THE LAST TWELVE MONTHS AT YUCCA MOUNTAIN: A YEAR OF PREPARATION, WAITING AND PROGRESS

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ABSTRACT

The U.S. Department of Energy (DOE) Office of Civilian Radioactive Waste Management (OCRWM) is continuing with its studies to determine if Nevada's Yucca Mountain would be a safe location for a high-level radioactive waste repository. As mandated by Congress, the DOE must study the geology, hydrology, environment and other factors to predict whether a geologic repository about 305 meters (1,000 feet) below Yucca Mountain's surface could isolate high-level waste for 10,000 years. Yucca Mountain lies on the western edge of the Nevada Test Site, 177 kilometers (110 miles) northwest of Las Vegas. Figure 1 shows where Yucca Mountain is located in the Southern Nevada region. The Yucca Mountain Site Characterization Project (YMP) has embarked on a broad-based testing program designed to examine all factors that could impact the performance of a repository. While there are several site studies under way, major site investigations have not progressed as planned. The DOE is presently involved in litigation with the state of Nevada, which has refused to issue environmental permits that are required before new surface-disturbing site characterization studies can begin. This paper will examine progress made on the YMP during the past year, discuss studies that are planned in the near-term, and will describe the Project's interactions with oversight groups, government entities, and the public.

DISCUSSION

The Yucca Mountain Site Characterization Project employs approximately 1,400 scientists, engineers, and support personnel. The majority of Project employees work for contractor companies, national laboratories, and federal agencies. The U.S. Geological Survey is performing geologic, hydrologic and climate investigations. Lawrence Livermore National Laboratory is working on waste package design and performance, while Los Alamos National Laboratory is conducting geochemical investigations, volcanism studies, and is responsible for underground test implementation. Sandia National Laboratories is responsible for repository facility design and interface with exploratory facilities, and repository performance assessment. Design of underground exploratory facilities is being prepared by Raytheon Services Nevada. Construction of the exploratory facilities and general site support will be provided by Reynolds Electrical and Engineering Company. Science Applications International Corporation is responsible for project management and integration, regulatory compliance, institutional affairs and Project quality assurance (QA). MAC Technical Services provides QA consulting services. Figure 2 depicts the organization of YMP participant contractors and national laboratories.

The Yucca Mountain Site Characterization Project's plans, procedures, personnel and equipment are ready to go to work collecting new data in specific areas, but we are still restricted from doing the job that Congress has mandated. The obstacle to performing new site characterization studies is DOE's inability to obtain environmental permits from the state of Nevada that are necessary for surface disturbing activities. With that one exception, the YMP has satisfied all prerequisites that needed to be resolved prior to starting new surface-disturbing site activities at Yucca Mountain. The Project's readiness to progress with new site characterization activities was recently stated in a letter from OCRWM Director John Bartlett to the U.S. Secretary of Energy. Dr. Bartlett told Secretary James Watkins that "... the Department is ready in every respect to proceed with planned new surface disturbing activities at Yucca Mountain, with the single exception that we do not have the air quality permit needed to begin work to meet our objectives."

The most significant accomplishment of 1990 was establishment of a fully qualified, Nuclear Regulatory Commission (NRC) accepted quality assurance program for the entire Project. The NRC is responsible for licensing a repository and has a major oversight role during the site investigations. QA is a paramount factor to the YMP, since all data and research must be traceable and verifiable in order to be considered by the NRC for repository licensing, a process that will begin about ten years from now. The framework document for our QA, the Yucca Mountain Quality Assurance Plan, was developed and accepted by the NRC. Individual Project participant organizations, including national labs and private contractors, have approved QA plans in place. After successfully completing comprehensive QA audits, each Project participant organization received approval to perform site characterization work.

