAPPs. The nonconformance shall be reviewed and dispositioned by the respective organizations.
- 15.2 Nonconformances are to be controlled in accordance with requirements of the individual QAPPs. When items or components are involved, they will be segregated, if possible, from acceptable items until adequate disposition can be made. If services or data appear to be nonconforming, the suspected condition will be documented and appropriate action will be taken. All nonconformances are to be documented by the appropriate Participating Organization or NTS Support Contractor to fully define the condition and the disposition of the nonconformance. The action taken to correct the nonconformance shall be verified and documented. Distribution of documentation shall be to all affected organizations.
- 3 | 15.3 Nonconformances for Level I and II quality activities will be dispositioned by the individual organization and shall have WMPO approval prior to implementation of the disposition. WMPO will decide whether the activities are to be suspended until disposition is taken, or to continue conditionally.
- 3 | 15.4 Copies of all closed-out Quality Level I and II nonconformances will be sent to the WMPO, by the issuing Participating Organization or NTS Support Contractor.

16.0 CORRECTIVE ACTION

16.1 A corrective action system is to be defined in the approved QAPP of each Participating Organization or NTS Support Contractor. The system will serve to identify significant conditions adverse to quality. The cause of the condition shall be determined and corrective action taken to preclude recurrence.

16.2 The identification, cause, and corrective action taken shall be documented and reported to appropriate levels of management. A follow-up action shall be taken to verify implementation of the corrective actions.

3 | 16.3 Copies of Level I & II corrective actions will be sent to the WMPO.

17.0 QUALITY ASSURANCE RECORDS

- 17.1 The Records Management Plan (RMP) establishes the method to assure that necessary and sufficient records will be maintained to support conclusions reached from investigations, tests, analyses, and other activities associated with the project, including the design and construction of required facilities. This overall RMP will be supplemented and expanded by the individual procedures of the Participating Organizations and NTS Support Contractors. The Project Record Center (PRC) reviews the documents to verify adequacy as a record and provides for permanent storage.
- 17.2 The RMP defines what records are to be retained; establishes the provisions for Participating Organizations, NTS Support Contractors, and WMPO records management and control; and outlines the requirements for record submittal, review of incoming records, filing methods, access control, and reproduction methods. Procedures utilized for the administration and control of the PRC are to be outlined in the RMP.
- 17.3 The PRC provides necessary precautions for the preservation and storage of quality records. Access to the records storage areas will be procedurally controlled.
- 17.4 The WMPO is responsible for identifying the record types that should be contained in the Project Record Center by means of the Record Management Plan. Each Participating Organization and NTS Support Contractor will develop a list of records planned for forwarding to the PRC. These lists of records are to be used by the PRC for development and maintenance of an overall record index. The WMPO will approve Participating Organization and NTS Support Contractor record lists to assure that adequate records are planned for retention in the PRC.
- 17.5 The record index will include retention times for all records stored in the PRC. Record retention times are based on requirements set forth in the Record Management Plan.

17.6 Participating Organizations and NTS Support Contractors will define their individual record management system in their QAPPs. Record control requirements will include a method for record identification, content, verification for completeness, and necessary approval. A method for the interim storage of the records, during the period prior to the transfer to permanent storage, and a description of the equipment and facilities to be used will be included in the QAPP or an appropriate implementing procedure.

18.0 AUDITS

18.1 Scope of NNWSI Project Audit Program

18.1.1 NNWSI Project activities will be subject to audits on the basis of impact to the Project. The method of planned and scheduled audits shall be developed to verify compliance with all aspects of the quality assurance program and to determine its effectiveness.

18.1.2 The audits shall be performed in accordance with written procedures or checklists by personnel who do not have direct responsibility for performing the activities being audited. Personnel performing audits shall be properly trained and qualified. Audit results shall be documented and reviewed by responsible management/organizations. Any follow-up action shall be taken where indicated.

