

TEXAS LOW-LEVEL RADIOACTIVE WASTE DISPOSAL SITE DEVELOPMENT STATUS

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ABSTRACT

The Texas Low-Level Radioactive Waste Disposal Authority's site development process has undergone significant changes in the past year. The lawsuit with El Paso County ended with an adverse decision by the district judge. Pending appeal of the district court ruling, the Texas Legislature intervened and directed the Authority to re-locate about 50 kilometers east of the Fort Hancock site -- still in Hudspeth County. During the summer of 1991, the Authority identified several good siting areas, and in the fall of 1991, pre-characterization work was conducted on a preferred area inside a 6,475 hectare ranch.

In another unprecedented action, the Texas Legislature amended (and the governor approved) the Authority's statute to allow compacting with other states with certain limitations.

INTRODUCTION

On January 29, 1991, the 34th District Court in El Paso issued a sweeping decision which declared the Authority's site selection process and the Fort Hancock site illegal, and directed the Authority to abandon the site. The Authority was in the process of preparing an appeal when, on March 15, 1991, Governor Richards directed the Authority to abandon the Fort Hancock site and search for a compromise site. On April 2, 1991, the Authority's board adopted a resolution that enforced Governor Richards' directive. During the 72nd Texas Legislature, which also met in the spring of 1991, a compromise siting area was identified by the Governor's Office, El Paso County, key legislative committees, and the Authority. A 1,036 square kilometer siting area was identified by legislation, and the Authority was given unprecedented powers to proceed with site selection and procurement.

A new compacting bill also authorizes Texas to enter into a compact with one or more states as long as the volume of waste contributed by other compact members does not exceed 20 percent of the projected Texas volume. Informal discussions have been held with several states concerning a compact, and formal discussions may begin in the spring of 1992.

SITE SELECTION AND DESCRIPTION

The 72nd Texas Legislature specifically delineated a 1,036 square kilometer area in southeast Hudspeth County where siting activities would be limited. Figure 1 shows the location of Hudspeth County and Fig. 2 shows the delineated siting area. The Authority was given unprecedented powers of property access and eminent domain and expanded budget authority to conduct site selection, characterization, and licensing. In the summer of 1991, the Authority identified five general siting areas in the prescribed region, and in the fall of 1991, the Authority narrowed the siting area to one large ranch composed of about 6,475 hectares -- called the Faskin Ranch.

At the Authority's August 1991 board meeting, authorization was given to evaluate the 6,475 hectare Faskin Ranch for suitable sites. The ranch is about 8 kilometers east of Sierra Blanca and south of Interstate 10. Blanca Draw crosses the northern portion of the ranch and separates it into two distinct siting areas. These two areas have similar geologic and hydrologic features, but have different surficial, access, ecological, and engineering characteristics. The Authority will select one

of the siting areas for characterization and licensing in February 1992.

SITE PRECHARACTERIZATION

Preliminary surface evaluations have been conducted on the Faskin Ranch including surface evaluations and drilling. Fissures have been noted in alluvial deposits associated with major drainages in the area and on the ranch. Six borings have been completed ranging in depth from about 18 meters to greater than 76 meters before bedrock was encountered. Fill material is composed of sand, silt, clay, and gravel layers characteristic of desert alluvial fill.

About 15 area wells have been sampled for water chemistry and water level. Numerous groundwater reports in this area are on file and help establish good background information. However, additional data from new or re-worked wells will be needed before groundwater hydrology can be completely defined.

General floodplain maps have been prepared for the siting area and the Faskin Ranch. Blanca Draw cuts through the area and, at places, has a floodplain approaching 914 meters wide. Other small drainages have floodplains associated with them, primarily from sheetflow. However, there is a sizeable area suitable for siting outside the calculated floodplains. Additional mapping work will better define the floodplains after topographic data has been received.

No active faults have been identified in close proximity to the Faskin Ranch, but older faults have been mapped associated with the mountains which ring the Eagle Flat Basin. The Trans-Pecos region of Texas is relatively more tectonically active than other parts of the state, but it is still not classed as a high frequency area. The Valentine earthquake, the largest in Texas, occurred about 75 kilometers southwest of the siting area and essentially establishes the postulated design acceleration at about .6 g.

A preliminary geotechnical analysis of materials from the borings has been conducted to define the engineering properties in the siting area. This information will be used to support facility design.

