
Nuclear Waste Policy Act
(Section 113)

Section 8.6

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Consultation Draft

QUALITY ASSURANCE
PROGRAM



Site Characterization Plan

***Yucca Mountain Site, Nevada Research
and Development Area, Nevada***

Volume VII

January 1988

***U.S. Department of Energy
Office of Civilian Radioactive Waste Management
Washington, DC 20585***

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(Section 113)***

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8.6 QUALITY ASSURANCE PROGRAM

This section briefly summarizes the Quality Assurance (QA) Program for the Nevada Nuclear Waste Storage Investigations (NNWSI) Project, including reference to the regulatory requirements applicable to the NNWSI Project and the QA administrative and technical procedures developed by the NNWSI Project participants to meet the requirements. A description of the NNWSI Project QA Program can be found in the NNWSI Project Quality Assurance Plan (NVO-196-17).

8.6.1 QUALITY ASSURANCE PLAN SUMMARY

The Waste Management Project Office (WMPO) approach to quality assurance is designed to ensure that technical items and activities are assigned a level of quality assurance for control and documentation that is consistent with the relative impact on public radiological health and safety, and relative importance to other U.S. Department of Energy (DOE) concerns. The purpose of the NNWSI Project Quality Assurance Plan (QAP) is to provide direction to the NNWSI Project participants to ensure a common approach to meeting the quality requirements that are applied to the NNWSI Project.

The NNWSI QA Program comprises all those planned and systematic actions that are necessary to provide adequate confidence that the mined geologic disposal system (MGDS) will perform satisfactorily in service. QA includes quality control, which comprises those quality assurance activities related to the physical characteristics of a material, structure, component, or system that provide a means by which to control the quality of the material, structure, component, or system to predetermined requirements. QA provides a multidisciplinary system of quality controls backed by verification activities that demonstrate the completeness and appropriateness of achieved quality.

The assurance of quality is recognized as an interdisciplinary activity involving many organizational components and is not regarded as the sole domain of an organization. It is the responsibility of all NNWSI Project staff to plan, perform, and document activities affecting quality in accordance with the NNWSI QAP and develop and implement verification and self-assessment activities to ensure compliance with these requirements. Each NNWSI Project participant's QA department is responsible for describing, monitoring, and verifying satisfactory accomplishment of quality related NNWSI Project activities.

The NNWSI Project QAP, NVO-196-17, describes the overall quality assurance requirements for the NNWSI Project. Quality Assurance Program Plans (QAPPs) of the WMPO and the individual participants of the NNWSI Project provide documented commitment to the NNWSI Project QAP. The QAPPs (equivalent to the term Quality Assurance administrative procedures in the U.S. Nuclear Regulatory Commission (NRC) Standard Review Plan) are the document(s) that describe the participant's QA program and the applicable QA requirements. The QAPPs also provide instruction to implement and apply the QA requirements to the technical activities. These documents are generated by the respective quality assurance organization, with assistance from the

CONSULTATION DRAFT

technical staff. Internal implementing procedures (equivalent to the term technical procedures in the NRC standard review plan) are written by the technical staff, including QA, to show how they implement the QA requirements in their respective disciplines. The details of how each of these organizations will meet quality assurance requirements may differ among the participants. These details are given in the participants' QAPPs listed in Table 8.6-1.

The general approach to quality assurance during site characterization, design, construction, and operation will be to assign a level of quality assurance to each item and activity. The level of quality assurance is consistent with the relative importance of the item and activity to public radiological health and safety and to other DOE concerns. This approach incorporates three quality assurance levels (QA levels). One will be assigned to each technical item and activity of the NNWSI Project. All items and activities will be assigned an appropriate QA level in accordance with the following discussions.

QA Level I is assigned to those radiological health and safety related items and activities that are important to either safety or waste isolation and that are associated with the ability of a geologic 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 and activities important to safety are those engineered structures, systems, components, and related activities essential to the prevention or mitigation of an accident that could result in a radiation dose 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. Items and activities important to waste isolation are those barriers and related activities that must meet the criteria that address postclosure performance of the engineered and natural barriers to prevent the release of radionuclides. The criteria for items or activities important to safety and waste isolation are found in 10 CFR Part 60 and 40 CFR Part 191.

QA Level II is assigned to those items and activities important to the reliability and maintainability of the repository, public and repository worker nonradiological health and safety, repository worker radiological health and safety, and other operational factors of the repository.

QA Level III is assigned to those items and activities not classified as QA Levels I or II.

QA Level I is the most stringent level of quality assurance. It is to be applied to those items and activities that may affect the ability of the repository to meet the preclosure and postclosure performance objectives specified by the NRC and the U.S. Environmental Protection Agency (EPA) for protecting public health and safety from radiological hazards. QA Level I items and activities that are on the Q-list (Sections 6.1.4 and 6.1.5) will form the basis for the NRC to authorize construction and to issue a license for the DOE to receive and possess source, special nuclear, and by-product material (waste) at the geologic repository. QA Level I control and documentation must be applied to site characterization and design activities, including data collection, investigation, analysis, design, construction,

CONSULTATION DRAFT

Table 8.6-1. Organizations participating in the NNWSI Project and their Quality Assurance Program Plans (QAPPs)

Participating Organization	QAPP
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)	Quality Assurance Program Plan --NNWSI Project
3. Los Alamos National Laboratory (Los Alamos)	LANL-NNWSI-QAPP; Quality Assurance Program Plan for Nevada Nuclear Waste Storage Investigations
4. Sandia National Laboratories (SNL)	SNL-NNWSI (Organization 6000) Quality Assurance Program Plan, SLTR 86-0001
5. Science Applications International Corporation (SAIC) Technical and Management Support Service (T&MSS)	T&MSS Quality Assurance Program Plan, QAPP-2.
6. United States Geological Survey (USGS)	NNWSI-USGS-QAPP-01, USGS Quality Assurance Program Plan
7. Fenix & Scisson, Inc. (F&S)	F&S Quality Assurance Program Plan QAPP-002
8. Holmes & Narver (H&N)	H&N-10471-1115, H&N QA Manual
9. Reynolds Electrical & Engineering Company (REECo)	NNWSI QAPP, NTS 568-DOC-115

fabrication, operation, decommissioning, or sealing, that are specifically concerned with the protection of the public's health and safety relative to a radiological hazard. To keep radionuclides out of man's environment, a high-level radioactive waste repository will use engineered systems, structures, and components to contain the waste and ensure preclosure safety. The repository also will use the natural barriers to afford postclosure isolation. Within this context, QA Level I will be applied to:

1. Items and activities important to the preclosure radiological health and safety of the general public. Specifically, this means items and activities essential to the prevention or mitigation of an

CONSULTATION DRAFT

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 permanent closure of the repository.

2. Activities that will provide site characterization data. Site characterization data are the field and laboratory data and subsequent analyses that provide the basis for determining and demonstrating that the natural and engineered systems of the repository are capable of providing postclosure waste containment and isolation. This includes data and analyses from all tests, experiments, and research that have a significant impact on site characterization or are an essential part of the site-related data base that directly support the final design of the repository and waste package as well as the assessment of MGDS performance. It also includes those activities (e.g., tests, experiments, and research) that are one of several independent activities contributing to a single base of information that is considered in formulating the repository design or performance assessment of the engineered or natural barriers.
3. Items and activities whose failure could cause a failure of a QA Level I item, or irretrievable loss of QA Level I data.
4. Items important to safety or waste isolation during the design phase conducted before application for an NRC license, procurement, or construction. One of the purposes of this design phase shall be to define in detail those items that are to be procured and/or constructed as a result of the design. As the design phase proceeds, each item shall be assigned a QA Level (I, II, or III as applicable). Once the QA Level for the item is approved, design activities associated with the item shall be governed by the QA Level assigned to the item.

QA Level II is the second highest level of quality assurance. QA Level II controls and documentation shall be applied to the NNWSI Project items and activities (described below) that are not associated with public radiological health and safety. The high-level waste (HLW) repository will use engineered systems, structures, and components that must be designed, constructed, fabricated, tested, and operated to meet the operational performance objectives and to minimize nonradiological hazards to the public and repository worker, and radiological hazards to the repository worker. Additionally, activities that have a major impact on Project costs or schedules that could delay the achievement of DOE/Office of Geologic Repositories (OGR) milestones must be appropriately controlled. Therefore, QA Level II must be applied as follows:

1. Where items and activities are essential to the design, construction, and operation of the repository or of the exploratory shaft facility, and could have a major impact on the nonradiological health and safety of the public and repository workers.

CONSULTATION DRAFT

2. Where items and activities, if having failed or if performed inadequately, would cause repository workers to be exposed to radiation or radioactive contamination levels in excess of the limits expressed in 10 CFR Part 20.
3. Where items and activities involve the operational reliability and maintainability of engineered systems, structures, or components.
4. Where the design phases that involve the comparative technical analysis of alternatives/methods/equipment are conducted to determine which alternative/method/equipment is preferred. Where a particular item can be identified during this phase, a separate QA level assignment may be made for that item. Once the QA level assignment for that item is approved, design activities associated with the item shall be governed by the QA level assigned to the item.
5. Where items and activities, if failed, could result in a major cost overrun.
6. Where items and activities, if failed, could result in a major schedule slippage.

QA Level II activities may have as much importance to DOE as QA Level I activities; however, except when used to support a QA Level I activity as indicated in the following, they do not provide primary information in the licensing efforts. Activities controlled in accordance with a QA Level II requirement cannot be subsequently used as primary data to directly support QA Level I activities unless it can be substantiated that quality assurance requirements equivalent to those that would have been applied to a QA Level I activity were implemented or that a technical justification process (e.g., peer review) is applied.

QA Level III is the least stringent level of QA. QA Level III items and activities are such that they have no major function in the characterization of the site and design of the repository, but they require good practices for the intended use. Design phases that are purely preliminary and are conducted to define the range of individual alternatives/methods/equipment that are felt to be worthy of more detailed study shall be assigned a QA level of III before execution.

