# OCRWM Backgrounder

United States Department of Energy
Office of Civilian Radioactive Waste Management
Washington, DC 20585

DOE/RW-0126

February 1987

## QUALITY ASSURANCE FOR NUCLEAR WASTE REPOSITORIES

### INTRODUCTION AND DEFINITION

The Office of Civilian Radioactive Waste Management (OCRWM) is dedicated to achieving quality management through a formal documented quality assurance (QA) program. QA is commonly defined as a set of planned and systematic actions that ensure satisfactory performance of a system, component, or structure.

During the site characterization phase for nuclear waste repositories, systematic actions are focused on providing adequate confidence in the validity and integrity of the data and other activities used in the site investigations.

This Backgrounder briefly discusses:

- the types of activities subject to the QA program requirements
- the specific requirements of the program
- the types of activities carried out by QA personnel and the parameters of their authority
- the type of interactions with the Nuclear Regulatory Commission (NRC)

### HISTORICAL BACKGROUND

The concept of QA evolved from early quality control (QC) activities, such as acceptance testing and product inspection. In the 1970s, QA was formalized as a discipline in the nuclear industry to deal with the growth of nuclear power. Under commercial nuclear powerplant programs, emphasis was placed on assurance of quality in the design, construction, and operations activities. These activities gave rise to a series of national consensus QA standards that defined QA program requirements and QC practices.

### REGULATORY DOCUMENTS

The Nuclear Waste Policy Act of 1982 (NWPA) states that, for work performed under OCRWM, the NRC must approve plans for the design and operation of a high-level nuclear waste repository. To this end, the NRC has directed [10 CFR 60, "Disposal of High-Level Radioactive Wastes in Geologic Repositories," and 10 CFR 72, "Licensing Requirements for the Storage of Spent Fuel in an Independent Spent Fuel Storage Installation (ISFSI)"] that the general quality assurance criteria in 10 CFR 50, "Quality Assurance Criteria for Nuclear Power Plants," are to be applied. Also, in 10 CFR 71, "Packaging and Transportation of Radioactive Material," the NRC has established QA criteria similar to those in 10 CFR 50, Appendix B, "Quality Assurance for Nuclear Power/Fuel Reprocessing Plants." The NRC staff will use the NRC Review Plan for reviewing the DOE QA program for site characterization activities during the prelicensing phase.

Basic policies and requirements for establishing and implementing QA programs are contained in the following documents which amplify and are consistent with the above regulations: *Program Management System Manual,* DOE/RW-0043, published January 1986; *Quality Assurance Management Policies and Requirements,* DOE/RW-0032, published October 1985; *Quality Assurance Plan for High-Level Radioactive Waste Repositories,* DOE/RW-0095, published August 1986; and *Office of Storage and Transportation Systems Quality Assurance Directive,* DOE/RW-0103, published October 1986.

**Published by the Office of Policy and Outreach**
To provide current background information on program facts, issues, and initiatives. For further information write to: Information Services Division, Office of Civilian Radioactive Waste Management, U.S. Department of Energy, Mail Stop RW-40, Washington, DC 20585, Telephone (202) 586-5722.

## ACTIVITIES SUBJECT TO QUALITY ASSURANCE REQUIREMENTS

In a major and continuing commitment to achieve and ensure quality at all levels, OCRWM's QA program is applied to the following types of activities:

- the designing, constructing, testing, operating, maintaining, and closing/decommissioning of waste management facilities and all associated components, systems, and structures
- the processing, treating, packaging, handling, transporting, storing, and monitoring of high-level radioactive waste and spent nuclear fuel
- the transfer of technology development and demonstration data and the collection of data
- the licensing/certifying of systems, structures, components, and processes
- the preparing, reviewing, approving, and finally distributing technically significant data and documents (e.g. studies, analyses, computer codes, test results, and reports)

OCRWM and its other program participants are required to have established QA program plans and implementing procedures in place so that all personnel will know their responsibilities and authorities for ensuring quality. Participants are to have access to the necessary levels of management to resolve any difficulties in implementing QA policy and requirements. Personnel are to be indoctrinated and trained for adequate proficiency in their work and familiarity with the requirements of the QA program. The QA program must be reviewed regularly to determine its adequacy.

At the present time, one of the primary program requirements is the quality control of project documents, including procedures, instructions, and drawings, so that work is accomplished according to the latest revisions of the documents.

As the development of the repository progresses, additional QA program requirements will include quality controlled design of facilities and specification of materials and equipment.

## INDEPENDENCE

The achievement of quality is a primary responsibility of line management, and it will be independently verified using various methods by OCRWM and the contractors' line and QA organizations. A full-time QA management position is to be established within all levels of the organization—from Headquarters, through Project Offices, to participating contractors. This position is to have direct channels of communication with senior management (at the same or higher levels within the organization), and have the authority and responsibility to verify the adequacy and effectiveness of the QA plan, requirements, and activities. All QA management levels will have the authority to order work stopped by line managers.

The organizational relationships for the performance of quality overview and audits and the feedback of quality status and problems are shown in the chart.

**CIVILIAN RADIOACTIVE WASTE MANAGEMENT PROGRAM**

## AUDITS

QA personnel are trained and authorized to audit ongoing activities to ensure that work is planned, implemented, and documented on a timely and continuing basis. Significant results of audit activities are reported to management. Planned and scheduled internal and external audits are performed regularly to verify compliance and measure effectiveness of the overall QA program. Audit results are analyzed for (1) quality trends and (2) possible QA management improvements. Any deficiencies noted during audits are to be tracked until closure. "Stop Work" orders on technical activities (e.g., investigation, design, parallel construction, test, or installation) have been imposed due to findings of insufficient data collection or inadequate QA procedures.

## GRADED QUALITY ASSURANCE

The QA requirements and procedural controls are applied selectively and judiciously on the basis of how important the items or activities are to safety, waste isolation, and overall mission performance criteria. A "graded approach" to QA is implemented to provide demonstrable evidence that the health and safety of the public are protected and that components and barriers important to waste isolation are subjected to appropriate QA methodology.

## INTERACTIONS WITH OTHER AGENCIES

To facilitate the prompt resolution of licensing issues, participating organizations are to provide for continuing interaction with the NRC and other involved agencies on QA matters. This procedure is intended to keep the NRC informed of ongoing activities and to provide for timely input from the NRC on any QA problems that might otherwise delay licensing of the repository or any other facility.