

WM-1
PDR
Return to WM
623-55

108.4/JER/82/07/28/0

- 1 -

DISTRIBURION

WMHT: 3108.4

JUL 30 1982

WMHT r/f
NMSS r/f
WM r/f
CF
JBMARTIN
REBROWNING
MBELL
PALTOMARE
JTGREEVES
JERHODRICK & r/f
PDR

MEMORANDUM FOR: Hubert J. Miller, Chief
High-Level Waste Technical
Development Branch
Division of Waste Management

FROM: John T. Greeves, Section Leader
Design Section
High-Level Waste Technical
Development Branch
Division of Waste Management

SUBJECT: FIRST DRAFT OF THE TECHNICAL POSITION ON QUALITY
ASSURANCE FOR GEOTECHNICAL INVESTIGATIONS (OPS PLAN
COMMITMENT #312312C1)

The scope and outline for the Branch Technical Position on Quality Assurance for Geotechnical Investigations was submitted in a memo to you dated April 30, 1982. Attached is the first draft of the Branch Technical Position on Quality Assurance for Geotechnical Investigations. A copy was sent to the Quality Assurance Branch, NRR, for technical review. This satisfies the OPS Plan Commitment #312312C1.

"ORIGINAL SIGNED BY"

John T. Greeves, Section Leader
Design Section
High-Level Waste Technical
Development Branch
Division of Waste Management

OFC :	WMHT <i>JR</i>	WMHT	:	:	:	:	:
NAME :	JRhoderick:dm	JTGreeves	:	<i>MNataraja</i>	:	:	:
DATE :	7/30/82	7/30/82	:	7/30/82	:	:	:

8208040593 820730
PDR WASTE
WM-1
PDR

TABLE OF CONTENTS

	<u>Page</u>
1.0 PURPOSE	
2.0 BACKGROUND	
3.0 REGULATORY BASIS.	
4.0 QUALITY ASSURANCE	
5.0 NRC TECHNICAL POSITION.	
5.1 DOE Quality Assurance Program.	
5.1.1 QA Section of the SCR	
5.1.2 Organization.	
5.2 Discussion	
6.0 SUMMARY	

BRANCH TECHNICAL POSITION ON DOE
QUALITY ASSURANCE PROGRAM FOR
GEOTECHNICAL INVESTIGATIONS

1.0 PURPOSE

The United States Nuclear Regulatory Commission (NRC) issues a number of Technical Positions (TPs) to provide guidance to the United States Department of Energy (DOE) in their high level nuclear waste isolation program. TPs issued by NRC cover a wide variety of topics. This TP reflects the current thinking of the waste management staff of NRC on the topic of Quality Assurance (QA) and its applicability to the ongoing site characterization (SC) activities by DOE. This TP is intended to provide insight to DOE and their contractors involved in the preparation of Site Characterization Reports (SCR) specifically regarding the applicability of QA to geotechnical activities being conducted at their sites.

2.0 BACKGROUND

DOE and their contractors are currently involved in performing laboratory and field investigations involving various technical disciplines such as, geology, hydrology, seismology, geophysics, geochemistry and rock mechanics--all of which are generally considered part of geotechnical studies and/or investigations. Data being gathered and analyzed under the above activities will be used by DOE in supporting a licence application to NRC for the construction of a deep geologic repository to be used for a permanent disposal of high-level nuclear wastes. In the past, NRC concerns regarding public health and

safety and, therefore, the need for performing all the geotechnical investigations under a formal QA program have been conveyed to DOE on several occasions. DOE QA order number 5700.6A dated August 13, 1981, in fact, reflects DOE's acceptance, in principle, of the need for a formal QA program to govern the site characterization activities.

3.0 REGULATORY BASIS

The NRC has set forth in 10 CFR 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," be used by DOE as a basis for structuring their QA program. Other preferred documents of reference are (1) ANSI/ASME NQA-1-1979 ("Quality Assurance Program Requirements for Nuclear Power Plants,") and (2) ANSI/ASME N45.2.20-1979 ("Supplementary Quality Assurance Requirements for Subsurface Investigations for Nuclear Power Plants"). In addition to the above references, US NRC Regulatory Guide 4.17, "Standard Format and Content of Site Characterization Reports for High-Level Waste Geologic Repositories," Part A, Section 1.3, Quality Assurance, states that DOE should present a detailed QA program to allow NRC to make an independent evaluation of the precision, accuracy, reproducibility, analytic sensitivity, and limitation of data acquisition and analysis methods that would be used before and during site characterization.

