STATUS REPORT ON TEXAS LOW-LEVEL RADIOACTIVE WASTE DISPOSAL AUTHORITY ACTIVITIES

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BACKGROUND

In 1981, the Texas Low-Level Radioactive Waste Disposal Authority was created by Article 4590f-1 to site, develop, operate, decommission, and close a low-level radioactive waste disposal facility for Texas generated waste. In 1989, the Authority's act was recodified by the Texas legislature in the Health and Safety Code., Title 5. Sanitation and Environmental Quality, Subtitle D. Nuclear and Radioactive Materials, Chapter 402. The Authority is governed by a Board of Directors appointed by the Governor, composed of a certified health physicist, geologist, attorney, medical doctor, and two private citizens.

Under the statute, low-level radioactive waste is defined as any radioactive material with a half-life of 35 years or less or having less than 10 nanocuries per gram of transuranics. Materials with half-lives of greater than 35 years may be classed as low-level waste if special criteria are established by the Texas Department of Health Bureau of Radiation Control.

Subsequent sessions of the legislature have amended the act to revise siting criteria, require consideration of state land, create a Citizen's Advisory Committee, incorporate alternative designs, and establish a special low-level radioactive waste account in the state treasury.

As illustrated in Figure 1, the Authority began its activities in 1982. The Authority has proposed a site in far West Texas near Fort Hancock, but El Paso County, the neighboring county to the west, has instituted three separate lawsuits to slow or stop the site selection process.

Particular attention was paid early in the site selection process to items which could be fatal flaws from a licensing standpoint. Nuclear Regulatory Commission (NRC) Regulations - 10 CFR 61; Texas Department of Health, Bureau of Radiation Control (BRC) Regulations - Texas Regulations for Control of Radiation (TRCR), Part 45; and Authority requirements provided guidance on fatal flaw evaluations. Table 1 presents a comparison of absolute exclusion, performance based, and preferred site selection criteria from NRC, BRC, and Authority requirements.

There are five prescriptive absolute exclusion criteria relating to modeling/characterization, surface water hydrology, groundwater hydrology,

and soils which could result in a fatal flaw not related to site performance objectives.

Figures 2, 3, and 4 show the site selection process from statewide screening through site designation.

FORT HANCOCK SITE

Site Description

The Fort Hancock site is located on a 65,000 acre block of state land in southwestern Hudspeth County. The site area is approximately 40 miles southeast of El Paso, 12 miles east of the El Paso County line, and 10 miles northeast of Fort Hancock, Texas. Figure 5 is a vicinity map.

The site area lies between the Rio Grande to the south and the Diablo Plateau to the north. The Finlay Mountains are about 4 miles to the east of the study area. The site has a slope of between 1-2% and is classed by geologists as an alluvial plain or alluvial slope. Several drainageways cross the siting area and the 100 year flood plain is contained within the banks of these areas. Surface drainage across the proposed site flows to the southwest into Alamo Arroyo which flows south into the Rio Grande. Camp Rice Arroyo lies to the south of the study area.

Transportation access to the site area is from Interstate 10 at Fort Hancock via a county road. Approximately 10 miles of road construction will be required to accommodate maximum weight trucks.

Both the site and surrounding areas are used as grazing land. The combination of soils, climate, and topography totally precludes any form of more intensive agriculture.

The site lies at the eastern edge of the Hueco Bolson, a major basin and range graben. Rocks in the area range in age from Precambrian to Recent. The strata most important at this site are late Tertiary to Recent sediments of the Hueco Bolson. The Fort Hancock and Camp Rice formations, composed of bedded stratas of fine and coarser materials, will be the host formations for the low-level radioactive waste disposal units.

A fault system cutting the Quaternary and Tertiary alluvial and basin-fill deposits in the vicinity of the study area has been mapped. The main fault is well exposed in several branches of Diablo Arroyo near Campo Grande Mountain and is informally referred to as the Campo Grande fault. This fault has

a very long recurrence interval and will not affect the security of the facility. The facility will be designed to withstand forces from earthquakes.

Cretaceous rocks form a plateau north of the siting area and underlie the siting area. Several wells in the area penetrate Cretaceous rocks of the Finlay, Cox, or Bluff Mesa Formations. No significant amounts of ground water have been encountered in the bolson fill in the site area, and no recharge into the bolson is indicated in the area of the site. More significant amounts of groundwater have been observed in the Cretaceous and it is confined at about 500 feet below land surface. However, water in the Cretaceous is of low quantity and quality and has a very low hydraulic conductivity. Data indicates that there is no significant hydrologic connection between the bolson deposits in the site area and the bolson deposits closer to the Rio Grande where the bolson is used as a water supply.

The site area and surroundings are a part of the southern desert shrub vegetation regions. The site receives about 9 inches of rainfall per year and experiences about 73 inches of evaporation per year.

Numerous native animal and plant species inhabit the area, but population densities are low. Site investigations have revealed only one threatened animal species, the Texas Horned Lizard. No endangered animal species inhabit the site, and based on published habitat preferences, none are expected to occur. No threatened or endangered plant species are currently listed for the county.

