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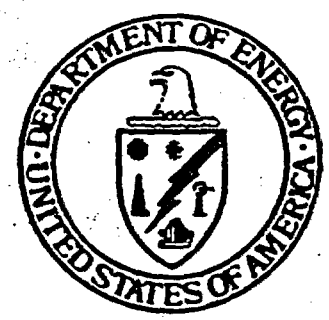
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NNWSI PROJECT MANAGEMENT PLAN

DECEMBER 1987

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



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**NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS
PROJECT MANAGEMENT PLAN**

OCTOBER 1987

Prepared by

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Prepared for

**U.S. Department of Energy
Nevada Operations Office**

Contract DE-AC08-87NV10576

Prepared for the Nevada Nuclear Waste Storage Investigations (NNWSI) Project participants as part of the Civilian Radioactive Waste Management Program. The NNWSI Project is managed by the Waste Management Project Office of the U.S. Department of Energy (DOE), Nevada Operations Office. NNWSI Project work is sponsored by the Office of Geologic Repositories of the DOE Office of Civilian Radioactive Waste Management.

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS

PROJECT MANAGEMENT PLAN

FOREWORD

The purpose of the Nevada Nuclear Waste Storage Investigations Project Management Plan is to set forth the plans, organization, and systems to be utilized by the Waste Management Project Office (WMPO), a project element of the Civilian Radioactive Waste Management Program being managed by the Nevada Operations Office of the Department of Energy. This plan is effective upon approval by the undersigned and shall remain in full force and effect for the execution of this Project. This plan shall be revised as required and shall be reviewed no less frequently than annually by the WMPO to assure that it is current. Recommended changes shall be submitted to the WMPO Project Manager, who shall be responsible for the coordination and resolution of proposed changes and the implementation of approved changes.

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PROJECT MANAGEMENT PLAN
FOR
NEVADA NUCLEAR WASTE STORAGE INVESTIGATION PROJECT

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NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS PROJECT

PROJECT MANAGEMENT PLAN

1.0 INTRODUCTION

1.1 OVERVIEW

This Project Management Plan (PMP) provides the plans, organization, and systems by which the Nevada Nuclear Waste Storage Investigations (NNWSI) Project will be managed.

The PMP format and content are generally in accordance with the guidelines contained in the March 6, 1987, U.S. Department of Energy (DOE) Order 4700.1. Specific topics addressed are NNWSI Project objectives; management organization and responsibility; work plans, including quality assurance aspects; work breakdown structure (WBS); schedule and logic diagrams; cost and manpower estimates; functional support requirements; Project management, measurement, and planning and control systems; configuration management and systems engineering management; and information and reporting. Baseline elements (milestones and budget) are presented in greater detail than in the NNWSI Project Plan, which discusses programmatic-level aspects of the Project.

1.2 PARTICIPANTS

Participants in the NNWSI Project are the DOE, Los Alamos National Laboratory (Los Alamos), Lawrence Livermore National Laboratory (LLNL), Sandia National Laboratories (SNL), the U.S. Geological Survey (USGS), Science Applications International Corporation (SAIC), the U.S. Bureau of Reclamation (USBR), Fenix & Scisson, Inc. (F&S), Holmes & Narver, Inc. (H&N), and Reynolds Electrical and Engineering Company, Inc. (REEC). EG&G, Inc. and the Desert Research Institute/University of Nevada - Reno (DRI-Reno) have minor roles relative to the rest of the participants. In addition, Pan Am provides photographic work for the Project, and Wackenhut Services, Inc. provides security support for Nevada Test Site-related activities.

In addition to stated participants, the State of Nevada receives a grant each year to enable the State to review Project activities and conduct independent testing and monitoring of activities at the site.

The responsibilities of participants are summarized in Section 3.2.

1.3 PERTINENT DOCUMENTATION

Reference documents pertinent to the development of this Project Management Plan are as follows:

1. NNWSI Project Charter (Office of Geologic Repositories (OGR) dated 1/16/87).
2. NNWSI Project Quality Assurance Plan, NVO-196-17 (current version).
3. Waste Management Project Office Quality Assurance Program Plan, NVO-196-18 (current version).
4. NNWSI Project Administrative Procedures Manual, January 1985.
5. NNWSI Project Plan, NVO-196-41, February 1986.
6. Environmental Assessment, Yucca Mountain Site, DOE/RW-0073, May 1986.
7. Documents defining quality assurance requirements listed in Section 15.
8. DOE Order 4700.1, dated March 6, 1987.
9. Nuclear Waste Policy Act of 1982, Public Law 97-425, January 7, 1983.
10. Draft Exploratory Shaft Test Plan (Rev. 1), (NVO-244) January 1986.
11. Project Management Plan for Exploratory Shaft at Yucca Mountain, August 1983 (NVO 255) (in revision).
12. Site Characterization Plan (SCP) Annotated Outline, February 1985.
13. SCP Management Plan, November 1986 (Rev. 1).
14. SCP-Conceptual Design Report (SAND84-2641), in preparation, 1987.
15. Mission Plan for the Civilian Radioactive Waste Management Program, DOE/RW-0005, June 1985.
16. OCRWM Mission Plan Amendment, DOE/RW-0128, June 1987.
17. NNWSI Project Systems Engineering Management Plan (in preparation).
18. NNWSI Project Configuration Management Plan (in preparation).
19. Office of Civilian Radioactive Waste Management Systems Engineering Management Plan, DOE/RW-0051, October 1985.
20. U. S. Department of Energy, 1985, Systems Engineering Management Plan for the Office of Geologic Repositories, OGR/13-7: Office of Civilian Radioactive Waste Management, Washington, D.C.

21. Subsystem Design Requirements to support the Advanced Conceptual Design Studies for the Yucca Mountain Mined Geologic Disposal system, SAND85-0260 (in preparation).
22. Procedural Agreement Between USNRC and USDOE Identifying Guiding Principles for Interface During Site Investigations and Characterization, (Morgan-Davis Agreement), June 29, 1983.
23. OCRWM Records Management Plan Draft (September 23, 1987).
24. NNWSI Project Records Management Plan Draft (in preparation).
25. NNWSI Project Regulatory Compliance Plan (in preparation).

2.0 PROJECT OBJECTIVES

The NNWSI Project was organized in 1977 to consider the general suitability of the Nevada Test Site (NTS) for a geologic repository for high-level nuclear waste and to identify specific sites on or adjacent to the NTS that might be suitable for a repository. In February 1983 the DOE formally identified Yucca Mountain (Figure 2-1) as one of nine national potentially acceptable repository sites. In May 1986, the final Environmental Assessments (EA) were issued to the public. The Secretary of the DOE recommended three of the final five sites to the President and the President then approved three sites for site characterization: Yucca Mountain in Nevada; Hanford, Washington; and Deaf Smith, Texas. The Project technical, schedule, and cost objectives to achieve Project goals are summarized here.

2.1 TECHNICAL OBJECTIVES

Technical objectives of the NNWSI Project span geologic, hydrologic, geochemical, geophysical, metallurgic, engineering, radiologic, archaeological, environmental, and socioeconomic disciplines that are required to establish the suitability of the Yucca Mountain site as a possible high-level nuclear waste repository. A Common Issues Hierarchy has been issued by the Office of Geologic Repositories to the Project offices. A summary is included in this PMP as Annex 4. These issues must be addressed during site characterization. Information needs have been identified to facilitate resolution of the common issues and are defined in the Site Characterization Plan, Section 8.2. The following technical objectives are required in order to obtain the information needed to resolve issues and, as a result, show that the site may be suitable for a geologic high-level waste repository.

The technical objectives of the NNWSI Project are:

1. To establish the suitability of the Yucca Mountain site by:
 - a. Demonstrating compliance with the postclosure siting guidelines of DOE Standard 10 CFR 960; i.e., demonstrating that the present and expected geohydrology, geochemistry, and rock characteristics of the site are compatible with the U. S. Nuclear Regulatory Commission (NRC) and U.S. Environmental Protection Agency (EPA) requirements for waste containment and isolation and that predicted climatic changes, erosion, dissolution, tectonics, and potential for human interference are such that radionuclide releases are not likely to exceed the applicable EPA requirements.
 - b. Demonstrating compliance with the preclosure siting guidelines of 10 CFR 960; i.e., demonstrating that projected radiological exposures to restricted and unrestricted areas during repository operation and closure meet the applicable requirements in 10 CFR 20, 10 CFR 60, and EPA Standard 40 CFR 191; showing that the environment shall be adequately protected from the hazards posed by disposal of radioactive waste; and demonstrating that

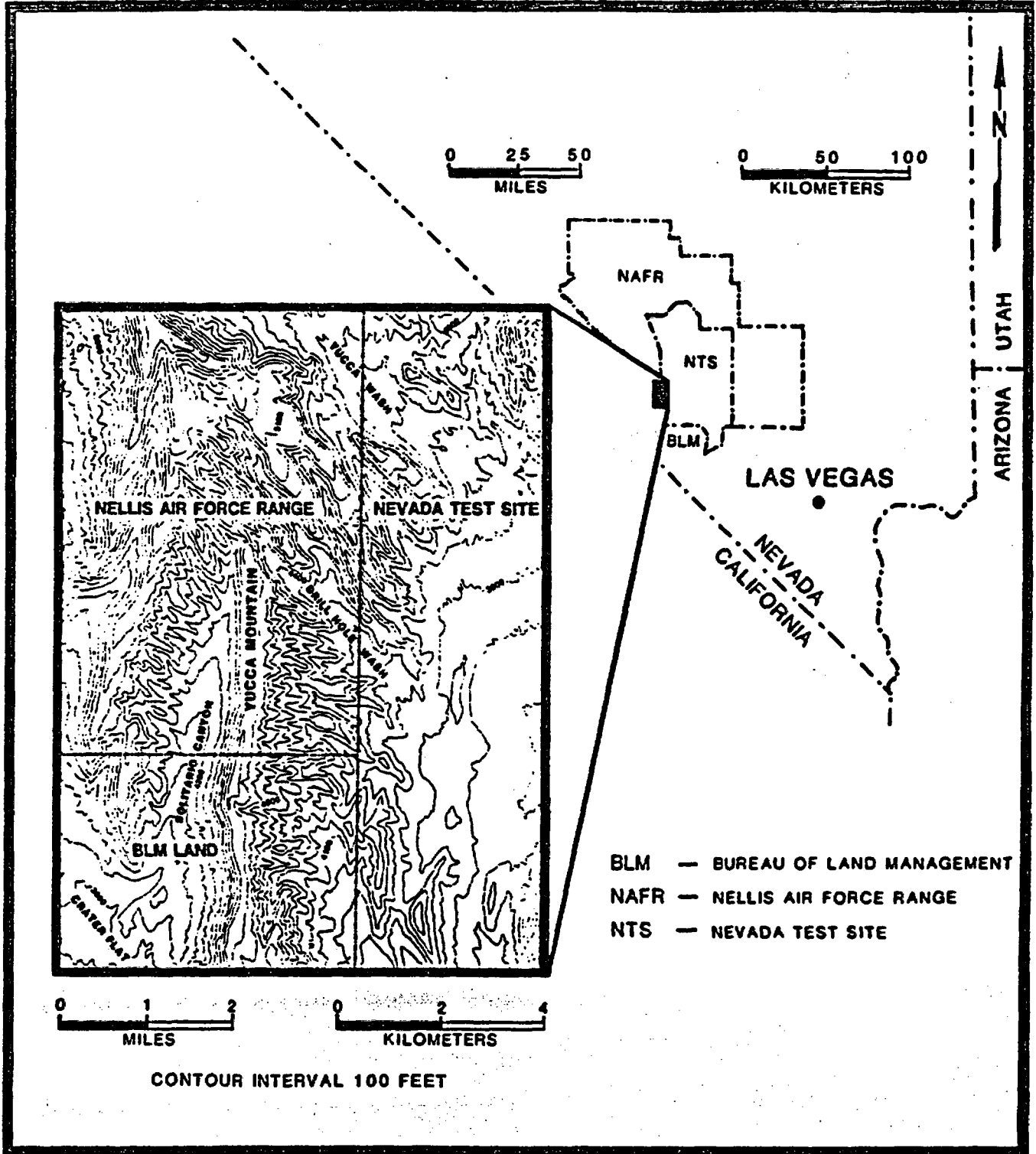


Figure 2-1. Location of the Yucca Mountain site in southern Nevada.

repository siting, construction, operation, and closure are technically feasible.

2. To complete designs for the mined geologic disposal system at Yucca Mountain that are adequate to support a license application to the NRC, including:
 - a. A demonstration that the waste package will comply with the postclosure design criteria of 10 CFR 60.135, which specifies that interactions of the waste package with the environment should not degrade overall repository performance, and a demonstration that the waste package will comply with the preclosure design criteria of 10 CFR 60.135 for waste containment.
 - b. A demonstration that the repository and repository-engineered barriers will comply with the postclosure design criteria of 10 CFR 60.133, which specify that the underground facility should contribute to containment and isolation; and a demonstration that the repository will comply with the preclosure design criteria of 10 CFR 60.131 through 60.133, which specify that the repository should maintain radiation doses, levels, and concentrations in the air within the limits of 10 CFR 20, and should also comply with mining regulations for worker safety.
 - c. A demonstration that the shaft and borehole seals will comply with postclosure design criteria of 10 CFR 60.134, which specifies that seals should not become pathways that compromise the performance of the geologic repository.
3. To develop the analytical methods and models required to perform the evaluations that support demonstrations of preclosure and post-closure performance including:
 - a. A demonstration that predicted radionuclide releases to the accessible environment are in compliance with the limits specified in EPA Standards 40 CFR 191.13, 40 CFR 191.15, and 40 CFR 191.16.
 - b. A demonstration that the waste packages will provide substantially complete containment as required by 10 CFR 60.113.
 - c. A demonstration that the waste package and repository engineered barriers will meet the radionuclide release rates specified by 10 CFR 60.113.
 - d. A demonstration that the site will meet the performance objective for pre-waste-emplacement ground-water travel time as required by 10 CFR 60.113.
 - e. A demonstration that the performance confirmation program meets the requirements of 10 CFR 60.137.

- f. A demonstration that the average radiation dose to members of the public within any highly populated area will be less than a small fraction of the allowable limits; and a demonstration that the expected radiation dose to any member of the public in an unrestricted area will be less than the allowable limits specified in 10 CFR 60.111, 40 CFR 191, and 10 CFR 20.
 - g. A demonstration that repository design, construction, and operation ensures the radiological safety of workers under normal operations as required by 10 CFR 60.111 and 10 CFR 20.
 - h. A demonstration that the repository design, construction, and operation ensures that credible accidents do not result in projected radiological exposures of the general public in unrestricted areas, or workers in the restricted area, in excess of applicable values.
 - i. A demonstration that the repository preserves the option of waste retrieval as required by 10 CFR 60.111.
4. To develop plans, schedules, and cost estimates for reference and alternate waste package and repository designs so that relative cost effectiveness can be determined.
 5. To collect site characterization data and information sufficient to provide the information required by repository and waste package design and to establish preclosure and postclosure performance, including site information on:
 - a. geohydrology (postclosure)
 - b. geochemistry
 - c. rock characteristics (postclosure)
 - d. climatic change
 - e. erosion
 - f. dissolution
 - g. tectonics (postclosure)
 - h. human interference
 - i. surface characteristics
 - j. rock characteristics (preclosure)
 - k. hydrology (preclosure)
 - l. tectonics (preclosure)
 6. To demonstrate that the mined geologic disposal system at Yucca Mountain can be sited, constructed, operated, closed, and decommissioned; and that the associated transportation system can be sited, constructed, and operated so that the quality of the environment will be protected and there will be no unacceptable risks to public health or safety. This will include:
 - a. Collection of data to form a sufficient baseline against which to assess environmental impacts, social and economic impacts, and transportation-related impacts.

- b. An assessment of the potential social and/or economic impacts that could be induced in communities and surrounding regions, and a determination of alternative mitigation or compensation strategies that could be employed to avoid, offset, or reduce these impacts.
- c. An assessment of projected transportation-related impacts and a determination of mitigation activities that will be employed to avoid or reduce these impacts.
- d. An assessment of the projected significant environmental impacts and risks to public health and safety that cannot be mitigated or otherwise avoided.
- e. An assessment of the projected environmental impacts and mitigation activities to be employed to avoid or reduce the impacts.

2.2 REGULATORY COMPLIANCE

The Nuclear Waste Policy Act requires that disposal of waste in a repository be under the licensing and regulatory control of the Nuclear Regulatory Commission. Consequently, Project management concepts specifically recognize that satisfaction of technical and administrative requirements established by another agency will be essential before the repository can be constructed or operated. The adjudicatory hearing process is defined in NRC 10 CFR 2. The DOE must defend its positions before a repository construction authorization or a license to receive radioactive material at the repository is issued by the NRC.

The hierarchy of applicable regulations are such that the acceptability of all components of the repository system important to public health and safety, as well as the acceptability of the system as a whole, and protection of the environment must be demonstrated. As shown in Figure 2-2, the prelicense submittal design, performance assessment, and site characterization and environmental data collection activities provide the integrated data base for demonstrating the acceptability of the components and the system. The resolution of licensing issues and the integration and documentation of the information used to resolve issues in the design and performance assessment area is central to successful completion of the Project.

Regulatory Topical Reports (RTRs) based on site investigation reports will be prepared by the Project as a mechanism for early interaction with the NRC (see Figure 2-2). The RTRs will be used to obtain agreement with the NRC staff on specific topics, generally documenting the Project position on a portion of an issue, rather than the issue as a whole.

The RTRs will contribute significantly to the development of Issue Resolution Reports, which will be used to support the site selection decision-making process and will be incorporated into the license application, should the Yucca Mountain site be selected. Thus, the objective of the issue resolution process is the development of high quality, defensible positions supportable by the DOE/HQ staff and the NRC staff that will serve as the basis for the license application. A more detailed discussion of the management of the

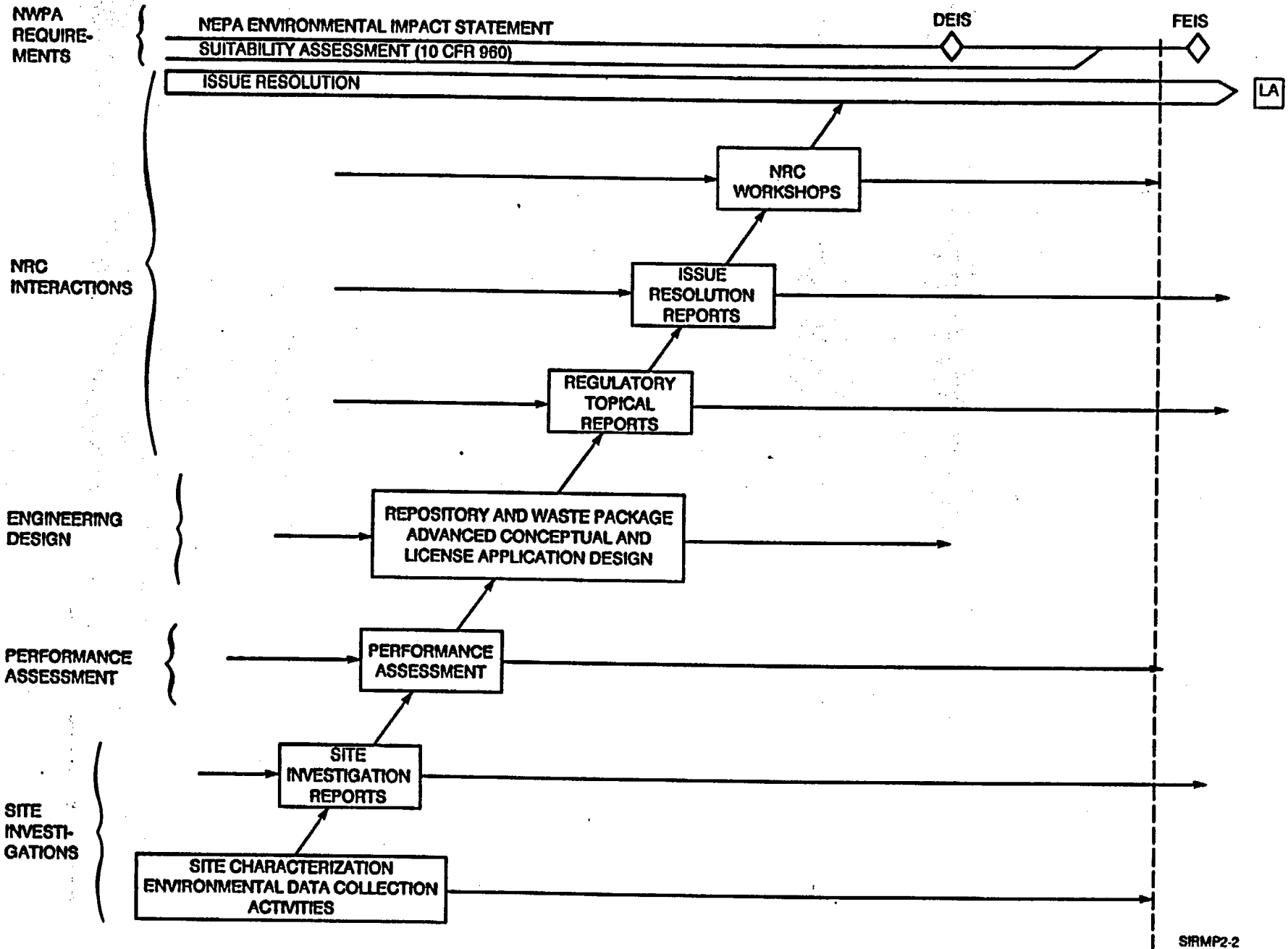


Figure 2-2. Simplified Issue Resolution Management Process.

issue resolution process is described in the Regulatory Compliance Plan, Chapter 8.0.

2.3 SCHEDULE OBJECTIVES

The schedule for the development of the first repository as established in the Nuclear Waste Policy Act of 1982 provides for an operational repository by 1998. The details of the implementation of the schedule were outlined in the Office of Civilian Radioactive Waste Management (OCRWM) Mission Plan. A revised schedule has been developed by DOE (OCRWM Mission Plan Amendment, June 1987) that has been presented to the U.S. Congress for approval. The decision of Congress is pending. Dates presented in this PMP reflect the revised dates given in the Amendment. The schedule objectives of the NNWSI Project are to complete the Site Characterization Plan (SCP), the Exploratory Shaft Facility (ESF) engineering effort, and site permitting so that exploratory shaft sinking, which is a major element of the detailed site characterization phase, can proceed. Figure 2-3 is an NNWSI Project key milestone overview as presented in the DOE Mission Plan (June 1985) and slightly modified based on FY 89 Work Authorization System (WAS) submittal dates.

2.4 COST OBJECTIVES

The most current and comprehensive statement of Project cost objectives is presented in the annual budget submission developed in accordance with the Work Authorization System, per DOE Order 5700.7B. That document is too large to be physically incorporated into this plan and therefore is considered to be a companion document incorporated herein by reference.

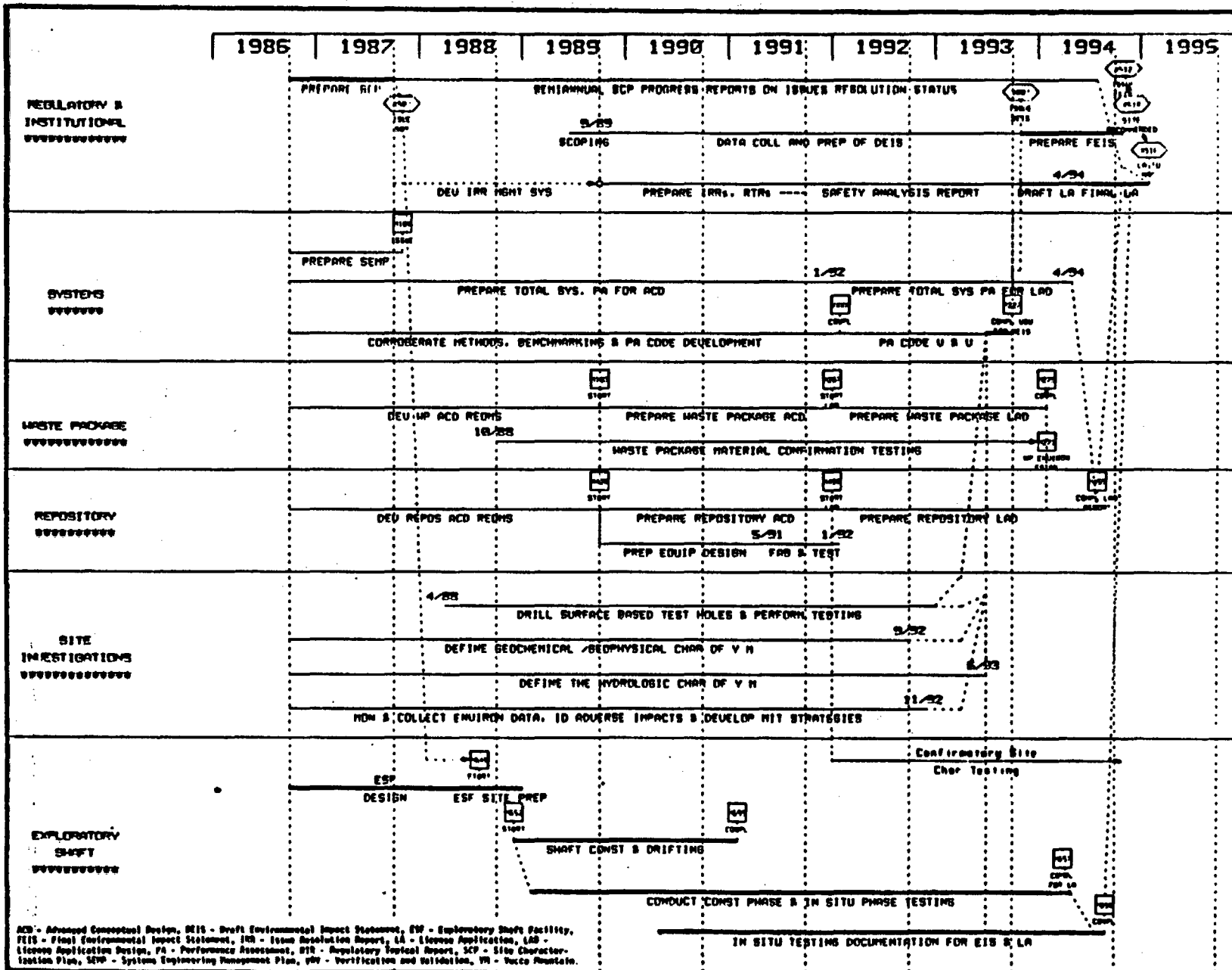


Figure 2-3. Headquarter's key milestone overview for the NNWSI Project, modified to incorporate FY 89 WAS reference case milestone dates.

3.0 MANAGEMENT ORGANIZATION AND RESPONSIBILITIES

3.1 ORGANIZATIONS

The relationship of the OCRWM to the Office of Geologic Repositories (OGR) and other program offices, and the relationship of the OGR to Project offices are shown and discussed in the NNWSI Project Plan (February 1986), Section 4.0.

The DOE Nevada Operations Office (DOE/NV) established the Waste Management Project Office (WMPO) to manage the NNWSI Project. The DOE/NV and WMPO organizational charts are shown in Figures 3-1 and 3-2, respectively. The WMPO organization chart shows its relationship to DOE/NV matrix support. Matrix support for the Project is described in detail in Section 4.0 of this PMP. Figure 3-3 is a functional description of each branch in WMPO. Figure 3-4 is a summary organization chart for the entire project.

Project participant organization charts are included in the following order:

SAIC	Figure 3-5
SNL	Figure 3-6
Los Alamos	Figure 3-7
LLNL	Figure 3-8
USGS	Figure 3-9
USBR (Relationship to USGS)	Figure 3-10
F&S	Figure 3-11
H&N	Figure 3-12
REEC0	Figure 3-13

All organization charts listed in Section 3.1 are located at the end of Section 3.0.

3.2 RESPONSIBILITIES

A summary of the lead responsibilities of WMPO and the Project participants relative to principal Project functional areas follows. The responsibilities are described in greater detail in the Project Charter (January 16, 1987).

3.2.1 Project Guidance, Management, Control, and Direction

This section describes the functional responsibilities of each of the Project participants in the areas of Project guidance, management, control, and direction. The DOE Office of Civilian Radioactive Waste Management and DOE Office of Geologic Repositories responsibilities and authorities are described in the Project Plan (February 1986) and Project Charter (January 16, 1987).