18.1.3 Audit findings will be reviewed with the audited organizations at a closing meeting. Formal written reports which request a response within 30 days of receipt shall be sent to the audited organization. The response shall address the corrective action for each finding and provide a realistic completion date for implementation of the corrective action.

18.1.4 The NNWSI Project audit program will be executed at the programmatic level by the WMPO and at the activity level by individual Participating Organizations and NTS Support Contractors.

18.2 WMPO Audits

18.2.1 The QASC will develop a schedule defining the WMPO audits planned for each fiscal year. This schedule will be approved and issued by the WMPO as an annual planning document. Additional audits may be conducted when a unique need arises or when an audit is requested by a Participating Organization or NTS Support Contractor. Participating Organizations and NTS Support Contractors shall be audited periodically

to verify implementation of all elements of their respective QAPPs and this QAP.

18.2.2 The WMPO will select a Lead Auditor to perform WMPO audits. With concurrence from WMPO, the Lead Auditor shall select qualified personnel as audit team members..

18.2.3 Copies of audit documents shall be sent to QAD/NV, the QASC, and the audited organization.

18.3 Participating Organization and NTS Support Contractor Audits

18.3.1 Each Participating Organization and NTS Support Contractor shall conduct internal and external (direct subcontractor) audits of activities under its direct control, but they will not conduct audits of each other.

18.3.1.1 The WMPO shall assure that a programmatic audit of all the Participating Organizations and NTS Support Contractors is conducted to determine the adequacy and effectiveness of their QAPPs. These audits will eliminate the need for the Participating Organizations or NTS Support Contractors to conduct audits of each other. Representatives of the Participating Organizations and/or NTS Support Contractors may be invited to participate in a WMPO audit when the audited organization's activities are of mutual interest.

18.3.2 Participating Organization and NTS Support Contractor audits will be scheduled, planned, conducted, and reported as described in their respective QAPPs and this QAP. External and internal audit schedules, and changes thereto, shall be sent to the WMPO. Audit schedules shall identify the date of the audit, the activities to be audited, and the requirements to which the activities are to be audited.

18.3.3 The results of these audits will be reported to appropriate levels of the audited organization's management who will review the audit findings and approve the proposed corrective action. Follow-up action or re-audits will be performed as necessary.

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18.3.4 The Participating Organizations and NTS Support Contractors shall send copies of external audit reports and close-out notifications to WMPO upon generation.

APPENDIX A

PARTICIPATING ORGANIZATION AND SUPPORT CONTRACTOR QAPPS*

Participating Organizations

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| 1. Waste Management Project Office/ Nevada Operations Office (WMPO) | Waste Management Project Office Quality Assurance Program Plan NVO-196-18 |
| 2. Lawrence Livermore National Laboratory (LLNL) | NNWSI Quality Management Plan QMP- M078-033 |
| 3. Los Alamos National Laboratory (LANL) | TWS-CMB QA-QP-01; Quality Assurance Program Plan for NTS Terminal Waste Storage |
| 4. Sandia National Laboratories (SNL) Nuclear Waste Geotechnical Projects Division Nuclear Waste Engineering Projects Division NNWSI Repository Performance Division | Nevada Nuclear Waste Storage Inves- tigations Quality Program Plan |
| 5. Science Applications, Inc. (SAI) | T&MSS Quality Assurance Program Plan, QAPP-1. |
| 6. United States Geological Survey (USGS) | NWM-USGS-QAPP-01, USGS Quality Assurance Program Plan |

3 | * The WMPO shall maintain a current approved copy of the Participating Organization and NTS Support Contractor QAPPs in the QA files.

