United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R06-89/051
September 1989

EPA

Superfund Record of Decision:

Sheridan Disposal Services, TX

50272-101

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Sheridan Disposal Services, TX
Second Remedial Action - Final

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15. Supplementary Notes

16. Abstract (Limit: 200 words)

The 110-acre Sheridan Disposal Services site is approximately 9 miles northwest of the city of Hempstead in Waller County, Texas. The site is located on the 100-year floodplain of the Brazos River and is bordered by a lake to the south, farmland, and a community of 20 residences to the north. The Evangeline aquifer, which runs under the site, is used to meet the drinking water needs of several communities nearby. Sheridan Disposal Services operated as a commercial waste disposal facility from about 1958 to 1984 using steam distillation, open burning, incineration, and direct disposal into a waste lagoon to dispose of various organic and inorganic chemical and solid wastes. The site includes a 12 to 22-acre lagoon, a 17-acre dike surrounding the lagoon, a 42-acre evaporation/land irrigation system, and an incinerator and 9 waste storage and treatment tanks located on the lagoon dikes. The primary contaminants of concern affecting the soil and sludge are VOCs including benzene and toluene, and other organics including PCBs.

The selected remedial action for the site includes excavation of all material with PCB concentrations greater than 25 mg/kg including 13,000 yd3 of pond and dike soil, 31,000 yd3 of pond sludge, and 300 yd3 of floating oil and emulsion in the pond and storage tanks. This will be followed by onsite biotreatment of (Continued on next page)

17. Document Analysis a. Descriptors
Record of Decision - Sheridan Disposal Services, TX
Second Remedial Action - Final
Contaminated Medium: gw
Key Contaminants: VOCs (benzene, PCE, TCE), metals (arsenic)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 89
	20. Security Class (This Page) None	22. Price

(See ANSI-Z39.18) *See Instructions on Reverse*

OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)
Department of Commerce

16. Abstract (Continued)

contaminated soil, sludge, and oil with stabilization and onsite disposal of residuals in the pond. If PCB concentrations in the residuals are less than 50 mg/kg, they will be placed under a RCRA-compliant cap. Residuals with PCB concentrations greater than 50 mg/kg PCB will be placed in a RCRA-compliant landfill in the pond area. In addition, the remediation requires capping the entire pond and dike area; decontamination and offsite disposal of tanks, drums, and debris; treatment to best available technology (BAT) of any contaminated wastewater and stormwater with discharge to the river; implementation of engineering controls to prevent bank erosion on the river; and ground water monitoring. The estimated present worth cost for this remedial action is $27,956,000, which includes total O&M costs of $863,000.

RECORD OF DECISION

FOR

SHERIDAN DISPOSAL SERVICES SITE

WALLER COUNTY, TEXAS

(GROUND WATER MIGRATION MANAGEMENT OPERABLE UNIT)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

SEPTEMBER 1989

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Sheridan Disposal Services site, Waller County, Texas

STATEMENT OF PURPOSE

This decision document outlines the selected remedial action for the second operable unit at the Sheridan Disposal Services site in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and to the extent practicable, the National Oil and Hazardous Substance Pollution Contingency Plan, 40 CFR Part 300, November 20, 1985.

On December 29, 1988, a Record of Decision (ROD) was signed which selected the appropriate remedial action for the Source Control Operable Unit for the Sheridan site. The Source Control ROD addressed the risks associated with exposure to contaminated soils and sludges on the site.

This document is the ROD for the second operable unit, hereafter referred to as the Ground Water Migration Management, or GWMM unit. The ROD for the GWMM unit addresses the risks associated with the potential or actual exposure to contaminated ground water.

The State of Texas (through the Texas Water Commission) has been provided an opportunity to comment on the technology and degree of treatment proposed by the Record of Decision. The letter describing the State's concurrence with the selected remedy is found in Appendix C.

STATEMENT OF BASIS

This decision is based on the administrative record for the Sheridan site. The index found in Appendix A identifies the items which comprise this administrative record.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE REMEDY

Upon review of the information contained in the administrative record, it is EPA's judgment that the natural attenuation alternative best serves both statutory and selection criteria in relation to the other solutions evaluated. A detailed description of this remedy and an explanation of how it meets statutory requirements is contained in the attached "Summary of Remedial Alternative Selection."

Implementation of the natural attenuation alternative requires the following components:

1. The establishment of Alternate Concentration Limits (ACLs) as the site ground water protection standards.

2. Ground water monitoring to ensure ACLs are not exceeded.

3. Sampling and analysis of the Brazos River immediately downgradient and upgradient of the point of entry of ground water from the site into the river.

4. Implementation of controls to preclude potential use of contaminated ground water.

5. In the event ACLs are exceeded at sometime in the future, the implementation of a corrective action plan to ensure that protective levels are met at the point of potential exposure.

Implementation of these activities addresses the principal threat posed by the site by preventing exposure to contaminated ground water and by maintaining safe levels in the Brazos River.

STATUTORY DETERMINATIONS

The remedy described above is protective of human health and the environment, attains Federal and State applicable or relevant and appropriate requirements and is cost-effective. This remedy satisfies the statutory preference for remedies that utilizes permanent solutions and alternative technologies to the maximum extent practicable. However, this remedy does not satisfy the statutory preference for treatment as a principal element because treatment of ground water contamination was found to be impracticable. Further, it should be noted that the Source Control remedy utilizes treatment as a principal element.

Because this remedy may result in hazardous substances remaining onsite above health-based levels, a review will be conducted within five years after commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Robert E. Layton Jr., P.E.,
Regional Administrator

Sept. 27, 1989
Date

SHERIDAN DISPOSAL SERVICES SITE

WALLER COUNTY, TEXAS

SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

SEPTEMBER, 1989

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I. SITE LOCATION

The Sheridan Disposal Services site is located approximately nine miles north-northwest of the City of Hempstead in Waller County, Texas. The site covers about 110 acres in a 700-acre tract of land which is bordered by the Brazos River to the north and Clark Road to the South (See Figures 1 and 2).

Located at the site are a lagoon (12-22 acres depending on water levels), a 17-acre dike surrounding the lagoon, and a 42-acre evaporation/land irrigation system. An incinerator and a group of nine storage tanks which were used for waste storage and treatment are located on the lagoon dikes. These site features are illustrated in Figure 3.

The predominant land-use within a four-mile radius of the site is agriculture and range land. The only primarily residential area within this four-mile radius is the community of Brown College. This community is made up of approximately 20 residences and is located one and one half miles north of the site. Nearby communities primarily utilize ground water from the Evangeline aquifer to meet their water supply needs.

The site is relatively flat, but slopes gently to the south. It lies within the 100-year floodplain of the Brazos River. However, the lagoon dikes have been built up to an elevation above that of the floodplain.

II. SITE HISTORY AND ENFORCEMENT

Sheridan Disposal Services operated as a commercial waste disposal facility from about 1958 to 1984. A wide variety of organic and inorganic chemical and solid wastes were disposed of at the site. The facility treated waste by steam distillation, open burning and incineration. The lagoon was developed in a low-lying area of the site and was used as a holding pond, and for the disposal of overflow wastes and waste treatment residues. In 1976, the facility initiated use of the evaporation system for disposal of water which accumulated on the lagoon.

The site's regulatory history began in 1963 when the Texas Water Quality Board (now known as the Texas Water Commission) issued a permit authorizing disposal of industrial solid waste. After permitting, the Texas Water Quality Board (TWQB) received complaints concerning odor, runoff and oil in the Brazos River. The State also noted increased concentrations of contaminants in on-site monitoring wells.

In 1970, the TWQB and Waller County filed suit against the Sheridan facility. After a series of meetings and public hearings, in 1975, a judgement was entered by the Court which prohibited further discharge of wastes into the lagoon. The TWQB and Sheridan Disposal Services discussed numerous closure plans for the lagoon until the TWQB determined that the facility did not have the economic or technical resources necessary to close the lagoon properly. In 1984, the Texas Department of Water Resources (successor of the TWQB) sent letters to generators and transporters of waste managed at the site to notify them of their potential liability under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