Data or data interpretations generated as a result of activities controlled in accordance with QA Level II or III programs, or activities performed before the complete implementation of the NNWSI Project QAP may be used in the licensing process as background or corroborative information.

CONSULTATION DRAFT

8.6.2 REQUIREMENTS FOR QUALITY ASSURANCE

The DOE activities are intended to produce an adequate data base to permit the NRC to make licensing decisions for the geologic repository that are consistent with the protection of the public health and safety. A quality assurance program is essential to provide confidence that the data base adequately represents the actual site conditions and that the design has been properly developed based on these conditions. The QA requirements placed on the NNWSI Project are established from three main sources:

1. NRC.
 - a. 10 CFR 60 Subpart G, Disposal of High Level Radioactive Wastes in Geologic Repositories--Quality Assurance.
 - b. 10 CFR 50 Appendix B, Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants.
 - c. NRC (1984) Standard Review Plan, Quality Assurance Programs for Site Characterization of High-Level Radioactive Waste Repositories.
2. DOE Nevada Field Operations Office.
 - a. DOE (1983c) 5700.6, Quality Assurance.
 - b. NV 5700.6, Quality Assurance.
3. DOE Office of Civilian Radioactive Waste Management (OCRWM).
 - a. OCRWM Quality Assurance Management Policies and Requirements.
 - b. OGR/B-3, OGR Quality Assurance Plan for High-Level Radioactive Waste Repositories.
 - c. ANSI/ASME (1983) NQA-1, American National Standard for Quality Assurance Program Requirements for Nuclear Facilities.

The WMPO has adopted the QA requirements from these documents, combined them with additional WMPO requirements, to develop the NNWSI Project Quality Assurance Plan (QAP) which identifies the QA requirements for the Project. The NNWSI QAP is the document that the WMPO uses to establish the quality assurance requirements for the NNWSI Project participants. Figure 8.6-1 identifies how the requirements for QA documents used across the entire Project are derived.

The NNWSI QAP is outlined in the same format as ANSI/ASME (1983) NQA-1, except that Criteria 3 has been identified as Design and Scientific Investigation Control. The quality assurance requirements in the NNWSI QAP for the three levels are as follows: The requirements of 10 CFR 50, Appendix B, ANSI/ASME (1983) NQA-1 (Basic, Supplemental, and selected Nonmandatory Requirements), and the NRC QA Standard Review Plan for HLW Geologic Repositories are applied to items and activities classified as QA Level I. ANSI/ASME (1983) NQA-1 basic requirements and selected Supplemental Requirements are applied to tasks classified as QA Level II. The QA

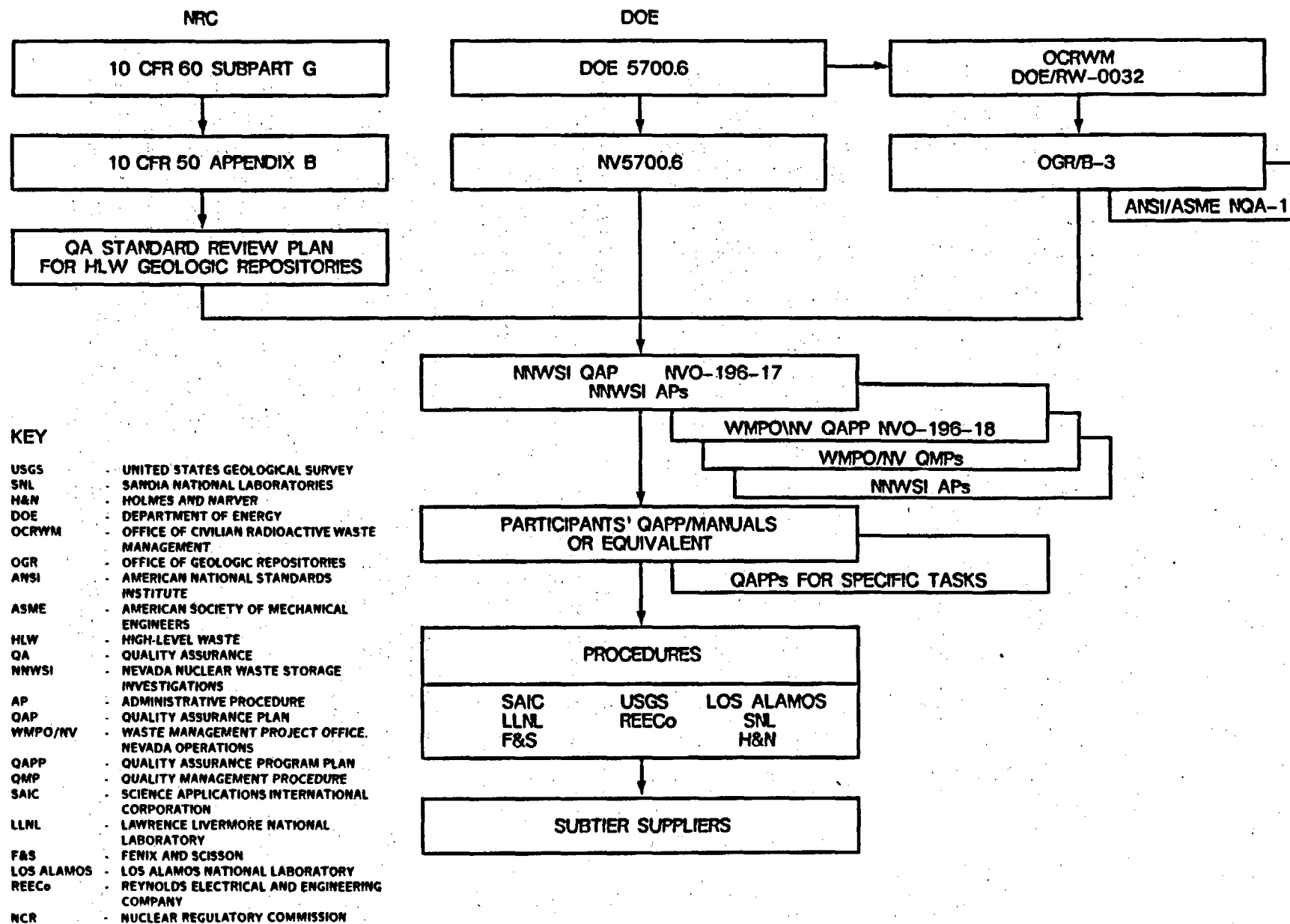


Figure 8.6-1. Criteria for quality assurance.

CONSULTATION DRAFT

requirements imposed for QA Level III items and activities are those managerial, administrative, scientific, engineering, commercial, and laboratory practices that are commonly used by the organizations participating in the NNWSI Project.

8.6.3 ORGANIZATION OF PROJECT WITH RESPECT TO QUALITY ASSURANCE

Figure 8.6-2 is the organization chart of the NNWSI Project. The DOE undersecretary was given the responsibility to carry out the Nuclear Waste Policy Act of 1982 (NWPAA, 1983). This responsibility has been delegated to the Office of Civilian Radioactive Waste Management (OCRWM) for the integration of QA and management policies and requirements for the entire program and for the overview of the activities performance by the operations offices. The DOE Nevada Operations Office (NV) has been delegated the responsibility for the implementation of the technical and QA activities of the NNWSI Project.

The DOE OCRWM provides programmatic and policy guidance, through the Office of Geologic Repositories (OGR), to ensure that adequate NNWSI Project QA programs are established, implemented, and maintained. The DOE/OGR provides QA guidance and overview to the NNWSI Project by implementing the requirements of the OGR QA Plan (QAP) (OGR/B3), which includes review and approval of the NNWSI Project QAP, NNWSI Project Administrative Procedures (APs), the Waste Management Project Office (WMPO) Quality Assurance Program Plan (QAPP), and WMPO implementing procedures, and conducting quality assurance audits.

The WMPO has been established within the DOE/NV for the implementation of the technical and quality assurance requirements of the NNWSI Project. The WMPO operates as a part of the DOE/NV under the programmatic guidance of the OCRWM. In matters of DOE policy, the DOE/NV works and cooperates with the OCRWM in establishing a consistent quality assurance approach for accomplishing the technical objectives of the geologic repository program.

The WMPO is programmatically responsible for management and technical direction of the activities of the participating organizations and Nevada Test Site (NTS) support contractors through the issuance of technical and programmatic guidance, technical integration of the NNWSI Project, project planning and documentation, and quality assurance programmatic guidance.

The WMPO director is responsible for the NNWSI Project management. Project management encompasses planning and directing activities; establishing goals and objectives, and assessing progress toward the attainment of those goals; administration of procurement of materials and services; preparing and issuing technical guidance; organizing and conducting peer reviews; overseeing compliance with laws, regulations, and DOE policies; and other administrative duties. The individual serving in the position of WMPO director has been officially delegated limited contractual authority and full responsibility to direct the DOE/NV contractors, national laboratories, and the U.S. Geological Survey (USGS) participation on the NNWSI Project.