Participating Organizations (continued)

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| 7. Westinghouse Electric Corporation - Waste Technology Services Division (<u>W</u> /WTSD) | AESD-TME 3060, Quality Assurance Program Plan for Spent Fuel Handling and Packaging Tests |
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Support Contractors (NTS)

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|---|------------------------------------|
| 1. Fenix & Scisson, Inc. (F&S) | F&S Quality Assurance Manual QAM-1 |
| 2. Holmes & Narver (H&N) | H&N-0020-1088 |
| 3. Reynolds Electrical & Engineering Company (REECO) | NNWSI QAPP, NTS 568-DOC-115 |

APPENDIX B

DEFINITIONS

The definitions of terms used in this Quality Assurance Plan shall be as given in American National Standards Institute specification ANSI/ASME NQA-1, Supplement S-1 with the following additions:

Contractor - Organizations under contract to provide supplies, construction, or services.

Design - The act of developing specifications for construction or analyzing the performance of waste repository engineered structures, systems, components and natural barriers. Design documentation includes, but is not limited to, drawings, specifications, test plans, design reports, test reports, system design descriptions, configuration status listings, design manuals, and computer code manuals describing computer programs utilized for design or performance analysis.

Experiments - Performance of those operations carried out under controlled conditions in order to establish characteristics or values not previously known.

Functional Characteristics - Those attributes of a repository or its structures/systems/components that determine its performance with respect to safety, reliability, operability, and other design criteria established in the NWTS Program or other federal regulatory documents.

Items - An all-inclusive term used in place of any of the following: appurtenance, assembly, component, equipment, material, module, part, services, structure, subassembly, subsystem, unit, data, sample (geological, environmental or radiological), and prototypic hardware.

Material - a term that includes items plus any hardware or geologic samples used in, or resulting from, research and development or site investigations on the NNWSI Project. Hardware and geologic specimens include, but are not limited to, test apparatus or equipment, special nuclear material, cores, geologic samples, water and gas samples, etc.

3 | Peer Review - A documented verification process over and above the normal independent technical review to assure that the activity conducted by a Participating Organization or NTS Support Contractor is technically adequate and that it will satisfy requirements established to meet the NNWSI Project objectives.

Product nonpermanent records - Documents that specify structures, systems, and components of a repository have been designed and constructed in accordance with applicable requirements, but are such that it is not necessary to retain them as lifetime records. These records include design verification data, receiving records, calibration records, maintenance records, inspection records, radiographs not associated with inservice inspection and test records which are not otherwise designated as life-time records.

Programmatic nonpermanent records - Those documents that are used to prescribe activities affecting quality, but which are not considered permanent records. Such records include documents describing the planning, execution, and auditing of activities affecting quality.

Quality Assurance Program Plan (QAPP) - The document that describes the quality criteria, practices, and procedures necessary to achieve the desired quality levels for the NNWSI Project.

NNWSI Project Quality Assurance Plan (QAP) - The document that describes the planned systematic quality requirements which assure that all activities of the NNWSI Project are accomplished per the QAPPs of the Participating Organizations and NTS Support Contractors to achieve the required quality levels.

Supplier - Organizations under contract to provide material, components, or services.

3 | Procurement documents - Purchase requisitions, or purchase orders, or letter of intent, or work authorization letters, and drawings, contracts, specifications, instructions, or any document which provides a means to acquire possession or ownership of items, or right to the use of services by payment.

Technical Review - A documented review to verify the adequacy of site investigations to ensure correct field and laboratory data acquisition, reduction, and interpretation of results.

APPENDIX C

MODIFICATION TO ANSI/ASME NQA-1 FOR LEVEL I
PROGRAM CONSIDERATIONS

I. Supplement 1S-1

- A. Section 2.1 add the following: (c) the quality assurance and quality control organizations and applicable performing organizations should be involved and integrated in those quality assurance and quality control aspects in the design and construction of the repository and the characterization of the site. (d) the extent of involvement, as determined by the technical and quality assurance staff, is dependent upon the specific activity and its subsequent effect upon the repository safety and reliability, and the complexity of the quality assurance requirements involved.