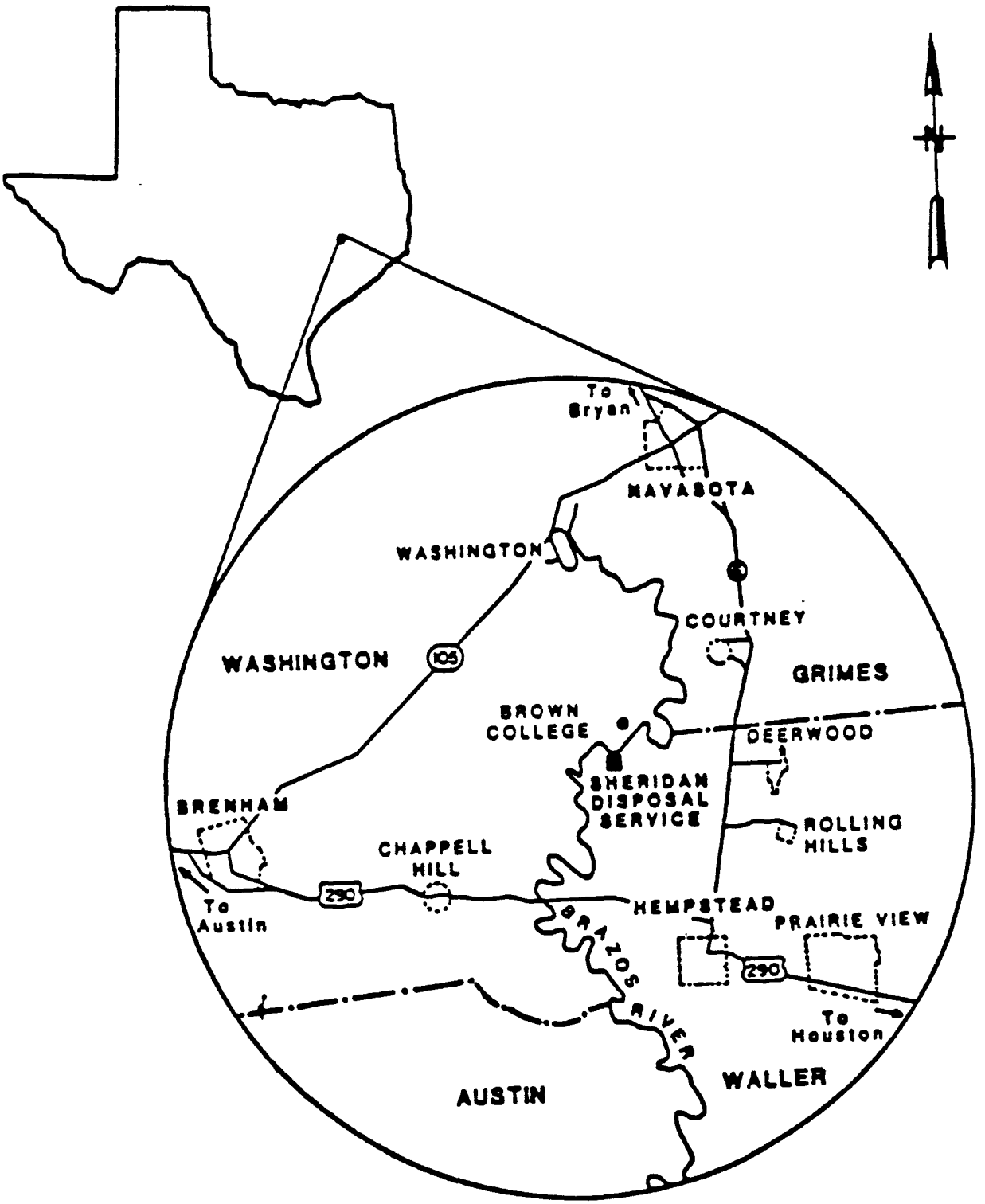

FIGURE I
SITE LOCATION MAP
SHERIDAN DISPOSAL SERVICE

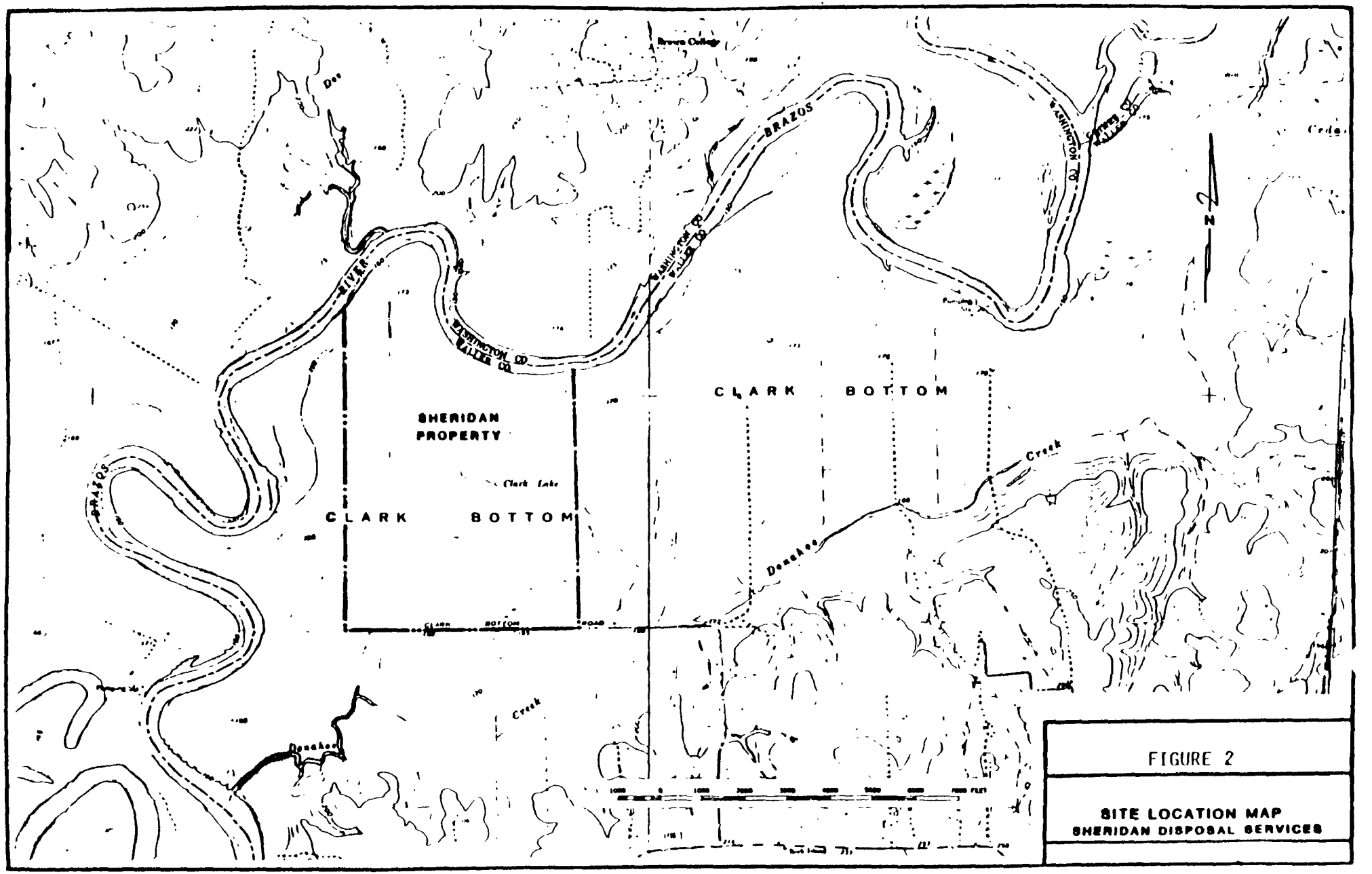

FIGURE 2

SITE LOCATION MAP
SHERIDAN DISPOSAL SERVICES

In response to this notification, the Sheridan Steering Committee, which is now known as the Sheridan Site Committee, organized and began to investigate the extent of contamination at the site. After polychlorinated biphenyls (PCBs) were identified in the lagoon, EPA became directly involved in site closure through the Toxic Substances Control Act. The site was ranked according to the Superfund Hazardous Ranking System and on June 10, 1986, the site was proposed for inclusion on the National Priorities List. The basis for inclusion on the NPL was primarily the volume, toxicity and mobility of contaminants found at the site and ground water contamination resulting from the site.

In June and July of 1986, 102 Notice/Information request letters were sent to site Potentially Responsible Parties (PRPs). During this time, the Sheridan Site Committee submitted a Remedial Investigation to EPA for evaluation. After reviewing this document the Agency determined that additional field investigations would be necessary to obtain adequate information on which to base a ground water remedy decision. However, in order to expedite lagoon cleanup and reduce further leaching into ground water, the site was divided into two operable units, a Source Control unit which was addressed in a previous ROD and the Ground Water Migration Management (GWMM) unit which is addressed in this ROD.

On February 3, 1987, 59 companies who were members of the Sheridan Site Committee entered into an Administrative Order on Consent with EPA to complete both the Source Control and GWMM remedial investigation/feasibility studies (RI/FSs). In 1988, EPA issued a unilateral order to site PRPs to lower the level of water in the lagoon. This action was implemented by the Committee's contractor with EPA oversight.

After the ROD for the Source Control operable unit was issued, additional Notice/ Information request letters were issued and Special Notice letters informing PRPs of the Remedial Design/Remedial Action (RD/RA) Moratorium period were submitted to over 180 PRPs. The Sheridan Site Committee, the Department of Justice (DOJ) and EPA have reached a tentative agreement for Source Control remediation.

EPA will continue its enforcement activities and send Special Notice Letters to PRPs prior to the initiation of the remedial design of the GWMM operable unit. Should the PRPs decline to conduct future remedial activities, EPA will either take enforcement actions or provide funding for these activities while seeking cost recovery for all EPA-funded response actions from the PRPs.