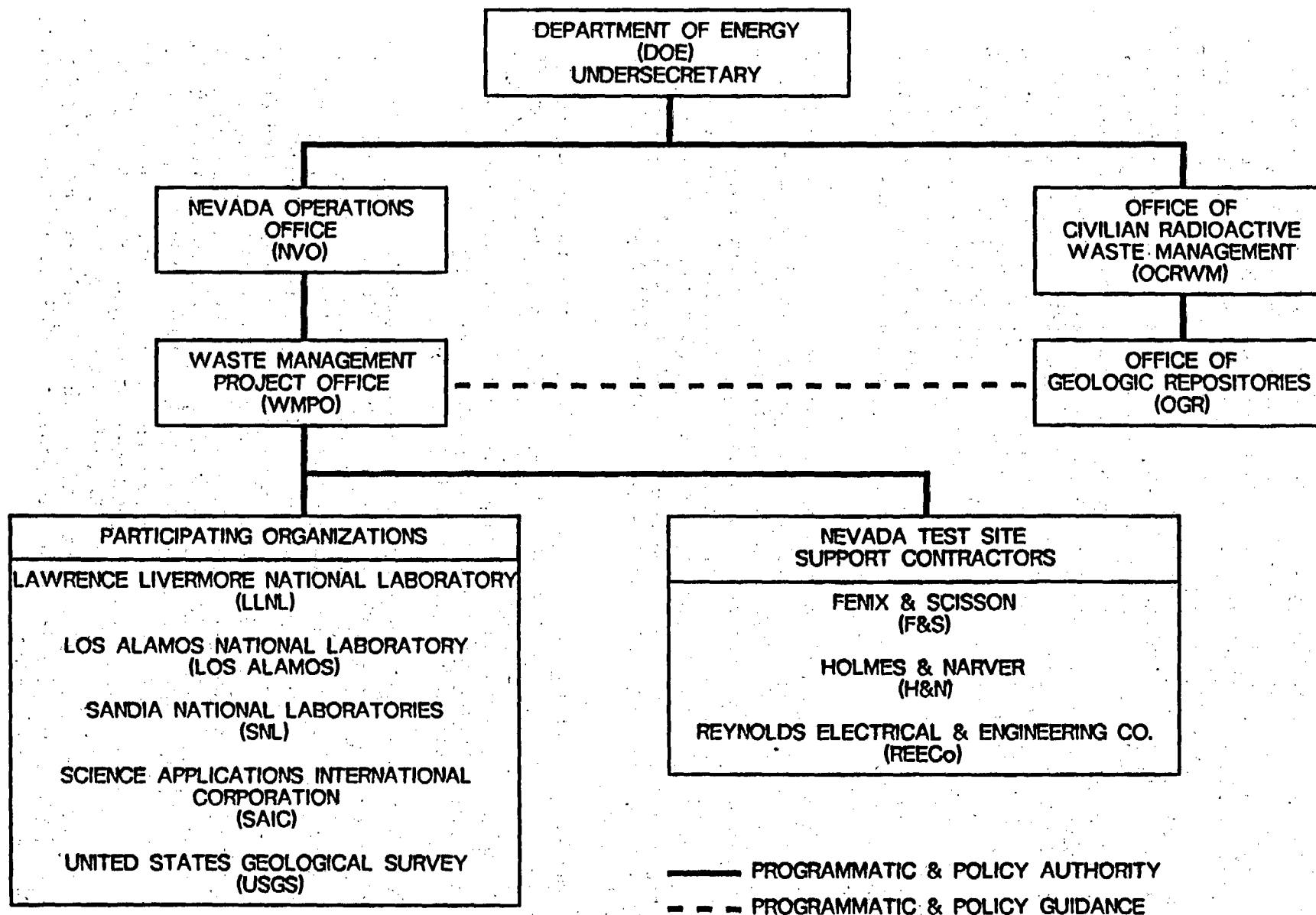


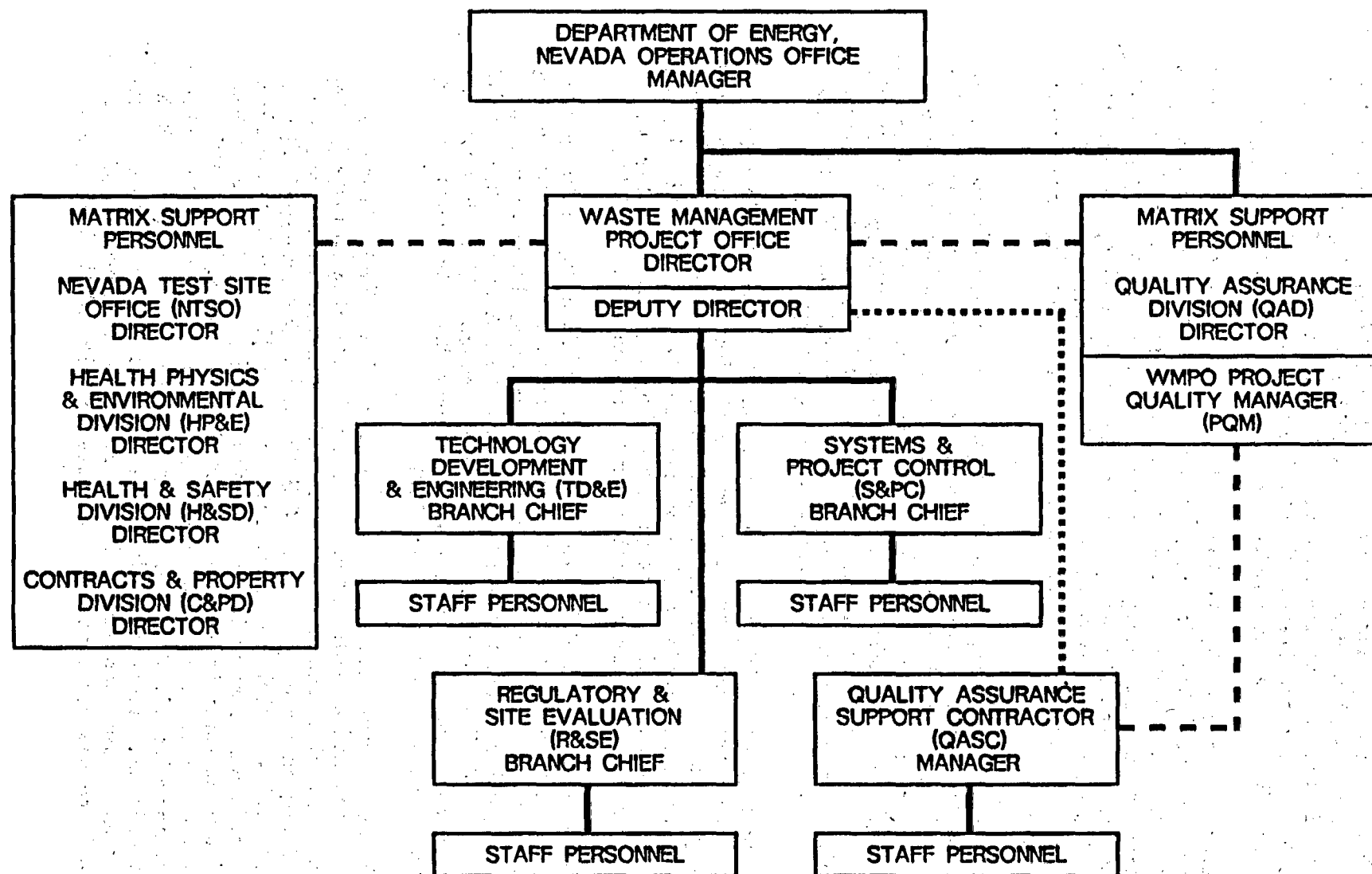
Figure 8.6-2. Nevada Nuclear Waste Storage Investigations Project organization.

The management and technical direction responsibilities of the WMPO focus in three areas, each under the direction of a Branch Chief. Each Branch Chief is responsible for implementing the QA program throughout their area of responsibility. The Regulatory and Site Evaluation Branch is responsible for site characterization (including geology, hydrology, geochemistry, and administrative support); performance assessment (including computer code documentation, analysis, field and laboratory experiments, and tests of radionuclide migration); drilling operations and borehole testing; regulatory interface; environmental analysis; and institutional liaison. The Technology Development and Engineering Branch is responsible for repository 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; and exploratory-shaft design, construction, and operation. The Systems and Project Control Branch is responsible for the administration and management support to integrate and control the NNWSI Project, including preparation of networks, monitoring milestones, overseeing issuance of project documentation, state liaison, transportation, socioeconomics, records management, and quality assurance records administration.

The WMPO uses a matrix organizational concept to support its activities. Figure 8.6-3 details the organization that provides matrix support. The matrix staff assists the WMPO by providing reviews, recommendations, management and direction, and expertise on various aspects of the NNWSI Project in terms of their respective responsibilities as established in accordance with the matrix organizational approach. Matrix support personnel perform quality related work under the controlling procedures of the WMPO QAPP. The matrix support personnel work under the cognizance of the WMPO Director or the WMPO Branch Chiefs.

The Quality Assurance Division (QAD) Director provides independent QA overview including QA guidance, surveillance, and audit capability for DOE/NV management; reviews and approves the NNWSI Project QAP, the WMPO QAPP, and implementing procedures for both documents. The QAD has assigned a Project Quality Manager (PQM), under the matrix organizational approach, dedicated to support the QA responsibilities on WMPO activities.

The dedicated PQM reports functionally to the WMPO Director for the maintenance and implementation of the NNWSI Project QAP and WMPO QAPP. The support provided by the PQM to the NNWSI Project includes the review of participating organizations' and support contractors' QAPPs, directing audits and surveillances, and coordination of the Quality Assurance Support Contractor (QASC) activities. The PQM is supported by the QASC to conduct WMPO QA activities. The responsibilities of the QASC are to provide support in the areas of (1) development, documentation, administration, and implementation of the NNWSI Project QAP and (2) development and implementation of the WMPO QAPP, which delineates the controls used by WMPO, WMPO matrix support, and the QASC to conduct their QA activities. QASC activities include participation in QA audits, review of test plans, provisions for QA surveillance and policy guidance, and review of the QAPPs prepared by the participating organizations and NTS support contractors. The overall responsibility to ensure that quality is maintained throughout the NNWSI Project is retained by the director of the WMPO.



- - - MATRIX SUPPORT
 CONTRACTUAL SUPPORT

Figure 8.6-3. Waste Management Project Office organization.

CONSULTATION DRAFT

The NNWSI Project QA organizational structure is such that if disputes in QA arise between the PQM and others (e.g., Branch Chief, Project participants), the disputes will be directed to the WMPO Director for arbitration. If not satisfied, the PQM has the authority (through the QAD Director) to have the DOE/NV Manager arbitrate. If still not satisfied with the resolution, the PQM has the responsibility to notify the OGR QA Manager.

Upon request of the WMPO, the Nevada Test Site Office (NTSO) may provide matrix support personnel that are responsible for field direction and coordination of (1) certain quality related or other work performed by the NTS support contractors and (2) design reviews performed by NTSS staff directly. This work may include architect-engineering, drilling, mining, construction, and logistical support performed at the NTS. The NTSS also acts on requests for NTS support contractor services submitted by participating organizations through the WMPO.