II. Supplement 2S-1

- A. Section 2.4 - Training shall include instructions on those changes to the quality assurance program and implementing procedures that affect previous training instructions.
- B. The provisions of Appendix 2A-1 shall be met as part of Supplement 2S-1 with the following modifications.
- 1) Section 2.3 - The Level III individual shall be capable of reviewing and approving inspection, examination, and test procedures and of evaluating the adequacy of such procedures to accomplish the inspection, examination, and test objectives.
 - 2) Section 3.0 - A general education development or completion of a 2-year or longer apprenticeship conducted by a labor union, corporation, vocational school, or state agency is an alternative to high school graduation.

- 3) Section 3.1 - There shall be documented evidence that the individual received adequate training including specific periods of supervised on-the-job training and has demonstrated proficiency through documented testing to perform each assigned task and to understand the purpose and objective of each task. Inspections by persons during on-the-job training for qualification shall be performed under the direct supervision and observation of a qualified person.

III. Appendix 2A-2

A. Section 3.1 and 3.2 shall apply with the following addition:

- 1) A plan should be developed outlining the work to be performed and the work procedures or instructions required to comply with the requirements of the defined work scope.
- 2) Planning should include a review of the structure, system, or component design/construction/procurement specifications, materials, drawings, work plans, and schedules to insure that fabrication, installation, modification, inspection, testing, etc., activities have been incorporated; that the work can be accomplished as specified and that time and resources plus training are sufficient to accomplish the work in accordance with the specified requirements. Planning shall define the operations to be performed, the systematic sequential progression of operations, and the overall measures to be employed to preserve the quality work.

IV. Supplement 3S-1

- #### A. Section 2.0 - Design inputs should consider the inputs of 3A-1, Section 5 where applicable. Design inputs selected shall be traceable to the design.

- B. Section 4 - The use of the designer's immediate supervisor to perform design verification should be limited to those cases where (1) the supervisor is the only technically qualified individual (2) the need is documented and approved in advance by the supervisor's management, (3) quality assurance audits cover frequency and effectiveness of the practice.
- C. Section 4.2.1 - Peer reviews are subject to the requirements of this section.
- D. Section 5 - Controls shall ensure that design document that become quality records reflect the as-built condition of the repository.
- E. Section 5 - Controls shall be established to evaluate original designs so that trends may be identified and effective corrections taken to preclude the recurrence of the condition necessitating changes.

V. Supplement 4S-1

- A. Section 2.7 - The procurement of spare and replacement parts shall be subject to equal or better technical and quality requirements. When QA and technical requirements of the original item cannot be determined, an engineering evaluation shall be conducted by qualified individuals to establish the requirements. The evaluation shall consider the interchangeability, function, and safety of the item. This evaluation shall be documented.

VI. Supplement 6S-1

- A. Section 2 - add the following:
 - d) a method for the removal or marking of obsolete or superseded documents to prevent inadvertent use,

- e) a master list or equivalent to identify the correct and updated revisions of documents,
- f) coordination of interfaces.

VII. Basic Requirement No. 11, "Test Control" is modified to read: "Tests required to verify conformance of an item to specified requirements or to demonstrate that items will perform satisfactorily in service, and experiments to determine functional characteristics or values not previously known shall be planned and executed. Characteristics and methods to be employed shall be specified. Results shall be documented and their conformance with acceptable criteria shall be evaluated. This requirement applies to geologic investigations that produce data, recommendations, or other bases for a decision on sites for a potential nuclear waste repository. R&D projects providing design bases for such a repository are also included."

VIII. Basic Requirement No. 17, "Quality Assurance Records" is modified to read: Records that furnish documentary evidence of quality shall be specified, prepared, and maintained. Records shall be legible, identifiable, and retrievable. Records shall be protected against damage, deterioration, or loss. Requirements and responsibilities for record transmittal, distribution, retention, maintenance, and disposition shall be established and documented. The cognizant DOE project shall prepare and submit a records management plan to DOE/HQ for review and concurrence.