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

In general, there has been a long history of citizen awareness of the Sheridan Disposal Services site. In the early 1970s when incineration at the site resulted in air emissions, people living within a 7-mile radius complained. In 197[illegible] a citizens' group submitted a petition with over 500 signatures to the Texas Water Quality Board calling for its closure. However, community concerns of either the area residents or local officials are now very low, probably because the site has been inactive since 1984. Also the site is relatively remote and there are no residences within a mile.

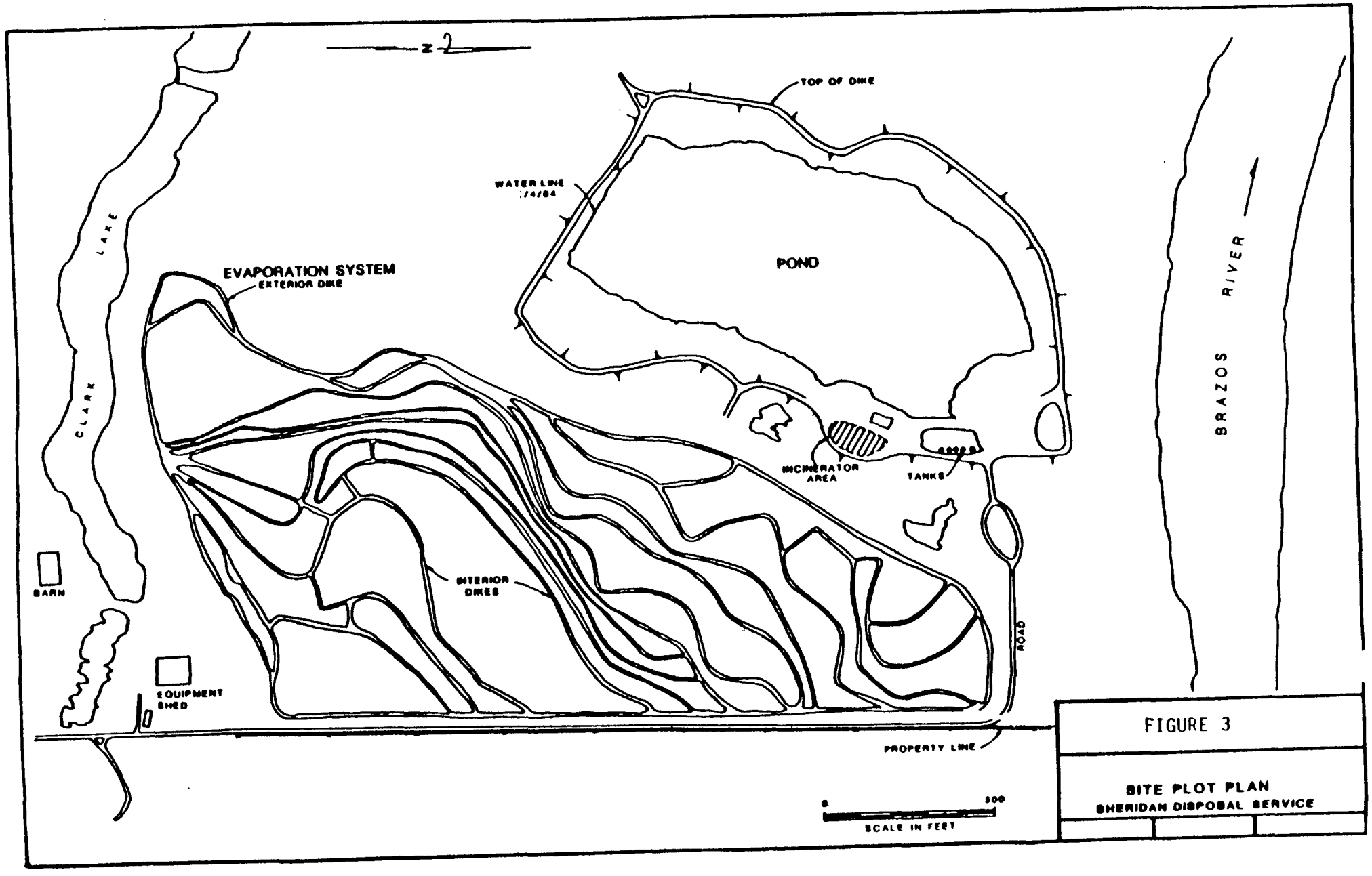

FIGURE 3

SITE PLOT PLAN
SHERIDAN DISPOSAL SERVICE

The proposed plan fact sheet announcing the public comment period and opportunity for a public meeting for the ground water portion of the site was distributed on July 31, 1989. The comment period began on August 14, 1989 and ended on September 11, 1989. No one responded to the offer of a public meeting and none was held. No written comments or questions were received by EPA.

IV. SCOPE AND ROLE OF OPERABLE UNIT

This ROD describes the remedy selection process for the second operable unit, which is known as the Ground Water Migration Management (GWMM) unit. The function of this operable unit is to prevent potential exposure to contaminated ground water and ensure protective levels are maintained in the Brazos River.

The ROD for the Source Control Operable unit at the site was issued in December 1988. The Source Control ROD addressed the risks associated with exposure to contaminated soils and sludges from the site.

V. SITE CHARACTERIZATION

5.1 GEOLOGY

The Sheridan site lies on the Brazos River Alluvium of recent age, which is comprised of gravel, sand, silt and clay deposited by the meandering river. The Brazos River Alluvium unconformably overlies the Miocene-aged Fleming formation. The Fleming is made up of interbedded sand and clay layers. Table 1 provides a general description of the hydrogeologic units present in Waller and Austin counties. However, all formations from the Goliad sand to the Beaumont clay are not present beneath the site.

According to the Austin sheet of the Geologic Atlas of Texas, no faults with surface expression occur in the vicinity of the site. Field investigations conducted by the responsible parties' contractor verified this conclusion. The Hockley escarpment and salt dome are found about 18 miles south of the site and the Millican fault zone lies approximately 20 miles to the north. However, there is no evidence that these features influence the hydrogeology of the site.

5.2 HYDROGEOLOGY

The alluvium of the Brazos River forms the first Regional aquifer beneath the site. The Evangeline and Jasper aquifers underlie the alluvium. Most wells in the vicinity of the site tap the Evangeline aquifer, which is about 450 feet thick beneath the site.

Figure 4 describes a general cross-section of site hydrogeology. The first water-bearing unit, which is referred to as the shallow aquifer, is identified in the cross-section as Stratum B. This aquifer is part of the sediments of the Brazos River Alluvium. The second water-bearing unit, know as the deep aquifer, is identified as Stratum D. This unit is part of the Evangeline aquifer. The clay layer know as Stratum E lies beneath the confined aquifer at about 100 feet in depth and was the deepest unit investigated at the site.

Table 1

Geologic description and water-bearing properties of the geologic units forming the aquifers in Austin and Waller Counties

Aquifer	Stratigraphic unit	Estimated thickness in area (feet)	General composition in Austin and Waller Counties	Surface expressions	Water-bearing properties in Austin and Waller Counties
Alluvial	Tributary alluvium and flood-plain alluvium of the Brazos River	0- 80	Unconsolidated gray, brown, and reddish-brown clay, silt, and sandy clay, commonly overlying light-colored sand or coarser-grained sand and gravel.	Occurs along the banks of smaller streams and in the flood plain of the Brazos River. Nearly flat plain. Forms reddish to dark-brown and black soils.	Yields small to large amounts of fresh water in the flood plain of the Brazos River.
Evangeline	Beaumont Clay	0- 75	Mottled red, reddish-brown, brown and gray, dense clay with white calcareous nodules. May contain lenses of fine and medium-grained sand or sand and gravel in places.	Occurs only along the fringes of the Brazos River flood plain. Forms nearly flat, narrow plain. Soils are gray to black, blocky.	Yields small to moderate amounts of water to scattered shallow wells less than 100 feet deep along the edge of the Brazos River flood plain.
	Montgomery Formation	0- 407	Light gray to light brown, fine-grained sand, silt, and clay, probably grading with depth to darker-colored coarser sand and in places basal sand and gravel.	Nearly flat, featureless plain; soils are light colored, fine-grained sandy. Occurs only along southern edge of area.	Yields small amounts of water to scattered shallow wells.
	Bentley Formation	0- 507	Alternating beds of reddish-brown to yellow and gray, mottled clay interbedded with grayish, fine- to coarse-grained sand and gravel lenses. Scattered lentils of lime-cemented sandstone. Clay, sandy clay, and fine sand predominate in the upper part, darker-colored coarser sand and gravel in the lower part.	Forms flat plains in the southern one-third of the counties; most of the rice-growing area is on the outcrop. Forms light-colored sandy loam soils.	Contributes small to moderate amounts of fresh water to domestic wells in the southern part of the area; probably represented by the uppermost sands screened in these wells.
	Willis Sand	0- 240?	Alternating beds of mottled red, yellow, brown, and gray clay and sand with scattered lenses unsorted sand and quartz gravel. Ferruginous nodules common. Packed and hard in fresh exposures. Basal part is usually a hard, gravelly sand and clay.	Forms the gently-rolling sand hills of northern Waller County and central Austin County. Most of the gravel pits in Austin County are in the basal Willis. Forms tan sandy soils.	Yields small to large amounts of fresh water to wells.
	Goliad Sand	0- 840?	White to gray, sticky, calcareous clay with interbedded lenses of light-colored, gravelly sand and lime-cemented sandstone. Black chert grains in the whitish sand give a salt and pepper effect.	Occurs as isolated surface exposures because the Goliad is overlapped by the Willis Sand or is easily removed by erosion. Forms gray, sticky soils. Usually occurs along valley bottoms and walls.	Yields large amounts of fresh water to wells.
	Fleming Formation	0-1,700	Interbedded clay and sand; clay predominantly in the upper part. The blocky, dense clay is various shades of gray, yellow, olive, and brown. White calcareous nodules are common. Sand is gray to brown, brown, interbedded with gray clay. Sand is medium to fine grained and often cross-bedded.	Forms the rolling and dissected topography of northern Austin County. Forms gray to black loam and sandy loam soils.	Yields small to large amounts of fresh to slightly saline water.
Burkeville Aquiclude					
Jasper	Catahoula Sandstone	?	Alternating beds of gray clay, tuff, and sand. Lower sands may be hard, white, and have opaline appearance.	Does not crop out in Austin or Waller Counties. Difficult to distinguish from overlying Fleming Formation in both surface exposures and in well logs.	May yield small amounts of fresh water in the most northern part of Austin County. Generally water is at least slightly saline.
	Undifferentiated	—	Alternating beds of gray sand, sandstone, and shale.	Does not crop out in Austin or Waller Counties.	Would yield only saline water.