3.2.1.1 DOE Nevada Operations Office

This office has the management responsibility, authority, and accountability for the execution of the Project. It provides management and administrative control over WMPO and monitors, controls, and supports all WMPO activities. Resources are allocated for adequate staffing and matrix support to the Project manager who assigns contractual authority for acquisition of materials and services. WMPO also assumes overall responsibility and provides guidance for Quality Assurance (QA), safety, and environmental activities. A detailed description of the NV authorities is in the Project Charter (January 16, 1987).

3.2.1.2 Waste Management Project Office

The WMPO is responsible for day-to-day execution of the Project, implementing Project policies, and directing efforts toward achievement of Project objectives. WMPO proposes budgets and changes to budgets, approves certain changes to Project scope and schedules, and identifies Project objectives, milestones, and deliverables. The Project Charter lists WMPO authorities and responsibilities in detail. WMPO is supported by a Technical and Management Support Services (T&MSS) contractor, responsible for overall integration of Project activities. The integrating contractor provides broad technical, operational, and managerial support to the WMPO, but WMPO retains sole responsibility and authority for authorization of work and direction of all Project participants.

3.2.2 Project Participants

Project participants are assigned activities that are thoroughly described by Work Breakdown Structure (WBS) element in the WBS Dictionary. In addition to the following summarized individual responsibilities, all organizations contribute to cost, schedule, and reporting activities and provide a Quality Assurance Program Plan (QAPP) that assures quality assurance support to Project activities. The national laboratories and USGS all contribute to the preparation of major documents such as the Site Characterization Plan (SCP) and Systems Engineering Management Plan and all contribute to development of the Exploratory Shaft Test Plan, as they will conduct tests in the Exploratory Shaft Facility (ESF). The following sections briefly summarize Project activities by organization.

3.2.2.1 Science Applications International Corporation (SAIC)

As mentioned earlier, SAIC is the T&MSS integrating contractor for the Project and as such, is responsible for the management and integration of all authorized activities performed by Project participants on the NNWSI Project. The integration effort involves both the direct provision of technical, scientific, and institutional expertise and the management and integration of support provided by all Project participants in connection with planning, design, field investigations, laboratory work, construction, and regulatory licensing and institutional activities related to the NNWSI Project. The T&MSS assists the Project Office in the identification and analysis of, and

compliance with, applicable statutory, regulatory, and program requirements; the preparation of the key decision documents identified in the Nuclear Waste Policy Act (NWPA, the Act) (e.g., EA, SCP, Environmental Impact Statement); the development and execution of Project management plans and strategies; the monitoring and coordination of work performed by Project participants, including the review of their work for completeness, technical sufficiency, and compliance with Project requirements; the preparation of assigned management, technical, and scientific reports and studies; the presentation to the public, the Program office, and affected Federal, state, and other agencies of Project positions, plans, and other Project-related information; and the execution, on an assigned basis, of any of the activities specified by the OCRWM-approved work breakdown structure.

3.2.2.2 Sandia National Laboratories (SNL)

Sandia has the lead responsibility for the systems and repository elements of the WBS. In this capacity they identify functions of all waste disposal components and provide detailed definitions of performance requirements, evaluate performance of natural and engineered barrier subsystems, are developing and will manage the Project Technical Data Base, and provide systems Performance Assessment to ensure total repository system and subsystem performance.

They also have responsibility to confirm site suitability for surface facilities by determining alluvial thickness and evaluating seismic hazards, and perform laboratory analyses to determine rock properties.

In their role as lead for Repository Development, SNL establishes the technological basis for repository development, provides the overall management and integration of the repository activities; provides for repository development and testing; evaluates and develops equipment and instrumentation to support the repository; develops and tests sealing concepts for tuff; and prepares conceptual designs for repository site preparation, surface facilities, shafts/ramps, underground excavations, and underground service facilities. SNL will develop repository operating and maintenance and repository decommissioning requirements.

Sandia is developing, verifying, validating, benchmarking, and documenting codes for assessing repository performance and will assess and document the safety and environmental characteristics of a repository system to meet anticipated Nuclear Regulatory Commission licensing requirements.

3.2.2.3 U.S. Geological Survey (USGS)

The USGS has the lead responsibility for geologic and hydrologic site investigation activities. They provide geologic data important to conditions and processes related to the stability of the site; collect and analyze high resolution geodetic information and prepare topographic contour maps, interpret the subsurface geologic framework of Yucca Mountain; develop a framework for understanding tectonic processes; identify ground-water flow paths, fluxes, and travel times within saturated and unsaturated zones; assess Quaternary hydrologic and climatic conditions as a basis for predicting

future conditions; and provide hydrologic data and interpretations important to conditions and processes related to the waste isolation capability of the site.

3.2.2.4 Los Alamos National Laboratory (Los Alamos)

Los Alamos is responsible for evaluation of the hazards of future volcanism with respect to burial of high-level radioactive waste at Yucca Mountain; planning and conducting tests needed to evaluate the geochemical characteristics of the site; determining the rock/ground-water interactions in and near Yucca Mountain; and determining the mineralogic and petrologic characteristics and variability of the site.

They support SNL sealing activities by evaluating materials for use in the site including various repository sealing components, and are responsible for development of a detailed plan for testing activities in the ESF.

3.2.2.5 Lawrence Livermore National Laboratory (LLNL)

LLNL has overall responsibility for managing work performed within the waste package WBS elements, which includes characterization of the time-dependent behavior of the hydrogeological environment for performance analysis; performing tests and evaluations to identify waste package components; characterizing the behavior of and determining the radionuclide release values of the various waste forms; developing, analyzing, fabricating, and testing waste package design; and testing waste forms under conditions that simulate those expected in a repository in the unsaturated zone.

In addition, LLNL defines the relationships that will permit extrapolation of test results to the extended periods of interest; develops product specifications and guidelines for waste acceptance; subjects the reference waste package materials, alternative alloys, and copper alloys to various corrosion tests; selects the candidate prototype canister materials and license application canister design; develops a waste-package model to predict the performance of individual components over time; and makes a quantitative prediction of waste-package performance with regard to containment time and release rates.

LLNL also is developing the EQ 3/6 geochemical modeling code used by LLNL and other participants and its supporting documentation.

3.2.2.6 Reynolds Electrical and Engineering Company, Inc. (REECo)

REECo is a Nevada Test Site (NTS) contractor that provides general support to the maintenance and operation of test site activities for the NNWSI Project; provides support for drilling, trenching, and construction activities related to the Project; performs design reviews and analysis, budgets, and schedules for the exploratory shaft; prepares site and roads for access to the ESF; provides utilities to support surface and subsurface operations; provides overall construction management of site surface and subsurface facilities including ES-1 and ES-2; and provides support for exploratory shaft testing programs.

In support of Project-related testing in G-Tunnel, REECO provides technical expertise for tuff rock properties field testing and provides support for prototype testing in G-Tunnel.

3.2.2.7 Fenix and Scisson, Inc. (F&S)

F&S is an NTS contractor with overall responsibility for the ESF subsurface design. In this capacity, F&S provides design reviews and analysis, budgets, and schedules for subsurface activities; provides design drawings, technical specifications, and engineering expertise for all ESF subsurface facilities; and provides support for the exploratory shaft testing programs.

F&S also provides support to Project testing activities in G-Tunnel by providing engineering support for geologic characterization and material sampling, and providing technical expertise for tuff rock properties field testing. They also provide Project participants with technical and planning support for drilling, trenching, and construction.

3.2.2.8 Holmes and Narver, Inc. (H&N)

H&N is an NTS contractor that has overall responsibility for ESF surface facilities design and as such, provides design drawings, technical specifications, and engineering design for all ESF site development surface facilities, surface utilities, underground power, and communication/instrumentation for both above and below ground; provides Title III support for field design changes and construction inspection.

H&N will also provide support for the exploratory shaft testing program and survey support for ES-1, ES-2, and subsurface excavation, as well as material testing and evaluation during construction.

In addition to ESF-related work, H&N provides Project participants with technical and planning expertise in support of surface activities related to drilling, trenching, and construction; and provides an interim Project records center with associated microfilming and storage of records. H&N also furnishes support to Project-related testing activities in G-Tunnel by providing engineering support for core drilling and quality assurance and testing documentation, and engineering, material testing, and survey support for test hole drilling and stemming, site testing, and prototype testing.

3.2.2.9 EG&G, Inc.

EG&G conducts ecological field studies to obtain data on flora and fauna of the Yucca Mountain site and vicinity.

3.2.3 SUPPORTING ORGANIZATIONS

3.2.3.1 U.S. Bureau of Reclamation (USBR)

The USBR supports USGS activities by developing flood inundation maps in support of USGS repository-siting efforts; and assisting the USGS in collection of engineering geology and hydrologic data from the ESF by providing staff to assist with planning, test design, prototype testing, labor intensive data collection, and test analysis.

3.2.3.2 Desert Research Institute/University of Nevada-Reno (DRI-Reno)

DRI-Reno is performing a survey for SAIC of the proposed repository site and vicinity to identify and categorize archaeological, historical, and cultural resources.

3.3 MAJOR INTERFACES

Interfaces between OCRWM, OGR, DOE Nevada Operations (NV), San Francisco Operations (SAN), Albuquerque Operations (AL), and the WMPO are explained in detail in the Project Charter (January 16, 1987) and are summarized in the Project Plan (February 1986).

3.3.1 Interfaces Between DOE and Project Participants

The NV office oversees and directs activities of WMPO. The NV Assistant Manager for Administration is the Contracting Officer for the NTS contractors that support the NNWSI Project. The WMPO Project Manager is the Contracting Officer's Technical Representative for SAIC, U.S. Department of Interior Interagency Agreement, and the State of Nevada Grant. He is Contracting Officer's Representative for the NTS contractors.

SAIC is under contract to NV. Although the Project is controlled by the NV Project Office (WMPO), SNL and Los Alamos are contracted through AL and LLNL is contracted through SAN. Management agreements exist between NV and AL, and NV and SAN. An interagency agreement exists between DOE/NV and the Department of Interior (DOI)/USGS for support on this Project. The interface between the USGS and USBR is clarified in a Memorandum of Understanding between the USGS and the USBR (refer to USBR organization chart, Figure 3-10).

NNWSI Project participants provide support as needed to the WMPO for SCP workshops, OGR coordination group meetings, and preparation of major Program documents such as the Mission Plan and DOE Siting Guidelines.

3.3.2 Interfaces Between Major Participants

The major forms of information exchange that facilitate interfaces among participants and the WMPO are informal weekly reports, formal monthly reports,

and formal communications as required. The Project Manager meets with the Technical Project Officers monthly and informally as needed. Data are exchanged through the quarterly technical reports prepared by each participant. Review of data and other reports prepared by participants prior to publication also results in data exchange. The Project has a technical data base, which is maintained by SNL and will contain all data generated in the Project. In addition, SNL maintains the Reference Information Base, which will contain reference data to be uniformly used by participants. Data are submitted to SNL for incorporation into the data base as they become available. A Project-wide information management system is being developed by SAIC.

3.3.3 Interfaces with the Public and the NRC

Informal agreements with the State of Nevada Nuclear Waste Project Office govern interaction with them; e.g., a representative is invited to attend the Project PM-TPO meetings each month and processes are in place to furnish the State with requested unpublished items. In addition, the DOE/NV has a Public Affairs Plan that addresses the NV policies regarding interaction with the public on all NV projects. An NNWSI Project-Specific Public Affairs Plan is being developed. A formal agreement between the DOE headquarters and the NRC exists, the Procedural Agreement Between the USNRC and USDOE Identifying Guiding Principles for the Interface During Site Investigations and Characterization, also known as the Morgan-Davis Agreement. This agreement governs interaction with the Project offices generally. A site-specific agreement between the Projects and the NRC, Appendix 7 of that agreement, establishes the interface between the NRC Onsite Representative and Project participants and the WMPO.

3.4 PROJECT STAFFING

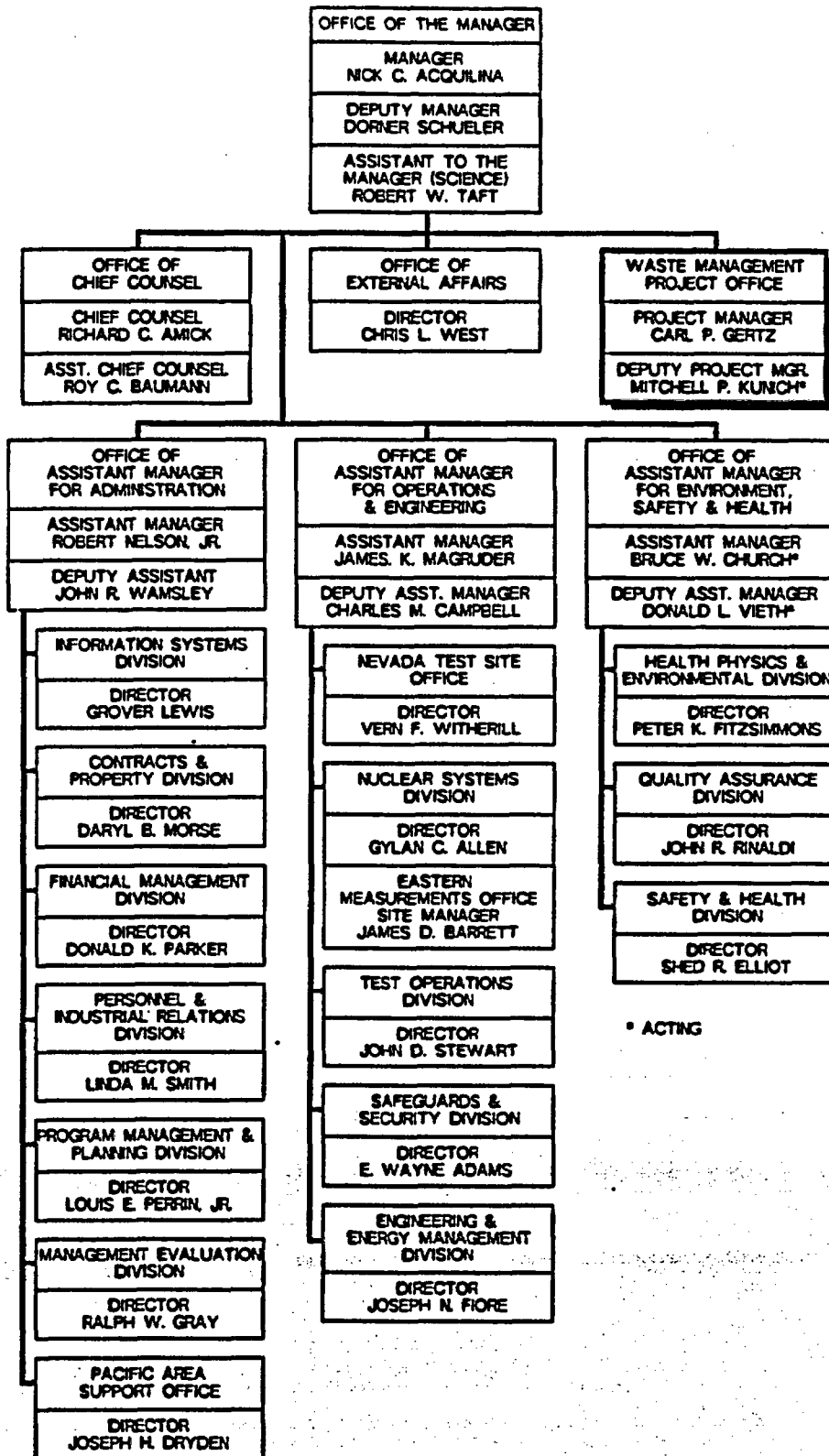
Projected manpower requirements for Project participants are shown in Table 3-1. The estimates are based on the FY 1988 WAS submittal.

Table 3-1. Manpower requirements for the Waste Management Project Office and the Nevada Nuclear Waste Storage Investigations Project participants

WBS element	Full-time-equivalent (FTE) manpower ^a				
	1987	1988	1989	1990	1991
1.2.1 Systems	46.8	64.8	73.8	85.1	85.5
1.2.2 Waste Package	41.8	52.1	65.6	66.0	59.5
1.2.3 Site	245.2	320.9	416.0	399.2	383.1
1.2.4 Repository	31.6	38.7	42.6	46.1	49.5
1.2.5 Regulatory and Institutional ^b	61.4	80.6	74.4	110.5	122.9
1.2.6 Exploratory Shaft	96.9	286.7	324.6	538.1	251.9
1.2.7 Test Facilities (Climax, G-Tunnel)	3.8	5.2	5.3	5.4	1.8
1.2.8 Land Acquisition	.9	2.2	2.5	4.0	4.0
1.2.9 Project Management	208.7	279.7	308.8	316.5	310.1
Total	737.1	1,130.9	1,313.6	1,570.9	1,268.3
WMPO (Federal Employees including Matrix FTE)	39	59	75	79	79

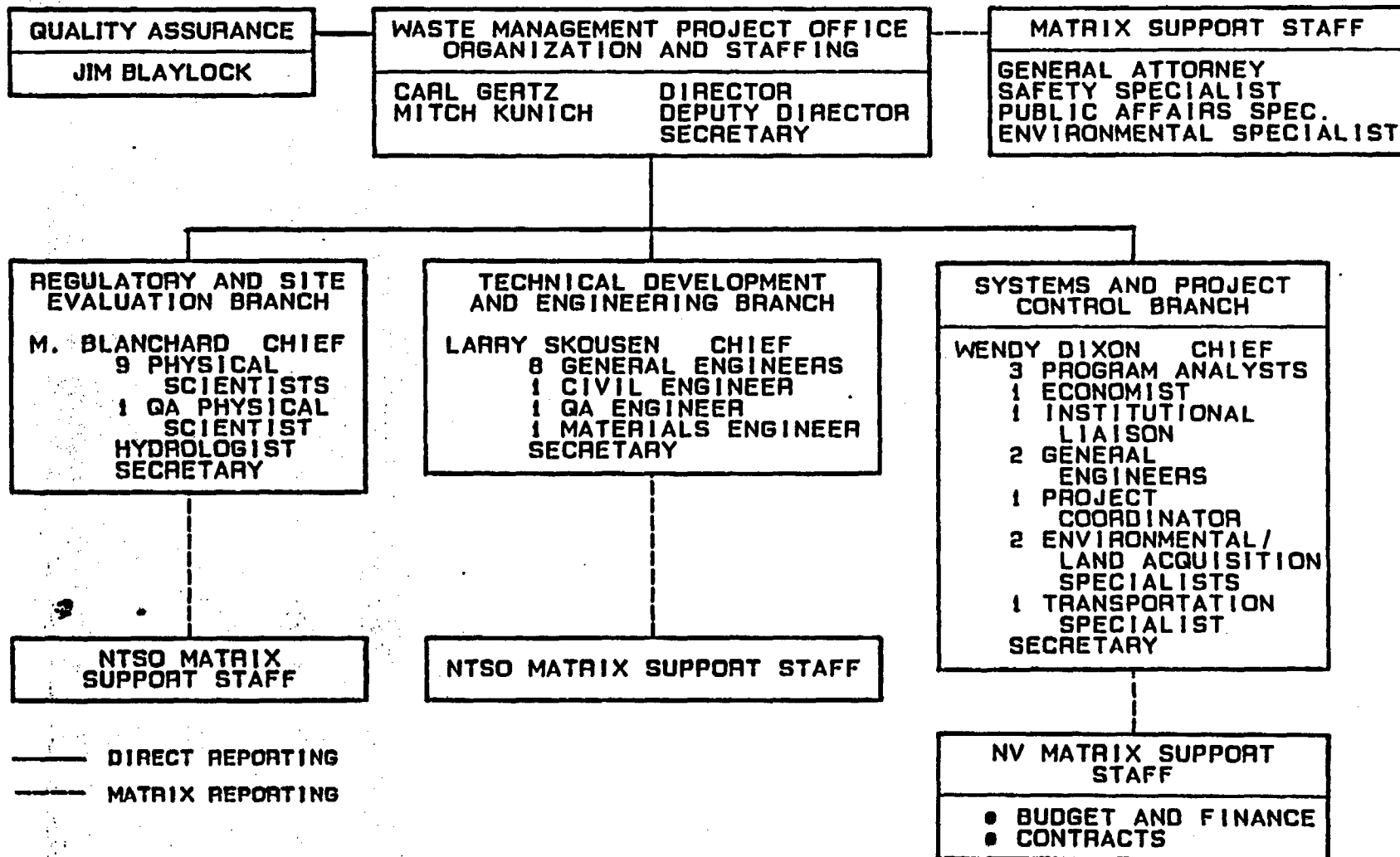
^aOnly direct FTE manpower estimates are given; subcontractors are not included.

^bDoes not include state grant



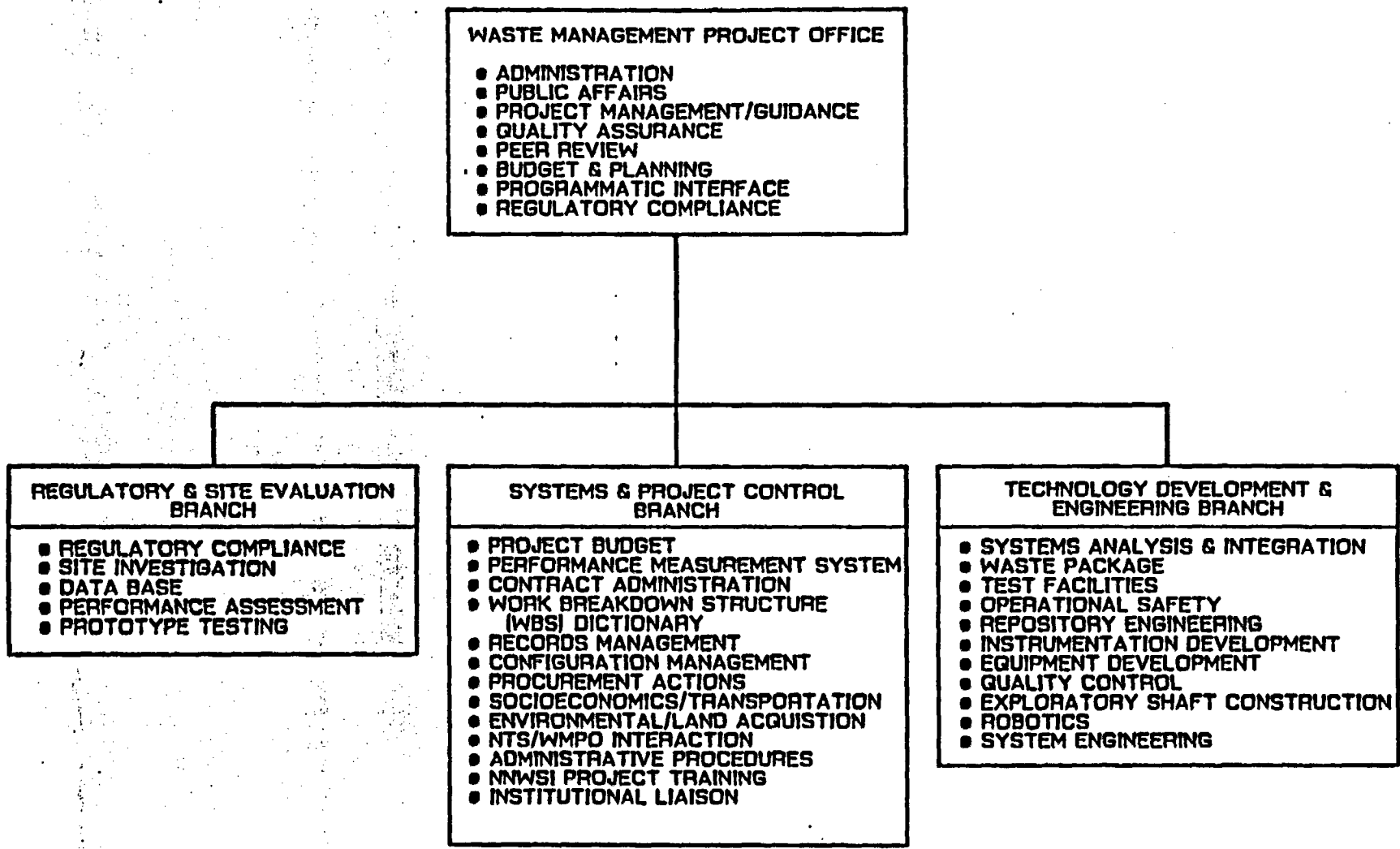
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Figure 3-1. United States Department of Energy - Nevada Operations Office.



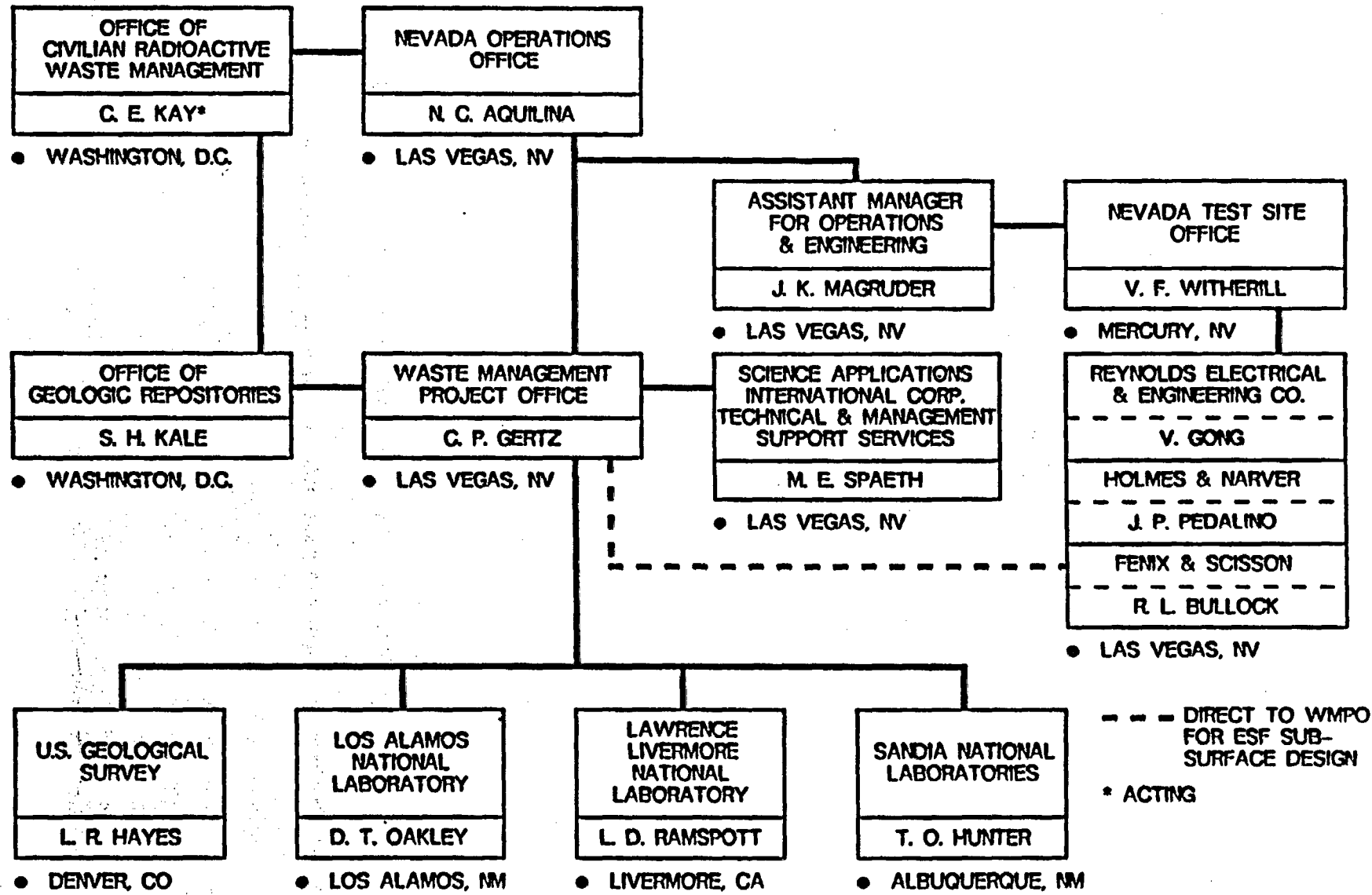
WMPDORG2-10/8/87-VA

Figure 3-2. Waste Management Project Office.