Upon request of the WMPO, the Health Physics and Environmental Division (HPED) may provide matrix support personnel that are responsible for review of procedures, facility designs, and operations plans applicable to radiological monitoring of the environment, radiological health of the public and radiological workers, and radiological operations at the NTS by the DOE/NV, its contractors, or the national laboratories. The HPED acts on requests for support submitted by participating organizations through the WMPO and provides design reviews, advice, and assistance to the WMPO.

Upon request of the WMPO, the Safety and Health Division (SHD) may provide matrix support personnel that are responsible for review of procedures, facility designs, and operations plans applicable to the occupational health and industrial and fire safety of site workers and facilities. The SHD acts on requests for support submitted by participating organizations through the WMPO and provides design reviews, advice, and assistance to the WMPO.

Upon the request of the WMPO, the Contracts and Property Division (CPD) may provide matrix support personnel that are responsible for preparing negotiation contracts and other agreements with the national laboratories and other federal agencies (except the NRC for which the DOE/HQ is responsible) on behalf of the DOE/NV in support of the NNWSI Project. The CPD acts on requests for support submitted by the WMPO and provides procurement package reviews, advice, and assistance to the WMPO.

The NTS support contractors, Fenix & Scisson, Inc. (F&S), Holmes & Narver, Inc. (H&N), and Reynolds Electrical and Engineering Company (REECo), provide support for site characterization. F&S is the architect-engineer (A-E) for drilling and mining for the NNWSI Project. F&S responsibilities also include field surveillance and inspection of drilling and mining, and subsurface facilities construction and testing. H&N is the A-E for above-ground facilities and provides material test laboratory support. H&N responsibilities include design and site preparation for surface facilities and drilling, including field inspection of facility construction. REECo is the prime support contractor 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.

CONSULTATION DRAFT

The participating organizations are Lawrence Livermore National Laboratory (LLNL), Los Alamos National Laboratory (Los Alamos), Sandia National Laboratories (SNL), Science Applications International Corporation (SAIC), and the U.S. Geological Survey (USGS).

LLNL is responsible for developing the waste package for the tuff environment, which includes the definition of the package environment, material development, package design, performance analysis, and testing.

Los Alamos is responsible for nuclide migration, geochemistry, mineralogy, and petrology studies. Los Alamos acts as the lead technical organization for the exploratory shaft testing, which includes coordination and scheduling of the exploratory shaft testing program.

SNL is responsible for repository systems development, data management, and analysis; systems performance assessment of the repository; conceptual design of the repository; equipment development and demonstrations; evaluation of thermal and mechanical properties of the host rock; and repository sealing performance requirements, materials evaluation, design, and testing.

SAIC is responsible for technical and management support services (T&MSS), which include technical and management assistance, advice, and consultation to the WMPO Director; 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; regulatory and environmental support; coordination of the WMPO peer review process; and conducting overview reviews for the WMPO when requested.

The USGS is responsible for site hydrologic and geologic characterization, including geology, hydrology, geophysical, and geochronology investigations, and tectonics, volcanics, and natural seismic studies.

All NNWSI Project participating organizations and NTS support contractors are responsible for providing assistance to other Project participants in areas of their respective expertise.

Participating organizations and NTS support contractors are responsible to the WMPO for the technical activities assigned to them per the NNWSI Project Work Breakdown Structure Dictionary, and NNWSI Project-specific technical and management plans. The technical activities are to be accomplished in accordance with the quality requirements in the NNWSI QAP and their respective QAPPs, which are approved by the WMPO.

Lines of communication among the WMPO, the participating organizations, and the NTS support contractors are described in the NNWSI Project QAP and the QAPPs of the respective organizations. From an overall NNWSI Project standpoint, these interfaces are exchanges of technical requirements of work to be performed until completion of the task. QAPPs for each participating organization and NTS support contractor describe the methods of conducting interorganizational interfaces, while the NNWSI Project administrative procedures are the procedures that provide the implementing interface controls used by all participating organizations and NTS support contractors.

CONSULTATION DRAFT

QA personnel throughout the NNWSI Project 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 is described in the individual organization's QAPP. The Technical Project Officer of the respective participating organizations and NTS support contractors are responsible to the WMPO Director to ensure that the NNWSI Project activities for which they are responsible are performed in accordance with a QAPP and implementing procedures that are consistent with the NNWSI Project QAP.

8.6.4 APPLICATION OF QUALITY ASSURANCE

8.6.4.1 Quality assurance during site exploration

The NNWSI Project performed comprehensive exploration activities to evaluate the Nevada Research and Development Area (NRDA) of the NTS and nearby areas for relatively favorable locations for the permanent disposal of radioactive waste in a mined geologic repository. This exploratory phase began in 1977. The information obtained during this phase was used in the preparation of the NNWSI Project environmental assessment. In May 1986, Yucca Mountain was selected for the site characterization phase.

The exploration phase of the NNWSI Project included these general activities: site screening, preliminary physical testing, conceptual design work, and developmental work on analytical models. When these activities were initiated, there were no formal NRC QA requirements; hence, these activities were accomplished consistent with good scientific and engineering practices. The most significant aspects of the controls were as follows:

1. Design, testing, analytical work, and site exploration activities were performed by individuals who were qualified by education and experience.
2. The processes for analysis and site exploration, as well as the published results of technical work, were exposed to technical review.

The NNWSI Project QA Plan (QAP), NVO-198-17, was first issued in August 1980. The QA requirements of the plan were based on ASME/ANSI NQA-1, 1979. The document required that QA Program Plans (QAPPs) and implementing procedures be developed by all participating organizations of the NNWSI Project that were performing NNWSI Project tasks, including data gathering from field studies or evaluations made for the exploration phase. A list of the plans and/or procedures developed in response to the requirements of the NNWSI Project QAPP are listed in Table 8.6-2. These documents were developed at different points in the exploration phase and were subject to varying degrees of change during the time the exploration phase was undertaken.

CONSULTATION DRAFT

Table 8.6-2. Quality assurance plans and procedures in effect during site exploration^a (page 1 of 12)

Document number	Title
NNWSI DOCUMENTS	
NVO-196-17	NNWSI Quality Assurance Plan
WMPO DOCUMENTS	
NVO-196-18	Management and Overview QA Program Plan
AP-NNWSI-17-01	NNWSI Files
AP-NNWSI-17-02	Activity Plan for the Data Base Management System
QMP-01-01	WMPO Organization
QMP-02-01	Indoctrination and Training
QMP-02-02	Qualification and Certification of Auditors
QMP-03-01	Peer Review
QMP-06-01	QMP Procedure Format and Preparation
QMP-06-02	Document Control
QMP-06-03	Document Review/Approval
QMP-07-01	Surveillance
QMP-11-01	QA Requirements and Responsibilities on NNWSI Drill Holes
QMP-15-01	Nonconformance Control
QMP-15-01	Drilling Program Nonconformance Reporting and Disposition Procedure
QMP-16-01	Corrective Action
QMP-16-02	Trend Analysis
QMP-17-01	NNWSI Record Management Plan

CONSULTATION DRAFT

Table 8.6-2. Quality assurance plans and procedures in effect during site exploration^a (page 2 of 12)

Document number	Title
WMPO DOCUMENTS (continued)	
QMP-18-01	Audits
SPI-110	Qualification of Quality Program Auditors
SPI-111	Audits of Quality Programs
SPI-112	Activity Plans and Activity Instructions
SPI-114	Nonconformance Reporting for Services and Activities
SPI-118	Verification of Services and Activities
SPI-119	Inspection and Surveillance
SPI-120	Control of Quality of Purchased Material, Equipment, and Services
SNL DOCUMENTS	
EPI I-1	Procedure Format and Preparation
EPI I-2	Controlled Document Transmittal
EPI II-1	Training and Indoctrination Program
EPI III-1	Control Requirements for the Design of Hardware, Experimental Programs, and Analytic Models
EPI III-2	Technical Review and Management Approval of Designs for Hardware, Experimental Programs, and Analytic Models
EPI III-3	Design Information Sources
EPI III-4	Design Definition System
EPI III-7	Control of Drawing Revisions (See also QAP III-6)
EPI III-9	Requests for Design Definition Services
EPI IV-1	Review and Approval of Documents

CONSULTATION DRAFT

Table 8.6-2. Quality assurance plans and procedures in effect during site exploration^a (page 3 of 12)

Document number	Title
SNL DOCUMENTS (continued)	
EPI IV-2	Control of the Quality of Purchased Materials, Equipment, and Services
EPI V-1	Interactive Procedure Generation
EPI VI-1	Document Control System
EPI VI-2	Contractor Software QA Programs
EPI VI-3	QA Program for Academic Studies and Investigations
EPI VI-4	Contractor QA Requirements for Guidance for R&D Activities
EPI VII-1	Surveillance and Inspection
EPI VII-4	Receiving Inspection
EPI VII-6	Supplier QA Questionnaire
EPI VII-7	Verification of Services and Activities
EPI VIII-1	Identification Marking of Energy Programs Material
EPI IX-1	Control of Special Processes
EPI XI-1	Test Plan/Procedure Content and Control
EPI XI-5	Test/Experiment Logbook Content and Control
EPI XII-2	Calibration Program
EPI XII-3	Calibration of Equipment, Gages, and Standards
EPI XII-4	Calibration and Certification of Sandia Owned Testers
EPI XIII-1	Handling, Shipping, and Storage Procedures
EPI XIII-2	Movement of Materials and Equipment
EPI XIV-1	Status Indication of Items

CONSULTATION DRAFT

Table 8.6-2. Quality assurance plans and procedures in effect during site exploration^a (page 4 of 12)