Source: Texas Water Development Board, Report 68

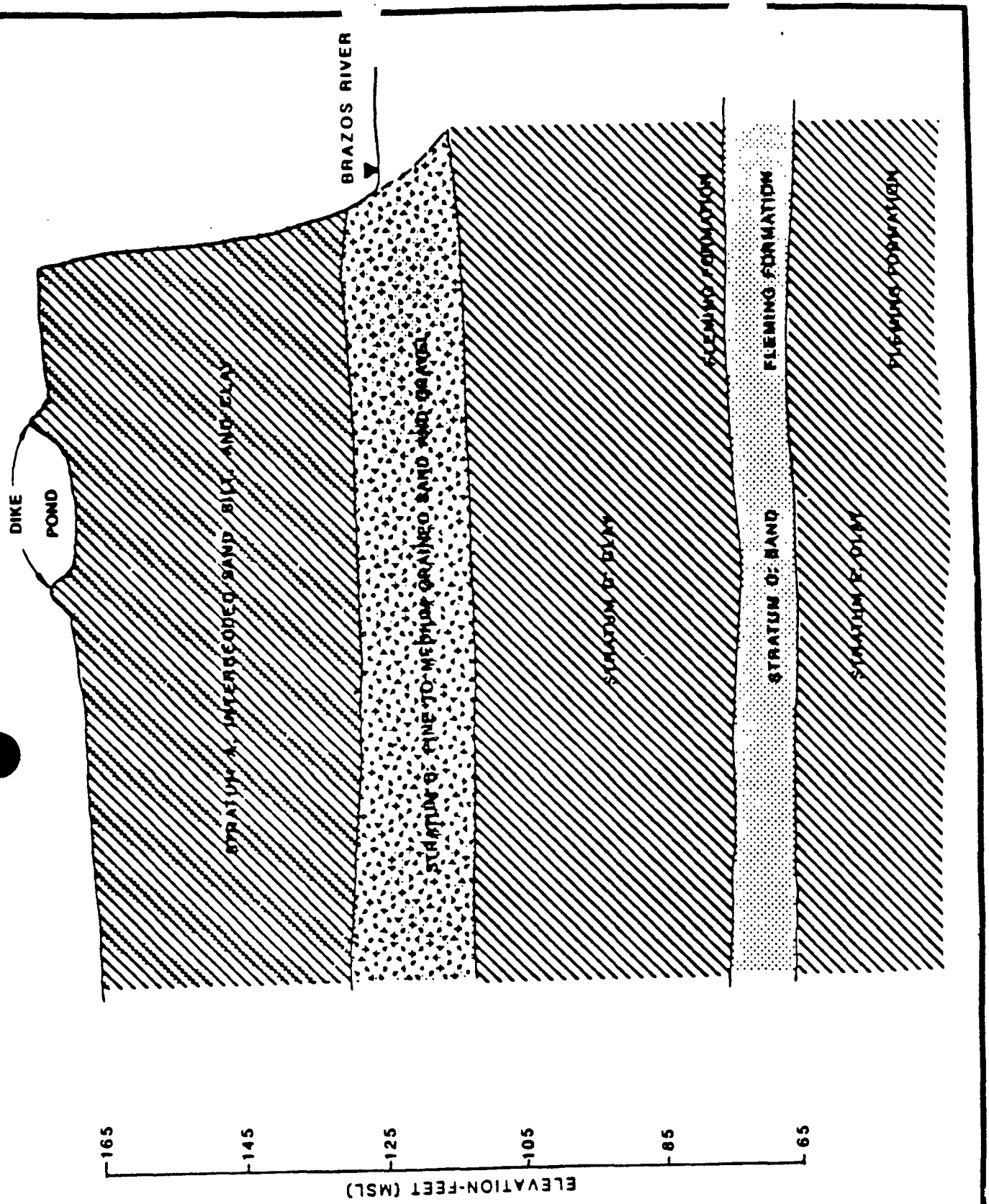

FIGURE 4

GENERAL SCHEMATIC SITE GEOLOGY

SHERIDAN DISPOSAL SERVICE

Ground water in the water table and confined aquifers generally flows towards the river, in a northwestern direction. However, during high river stage conditions (less than about one third of the time) ground water flow in the water table aquifer may shift to the west and south. The predominant vertical hydraulic gradient is upwards from the confined aquifer towards the water table aquifer.

5.3 SAMPLING RESULTS

A. Soil and Sludge

The results of the soil and sludge sampling may be found in the site Source Control RI/FS and risk assessment. Both organic and inorganic (metal) contaminants were detected at the site. The most significant contaminants in terms of toxicity and mobility are PCBs, benzene, toluene and trichloroethylene. A summary of this information is found in EPA's ROD dated December, 1988.

B. Surface Water

Sampling of the Brazos River downstream and upstream of the site indicated that there was no measureable difference in water quality between the downstream and upstream samples. Sediment samples were also obtained from the river bottom at locations downstream and upstream of the site. Concentrations of organic constituents indicated that the site had not impacted the sediment however, concentrations of metals were slightly higher in the downstream sample than the upstream sample. Analyses of Clark Lake water and sediments do not exhibit elevated levels of site contaminants.

C. Ground Water

Over thirty wells have been installed at the site in both the shallow and deep aquifers to determine the extent of contamination and evaluate site hydrogeology. Table 2 shows the highest levels of contaminants detected in the shallow wells to date and Figure 5 illustrates the extent of contamination in the shallow aquifer. No contamination has been detected in the deep aquifer. The only significant group of contaminants identified in the shallow ground water are volatile organics. However, the Maximum Contaminant Level (MCL) for arsenic was exceeded in one well by .01 ppm during one sampling period. The highest concentration of contaminants detected during recent sampling was benzene, at 130 ppb.

D. Air

Extensive air sampling has been completed at the site. No priority pollutant constituents were detected at concentrations above ambient background levels.

VI. SUMMARY OF SITE RISKS

The assessment of risk posed by the Sheridan site was evaluated in the Sheridan Risk Assessment. This assessment examined the amount, concentration, properties, and environmental fate and transport of chemical found at the site; the populations and environments potentially at risk; exposure

Table 2

Summary of Highest Levels of Contaminants Detected in Shallow Ground Water
for
SHERIDAN DISPOSAL SERVICES SITE

Well Number:		MW3	MW12	MW34	MW37	MW38	MW39
Sampling Dates:		6/84	Upgradient 4/89	10/87 (4/89)	10/87 (4/89)	10/87 (4/89)	10/87 (4/89)
Contaminant	Units						
Benzene	ppb	ND	ND	27 (130)	ND	ND	ND
Tetrachloroethylene	ppb	ND	ND	ND	13 (18)	21	ND
Trans-1,2 dichloroethylene	ppb	ND	ND	25 (30)	5.2 (6.1)	43	ND
Trichloroethane	ppb	ND	ND	15 (14)	ND	13 (10)	ND
Chlorodibromomethane	ppb	11	ND	ND	ND	ND	ND
Chloroform	ppb	60	ND	ND	ND	ND	ND
Dichlorobromethane	ppb	63	ND	ND	ND	ND	ND
1,1,1-trichloroethane	ppb	11	ND	ND	ND	ND	ND
Isophorone	ppb	30	ND	ND	ND	ND	ND
Arsenic	ppb	NA	ND	ND	ND	ND	43 (60)
Copper	ppb	NA	78*	ND	ND	6	8
Selenium	ppb	NA	ND	ND	ND	ND	ND

ND - Not detected, detection limits differ slightly for each sampling event

NA - Not Analyzed

* Anomolously high levels of copper were detected in upgradient wells in April 1989. Since copper is not a site contaminant and it was found in highest concentrations in upgradient locations distant from the waste areas, it is thought to result from sampling apparatus, off-site hydrocarbon recovery operations, or landowner activities.