WMPOORG-10/7/87-VA

Figure 3-3. Waste Management Project Office functional organization chart.



[NWSI.ORG]

Figure 3-4. Nevada Nuclear Waste Storage Investigations Project.

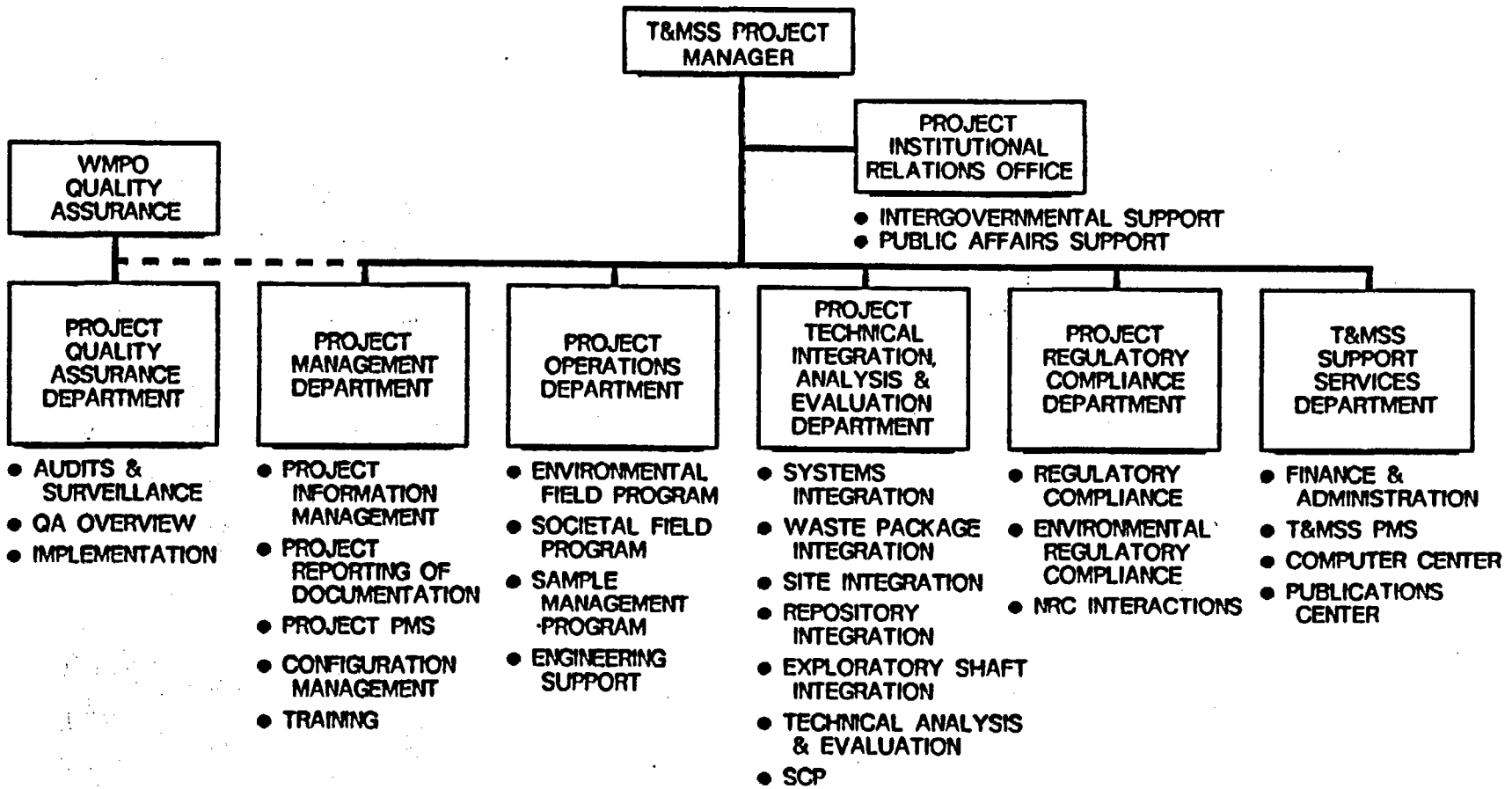
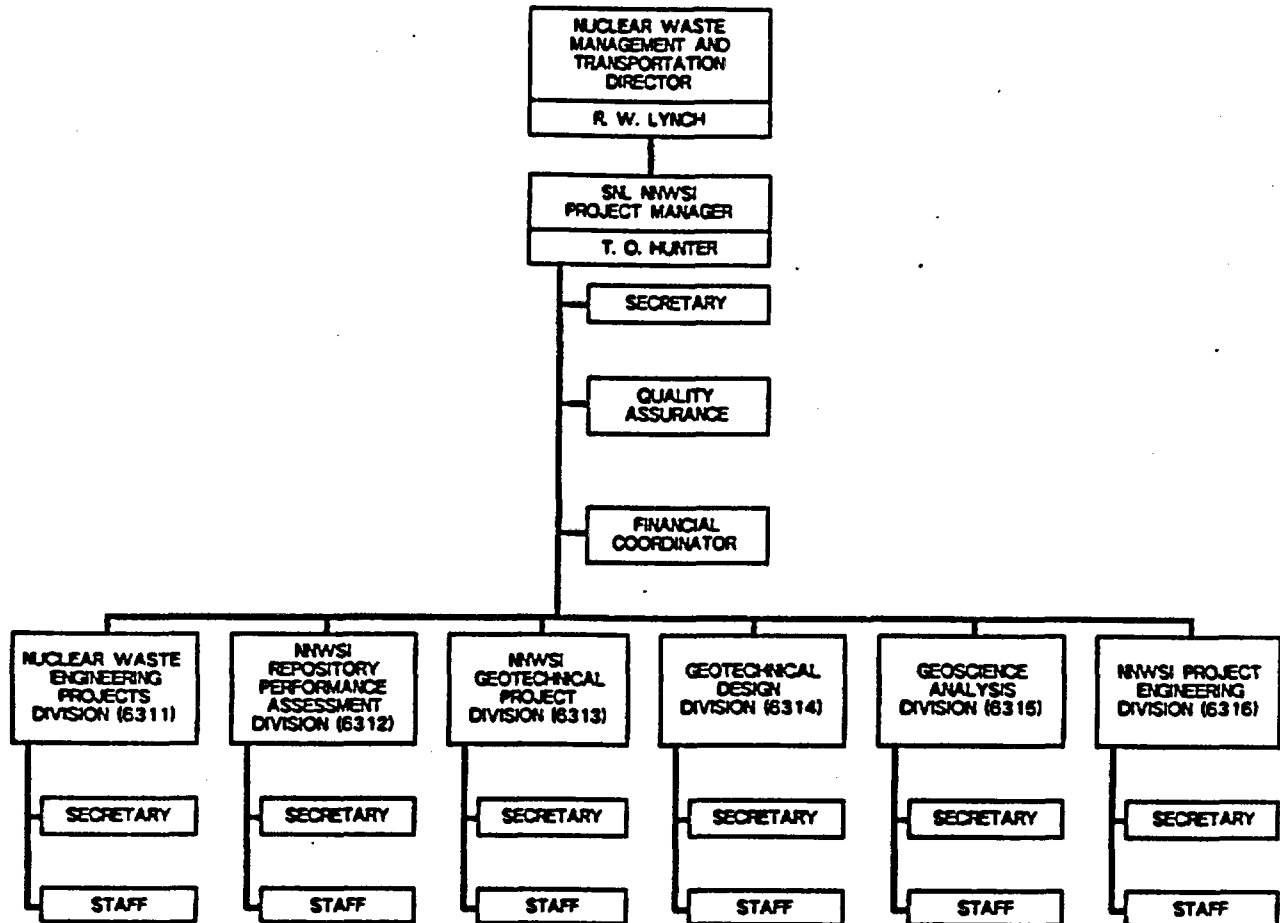


Figure 3-5. Science Applications International Corporation, Technical and Management Support Services functional organization chart.



[SNL.ORG:8/24/87]

Figure 3-6. Sandia National Laboratories.

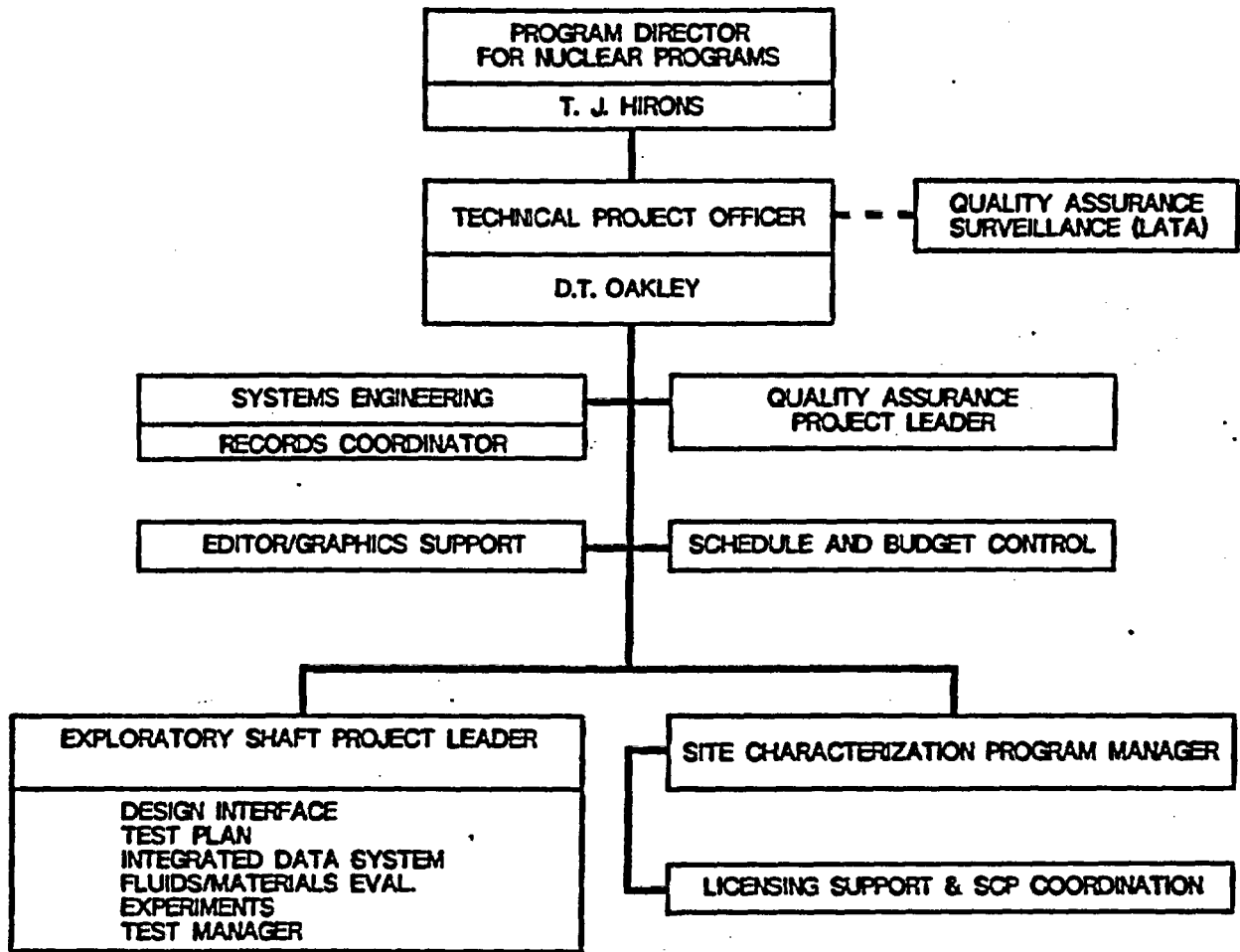
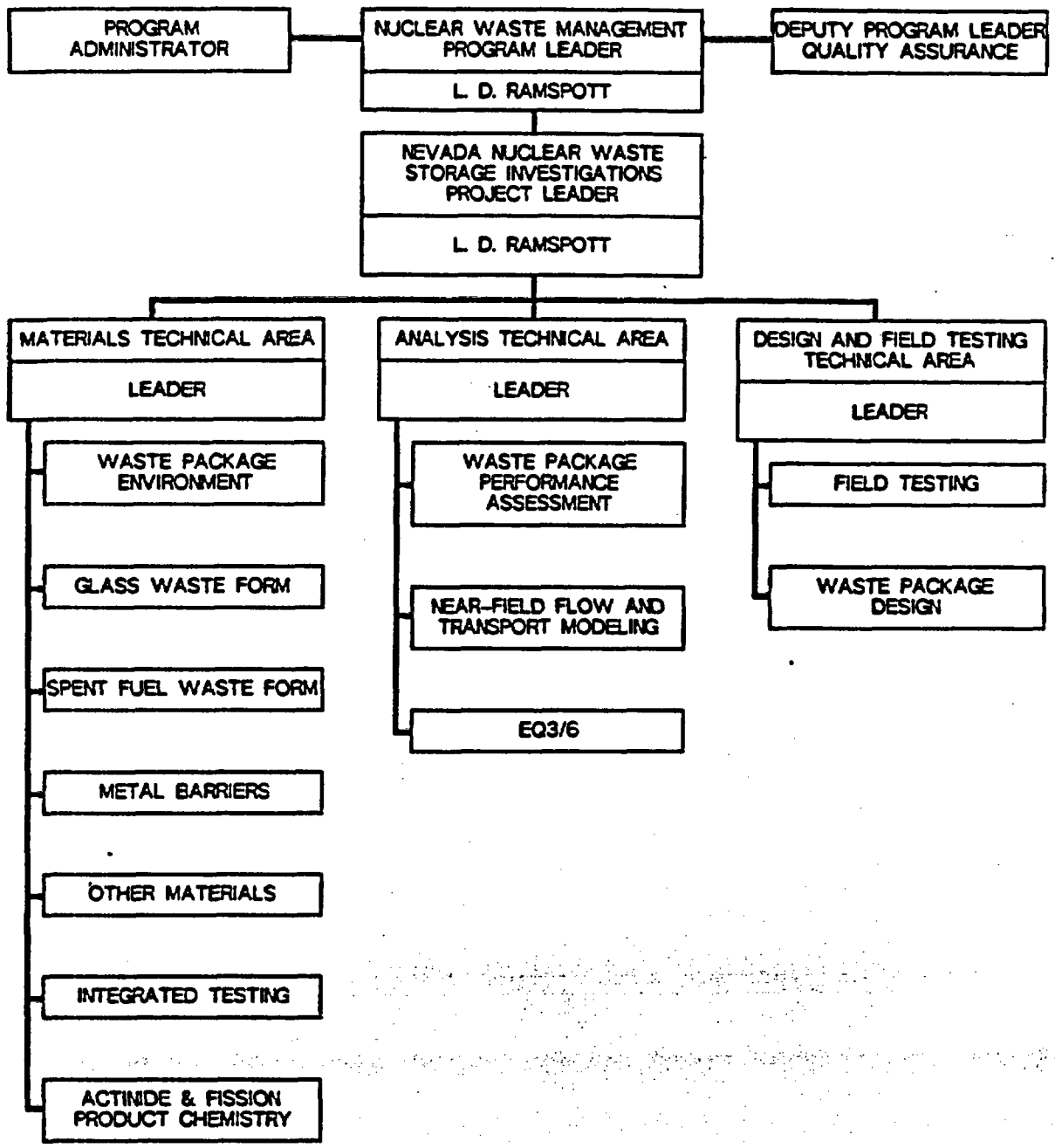


Figure 3-7. Los Alamos National Laboratory.



[LLNLORG:8/21/87]

Figure 3-8. Lawrence Livermore National Laboratory.

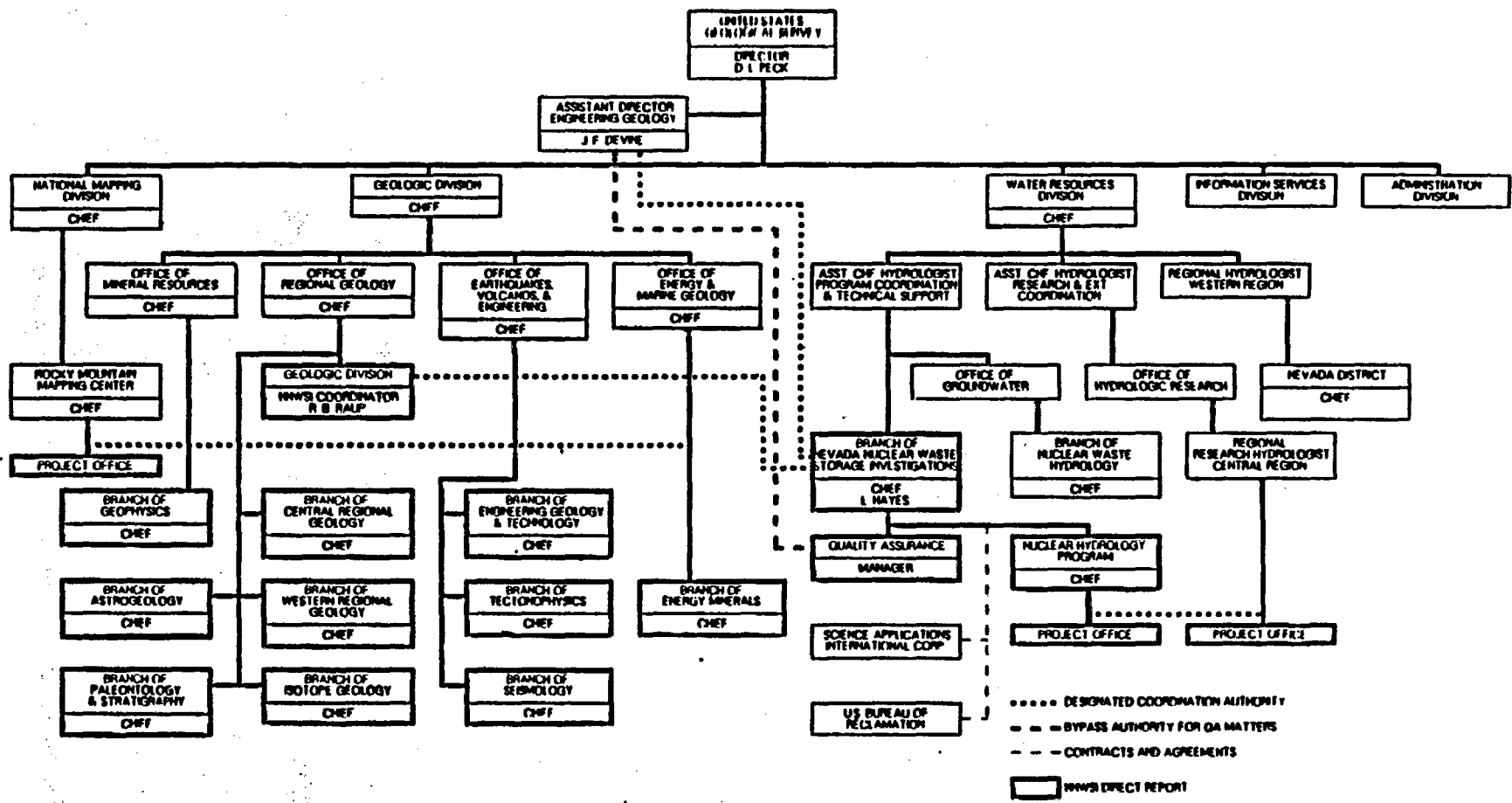
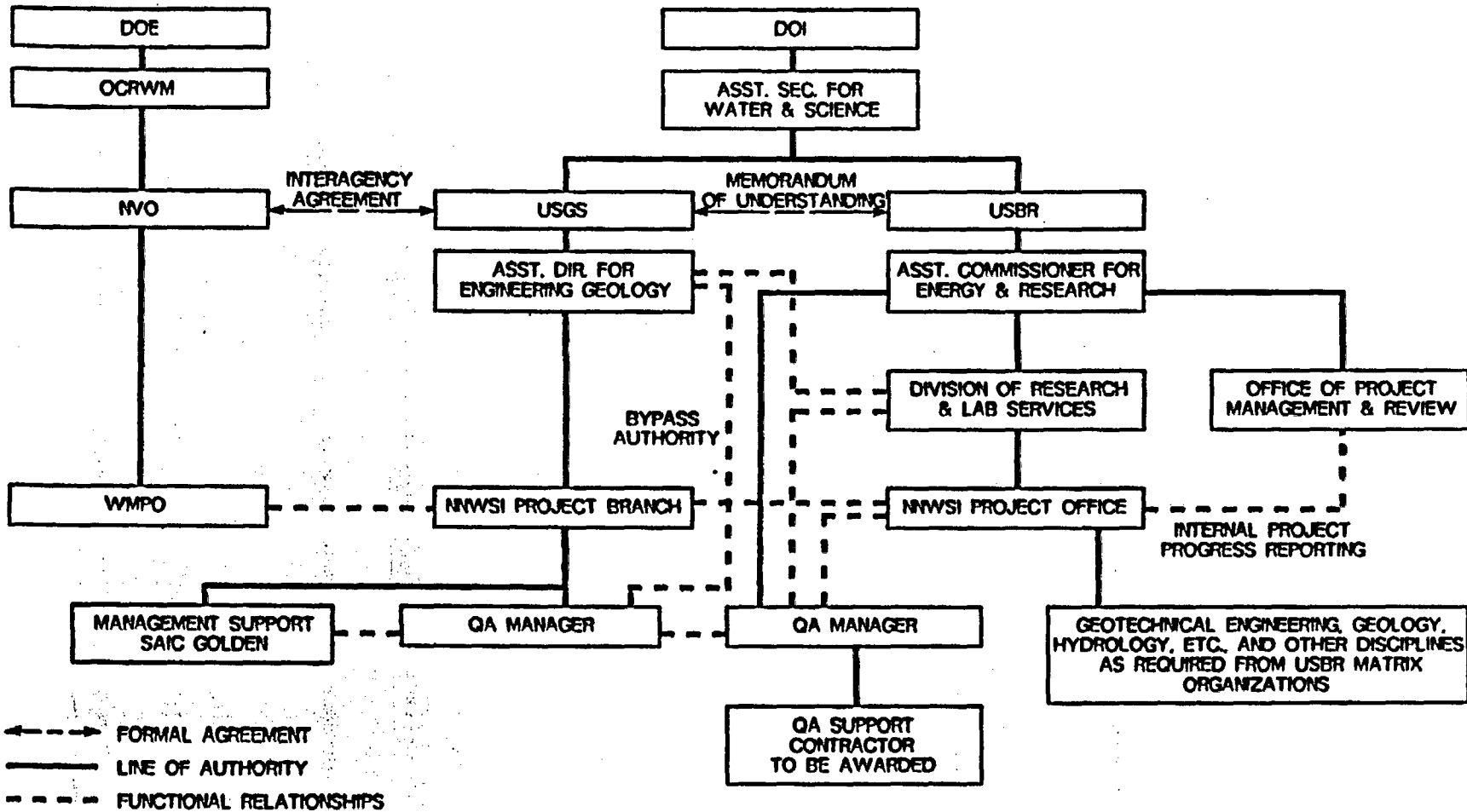


Figure 3-9. United States Geological Survey.



[USBR.ORG:7/27/87]

Figure 3-10. Bureau of Reclamation NNWSI Project Organization.

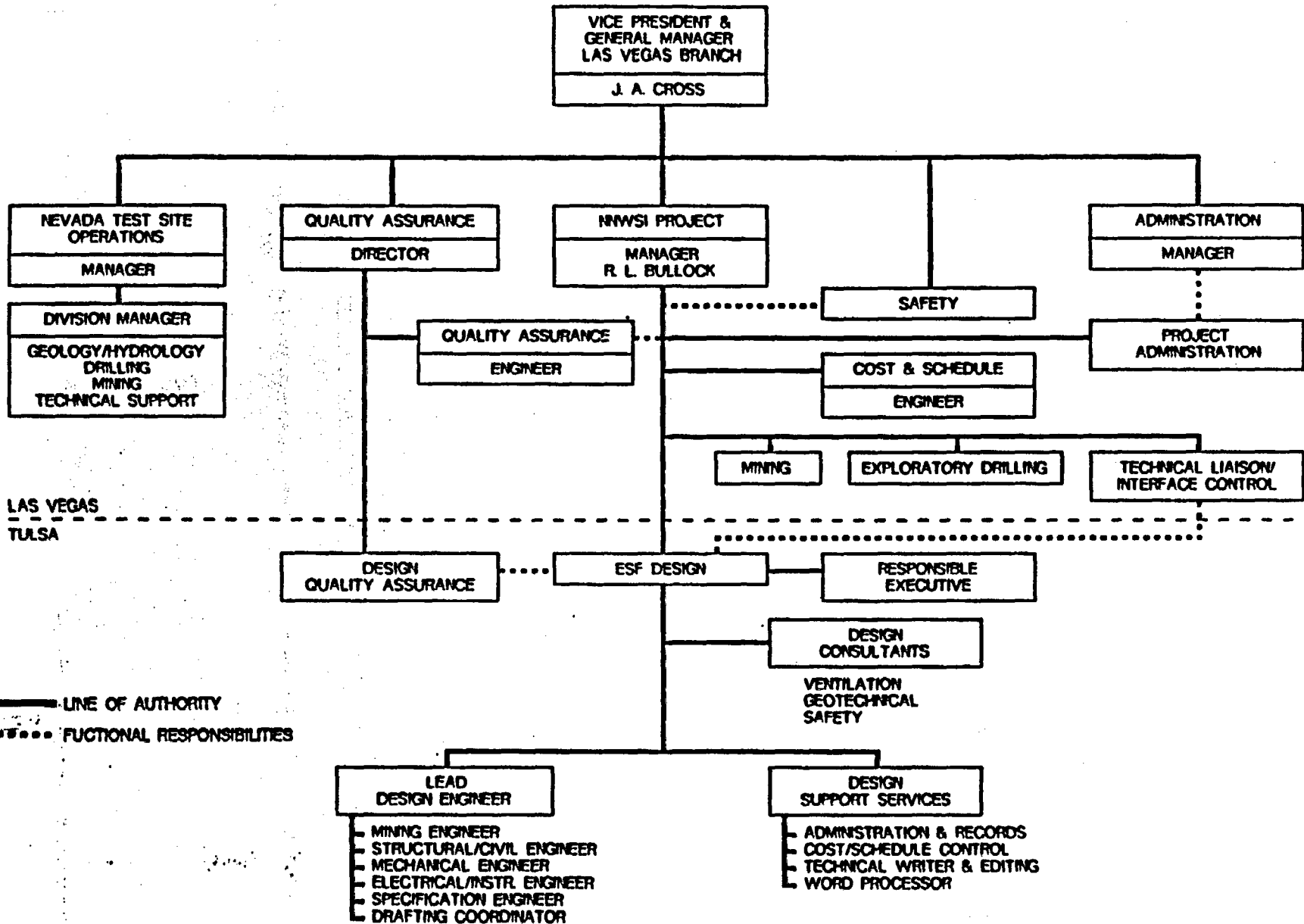


Figure 3-11. Fenix and Scisson, Inc.