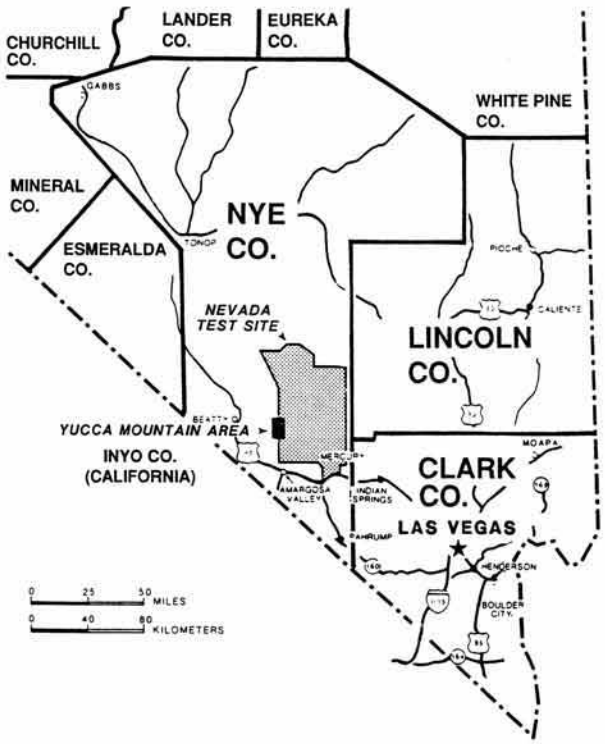

Fig. 1. Southern Nevada Region.

The DOE has been trying to work with the state of Nevada for more than two years to obtain the permits, but the state refused to cooperate. The DOE filed suit against Nevada on January 25, 1990, seeking the necessary permits and an end to the delay in starting new site characterization activities. The suit contends that Nevada has prevented the DOE from carrying out necessary site studies by unlawfully refusing to act on DOE's permit application. The state has cited its "disapproval" of the proposed repository site as justification for not issuing the environmental permits. The Ninth U.S. Circuit Court of Appeals unanimously decided in favor of the DOE on September 9, 1990, saying that Nevada's "disapproval" is premature. The ruling stated that Congress has provided for a state veto only after site characterization studies prove that Yucca Mountain is a suitable repository location and the site has been recommended to the President. Nevada is appealing the Ninth Circuit decision to the U.S. Supreme Court and has asked the U.S. District Court in Las Vegas to stay a DOE motion for state action on the environmental permits.

There is no way to predict with any certainty when and if the court battle for environmental permits will be resolved. Since the DOE is attempting to carry out a Congressional mandate, there has been significant concern in