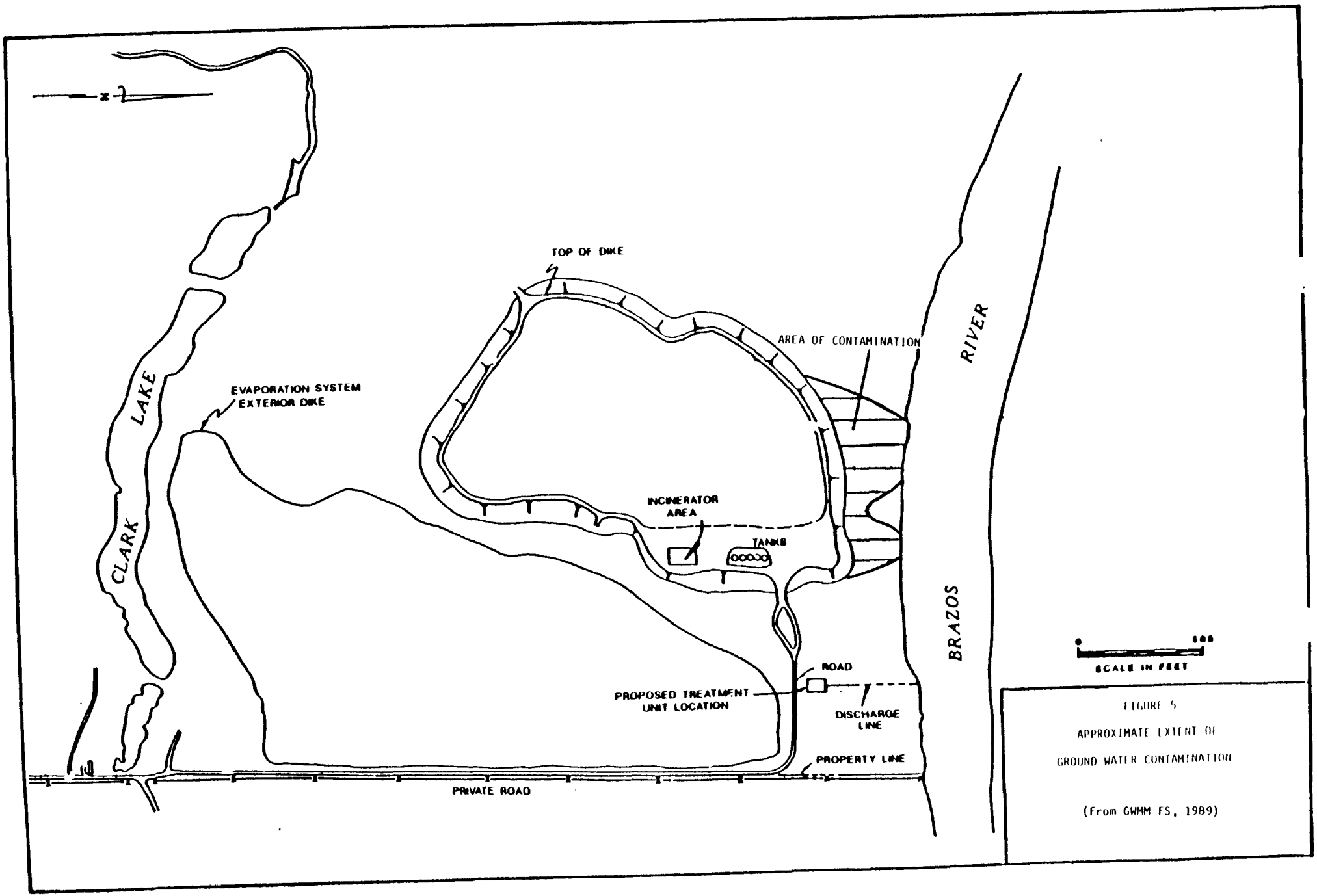

FIGURE 5

APPROXIMATE EXTENT OF

GROUND WATER CONTAMINATION

(From GWMM FS, 1989)

pathways; and potential exposure events. The document described the risks associated with current and future (probable and worst-case) exposure scenarios. The numerical cancer risk values discussed below are theoretical quantifications of the excess lifetime cancer risk, that is, the increased probability of contracting cancer as a result of exposure to wastes, compared to the probability if no exposure occurred. For example, a 10^{-6} excess cancer risk represents an exposure that could result in one extra cancer case per million people exposed.

Three scenarios were developed in the site risk assessment. The first scenario evaluated is for current conditions which assume restricted site access and maintenance of the site. The second scenario addresses the risks associated with the most probable future land use conditions. These conditions assume continued agricultural (rangeland) use and unrestricted access to wastes. The third scenario describes the risks associated with the worst-case future scenario of residential development adjacent to the waste areas.

Under current conditions which assume restricted site access and maintenance of the site, the only potentially significant pathway is migration of contaminants into the Brazos River. This pathway was modelled using very conservative assumptions, resulting in an upper bound excess cancer risk from the ingestion of PCBs in fish of 1.5×10^{-5} (1.5 excess cancer cases per 100,000 people exposed). Modelling using less conservative assumptions indicated that the 1×10^{-6} excess cancer risk would not be exceeded. However, it should be noted that both models assume essentially all of the source will leach into the ground water over time; This is not expected to occur since the majority of contamination will be addressed by the Source Control remedy.

The second scenario evaluated was the most probable future land use which assumed continued agricultural (rangeland) land use and unrestricted access to the waste disposal area. This scenario differs from the first only with regard to exposure to lagoon sludges which is addressed in the Source Control ROD. Therefore, the risks associated with this scenario are identical to the first.

The last scenario evaluated in the Risk Assessment is the worst-case scenario of residential development adjacent to the waste areas. The pathway previously described for the current-use scenario of migration of contaminants into the Brazos River would be similar in the residential scenario. However, an additional exposure pathway of ingestion of contaminated ground water would result in a total excess cancer risk greater than 1×10^{-3} as well as a significant non-carcinogenic risk posed by phenol (Hazard Risk [1] of 15). Phenol is potentially the most significant non-carcinogenic contaminant which could could impact ground water.

The preceding paragraphs describe potential impacts to human health. Analyses of water and sediments in the Brazos River indicate that the ground water is not adversely impacting potential environmental receptors in the Brazos River.

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[1] The risk for a non-carcinogenic compound is described by a Hazard Index. A hazard index is the ratio of the contaminant concentration to EPA's reference dose for the contaminant. A value greater than one indicates that the ambient concentration of a contaminant is higher than the acceptable reference dose, and may be significant.

The actual or threatened releases of hazardous substances from the site described above, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

VII. ALTERNATIVE EVALUATION

7.1 EVALUATION CRITERIA

In accordance with Section 121 (a), (b), and (d) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC Section 9621(a)(b) and (d), EPA has determined that nine factors must be considered in selecting a remedy for a Superfund site. Two of the criteria, Protection of Human Health and the Environment and Consistency with Other Laws, are known as Threshold Criteria which must be met. Long-term Effectiveness and Permanence, Reduction of Toxicity, Mobility, or Volume, Short-term Effectiveness, Implementability and Cost are considered to be Primary Balancing Criteria. Modifying Criteria include State Acceptance and Community Acceptance. These criteria are summarized below:

A. Overall Protection of Human Health and the Environment

Following the analysis of the remedial options against individual evaluation criteria, the alternatives are assessed from the standpoint of whether they provide adequate protection of human health and the environment.

B. Consistency with Other Environmental Laws

In determining appropriate remedial actions at Superfund sites, consideration must be given to the requirements of other Federal and State environmental laws, in addition to CERCLA as amended by SARA. Primary consideration is given to attaining applicable or relevant and appropriate Federal and State public health and environmental laws and regulations and standards. Not all Federal and State environmental laws and regulations are applicable to each Superfund response action. The compliance of each remedial alternative with all applicable or relevant and appropriate environmental laws is discussed in Appendix C.

C. Long-term Effectiveness and Permanence

Alternatives are assessed for the long-term effectiveness and permanence they afford along with the degree of certainty that the remedy will prove successful. Factors considered are:

- Magnitude of residual risks in terms of amounts and concentrations of wastes remaining following implementation of a remedial action, considering the persistence, toxicity, mobility, and propensity for bioaccumulation of such hazardous substances and their constituents;

- type and degree of long-term management required, including monitoring and operation and maintenance;

- potential for exposure of human and environmental receptors to remaining waste considering the potential threat to human health and the environment associated with excavation, transportation, redisposal, or containment;

- o long-term reliability of the engineering and institutional controls, including uncertainties associated with the land disposal of untreated wastes and residuals; and

- o potential need for replacement of the remedy.