The basic requirements of NOA-1 consisting of eighteen elements may not all be applicable to some of the geotechnical investigations performed by DOE during the site characterization. However, most of the basic QA program concept should be applicable to geotechnical data gathering also.

4.0 QUALITY ASSURANCE

Quality Assurance (QA), according to 10 CFR 60 Subpart G, comprises all those planned and systematic actions necessary to provide adequate confidence that the repository and its subsystems or components will perform satisfactorily. QA is a multidisciplinary system of management controls which address safety, reliability, maintainability, performance, and other factors. The quality assurance program shall apply to all items and activities which would prevent or mitigate events that could cause an undue risk to the health and safety of the public. This draft Technical Position (TP) addresses the Geotechnical Engineering concerns for Quality Assurance before and during the site characterization activities. Much of the geotechnical data obtained during site characterization will be used to make major decisions concerning the suitability and design of high-level waste repository. It is, therefore, important that a quality assurance program be implemented during the screening and site characterization activities to provide acceptability and reliability of those geotechnical investigations that will be considered important to safety. The organizations involved in the QA program for a high-level waste repository would include the Department of Energy (DOE), its contractors and subcontractors. The responsibilities of these organizations are discussed in this technical position paper.

5.0 NRC TECHNICAL POSITION

This Branch Technical position on QA reflects the current thinking of the NRC staff in the Waste Management Division. Site characterization will consist of acquisition of geotechnical data (geological, geophysical, geochemical,

seismological, hydrological and data related to rock mechanics). It is considered by NRC staff that without an adequate DOE QA program, there can only be a limited confidence in the geotechnical data gathered before and during the site characterization. Therefore, NRC considers it very important that a formal QA program be adopted by DOE and details of such a program including organizational setup and administrative and technical procedures be presented to NRC in appropriate sections of the SCR for the sites under study.

5.1 DOE QUALITY ASSURANCE PROGRAM

DOE quality assurance is that part of the organization by which DOE implements an overall program with provisions and mechanisms to verify the quality assurance programs of its contractors and subcontractors. DOE has the ultimate responsibility of assuring a quality product in all aspects of repository development, and, therefore, should have a QA program for all activities concerning the repository. However, the NRC will only review the QA for those activities that are important to public health and safety. Therefore, DOE should delineate those activities accomplished during site screening and site characterization that are important to safety. DOE contractor/subcontractor quality assurance program is that part of the organization by which a contractor/subcontractor tests, and inspects his procedures, equipment, materials, and personnel so that the completed function will comply with the requirements of the activity specifications. These QA programs will form a part of the overall DOE QA program and will have common objectives.

The DOE QA program should be established at the earliest practicable time consistent with the schedule for accomplishing activities affecting quality for

the project. That is, the DOE QA program should be established in advance of the activity to be controlled and the program should be implemented as the activity proceeds.

5.1.1. QA Section of the SCR

The QA Section of the SCR prepared by DOE for submission to NRC should identify the safety-related structures, systems, components, investigations, activities, facilities, and equipment to be controlled by the QA program and a measure of their required quality levels and the QA effort necessary to achieve the specified quality requirements. DOE should describe in the SCR how the QA program is documented by written policies, procedures, or instructions and how it will be implemented in accordance with the administrative policies, procedures, and instructions. A listing of QA program procedures or instructions should be included that will be used to implement each major activity of the program, such as investigations, testing, design and procurement. The procedure list should identify which criteria of Appendix B to 10 CFR Part 50 are implemented by each procedure. In the event certain required procedures are not yet established, a schedule for their preparation should be provided. A clear distinction should be made between administrative procedures and technical procedures and the two shall be listed separately in the SCR.

DOE should describe in the SCR the program which provides adequate indoctrination and training of the personnel performing activities that affect quality to assure that suitable proficiency is achieved and maintained by the

personnel. The indoctrination and training program should assure that:

- (1) personnel performing activities affecting quality are appropriately trained in the principles and techniques of the activity being performed;
- (2) personnel performing activities affecting quality are instructed as to purpose, scope, and implementation, of governing manuals, policies, and procedures; and
- (3) appropriate training procedures are established.