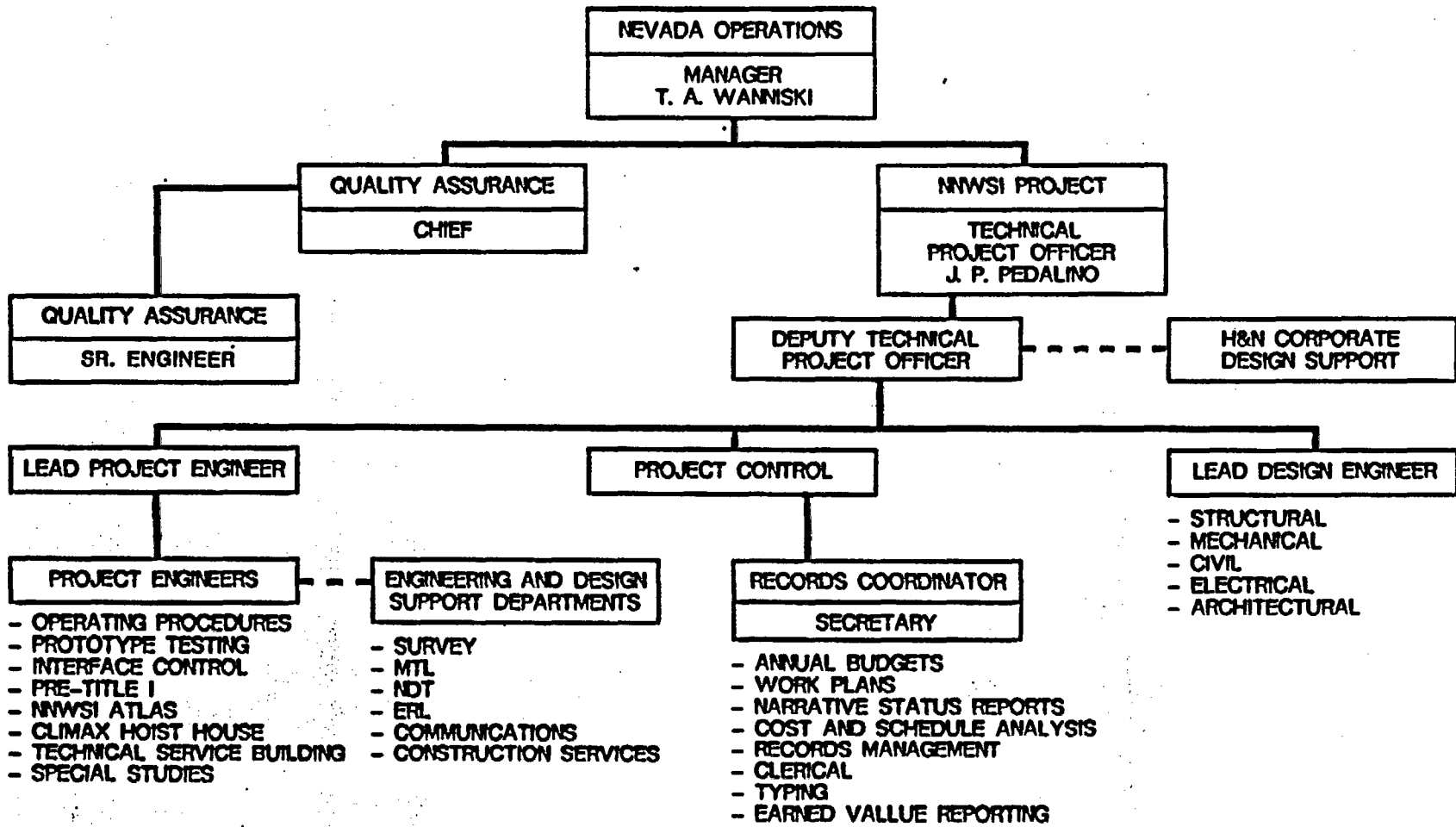
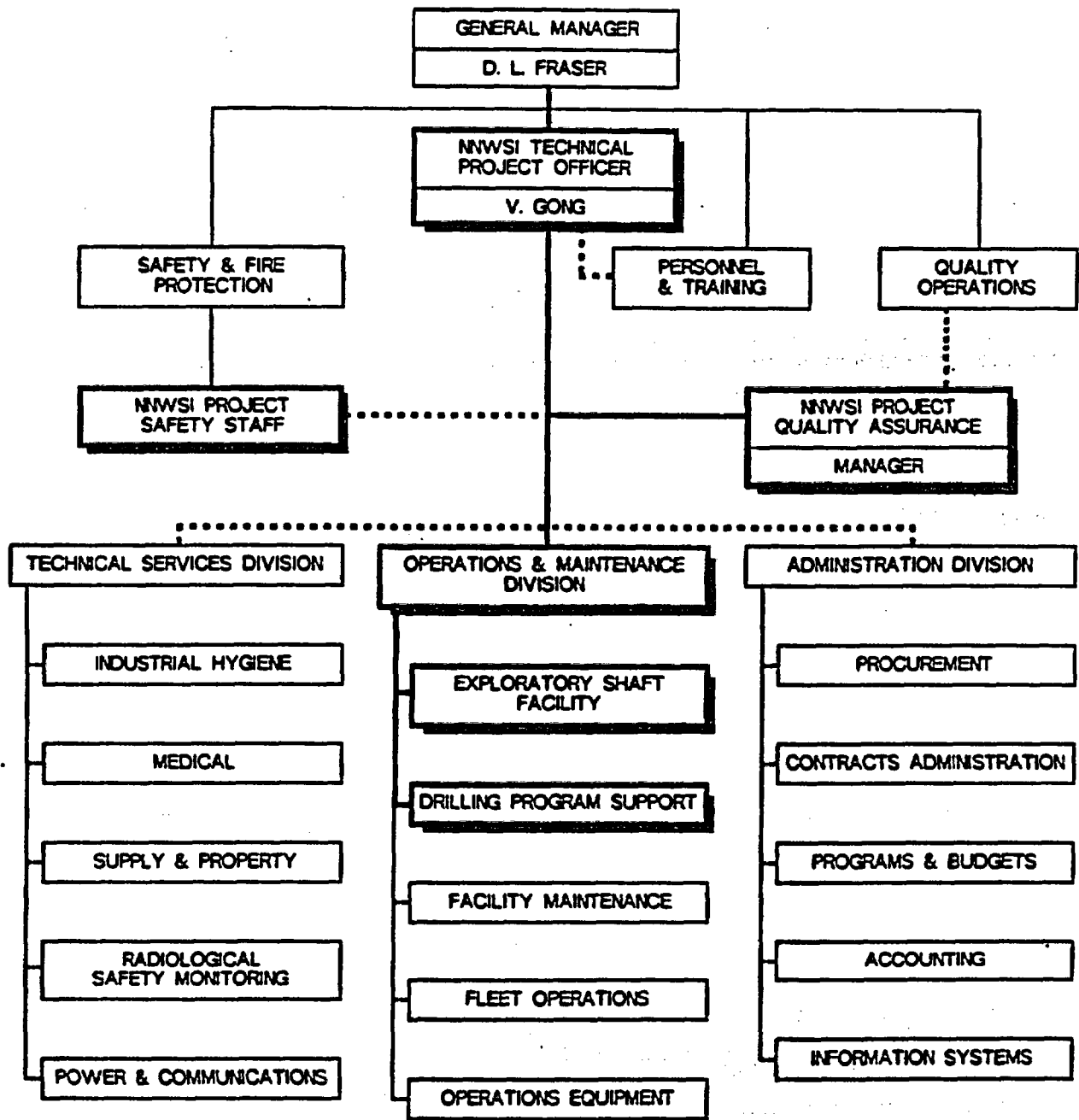


Figure 3-12. Holmes and Narver, Inc.

[HM.ORG:8/24/87]



————— OPERATIONAL & ADMINISTRATIVE AUTHORITY & ACCOUNTABILITY
 FUNCTIONAL SUPPORT MATRIX

(RECO.ORG)

Figure 3-13. Reynolds Electrical & Engineering Co., Inc.

4.0 FUNCTIONAL RELATIONSHIPS

Overall relationships together with a description of major responsibilities of the major Project participants have been described in Section 3.0, Management Organization and Responsibilities. The following discussions describe further the administrative and functional interrelationships among the NV organizational elements depicted in the Project organization chart (Figure 3-4). Policies and procedures that apply to the participants during day-to-day conduct of Project activities are summarized in this section and conflict resolution among organizational elements is briefly addressed.

4.1 POLICIES AND PROCEDURES

NTS-SOP-6001 (revised November 1981) is the Standard Operating Procedure (SOP) used in operating the NTS and other off-site locations. Administrative policies and procedures are established for preparation, approval, and distribution of criteria letters/work requests, work orders, and requests for work order modifications; preparation of Title I, Title II, and Title III design; and overtime. Included is a definition of each organization and a description of their responsibilities in accomplishing engineering, construction, and miscellaneous support at the NTS.

In addition, NNWSI Project SOP 03-01, "Engineering, Construction, and Support Services at the NTS," covers engineering and construction support for NTS activities and applies to Title I, Title II, and Title III ESF design activities.

The NNWSI Project Administrative Procedures Manual (January 1985) is a controlled document that establishes the minimum administrative requirements for which Project participants are responsible. Included are procedures for administrative procedure preparation and document control; conduct of Technical Project Officer (TPO) meetings and preparation and distribution of meeting minutes; publications review and clearance; document distribution; reporting; planning and scheduling; analysis of Project cost and status; the change control process; and participant/public interaction.

OGR procedures are issued to the projects and are controlled by the OGR Change Control process.

4.2 CONFLICT RESOLUTION

Should conflicts arise over priority use of NV resources or NV contractor resources, resolution will be effected through agreement between the WMPO Project Manager and the involved parties. If necessary, NV offices that maintain administrative authority over the involved parties will assist the WMPO Project Manager in resolving conflicts.

5.0 WORK PLANS

This section provides a summary Project description to present the framework around which work plans are built. It briefly describes the work plans that are incorporated by reference into this PMP.

5.1 SUMMARY PROJECT DESCRIPTION

The NNWSI Project is one of three projects that has been identified as a candidate for site characterization in the final Environmental Assessment dated May 1986. The President approved Yucca Mountain for site characterization in May 1986 when the Environmental Assessment (EA) was released to the public. Site characterization activities will take five years and should determine whether the site is suitable as a potential high-level nuclear waste geologic repository.

Technical activities in the Project require surface-based field work such as drilling boreholes, coring, and testing of the saturated and unsaturated zones using downhole geophysical logging methods. Other work includes laboratory measurements on core samples to identify thermomechanical, geochemical, petrologic, hydrologic, and petrographic properties of the rock. Engineering concepts and designs must be evaluated for surface and subsurface repository facilities. In situ tests will be conducted for hydrologic, thermomechanical, geochemical, and geologic conditions in the exploratory shaft, a major testing facility for site characterization.

If, after evaluating all data obtained during the site characterization phase of the Project, the site is determined by Congress to be the suitable site for the first geologic repository, the Governor of Nevada has the option to veto the congressional recommendation. Congress can override the Governor's veto. If it is overridden, the license application will be filed with the NRC. Upon approval of that application, a repository would be constructed at the Yucca Mountain site.

Quality assurance levels will be assigned to every activity within the Project according to the NNWSI Project SOP 02-02 (current revision). Quality assurance will be consistent with NVO-196-17 (current revision), the NNWSI Project Quality Assurance Plan, and with each participant organization's Quality Assurance Program Plan and attendant quality procedures and Standard Operating Procedures implemented by the WMPO.

5.2 PROJECT PARTICIPANT WORK PLANS

Project work plans for the current five-year period have been developed and prepared by each major participant organization for its activities. The work plans, which are updated annually, are included in their entirety in a separate Project internal document that is issued on a controlled basis. Current work plans are written to correspond to the Project Issues Hierarchy, which is consistent with the Common Issues Hierarchy.

Work plans are prepared to the lowest WBS element that is a current cost center and are organized according to the following format:

1. Objectives and issues addressed.
2. Principal investigator.
3. Statement of work.
4. Data and materials needed.
5. Nonstandard methods or techniques.
6. Location of work performance.
7. Quality assurance requirements.
8. Application of results.
9. Schedule.
10. Past and expected achievements.
11. Milestones and deliverables.
12. Cost.
13. Performance measurement.

A work plan may contain multiple discrete work packages or activities. The work plans describe in detail work that is being done to achieve the technical objectives of the Project as described in Section 2.1 of this PMP.

5.3 TECHNICAL CRITERIA

The OGR-approved Generic Requirements for a Mined Geologic Disposal System (MGDS) document (1984) establishes the technical criteria that govern the NNWSI Project. This document evolved from numerous federal regulations which are referenced in the document. The major federal regulations are:

1. 10 CFR 960, "General Guidelines for the Recommendation of Sites for the Nuclear Waste Repositories" (DOE siting guidelines).
2. 10 CFR 60, "Disposal of High-Level Radioactive Wastes in Geologic Repositories" (Nuclear Regulatory Commission (NRC) criteria).
3. 40 CFR 191, "Standards for Radioactive Releases to the Accessible Environment" (Environmental Protection Agency (EPA) standards).
4. 10 CFR 20 "Standards for Protection Against Radiation" (NRC standard).

6.0 WORK BREAKDOWN STRUCTURE

The NNWSI Project Work Breakdown Structure (WBS) has been developed to define, organize, and manage the major functions required to accomplish the objectives of the NNWSI Project. This product-oriented WBS is based upon the overall OCRWM Program objectives. It is subdivided into descending levels to provide increasingly detailed definition of the end objective. It establishes a common framework within the OGR program and permits assignment of responsibilities, delineates objectives for monitoring progress, and provides a basis for uniform planning and Project control.

6.1 PROJECT SUMMARY WORK BREAKDOWN STRUCTURE

The Project Summary WBS (revised 1986) was developed by OCRWM with input from all OGR projects. It provides a common framework, showing the relationship between all elements supporting the Project and provides a basis for reporting costs and controlling schedules during the Project's lifetime. The baselined NNWSI Project Summary WBS is based on the OGR summary WBS, extended to provide a detailed framework unique to the Nevada site. The current baselined NNWSI Project Summary WBS is presented in Figure 6.1.

6.2 DEFINITIONS OF PROJECT SUMMARY WORK BREAKDOWN STRUCTURE ELEMENTS

The detailed WBS Dictionary is incorporated into this PMP by reference. It is issued separately on a controlled basis. The dictionary is baselined and defines in detail the responsible participant, objectives, issues addressed, and a statement of work for each WBS element. The definitions are consistent with Project participant work plans and are reviewed annually.

1.2.1	SYSTEMS
1.2.1.1	Systems Management and Integration
1.2.1.1.S	SNL
1.2.1.1.T	SAIC
1.2.1.2	Systems Engineering
1.2.1.2.1.S	System Description
1.2.1.2.2.S	System Studies
1.2.1.2.3.S	Cost Schedule
1.2.1.2.4	Systems Engineering Integration
1.2.1.2.4.A	LANL
1.2.1.2.4.G	USGS
1.2.1.2.4.L	LLML
1.2.1.2.4.S	SNL
1.2.1.2.4.T	SAIC
1.2.1.2.5.T	Configuration Management & Change Control
1.2.1.3	Technical Data Base Management
1.2.1.3.1.S	Tuff Data Base
1.2.1.3.2.S	Computer Graphics
1.2.1.3.3.S	Reference Information Base
1.2.1.3.4.S	Data Base Management Computer Systems Support
1.2.1.4	Total Systems Performance Assessment
1.2.1.4.1.S	Flow & RN Transport
1.2.1.4.2.S	RN Source Term
1.2.1.4.3.S	Development & Certification of Computer Codes
1.2.1.4.4.S	RN Releases From Total System
1.2.2	WASTE PACKAGE
1.2.2.1	Management and Integration
1.2.2.1.L	LLML
1.2.2.1.R	REECo
1.2.2.1.T	SAIC
1.2.2.2.L	Package Environment

1.2.2.3	Waste Form & Materials Testing
1.2.2.3.1	Waste Form Testing
1.2.2.3.1.1.L	Waste Form Testing - Spent Fuel
1.2.2.3.1.2.L	Waste Form Testing - Glass
1.2.2.3.2.L	Metal Barrier Testing
1.2.2.3.3.L	Other Materials
1.2.2.3.4.L	Integrated Testing
1.2.2.4.L	Design, Fabricate, and Prototype Testing
1.2.2.5	Performance Assessment
1.2.2.5.1.L	Waste Package Performance Assessment Modeling
1.2.2.5.2.L	Near-field Flow and Transport
1.2.3	SITE INVESTIGATIONS
1.2.3.1	Management & Integration
1.2.3.1.A	LANL
1.2.3.1.G	USGS
1.2.3.1.R	REECo
1.2.3.1.S	SNL
1.2.3.1.T	SAIC
1.2.3.2	Geology
1.2.3.2.1	Geologic Investigations
1.2.3.2.1.1	Site Geology
1.2.3.2.1.1.G	USGS
1.2.3.2.1.1.S	SNL
1.2.3.2.1.2.G	Topographic Analysis
1.2.3.2.2	Geophysical Investigations
1.2.3.2.2.1.G	Gravity and Magnetics
1.2.3.2.2.2.G	Seismic Investigations
1.2.3.2.2.3.G	Rock Properties

Figure 6-1. NNWSI Project Work Breakdown Structure.

1.2.3.2.2.4.G	Heat Flow	1.2.3.4.1.5.A	Sorption
1.2.3.2.2.5.G	Remote Sensing	1.2.3.4.1.6.A	Dynamic Transport Process
1.2.3.2.3	Site Stability	1.2.3.4.1.7.A	Retardation Sensitivity Analysis
1.2.3.2.3.1	Tectonics and Volcanism	1.2.3.4.1.8.A	Applied Diffusion
1.2.3.2.3.1.A	LANL	1.2.3.4.1.9.A	Biological Sorption and Transport
1.2.3.2.3.1.G	USGS	1.2.3.4.2.A	Mineralogy & Petrology
1.2.3.2.3.2.G	Isotope Geology	1.2.3.4.3.A	Microbiology
1.2.3.2.3.3.G	Seismicity & Strain	1.2.3.5	Drilling
1.2.3.2.3.4.5	Weapons-Test Seismicity	1.2.3.5.1	Core Library
1.2.3.3	Hydrology	1.2.3.5.1.A	LANL
1.2.3.3.1.G	Stream Flow	1.2.3.5.1.F	F & S
1.2.3.3.2	Groundwater Flow Analysis	1.2.3.5.1.G	USGS
1.2.3.3.2.B	LBL	1.2.3.5.1.R	REECo
1.2.3.3.2.G	USGS	1.2.3.5.1.T	SAIC
1.2.3.3.3.G	Saturated Zone Hydrology	1.2.3.5.2	Drilling, Construction, Engineering
1.2.3.3.4.B	Unsaturated Zone Hydrology	1.2.3.5.2.A	LANL
1.2.3.3.4.G	Unsaturated Zone Hydrology	1.2.3.5.2.F	F & S
1.2.3.3.5	Future Hydrologic Conditions	1.2.3.5.2.G	USGS
1.2.3.3.5.1	Future Climates	1.2.3.5.2.H	H & N
1.2.3.3.5.1.B	LBL	1.2.3.5.2.R	REECo
1.2.3.3.5.1.G	USGS	1.2.3.5.3.F	Field Geology/Hydrology
1.2.3.3.5.2.G	Future Groundwater	1.2.3.5.4.P	Site Photography (PAN AM)
1.2.3.4	Geochemistry	1.2.3.6	Environment
1.2.3.4.1	Geochemistry	1.2.3.6.1	Environmental Surveys
1.2.3.4.1.1.A	Groundwater Chemistry	1.2.3.6.1.E	Ecology
1.2.3.4.1.2.A	Natural Isotope Chemistry	1.2.3.6.1.R	Environmental Monitoring - Radiological
1.2.3.4.1.3.A	Hydrothermal Geochemistry	1.2.3.6.1.R	Environmental Monitoring
1.2.3.4.1.4.A	Solubility Determination	1.2.3.6.1.S	Site Monitoring
		1.2.3.6.1.T	Environmental Monitoring
		1.2.3.6.1.U	Archeology
		1.2.3.6.2.T	Transportation
		1.2.3.7.T	Socioeconomic
Page 3	Changes thru 9/25/87	Page 4	Changes thru 9/25/87

Figure 6-1. NNWSI Project Work Breakdown Structure (continued).

1.2.3.6 Performance Assessment

1.2.3.6.L Geochemical Modeling Code EQ3/6
1.2.3.6.T Performance Assessment

1.2.3.9 Deferred Site Close Out

1.2.4 REPOSITORY INVESTIGATIONS

1.2.4.1 Management and Integration

1.2.4.1.1.S Management
1.2.4.1.2.S Basis for Design
1.2.4.1.3.S Major Design Deliverables
1.2.4.1.4.S Engineering Design Support; Special Studies
1.2.4.1.5.T Management and Integration Support

1.2.4.2 Development and Testing

1.2.4.2.1 Rock Mechanics

1.2.4.2.1.1.S Rock Mass Analysis
1.2.4.2.1.2.S Field Testing
1.2.4.2.1.3 Laboratory Properties

1.2.4.2.1.3.A LANL
1.2.4.2.1.3.S SNL

1.2.4.2.1.4.S Water Migration Analysis

1.2.4.2.2 Equipment & Instrumentation Development

1.2.4.2.2.1.S Equipment Engineering

1.2.4.2.3 Sealing

1.2.4.2.3.1.S Seal Performance Requirements
1.2.4.2.3.2 Seal Materials Evaluation

1.2.4.2.3.2.A LANL
1.2.4.2.3.2.S SNL

1.2.4.2.3.3.S Seal Concept Development

1.2.4.3 Facilities

1.2.4.3.1.S Site Preparation
1.2.4.3.2.S Surface Facilities
1.2.4.3.3.S Shafts/Ramps
1.2.4.3.4.S Underground Excavations
1.2.4.3.5.S Underground Service Systems

1.2.4.4 Operations and Maintenance

1.2.4.4.0 HEDL
1.2.4.4.5 SNL

1.2.4.5.S Decommissioning
1.2.4.6 Repository Performance Assessment

1.2.4.6.1.S Performance Code Dev. & Certif.
1.2.4.6.2.S Design Analysis
1.2.4.6.3.S Preclosure Safety Analysis
1.2.4.6.4.S Performance Confirmation

1.2.5 REGULATORY AND INSTITUTIONAL INVESTIGATIONS

1.2.5.1 Management and Integration

1.2.5.1.A LANL
1.2.5.1.G USGS
1.2.5.1.S SNL
1.2.5.1.T SAIC

1.2.5.2 Licensing

1.2.5.2.1 Regulatory Interactions

1.2.5.2.1.A LANL
1.2.5.2.1.G USGS
1.2.5.2.1.L LLNL
1.2.5.2.1.S SNL
1.2.5.2.1.T SAIC

1.2.5.2.2 Site Characterization Plan

1.2.5.2.2.A LANL

Figure 6-1. NNWSI Project Work Breakdown Structure (continued).

1.2.5.2.2.G	USGS
1.2.5.2.2.L	LLNL
1.2.5.2.2.S	SNL
1.2.5.2.2.T	SAIC
1.2.5.2.3	Construction Authorization Application
1.2.5.2.4	Preliminary Safety Analysis Report
1.2.5.3	Environmental Compliance
1.2.5.3.1	Environmental Assessment
1.2.5.3.1.A	LANL
1.2.5.3.1.G	USGS
1.2.5.3.1.L	LLNL
1.2.5.3.1.S	SNL
1.2.5.3.1.T	SAIC
1.2.5.3.2	Environmental Impact Statement
1.2.5.3.2.G	USGS
1.2.5.3.2.S	SNL
1.2.5.3.2.T	SAIC
1.2.5.3.3.T	Environmental Regulatory Interactions
1.2.5.3.4.T	Environmental Monitoring
1.2.5.4	Communication and Liason
1.2.5.4.1	Institutional Studies
1.2.5.4.1.S	SNL
1.2.5.4.1.T	SAIC
1.2.6	EXPLORATORY SHAFT INVESTIGATIONS
1.2.6.0	Decommissioning
1.2.6.1	Management and Integration
1.2.6.1.1	Exploratory Shaft Management, Planning and Design Review
1.2.6.1.1.A	LANL

1.2.6.1.1.F	F&S
1.2.6.1.1.G	USGS
1.2.6.1.1.H	H&N
1.2.6.1.1.L	LLNL
1.2.6.1.1.R	REECo
1.2.6.1.1.S	SNL
1.2.6.1.1.T	SAIC
1.2.6.1.2	Quality Assurance
1.2.6.1.2.A	LANL
1.2.6.1.2.F	F&S
1.2.6.1.2.G	USGS
1.2.6.1.2.H	H&N
1.2.6.1.2.L	LLNL
1.2.6.1.2.R	REECo
1.2.6.1.2.S	SNL
1.2.6.1.2.T	SAIC
1.2.6.2	Site Preparation
1.2.6.2.1	Site & Roads
1.2.6.2.1.H	H&N
1.2.6.2.1.R	REECo
1.2.6.2.2	Utilities & Communications Systems
1.2.6.2.2.H	H&N
1.2.6.2.2.R	REECo
1.2.6.3	Surface Facilities
1.2.6.3.1	Buildings
1.2.6.3.1.F	F&S
1.2.6.3.1.H	H&N
1.2.6.3.1.R	REECo
1.2.6.4	First Shaft
1.2.6.4.1	Shaft and Liner
1.2.6.4.1.F	F&S

Figure 6-1. NNWSI Project Work Breakdown Structure (continued).

1.2.6.4.1.H	H&N
1.2.6.4.1.R	REECo
1.2.6.4.2	Hoist and Headframe
1.2.6.4.2.F	F&S
1.2.6.4.2.H	H&N
1.2.6.4.2.R	REECo
1.2.6.5	Second Shaft
1.2.6.5.1	Shaft and Liner
1.2.6.5.1.F	F&S
1.2.6.5.1.H	H&N
1.2.6.5.1.R	REECo
1.2.6.5.2	Hoist and Headframe
1.2.6.5.2.F	F&S
1.2.6.5.2.H	H&N
1.2.6.5.2.R	REECo
1.2.6.6	Subsurface Excavations
1.2.6.6.F	F&S
1.2.6.6.H	H&N
1.2.6.6.R	REECo
1.2.6.7	Underground Service Systems
1.2.6.7.1	Utilities & Communications
1.2.6.7.1.F	F&S
1.2.6.7.1.H	H&N
1.2.6.7.1.R	REECo
1.2.6.7.2	Mine Plant
1.2.6.7.2.F	F&S
1.2.6.7.2.H	H&N
1.2.6.7.2.R	REECo
1.2.6.7.3	Shaft Internals & Conveyances-First Shaft
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1.2.6.7.3.F	F&S
1.2.6.7.3.H	H&N
1.2.6.7.3.R	REECo
1.2.6.7.4	Shaft Internals & Conveyances-Second Shaft
1.2.6.7.4.F	F&S
1.2.6.7.4.H	H&N
1.2.6.7.4.R	REECo
1.2.6.8	Operations
1.2.6.8.1.R	Site & Equipment Maintenance
1.2.6.8.2.R	Project Operations
1.2.6.8.3.R	Training
1.2.6.9	Testing
1.2.6.9.1	Exploratory Shaft Test Plan
1.2.6.9.1.A	L&M
1.2.6.9.1.G	USGS
1.2.6.9.1.L	LL&M
1.2.6.9.1.S	SNL
1.2.6.9.2	Exploratory Shaft Testing
1.2.6.9.2.1	Geologic Testing
1.2.6.9.2.1.B	LBL
1.2.6.9.2.1.F	F&S
1.2.6.9.2.1.G	USGS
1.2.6.9.2.1.H	H&N
1.2.6.9.2.1.P	Pan Am
1.2.6.9.2.1.R	REECo
1.2.6.9.2.2	Hydrologic Testing
1.2.6.9.2.2.F	F&S
1.2.6.9.2.2.G	USGS
1.2.6.9.2.2.H	H&N
1.2.6.9.2.2.R	REECo
1.2.6.9.2.3	Geomechanical Testing
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Figure 6-1. NNWSI Project Work Breakdown Structure (continued).