Cultural features such as schools, churches, and cemeteries are located in the communities of Fort Hancock and Sierra Blanca, 10 miles southwest and 27 miles southeast respectively. Other areas of historic significance located along the Rio Grande and downstream include Fort Quitman and Indian Hot Springs.

The Guadalupe Mountain National Park extends into the northeast corner of Hudspeth County some 54 miles to the northeast of the site area, and the Sierra Diablo Wildlife Management area is located approximately 47 miles to the east of site area.

The nearest archaeological sites are prehistoric rock art of the Yamada Mogollon people in a header canyon of Alamo Arroyo and at various spots along the Diablo Plateau escarpment 3 miles to the north and east of the site. A detailed survey of the site area has revealed isolated hearth sites. Excavation

of the most significant hearth sites revealed no significant cultural resources on the site area.

A radiological performance assessment of the site has determined that the site will perform well within regulatory requirements. The high differential between evaporation and rainfall greatly reduces the potential for downward water migration, and the site geology and facility design further assure a safe and secure site.

Detailed Site Evaluation Studies

The Authority began detailed site evaluation studies on the Fort Hancock site in the summer of 1988 and the studies were completed in the spring of 1990. More detailed data than had been developed during site screening activities was required to provide sufficient data to determine site suitability and to support licensing.

The detailed site evaluation program addressed the full range of regulatory criteria presented in Table 1 and was separated into three major study areas: Engineering and Geology, Environmental, and Health Physics. These are illustrated in Figure 6. Detailed analyses have been prepared related to:

geology (stratigraphy, geomorphology, structure and geochemistry);
geophysics and seismicity;
geotechnical engineering;
groundwater and surface water hydrology;
flora/fauna/soils (endangered/threatened species, flora/fauna/soils inventory, site condition analysis, and soils map);
socioeconomics/demography (socioeconomic condition, economic impact, demographic/public service impact, local government impact, and historic, demographic, economic and rural characteristics);
meteorology/air quality (regional/local climatology and airborne pathway analysis);
cultural resources (archaeological survey);
background radiation; and
site/facility performance assessment.

Site Designation

Until pending litigation is complete, the Authority's Board of Directors may not be able to proceed with site designation. State law requires that the Authority go through a number of procedural steps prior to designating a site. This includes preparing a summary report on the site selection process, scheduling and holding a public hearing in the county of the candidate site, designating the site through Board action, and issuing a formal Board order designating the site. Designation will trigger the preparation and submittal of a license application to the Texas Department of Health, Bureau of Radiation Control (BRC). BRC is the state regulatory agency responsible for enforcing Nuclear Regulatory Commission regulations.

Siting Issues

Since the summer of 1988, El Paso County has hired numerous technical consults and attorneys to scrutinize the Authority's site selection process, the Fort Hancock site, and the facility design. Well over $2,000,000 has been spent on this effort.

Three lawsuits have been filed by El Paso County attempting to slow or stop the site designation process. The first lawsuit was resolved by a Supreme Court decision in favor of the Authority, the second was dropped, and the third is scheduled for trial in September 1990 in a District Court in El Paso. The Authority anticipates that up to two years could be consumed by this lawsuit and the inevitable appeals.

Site suitability and facility design are the major areas where El Paso County has attacked the site selection process. The Authority contends that El Paso has not considered the importance of performance objectives in proving site suitability as required by the regulations. El Paso County correctly observes that there are limited prescriptive site selection criteria either in BRC or Authority requirements, and they argue that specific prescriptive criteria delineating distances to active faults, maximum areas of upstream drainage, distances to populated areas, depth to groundwater, etc. should have been developed and applied.

The pertinent regulations do not require prescriptive requirements except for modeling/characterization, the 100-year flood plain, water table, and ground water discharge. All other criteria rely on demonstrating that the site can meet

performance objectives. If highly prescriptive rules had been promulgated, many good sites could have been disqualified regardless of how well they might have met performance objectives.

In NUREG 1199, an NRC guidance document, reference is made to 10 CFR 100, which relates to nuclear power plants and to the Standard Review Plan for UMTRCA Title 1 Mill Tailings Remedial Action Plans. El Paso County has attempted to apply this guidance as absolute site selection and design criteria for a low-level radioactive waste disposal facility. Even though a low-level radioactive waste disposal facility may have some similarities, to apply the same design standards for a low-level radioactive waste disposal facility and for nuclear power plant or mill tailings facility is totally inappropriate.

Attachment 1 provides a detailed comparison of TRCR Part 45, El Paso's position, and the Authority's position regarding the Fort Hancock site.

WASTE VOLUME PROJECTIONS

In 1989, the Texas Low-Level Radioactive Waste Disposal Authority surveyed low-level waste generators in Texas and projected an annual waste generation rate of about 52,000 cubic feet per year. Table 2 shows the waste volume projections from this survey.

