OVERVIEW OF ONWI'S SALT SITE SELECTION PROGRAM

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ABSTRACT

In the past year, activities in the salt site selection program of the Office of Nuclear Waste Isolation (ONWI) have focused on narrowing the number and size of areas under consideration as candidate repository sites. The progressive focusing is illustrated in Fig. 1. Bedded salt, in the Permian Basin of West Texas and the Paradox Basin of Utah, and salt domes in the Gulf Coast Salt Dome Region (including parts of East Texas, Louisiana, and Mississippi) have been the subjects of geologic, environmental, and socioeconomic characterization of progressively greater detail as the screening process has proceeded. Detailed, field-oriented research and testing have superceded broad-based studies relying heavily on literature and other existing data. Coinciding with the increased field activities has been the publication of results and recommendations resulting from earlier program efforts.

The task of managing studies and conducting analyses leading to the selection of a salt site for a repository from among the candidate salt regions of the continental United States has been ONWI's responsibility since 1978. The selection process has proceeded stepwise, as shown in Fig. 1, from regions of thousands of square miles, to areas, to locations of much more limited extent, and, in Fiscal Year 1983, it will narrow to a single site. Each of the successive recommendations to focus on smaller areas was proceeded by extensive geologic, environmental, and socioeconomic characterization to evaluate relative favorability.

Site characterization studies were conducted in order to describe the areas under investigation so that they could be evaluated as to their engineering feasibility and licensability. The geologic, environmental, and socioieconomic studies undertaken by ONWI to characterize areas are summarized in Table I and included the following:

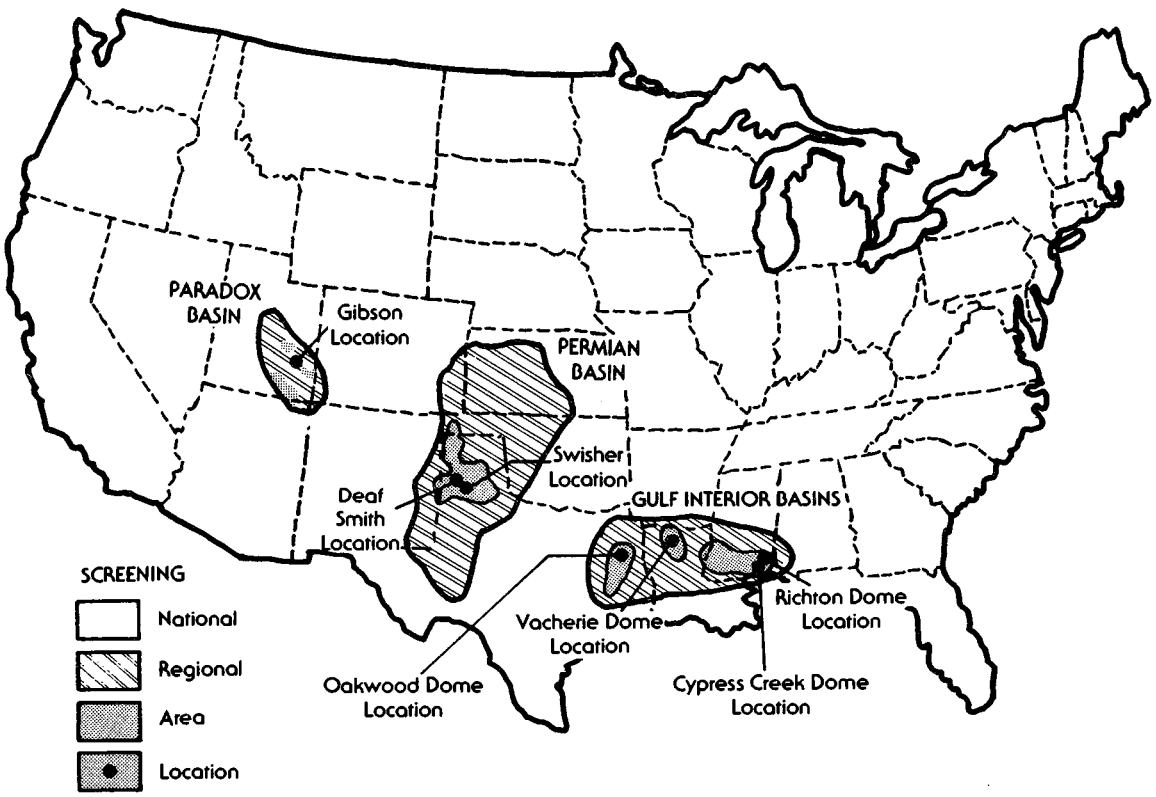

Fig. 1. Salt Site Exploration Program.

TABLE I. FY 1982 FIELD PROGRAM SUMMARY

Geologic	
Deep Boreholes (core)	5 (2,900 m [9,500 ft])
Seismic Lines	512 km (320 mi) run; 725 km (453 mi) purchased
Gravity Surveys	2,470 sq km (950 sq mi)
Aeromagnetic Surveys	3,200 line km (2,000 line mi)
Well-monitoring Stations	58
Seismic-monitoring Stations	16
Detailed Field Mapping	13 sq km (5 sq mi)
Environmental	
Air Photo Surveys	1,820 sq km (700 sq mi)
Archaeological Surveys	177 sq km (68 sq mi)
Threatened and Endangered Species Survey	83 sq km (32 sq mi)
Plant Community Field Surveys	138 sq km (53 sq mi)
Probable Maximum Flood Field Surveys	31 sq km (12 sq mi)
Land-use Characterizations	1,690 sq km (650 sq mi)
Transportation Routing Surveys	771 km (482 mi)
Socioeconomic	
Detailed Demographic Collection	76 counties
Detailed Economic Data Collection	76 counties
Services and Fiscal Data Collection	16 counties 14 communities
Housing Conditions and Availability Data Collection	16 counties

Geological Studies:

Stratigraphic boreholes: Holes were drilled to determine the sequence and characteristics of possible repository host rock and surrounding rock and to obtain core samples for testing.