IX. Supplement 17S-1

- A. Section 2.8 - Programmatic nonpermanent records should be retained for at least 3 years and product nonpermanent records should be retained for at least 10 years or the life of the item if less than 10 years. For programmatic nonpermanent records, the retention period should be considered to begin upon completion of the activity. For product nonpermanent records, the retention should be considered to begin upon completion of the activity. In addition, nonpermanent

records should be retained at least until the date of commercial operation of the repository.

- B. Section 4.3 - Prompt replacement shall be accomplished within 90 days after determination that the record was lost or damaged to a degree that it is no longer complete or legible.
- C. Section 4 - This section shall apply to permanent and temporary record storage facilities.

X. Appendix 17A-1

- A. Section 3.0 shall apply to supplement 17S-1.
- B. Section 3.3 and 3.4.3 - include radiographs (for inservice inspection applications).
- C. Section 3.3 - As-built drawings and records shall correctly identify the installed condition of the item. The type of as-built drawings and records to be maintained at the operating repository shall be specified.

XI. Supplement 18S-1

- A. Section 2.0 - Internal Audits. All elements of the organization's quality assurance program shall be audited at least annually or once during the life of the activity whichever is shorter.
- B. Section 2.0 - External Audits. Elements of a suppliers' QA program plan shall be audited by the purchaser on a triennial basis. The triennial period begins with performance of an audit when sufficient work is in progress to demonstrate that the organization is implementing a QA program plan having the required scope for the activities placed during the triennial period. When a subsequent contract or work task modification that significantly enlarges the scope of or changes the methods of control for the activities performed is executed, an audit shall be conducted, thus starting a

new triennial period. If at the time of a pre-award survey, the supplier is already implementing the same QA program plan for others than the pre-award survey, if it was conducted in accordance with this document, may serve as the first triennial audit. Therefore, when such pre-award surveys are employed as the first triennial audits, they shall satisfy the same audit elements and requirements as those used on other audits.

- C. Section 2.0 - Regularly scheduled audits shall be supplemented when (1) significant changes are made in functional areas of the QA program plan such as significant reorganization or procedure revisions; (2) it is suspected that the quality of an item or service is in jeopardy due to deficiencies in the QA program plan; and (3) a systematic, independent assessment of the QA program plan effectiveness is considered desirable. The performance of a supplement audit may be considered to begin a new triennial period.
- D. Section 4.0 - This section shall incorporate sections 2.3 and 2.4 from 18A-1. Also, one of the elements that shall be reviewed during an audit is the corrective action taken on the deficiencies that were identified during a previous audit of that area.
- E. Section 8.0 Records - Audit records shall include any audit procedures or checklists associated with the audit. The audit records system shall include measures to indicate the extent of completion of the audit and the audit results for each completed audit plan item.

APPENDIX D

List of NNWSI Project Standard Operating Procedures to be used by all Participating Organizations and NTS Support Contractors.*

| | <u>TITLE</u> | <u>NUMBER</u> |
|---|--|-----------------------------|
| | o Records Management Plan | NNWSI-SOP-17-01 (QMP-17-01) |
| | o Engineering, Construction, and Support Services at the NTS | NNWSI-SOP-03-01 |
| 3 | o Computer Code Assessment | NNWSI-SOP-03-02 |
| | o QAPP Requirements for NNWSI Project Participating Organizations and NTS Support Contractors, and other subtier vendors | NNWSI-SOP-02-01 |
| | o Nonconformance Control System | NNWSI-SOP-15-01 |
| 3 | o Verification of Data Generated Pre-NNWSI Project QAP | NNWSI-SOP-03-03 |

3 | * Additional NNWSI SOPs shall be generated as needed. An up to date index of all current SOPs shall be kept in the WMPO QA files and shall be transmitted by the same controls as the QAP.