On a regional basis, the generation of low-level waste in Texas can be estimated as follows:

Nuclear Power Industry		Non-Utility Generators	
Glen Rose	31%	Houston - Galveston	16%
Bay City	31%	Dallas - Ft. Worth	11%
		Austin - San Antonio	5%
		Balance	6%

Low-level radioactive waste is divided into classes based on the amount of radioactivity and the radiotoxicity of the nuclides present in the waste. Class A is the least hazardous waste. Class B and C wastes are more hazardous and must meet special stability requirements before they can be disposed of at a low-level waste disposal facility. In Texas, the low-level waste generated is projected to be:

Class A	94%
Class B	4%
Class C	2%

FACILITY DESIGN

The facility will be located on about 3,000 acres of the 65,000 acre state tract. Disposal will take place on 100-200 acres, and the remainder of the area will be used for drainage, roads, support facilities, and buffer areas.

State law requires that all waste be placed in steel reinforced concrete containers. Steel reinforced concrete canisters will be at least sixteen feet below ground level. They will be spaced about eighteen inches apart and backfilled with granular material to facilitate monitoring and cushioning against seismic movement. Waste will be disposed of by class depending on whether it is Class A, B/C, or mixed waste. Figure 7 shows a typical cross section of a disposal unit. Table 3 defines the waste acceptance criteria of the Authority, and Table 4 lists the facility structures and improvements.

LICENSE APPLICATION

Texas is an Agreement State. Under this program, the NRC has delegated its regulatory authority to Texas. The BRC will license the Authority's facility applying TRCR Part 45 which is based in part on 10 CFR 61. The license application format adopted by the Authority follows the structure of TRCR Part 45 and contains six sections. Table 5 shows the format of the license application.

COST AND SCHEDULE

The total cost of construction and equipment is estimated to be about $27 million. The life cycle cost over a thirty year period is projected at about $233 million. Table 6 shows the life cycle costs of the Authority.

The outcome of the pending lawsuit and the appeals process will have a major impact on the Authority's schedule. Unless there is relief from extended litigation, Table 7 shows the anticipated development schedule for the Authority.

CONCLUSION

In spite of political and legal impediments, the Authority has been able to identify and characterize a suitable site for Texas low-level radioactive waste. The Authority expects to prevail in the litigation at the appellate stage, but up to two years could be required to do so.

When the Authority is allowed to proceed, licensing could begin in 1993 and will take about two years. A license could be issued in 1995. Construction will take about one year and the facility could be operational in 1996.

Table 1
Texas Low-Level Radioactive Waste Disposal Authority
Comparison of Selected Regulations and Requirements

		10 CFR 61		TRCR Part 45.50		Authority	
		General	Prescriptive	General	Prescriptive	General	Prescriptive
1.	Ensure Performance Objectives	X (PB)		-----		- (1)	
2.	Characterized, Modeled, Analyzed, Monitored	X (AE)		X (AE)		X (AE)	
3.	Low Population Growth	X (PB)		X (PB)		X (PB)	
4.	Natural Resources	X (PB)		X (PB)		X (PB)	X
5.	100 Yr Flood Plain	X (AE)		X (AE)		X (AE)	
6.	Upstream Drainage	X (P)		X (P)		X (P)	X
7.	Water Table	X (AE)		X (AE)		X (AE)	X
8.	Ground Water Discharge	X (AE)		X (AE)		X (AE)	
9.	Tectonics	X (PB)		X (PB)		X (PB)	
10.	Surface Geology	X (PB)		X (PB)		X (PB)	
11.	Nearby Facilities	X (PB)		X (PB)		X (PB)	
12.	Aquifer Recharge Zone			X (PB)		X (AE)	
13.	Soil Conditions			X (AE)		- (1)	
14.	Meteorological Conditions					X (P)	
15.	Parks, Monuments, Wildlife Areas					X (P)	
16.	Archaeology					X (P)	
17.	Endangered Species					X (P)	
18.	Conflicting Easements					X (P)	
19.	Access					X (P)	
20.	State Land					X (P)	
21.	Transportation					X (P)	

PB - Performance Based AE - Absolute Exclusion P - Preferred
1 - This requirement is addressed in other Authority criteria

Table 2
Texas Low-Level Radioactive Waste Disposal Authority
Waste Volume Projections

UTILITY WASTE STREAMS (2 NUCLEAR POWER PLANTS - 4 UNITS)	
COMPACTIBLE TRASH	16,000 CU. FT.
NON-COMPACTIBLE TRASH	13,000 CU. FT.
ION-EXCHANGE RESINS	4,600 CU. FT.
FILTER CARTRIDGES ETC.	3,100 CU. FT.
OTHER	200 CU. FT.
TOTAL PER YEAR	36,900 CU. FT.
NON-UTILITY WASTE STREAMS (UNIVERSITIES, HOSPITALS, RESEARCH FACILITIES & INDUSTRIES)	
COMPACTIBLE TRASH	12,000 CU. FT.
NON-COMPACTIBLE TRASH	1,800 CU. FT.
BIOLOGICAL WASTES	750 CU. FT.
ABSORBED LIQUIDS	220 CU. FT.
SEALED SOURCES	220 CU. FT.
OTHER	100 CU. FT.
TOTAL PER YEAR	15,090 CU. FT.
MIXED WASTE (HAZARDOUS / RADIOACTIVE)	
TOTAL PER YEAR	100 CU. FT.
PROJECTED TEXAS WASTE STREAM	
TOTAL PER YEAR	52,090 CU. FT.