Document number	Title
SNL DOCUMENTS (continued)	
EPI XVII-1	Project Records Collection, Filing, Storage, and Maintenance
EPI XVII-3	Conference/Telecon Notes
EPI XVIII-1	Audits of Quality Programs
EPI XVIII-2	Qualifications of Auditors
EPI XIX-1	Software Quality Assurance
QAP I-1	NNWSI Supplemental Quality Assurance Features
QAP I-2	NNWSI Procedure for Quality-Related Work Stoppage
QAP III-3	NNWSI Analysis and Calculation Control
QAP III-6	NNWSI Repository Design Changes (SNL)
QAP IV-1	Contractor QA Program Plan Evaluation
QAP V-2	NNWSI Test Plan/Procedure Control
QAP XI-2	Procedure for Reviewing, Approving, and Issuing NNWSI Technical Information Documents
QAP XI-11	Quality Assurance Procedure for Operation of the SNL NNWSI Core Library
QAP XI-13	SNL NNWSI Quality Assurance Procedure for Writing Letters of Criteria in Support of Laboratory Testing
QAP XVII-4	NNWSI QA Records Requirements
LOS ALAMOS DOCUMENTS	
NNWSI-QP-01	Quality Assurance Program Plan for NNWSI
TWS-MSTQA-QP-02	Quality Assurance Program Index
TWS-MSTQA-QP-03	Document Control Procedure

CONSULTATION DRAFT

Table 8.6-2. Quality assurance plans and procedures in effect during site exploration^a (page 5 of 12)

Document number	Title
LOS ALAMOS DOCUMENTS (continued)	
TWS-MSTQA-QP-04	Handling, Storage, and Shipping Procedure
TWS-MSTQA-QP-06	NNWSI Procurement Procedures
TWS-MSTQA-QP-07	Procedure for Technical Review of Publications
TWS-MSTQA-QP-08	Personnel Certification Procedure for NNWSI
TWS-MSTQA-QP-10	Document Control of the Exploratory Shaft Test Plan
TWS-MSTQA-QP-11	NNWSI Surveillance Procedure
TWS-MSTQA-QP-14	Research and Development (Experimental) Procedure
LLNL DOCUMENTS	
033-NNWSI-P.1.0	Organization
033-NNWSI-P.15.0	Nonconformance
033-NNWSI-P.16.0	Corrective Action
033-NNWSI-P.17.0	Quality Assurance Records
033-NNWSI-P.18.0	Audits
033-NNWSI-P.2.0	Assurance
033-NNWSI-P.4.0	Procurement Document Control
033-NNWSI-P.6.0	Document Control
033-NNWSI-R.10.0	Inspection
033-NNWSI-R.11.0	Test Control
033-NNWSI-R.13.0	Handling, Storage, and Shipping
033-NNWSI-R.14.0	Inspection, Test, and Operating Status
033-NNWSI-R.3.0	Design Control

CONSULTATION DRAFT

Table 8.6-2. Quality assurance plans and procedures in effect during site exploration² (page 6 of 12)

Document number	Title
LLNL DOCUMENTS (continued)	
033-NNWSI-R.6.0	Document Control
033-NNWSI-R.7.0	Control of Purchased Materials, Equipment, and Services
033-NNWSI-R.8.0	Identification and Control of Materials, Parts, and Components
033-NNWSI-R.9.0	Control of Processes
033-NWMP-P.5.0	Instructions, Procedures, Drawings
033-NWMP-P17.0	Quality Assurance Records
033-NWMP-P17.1	Receipt and Review of QA Records
033-NWMP-P17.2	Identification and Indexing of QA Records
033-NWMP-P18.0	Audits
033-NWMP-P6.1	Issue of Controlled Documents
SAIC DOCUMENTS	
A 13	Corporate Purchasing Instructions for Purchase Requests
A 14	Corporate Purchasing Instructions for Purchase Orders
A 15	Corporate Purchasing Instructions for Processing Changes or Cancellation to PROs and POs
A 22	Corporate Purchasing Instructions for Preparation and Processing of Requests for Quotation
A 23	Corporate Purchasing Instructions for Subcontract
A 31	Corporate Purchasing Instructions for Subcontract Documentation Requirements

CONSULTATION DRAFT

Table 8.6-2. Quality assurance plans and procedures in effect during site exploration^a (7 of 12)

Document number	Title
SAIC DOCUMENTS (continued)	
A 39	Corporate Purchasing Instructions for Administration of POs and Subcontracts
AP 1.16	T&MSS Master Project File Description and Control
AP 2.1	Task Planning and Review
AP 2.3	Independent Review and Peer Review
AP 3.1	Training and Orientation of T&MSS Staff
B 18	Use of Consultants
B 3	Employment Records
QAPP-1	T&MSS Quality Assurance Program Plan
QP 2.2	Indoctrination and Training of Personnel Performing Quality Related Functions
QP 2.3	Auditor Qualification
QP 2.4	Assignment of Quality Levels
QP 3.1	Design Control
QP 3.2	Use and Control of Computer Programs
QP 4.1	Procurement Document Control
QP 5.1	Instructions, Procedures, and Drawings
QP 6.1	Document Control
QP 7.1	Control of Purchased Items and Services
QP 8.1	Identification and Control of Materials, Parts, and Components
QP 9.1	Control of Processes
QP 10.1	Test/Experiment Control

CONSULTATION DRAFT

Table 8.6-2. Quality assurance plans and procedures in effect during site exploration^a (page 8 of 12)

Document number	Title
SAIC DOCUMENTS (continued)	
QP 12.1	Control of Measuring and Test Equipment
QP 13.1	Control of Handling, Storage, and Shipping
QP 14.1	Control of Inspection, Test, and Operating Status
QP 15.1	Control of Nonconforming Items
QP 16.1	Corrective Action
QP 17.1	Quality Assurance Records
QP 18.1	Audits
USGS DOCUMENTS	
NNWSI-USGS-QAPP-01	Quality Assurance Program Plan
QMP 10.01	Surveillance Procedure
QMP 11.01	Preparation and Issuance of Tentative Technical Procedures
QMP 15.01	Procedure for Control of Nonconforming Items
QMP 16.01	Control for Corrective Action Procedure
QMP 17.01	Quality Assurance Records Management
QMP 18.01	Auditing Procedure
QMP 2.01	Management Assessment of the NNWSI USGS Quality Assurance Program
QMP 2.02	Indoctrination and Training
QMP 2.03	Certification of USGS Technical Personnel for the NNWSI Project
QMP 2.04	Certification of Fenix and Scisson Geologists

CONSULTATION DRAFT

Table 8.6-2. Quality assurance plans and procedures in effect during site exploration^a (page 9 of 12)

Document number	Title
USGS DOCUMENTS (continued)	
QMP 2.05	Qualification of Quality Assurance Program Audit Personnel
QMP 3.01	Procedure for Identification of Research/Experiment Activities
QMP 3.02	USGS QA Levels Assignment Procedure
QMP 3.04	Technical Review of NNWSI Publications of the U.S. Geological Survey
QMP 3.05	Work Request for NTS Contractor Services (Criteria Letter)
QMP 4.01	Procurement Document Control
QMP 5.01	Preparation of Technical Procedures
QMP 6.01	Document Control
QMP 8.01	Identification and Control of Geologic and Hydrologic Samples
REECo DOCUMENTS	
568-DOC-115	Quality Assurance Program Plan for the NNWSI Project
NQP 1.0	Organization
NQP 10.0	Inspection
NQP 11.0	Test and Experiment Control
NQP 12.0	Control of Measuring and Test Equipment
NQP 13.0	Handling, Shipping, and Storage
NQP 14.0	Inspection, Test, and Operating Status
NQP 15.0	Control of Nonconforming Items

CONSULTATION DRAFT

Table 8.6-2. Quality assurance plans and procedures in effect during site exploration^a (page 10 of 12)

Document number	Title
USGS DOCUMENTS (continued)	
NQP 16.0	Corrective Action
NQP 17.0	Quality Assurance Records
NQP 18.0	Audits
NQP 2.0	Quality Assurance Program
NQP 3.0	Design Control
NQP 4.0	Procurement Document Control
NQP 5.0	Instructions, Procedures, and Drawings
NQP 6.0	Document Control
NQP 7.0	Control of Purchased Items and Services
NQP 8.0	Identification and Control of Materials, Parts, and Components and Samples
NQP 9.0	Control of Processes
F&S DOCUMENTS	
QAP-1.1(N)	Organization
QAP-10.1(N)	Source Inspection
QAP-10.2(N)	Quality Assurance Surveillance of Neutron Hole Drilling Programs
QAP-11.1	Procedure for Permeability Tests of Underground Holes
QAP-11.4	Procedure for Surveillance of Seismic Testing Activities
QAP-12.1	Calibration Procedure
QAP-13.1	Handling, Storage, and Shipment

CONSULTATION DRAFT

Table 8.6-2. Quality assurance plans and procedures in effect during site exploration^a (page 11 of 12)

Document number	Title
F&S DOCUMENTS (continued)	
QAP-14.1	Inspection, Test, and Operating Status
QAP-15.2(N)	Reporting Nonconformances on the NNWSI Project
QAP-16.1(N)	Corrective Action Procedure
QAP-17.1	Quality Assurance Records Procedure
QAP-18.1(N)	Audit Procedure
QAP-18.2(N)	Qualification and Certification of Auditors
QAP-2.1(N)	Quality Assurance Program
QAP-2.2(N)	Indoctrination and Training of Quality Assurance Personnel
QAP-2.3(N)	Preparation of Quality Assurance Procedures
QAP-3.1(N)	Engineering Drawings
QAP-3.2(N)	Engineering Specifications
QAP-5.1	Instructions, Procedures, and Drawings
QAP-6.1	Document Control
QAP-7.1	Supplier Survey
QAP-7.2(N)	Surveillance Inspection Requirement
QAP-8.1	Identification and Control of Items
QAP-9.1(N)	Control of Processes
QAPP-002	Quality Assurance Program Plan for the NNWSI Project
QRP-1	NNWSI Quality Assurance Records Procedure
H&N DOCUMENTS	
HN-1047-1115	QA Manual

CONSULTATION DRAFT

Table 8.6-2. Quality assurance plans and procedures in effect during site exploration^a (page 12 of 12)

Document number	Title
H&N DOCUMENTS (continued)	
4.6.2	Drill Rig Inspection and Certification
4.6.3	Nondestructive Testing Personnel Qualification and Certification
4.6.4	NDT Contractor Qualification, Certification and Audit
4.6.6	Boiler & Pressure Vessel Program
4.6.7	Welder Certification
4.6.8	Welding Inspector Qualification and Certification
4.6.9	Wire Rope Socket Installer Certification
4.6.12	Fire Sprinkler System Installation
4.6.14	Certification Requirements for Quality Audit Personnel
4.7.1	Calibration Program
4.7.2	Calibration of Electrical Electronic Instrumentation
4.7.3	Calibration of Flow Meters
4.7.4	Pressure Systems Inspection Procedure

^aNNWSI - Nevada Nuclear Waste Storage Investigations, WMPO - Waste Management Project Office, QA - Quality Assurance, QMP - Quality Management Procedure, SNL - Sandia National Laboratories, QAP - Quality Assurance Plan, R&D - Research and Development, LLNL - Lawrence Livermore National Laboratory, SAIC - Science Applications International Corporation, PRO - Purchase Requisition Order, PO - Purchase Order, T&MSS - Technical and Management Support Services, USGS - United States Geological Survey, NTS - Nevada Test Site, REECo - Reynolds Electrical and Engineering Company, F&S - Fenix & Scisson, H&N - Holmes & Narver, NDT - nondestructive testing.