1.2.6.9.2.3.F F&S
 1.2.6.9.2.3.G USGS
 1.2.6.9.2.3.H H&N
 1.2.6.9.2.3.R REEC_o
 1.2.6.9.2.3.S SNL

 1.2.6.9.2.4 Geochemical Testing

 1.2.6.9.2.4.A LANL
 1.2.6.9.2.4.F F&S
 1.2.6.9.2.4.G USGS
 1.2.6.9.2.4.H H&N
 1.2.6.9.2.4.R REEC_o

 1.2.6.9.2.5 Engineered Barrier Design Testing

 1.2.6.9.2.5.F F&S
 1.2.6.9.2.5.H H&N
 1.2.6.9.2.5.L LLNL
 1.2.6.9.2.5.R REEC_o

 1.2.6.9.3 Integrated Data System

 1.2.6.9.3.A LANL
 1.2.6.9.3.H H&N
 1.2.6.9.3.R REEC_o

 1.2.6.9.4 Prototype Testing

 1.2.6.9.4.1 Prototype Geologic Testing

 1.2.6.9.4.1.A Prototype Geologic Testing
 1.2.6.9.4.1.B LBL
 1.2.6.9.4.1.F F&S
 1.2.6.9.4.1.G USGS
 1.2.6.9.4.1.H H&N
 1.2.6.9.4.1.P Pan Am
 1.2.6.9.4.1.R REEC_o

 1.2.6.9.4.2 Prototype Hydrologic Testing

 1.2.6.9.4.2.F F&S
 1.2.6.9.4.2.G USGS

1.2.6.9.4.2.H H&N
 1.2.6.9.4.2.R REEC_o

 1.2.6.9.4.3 Prototype Geomechanical Testing

 1.2.6.9.4.3.F F&S
 1.2.6.9.4.3.G USGS
 1.2.6.9.4.3.H H&N
 1.2.6.9.4.3.R REEC_o
 1.2.6.9.4.3.S SNL

 1.2.6.9.4.4 Prototype Geochemical Testing

 1.2.6.9.4.4.A LANL
 1.2.6.9.4.4.F F&S
 1.2.6.9.4.4.G USGS
 1.2.6.9.4.4.H H&N
 1.2.6.9.4.4.R REEC_o

 1.2.6.9.4.5 Prototype Engineered Barrier Design Testing

 1.2.6.9.4.5.F F&S
 1.2.6.9.4.5.H H&N
 1.2.6.9.4.5.L LLNL
 1.2.6.9.4.5.R REEC_o

 1.2.6.9.4.6 Prototype Air Coring

 1.2.6.9.4.6.A LANL
 1.2.6.9.4.6.F F&S
 1.2.6.9.4.6.H H&N
 1.2.6.9.4.6.R REEC_o

 1.2.6.9.4.7 Prototype IDS Testing

 1.2.6.9.4.7.A LANL
 1.2.6.9.4.7.H H&N
 1.2.6.9.4.7.R REEC_o

1.2.7 TEST FACILITIES

1.2.7.1 Management & Integration

 1.2.7.1.F F&S

Figure 6-1. NNWSI Project Work Breakdown Structure (continued).

1.2.7.1.H	H&N
1.2.7.1.R	REECo
1.2.7.2	Testing
1.2.7.2.1	Climax
1.2.7.2.1.F	F&S
1.2.7.2.1.H	H&N
1.2.7.2.1.L	LLML
1.2.7.2.1.R	REECo
1.2.7.2.2	E-MAD
1.2.7.2.2.H	H&N
1.2.7.2.2.R	REECo
1.2.7.2.2.W	Westinghouse
1.2.7.2.3	G-Tunnel
1.2.7.2.3.F	F&S
1.2.7.2.3.H	H&N
1.2.7.2.3.R	REECo
1.2.7.3	New Facility Acquisitions
1.2.8	LAND ACQUISITION
1.2.8.1.T	Management and Integration
1.2.9	PROJECT MANAGEMENT
1.2.9.1	Management and Integration
1.2.9.1.1	Management
1.2.9.1.1.A	LANL
1.2.9.1.1.C	CSC
1.2.9.1.1.F	F&S
1.2.9.1.1.G	USGS
1.2.9.1.1.H	H&N
1.2.9.1.1.I	Security/WSI

1.2.9.1.1.J	OSTI/TC
1.2.9.1.1.L	LLML
1.2.9.1.1.R	REECo
1.2.9.1.1.S	SNL
1.2.9.1.1.T	SAIC
1.2.9.1.2	Interface Activities
1.2.9.1.2.A	LANL
1.2.9.1.2.G	USGS
1.2.9.1.2.L	LLML
1.2.9.1.2.R	REECo
1.2.9.1.2.S	SNL
1.2.9.1.2.T	SAIC
1.2.9.1.3	Geologic Repository Program Support
1.2.9.1.3.A	LANL
1.2.9.1.3.G	USGS
1.2.9.1.3.L	LLML
1.2.9.1.3.S	SNL
1.2.9.1.3.T	SAIC
1.2.9.1.4	Records Management
1.2.9.1.4.A	LANL
1.2.9.1.4.F	F&S
1.2.9.1.4.G	USGS
1.2.9.1.4.H	H&N
1.2.9.1.4.L	LLML
1.2.9.1.4.R	REECo
1.2.9.1.4.S	SNL
1.2.9.1.4.T	SAIC
1.2.9.2	Project Control
1.2.9.2.A	LANL
1.2.9.2.F	F&S
1.2.9.2.G	USGS
1.2.9.2.H	H&N
1.2.9.2.L	LLML
1.2.9.2.R	REECo
1.2.9.2.S	SNL
1.2.9.2.T	SAIC

Figure 6-1. NNWSI Project Work Breakdown Structure (continued).

1.2.0.3	Quality Assurance	TOTAL WBS ITEMS IN BUDGET TABLE FOR FY-1987:	435
1.2.9.3.A	LANL		
1.2.9.3.F	F&S		
1.2.9.3.G	USGS		
1.2.9.3.H	HEN		
1.2.9.3.L	LLNL		
1.2.9.3.R	REECo		
1.2.9.3.S	SNL		
1.2.9.3.T	SAIC		
1.2.9.9.X	NTS Allocation		
1.2.10	FINANCIAL & TECHNICAL ASSISTANCE		
1.2.10.1.N	State of Nevada		
1.2.11.2	Undistributed Budget		
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Figure 6-1. NNWSI Project Work Breakdown Structure (continued).

7.0 SCHEDULE

The NNWSI master schedule is summarized on the HQ key milestone overview in Section 2.2 (Figure 2-2). The critical path follows through the engineering effort and through the effort to obtain site permits after which exploratory shaft construction and testing become the critical path. Critical path activities also occur in unsaturated zone hydrology and the systems work for performance assessment that will be used in the draft Environmental Impact Statement and the NRC license application. This schedule is based on the best estimates for current Project and Program goals.

A simplified summary milestone log of major NNWSI Project milestones follows. The outyear milestone dates are identified in the OCRWM Mission Plan Amendment. Many of these dates are currently being evaluated and are in process of changing to reflect most recent Program developments.

<u>Milestone</u>	<u>Date for accomplishment</u>
Issue DOE siting guidelines (10 CFR Part 960)	12-6-84*
<u>Environmental Assessment</u>	
Issue draft environmental assessment	12-20-84*
Conduct public hearings on draft environmental assessment	2-22/25-85*
Close comment period on draft environmental assessment	3-20-85*
Issue final environmental assessment	5-28-86*
Nominate five sites as candidates for site characterization	5/86*
Receive Presidential approval of three sites	5-28-86*
<u>Site Characterization</u>	
Start negotiations with State on consultation and cooperation agreement	7/86*
Issue site characterization plan for NRC to DOE headquarters	9/87
Start site preparation for exploratory shaft	8/88

*Completed

<u>Milestone</u>	<u>Date of Accomplishment</u>
Conduct public hearing on the site characterization plan	11/87
Complete consultation and cooperation agreement	9/88
Issue request for proposal (RFP) for shaft-sinking contractors	6/88
Receive NRC comments on site characterization plan	2/88
<u>Exploratory Shaft Test Facility</u>	
Select contractors for shaft sinking	2/89
Start exploratory-shaft construction (ES-1)	12/88
Start exploratory shaft facility testing	12/88
Complete exploratory-shaft construction (ES-1)	6/90
Start underground-facility construction	12/90
Complete underground-facility construction	1/91
Start egress-shaft construction (ES-2)	1/89
Complete egress-shaft construction (ES-2)	12/90
<u>Surface Investigations</u>	
Final geologic model	12/93
Characterization of the Yucca Mountain hydrologic system	6/93
Final geochemical and geophysical model	9/92
Report on final tectonic model	10/94
Final probabilistic seismic hazard analysis at Yucca Mountain	2/92
Complete mineralogy evaluations of Yucca Mountain and along flow paths	12/92

<u>Milestone</u>	<u>Date for Accomplishment</u>
<u>Repository Design</u>	
Complete repository advanced conceptual design	1/92
Select architect-engineer for repository license application design	7/91
Initiate repository license application design	1/92
Complete repository license application design	6/94
<u>Environmental Impact Statement</u>	
Start preparation of environmental impact statement (after scoping)	11/89
Issue draft environmental impact statement	10/93
Conduct hearings on draft environmental impact statement	2/94
Issue final environmental impact statement	10/94
<u>Site Selection</u>	
Submit site selection report to President	11/94
President recommends site to Congress	11/94
<u>Construction</u>	
Submit license application to NRC	1/95
NRC review for construction authorization completed	1/98
Start repository construction	1/98

8.0 LOGIC DIAGRAMS

The logic for the Project elements and critical path are shown on the network in Section 2 (Figure 2-2). This summary master logic diagram or network is compiled from individual networks that are maintained for every WBS element. The T&MSS contractor prepares and maintains summary and detailed networks of all Project activities. The networks are updated monthly based on input from the Project organizations and show critical paths, interaction with other networks and Project activities, and the sequencing of events for the WBS element or activity.

9.0 PERFORMANCE CRITERIA

The NNWSI Project performance criteria are being developed for many major Project elements and will be determined as part of the systems engineering management process.

Performance criteria are or will be defined in several NNWSI Project documents:

- o NNWSI Project Mined Geologic Disposal System Description
- o Repository Design Requirements Document
- o Waste Package Conceptual Design Requirements Document
- o Exploratory Shaft Subsystem Design Requirements Document
- o Repository Subsystem Design Requirements to Support Advanced Conceptual Design

All of these documents are in some stage of preparation.

10.0 COST ESTIMATES

Detailed cost estimates for the Project are prepared, accumulated, organized, published, reviewed, and approved in accordance with DOE Order 5700.7B, Work Authorization System. The estimates are updated annually based upon Project guidance from DOE Headquarters and the current definition and status of the Project, along with the plans for future work. The document is used as the annual budget submission for the Project. It provides prior, current, budget (year being submitted to Congress), and outyear data by Project WBS (to at least Level 3) and by participant, for both BO and BA financial categories. Budget and outyear estimates include DOE divested escalation rates. The document is too large to be physically incorporated into this plan and therefore is considered to be a companion document incorporated herein by reference.

Total Project baselined cost plans to Level 4 of the WBS for the current fiscal year are given in Table 10-1. Table 10-2 shows projected Project costs through FY 1993 to Level 3 of the WBS. The capital equipment and construction funding at Level 3 of the WBS through FY 1993 is presented in Table 10-3.

Table 10-1. Baseline NNWSI Project cost plans FY 1987

Sheet 1

1. Project Name/Number:		12. Dollars Expended in:											13. Cost Plan Date:				
NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS		Thousands											June 15, 1987				
4. Location:		5. Revision:											6. Revision Date:				
NNWSI Project P.O. Box 16100 Las Vegas, NV 89116																	
7. WBS NUMBER	8. Title	10. Current Fiscal Year 1987												11. Future FY's			
		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Total	FY 1988	FY 1989	FY 1990
1211	Systems Management and Integration	20,000	20,000	25,100	35,100	35,400	30,900	43,900	40,900	50,500	56,800	51,900	51,900	478,000	.000	.000	.000
1212	Systems Engineering	191,000	145,200	171,300	229,300	109,800	223,000	215,000	220,000	200,100	340,400	201,200	209,200	2,740,000	.000	.000	.000
1213	Technical Data Base Management	04,000	07,000	09,000	09,000	113,000	124,000	120,000	134,000	140,000	149,000	150,000	170,000	1,437,000	.000	.000	.000
1214	Total Systems Performance Assessment	145,000	170,000	167,000	200,000	230,000	250,000	293,000	323,000	333,000	370,000	353,000	444,000	3,200,000	.000	.000	.000
121	SYSTEMS	400,000	410,000	432,400	571,400	579,400	641,900	680,900	735,400	792,000	800,200	840,100	955,100	7,923,000	.000	.000	.000
1221	Management and Integration	47,900	52,000	64,000	66,200	81,000	63,000	61,000	62,300	63,100	70,700	51,000	69,000	775,000	.000	.000	.000
1222	Package Environment	00,000	00,000	05,000	05,000	05,000	05,000	05,000	05,000	00,000	00,000	00,000	00,000	990,000	.000	.000	.000
1223	Photo Form & Materials Testing	170,000	200,000	425,000	440,000	445,000	400,000	400,000	402,000	402,000	402,000	307,000	1007,000	3,075,000	.000	.000	.000
1224	Design, Fabricate, and Prototype Testing	40,000	45,000	45,000	45,000	110,000	110,000	110,000	110,000	110,000	110,000	110,000	270,000	1,240,000	.000	.000	.000
1225	Performance Assessment	05,000	05,000	05,000	00,000	00,000	00,000	00,000	00,000	00,000	103,000	103,000	104,000	955,000	.000	.000	.000
122	WASTE PACKAGE	392,000	492,000	874,000	721,200	700,000	806,000	804,000	807,300	803,100	822,700	819,000	1499,000	2,535,000	.000	.000	.000
1231	Management & Integration	302,000	403,700	452,400	403,500	410,000	610,000	595,000	591,700	703,500	601,000	601,300	592,700	6,821,000	.000	.000	.000
1232	Geology	410,000	370,000	304,200	391,400	400,000	411,400	445,000	435,000	467,500	490,000	454,000	470,700	3,131,000	.000	.000	.000
1233	Hydrology	545,000	545,000	545,000	545,000	545,000	545,000	545,000	545,000	545,000	545,000	545,000	557,000	6,052,000	.000	.000	.000
1234	Geochemistry	297,000	390,000	527,400	504,300	450,500	504,300	522,300	400,000	522,900	540,000	499,100	522,000	3,000,000	.000	.000	.000
1235	Drilling	123,030	121,700	104,700	100,400	375,700	470,420	221,500	009,140	010,140	000,040	002,420	025,190	4,701,000	.000	.000	.000
1236	Environment	73,700	177,400	110,100	137,000	105,400	07,000	07,000	03,300	01,300	07,100	72,300	01,000	1,232,000	.000	.000	.000
1237	Socioeconomic	40,700	47,000	02,700	01,000	00,000	70,000	07,000	00,400	07,000	00,000	00,700	70,000	010,000	.000	.000	.000
1238	Geochemical Modeling Code (G3/G)	04,000	04,000	04,000	04,000	04,000	04,000	05,000	05,000	05,000	05,000	05,000	05,000	774,000	.000	.000	.000
11. Remarks:													12. Contract Number:				
13. Signature of Contractor's Project Manager and Date				14. Signature of Contractor's Authorized Financial Representative and Date				15. Signature of Government Technical Representative and Date									

Table 10-1. Baselined NNWSI Project cost plans FY 1987 (continued)

1. Project Name/Number:		12. Dollars Expressed In:												13. Cost Plan Date			
NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS		Thousands												June 15, 1987			
4. Location:		5. Revision:												6. Revision Date:			
NNWSI Project P.O. Box 14198 Las Vegas, NV 89114																	
7. WBS NUMBER	10. Title	10. Current Fiscal Year 1987												110. Future FY's			
		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Total	FY 1988	FY 1989	FY 1990
1230	Deferred Site Close Out	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
123	ISITE INVESTIGATIONS	1941.230	2134.040	2310.500	2304.000	2434.400	2723.520	2500.000	2900.140	3140.140	2990.540	2900.020	2992.090	31,520.000	.000	.000	.000
1241	Management and Integration	107.700	170.100	109.700	214.000	210.700	245.700	209.700	207.400	270.000	290.200	297.700	350.200	2,000.000	.000	.000	.000
1242	Development and Testing	271.000	340.000	240.000	250.000	205.000	205.000	307.000	070.000	000.000	003.000	072.000	043.000	0,534.000	.000	.000	.000
1243	Facilities	20.000	7.000	30.000	101.000	133.000	130.000	133.000	100.000	101.000	101.000	107.000	202.000	1,440.000	.000	.000	.000
1244	Operations and Maintenance	17.000	30.000	25.000	34.000	44.000	54.000	04.000	04.000	03.000	03.000	113.000	100.000	011.000	.000	.000	.000
1245	Decommissioning	.000	.000	0.000	10.000	10.000	10.000	10.000	10.000	0.000	10.000	10.000	14.000	00.000	.000	.000	.000
1246	Repository Performance Assessment	43.000	31.000	03.000	07.000	110.000	140.000	100.000	170.000	170.000	100.000	100.000	102.000	1,004.000	.000	.000	.000
124	IREPOSITORY INVESTIGATIONS	027.700	070.100	007.700	712.000	700.700	090.700	071.700	1300.400	1004.000	1020.200	1000.700	1750.200	12,472.000	.000	.000	.000
1251	Management and Integration	00.200	00.700	01.000	70.400	04.100	05.300	05.700	04.500	03.000	70.300	04.100	04.100	001.000	.000	.000	.000
1252	Licensing	470.700	004.000	030.000	001.700	000.000	033.300	010.000	021.200	001.300	030.300	033.000	002.400	0,377.000	.000	.000	.000
1253	Environmental Compliance	04.000	01.200	03.000	03.400	03.000	00.000	07.300	03.000	00.000	00.000	03.000	03.300	000.000	.000	.000	.000
1254	Communication and Liaison	07.700	00.300	00.300	00.400	00.000	04.000	00.400	00.400	00.000	00.000	00.000	00.200	070.000	.000	.000	.000
1255	Technology and Financial Assistance	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
125	REGULATORY AND INSTITUTIONAL INVESTIGATIONS	090.200	003.700	072.000	790.000	021.000	072.300	040.000	005.100	021.400	073.100	007.000	010.000	7,000.000	.000	.000	.000
1201	Management and Integration	070.330	072.000	000.300	030.300	000.300	003.400	004.000	000.300	004.100	040.000	011.300	011.770	4,071.000	.000	.000	.000
1202	Site Preparation	.000	10.000	22.000	4.000	0.400	00.500	00.000	25.000	00.100	07.200	00.000	12.400	024.000	.000	.000	.000
1203	Surface Facilities	.000	0.000	0.000	10.000	10.700	11.000	10.100	21.500	24.000	17.200	10.000	0.000	101.000	.000	.000	.000
11. Remarks:		12. Contract Number:															
13. Signature of Contractor's Project Manager and Date				14. Signature of Contractor's Authorized Financial Representative and Date				15. Signature of Government Technical Representative and Date									

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Table 10-1. Baselined NNWSI Project cost plans FY 1987 (continued)

1. Project Name/Number:		2. Dollars Expressed In:											13. Cost Plan Date				
NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS		Thousands											June 15, 1987				
4. Location:		5. Revision:											6. Revision Date:				
NNWSI Project P.O. Box 14100 Las Vegas, NV 89114																	
7. WBS NUMBER	10. Title	19. Current Fiscal Year 1987												110. Future FY's			
		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Total	FY 1988	FY 1989	FY 1990
1204	IFirst Shaft	25.000	12.000	14.000	23.000	16.000	43.000	8.000	45.000	52.000	15.000	1.000	.000	252.000	.000	.000	.000
1205	ISecond Shaft	.000	3.000	3.000	2.000	14.000	22.000	18.000	48.000	88.000	24.000	3.000	.000	195.000	.000	.000	.000
1206	ISubsurface Enclosures	56.000	28.000	13.000	24.000	18.000	38.000	28.000	13.000	39.000	115.000	4.000	.000	358.000	.000	.000	.000
1207	IUnderground Service Systems	17.100	25.000	58.500	54.500	44.000	75.000	98.000	81.000	129.400	293.000	195.300	27.200	981.000	.000	.000	.000
1208	IOperations	2.200	12.000	.000	.000	.000	.000	.000	5.000	.000	.000	.000	.000	24.000	.000	.000	.000
1209	ITesting	478.000	478.000	537.000	538.700	548.500	883.350	1108.350	1089.150	1147.870	1148.200	1158.000	1157.400	10,205.000	.000	.000	.000
1210	IEXPLORATORY SHAFT INVESTIGATIONS	957.838	1001.000	1088.000	1000.000	1027.000	1378.000	1005.500	1705.150	1894.270	2117.100	1752.200	1818.270	17,370.000	.000	.000	.000
1271	IManagement and Integration	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
1272	ITesting	21.878	31.778	38.578	31.778	31.878	88.878	78.878	29.778	38.578	29.778	38.878	34.238	489.000	.000	.000	.000
1273	INew Facility Acquisitions	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
127	IYEST FACILITIES	21.878	31.778	38.578	31.778	31.878	88.878	78.878	29.778	38.578	29.778	38.878	34.238	489.000	.000	.000	.000
1281	ILand Acquisition	8.000	3.700	11.000	7.700	12.700	11.700	18.000	14.000	11.000	21.000	18.000	18.300	158.000	.000	.000	.000
128	ILAND ACQUISITION	8.000	3.700	11.000	7.700	12.700	11.700	18.000	14.000	11.000	21.000	18.000	18.300	158.000	.000	.000	.000
1291	IManagement and Integration	983.890	959.000	949.100	1118.000	897.500	932.000	1078.100	1089.800	1055.300	1236.500	1088.100	1091.810	12,258.000	.000	.000	.000
1292	IProject Control	283.840	271.800	291.200	378.400	313.800	328.000	351.800	348.000	344.800	401.800	342.800	348.000	3,898.000	.000	.000	.000
1293	IQuality Assurance	448.200	453.400	448.100	598.100	538.000	588.000	585.800	813.200	835.000	787.800	851.300	781.400	7,823.000	.000	.000	.000
1299	INTS Allocation	78.000	78.000	78.000	78.000	78.000	78.000	78.000	78.000	78.000	78.000	78.000	87.000	838.000	.000	.000	.000
129	IPROJECT MANAGEMENT	1712.390	1783.400	1778.000	2188.500	1829.000	1813.800	2092.000	2051.400	2114.700	2423.800	2141.800	2288.110	24,238.000	.000	.000	.000
12101	IFinancial & Technical Assistance	438.000	438.000	438.000	438.000	438.000	438.000	438.000	438.000	438.000	438.000	438.000	438.000	4,404.000	.000	.000	.000
11. Remarks:		12. Contract Number:															
13. Signature of Contractor's Project Manager and Date				14. Signature of Contractor's Authorized Financial Representative and Date				15. Signature of Government Technical Representative and Date									

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Table 10-1. Baseline NNWSI Project cost plans FY 1987 (continued)

Sheet 4

1. Project Name/Number:		NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS												12. Dollars Expensed In: Thousands		13. Cost Plan Date June 15, 1987		
4. Location:		NNWSI Project P.O. Box 14100 Las Vegas, NV 89114												14. Revision:		15. Revision Date:		
7. WDS HEADER	8. Title	9. Current Fiscal Year 1987												10. Future FY's				
		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Total	FY 1988	FY 1989	FY 1990	
1210	FINANCIAL & TECHNICAL ASSISTANCE	430.000	430.000	430.000	430.000	430.000	430.000	430.000	000.000	000.000	000.000	000.000	000.000	700.000	8,400.000	.000	.000	.000
12	INWSI - SUBTOTAL UNDISTRIBUTED BUDGET	7016.020	7009.110	7002.230	6995.470	6988.710	6981.940	6975.180	6968.420	6961.660	6954.900	6948.140	6941.380	6934.620	117,370.000	.000	.000	.000
	WDS TOTAL													117,470.000				
	CAPITAL EQUIPMENT													11,045.000				
	TOTAL BUDGET - FY 1987													128,515.000				
11. Remarks:																		
13. Signature of Contractor's Project Manager and Date						14. Signature of Contractor's Authorized Financial Representative and Date						15. Signature of Government Technical Representative and Date						
12. Contract Number:																		

Table 10-2. Projected Project costs for fiscal years 1987 through 1993.

(\$ in Thousands)

	FY 1987		FY 1988		FY 1989		FY 1990		FY 1991		FY 1992		FY 1993	
	BA	BO	BA	BO	BA	BO	BA	BO	BA	BO	BA	BO	BA	BO
<u>Operating</u>														
SYSTEMS	8587	7923	10886	10360	12389	12190	14459	14673	12000	11995	12010	12055	11482	11482
WASTE PACKAGE	7898	9535	11890	11370	13857	13671	15686	15994	12026	12144	10421	10667	7588	7588
SITE INVESTIGATIONS	29498	31875	50903	45787	84108	84260	80126	82363	53275	54408	39422	40255	29853	29853
REPOSITORY INVESTIGATIONS	6693	12472	18057	17258	21402	21695	17671	18025	13664	13600	14731	14641	15762	15762
REGULATORY AND INSTITUTIONAL INVESTIGATIONS	5962	7086	10397	9648	10903	10602	14283	14361	13766	13382	18496	18182	22104	22104
EXPLORATORY SHAFT INVESTIGATIONS	12273	17741	49710	45769	63116	61001	83327	87436	35194	36076	24582	25048	19228	19228
TEST FACILITIES	385	522	545	548	552	548	585	616	226	226	232	232	238	238
LAND ACQUISITION	150	150	352	326	337	326	452	458	380	379	390	389	398	398
PROJECT MANAGEMENT	27495	23688	20746	28787	31961	31731	34117	34607	28463	28473	28380	28370	28480	28480
FINANCIAL/TECHNICAL-ASSISTANCE	6591	6486	16700	15720	19000	18200	22000	21250	22000	22000	22000	22000	22000	22000
<u>TOTAL OPERATING</u>	<u>105532</u>	<u>117478</u>	<u>190186</u>	<u>185573</u>	<u>257625</u>	<u>254224</u>	<u>282706</u>	<u>289783</u>	<u>191014</u>	<u>192683</u>	<u>170664</u>	<u>171839</u>	<u>157133</u>	<u>157133</u>

Table 10-3. Capital equipment and construction funding for fiscal years 1987 through 1993
(\$ In Thousands)

	FY 1987		FY 1988		FY 1989		FY 1990		FY 1991		FY 1992		FY 1993	
	BA	BO	BA	BO	BA	BO	BA	BO	BA	BO	BA	BO	BA	BO
Capital Equipment														
SYSTEMS	25	173	130	130	195	195	85	85	64	64	0	0	0	0
WASTE PACKAGE	350	611	384	384	869	869	462	462	230	230	161	161	161	161
SITE INVESTIGATIONS	506	2257	4349	4349	2494	2494	979	979	511	511	342	342	245	245
REPOSITORY INVESTIGATIONS	30	30	25	25	117	117	65	65	32	32	0	0	0	0
REGULATORY AND INSTITUTIONAL INVESTIGATIONS	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EXPLORATORY SHAFT INVESTIGATIONS	1036	5685	3016	3015	5512	5512	1103	1103	318	318	239	239	232	232
TEST FACILITIES	0	65	0	0	0	0	0	0	0	0	0	0	0	0
LAND ACQUISITION	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PROJECT MANAGEMENT	1180	2224	5210	5210	2352	2352	3061	3061	1566	1566	1573	1573	1645	1645
FINANCIAL/TECHNICAL-ASSISTANCE	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL CAPITAL EQUIP	3127	11045	13114	13113	11539	11539	5755	5755	2723	2723	2315	2315	2283	2283
Construction														
REPOSITORY INVESTIGATIONS	0	0	0	0	0	0	17625	10612	73094	72720	74130	77375	36829	36829
TOTAL CONSTR. EQUIP.	0	0	0	0	0	0	17625	10612	73094	72720	74130	77375	36829	36829
GRAND TOTALS/NNWSI	108659	128523	203300	198686	269164	265763	306086	306150	266831	268126	247109	251529	196245	196245

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11.0 PROJECT MANAGEMENT PLANNING AND CONTROL SYSTEMS

The execution of the NNWSI Project is controlled through reporting and performance measurement systems. These systems provide for the definition of work and assignment of tasks in accordance with a formal WBS. Included are procedures for planning, tracking, and controlling budgets, costs, schedules, milestones, and deliverables. A key element in these management systems is the use of a formal change control process. Through the use of baselines for technical, regulatory, and management aspects, the Project management system effectively controls Project execution. These baselines are the criteria against which Project progress is measured. The Project Configuration Management Plan (CMP) describes the Project baselines, change control process, and baseline review board role and responsibilities. The Project CMP and Systems Engineering Management Plan (SEMP) are discussed more fully in sections 13.0 and 14.0 of this PMP. The NNWSI Project Administrative Procedures Manual provides procedures for day-to-day activities such as reporting change control, publication of documents, etc. It is issued as a controlled document and revised as needed in accordance with a procedure in the manual.

11.1 RESPONSIBILITIES MATRIX

Responsibilities of major participants are described in Section 3.2. A responsibility assignment matrix (Figure 11-1) indicates the responsibility of every Project participant related to the fourth level of the Project WBS.

11.2 MILESTONES AND SCHEDULE FOR DELIVERABLES

Project Level 1 milestones are listed in Table 11-1. The list includes a brief milestone description, the responsible WMPO individual, responsible organization, the milestone number, whether the milestone is baselined (B) or proposed (P) to the Change Control Board (CCB) for baselining, and the Headquarters (HQ) planned delivery date. The initial A after a date means actual delivery, E is expected delivery date.