Table 3
Texas Low-Level Radioactive Waste Disposal Authority
Waste Acceptance Criteria

55-gal. Drums / 85-gal. Overpacks

B-25 Boxes or Equivalent

195 / 215 Liners

High Integrity Containers

Maximum Single Container Height - 79 in.

Maximum Container Diameter - 76 in.

Odd-shapes Items Accepted on Case-By-Case Basis

Dewatered Resins Cannot Contain More Than 0.5% Freestanding Liquids

No Pyrophoric, Flammable, or Explosive Materials

Compactible Waste Must be Compacted at Least by a Ratio of 3:1

Table 4
Texas Low-Level Radioactive Waste Disposal Authority
Facility Structures and Improvements

Disposal Units

- Class A
- Class B/C
- Mixed Waste

Buildings

- Administration
- Health Physics
- Maintenance
- Waste Storage and Processing
- Warehouse
- Pump House
- Security Station

Drainage System

Retention/Detention Pond

Roads

Perimeter and Internal Fencing

Utilities

Equipment

Furnishings

Table 5
Texas Low-Level Radioactive Waste Disposal Authority
License Application Format

- General Information
  - General descriptions of applicant, personnel, facility, waste stream, and schedule
- Specific Technical Information
  - Design Criteria
  - Natural Events and Phenomenon
  - Codes and Standards
  - Design Features
  - Construction and Operation
  - Source Term
  - Quality Control
  - Radiation Safety Program
  - Operation and Procedures Manual
  - Administrative Procedures
- Environmental Information
  - Statement of Need
  - Schedule
  - Area and Site Characteristics
  - Natural Resources
  - Flow Diagram
  - Site Selection
  - Project Alternatives
  - Radiological and Non-radiological Impacts
  - Environmental Effects
  - Environmental Monitoring Programs
  - Decommissioning and Site Closure
  - List of Permits
- Technical and Environmental Pathways
  - Migratory Pathways
  - Inadvertent Intruder
  - Worker Protection
  - Site Stability
  - Nonradiological Impact
- Institutional Information
  - Certification of Post Closure Acceptance
  - Ownership of Site
  - Site Legal Description
  - Management Plan
- Financial Information
  - Financial Stability
  - Funding of Closure, Stabilization, and Institutional Controls

Table 6
Texas Low-Level Radioactive Waste Disposal Authority
Projected Life Cycle Costs

PRE-OPERATION	$ 39,813,000
OPERATION	163,787,000
CLOSURE	8,456,000
POST CLOSURE	21,368,000
TOTAL	$ 233,424,000

PROJECTED AVERAGE FEE
$100 - $200 PER CU. FT.

Table 7
Texas Low-Level Radioactive Waste Disposal Authority
Schedule

SPRING 1992	LITIGATION COMPLETE
SUMMER 1992	DESIGNATE SITE
FALL 1992	SUBMIT LICENSE APPLICATION
WINTER 1994	LICENSE HEARING COMPLETE
SPRING 1995	LICENSE ISSUED
SPRING 1996	CONSTRUCTION COMPLETE
SUMMER 1996	OPERATION

Note: Litigation comprises about two years of this schedule. Any reduction in the time of litigation would proportionately shorten the development schedule.

Figure 1
Texas Low-Level Radioactive Waste Disposal Authority
Chronology

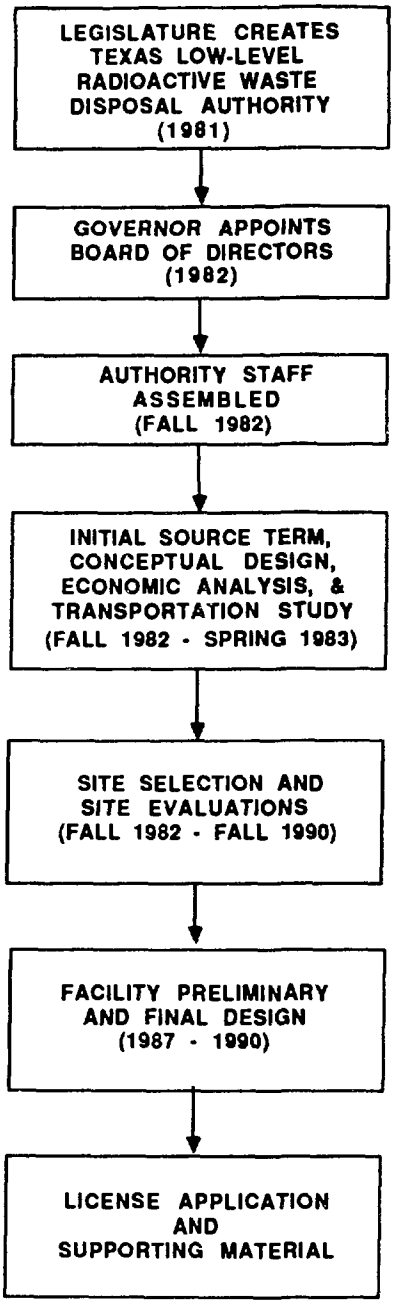

Figure 2
Texas Low-Level Radioactive Waste Disposal Authority
State-Wide Site Selection Process