The SCR should describe the measures which ensure that activities affecting quality will be accomplished under suitable controlled conditions, including (1) the use of appropriate equipment; (2) a suitable environment for accomplishing the activity; and (3) compliance with necessary prerequisites for the given activity.

The DOE QA program should include the measures which ensure that there is regular management review of the program to assess the adequacy of its scope, implementation, and effectiveness. Provisions should be made for reviews by management above or outside the QA organization to ensure achieving an objective program assessment. The measures taken to ensure that the DOE QA organization will (1) review and document agreement with the QA programs of the principal contractors and subcontractors and (2) conduct or have conducted audits of the contractor's QA program activities, should be clearly presented in the SCR.

5.1.2 Organization



DOE should describe clearly the authority and duties of positions and organizations performing quality assurance functions, for ensuring that the

QA program is established and executed, and for verifying that all activities have been correctly performed. The SCR should include organization charts and functional responsibility descriptions that denote the lines of responsibility and of authority within each of the major organizations involved in the project. These charts and descriptions should present the structure of all organizations involved. In addition, a single overall project organization chart should be included showing how the major organizations working directly for DOE inter-relate and interact with one another. This would include any contractors, sub-contractors and technical services organizations that are used for research and development, laboratory and field tests, and performance assessments.

DOE should describe those measures which ensure that persons and organizations performing QA functions have sufficient authority and organizational freedom to (1) identify problems related to quality; (2) initiate, recommend or provide solutions; and (3) verify implementation of solutions. The SCR should also describe the measures taken to assure that persons and organizations assigned the responsibility for checking, auditing, inspecting, or otherwise verifying that an activity has been correctly performed, report on a high enough management level to allow for authority and organizational freedom, including sufficient independence from the production activities.

Irrespective of organizational structure, DOE should describe how the individual, or individuals, with primary responsibility for ensuring effective implementation of the QA program (at any location where activities subject to the QA program are being performed) will have direct access to the levels of management necessary to carry out this responsibility. The SCR should indicate from whom the persons performing QA functions receive technical direction

for performing QA tasks and administrative control. DOE should identify those positions or organizations that have written delegated responsibility and authority to stop work or control further processing, delivery, installation, or use of nonconforming items until proper disposition of the deficiency has been approved.

✓ DOE should describe in the SCR how requirements will be imposed on contractors and subcontractors to ensure that individuals or groups within their organizations performing QA/QC functions have sufficient authority and organizational^{al} freedom to effectively implement their respective QA programs. DOE should describe the extent to which it will delegate to other contractors the work of establishing and executing the QA program or any part thereof. A clear delineation of those QA functions which are implemented within DOE's QA organization(s) and those which are delegated to other organizations should be provided. DOE should describe the method that will ensure the retention of responsibility for and maintenance of control over those portions of the QA program delegated to other organizations and identify the organization responsible for verifying that the delegated QA functions are carried out. DOE should identify major work interfaces for activities affecting quality and describe how clear and effective lines of communication exist between DOE and principal contractors to ensure necessary coordination and control of the QA programs.

5.2 DISCUSSION

Quality assurance programs for geotechnical investigations should assure that: (1) specific procedures are documented prior to data collection,

(2) procedures are enforced under appropriate quality assurance surveillance, and (3) qualified technical personnel are involved in the preparation of procedures, performance of tests, data acquisition, data reduction, and interpretation of results of each geotechnical investigation. Typical quality assurance programs are conceived and operated by quality assurance personnel with the help of appropriate technical experts. Most geotechnical investigations involve data interpretation and will require concurrent review teams to satisfy the QA requirements. The QA review teams would consist of (1) qualified technical personnel who will perform peer reviews of the procedures, tests, data acquisition and reduction, analysis and interpretation of data for each activity and (2) independent quality assurance personnel who will enforce the application of quality assurance procedures to each activity in accordance with the project plan (this will also include independent surveillance and auditing to assure that the peer reviews were indeed performed and review comments incorporated).

6.0 SUMMARY

From time-to-time NRC issues technical positions on different topics to provide guidance to other agencies and private industry to aid them in preparing adequately for license applications for safety related facilities. In this technical position on Quality Assurance, the current thinking of NRC waste management staff regarding the applicability of Quality Assurance to the geotechnical activities before and during Site Characterization for deep geologic repositories for high-level nuclear waste isolation, is reflected. The primary intent of this TP is to provide guidance to DOE and their contractors to prepare adequately for proper submissions of site characterization reports to NRC.