CONSULTATION DRAFT

Primary data or data interpretations generated before August 1980 that will be used during licensing will undergo an acceptance review process per the NNWSI Project administrative procedure for acceptance of data or data interpretations not developed under the NNWSI Project QAP.

8.6.4.2 Quality Assurance during site characterization

The NNWSI Project approach to identification of items and activities important to safety or waste isolation is encompassed in the NNWSI Project Quality Assurance level system as described in Section 8.6.1. Each NNWSI Project participant is to evaluate their assigned tasks (from the Waste Management Project Office) for identification and classification of items and activities that require QA level assignments. The NNWSI Project site characterization items and activities classified as QA Level I will be processed through the Office of Geologic Repositories guidance on Site Characterization Plan Q-list methodology. This process and NNWSI Project Q-list are identified in Sections 6.1.4 and 6.1.5.

The Quality Activities List is a list of activities that are associated with assessing the natural barriers important to waste isolation or activities whose undertaking could adversely affect the performance of the natural barriers. These activities will be controlled as QA Level I activities in accordance with the NNWSI Project QA Plan. The preliminary NNWSI Quality Activities List includes the following:

1. Data collection activities associated with the site characterization test as described in Section 8.3, which will be used as primary data to aid in formulating the description of the site.
2. Blasting of the shafts and drafts.

The rationale for inclusion of activities on the activities list is that they (1) will provide site characterization data which will be utilized to assess the performance of the natural barriers important to waste isolation and hence be used as primary data to support the license application and (2) if not performed in a controlled manner, could adversely affect the performance of the existing natural barriers.

The Quality Activities List is based on detailed planning of tests and analyses that is not presented in the SCP. This detailed planning will be presented in study plans. As study plans are developed, the QA Level for specific tests and analyses will be determined. For each test and analysis, the QA Level will be indicated and the rationale will be provided for any activity that is not judged to be QA Level 1. The Quality Activities List, and any changes to it, will be identified in the semiannual progress reports.

8.6.5 ADMINISTRATIVE QUALITY ASSURANCE PROCEDURES

The NNWSI Project Quality Assurance Plan (QAP) directs each participating organization in the NNWSI Project to prepare and submit to the Waste

CONSULTATION DRAFT

Management Project Office (WMPO) a Quality Assurance Program Plan (QAPP) to control their particular technical tasks affecting quality. These QAPPs are equivalent to the QA administrative procedures identified in the NRC standard review plan (Section 8.6.1). The WMPO will review and approve each participant's QAPP, and changes thereto prior to use on site characterization and design activities, in accordance with OGR/B3. Table 8.6-1 lists the documents of the current QAPP of each participating organization. The latest approved and issued revisions of the documents will be applied during site characterization.

In accordance with the NNWSI Project QAP, the participating organizations will develop implementing procedures to show how the QA requirements of their QAPPs are implemented. The implementing procedures are equivalent to the term detailed technical procedures identified in the NRC standard review plan and are written by various disciplines, including QA. Implementing procedures are reviewed and approved by the organization's technical management and QA divisions.

The specific implementing procedures to be utilized for site characterization are provided in Chapter 8.3 with the specific test to be conducted during site characterization. Table 8.6-3 provides a listing of implementing procedures that will be generic to all site characterization tasks.

8.6.6 QUALITY ASSURANCE PLANS AND PROCEDURES FOR SPECIFIC PROGRAM AREAS

The QA Plans and Procedures that will be used to control the NNWSI Project site characterization and design activities are listed in Tables 8.6-1 and 8.6-3 or in Section 8.3. These plans and procedures include the implementing methods for design and site investigation control; procurement document control; instructions, drawings, and procedures; document control; control of purchased materials, equipment, and services; identification and control of material parts and components; control of processes; inspection; test and experiment control; control of measuring and test equipment; handling, storage, and shipping; control of inspection, test, and operating status; nonconformances; corrective action; quality assurance records; and audits. The QA requirements that are applied to the criteria, to ensure adequate controls, are found in the NNWSI QA Plan.

Detailed implementing procedures have been developed by the NNWSI Project participants' technical staff to provide instructions for the actual performance of the individual technical activities associated with site characterization. These procedures have been developed with the appropriate QA requirements included and are in accordance with the applicable QA Program Plan. Implementing procedures that will be used for conducting tests during site characterization are referenced in Section 8.3 of this plan. Implementing procedures that are not yet available at issuance of the SCP will be identified in future SCP progress reports and made available for review before testing begins.

CONSULTATION DRAFT

Table 8.6-3. Nevada Nuclear Waste Storage Investigations Project procedures generic to site characterization tasks²
(page 1 of 18)

Number	Title
NNWSI DOCUMENTS	
NNWSI-AP-1.1Q	Administrative Procedure Preparation
NNWSI-AP-1.3Q	Documents requiring WMPO review
NNWSI-AP-1.5Q	Issuance of Controlled Documents
NNWSI-AP-1.6Q	Release of Unpublished Information
NNWSI-AP-1.8Q	NNWSI Project QA Records Management
NNWSI-AP-3.3Q	Change Control Process
NNWSI-AP-3.4Q	Project Technical Baseline
NNWSI-AP-3.5Q	Project Regulatory Baseline
NNWSI-AP-5.2Q	Screening and Identification of data and information for entry into the Technical Data Base
NNWSI-AP-5.3Q	Technical data and information submitted to the Reference Information Base
NNWSI-AP-5.4Q	Assignment of Quality Assurance Levels to NNWSI Project Activities and Items
NNWSI-AP-5.5Q	Software QA
NNWSI-AP-5.6Q	ESF Interface Control
NNWSI-AP-5.7Q	Site Integration Control
NNWSI-AP-5.8Q	NNWSI Project Management Assessment
NNWSI-AP-5.9Q	Acceptance of Data or Data Interpretations Not Developed under the NNWSI Project QA Plan
NNWSI-AP-5.10Q	Use of NTS Support Contractors on the NNWSI Project
NNWSI-AP-5.11Q	Calibration of M&TE utilizing NTS Support Contractors

CONSULTATION DRAFT

Table 8.6-3. Nevada Nuclear Waste Storage Investigations Project
procedures generic to site characterization tasks²
(page 2 of 18)

Number	Title
WMPO DOCUMENTS	
QMP-01-01	WMPO Organization
QMP-01-02	Stop Work
QMP-02-01	Indoctrination and Training
QMP-02-02	Qualification and Certification of Auditors
QMP-02-03	Management Assessment of the NNWSI Project QA Program
QMP-02-04	Readiness Reviews
QMP-02-05	QA Commitment to Outside Agencies
QMP-03-01	Peer Review
QMP-04-01	Procurement Document Control
QMP-05-01	QMP Format and Preparation
QMP-06-02	Document Control
QMP-06-03	Document Review and Approval
QMP-07-02	Effectiveness of Participants QA Programs
QMP-07-03	Control of Purchased Materials and Service
QMP-15-01	Nonconformance Control
QMP-15-02	Usual Occurrence Reporting
QMP-16-01	Corrective Action
QMP-16-02	Trend Analysis
QMP-16-03	Deficiency Reporting
QMP-17-01	QA Records
QMP-18-01	Audits

CONSULTATION DRAFT

Table 8.6-3. Nevada Nuclear Waste Storage Investigations Project
procedures generic to site characterization tasks^a
(page 3 of 18)

Number	Title
WMPO DOCUMENTS (continued)	
QMP-18-02	Surveillance
SAIC DOCUMENTS	
QP 2.2	Indoctrination and Training of Personnel Performing Quality Related Functions
QP 2.3	Auditor Qualification
QP 2.4	Assignment of Quality Levels
AP 2.1	T&MSS--Task Planning and Review
AP 2.3	T&MSS--Independent Review and Peer Reviews
AP 3.1	T&MSS--Training and Orientation of T&MSS Staff
B-3	Personnel Records (Education/Experience Verification only)
B-18	Use of Consultants
QP 3.1	Design Control
QP 3.2	Use and Control of Computer Codes
QP 4.1	Procurement Document Control
A-13	SAIC--Instructions for Preparation and Processing of Purchase Request Orders
A-14	SAIC--Instructions for Preparation and Processing of Purchase Orders
A-15	SAIC--Instructions for Processing Changes or Cancellations to Purchase Request Orders and Purchase Orders
A-22	SAIC--Instructions for Preparation and Processing of Requests for Quotations

CONSULTATION DRAFT

Table 8.6-3. Nevada Nuclear Waste Storage Investigations Project
procedures generic to site characterization tasks²
(page 4 of 18)