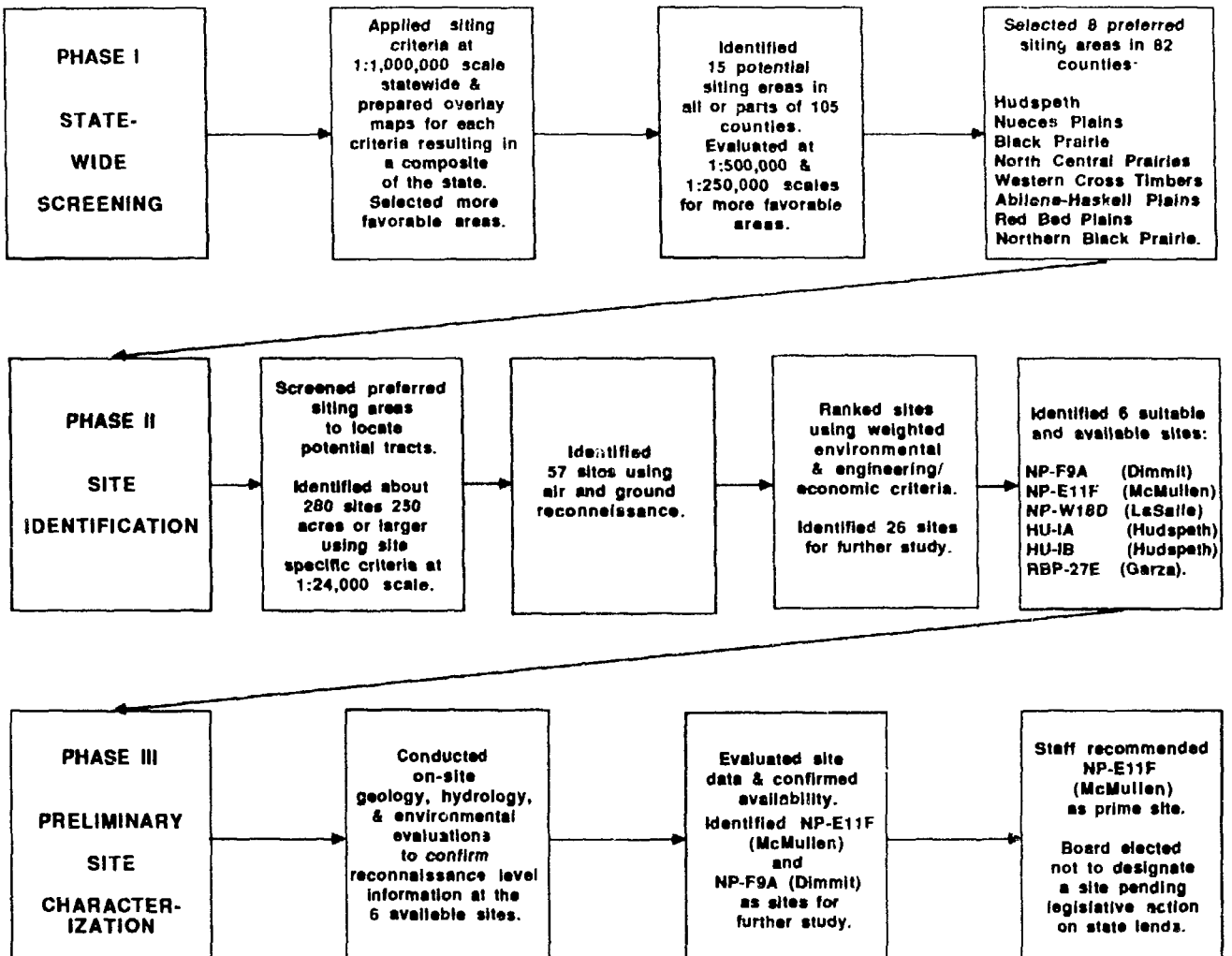

Figure 3
Texas Low-Level Radioactive Waste Disposal Authority
State Land Siting Process
(1885 - 1986)