11.3 COST CONTROL

Preparation of this section is deferred pending development of definitive plans for the Integrated Project Management System (IPMS) which will encompass the planning, tracking, and controlling of budgets, costs, schedules, milestones and deliverables in accordance with DOE 4700.1, Project Management System.

11.4 MEETINGS

Monthly Project Manager meetings with the Technical Project Officers (PM-TPO) are conducted and a record of the meeting is prepared. Action items that are generated during the meeting are entered into an Action Items Log and the T&MSS contractor tracks items in the log. The participants in the meeting

exchange information, review progress, discuss Project problems, and identify future potential problems. State of Nevada representatives and the on-site NRC representative are invited to attend the PM-TPO meetings.

Other meetings are held as required to complete Project assignments such as SCP working group meetings, EA working group meetings, QA monthly meetings, ESF status meetings, Exploratory Shaft Test Plan (ESTP) committee meetings, and others. A weekly calendar of scheduled meetings is maintained by the support services contractor based on input received from all participants.

WBS ELEMENT	DRI	EG&G	F&S	H&N	LANL	LLNL	REECO	SAIC	SNL	USGS	PAN AM	WSI	WMPO
1.2.1.1 SYSTEMS MANAGEMENT & INTEGRATION								●	●				
1.2.1.2 SYSTEMS ENGINEERING					●	●		●	●	●			
1.2.1.3 TECHNICAL DATA BASE MANAGEMENT									●				
1.2.1.4 TOTAL SYSTEMS PERFORMANCE ASSESSMENT									●				
1.2.2.1 WASTE PACKAGE MANAGEMENT & INTEGRATION						●	●	●					
1.2.2.2 PACKAGE ENVIRONMENT						●							
1.2.2.3 WASTE FORM & MATERIALS TESTING						●							
1.2.2.4 DESIGN, FABRICATE & PROTOTYPE TESTING						●							
1.2.2.5 WASTE PACKAGE PERFORMANCE ASSESSMENT						●							
1.2.3.1 SITE INVESTIGATIONS MANAGEMENT & INTEGRATION					●		●	●	●	●			
1.2.3.2 GEOLOGY					●				●	●			
1.2.3.3 HYDROLOGY										●			
1.2.3.4 GEOCHEMISTRY					●								
1.2.3.5 DRILLING			●	●	●		●			●	●		
1.2.3.6 ENVIRONMENT	●	●					●	●	●				
1.2.3.7 SOCIOECONOMIC								●					
1.2.3.8 PERFORMANCE ASSESSMENT						●							
1.2.3.9 SITE INVESTIGATIONS DEFERRED SITE CLOSE OUT													●
1.2.4.1 REPOSITORY INVESTIGATIONS MANAGEMENT & INTEGRATION								●	●				
1.2.4.2 DEVELOPMENT & TESTING					●				●				
1.2.4.3 FACILITIES									●				
1.2.4.4 OPERATIONS & MAINTENANCE									●				

Figure 11-1. Responsibility assignment matrix.

WBS ELEMENT	ORI	EG&G	F&S	H&N	LANL	LLNL	REEC ₀	SAIC	SNL	USGS	PAN AM	WSI	WMPC
1.2.4.5 DECOMMISSIONING									●				
1.2.4.6 REPOSITORY INVESTIGATIONS PERFORMANCE ASSESSMENT									●				
1.2.5.1 REGULATORY & INSTITUTIONAL MANAGEMENT & INTEGRATION					●			●	●	●			
1.2.5.2 LICENSING					●	●		●	●	●			
1.2.5.3 ENVIRONMENTAL COMPLIANCE					●	●		●	●	●			
1.2.5.4 COMMUNICATION AND LIAISON								●	●				
1.2.6.0 EXPLORATORY SHAFT DECOMMISSIONING													●
1.2.6.1 EXPLORATORY SHAFT MANAGEMENT & INTEGRATION			●	●	●	●	●	●	●	●			
1.2.6.2 SITE PREPARATION				●			●						
1.2.6.3 SURFACE FACILITIES			●	●			●						
1.2.6.4 FIRST SHAFT			●	●			●						
1.2.6.5 SECOND SHAFT			●	●			●						
1.2.6.6 SUBSURFACE EXCAVATIONS			●	●			●						
1.2.6.7 UNDERGROUND SERVICE SYSTEMS			●	●			●						
1.2.6.8 OPERATIONS							●						
1.2.6.9 EXPLORATORY SHAFT TESTING			●	●	●	●	●		●	●	●		
1.2.7.1 TEST FACILITIES MANAGEMENT & INTEGRATION			●	●			●						
1.2.7.3 NEW FACILITY ACQUISITIONS													●
1.2.8.1 LAND ACQUISITION													●
1.2.9.1 PROJECT MANAGEMENT & INTEGRATION			●	●	●	●	●	●	●	●			
1.2.9.2 PROJECT CONTROL			●	●	●	●	●	●	●	●			
1.2.9.3 QUALITY ASSURANCE			●	●	●	●	●	●	●	●			
1.2.10.1 FINANCIAL & TECHNICAL ASSISTANCE STATE OF NEVADA													●

Figure 11-1. Responsibility assignment matrix (continued).

Table 11-1. NMWSI baselined and planned Level 1 milestones for period 10/1/86 to 12/31/95

MILESTONE DESCRIPTION	WBS NO.	WMPO RESP	LEVEL	RESP ORG	MILESTONE	BASELINED	HQ PLANNED HQ ACTUAL/ EXPECTED
Annual PASS Program Interaction - (Letter Report)	1.2.1.1.S	Robson	1	SNL	M870	B	30 Sep 86 24 Nov 86 A
WMPO submits Annual PASS Program Interaction Letter Report for FY87 to OGR	1.2.1.1.X	Robson	1	WMPO/SNL	P132	B	30 Sep 87 20 Nov 87 E
WMPO submits letter report on Studies of Performance Allocation Included in SCP to OGR	1.2.1.1.X	Robson	1	WMPO/SNL	R108	B	16 Feb 87 30 Jan 88 E
WMPO submits letter report on Studies of Coupled Processes Included in the SCP to OGR for information	1.2.1.1.X	Robson	1	WMPO	R109	B	26 Nov 86 8 Apr 87 A
61 Yucca Mountain Mined Geologic Disposal System (MGDS) Requirements	1.2.1.2.1.S	Robson	1	SNL	M120	B	30 Nov 85 28 Feb 88 E
Updated Systems Requirement Document for LA	1.2.1.2.1.S	Robson	1	SNL	M194	P	14 Jan 94 E
WMPO Submits updated System Description for LA to HQ	1.2.1.2.1.X	Robson	1	WMPO	M160	P	14 Jan 94 E
Submit Yucca Mountain Site - Specific Mined Geologic Disposal System (MOGS) Description to OGR.	1.2.1.2.1.X	Robson	1	WMPO/SNL	M261	B	30 Jun 87 1 Sep 88 E
OGR Systems Engineering Review	1.2.1.2.4.S	Robson	1	SNL	P041	P	15 Aug 91 E
OGR Systems Engineering Review	1.2.1.2.4.S	Robson	1	SNL	P079	P	15 Aug 90 E

Table 11-1. NNWSI baselined and planned Level 1 milestones for period 10/1/86 to 12/31/95 (continued)

MILESTONE DESCRIPTION	WBS NO.	WMPO RESP	LEVEL	RESP ORG	MILESTONE	BASELINED	HQ PLANNED HQ ACTUAL/ EXPECTED
WMPO Submits SEMP to OGR for Approval	1.2.1.2.4.X	Robson	1	WMPO/SNL	M108	B	16 Feb 87 25 Nov 87 E
OGR Systems Engineering Review	1.2.1.2.4.X	Robson	1	WMPO	P039	P	15 Mar 88 E
OGR Systems Engineering Review of the NNWSI Project	1.2.1.2.4.X	Robson	1	WMPO/SNL	R074	B	15 Mar 87 30 Jan 87 E
Baseline NNWSI Project Budget and Cost Plans for FY 87	1.2.1.2.5.T	Dixon	1	SAIC	M726	B	30 Nov 86 9 Oct 86 A
Submit Baselined Updated System Requirements Document to DOE/HQ	1.2.1.2.5.X	Dixon	1	WMPO	P072	P	30 Oct 87 E
Licensing RIB Established	1.2.1.3.3.S	Livingston	1	SNL	M155	P	30 Nov 90 E
WMPO submits hard copy (1987 Annual) version of the Reference Information Base to OGR	1.2.1.3.3.X	Livingston	1	WMPO/SNL	R092	B	29 May 87 30 Jan 88 E
Final Documentation of PA Codes	1.2.1.4.4.X	Livingston	1	WMPO	M121	P	31 May 91 E
Waste Package Postclosure Compliance Strategy Document	1.2.2.1.X	Valentine	1	WMPO/LLNL	R003	B	30 Jan 87 31 Mar 88 E
Final Waste Package Environment Established	1.2.2.2.L	Valentine	1	LLNL	M271	P	31 Dec 93 E
Complete Spent Fuel Waste Form Testing for Advanced Conceptual Design	1.2.2.3.1.1.L	Valentine	1	LLNL	M269	P	15 Sep 88 E

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Table 11-1. NNWSI baselined and planned Level 1 milestones for period 10/1/86 to 12/31/95 (continued)

MILESTONE DESCRIPTION	WBS NO.	WMPO RESP	LEVEL	RESP ORG	MILESTONE	BASELINED	HQ PLANNED HQ ACTUAL/ EXPECTED	
Initiate Dissolution Testing of Partially Oxidized Spent Fuel	1.2.2.3.1.1.L	Valentine	1	LLNL	P111	P	1 Dec 87 1 Mar 88	E
Initiate Long Term Confirmation Testing of West Valley HLW Glass	1.2.2.3.1.2.L	Valentine	1	WMPO/LLNL	M009	P	1 Oct 89	E
West Valley Glass Waste Form Testing for Design Complete	1.2.2.3.1.2.L	Valentine	1	WMPO/LLNL	P112	P	30 Apr 90	E
Progress Report on the Results of Testing Advanced Conceptual Design Metal Barrier Materials Under Relevant Environmental Conditions for a Tuff Repository	1.2.2.3.2.L	Valentine	1	LLNL	M236	B	30 Apr 86 31 Dec 87	E
Detail Report to Congress on Copper for Waste Package	1.2.2.3.2.L	Valentine	1	LLNL	P002	P		E
Decision Made on Using Packing Material in the Waste Package to Assist in Controlling Radionuclides Release Rate	1.2.2.3.3.X	Valentine	1	WMPO/LLNL	M257	B	30 Jan 87 29 Jan 88	E
Draft Report on Waste Package Advanced Conceptual Designs	1.2.2.4.L	Valentine	1	WMPO/LLNL	M259	P	31 Jan 90	E
Complete Engineering Tests of Advanced Conceptual Design Prototype Waste Package	1.2.2.4.L	Valentine	1	LLNL	M262	P	31 Mar 91	E
Complete Waste Package License Application Design Requirements Document	1.2.2.4.L	Valentine	1	WMPO/LLNL	M267	P	31 Aug 90	E

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Table 11-1. NNWSI baselined and planned Level 1 milestones for period 10/1/86 to 12/31/95 (continued)

MILESTONE DESCRIPTION	WBS NO.	WMPO RESP	LEVEL	RESP ORG	MILESTONE	BASELINED	HQ PLANNED HQ ACTUAL/ EXPECTED	
Complete WP Design Input to Repository License Application Design	1.2.2.4.L	Valentine	1	WMPO/LLNL	M270	P	31 Dec 91	E
Final License Application WP Design Review Complete	1.2.2.4.L	Valentine	1	WMPO/LLNL	M274	P	30 Aug 92	E
Complete Waste Package License Application Design Drawings and Specifications	1.2.2.4.L	Valentine	1	WMPO/LLNL	M275	P	30 Apr 93	E
Revised Draft Waste Package Subsystem Conceptual Design Requirements to DOE/HQ for Review	1.2.2.4.X	Valentine	1	WMPO/LLNL	M013	B	30 May 86 31 Mar 88	E
Initiate Waste Package Advanced Conceptual Design	1.2.2.4.X	Valentine	1	WMPO/LLNL	M233	B	30 Sep 87 1 Oct 89	E
Report on Long Term Performance Analysis of the Conceptual Waste Package Design	1.2.2.5.X	Valentine	1	WMPO/LLNL	M260	B	30 Apr 87 28 Feb 88	E
Report on the System Model for Waste Package Performance Analysis	1.2.2.5.X	Valentine	1	WMPO/LLNL	M276	B	31 Oct 86 12 Jan 87	A
WP Performance Assessment Codes Completed and Documented and Performance Analysis of License Application Design Waste Package	1.2.2.5.1.L	Valentine	1	WMPO/LLNL	M266	P	31 Jan 93	E
Final Report on LAD WP PA, Regulatory Performance of Aggregate of WP, Reliability in Meeting Regulatory Requirements, and WP Radionuclides Source Term	1.2.2.5.1.L	Valentine	1	WMPO/LLNL	M273	P	31 Dec 93	E

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Table 11-1. NNWSI baselined and planned Level 1 milestones for period 10/1/86 to 12/31/95 (continued)

MILESTONE DESCRIPTION	WBS NO.	WMPO RESP	LEVEL	RESP ORG	MILESTONE	BASELINED	HQ PLANNED HQ ACTUAL/ EXPECTED	
Submit Report on Evaluation of Natural Resources at Yucca Mountain and Vicinity received to DOE/ HQ for Information	1.2.3.1.X	Livingston	1	WMPO/SAIC	M895	B	31 Jul 87 30 Jan 88	E
Report: Complete Geologic Model	1.2.3.2.1.1.G	Levich	1	USGS	M384	P	23 Jul 90	E
Issue Map: Final Geologic Map of Yucca Mountain	1.2.3.2.1.1.G	Levich	1	USGS	P780	P	15 Jan 88	E
Status Report: Regional Geophysics	1.2.3.2.2.1.G	Levich	1	USGS	M369	P	19 Dec 87	E
Complete Site Specific Geophysics	1.2.3.2.2.1.G	Levich	1	USGS	M379	P	28 Feb 92	E
Recommendation to Proceed With Deep Regional Seismic Survey to OGR for Approval	1.2.3.2.2.2.X	Blanchard	1	WMPO/USGS	R845	B	31 Aug 87 31 Aug 88	E
Issue Report: Preliminary Seismic Hazard Update	1.2.3.2.3.3.G	Levich	1	USGS	M363	P		E
Issue Report: Seismic Hazard Update For FEIS	1.2.3.2.3.3.G	Blanchard	1	USGS	M387	P	21 Jul 91	E
Issue Report: Southern Great Basin Seismotectonic For DEIS and LA	1.2.3.2.3.3.G	Levich	1	USGS	P107	P	24 Aug 89	E
Issue Report/Map: Potentiometric Level Measurements	1.2.3.3.3.G	Symanski	1	USGS	M378	P	2 Jan 90	E

Table 11-1. NNWSI baselined and planned Level 1 milestones for period 10/1/86 to 12/31/95 (continued)

MILESTONE DESCRIPTION	WBS NO.	WMPO RESP	LEVEL	RESP ORG	MILESTONE	BASELINED	HQ PLANNED HQ ACTUAL/ EXPECTED	
Complete Hydrologic Testing of the Saturated Zone	1.2.3.3.3.G	Blanchard	1	USGS	M388	P	3 Jul 91	E
Issue Report: Final Hydrologic Description of SZ	1.2.3.3.3.G	Symanski	1	USGS	M389	P	28 Jan 94	E
Decision to Proceed With SZ Multiple-Well Tracer Tests at Second Site in SZ	1.2.3.3.3.G	Symanski	1	USGS	R846	P	15 Oct 90	E
Issue Report: Preliminary Hydrologic Model of the UZ	1.2.3.3.4.G	Blanchard	1	USGS	M036	P	4 Mar 92	E
Complete Hydrologic Testing of the unsaturated zone	1.2.3.3.4.G	Blanchard	1	USGS	M385	P	22 Mar 93	E
Issue Report: Final Hydrologic Description of the UZ	1.2.3.3.4.G	Blanchard	1	USGS	M391	P	10 Apr 94	E
Initiation of Hydrologic Measurements in UZ-6	1.2.3.3.4.G	Blanchard	1	USGS	R847	P	5 Sep 88	E
Define Quaternary Climate Of Yucca Mountain	1.2.3.3.5.1.G	Livingston	1	USGS	M366	P	31 May 90	E
Issue Report: Final Climate Study at Yucca Mountain	1.2.3.3.5.1.G	Livingston	1	USGS	P104	P	5 Nov 90	E
Report: Final Report on Water Chemistry	1.2.3.4.1.1.A	Livingston	1	LANL	M374	P	30 Nov 90	E
Report: Conceptual Model for Mineral Evolution and Tuff Water Reactions at Yucca Mountain	1.2.3.4.1.3.A	Livingston	1	LANL	R360	P	31 Oct 90	E

Table 11-1. NNWSI baselined and planned Level 1 milestones for period 10/1/86 to 12/31/95 (continued)

MILESTONE DESCRIPTION	WBS NO.	WMPO RESP	LEVEL	RESP ORG	MILESTONE	BASELINED	HQ PLANNED HQ ACTUAL/ EXPECTED	
Report : Final Report on Solubility	1.2.3.4.1.4.A	Livingston	1	LANL	M377	P		E
Report: Final Sorption and Precipitation	1.2.3.4.1.5.A	Livingston	1	LANL	M376	P	31 Dec 92	E
Preliminary Report on Sorption Modeling	1.2.3.4.1.5.X	Livingston	1	WMPO/LANL	R309	B	30 Jan 87 9 Sep 87	A
Update of Geochemical/Geophysical Model	1.2.3.4.1.7.A	Livingston	1	LANL	M388	P	31 Jan 90	E
Final Geochemical/Geophysical Model	1.2.3.4.1.7.A	Livingston	1	LANL	M390	P	30 Sep 92	E
Report on Geochemistry Simulation of Yucca Mountain Using Best Available Data on Mineralogy, Water Chemistry, Flow Rates and Crack Statistics	1.2.3.4.1.7.X	Livingston	1	WMPO/LANL	M325	B	27 Feb 87 4 Sep 87	A
Summary of 3-D Mineralogic Variation Along Transport Pathways	1.2.3.4.2.3.A	Livingston	1	LANL	M335	P		E
Complete Mineralogy Evaluations of Yucca Mountain Along Flow Path	1.2.3.4.2.3.A	Livingston	1	LANL	M382	P	31 Dec 91	E
Complete Five Year MET Data Collection	1.2.3.6.1.T	Kaiser	1	SAIC	M392	P	15 Oct 90	E
Document Meteorological Conditions	1.2.3.6.1.T	Kaiser	1	SAIC	M393	P	14 Jun 91	E

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Table 11-1. NNWSI baselined and planned Level 1 milestones for period 10/1/86 to 12/31/95 (continued)

MILESTONE DESCRIPTION	WBS NO.	WMPO RESP	LEVEL	RESP ORG	MILESTONE	BASELINED	HQ PLANNED HQ ACTUAL/ EXPECTED	
Commence Radiological Monitoring	1.2.3.6.1.T	Kaiser	1	SAIC	P970	P		E
Start Noise Monitoring	1.2.3.6.1.T	Blanchard	1	SAIC	R639	P	30 Sep 88	E
Submit Radiological Monitoring Plan to DOE/HQ	1.2.3.6.1.X	Kaiser	1	WMPO/SAIC	M897	B	15 Jul 87 15 Mar 88	E
Submit Air Quality Monitoring Plan to DOE/HQ	1.2.3.6.1.X	Kaiser	1	WMPO/SAIC	R327	B	30 Apr 87 7 Jul 87	E
Begin Air Quality Monitoring	1.2.3.6.1.1.X	Blanchard	1	WMPO/SAIC	N345	B	30 Sep 87 22 Dec 87	E
Draft Revision 1 Site Characterization Socioeconomic Monitoring and Mitigation Plan (SMMP)	1.2.3.7.T	Dixon	1	SAIC	T165	P	20 Jul 87 22 Jul 87	A
Draft analysis of comments on the December 1, 1987, working draft of the NNWSI Project Socioeconomic Monitoring and Mitigation Plan for Site Characterization	1.2.3.7.T	Dixon	1	SAIC	T190	P	3 Aug 87 10 Aug 87	A
Draft analysis of comments on the December 1, 1986, working draft of the NNWSI Project SMMP for Site Characterization (with DOE/HQ concurrence changes)	1.2.3.7.T	Dixon	1	SAIC	T191	P	21 Sep 87	E
Submit Draft Socioeconomic Monitoring and Mitigation Plan to DOE/HQ	1.2.3.7.X	Dixon	1	WMPO/SAIC	P030	B	2 Apr 87 8 Jan 88	E

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Table 11-1. NNWSI baselined and planned Level 1 milestones for period 10/1/86 to 12/31/95 (continued)

MILESTONE DESCRIPTION	WBS NO.	WMPO RESP	LEVEL	RESP ORG	MILESTONE	BASELINED	HO PLANNED HO ACTUAL/ EXPECTED
Submit Working Draft Site Characterization Socioeconomic Monitoring and Mitigation Plan (SMMP)	1.2.3.7.X	Dixon	1	WMPO/SAIC	R945	B	1 Dec 86 21 Nov 86 A
Initiate Repository License Application Design (LAD)	1.2.4.1.1.S	Zvada	1	SNL	M458	P	31 Aug 90 1 Jan 92 E
Complete Repository License Application Design (LAD) and Publish Report	1.2.4.1.1.S	Zvada	1	SNL	M459	P	31 Jul 93 1 Jul 94 E
Recommended Candidate for License Application Design Architect/Engineer	1.2.4.1.1.X	Zvada	1	WMPO	N421	P	25 May 89 E
69 Notice to Proceed for License Application Design (LAD)	1.2.4.1.1.X	Zvada	1	WMPO	N422	P	28 Feb 90 E
Start Repository Advanced Conceptual Design	1.2.4.1.1.X	Zvada	1	WMPO/SNL	N430	B	30 Sep 87 E
Complete License Application Design (LAD) Subsystem Design Requirements (SDR) (Design Criteria)	1.2.4.1.2.S	Zvada	1	SNL	M042	P	31 Jul 90 1 Sep 91 E
Update Subsystem Design Requirements (SDR) with Changes Resulting from Advanced Conceptual Design (ACD) Review	1.2.4.1.2.S	Zvada	1	SNL	M456	P	30 May 90 E
Initial Subsystem Design Requirement (SDR)	1.2.4.1.2.X	Zvada	1	WMPO/SNL	N433	B	30 Apr 87 1 Mar 88 E
Advanced Conceptual Design Report (Reference Design for License Application Design)	1.2.4.1.3.S	Zvada	1	SNL	M468	P	31 Mar 91 E

Table 11-1. NNWSI baselined and planned Level 1 milestones for period 10/1/86 to 12/31/95 (continued)

MILESTONE DESCRIPTION	WBS NO.	WMPO RESP	LEVEL	RESP ORG	MILESTONE	BASELINED	HQ PLANNED HQ ACTUAL/ EXPECTED
Repository Conceptual Design in Support of Site Characterization	1.2.4.1.3.X	Zvada	1	WMPO/SNL	N432	B	27 Feb 87 26 Apr 87 A
Rock Mass Properties and ES Preliminary Data Summary	1.2.4.2.1.1.S	Owens	1	SNL	M473	P	31 Jul 92 E
Submit Report on G-Tunnel Underground Facility (GTUF) Summary	1.2.4.2.1.2.X	Owens	1	WMPO/SNL	M455	B	30 Jan 87 1 Apr 87 A
End of G-Tunnel Testing for Development Prototype Boring Machine	1.2.4.2.2.1.S	Owens	1	SNL	M281	P	30 Dec 89 E
Submit Horizontal Waste Emplacement Equipment Plan to DOE/HQ	1.2.4.2.2.1.X	Owens	1	WMPO/SNL	N406	B	27 Feb 87 16 Oct 87 E
Initiate Procurement of Development Prototype Boring Machine	1.2.4.2.2.1.X	Owens	1	WMPO/SNL	N427	B	30 Nov 86 2 Jan 88 E
WMPO Initiates Drill Tests in G-Tunnel	1.2.4.2.2.1.X	Owens	1	WMPO	N603	P	15 Aug 89 E
Complete Fabrication of Development Prototype Boring Machine (DPBM) Waste Emplacement	1.2.4.2.2.1.X	Owens	1	WMPO	P403	P	15 May 89 E
Submit Horizontal Waste Emplacement Option Study to DOE/HQ for Policy Review	1.2.4.2.2.1.X	Skousen	1	WMPO	T161	P	30 Nov 87 1 Mar 88 E
Prepare "Technical Basis for Performance Goals, Design Requirements and Material Recommendation for the NNWSI Project Repository Sealing Program Report"	1.2.4.2.3.1.X	Zvada	1	WMPO/SNL	P404	B	31 Mar 87 9 Sep 87 A

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Table 11-1. NNWSI baselined and planned Level 1 milestones for period 10/1/86 to 12/31/95 (continued)

MILESTONE DESCRIPTION	WBS NO.	WMPO RESP	LEVEL	RESP ORG	MILESTONE	BASELINED	HQ PLANNED HQ ACTUAL/ EXPECTED	
Analysis to Evaluate the Effect of the Exploratory Shaft on Repository Performance at Yucca Mountain	1.2.4.2.3.1.X	Zvada	1	WMPO/SNL	R036	B	27 Feb 87 1 Apr 88	E
Report on Sealing Subsystem Performance Complete	1.2.4.2.3.3.S	Owens	1	SNL	M449	P	1 Sep 92	E
Submit Retrievability Compliance Strategy Plan to OGR for Review and Comment	1.2.4.3.4.X	Owens	1	WMPO/SNL	R048	B	31 Mar 87 1 Feb 88	E
Submit Initial Draft Report on Spent Fuel Rod Consolidation Study to DOE/HQ for Review	1.2.4.4.X	Zvada	1	WMPO/SNL	R267	B	22 May 86 22 Jan 87	A
Final Report on Spent Fuel Rod Consolidation Study to DOE/HQ	1.2.4.4.X	Zvada	1	WMPO/SNL	T157	P	19 Nov 87	E
Submit Report on the "Preliminary Study of the Effects of Uncertain Geologic Data on Design of the Underground Facility to DOE/HQ	1.2.4.6.2.X	Owens	1	WMPO/SNL	N457	B	27 Feb 87 22 May 87	A
Preclosure Performance Assessment Input for Enclosure in License Application	1.2.4.6.3.S	Zvada	1	SNL	M068	P	31 Mar 93 1 Jan 94	E
Site Characterization Analysis (SCA) Issued by the NRC	1.2.5	Szymanski	1	NRC	X508		30 Jun 87	E
NRC Grants Construction Authorization (CA)	1.2.5		1	NRC	X518	P	30 Aug 93	E

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Table 11-1. NNWSI baselined and planned Level 1 milestones for period 10/1/86 to 12/31/95 (continued)

MILESTONE DESCRIPTION	WBS NO.	WMPO RESP	LEVEL	RESP ORG	MILESTONE	BASELINED	HO PLANNED HO ACTUAL/ EXPECTED	
Site Characterization Plan (SCP) Issued by DOE/HQ	1.2.5.D		1	OGR	X507		31 Jan 87	E
Draft Environmental Impact Statement (DEIS) Issued to the Public	1.2.5.D		1	OGR	X509	P	30 Jun 90 2 Jan 91	E
Final Environmental Impact Statement (FEIS) Issued	1.2.5.D		1	OGR	X512	P	31 Jul 91	E
Site Selection Report (SSR) Issued	1.2.5.D		1	OGR	X513	P	31 Aug 91	E
Presidential Recommendation to Congress	1.2.5.D		1	OGR	X514	P	31 Oct 91	E
Draft Environmental Impact Statement (DEIS) Public Comment Period Closed	1.2.5.D		1	OGR	X515	P	30 Sep 90	E
Construction Authorization Application (CAA) and License Application (LA) Sent to NRC	1.2.5.D		1	OGR	X516	P	31 Dec 91	E
Final Draft License Application Support Plans and Documents Issued	1.2.5.2.1.T	Szymanski	1	SAIC	M553		1 Mar 91	E
License Application Finalized	1.2.5.2.1.T	Szymanski	1	SAIC	N516	P	30 Apr 94	E
Submit Draft Preliminary Plan for Scheduling, Management, and Preparation of Position Papers to WMPO/NV	1.2.5.2.1.X	Szymanski	1	WMPO/SAIC	R579	B	31 Aug 87	E