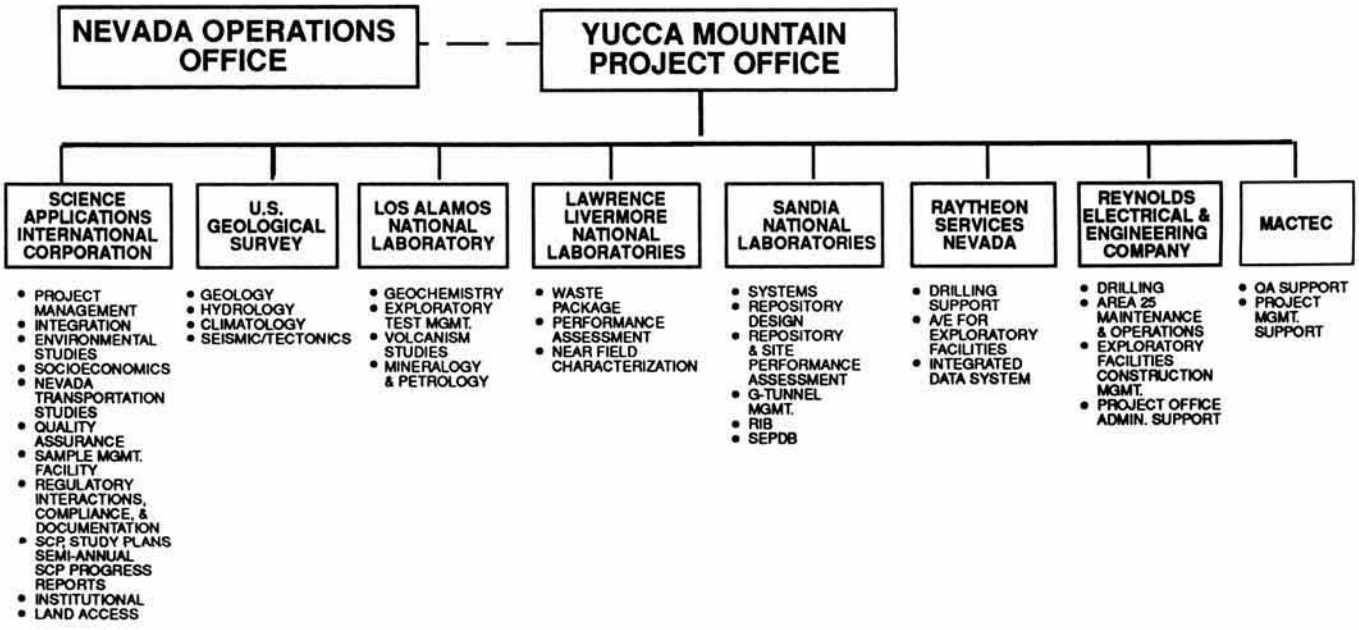

Fig. 2. Roles of project participants.

Congress, the nuclear industry, and within the DOE about the potential for years of delay while the permit issue is litigated. U.S. Secretary of Energy James Watkins reflected this concern in an October 11, 1990, letter to Congress. Secretary Watkins emphasized the DOE's commitment to meeting all environmental regulations, but stated "Under these circumstances (lengthy litigation), I strongly believe that legislative action to gain access to Yucca Mountain and to sustain our characterization activities without future permitting obstructions is necessary in order to fulfill our mandate from Congress." President Bush recently included such a legislative initiative as part of the proposed national energy strategy.

Frequent interactions with independent regulatory and oversight groups have led to a better understanding of the YMP, and have allowed the DOE to be responsive to their comments and concerns. One of the Project's highest priorities is interacting with the Presidentially-appointed Nuclear Waste Technical Review Board (NWTRB). While amending the Nuclear Waste Policy Act (NWPA) in 1987, Congress created the NWTRB to evaluate the scientific and technical validity of activities in the DOE's civilian high-level nuclear waste disposal program. The nine-member board made its first report to Congress and the Secretary of Energy in March 1990, and its second report at the end of November 1990. The NWTRB has provided valuable guidance in areas it considered lacking, but has endorsed the Project as a whole. NWTRB Chairman Don U. Deere said "I have been favorably impressed with the work they have done and the quality of scientists working on the program ...." In its second report, the NWTRB said "Because of the DOE's responsiveness to Board requests, the Board has been able to familiarize itself with many aspects of the DOE program over the past few months. The DOE has made a good-faith effort to address the recommendations in the Board's first report."

The DOE also places a high priority on maintaining a strong working relationship with the NRC. Project staff met with NRC representatives 24 times in 1990 to discuss issues associated with studying the site. The NRC completed its review of the Yucca Mountain Site Characterization Plan (SCP) - the 6,300 page document that will guide site studies - in July 1989. In 1990 the DOE provided a formal response to NRC comments on the SCP. NRC comments also will be addressed in on-going technical interactions with NRC staff. NRC input also influences the development of detailed work descriptions called Study Plans, which must be accepted by the NRC. Four Study Plans have already been accepted by the NRC; one for surface trenching in Midway Valley near Yucca Mountain and calcite-silica studies in an existing trench. The work in Midway Valley will include excavation of new trenches to obtain additional data on faults in the area. Mineralogy studies will be conducted in Trench 14 to determine the origin of calcite-silica deposits near Yucca Mountain. Two other Study Plans for volcanic and geochemistry investigations were also approved by the NRC. In addition to receiving NRC comments on the SCP, the DOE held three hearings in Nevada to gather public comments on the document. More than 150 people provided oral testimony at the hearings, and additional public comments were received in writing. The DOE has reviewed 2,287 SCP comments, and released a response package which addresses all the public comments in August of 1990.

The DOE is interacting with "affected units of local government," to assist with the oversight role provided for them in the NWPA. Clark County, Nye County (where Yucca Mountain is located), and Lincoln County have "affected" status. Each local government receives grants from the Nuclear Waste Fund to conduct independent studies to determine what impact a Yucca Mountain repository might have on their community. The counties have established offices to coordinate their own repository studies, which focus on potential socioeconomic impacts and transportation hazards. YMP staff frequently meet with local government representatives to share information and local officials are invited to participate in DOE-sponsored public information meetings.