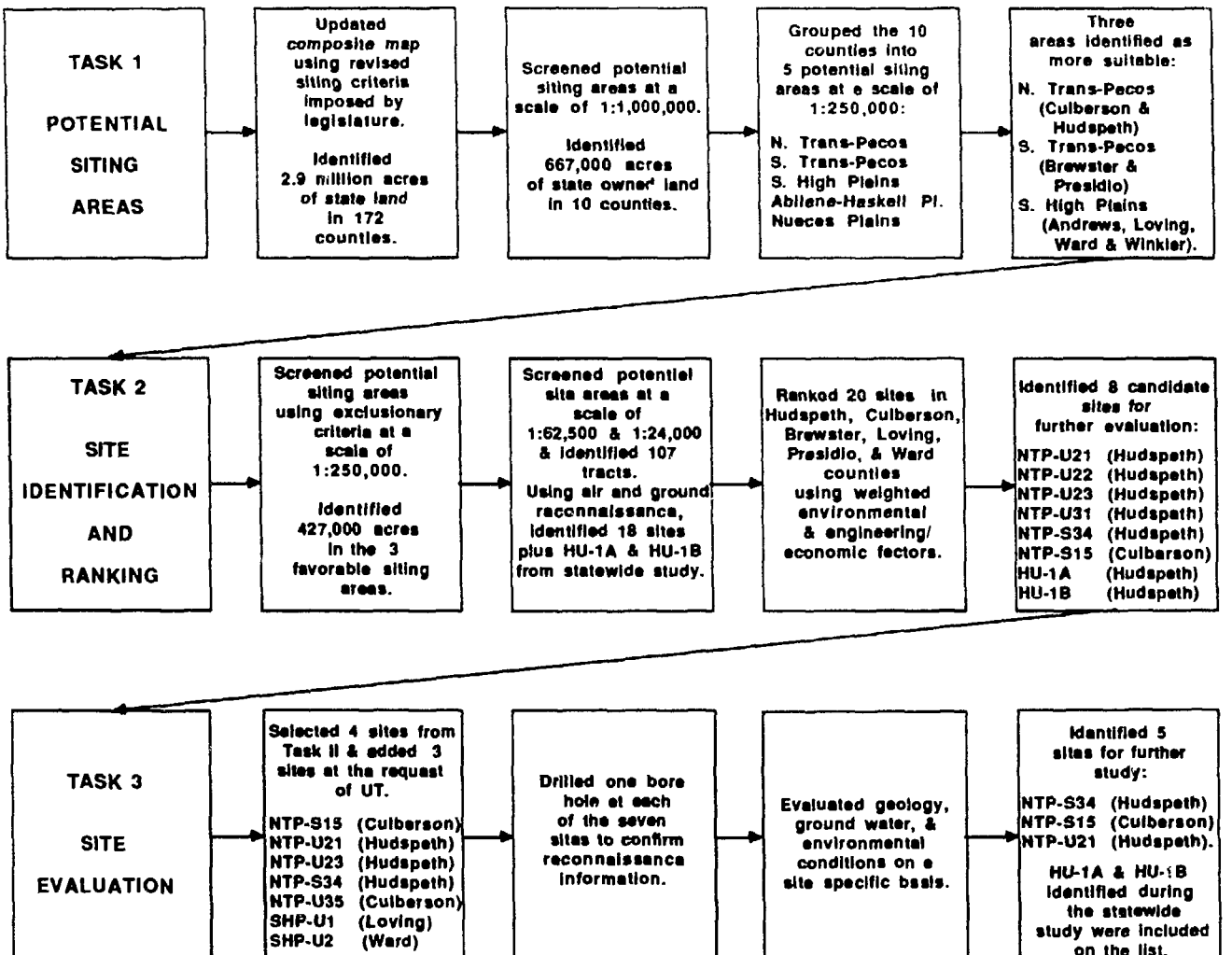

Figure 4
Texas Low-Level Radioactive Waste Disposal Authority
Site Designation
(1886 - 1990)