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Table 11-1. NNWSI baselined and planned Level 1 milestones for period 10/1/86 to 12/31/95 (continued)

MILESTONE DESCRIPTION	WBS NO.	WMPO RESP	LEVEL	RESP ORG	MILESTONE	BASELINED	HQ PLANNED HQ ACTUAL/ EXPECTED	
Submit Draft Seismic/ Tectonic Summary Position Paper to WMPO/NV	1.2.5.2.1.X	Szymanski	1	WMPO/SAIC	R583	B	15 Jun 87	E
Initial Site Characterization Plan (SCP) Introduction Input	1.2.5.2.2.T	Clanton	1	OGR	M527	B	1 Jun 86 31 Oct 86	A
Draft Site Characterization Plan (SCP) Introduction Complete	1.2.5.2.2.T	Clanton	1	OGR	M541	B	15 Aug 86 16 Jan 87	E
Draft Site Characterization Plan (SCP)	1.2.5.2.2.X	Clanton	1	WMPO/SAIC	M521	B	16 Jan 87 14 Jan 87	A
Site Characterization Plan (SCP)	1.2.5.2.2.X	Clanton	1	WMPO/SAIC	M522	B	27 Feb 87 2 Jan 89	E
Submit Site Characterization Plan (SCP) Progress Report Project Changes to DOE/HQ	1.2.5.2.2.X	Clanton	1	WMPO	M947	P	30 Sep 87	E
License Application (LA) Submitted to DOE Headquarters	1.2.5.2.3.T	Blanchard	1	SAIC	M516	P	30 Sep 91	E
Submit Draft Environmental Field Study Plans to DOE/HQ for Review.	1.2.5.3.X	Levich	1	WMPO/SAIC	R798	B	30 Jun 87 10 Jul 87	A
Submit Environmental Field Study Plans to DOE/HQ For Baselining	1.2.5.3.X	Kaiser	1	WMPO/SAIC	R799	B	31 Aug 87 15 Dec 87	E
Publish Environmental Impact Statement (EIS) Federal Notice of Intent	1.2.5.3.2.D	Kaiser	1	OGR	X889	P	30 May 89	E

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Table 11-1. NNWSI baselined and planned Level 1 milestones for period 10/1/86 to 12/31/95 (continued)
Run Date: 30 November 1987

MILESTONE DESCRIPTION	WBS NO.	WMPO RESP	LEVEL	RESP ORG	MILESTONE	BASELINED	HQ PLANNED HQ ACTUAL/ EXPECTED	
Submit Input to Environmental Impact Statement (DEIS) to DOE/HQ	1.2.5.3.2.T	Kaiser	1	SAIC	M509	P	30 Sep 93	E
Submit Input to Environmental Impact Statement ((EIS)to DOE/HQ (Text and CRD)	1.2.5.3.2.T	Kaiser	1	SAIC	M831	P	30 Sep 94	E
Submit Environmental Impact Statement (EIS) Topical Reports to WMPO/NV	1.2.5.3.2.T	Kaiser	1	SAIC	P042	P	30 Dec 92	E
Submit FY 88 Environmental Field Study Plans to DOE/HQ	1.2.5.3.2.X	Kaiser	1	WMPO	P463	P	6 Mar 88	E
Submit Working Draft Environmental Regulatory Compliance Plan to DOE/HQ & State	1.2.5.3.3.X	Kaiser	1	WMPO/SAIC	R794	B	30 Jan 87 6 Mar 87	A
Issue Environmental Regulatory Compliance Plan	1.2.5.3.3.X	Kaiser	1	WMPO/SAIC	R795	B	31 Mar 87 15 Dec 87	E
Submit Concurrence Copy of the EAMP Comment Analysis Document to WMPO/NV-DOE/HQ	1.2.5.3.4.T	Dixon	1	WMPO/SAIC	T193	P	20 Nov 87	E
Submit Revision 1 Environmental Monitoring and Mitigation Plan (EMMP) to DOE/HQ	1.2.5.3.4.X	Kaiser	1	WMPO/SAIC	P034	B	12 Aug 87 15 Dec 87	E
Submit Draft Revision 1 Environmental Monitoring and Mitigation Plan (EMMP) to DOE/HQ	1.2.5.3.4.X	Kaiser	1	WMPO/SAIC	P876	B	31 Jul 87 22 Jul 87	A
Submit Working Draft Environmental Monitoring and Mitigation Plan (EMMP) to DOE/HQ	1.2.5.3.4.X	Kaiser	1	WMPO	R898	B	28 Nov 86 26 Nov 86	A

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Table 11-1. NNWSI baselined and planned Level 1 milestones for period 10/1/86 to 12/31/95 (continued)

MILESTONE DESCRIPTION	WBS NO.	WMPO RESP	LEVEL	RESP ORG	MILESTONE	BASELINED	HQ PLANNED HQ ACTUAL/ EXPECTED	
Submit Draft II Environmental Monitoring and Mitigation Plan (EMMP) to WMPO/NV	1.2.5.3.4.X	Kaiser	1	WMPO/SAIC	R996	B	1 Dec 86 1 Dec 86	A
Rev 1 of the EMMP and CAD Issued to the State of Nevada	1.2.5.3.4.X	Kaiser	1	WMPO/SAIC	T094	P	15 Jan 88	E
Start Conducting Environmental Impact Statement (EIS) Scoping Hearings	1.2.5.4.1.D	Dixon	1	OGR	X001	P	15 Jun 89	E
Submit Report to Congress if C&C Agreement is not Attained	1.2.5.4.1.D	Dixon	1	OGR	X003		30 Dec 86	E
75 Publish Federal Notice of Intent to Conduct Environmental Impact Statement (EIS) Hearings	1.2.5.4.1.D	Kaiser	1	OGR	X010	P	30 Dec 94	E
Complete and Sign C&C Agreement with State	1.2.5.4.1.X	Dixon	1	WMPO	M795	P	30 Sep 88	E
Preliminary Exploratory Shaft In-Situ Test data for the Draft Environmental Impact Statement Available	1.2.6.1.1.A	Irby	1	LANL	M648	P	13 Oct 92	E
Exploratory Shaft Facility Testing Complete	1.2.6.1.1.A	Irby	1	LANL	M657	P	9 Jul 93	E
Exploratory Shaft Test Results Documented	1.2.6.1.1.A	Irby	1	LANL	M658	P	22 Jan 94	E
DOE/HQ approval of the Exploratory Shaft Facility Subsystem Design Requirements document	1.2.6.1.1.D		1	OGR	X018		15 May 87	E

Table 11-1. NNWSI baselined and planned Level 1 milestones for period 10/1/86 to 12/31/95 (continued)

MILESTONE DESCRIPTION	WBS NO.	WMPO RESP	LEVEL	RESP ORG	MILESTONE	BASELINED	HQ PLANNED HQ ACTUAL/ EXPECTED	
ESF Shaft and Mining Subcontract Awarded	1.2.6.1.1.X	Irby	1	WMPO	M022	B	11 May 88	E
Submit Prototype Test Plans to DOE/HQ for review and comment	1.2.6.1.1.X	Symanski	1	WMPO/LANL	M105	B	27 Feb 87	E
Complete Exploratory Shaft Readiness Review	1.2.6.1.1.X	Irby	1	WMPO/LANL	M243	B	30 Sep 87 31 Oct 87	E
Start Field Prototype Testing to G-Tunnel	1.2.6.1.1.X	Symanski	1	WMPO/LANL	M282	B	30 Mar 87 6 Oct 87	A
Start First Shaft (ES-1) Construction	1.2.6.1.1.X	Irby	1	LANL	M652	B	1 May 88 21 May 88	E
ESF Study Plans Received at HQ for Review and Approval	1.2.6.1.1.X	Bianchard	1	WMPO	M728	P	30 Sep 87	E
Final ESF Title II Design Requirements Document submitted to DOE/HQ	1.2.6.1.1.X	Irby	1	WMPO/SAIC	M773	B	29 May 87	E
Exploratory Shaft Title I Design Summary Submitted to WMPO	1.2.6.1.1.X	Irby	1	WMPO/SAIC	P763	B	29 May 87	E
Exploratory Shaft Facility Subsurface Readiness Review	1.2.6.1.1.X	Irby	1	WMPO	R033	P	1 May 88	E
Exploratory Shaft Facility (ESF) Subsystems Design Requirements Document	1.2.6.1.1.X	Irby	1	WMPO/LANL	R241	B	16 Feb 87 23 Apr 87	A

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Table 11-1. NNWSI baselined and planned Level 1 milestones for period 10/1/86 to 12/31/95 (continued)

MILESTONE DESCRIPTION	WBS NO.	WMPO RESP	LEVEL	RESP ORG	MILESTONE	BASELINED	HQ PLANNED HQ ACTUAL/ EXPECTED
DOE/HQ Receives Final FY89 Project Validation Material	1.2.6.1.1.X	Irby	1	WMPO/SAIC	R841	B	13 Mar 87 20 Mar 87 A
Start ESF Site Preparation	1.2.6.2	Irby	1	LANL	M645	B	1 Dec 86 1 Dec 87 E
Exploratory Shaft Facilities Construction Complete	1.2.6.3.1.R	Irby	1	REECO	M646	P	28 May 88 E
Exploratory Shaft One Liner and Internals Complete	1.2.6.4.1.R	Irby	1	REECO	M654	P	8 Mar 90 E
Exploratory Shaft Two Shaft Construction Complete	1.2.6.5.1.R	Irby	1	REECO	M643	P	24 Jun 90 E
Exploratory Shaft Two Construction Started	1.2.6.5.1.R	Irby	1	REECO	M647	P	25 Apr 90 E
Exploratory Shaft 1020' Level Testbed Excavation Complete	1.2.6.6.R	Irby	1	REECO	M655	P	20 Oct 90 E
Geologic Drifting Complete	1.2.6.6.R	Irby	1	REECO	M656	P	14 May 90 E
In-Situ Testing Started	1.2.6.9.1.A	Irby	1	LANL	R570	P	26 Dec 88 E
Begin ESF Testing	1.2.6.9.2	Irby	1	LANL	M612	B	1 May 88 1 Jul 88 E
G-Tunnel Operations for NNWSI Project Support Complete	1.2.7.2.3.S	Skousen	1	SNL	M283	P	30 Sep 88 E

Table 11-1. NNWSI baselined and planned Level 1 milestones for period 10/1/86 to 12/31/95 (continued)

MILESTONE DESCRIPTION	WBS NO.	WMPO RESP	LEVEL	RESP ORG	MILESTONE	BASELINED	HQ PLANNED HQ ACTUAL/ EXPECTED	
Submit FY 92 WPAS TO OGR	1.2.9.1.1.T	Dixon	1	SAIC	R000	P	29 Apr 90	E
Final NNWSI Project Management Plan to WMPO/NV and DOE/HQ	1.2.9.1.1.X	Dixon	1	WMPO/SAIC	R448	B	30 Dec 86 30 Nov 87	E
Submit NNWSI Project Plan to WMPO/NV and DOE/HQ	1.2.9.1.1.X	Dixon	1	WMPO/SAIC	R810	B	30 Sep 87 30 Dec 87	E
Submit FY 87 Baseline Budget Information and Cost Plans to OGR for Information	1.2.9.1.1.X	Kunlich	1	WMPO/SAIC	R849	B	30 Dec 86 22 Dec 86	A
Approved Revised Project Charter	1.2.9.1.1.X	Gertz	1	WMPO/SAIC	R850	B	30 Jan 87 16 Apr 87	A
Submit FY 88 Budget Information (WPAS) to OGR	1.2.9.1.1.X	Dixon	1	WMPO/SAIC	T171	P	15 Mar 88	E
Submit FY 89 Budget to DOE/HQ	1.2.9.1.2.X	Dixon	1	WMPO/SAIC	M712	B	13 Mar 87 14 Mar 87	A
Submit Licensing Support System Document Collection Procedure to Headquarters for Approval	1.2.9.1.4.T	Hatch	1	WMPO/SAIC	R647	B	30 Apr 87	E
List of Project Office Controlled Milestones Complete	1.2.9.2.T	Dixon	1	SAIC	M893	B	31 Dec 85 30 Nov 86	E
Performance Measurement Data System (20%) Implemented	1.2.9.2.T	Dixon	1	SAIC	R825	P	3 Nov 86 3 Nov 86	A

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Table 11-1. NNWSI baselined and planned Level 1 milestones for period 10/1/86 to 12/31/95 (continued)

MILESTONE DESCRIPTION	WBS NO.	WMPO RESP	LEVEL	RESP ORG	MILESTONE	BASELINED	HQ PLANNED HQ ACTUAL/ EXPECTED	
Implement Phase II of Earned Value System	1.2.9.2.X	Dixon	1	WMPO/SAIC	M725	B	30 Nov 86 4 May 87	A
Begin NRC Audit of NNWSI Project Prior to the Start of the Exploratory Shaft	1.2.9.3.T	Blaylock	1	SAIC	P443	P	31 Jan 88	E
Complete Response Process for NRC Audit of NNWSI Project Prior to the Start of Exploratory Shaft	1.2.9.3.T	Blaylock	1	SAIC	P444	P	30 Jun 88	E
Review Project Milestones in List Provided by Quality Assurance Coordinating Meeting and Advise HQ of Problems and Suggestions for Resolution	1.2.9.3.X	Blaylock	1	WMPO	R873	B	23 May 86	E

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12.0 INFORMATION AND REPORTING

Reporting and documentation requirements of the Project cover a broad range of needs. Weekly, monthly, and quarterly reports are routinely developed to report on progress, costs, schedule status, and planning adjustments. A detailed listing is provided in Section 12.3.

12.1 PROJECT DOCUMENTATION

In addition to routine reporting, documentation includes requirements to comply with the NHPA in the areas of environmental assessment, site characterization, test plans, and licensing documentation. Figure 12-1 presents Project management documentation requirements, ordered according to legislative, regulatory, or DOE requirements.

Figure 12-2 summarizes major regulatory and technical documents or plans required by the NHPA, the National Environmental Policy Act (NEPA), and the NRC. The documents are arranged in a hierarchy based on legislative, regulatory, and DOE requirements. The NHPA impact on the regulatory hierarchy is shown in Figure 12-2. The NHPA (page 96, STAT 2208, Section 112) requires that siting guidelines (10 CFR 960) be developed by DOE. Following issuance of 10 CFR 960, the act requires that the NRC revise 10 CFR 60 to include the specific guidance in the Act (page 96, STAT 2228, Section 121(b)) and also requires the Environmental Protection Agency (EPA) to promulgate a standard for protection of the general public (40 CFR 191) in Section 121(a). The Environmental Impact Statement (EIS) is required by the NHPA.

The integrating contractor is tracking the progress of all plans under development and checking the content of plans that are related to assure consistency. The hierarchy shown in Figures 12-1 and 12-2 will be updated as this PMP is updated.

12.2 TECHNICAL REPORTS

Project participants also prepare detailed technical reports on activities as they are completed or reach a milestone point. Many of these technical reports are transmitted to DOE headquarters and some become references for required regulatory documents. The reports are reviewed internally by the organization that is generating the report. Those that involve integrated efforts from other participants are also reviewed by the involved participating organizations prior to release to WMPO for review. Published reports are available to the public through the DOE Scientific and Technical Information Center (STIC) in Oak Ridge, Tennessee. Any report that has been used as a reference for the Draft and Final Environmental Assessments is available through a Nevada public library.

Specific technical position papers are prepared as required for presentation to the NRC on specified topics such as Seismic/Tectonics and Use of Corroborative Information in the Licensing Process. When the papers are submitted to the NRC for review, the Project requests comments in return.

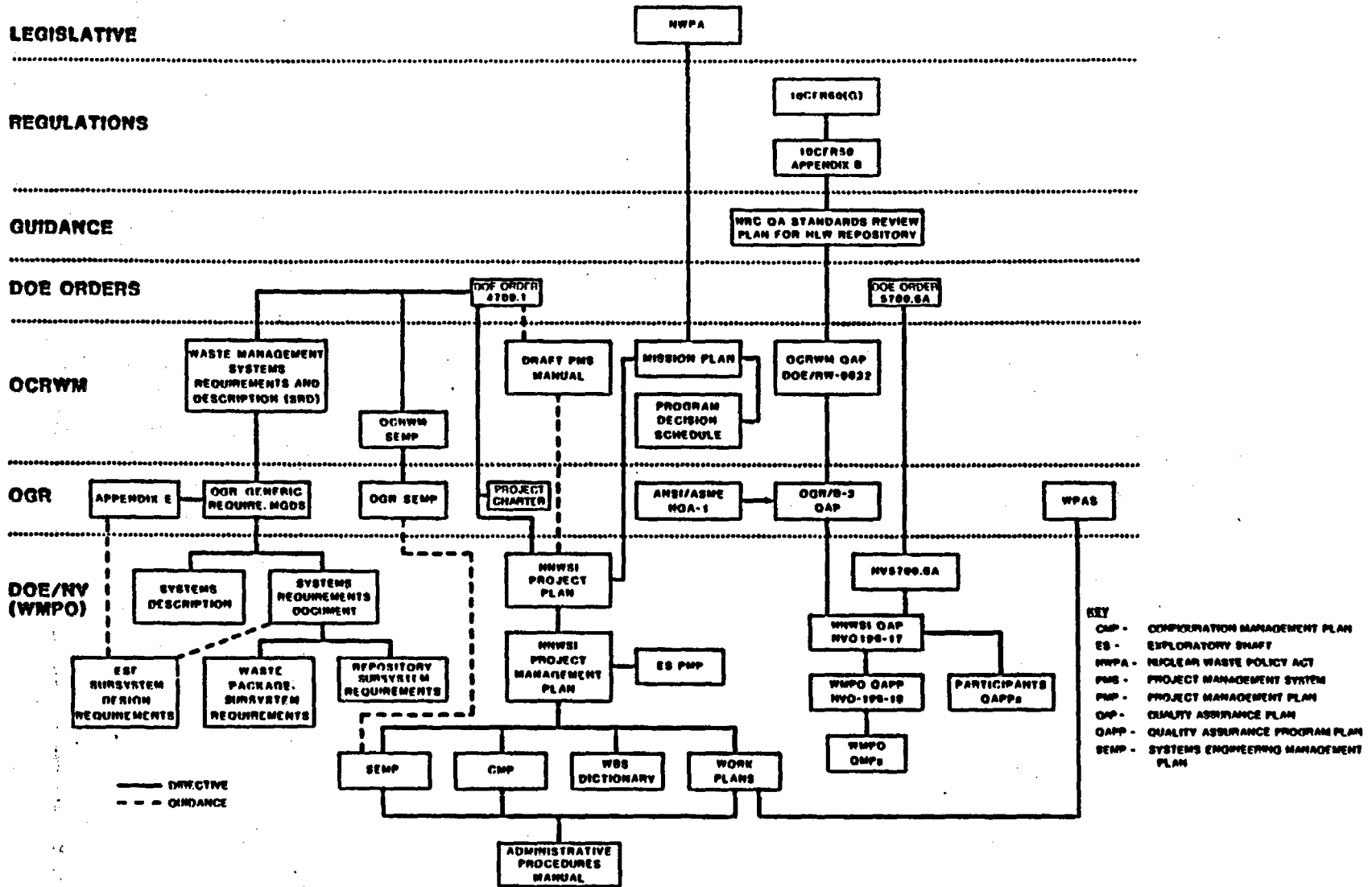


Figure 12-1. Simplified Project management documentation hierarchy.

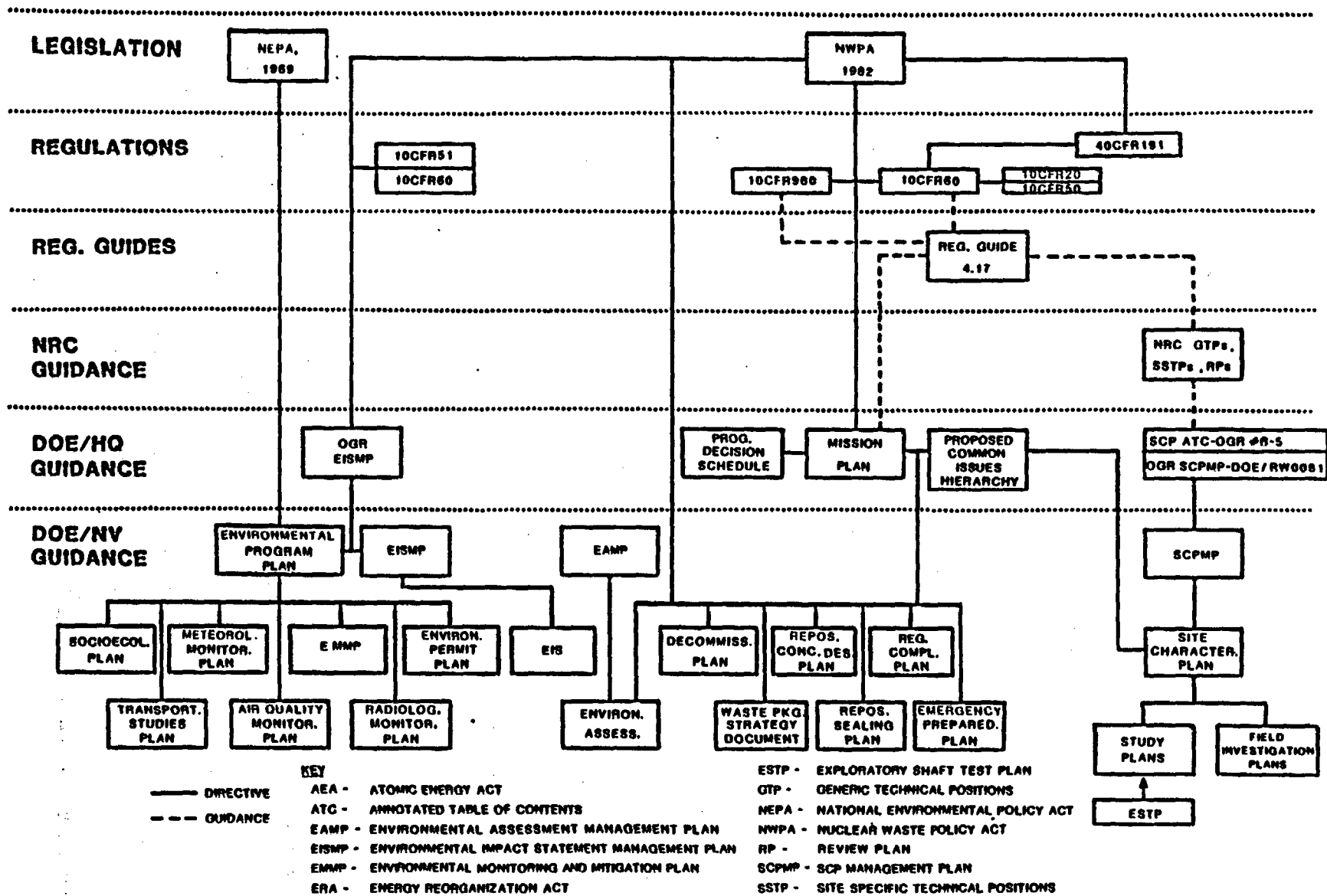


Figure 12-2. Simplified regulatory and technical document hierarchy.

The NRC review comments are used by the Project to identify whether corrective action is necessary at an early stage to change an approach to resolving licensing needs.

12.3 STATUS REPORTS TO WMPO, DOE HEADQUARTERS, AND PARTICIPANTS

1. **Weekly Informal Reports** - Participants submit weekly reports to the support services contractor. They are compiled into an informal weekly report and distributed internally to Project participants.
2. **Monthly NNWSI Project Progress Reports** - Participants submit monthly reports which are compiled by the support services contractor into a Project monthly report for OGR according to Uniform Reporting System (URS) requirements. The report includes performance measurement reports for WBS Level 3 and milestone progress reporting.
3. **Weekly Highlight Reports** - A weekly report is sent to OGR summarizing significant accomplishments, informational items, and issues that need to be addressed with DOE headquarters. The report includes a calendar of upcoming events. Guidance is provided by a baselined OGR procedure for Weekly Highlight reports.
4. **Quarterly Technical Progress Reports** - Project participants submit a technical progress report to WMPO. All of the reports are compiled into a Project Quarterly Technical Progress Report that becomes available to the public through STIC. The URS requires the technical progress reports and they are prepared consistent with URS guidance.
5. **Major Systems Acquisition Monthly Project Manager's Progress Report (MSA)** - The MSA report is compiled by the integrating contractor and submitted to OGR monthly in accordance with guidance in DOE Order 4700.1. Guidance is provided by a baselined OGR procedure.

In addition to these reports, the NNWSI Project bibliography (NVO-196-24) is updated by the WMPO annually and distributed to Project participants and the public.

12.4 PROJECT LOGS

An updated Change Control Board (CCB) log is issued to Project participants on the controlled CCB distribution list following each CCB meeting. It lists proposed changes and actions taken that result in changes to the Project baseline.

An action items log is maintained by the T&MSS contractor that tracks action items generated during the PM-TPO monthly meetings, and the WMPO maintains an action items log containing items generated out of the WMPO. This log covers both WMPO personnel assignments and Project Manager assignments to the Project participants.

Logs and records that will be generated during the exploratory shaft and testing program are detailed in the Draft ESTP (Rev. 1).

Logs and records that are generated for quality assurance purposes are detailed in the respective quality assurance procedures, plans, and standard operating procedures.

13.0 SYSTEMS ENGINEERING

Systems engineering is a planned and controlled process to be used in the technical management and development of the Yucca Mountain Mined Geologic Disposal System (MGDS). The systems engineering process will define and document the technical part of the NNWSI Project Baseline and will provide for the systematic development, periodic review, and control of changes to the technical, management, and regulatory parts of the Project Baseline. The process will also facilitate the integration of all technical disciplines involved in the MGDS development in order to achieve the common goals of the Mission Plan.

The NNWSI Project Systems Engineering Management Plan (SEMP), which is incorporated by reference into this PMP, describes the systems engineering process and its application to the development of the Yucca Mountain MGDS. The development of the MGDS commences with the identification of a mission need at the OCRWM level and proceeds with the identification of system and subsystem requirements for design, construction, operation, closure, and decommissioning of the MGDS. The SEMP also addresses the resolution process concerning the Key Issues and Common Issues (NNWSI Project Issues Hierarchy) that correspond to the system guidelines in 10 CFR 960 and are defined in the Program Mission Plan. These issues must be resolved before a licensing application can be prepared and design suitability of the Yucca Mountain MGDS can be established.

The interactive, iterative process of systems engineering will ensure that the Yucca Mountain MGDS will perform all of the required functions. It will also ensure that the MGDS subsystems, when combined, will form a well-integrated MGDS with no mismatches among the subsystems.

14.0 CONFIGURATION MANAGEMENT

The configuration management process is a management mechanism for the control of change. Baseline information developed through the systems engineering process is maintained through the configuration management process to ensure that all significant aspects of proposed changes are adequately considered prior to implementation. Changes to the base of information that describe the MGDS result from the evolving description of the system. The configuration management process provides a mechanism for the systematic evaluation, coordination, and approval or disapproval of all changes to and for reporting the status of the current approved Project information base.

The Configuration Management Plan (CMP), incorporated into this PMP by reference, assigns responsibilities and describes the processes for Project configuration management. Participant organizations are required to develop individual procedures for controlling their technical baseline to ensure lower-tier subcontracts are effectively managed through consistent mechanisms.

Baseline changes are categorized into four classifications, which designate the level of approval authority. The lowest classification change may be approved and issued by the TPO of the responsible participant organization. All other changes are submitted to the T&MSS contractor by the TPO of the responsible participant. The T&MSS Baseline Review Board (BRB), consisting of management representatives of all appropriate disciplines, performs an objective analysis of proposed changes and makes a recommendation to DOE for disposition.

There are two levels of WMPO approval authority. The responsible Branch Chief(s) and/or Project Engineer(s) are delegated authority to approve Class 3 changes. The NNWSI Project Change Control Board (CCB) is composed of the WMPO Branch Chiefs and chaired by the WMPO Project Manager. Upper-level Project change approval is the responsibility of the CCB.

Changes that potentially impact the OCRWM program require DOE headquarters approval prior to implementation. Change proposals are submitted to headquarters after Project CCB recommendation for approval.