D. Reduction of Toxicity, Mobility or Volume

The degree to which alternatives employ treatment that reduces toxicity, mobility or volume must be assessed. Relevant factors include:

- o the treatment processes the proposed solutions employed and materials they treat;

- o the amount of contaminated materials that will be destroyed or treated;

- o the degree of expected reduction in toxicity, mobility, or volume;

- o the residuals that will remain following treatment, considering the persistence, toxicity, mobility, and propensity for bioaccumulation of such hazardous substances and their constituents.

E. Short-term Effectiveness

The short-term effectiveness of an alternative must be assessed considering the following:

- o Magnitude of reduction of existing risks; and

- o short-term risks that might be posed to the community, workers, or the environment during the implementation of an alternative including potential threats to human health or the environment associated with excavation, transportation, and redisposal or containment.

F. Implementability

The ease or difficulty of implementing the alternatives are assessed by considering the following factors;

- o Degree of difficulty associated with constructing the solution;

- o expected operational reliability of the treatment technology;

- o need to coordinate with and obtain necessary approvals and permits (or meet the intent of any permit in the case of Superfund actions);

- o availability of necessary equipment and specialists; and

- o available capacity and location of needed treatment, storage, and disposal services.

G. Cost

The types of costs that should be assessed include the following:

- o Capital costs;
- o operation and maintenance costs;
- o net present value of capital and operation and maintenance cost; and
- o potential future remedial action costs.

H. State Acceptance (through the Texas Water Commission)

Evaluation includes assessment of:

- o Components of remedial alternatives that the State supports;
- o features of the alternatives about which the State has reservations; and
- o elements of the alternatives which the State strongly opposes.

I. Community Acceptance

This assessment should evaluate:

- o Components of remedial alternatives that the community supports;
- o features of the alternatives about which the community has reservations; and
- o elements of the alternatives which the community strongly opposes.

EPA is also directed by SARA to give preference to solutions that utilize treatment to remove contaminants from the environment. Offsite transport and disposal without treatment is the least preferred option where practicable treatment technologies are available.

7.2 DESCRIPTION OF ALTERNATIVES

In conformance with the National Contingency Plan (NCP), initial remedial approaches were screened to determine which might be appropriate for this site (see the Sheridan Disposal Services GWMM Feasibility Study for details of this evaluation). From these possible remedies, three were chosen for more detailed evaluation and comparison with the remedy selection criteria outlined above. In addition, "No Action" was evaluated to comply with the requirements of the NCP. Each remedy is summarized below.

All of the alternatives have some parts in common. They all require ground water monitoring to track the position of the plume of contamination. Additionally, all alternatives include the use of institutional controls to prevent the use of contaminated ground water. Finally, in the two alternatives which involve ground water treatment, ground water will be treated to meet ARARs and discharged into the Brazos River.

Alternative 1 - Natural Attenuation

This alternative relies on lowering contaminant concentration through natural processes such as sorption, dispersion and biodegradation. Surface water monitoring in the Brazos River will also be conducted to ensure that protective levels are maintained in the river. It will require a minimum of thirty years for contaminants at the upgradient edge of the plume to move through the hydrogeologic system. The cost of this alternative is approximately $326,000.

Alternative 2 - Partial Slurry Wall with Ground Water Treatment

This alternative involves the construction of a 65 foot deep low permeability slurry wall at the downgradient edge of the contamination plume (Figure 6). The slurry wall will intercept contaminated ground water and channel it towards extraction wells located at the center and ends of the slurry wall. Contaminants in the extracted ground water will be treated onsite by passage through a granulated activated carbon (GAC). It is expected to take approximately 25 years for ground water at the upgradient edge of the plume to reach the slurry wall for recovery and treatment. The cost of this alternative is approximately $4.2 million dollars.

Alternative 3 - Recovery Wells with Ground Water Treatment

This alternative involves placement of a line of wells near the downgradient edge of the contamination plume (Figure 7). Ground water will be extracted by these wells and treated onsite by passage through GAC. It is expected to take about 25 years for contaminated ground water at the far edge of the plume to be recovered by the wells and treated. The cost of this alternative is estimated to be about $5.3 million dollars.

It should be noted that the cleanup timeframes described for the alternatives described above are based on the time necessary to move one pore volume of contaminated ground water through the aquifer and do not account for desorption of contaminants bound to the aquifer. These timeframes will be considerable longer (i.e., 90 years) since additional pore volumes of ground water are expected to be necessary to remove contaminants bound to the aquifer.

Alternative 4 - No Action

The No Action alternative does not provide for any capital improvements or other activities to address the ground water contamination. With no action, potential exposure to contaminated ground water is not prevented and potential impacts on the river not controlled. However, Superfund regulations require that this alternative be evaluated as a basis for comparison to other alternatives.

7.3 EVALUATION OF ALTERNATIVES

The following values were assigned to compare remedial selection criteria:

"+" Alternative should exceed a criterion in comparison to other alternatives.
"." Alternative should meet the selection criterion.
"-" Alternative will not meet a criterion, or will not meet a criterion as well as other alternatives.

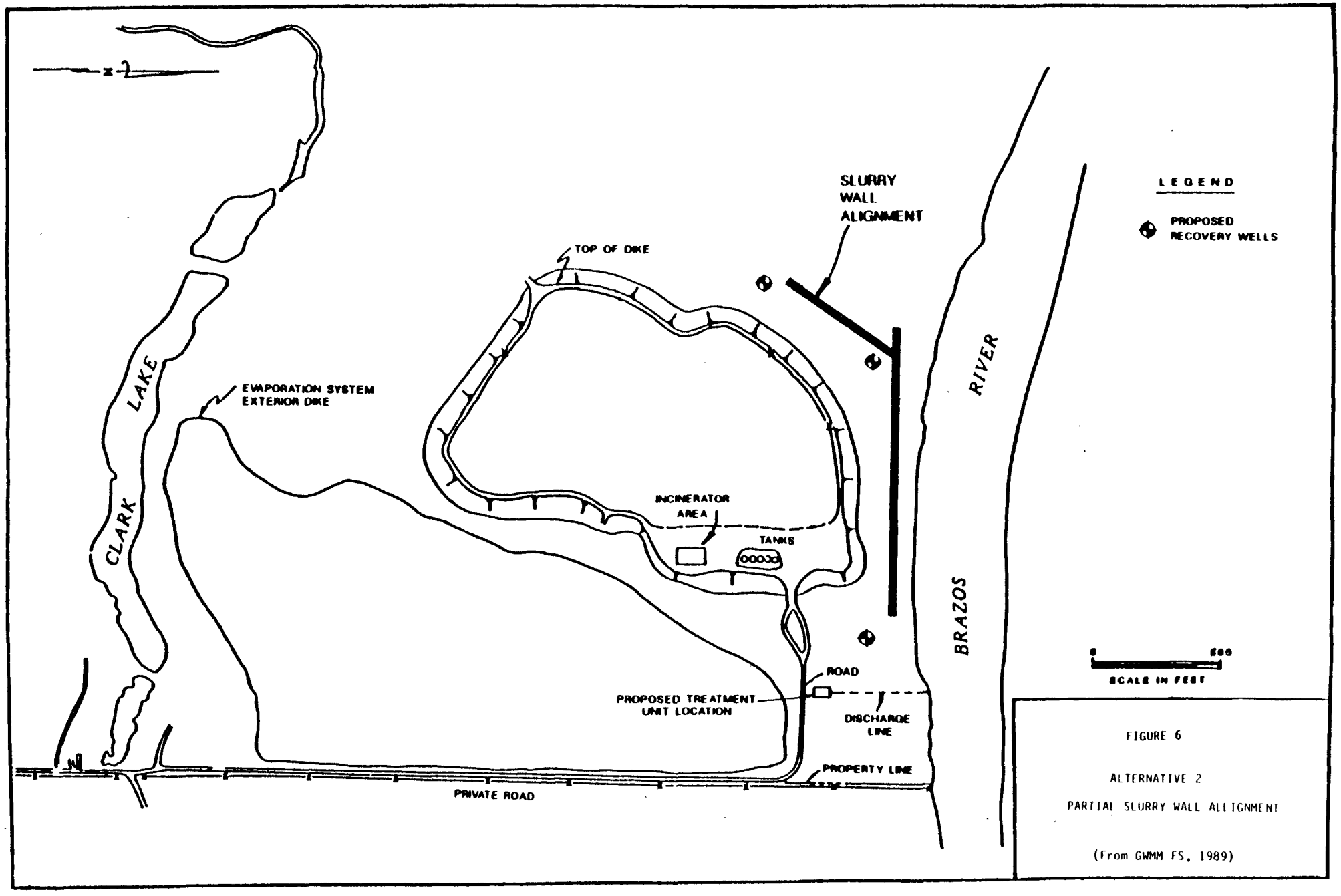

FIGURE 6

ALTERNATIVE 2

PARTIAL SLURRY WALL ALIGNMENT

(From GWMM FS, 1989)