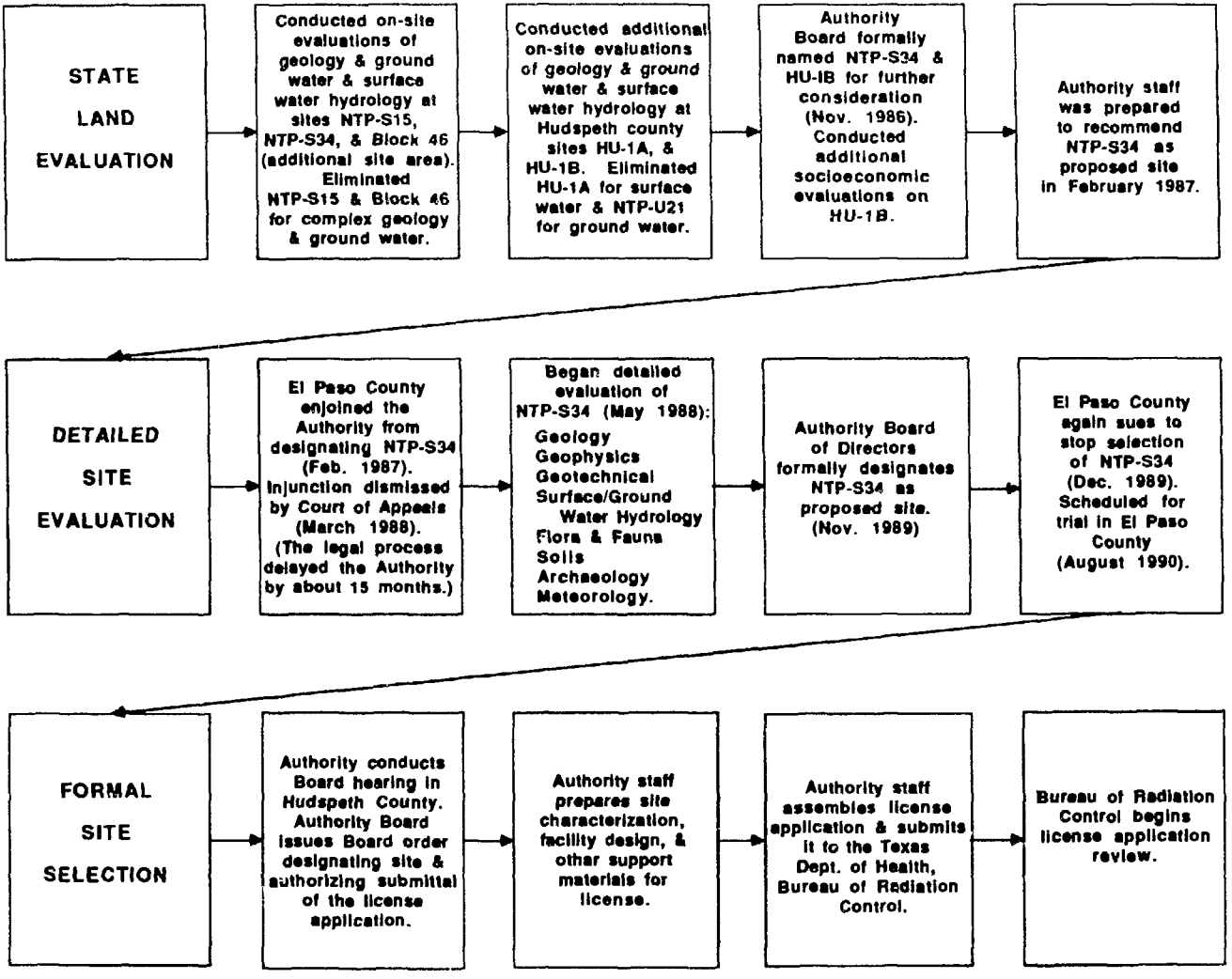

Figure 5
Texas Low-Level Radioactive Waste Disposal Authority
Fort Hancock Site Vicinity Map