15.0 QUALITY ASSURANCE PLAN

Although DOE Order 5700.6A and DOE/NV Order 5700.6A-4 outline the DOE requirements for quality assurance (QA), the NRC regulations are the governing standards for establishing, implementing, and maintaining a QA program for the NNWSI Project. The NNWSI Project QA program is being developed to satisfy the QA requirements of the NRC 10 CFR 60 (Subpart G), Appendix B of 10 CFR 50, and the NRC requirements for QA that are currently outlined in the NRC Review Plan dated June 1984.

The QA requirements for ensuring that all the activities of the Project are accomplished in accordance with the QA program for the NNWSI Project are specified in the general QA plan for the Project (NVO-196-17), which summarizes the QA policy and program for the Project. This general plan is implemented through the QA Program Plan for WMPO (NVO-196-18) and the QA Program Plan (QAPP) for each Project participant. These program plans specify the quality criteria, practices, and procedures necessary to achieve the desired quality for the Project. The current revisions of the quality assurance program plans for NNWSI Project participating organizations are as follows:

1. NNWSI Project QAP NVO-196-17
2. WMPO QAPP NVO-196-18
3. SAIC QAPP QAPP-1
4. REEC_o QAPP 568-DOC-115
5. F&S QAPP QAPP 001, Rev. 0
6. H&N QAPP QAM-10471-1115
7. SNL QAPP 6000 QAPP
8. USGS QAPP NNWSI-USGS-QAPP-01, Rev. 1
9. LLNL QAPP 033-NNWSI
10. LANL QAPP NNWSI-QP-01

The Project participants are required to submit their QAPPs and any major changes thereto to the WMPO for review and approval. Assurance of adequate implementation of the approved plans will be accomplished through periodic audits and surveillances of Project participant activities by their internal QA organization and the WMPO QA. Reports of any deficiencies will be provided to the TPO of the affected organization for initiation of appropriate corrective action.

An overall evaluation of the effectiveness of the NNWSI Project QA program is provided to the WMPO by the T&MSS QA support contractor (QASC) at the end of each fiscal year, including recommendations for improvements to the system.

16.0 UTILITY SERVICE

Specific actions that the Project is taking to assure availability of reliable utility service for ESF and repository construction and operation are defined in the ESF Subsystem Design Requirements Document and Repository Subsystem Design Requirements to Support the Advanced Conceptual Design Studies for a Yucca Mountain MGDS. Both of these documents are in preparation.

ANNEX 1

ACQUISITION PLAN

1.1 GENERAL PROCUREMENT REQUIREMENTS

This acquisition plan is simplified relative to guidance in DOE Order 4700.1 because three plans exist that cover details requested in the Order: The Project Plan, the Project Management Plan, and the ES Project Management Plan.

1.2 PROCUREMENT STRATEGY FOR THE EXPLORATORY SHAFT PROJECT

The conceptual design for the exploratory shaft (ES) was prepared under the direction of Los Alamos National Laboratory with the support of the existing NTS support contractors--Fenix & Scisson, Holmes & Narver, and the Reynolds Electrical and Engineering Company, Inc. (REECo). The construction manager for the ES program will be the NV Office. Engineering design and inspection will be performed by Holmes & Narver for the surface facilities underground power, communications, and instrumentation and by Fenix & Scisson for the subsurface facilities. Generally, the surface and subsurface construction will be performed by REECo except for the sinking of the exploratory shaft and the secondary egress shaft. Competitive contracts for shaft construction activities and equipment requirements will be initiated as REECo subcontracts. REECo will execute the subcontract because it has experience in managing other mining contractors and can ensure compliance with mining safety standards. The subcontractor also will be responsible for limited development of the underground facility after the shaft is completed.

1.3 PROCUREMENT STRATEGY FOR REPOSITORY DEVELOPMENT

Since the Yucca Mountain site has been recommended as one of the three candidate sites, major procurement actions must be implemented in order to design and build a government-owned, contractor-operated facility. It will be necessary to establish separate Source Evaluation Boards to competitively select a Support Service Contractor, an Architect/Engineer (A/E) Contractor, a Management and Operation Contractor (M&O), and a Constructor.

A new Technical and Management Support Service (T&MSS) Contract (starting in 3/87) replaced the previous T&MSS contract, and designated SAIC as the integrating contractor for the Project to prepare for and carry the Project through the licensing process. Their scope of work also includes management and integration of the nine Work Breakdown Structure (WBS) elements, preparation of license application documentation, and technical support in the review of activities performed by the A/E Contractor. The Nevada Test Site (NTS) contractors will provide major assistance to WMPO in design criteria development and technical review of all facilities and systems designed by outside contractors.

The A/E Contractor, beginning in mid-1988, will produce a Waste Package and Repository License Application Design and Final Procurement and Construction Design by about May 1990 and August 1993, respectively.

Should the Yucca Mountain site be designated for the first repository, the M&O Contractor will ultimately be responsible for the management and operation of the repository and would begin work in 1991. Initially, major activities will be to review final designs of the A/E Contractor. The M&O Contractor will also observe and understand ongoing licensing actions in the preparation to assume the responsibility of maintaining a license to possess waste at the repository. In 1992, the M&O contractor will begin a transition period assuming all responsibilities assigned to the Support Service Contractor, except those which relate to the ongoing licensing actions. From about January 1996 to mid-1997, the contractor will prepare plans and procedures and begin training personnel and developing the capability to operate a repository and begin cold and hot testing.

Should Yucca Mountain be designated for the first repository, the Constructor will be responsible for the construction of repository facilities. The Constructor will also begin work in about May of 1991 at a level necessary to interact with the A/E Contractor to ensure final designs are consistent with economical and efficient construction phasing, plans, and schedules.

1.4 EQUIPMENT

Major equipment needed for site characterization will be in the exploratory shaft. Government-furnished, exploratory-shaft-related equipment is described in the ESPMP. Other major government-furnished items are the automated data processing (ADP) equipment, which is maintained by the support services contractor, equipment used for meteorological monitoring at the NTS, laboratory equipment at the laboratories and survey, and equipment used in the Sample Management Facility. Equipment requirements for the repository will be identified in the Subsystem Design Requirements Document.

Representatives from the support services contractor and Waste Management Project Office attend meetings of and are in contact with the OGR Office Automation Coordinating Group to assure that Project automation is consistent with OGR automation goals.

1.5 PROCUREMENT PROCESSES

Standard DOE procurement policies are adhered to for all procurement.

ANNEX 2

TEST AND INVESTIGATION PLANS

1.0 EXPLORATORY SHAFT TEST PLANS

Surface and subsurface tests will be conducted to acquire the technical data necessary to meet the information requirements for site characterization and nuclear waste repository license application as identified in 10 CFR 60.

A separate document entitled "Exploratory Shaft Test Plan" (ESTP) is being developed to describe in detail the subsurface tests to be conducted in the exploratory shaft (ES). Certain tests will be performed during the shaft-sinking (mining) operation. These tests have been selected to minimize delays in mining and include (1) shaft wall mapping and photography, (2) large block sampling, (3) perched-water sampling, (4) shaft mechanical testing, (5) vertical core drilling, (6) lateral core drilling, (7) overcore testing, (8) breakout room deformation testing, (9) effects of evacuation testing, (10) radial borehole hydrologic testing, and (11) unsaturated zone water sampling and analysis for matrix properties.

After the shaft has reached its planned depth of approximately 1,500 ft and the shaft-sinking operation has been demobilized, the in situ tests will be conducted. The in situ test phase includes (1) drift wall mapping, (2) long lateral coring, (3) short radial coring, (4) drift and pillar deformation measurements, (5) intact fracture sampling, (6) bulk permeability tests, (7) infiltration tests, (8) hydrologic tests in the Calico Hills, (9) waste package environment tests, (10) heated block tests, (11) canister-scale heater tests, (12) borehole and drift seal tests, (13) diffusion tests, and (14) horizontal emplacement hole tests.

The ES Project Management Plan is the guiding management document for all ES activities and encompasses the design, construction, and operation phases of the shaft. The Exploratory Shaft Facility (ESF) Subsystem Design Requirements document specifies surface and subsurface design criteria.

2.0 SITE CHARACTERIZATION PLAN

A Site Characterization Plan (SCP) is being prepared to describe the present state of knowledge of the site, data that needs to be obtained during site characterization, and the tests and investigations that will be conducted to obtain that data during site characterization. Chapters 1-7 of the SCP present the Project's current understanding of site geology, hydrology, geo-mechanics, geochemistry, climatology, and the current repository and waste package designs. SCP Chapter 8.3, Planned Tests, Analyses, and Studies, will include all planned activities related to the site, repository, seal system, waste package, and performance assessment programs. The Site Program, Section 8.3.1, will include plans related to geology, hydrology, geochemistry, and climatology. Section 8.3.2, Repository Program, will describe the research and development and engineering activities required to ensure that the repository is capable of satisfying applicable performance objectives.

These activities include (1) analysis of host rock environment, (2) coupled interaction tests, (3) design optimization tests, and (4) repository modeling. The Seal System Program, Section 8.3.3, will include (1) analysis of the repository seal and backfill environment, (2) seal-system components and interaction tests, (3) design optimization, and (4) seal system modeling. The Waste Package Program, Section 8.3.4, will include (1) analysis of the waste-package environment, (2) waste-package components and interaction testing, (3) design development, and (4) waste-package modeling. The Performance Assessment Program, Section 8.3.5, includes the strategy for preclosure and postclosure performance assessment and plans for demonstrating compliance with the regulations.

3.0 SUMMARY OF DEVELOPMENTAL TEST PLANNING

In April 1986, the Exploratory Shaft Test Manager recommended that near-term ES testing activities focus on the development and implementation of prototype tests needed to properly prepare for ES testing.

All ES investigators reviewed their ES test proposals to identify all tests or test elements that needed to be prototyped, to prepare investigations plans and to develop appropriate Quality Assurance documents. The test plans resulting from this activity will be compiled in a separate Prototype Test Plan (PTP).

Based on the review of the ES test proposals, Prototype Test Plans will be developed in the following areas:

WBS 1.2.6.9.4.1.1	Shaft Mapping
WBS 1.2.6.9.4.1.2	Drift Mapping
WBS 1.2.6.9.4.1.3	Mineralogy/Petrology
WBS 1.2.6.9.4.2.1	Dry Coring/Drilling
WBS 1.2.6.9.4.2.2	Drill Hole Stemming
WBS 1.2.6.9.4.2.3	Effects of Blasting on Instrumentation
WBS 1.2.6.9.4.2.4	Cross Hole Pneumatic and Hydraulic Testing
WBS 1.2.6.9.4.2.5	Tracer Testing (Gas and Water) in ES Tests
WBS 1.2.6.9.4.2.6	Drill Hole Stress Meters (Installation and Monitoring Techniques)
WBS 1.2.6.9.4.2.7	Determining Optimal Rubble Size (from Blasting) for Laboratory Core Sampling
WBS 1.2.6.9.4.2.8	Intact Fracture Sampling
WBS 1.2.6.9.4.2.9	Infiltrometer Set-up and Instrumentation
WBS 1.2.6.9.4.2.10	Instrumentation and Monitoring Environmentally Controlled Room for Bulk Permeability Test
WBS 1.2.6.9.4.2.11	Laboratory Analyses of Fractures
WBS 1.2.6.9.4.2.12	Bulk Sampling and Handling Procedures
WBS 1.2.6.9.4.2.13	Water Sampling and Flow Measurement Procedures for Perched Water
WBS 1.2.6.9.4.2.14	Dry Coring from Rubble
WBS 1.2.6.9.4.2.15	Pore Water Squeezing by Triaxial Compression Method for Hydrochemical Analyses
WBS 1.2.6.9.4.3.1	Mining Demonstration
WBS 1.2.6.9.4.3.2	Thermal Stress Testing
WBS 1.2.6.9.4.3.3	Overcore Stress Testing

WBS 1.2.6.9.4.4.1	Diffusion Test
WBS 1.2.6.9.4.5.1	Engineered Barrier Design Testing
WBS 1.2.6.9.4.6.1A	Air Coring
WBS 1.2.6.9.4.6.1B	Dust Hazards
WBS 1.2.6.9.4.7	Prototype IDS Test

As each plan is approved, the testing will be implemented.

4.0 FIELD ACTIVITIES/TEST

A Field Activities Plan (FAP) is being prepared which will list and briefly describe all surface-based field activities that are being or will be conducted as part of the site characterization program described in Section 8.3.1 of the Site Characterization Plan. These activities will include surface-based drilling, trenching, streamflow monitoring, infiltration studies, meteorological monitoring, erosion studies, geophysical surveys, and geologic and surficial deposits mapping.

The FAP will give a more detailed description of individual activities than is possible in Section 8.3.1 of the SCP. It will serve as a basic reference for SCP planning and scheduling activities, as well as for construction and scientific planning by NTS contractors and Project participants. The document will be updated periodically to reflect changes in field activities brought about by integrated activity planning, such as is envisioned by the drilling integration.

5.0 OPERATIONAL TEST PLANNING

Operational testing is covered in the ESTP and in Chapter 8.3 of the SCP.

6.0 TESTING RESOURCE REQUIREMENTS

Resources required to conduct the proposed tests are defined in the Work Plans, the ESTP, the ES Project Management Plan, the Field Activities Plan, and SCP Chapter 8.3.

ANNEX 3

ENVIRONMENTAL, HEALTH, AND SAFETY PLANS

1.0 INTRODUCTION

Specific actions are being taken on the NNWSI Project to comply with federal and state regulatory requirements pertaining to environmental issues and DOE Nevada Operations Office (NV) policy with respect to health and safety considerations. These actions consist of (1) the preparation of environmental documentation to meet the requirements of the National Environmental Policy Act (NEPA), as well as the Nuclear Waste Policy Act of 1982 (NWSA) (Public Law 97-425), and (2) the preparation of an NNWSI Project-specific Safety and Health Program Plan in response to the NV management position with respect to the importance of providing the highest possible degree of personnel safety during all NNWSI Project-related activities.

2.0 ENVIRONMENTAL DOCUMENTATION

Compliance with existing NEPA and NWSA provisions requires the following:

- A. The DOE must prepare a NEPA environmental assessment (EA) to address the impacts of site investigation studies. (Site investigation is the phase prior to site characterization. Site characterization begins when the President approves a site for site characterization.) The EA must be reviewed by the Bureau of Land Management (BLM). This EA was issued in February 1983 and has been approved by BLM as part of a cooperative agreement that was executed and along, with a Finding of No Significant Impact, was issued by BLM on June 15, 1983.
- B. The DOE must prepare a NWSA EA to address the impacts of site characterization and evaluate the site against the siting guidelines (10 CFR 960) to support the DOE Secretary's recommendation to the President of a site for site characterization. A draft EA was issued to the public for a 90-day comment period on December 20, 1984. During this period, public hearings were held in Las Vegas, Beatty, and Reno, Nevada. The Final EA was released to the public on May 28, 1986.
- C. The DOE must prepare a NEPA Environmental Impact Statement (EIS) to address the impacts of constructing, operating, closing, and decommissioning a repository at Yucca Mountain. The EIS is necessary to support the President's recommendation to Congress of one site for the first repository. The draft EIS is scheduled for release in January 1991 and the final EIS is scheduled for release in July 1991.

3.0 SAFETY AND HEALTH PROGRAM PLAN

The memorandum of the decision to use conventional shaft-sinking methods included an "absolute requirement that a safety program providing the highest possible protection of workers be developed and approved by NV" before starting construction activities at the exploratory shaft site. The plan describing the development and implementation of such a safety and health program has been prepared by REECo and was approved by the Manager, NV, on April 15, 1983, and is presently being revised by REECo. That plan, REECo document No. D672A/1, NNWSI Exploratory Shaft at Yucca Mountain, Safety and Health Program Plan, is hereby incorporated into the Project Management Plan for the NNWSI Project.

ANNEX 4

OGR ISSUES HIERARCHY

This annex is an excerpt of the Office of Geologic Repositories Issues Hierarchy for a Mined Geologic Disposal System (OGR/B-10, DOE/RW-0101) dated September 1986.

1.0 FOREWARD

The Nuclear Waste Policy Act of 1982 (NWSA) charges the Department of Energy (DOE) with responsibility for siting, constructing, operating, and permanently closing a mined geologic disposal system (MGDS) for high-level nuclear waste and spent nuclear fuel. The Nuclear Regulatory Commission (NRC) is charged with responsibility for promulgating the regulatory requirements and criteria (10 CFR Part 60) that will govern authorization for construction, licensing, and approval for permanent closure of the MGDS.

In 10 CFR Part 60, and in their guidance (Proposed Revision 1 to Regulatory Guide 4.17) to the DOE for the preparation of site characterization plans (SCPs) for geologic repositories, the NRC has indicated that identification of the issues that must be resolved to complete licensing assessments of site and design suitability is an important step in the licensing process.

As required by the NWSA, the DOE prepared a Mission Plan for the Civilian Radioactive Waste Management Program (the Mission Plan, DOE/RW-0005) to provide an informational basis sufficient to permit informed decisions to be made in carrying out the program for development of the MGDS. To address the NWSA requirement that the information needed to support siting and construction of the MGDS be identified, the Mission Plan included a hierarchy of generic issues derived from the applicable Federal regulations that define the requirements of the MGDS, and that must be resolved to demonstrate that these requirements have been satisfied.

The Office of Geologic Repositories (OGR) within the DOE's Office of Civilian Radioactive Waste Management (OCRWM) has primary responsibility for the MGDS program. Based on the issues hierarchy concept presented in the DOE's Mission Plan, the OGR Issues Hierarchy presents the issues that the DOE will use to guide development of site characterization plans and the conduct of site characterization activities. These issues must be resolved to demonstrate compliance with applicable Federal regulations and to support site selection and licensing for an MGDS.

2.0 RATIONALE FOR DEVELOPMENT AND STRUCTURE OF THE ISSUES HIERARCHY

The issues hierarchy consists of three levels of detail: key issues, issues, and information needs. The issues under each key issue are grouped into three categories: performance issues, design issues, and characterization issues, to reflect the structure and intent of the primary governing

regulations contained in the 10 CFR Part 60 and 10 CFR Part 960. (Only the four key issues are presented in this excerpt.)

Performance issues generally address questions regarding compliance with regulatory requirements that are related to the performance of the mined geologic disposal system. They generally relate directly to the highest level of regulatory requirements to be satisfied or findings that must be made. For example, there are performance issues that correspond to each of the postclosure performance objectives set forth in the 10 CFR 60.112. Performance issues identify the information related to design, site characteristics, and performance assessments needed to address the regulatory requirements. Information about performance assessments is addressed directly by the performance issues; information about design and site characteristics is address by the design and characterization issues, respectively.

Design issue address needs for information about the design of the repository, seals, and the waste package. Design issues may address design criteria specified in the 10 CFR 60.130 through 60.134, preclosure system and technical guidelines in 10 CFR 960.5-1 and 960.5-2, and/or information required to support resolution of the performance issues. Design issues also identify information about site characteristics that is needed for design purposes.

Characterization issues are intended to encompass the site characteristics, processes, and events that may affect repository design and performance. These issues address the detailed information on site characteristics that will be used to develop site descriptions and support resolution of related design and performance issues, including the information needed to determine compliance with the guidelines of 10 CFR Part 960 in support of site selection.

The relationships among the three categories of issues are illustrated in Figure A 4-1. The performance and design issues provide requirements (priorities) for the characterization issues. Resolution of the characterization issues results in data for the analyses needed to address design and performance issues.

3.0 ISSUES HIERARCHY

Key Issue 1: Will the mined geologic disposal system at (site name) isolate the radioactive waste from the accessible environment after closure in accordance with the requirements set forth in 40 CFR Part 191, 10 CFR Part 60, and 10 CFR Part 960?

(There are 9 performance issues, 3 design issues, and 8 characterization issues subordinate to Key Issue 1.)

KEY ISSUE 2: Will the projected releases of radioactive materials to restricted and unrestricted areas and the resulting radiation exposures of the general public and workers during repository operation, closure and decommissioning at (site name), meet

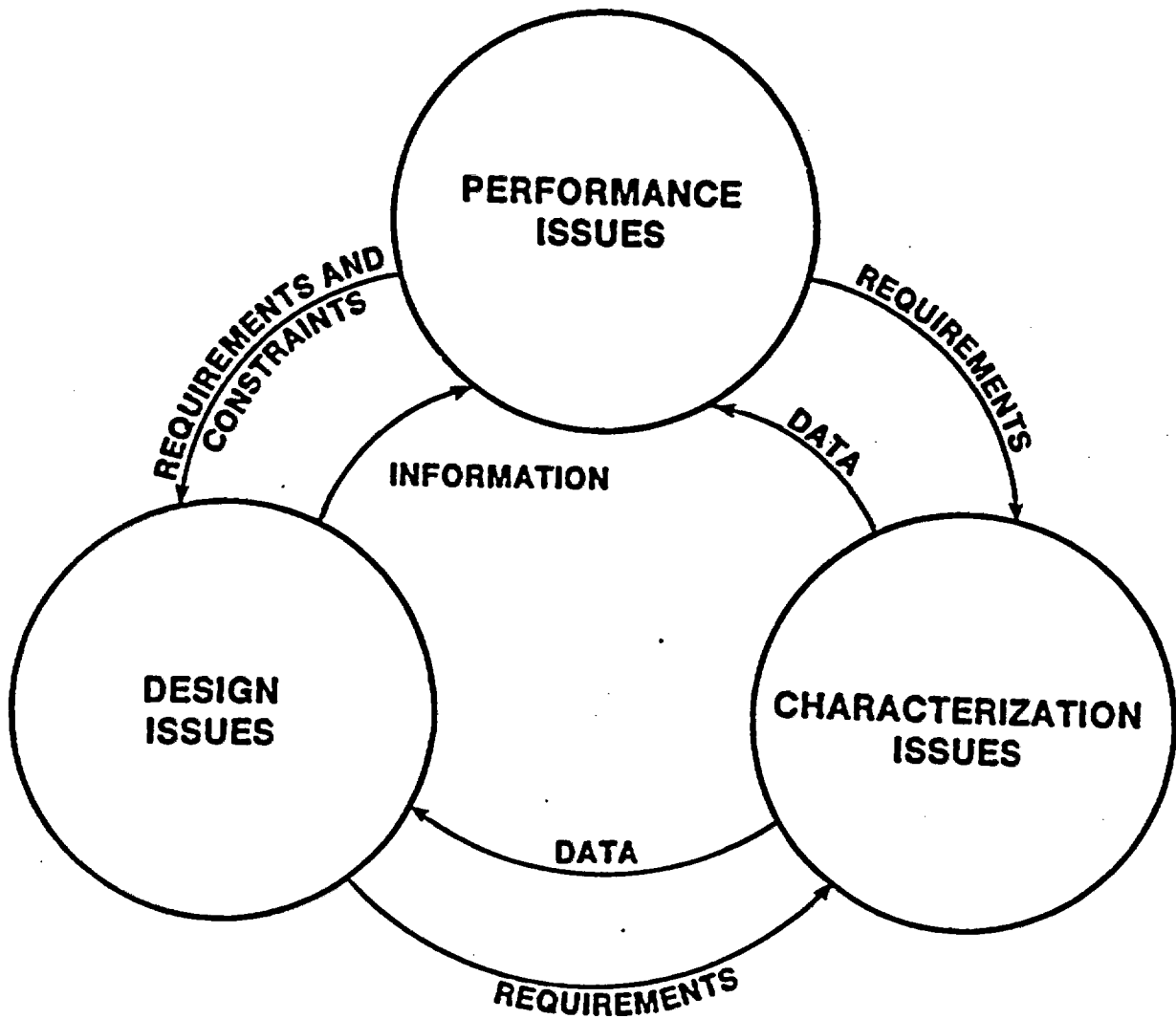


Figure A 4-1. Relationships among the three categories of issues in the OGR.

applicable safety requirements set forth in 10 CFR Part 20, 10 CFR Part 60, 10 CFR Part 960, and 40 CFR Part 191?

(There are 5 performance issues, 2 design issues, and 4 characterization issues subordinate to Key Issue 2.)

KEY ISSUE 3: Can the mined geologic disposal system at (site name) be sited, constructed, operated, closed, and decommissioned, and can the associated transportation system be sited, constructed, and operated so that the quality of the environment will be protected and waste-transportation operations can be conducted without causing unacceptable risks to public health or safety?

The NWPA also requires that the DOE prepare, and the NRC adopt to the extent practicable, an environmental impact statement (EIS) to satisfy the requirements of the National Environmental Policy Act (NEPA) and the implementing regulations of 40 CFR Part 1500 et seq. These implementing regulations require that the DOE undertake a scoping process to identify the significant issues to be addressed in the EIS.

(The issues subordinate to Key Issue 3 have not yet been defined.)

KEY ISSUE 4: Will the construction, operation (including retrieval), closure, and decommissioning of the mined geological disposal system be feasible at (site name) on the basis of reasonably available technology, and will the associated costs be reasonable in accordance with the requirements set forth in 10 CFR Part 960?

(There are one performance issue, four design issues, and four characterization issues subordinate to Key Issue 4.)

APPENDIX A

LIST OF ACRONYMS

ACD	Advanced Conceptual Design
ADP	Automated Data Processing
A/E	Architect/Engineer
AL	DOE Albuquerque Operations Office
BA	Budget Authorization
BLM	Bureau of Land Management
BO	Budget Outlay
BRB	Baseline Review Board
CCB	Change Control Board
CFR	Code of Federal Regulations
CMP	Configuration Management Plan
DOE	U.S. Department of Energy
DOE/NV	DOE Nevada Operations Office
DOI	U.S. Department of the Interior
DRI-Reno	Desert Research Institute/University of Nevada - Reno
EA	Environmental Assessment
EG&G	Edgerton, Germeshausen & Grier, Inc.
EIS	Environmental Impact Statement
E-MAD	Engine Maintenance, Assembly and Disassembly
EPA	U.S. Environmental Protection Agency
ES	Exploratory Shaft
ES-1	Exploratory Shaft - 1
ES-2	Exploratory Shaft - 2
ESF	Exploratory Shaft Facility

ESPMP	Exploratory Shaft Project Management Plan
ESTP	Exploratory Shaft Test Plan
FAP	Field Activities Plan
F&S	Fenix & Scisson, Inc.
FTE	Full-time-equivalent
FY	Fiscal Yeat
HEDL	Hanford Engineering Development Laboratory
H&N	Holmes & Narver, Inc.
HQ	Headquarters
IDS	Integrated Data System
IPMS	Integrated Project Management System
IMS	Information Management System
LANL	Los Alamos National Laboratory (Archaic)
LBL	Lawrence Berkeley Laboratory
LLNL	Lawrence Livermore National Laboratory
Los Alamos	Los Alamos National Laboratory
MGDS	Mined Geologic Disposal System
MIT	Materials Interaction Test
M & O	Management and Operation Contractor
MSA	Major Systems Acquisition
NAFR	Nellis Air Force Range
NEPA	National Environmental Policy Act
NNWSI	Nevada Nuclear Waste Storage Investigations
NRC	Nuclear Regulatory Commission
NTS	Nevada Test Site
NTSO	Nevada Test Site Support Office (DOE)
NV	DOE Nevada Operations Office

NWPA	Nuclear Waste Policy Act
OCRWM	Office of Civilian Radioactive Waste Management
OGR	Office of Geologic Repositories
PMF	Project Management Plan
PMS	Project Management System
PM-TPO	Project Manager-Technical Project Officer
PTP	Prototype Test Plan
QA	Quality Assurance
QAPP	Quality Assurance Program Plan
QASC	Quality Assurance Support Contractor
REECo	Reynolds Electrical & Engineering Co., Inc.
RFP	Request for Proposal
RTR	Regulatory Topical Report
SAIC	Science Applications International Corporation
SAN	DOE San Francisco Operations Office
SCP	Site Characterization Plan
SEMP	Systems Engineering Management Plan
SNL	Sandia National Laboratories
SOP	Standard Operating Procedure
STIC	Scientific and Technical Information Center
T&MSS	Technical and Management Support Services
TPO	Technical Project Officer
URS	Uniform Reporting System
USBR	United States Bureau of Reclamation
USGS	United States Geological Survey
WBS	Work Breakdown Structure
WMPO	NV Waste Management Project Office

WP **Waste Package**
WAS **Work Authorization System**
WSI **Wackenhut Services, Inc.**