Radiological dose assessments for the groundwater flow pathway indicates that the new site will meet regulatory performance objectives as long as there is a substantial unsaturated depth to groundwater regardless of the type of unsaturated material underlying the disposal site. Preliminary information projects that the saturated zone will be at a depth



Fig. 1. Hudspeth County location.

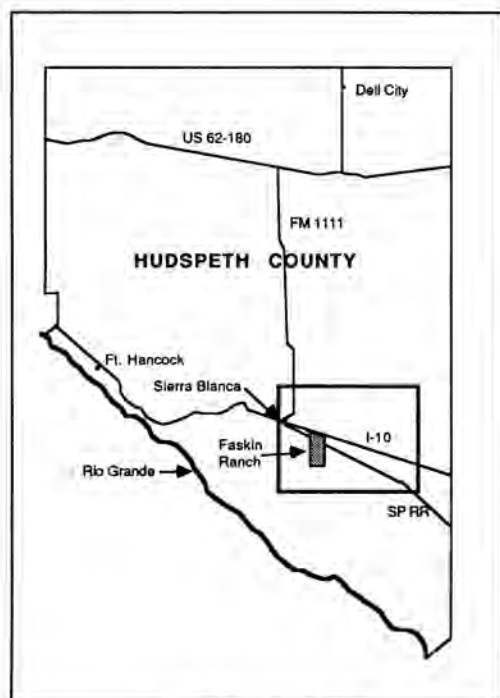


Fig. 2. Siting area.

of 183 to 274 meters below the site. Also, alluvial fill thickness below disposal units is expected to be about 30 meters which will further limit downward movement of water. Based on this information, exposure levels are expected to be at least one order of magnitude below the regulatory limits.

Recorded meteorological data from Ft. Hancock and Sierra Blanca have been compared, and about 31.75 centimeters of rainfall can be expected annually at Sierra Blanca -- about 5 centimeters more than Ft. Hancock. Because of the mountains surrounding Sierra Blanca, prevailing wind direc-

tion and wind velocities cannot be predicted until the meteorological station is operational at the new site. Other weather conditions, such as temperature and extreme weather, would be similar to Ft. Hancock.

Since the Sierra Blanca area gets more rainfall than Ft. Hancock, a more productive habitat exists on the Faskin Ranch. The physiographic classification of the area is the Desert Grassland Vegetation Region. Although plant and animal species are more diverse, no endangered species are listed by the U.S. Fish and Wildlife Service for Hudspeth County. However, certain endangered species are listed and documented in adjacent counties, but the habitats for these species are not found on the siting area. The Texas Horned Lizard is a threatened species and does exist in the Eagle Flat area. However, the presence of a threatened species will not affect the siting or design of the Authority's facility.

Cultural features such as the schools, churches, and cemeteries at Sierra Blanca are located within about 8 kilometers of the Faskin Ranch. Other historic features such as the Old Spanish Trail, Fort Quitman, and Indian Hot Springs are located in the general region of the ranch. No significant archaeological sites are expected to be found in the siting area on the Faskin Ranch, but archaeological features may exist in the mountains surrounding Sierra Blanca. These features are not expected to affect siting.

There is good transportation access to the Faskin Ranch. It can be accessed directly by Interstate Highway 10 or from Farm-to-Market 1111 through state property. Rail lines cross the siting area, but waste shipments are not anticipated by rail.

Water, electricity, and telephone service are available to the ranch.

SITE CHARACTERIZATION

Since the new siting region is within about 48 kilometers of the abandoned Fort Hancock site, a significant amount of regional geology, geophysical, meteorological, flora and fauna, demographics, and archaeology information is available. Additional site-specific data will be collected to augment the data obtained during the characterization of the Fort Hancock site, where necessary, to support the performance assessment, facility design, and licensing. Site-specific characterization will start in May 1992 and will take about 15 months.

Geology

The host sediments for the repository and the stratigraphic framework of the surrounding region will be described. Related studies of structural geology will produce data needed to evaluate the potential for earthquakes to produce accelerations of sufficient magnitude to impact the performance of the repository. The description of the regional setting of the Fort Hancock area will be updated to include the Eagle Flat region; this will include an evaluation of the natural resources of the area and a description of the lineament analysis of the region.

Studies of the geomorphic and surficial geology of the area will emphasize description of processes, such as erosion and deposition of sediments and the formation of fissures, that have affected the development of the surface and the shallow subsurface of the study area during the Quaternary (last 1.8 million years). Surficial sediments and the location of fissures will be mapped. Fissures will be excavated and described in detail. Studies of fissures will be coordinated with

geohydrologic processes studies in the unsaturated zone to better define the possible role of fissures in recharge of groundwater.