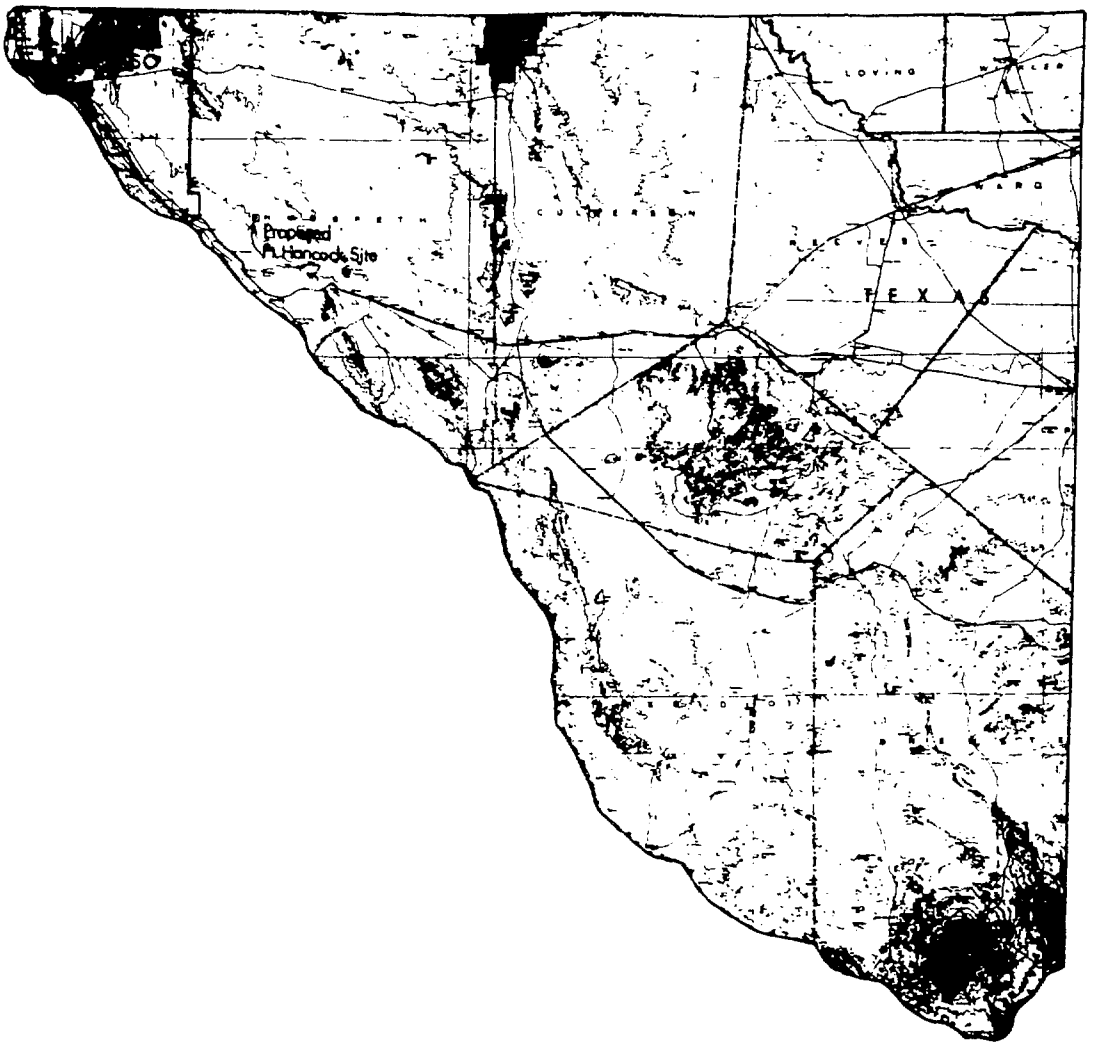

Figure 6
Texas Low-Level Radioactive Waste
Disposal Authority
Fort Hancock Site Evaluation Organization

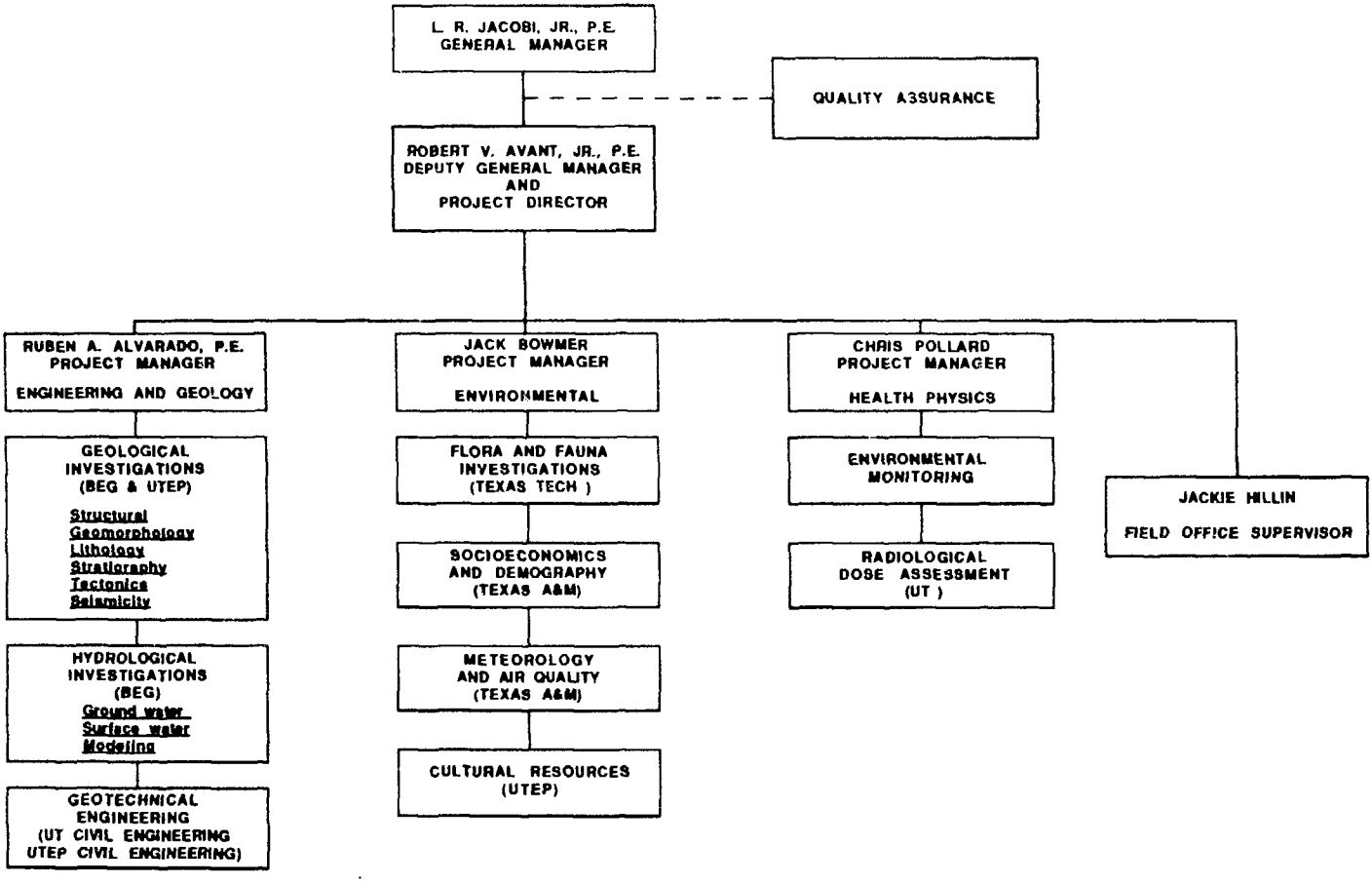

Figure 7
Texas Low-Level Radioactive Waste Disposal Authority
Cross Section Schematic of Disposal Unit