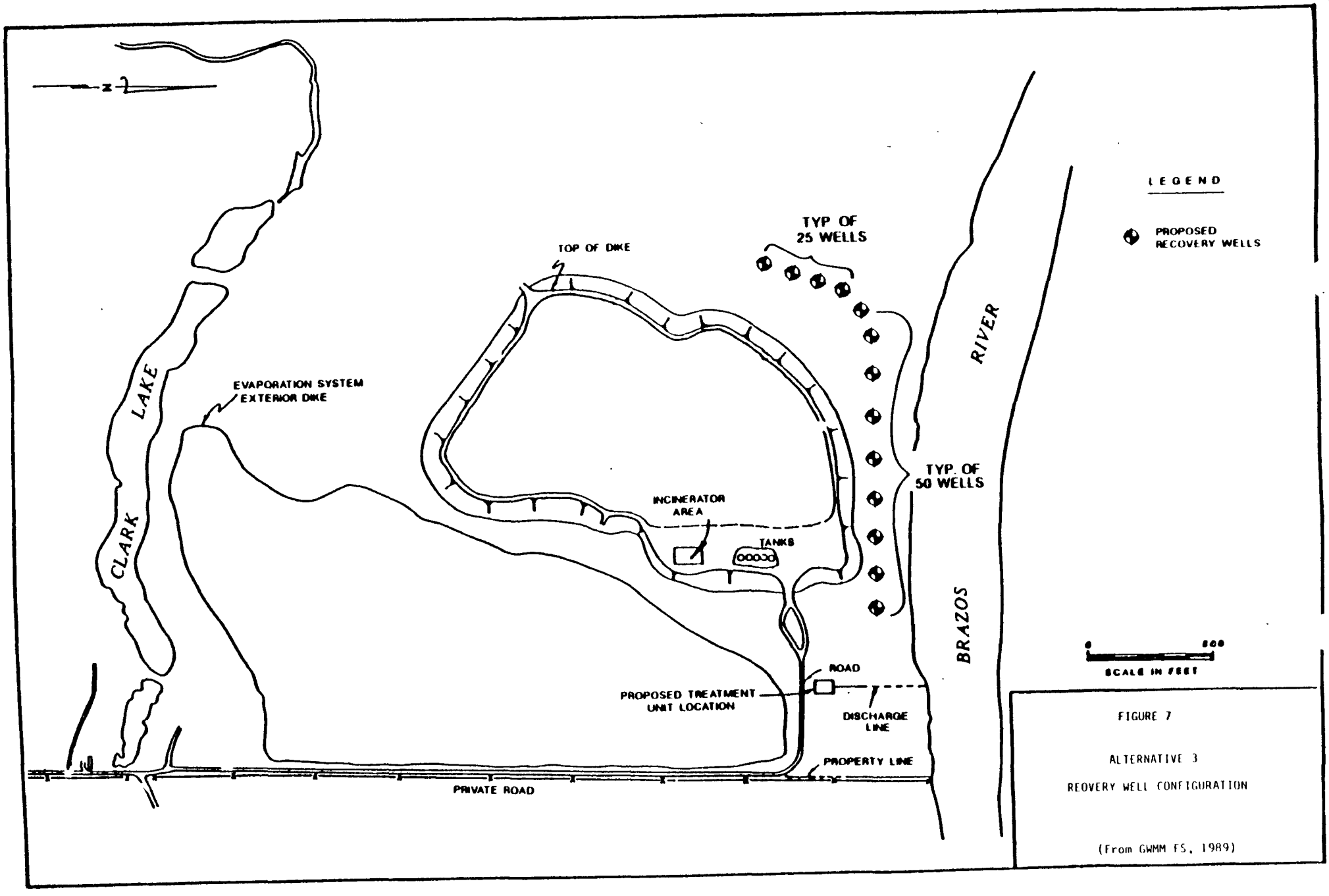

FIGURE 7

ALTERNATIVE 3

REOVERY WELL CONFIGURATION

(From GWMM FS, 1989)

The rationale for the ratings assigned each alternative is presented in the following subsections.

A. Compliance with Applicable or Relevant Appropriate Requirements (ARARs) of Other Laws

The No Action Alternative is accorded a rating of "-" due to the inability to monitor the ground water and determine whether ARARs are continuing to be met for the long term. The Alternatives 1, 2, and 3 all meet ARARs and are rated ".".

B. Reduction of Mobility, Toxicity and Volume

The processes of natural attenuation such as biodegradation, sorption and dispersion, may reduce the toxicity, mobility and volume of waste constituents For this reason, Alternatives 1 and 4 are ranked ".". The alternatives which involve ground water recovery (Alternatives 2 and 3) include ground water treatment and thus reduce the mobility, toxicity and volume of the ground water. These alternatives are given a rating of "+". However, it should be noted that at the design flow rate and composition of the treatment scheme proposed for Alternatives 2 and 3, less than eight pounds of total contaminants would be removed in the first year and this quantity would very likely decrease with time.

C. Long-Term Effectiveness and Permanence

The No Action alternative is ranked "-" due to the inability to monitor whether ARARs are continuing to be met or prevent the use of contaminated ground water for the long term. In the long-term, the concentrations of constituents will be reduced by natural processes, therefore Alternative 1 is accorded a ranking of ".". Alternatives 2 and 3 will be slightly more effective at reducing the concentrations of constituents in the long-term. Therefore, both 2 and 3 are rated "+".

D. Short-Term Effectiveness

The No Action alternative is ranked "-" due to the inability to prevent ground water use before attenuation takes place. The Natural Attenuation Alternative, for the short-term, is equally effective as Alternatives 2 and 3 since the institution of controls will prevent exposure to contaminated ground water. For this reason, Alternative 1 is ranked ".". However, alternatives 2 and 3 will cause onsite workers to be exposed to additional potential risk since these alternatives include active construction and operation activities. Therefore, Alternatives 2 and 3 are ranked "-".

E. Implementability

Alternative 1 and 4 would be the most easily implemented and are rated "+". Between the remaining alternatives, Alternative 3 is more easily implemented than 2. Alternative 3 is rated ".", since it requires construction of wells and a treatment plant. Alternative 2, partial slurry wall with ground water treatment, is rated "-" due to the difficulties in constructing a slurry wall considering the site constraints. Site constraints include a narrow strip of land for access, the fact that a trench of 65' depth is beyond the

reach of normal trenching equipment and a new working "bench" would need to be constructed.

F. Cost

Table 3 summarizes the cost of the alternatives as developed in detail in Section 6.3 and Appendix C of the feasibility study. Costs are presented as capital, operation and maintenance, present value and total cost. The No Action and Natural Attenuation alternatives (4 and 1) are the least costly alternat and are both ranked "+". Alternative 2 is intermediate in terms of cost and is rated ".". Alternative 3 is the most costly alternative and is therefore rated "-".

G. Overall Protection of Human Health and the Environment

The No Action alternative is ranked "-" due to the inability to prevent potential use of affected ground water and lack of monitoring. Alternative 1 is ranked "." since the seepage of ground water into the Brazos River under current and projected future conditions will result in concentration levels which are protective of human health and the environment. In addition, institutional controls would effectively prevent use of the affected ground water. Alternatives 2 and 3 are equivalent to Alternative 1 in terms of overall protection of human health and the environment and are therefore rated ".". The reasons for this ranking are discussed below:

The shallow ground water recovery rate is relatively low, therefore withdrawal of one pore volume of ground water will require about 25 years. Since extraction of multiple pore volumes would probably be necessary to achieve drinking water criteria (MCLs), it is anticipated that treatment would continue for some multiple of 25 years. During this relatively long time period, the shallow ground water would not meet drinking water criteria and could not be used as such. Institutional controls would be maintained for this period to prevent potable use of the shallow aquifer. Therefore, Alternatives 1, 2 and 3 all require long-term institutional controls to prevent use of the shallow aquifer.

H. Community Acceptance

The community has voiced limited support for the Natural Attenuation alternative and has not expressed any concerns about the alternative. Therefore natural attenuation is rated "+" and all other alternatives are rated ".".

I. State Acceptance

The State of Texas, through the Texas Water Commission, has indicated that they have no objection to the selected alternative. Therefore, Natural Attenuation is rated "+" and all remaining alternatives are rated "0".