Surface Hydrology

Priority surface water hydrology issues include delineation of the 100-year floodplain on or near the site and determination of all potential surface water pathways at the site. Because of the aridity of the region and the infrequent precipitation, gaging station data probably will not be relied on for input to the surface water model. Precipitation amounts to be used in analyzing the site will be obtained from literature values and instrumentation. HEC 1 and HEC 2 models will be used along with detailed surveys to delineate the 100-year floodplain and probable maximum flood level.

Unsaturated Zone Geohydrology

The unsaturated zone is the immediate host environment for the repository. Recharge through the unsaturated portion of the hydrologic system and processes in the unsaturated zone will be defined. Unsaturated zone studies will require drilling test holes, installation of testing and monitoring equipment, and analysis of samples. Data will be used to support the performance assessment and for numerical models to interpret unsaturated zone processes. Unsaturated zone studies will also investigate the role of natural fissures as controls on the introduction of surface waters to the subsurface.

Saturated Zone Geohydrology

Saturated zone studies will characterize the regional flow system(s) of Eagle Flat and the particular setting of the siting area within the regional flow system. Up- and down-gradient monitoring wells will be established in the vicinity of the site, and other wells will be established or rehabilitated as may be needed to define the characteristics of the saturated zone. Wells will be tested to determine such parameters as flow rates, transmissivities, storativities, and water age. Isotopic analyses will be used to evaluate recharge rates and sources of waters. Data compilations and numerical analyses will be used to interpret regional flow paths, areas of recharge and discharge, and directions and rates of ground-water movement.

Geophysical

Geophysical techniques will be used to address issues of current seismicity and the character of the geologic materials that underlie the site vicinity. Current seismicity in the site vicinity will be monitored and surveys will be conducted to provide additional data on the distribution of geologic strata beneath the site and in the site vicinity. These surveys will also help to determine the presence or absence of faults that may displace the Mesozoic bedrock or overlying bolson deposits and, thus, represent either a potential seismic hazard or a potential conduit for groundwater.

A network of seismic stations will be established to monitor current seismic activity in the site vicinity. The network will be designed to detect seismic events in the siting region.

Geotechnical

Geotechnical evaluations of soils, granular materials, cemented materials, and borrow materials will be conducted.

Also, construction materials, indigenous to the area, will be evaluated for supply and availability.

Agricultural Soils

Soils will be mapped in high detail such that each soil series is defined. Available information on agricultural and engineering properties will be provided based on procedures used by the USDA Soil Conservation Service.

Flora

Detailed flora evaluations will identify each plant community on the site. All species will be collected and preserved as specimens, or in the case of cacti, as pictorial vouchers. Special attention will be given to any endangered, rare, threatened, or peripheral plant species which mitigative measures might be required.

Fauna

A descriptive account of fauna on the site will be based on both collections and observations. The evaluation will document and quantify those species that occupy the site as well as the migratory species that are seasonally in the area. Also, special attention will be given to any endangered, rare, threatened, or peripheral animal species.

Cultural Resources

Archaeological and cultural sites in the siting area will be classified and quantified. A reconnaissance of the immediate vicinity of the site will be conducted. In addition, specific area reconnaissance will be conducted for areas where other investigations are anticipated so that significant archaeological sites are not disturbed.

Environmental Monitoring

Radiological data from flora, fauna, soil, and water samples and TLDs will be compiled to define background radiation levels at the site. A continuous record of environmental monitoring data for the site is required to support licensing and site operation.

Performance Assessment

Performance assessment modeling will use site characterization data to assess compliance with performance objectives. Doses to the public and workers will be predicted, and long term release scenarios will be evaluated to determine the impact to the public for at least 1,000 years after site closure. Selected scenarios will be modeled using computer codes which will be selected for their applicability to the site. Because of the arid environment and high evapotranspiration, performance modeling indicates virtually no potential for downward movement of groundwater. Consequently, conservative infiltration scenarios will be evaluated to demonstrate compliance at levels at least one order of magnitude below the performance objectives.

Socioeconomics and Demography

Socioeconomic and demographic information will be reviewed and updated to reflect the 1990 census and revised growth projections.

Meteorology

The meteorological station will be moved to the new site from Ft. Hancock, and data from the Faskin Ranch site will be retrieved, processed, and archived.