The DOE completed its effort to obtain legal access to the Federal lands on which the Yucca Mountain site lies in October of 1989, when the Bureau of Land Management (BLM) granted a right of way (ROW) reservation for the Nellis Air Force Range property. The ROW allows the DOE perform characterization studies on the property, but does not protect the site from intrusions by other parties. The DOE submitted an application to administratively withdraw 4,255 acres of Yucca Mountain area property from public use for mining activities. Public hearings concerning the land withdrawal application were held by the BLM in December 1989, and it was approved in 1990. The land withdrawal is necessary to protect the Yucca Mountain site from intrusions that might compromise scientific data or impact future repository performance.

The YMP resolved an environmental issue that could have affected site characterization activities. The U.S. Fish and Wildlife Service (FWS) listed the desert tortoise as an endangered species under emergency provisions of the Endangered Species Act of 1973. The DOE prepared a biological assessment of Yucca Mountain field activities' potential impact on the tortoise in October 1989. The FWS reviewed DOE's biological assessment, Project planning documents, and other available biological information in order to prepare a Biological Opinion on the issue. The FWS opinion concludes that the tortoise population in the Yucca Mountain area is low, and that Project field investigation activities are not likely to jeopardize the continued existence of the desert tortoise.

Although scientific understanding of the Yucca Mountain site is far from complete, it is moving forward. To date, approximately 60 Study Plans covering geology, hydrology, geochemistry, tectonics, and climatology have been completed. Monitoring to prevent loss of irretrievable data and other ongoing investigations continued in 1990. These investigations include water table monitoring in the saturated zone, unsaturated zone gas sample monitoring, seismic monitoring, soil studies, surface flood monitoring, groundwater geochemistry sampling, geologic mapping and meteorological surveys. Almost 600 stations are being utilized for various monitoring activities. Also, new air quality and radiological monitoring programs were implemented in 1989. Figure 3 outlines the current and planned investigations that comprise the YMP.

Site characterization studies will require the recovery of dry, intact core samples from drill holes for laboratory study. This requirement is unique, in that conventional dry drilling techniques produce fragmented cuttings. A program to develop dry drilling and coring equipment, methods, and procedures was conducted in Utah and Arizona, since Nevada refused to issue permits to perform the testing near Yucca Mountain. In addition to equipment development, the prototype program offers an opportunity for personnel training and a chance to "dry run" QA procedures, including sample handling and processing. The YMP Sample Management Facility (SMF) is on-line and ready to receive core samples. The SMF will collect, process, catalog and track geologic samples. The facility is designed so that a particular sample can be tracked in detail from the moment it is removed from the ground, including who had access to it and what type of research was performed on the sample. The objective of the prototype drilling program is to prove drilling technology and scientific instrumentation concepts, and to reduce uncertainties for the start of surface-based site characterization drilling at Yucca Mountain.

The YMP public outreach program has continued to develop over the past year. Our speaker's bureau addressed more than 150 civic groups, professional associations, school classes and other audiences. The existing Yucca Mountain Information Office in Beatty, Nevada and a new Information Office in Las Vegas are available to provide local residents, the education community, government officials and the news media with readily accessible and credible information about the repository program.