Number	Title
SAIC DOCUMENTS (continued)	
A-23	SAIC--Subcontracts
A-31	SAIC--Purchase Order and Subcontract Documentation Requirements
A-39	SAIC--Administration of Purchase Orders and Subcontracts
QP 5.1	Instructions, Procedures, and Drawings
QP 6.1	Document Control
QP 7.1	Control of Purchased Items and Services
QP 8.1	Identification and Control of Materials, Parts, and Components [includes geological and environmental samples as well as government furnished/purchased equipment (GFE/GPE)]
QP 9.1	Control of Processes
QP 10.1	Inspection
QP 11.1	Test/Experiment Control
QP 12.1	Control of Measuring and Test Equipment
QP 13.1	Handling, Storage, and Shipping (includes archival, geological, and environmental samples)
QP 14.1	Control of Inspection, Test, and Operating Status
QP 15.1	Control of Nonconforming Items
QP 16.1	Corrective Action
QP 17.1	QA Records
QP 18.1	Audits

CONSULTATION DRAFT

Table 8.6-3. Nevada Nuclear Waste Storage Investigations Project procedures generic to site characterization tasks^a
(page 5 of 18)

Number	Title
SNL DOCUMENTS	
QAP 01-03	Procedure for Quality-Related Work Stoppage
DOP 02-01	Requirements for Task Definition Statements
DOP 02-02	Study Plan Requirements
QAP 02-03	QA Level Determination and Assignment
DOP 02-04	Analysis Control and Verification
QAP 02-05	Training and Familiarization Program
DOP 02-06	Certification of Project Personnel
QAP 02-07	Certification of Quality Assurance Auditors
DOP 03-01	Reviewing, Approving, and Issuing NNWSI Engineering Drawings
DOP 03-02	Software Quality Assurance Requirements
DOP 03-03	Analysis Definition requirements (new title)
DOP 03-04	Design Investigation Control
DOP 03-05	Design Control and Verification
DOP 03-06	Design Change Control
DOP 03-07	Technical Data Base Requirements
DOP 03-09	SNL Interface Controls of Engineering Design
DOP 03-10	NNWSI Routine Design Calculations
DOP 04-01	Procurement Document Requirements
DOP 04-02	Changes to Procurement Documents
DOP 05-01	Quality Assurance Procedure Requirements
DOP 05-02	Technical Procedures Requirements

CONSULTATION DRAFT

Table 8.6-3. Nevada Nuclear Waste Storage Investigations Project procedures generic to site characterization tasks^a
(page 6 of 18)

Number	Title
SNL DOCUMENTS (continued)	
DOP 05-03	QA Review of DOPs
DOP 06-01	Document Control System
DOP 06-02	Procedure for Reviewing, Approving, & Issuing NNWSI Technical Information
DOP 07-01	Planning of Procurements
DOP 07-02	Evaluation for Acceptance of Purchased Items and Services
DOP 07-03	Evaluation of Contractor QA Programs
DOP 08-01	Sample Identification and Handling Requirements
DOP 08-02	Quality Assurance Procedure for Operation of the NNWSI Core Library
DOP 09-01	Control of Special Processes
QAP 10-01	Surveillance Requirements
QAP 10-02	Inspection
DOP 11-01	Experiment Procedure Requirements
DOP 11-02	Requirements for Experiment/Test Logbooks
DOP 11-03	Data Records Management System Interaction
DOP 11-05	Analysis of Data Gathered in Experiments or Equipment Tests
DOP 12-01	Calibration Program
DOP 13-01	Identification, Handling, Shipping, and Storage Procedures for Items
DOP 14-01	Status Indication of Items
QAP 15-01	Nonconformance Reporting and Controls

CONSULTATION DRAFT

Table 8.6-3. Nevada Nuclear Waste Storage Investigations Project procedures generic to site characterization tasks^a
(page 7 of 18)

Number	Title
SNL DOCUMENTS (continued)	
QAP 16-01	Corrective Action Requirements
DOP 17-01	Records Management
DOP 17-02	DRMS Operation
QAP 18-01	Audit Requirements
EPI III-3	Design Information Sources
EPI III-9	Request for Design Definition Services
EPI IV-2	Control of the Quality of Purchased Materials, Equipment, and Services
EPI VI-2	Contractor Software QA Programs
EPI VI-3	QA Program for Academic Studies and Investigations
EPI VI-4	Contractor QA Requirements for Guidance for R&D Activities
EPI VII-1	Surveillance and Inspection
EPI VII-4	Receiving Inspection
EPI VII-6	Supplier QA Questionnaire
EPI VII-7	Verification of Services and Activities
EPI VIII-1	Identification Marking of Energy Programs Material
EPI IX-1	Control of Special Processes
EPI XII-2	Calibration Program
EPI XII-3	Calibration of Equipment, Gages, and Standards
EPI XII-4	Calibration and Certification of Sandia Owned Testers

CONSULTATION DRAFT

Table 8.6-3. Nevada Nuclear Waste Storage Investigations Project
procedures generic to site characterization tasks^a
(page 8 of 18)

Number	Title
SNL DOCUMENTS (continued)	
EPI XIII-1	Handling, Shipping, and Storage Procedures
EPI XIII-2	Movement of Materials and Equipment
EPI XVII-3	Conference/Telecon Notes
EPI XVIII-2	Qualifications of Quality Program Auditors
EPI XIX-1	Software Quality Assurance
LLNL DOCUMENTS	
033-NWMP-P 1.0	Organization
033-NWMP-P 2.0	Assurance
033-NWMP-P 2.2	Peer Review
033-NWMP-R 3A.0	Scientific Investigation Control
033-NWMP-R 3B.0	Design Control
033-NWMP-P 4.0	Procurement Document Control
033-NWMP-P 5.0	Instructions, Procedures, and Drawings
033-NWMP-P 5.1	Preparation of Technical Procedures
033-NWMP-P 5.2	Review & Approval of Technical Procedures
033-NWMP-P 6.0	Document Control
033-NWMP-P 6.1	Issue of Controlled Documents
033-NWMP-P 7.0	Control of Purchased Materials, Equipment, and Services
033-NWMP-R 8.0	Identification and Control of Materials, Parts, and Components
033-NWMP-R 9.0	Control of Processes

CONSULTATION DRAFT

Table 8.6-3. Nevada Nuclear Waste Storage Investigations Project procedures generic to site characterization tasks^a
(page 9 of 18)

Number	Title
LLNL DOCUMENTS (continued)	
033-NWMP-R 10.0	Inspection
033-NWMP-R 11.0	Test Control
033-NWMP-R 12.0	Control of Measuring and Test Equipment
033-NWMP-P 12.1	Laboratory Calibration of the Goodman Borehole Jack
033-NWMP-P 12.2	Calibrating Balances
033-NWMP-R 13.0	Handling, Storage, and Shipping
033-NWMP-R 14.0	Inspection, Test, and Operating Status
033-NWMP-P 15.0	Nonconformances
033-NWMP-P 16.0	Corrective Action
033-NWMP-P 17.0	Quality Assurance Records
033-NWMP-P 17.1	Receipt and Review of Quality Assurance Records
033-NWMP-P 17.2	Identification and Indexing of Quality Assurance Records
033-NWMP-P 17.3	Storage of Quality Assurance Records
033-NWMP-P 17.4	Transmittal of Quality Assurance Records
033-NWMP-P 17.5	Receipt and Verification of Film Received
033-NWMP-P 17.6	Retrieval of Quality Assurance Records
033-NWMP-P 18.0	Audits
033-NWMP-P 18.1	Surveillance
033-NWMP-P 18.2	Qualification of Quality Assurance Audit Personnel
033-NWMP-R 19.0	Software Quality Assurance

CONSULTATION DRAFT

Table 8.6-3. Nevada Nuclear Waste Storage Investigations Project
procedures generic to site characterization tasks^a
(page 10 of 18)

Number	Title
LLNL DOCUMENTS (continued)	
033-NWMP-R 19.1 (EQ3/6)	Appendix 1
033-NWMP-R 19.1 (EQ3/6)	Appendix 2
033-NWMP-R 19.1 (EQ3/6)	Requirements for Development and use of Scientific and Engineering Software
033-NWMP-R 19.2 (EQ3/6)	Coding Standards for Fortran Computer Codes
033-NWMP-R 19.3 (EQ3/6)	Acquisition and Evaluation of Computer Codes
033-NWMP-P 19.4 (EQ3/6)	Development of Computer Codes
033-NWMP-P 19.5 (EQ3/6)	Verification and Validation of Computer Codes
033-NWMP-P 19.6 (EQ3/6)	Documentation of Scientific and Engineering Software
033-NWMP-P 19.7 (EQ3/6)	Peer Review of Scientific and Engineering Software
033-NWMP-P 19.8 (EQ3/6)	Transfer of Computer Codes
033-NWMP-P 19.9 (EQ3/6)	Application of Scientific and Engineering Software
033-NWMP-P 19.10 (EQ3/6)	Error Reporting and Resolution
033-NWMP-P 19.11 (EQ3/6)	Working Environment for Storage, Development, and Application of Computer Codes
033-NWMP-P 19.12 (EQ3/6)	Backup and Archiving of Computer Codes
033-NWMP-P 20.0	Quality Assurance Level
033-NWMP-P 20.1	Numbering of Activities
033-NWMP-R 21A.0	Training
033-NWMP-R 21B.0	Qualification of Personnel
033-NWMP-P 22.0	Technical Review of Publications

CONSULTATION DRAFT

Table 8.6-3. Nevada Nuclear Waste Storage Investigations Project
procedures generic to site characterization tasks^a
(page 11 of 18)

Number	Title
F&S DOCUMENTS	
QAP-1.1 (N)	Organization
QAP-2.1 (N)	Quality Assurance Program
QAP-2.2 (N)	Indoctrination and Training of Personnel
QAP-2.3 (N)	Preparation of QA Procedures
QAP-3.1	Engineering Drawings
QAP-3.2 (N)	Engineering Specifications
QAP-4.2 (N)	Procurement Authorization Form
QAP-5.1 (N)	Instructions, Procedures, and Drawings
QAP-6.1 (N)	Document Control
QAP-7.1 (N)	Supplier Survey
QAP-7.2 (N)	Surveillance Inspection Requirement
QAP-8.1 (N)	Identification and Control of Items
QAP-12.1	Calibration Procedure
QAP-9.1 (N)	Control of Processes
QAP 10.1 (N)	Source Surveillances
QAP-10.2 (N)	QA Surveillance of Neutron Hlz Drilling Program
QAP-13.1	Handling, Storage, and Shipment
QAP-14.1	Inspection, Test, and Operating Status
QAP-15.2 (N)	Reporting Nonconformance on the NNWSI Project
QAP-16.1 (N)	Correction Action Procedure
QAP-17.1	Quality Assurance Records Procedure