Deep hydrologic test wells: Wells were drilled to obtain information on the quantity and direction of ground-water flow and to obtain samples of ground water for chemical analysis.

Gravity and magnetic surveys: Geophysical surveys were conducted from the surface to determine geologic characteristics over large areas and to evaluate structural characteristics of the geologic setting.

Seismic reflection profiles: Geophysical tests were used to identify subsurface structures (including folding and faulting) and to evaluate the lateral continuity of strata.

Hydrologic modeling: Computer programs were used to analyze ground-water flow using available data on hydrology and geology.

Geochemical analyses: Chemical analyses were performed on rock and ground water to determine salinity, nuclide retardation characteristics, and other geochemical qualities.

Microseismic earthquake networks: Instrumentation was installed over two areas to monitor low-level seismic activity.

Well monitoring: Piezometric levels were determined, recorded, and used to determine long-range fluctuations of ground water.

Field mapping: Distributions of rock types, structures, ages, and other characteristics were recorded by field geologists.

Environmental Studies:

Archaeological surveys: Information was obtained from national and state records; sometimes an archaeologist conducted field investigations of limited areal extent.

Ambient noise-level assessments: Noise-measurement instrumentation was placed at receptor locations to determine ambient levels.

Transportation impact analysis: Literature was searched for data on traffic levels, accidents, load limits, and road construction specifications.

Threatened and endangered species surveys: Data were collected from state and federal agencies and from experts; some field studies were also included.

Plant community field surveys: Field methods were used to determine dominant habitat types and the successional stage; this information was also used to estimate animal species diversity and numbers.

Probable maximum flood field surveys: Information on stream flow, topography, and precipitation from sources such as the Soil Conservation Service, the U.S. Geological Survey, and the U.S. Army Corps of Engineers was used to model and project flooding.

Air and water quality projections: Data were collected from literature and new measurements were made; models were used to estimate dispersion and make projections.

Land-use analyses: Air photos were used in conjunction with ground verificaiton, and appropriate government agencies were consulted about both plans and projections.

Socioeconomic Studies:

Labor-force analyses: Information from the U.S. Bureau of the Census and states on workforce size and skills available were compared with projections of repository workforce needs.

Business growth projections: Data collected from state and federal agencies were analyzed to identify trends.

Community services assessments: State and local agency information on current service levels and excess capacity was obtained.

Housing requirements: The types of current housing and vacancy rates were compared to estimated repository worker needs.

Repository impact models: A computer model was used to project population, economic, and service requirement changes in a potential site area.

Impact mitigation analyses: Programs to alleviate impacts on communities were developed, such as housing and job training alternatives.

Highlighting ONWI's accomplishments in site exploration activities of the Fiscal Year 1982 have been the following achievements:

- Area-phase investigations were completed with the publication and distribution of Geologic and Environmental Area Characterization Reports for the Gulf Coast Salt Dome Region (ONWI-117, 118, 119, 120[1,2,3,4] and ONWI-192, 193, 194[5,6,7], respectively); completion of Geologic and Environmental Area Characterization Reports for the Permian Basin (ONWI-292[8] and 102[9], respectively); and the completion and distribution of Geologic and Environmental Area Characterization Reports for the Paradox Basin (ONWI-290[10] and 144[11], respectively).

- A Location Recommendation Report for each region was prepared, screening down from areas to specific locations which were recommended for more detailed study. Four salt domes in the Gulf Coast Salt Dome Region were recommended for further consideration in ONWI-109[12]. In the Permian Basin, Draft ONWI-288[13] screened down to two counties. Two locations in the Paradox Basin were recommended in ONWI-291

- An Environmental Assessment for use of public land during location phase screening in the Pardox Basin of Utah was completed by the Bureau of Land Management.

- ONWI developed plans for writing a Site Characterization Report for the prime salt site. The report will conform to the U.S. Nuclear Regulatory Commission's Standard Format and Content Guidance for site characterization reports.

- A decision methodology has been developed and is being tested to determine its suitability for selecting a single, prime site in salt. The decision process is being designed to take into consideration safety factors, environmental factors, community impact, regulatory issues, and costs.

- A sample-management program has been developed for rock, soil, and water samples collected in project field investigations. The objective of the program is to maximize the usefulness of samples and data gained from their analysis; provide for adequate storage and handling of samples; and conduct preservation and degradation research efforts.

- A draft of a community planning handbook, Framework for Community Planning Associated with Nuclear Waste Repository Siting, (ONWI-254[15]) was completed and distributed. The book is designed for those communities which may be affected by ONWI's programs to assist in planning for impacts and their mitigation.

The coming year will bring the site screening process to its culmination in the selection of a prime salt site. Detailed site characterization, including an exploratory shaft, will be undertaken in 1984. Milestones in 1983 are oriented toward this decision and its documentation. Milestones planned for FY 83 include:

- Identification of a prime salt site from among the candidate locations in mid-1983. The prime site will undergo detailed characterization.

- Completion of a first draft of a Site Characterization Report (SCR) for the prime salt site and submission of the SCR to the Department of Energy for review before it is presented to the NRC.

- Continuation of geologic, environmental, and socioeconomic characterization activities contributing technical data to primary site selection and characterization. Included in this task is the planning of advanced site characterization activities.

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