FACILITY DESIGN

Since the facility design is generic to any site, most of the facility design from the Fort Hancock site can be used at the new site including the design of disposal units, canisters, and buildings. However, the facility layout and drainage system will be changed to match topography on the new site. Facility design related to topography relates more to construction plans than the facility design which will be available for licensing review.

LICENSE APPLICATION**License Application Status**

A significant part of the license application for the Ft. Hancock site had been prepared prior to the abandonment of the site in March 1991. Much of this information was related to generic issues, regional characteristics, and facility systems design which can apply to any site. As discussed previously, certain site-specific data such as geology, hydrology, meteorology, and soils must be obtained to update existing information. Because a substantial amount of information is already

available from reconnaissance level information, previous characterization activities at Ft. Hancock, previous design activities, and previous license preparation activities, the Authority has determined that a sufficient amount of complete, detailed information is available for the license review process to begin. Additional site specific detail will be submitted concurrently with the review process. The licensing agency will be consulted during this process to ensure that acceptable data is submitted for review and to reduce the possibility that additional field characterization data will be required.

License Application Content and Format

Table I lists the major sections of the license application. Table II shows the facility development schedule.

COMPACT NEGOTIATIONS

Texas may now enter into a compact with *one or more* states so long as compact members are limited to a cumulative amount of waste not to exceed 20 percent of the projected Texas waste generation over a 50 year period. The Texas Governor's Office may begin negotiations with other compact members in the spring of 1992. Numerous northeastern states, including Maine and Vermont, have been in contact with the Governor's Office and the Authority.

TABLE I

License Application Sections

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| <p>1.0 GENERAL INFORMATION</p> <p>1.1 Identity of Applicant</p> <p>1.2 Qualification of Applicant</p> <p>1.3 Description of Site and Proposed Facility</p> <p>1.4 Schedules</p> <p>2.0 SPECIFIC TECHNICAL INFORMATION</p> <p>2.1 Design Criteria</p> <p>2.2 Natural Events and Phenomena</p> <p>2.3 Codes and Standards</p> <p>2.4 Design Features</p> <p>2.5 Construction and Operation</p> <p>2.6 Source Term</p> <p>2.7 Quality Control</p> <p>2.8 Radiation Safety Program</p> <p>2.9 Operation and Procedures Manual</p> <p>2.10 Administrative Procedures</p> <p>3.0 ENVIRONMENTAL INFORMATION</p> <p>3.1 Statement of Need</p> <p>3.2 Schedule</p> <p>3.3 Area and Site Characteristics</p> <p>3.4 Natural Resources</p> <p>3.5 Flow Diagram</p> <p>3.6 Site Selection</p> <p>3.7 Project Alternatives</p> |
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TABLE I

(Cont.)

3.8 Radiological and Nonradiological Impacts
3.9 Environmental Effects
3.10 Environmental Monitoring Program
3.11 Decommissioning and Site Closure
3.12 List of Permits
4.0 TECHNICAL AND ENVIRONMENTAL PATHWAYS
4.1 Migratory Pathways Analyzed
4.2 Protection of Inadvertent Intruders
4.3 Worker Protection Procedures
4.4 Site Stability
4.5 Nonradiological Impacts
5.0 INSTITUTIONAL INFORMATION
5.1 Certification of Post-Closure Agency Acceptance
5.2 Ownership of Site
5.3 Legal Description
5.4 Detailed Management Plan
6.0 FINANCIAL INFORMATION
6.1 Applicant Qualification and Assurances
6.2 Funding for Disposal Site Closure, Stabilization, and Institutional Controls

TABLE II

Facility Development Schedule

DEVELOPMENT ITEM	SCHEDULE
Generic, Regional, Reconnaissance-Level Information Site-Specific Characterization Planning and Organization	Feb. 1992
First License Application Submission	Mar. 1992
Site-Specific Characterization Begins	May 1992
First Phase Characterization Reports Available First License Application Revision	Dec. 1992
Second Phase Characterization Reports Available Second License Application Revision	Jun. 1993
Site-Specific Characterization Complete	Aug. 1993
Third Phase Characterization Reports Available Final License Application Revision	Oct. 1993
License Review Complete	April 1994
License Hearing Process Submit Construction Plans for Review	Jun. 94- May 95
License Issued	June 1995
Facility Construction	Jul-Dec.95
Operation	Jan. 1996