CONSULTATION DRAFT

Table 8.6-3. Nevada Nuclear Waste Storage Investigations Project procedures generic to site characterization tasks^a
(page 12 of 18)

Number	Title
F&S DOCUMENTS (continued)	
QAP-18.1 (N)	Audit Procedure
QAP-18.2 (N)	Qualification and Certification of Auditors.
USGS DOCUMENTS	
NNWSI-USGS-QMPP-1.01	Organization Procedure
NNWSI-USGS-QMP-1.02	Stop Work Authority
NNWSI-USGS-QMPP-2.01	Management Assessment of the NNWSI-USGS Quality Assurance Program
NNWSI-USGS-QMPP-2.02	Indoctrination and Training
NNWSI-USGS-QMPP-2.03	Certification of USGS and USGS Contractor Personnel for the NNWSI Project
NNWSI-USGS-QMP-2.05	Qualification of QA Program Audit Personnel
NNWSI-USGS-QMP-3.01	Identification of Research/Experimental Activities
NNWSI-USGS-QMP-3.02	USGS QA Level Assignment
NNWSI-USGS-QMP-3.03	Scientific and Engineering Software QA
NNWSI-USGS-QMP-3.04	Technical Review of NNWSI-USGS Publications
NNWSI-USGS-QMP-3.05	Work Requests for NTS Contractor Services
NNWSI-USGS-QMP-3.06	Scientific Investigation Plan
NNWSI-USGS-QMP-3.07	Technical Review Procedure
NNWSI-USGS-QMP-4.01	Procurement Document Control
NNWSI-USGS-QMP-5.01	Preparation of Technical Procedures
NNWSI-USGS-QMP-5.02	Preparation and Control of Drawings and Sketches

CONSULTATION DRAFT

Table 8.6-3. Nevada Nuclear Waste Storage Investigations Project
procedures generic to site characterization tasks^a
(page 13 of 18)

Number	Title
USGS DOCUMENTS (continued)	
NNWSI-USGS-QMP-5.03	Participant Control of the USGS QAPP and QMPs
NNWSI-USGS-QMP-6.01	Document Control
NNWSI-USGS-QMP-7.01	Certification of Suppliers
NNWSI-USGS-QMP-7.02	Receiving Inspection
NNWSI-USGS-QMP-7.03	Acceptance of Materials, Equipment and Services
NNWSI-USGS-QMP-8.01	Identification and Control of Geologic and Hydrologic Samples
NNWSI-USGS-QMP-9.01	Special Processes
NNWSI-USGS-QMP-10.01	Inspection (Surveillance)
NNWSI-USGS-QMP-11.01	Preparation and Issuance of Tentative Technical Procedures
NNWSI-USGS-QMP-12.01	Instrument Calibration
NNWSI-USGS-QMP-13.01	Handling, Storage, & Shipping of Instruments
NNWSI-USGS-QMP-15.01	Control of Nonconforming Items
NNWSI-USGS-QMP-15.02	Control of Unusual Occurrences
NNWSI-USGS-QMP-16.01	Control for Corrective Action Procedure
NNWSI-USGS-QMP-17.01	QA Records Management
NNWSI-USGS-QMP-17.02	Acceptance of Data not Developed under the NNWSI QA Plan
NNWSI-USGS-QMP-18.01	External and Internal Auditing
LOS ALAMOS DOCUMENTS	
TWS-QASQA-QP-02	Quality Assurance Program Index

CONSULTATION DRAFT

Table 8.6-3. Nevada Nuclear Waste Storage Investigations Project procedures generic to site characterization tasks^a
(page 14 of 18)

Number	Title
LOS ALAMOS DOCUMENTS (continued)	
TWS-QASQA-QP-03	Document Control Procedure
TWS-QASQA-QP-04	Handling, Storage, and Shipping Procedure
TWS-QASQA-QP-06	NNWSI Procurement Procedures
TWS-QASQA-QP-07	Procedure for Technical Review of Publications
TWS-QASQA-QP-08	Personnel Certification Procedure for NNWSI
TWS-QASQA-QP-09	Records Control Procedure
TWS-QASQA-QP-10	Document Control of the Exploratory Shaft Test Plan
TWS-QASQA-QP-11	NNWSI Surveillance Procedure
TWS-QASQA-QP-12	Receiving Inspection
TWS-QASQA-QP-13	Conflict Resolution Procedure
TWS-QASQA-QP-14	Quality Assurance Procedure for One-Time Research and Development Work
H&N DOCUMENTS	
QAGL 1.0	Organization and Responsibilities of Quality Assurance Personnel
QAGL 2.0	Orientation and Training
QAGL 3.0	Drawing and Specification Review
QAGL 5.0	Generation and control of Quality Assurance Guidelines
QAGL 6.0	Generation and Control of Quality Assurance Guidelines
QAGL 8.0	Identification and Control of Material, Parts, and Components

CONSULTATION DRAFT

Table 8.6-3. Nevada Nuclear Waste Storage Investigations Project
procedures generic to site characterization tasks^a
(page 15 of 18)

Number	Title
H&N DOCUMENTS (continued)	
QAGL 9.0	Control and Special Processes
QAGL 10.0	Inspection
QAGL 12.0	Control of Measuring and Test Equipment
QAGL 13.0	Handling, Storage, and Shipping
QAGL 14.0	Inspection, Test, and Operating Status
QAGL 15.0	Nonconformances
QAGL 16.0	Corrective Action
QAGL 16.2	Review of Nonconforming Documentation
QAGL 17.0	QA Records
QAGL 18.0	Audits
QAGL 18.1	Qualification of Audit Personnel
QAGL 18.2	Surveillance Activities
NNWSI-001	Generation and Control of NNWSI Procedures
NNWSI-002	Indoctrination, Training, Certification, and Qualification
NNWSI-003	Specification Preparation and Control
NNWSI-004	Controlled Distribution of Design Documents
NNWSI-005	Design Drawing Preparation and Control
NNWSI-006	Design Calculation
NNWSI-007	Work Initiation, Criteria Gathering, and Reporting
NNWSI-009	Stop Work Order

CONSULTATION DRAFT

Table 8.6-3. Nevada Nuclear Waste Storage Investigations Project
procedures generic to site characterization tasks^a
(page 16 of 18)

Number	Title
SURVEY	
NNWSI-016	Survey Document Control and Distribution
NNWSI-017	Survey Department work function
NONDESTRUCTIVE TESTING	
NNWSI-022	Personnel Qualification and Certification
NNWSI-TBD	Filing and Retention of Testing and Inspection Reports
NNWSI-TBD	Magnetic Particle Testing
NNWSI-TBD	Liquid Penetrant Testing
NNWSI-TBD	Ultrasonic Testing
NNWSI-TBD	Radiography Testing
NNWSI-TBD	Standards Certification
NNWSI-TBD	Raw Film and Chemical Storage
NNWSI-TBD	Exposed Film Storage
NNWSI-TBD	Expendable Film Storage
NNWSI-TBD	Expendable Material Certifications
CONSTRUCTION SERVICES	
NNWSI-TBD	Ordering Materials
NNWSI-TBD	Stop Work
NNWSI-TBD	Vendor Requested Specification Deviations
NNWSI-TBD	Qualification of Personnel
NNWSI-TBD	Inspection

CONSULTATION DRAFT

Table 8.6-3. Nevada Nuclear Waste Storage Investigations Project procedures generic to site characterization tasks²
(page 17 of 18)

Number	Title
REECo DOCUMENTS	
NQP-1.0	Organization
NQP-2.0	Quality Assurance Program
NQP-2.1	Qualification and Certification of Inspection Personnel
NQP-2.2	Personnel Certification for QA Level 1
NQP-3.0	Design Control
NQP-3.1	Design Review
NQP-4.0	Procurement Document Control
NQP-5.0	Instructions, Drawings, and Procedures
NQP-5.1	Procedure Review
NQP-6.0	Document Control
NQP-7.0	Control of Purchased Items, and Services
NQP-7.2	Procurement Document Review
NQP-7.4	Annual Supplier Evaluation
NQP 7.5	Supplier Evaluation
NQP-8.0	Identification and Control of Materials, Parts, Components, and Samples
NQP-9.0	Control of Processes
NQP-9.1	Welding Procedure Qualification
NQP-9.2	Welder Certification
NQP-10.0	Inspection
NQP-11.0	Test and Experiment Control
NQP-12.0	Control of Measuring and Test Equipment

CONSULTATION DRAFT

Table 8.6-3. Nevada Nuclear Waste Storage Investigations Project procedures generic to site characterization tasks²
(page 18 of 18)

Number	Title
REECo DOCUMENTS (continued)	
NQP-13.0	Handling, Storage, and Shipping
NQP-14.0	Inspection, Test, and Operating Status
NQP-15.0	Control of Nonconforming Items
NQP-16.0	Corrective Actions
NQP-16.1	Request for Corrective Actions
NQP-17.0	Quality Assurance Records
NQP-18.0	Audits
NQP-18.1	Surveillance

²NNWSI - Nevada Nuclear Waste Storage Investigations, WMPO - Waste Management Project Office, QA - Quality Assurance, QMP - Quality Management Procedure, SNL - Sandia National Laboratories, R&D - Research and Development, LLNL - Lawrence Livermore National Laboratory, SAIC - Science Applications International Corporation, USGS - United States Geological Survey, NTS - Nevada Test Site, REECo - Reynolds Electrical and Engineering Company, F&S - Fenix & Scisson, H&N - Holmes & Narver, NDT - nondestructive testing, M&TE - measuring and test equipment, DRMS - data record management system, QAPP - Quality Assurance Program Plan, ESF - exploratory shaft facility, T&MSS - technical and management support services, DOP - TBD - to be developed.