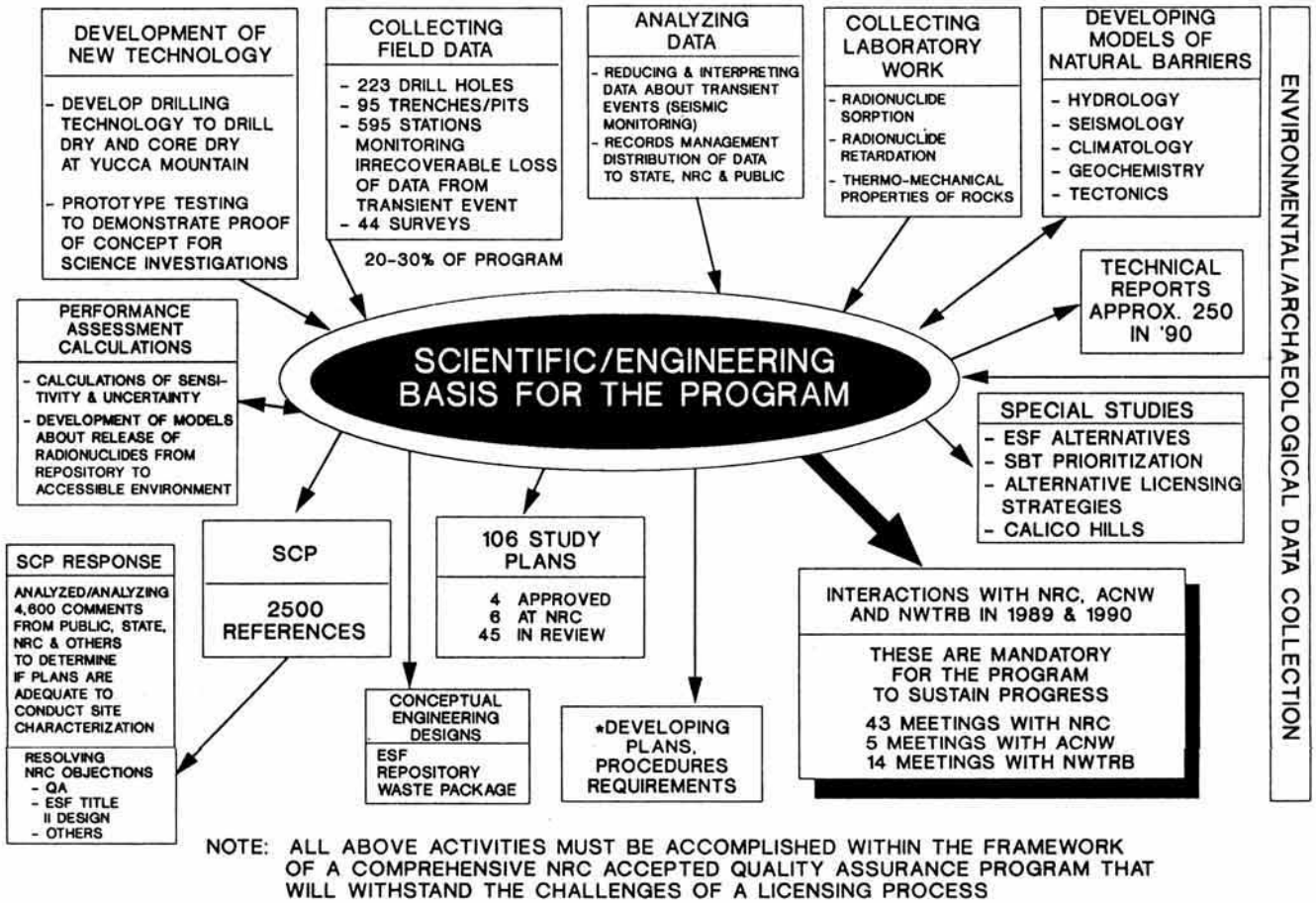

Fig. 3. Representation of key scientific investigation activities.

The information offices have averaged 500 visitors per month, including walk-ins, organized tours and special events. The DOE holds twice-yearly YMP Update Meetings in the Las Vegas area, Nye County, and Northern Nevada. The Update Meetings have proven to be an effective means to let local residents know what the DOE is doing at Yucca Mountain, and to respond to Nevadans' questions and concerns.

The YMP keeps in touch with many of Nevada's smaller communities by participating in "town hall meetings" that cover various DOE programs in the state. Additionally, we have an exhibit program where Project employees participate in fairs, conventions and special community events. The YMP has an open communication policy with the media and schedules press briefings for significant events. In all aspects of public outreach, our willingness to respond to any request for information has been supplemented by active efforts to let the people of Nevada know what is going on with the YMP.

The Yucca Mountain Site Characterization Project faces many technical challenges, but there are serious legal issues that have to be resolved before those challenges can be undertaken. The DOE and the state of Nevada have been and will continue to be involved in complicated litigation. Progress is being made, but until a legal or legislative remedy to the environmental permit dilemma is reached, we cannot gather the data needed to determine whether Yucca Mountain would be a suitable repository site. Meanwhile, the DOE stands ready to perform the work Congress has asked it to do.