J. Summary of Comparative Analysis

As described above, alternatives 1, 2 and 3 are fully protective of public health and the environment. All of the alternatives except No Action could also be implemented to comply with all ARARs. With regard to the balancing

TABLE 3

Alternative Costs (in thousands)

	Alternative	Capital Cost	Operation and Maintenance	Present Value Cost	Total Cost
1.	Natural Attenuation	-0-	$326	$194	$326
2.	Partial Slurry Wall with Ground Water Treatment	$850	$3,346	$2,428	$4,196
3.	Recovery Wells with Ground Water Treatment	$1,095	$4,234	$3,073	$5,329
4.	No Action	-0-	-0-	-0-	-0-

criteria, alternatives 2 and 3, make a slight reduction of toxicity of the affected ground water, but the reduction is very small, and the resulting decrease in surface water concentrations would not be detectable. Furthermore, these alternatives concentrate waste constituents on GAC, which must eventually be disposed of. The more costly alternatives (Alternatives 2 and 3), are generally more difficult to implement and may pose more short-term risks to onsite workers. Finally, Alternatives 2 and 3 will not appreciably decrease the time necessary to achieve MCLs.

VIII. SELECTED REMEDY

Based on the information provided in the administrative record and the results of the evaluation of alternatives (Section 5.3), the "final" remedy has been selected. It is EPA's judgement that Alternative 1, Natural Attenuation, best satisfies both the statutory and selection criteria in comparison to the other alternatives evaluated in this document. This remedy is consistent with the remedy selected for the Source Control operable unit.

8.1 DESCRIPTION OF SELECTED REMEDY

A. Establish Alternate Concentration Limits (ACLs) as the Ground Water Protection Standard

EPA has selected ACLs as the apprpriate ground water standard for the site as long as the conditions set forth below remain valid. ACLs are ground water protection standards that are used to assure that hazardous constituents found in the ground water do not pose a risk to human health or the environment. To ensure that ACLs remain protective, the following conditions must continue to be met at the site:

a. The Brazos River must remain the discharge point for ground water from the site.

b. The Brazos River cannot be adversely impacted by the discharge of contaminated ground water into the river. Presently, no adverse impacts to the river from the site have been observed. To ensure that future adverse impacts from the site do not occur at the point of exposure for environmental receptors in the river, river water will be sampled to ensure that there is no statistically significant increase in contamination, as compared to upgradient locations.

c. The ground water use restrictions outlined below must be implemented and continued to ensure that affected ground water is not consumed and the integrity of the Brazos River as a hydraulic barrier to ground water flow is maintained.

If any of these conditions change, the situation will be reevaluated and appropriate action taken. The specific provisions for setting the ACLs are outlined below.

ACL Contaminants and Concentrations

EPA has set ACLs for the contaminants detected in the ground water in order meet drinking water criteria in the Brazos river. These values were calculated by determining the volume of affected water entering the river at any time and factoring in the dilution which would occur in the river at historical low flow conditions.

These ACLs are listed below:

Compound	ACL (ppm)
Benzene	26
Tetrachloroethylene	41
Trans-1,2 dichloroethylene	26
Trichloroethylene	26
Arsenic	260

If additional contaminants are detected in the ground water in the future, ACLs will be developed for them using the methodology described in the F.S.

Point of Compliance

The point of compliance is the location where ACLs must be met and is also the well location where ACLs are monitored. At the point of compliance, ACLs will be met at concentrations that ensure that human health and the environment are protected at the point of exposure and that no statistically significant increase in contamination occurs in the river.

The specific locations for the point of compliance monitoring, based on the existing position of the ground water plume, are around the boundary of the lagoon and are designated as well numbers 34 and 35 as illustrated in Figure 8. If the plume position changes additional compliance points may be identified.

Point of Exposure

A point of exposure is a location where environmental or human receptors may be exposed to or use ground water. Exposure to ground water at that point cannot result in an endangerment to human health or the environment. At the Sheridan site, the point of exposure will be the interface of ground water and the Brazos River (i.e., where offered ground water comes into contact with the river). It will be monitored by the collection of water samples from the Brazos River at the projected point, or points of entry of affected ground water from the site.

Ground Water Use Restrictions

Ground water use at the site will be restricted to ensure that contaminated ground water is not consumed and that the hydraulic barrier that the Brazos River provides is not affected. Ground water use onsite will be restricted within a minimum of 100 feet from the edge of the plume of contaminated ground water. In addition, the use of any well (other than that employed as part of a corrective action) which could potentially affect the size or position of the plume of ground water contamination is prohibited.

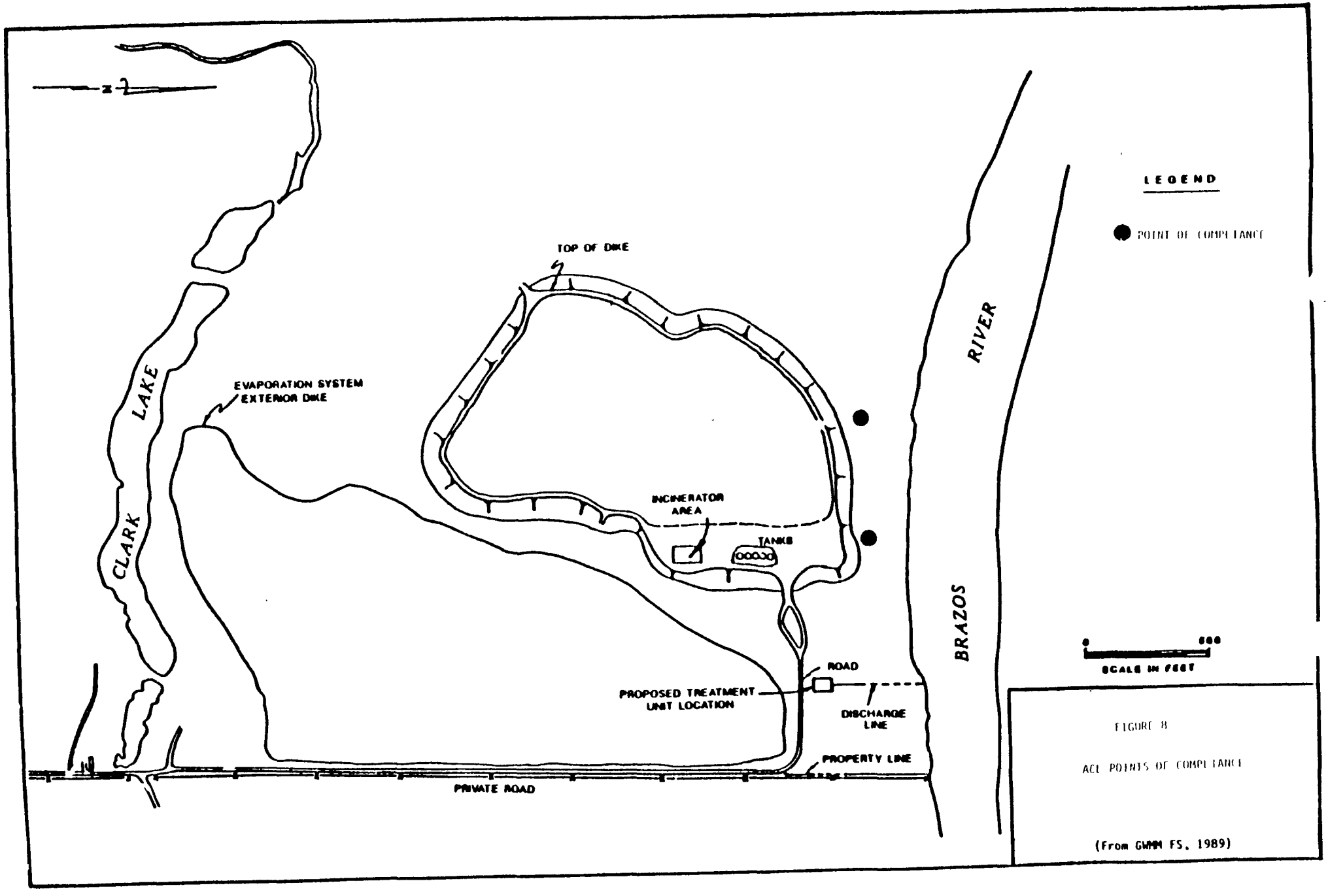

FIGURE 8

ACL POINTS OF COMPLIANCE

(From GWMM FS, 1989)

The ground water use restrictions which will be implemented are deed notices recorded in the county clerks office. These restrictions are expected to be reliable and effective for the following reasons.

1. The area of attainment (ground water contamination plume exclusive of the area beneath the lagoon) is limited to a narrow strip of land between the waste lagoon and the river, and is located entirely onsite, on the land owner/former operator's property.

2. The yield of the aquifer is too low to be of agricultural use, which is the most likely potential use.

3. The land owner/former operator is a signatory to a proposed Consent Decree which states that he will not take any actions at the site without getting prior written Consent from EPA. In addition, the terms of any sale of the site property must contain a provision requiring compliance with the consent decree.

4. There will be, at the minimum, annual monitoring of site conditions to verify that the restrictions are effective.

EPA has enforcement authority to ensure that the remedy selections for the source control and GWMM operable units are implemented and that no one interferes with remedy implementation. If any of the conditions listed above should change, the existing situation will be evaluated and appropriate action will be taken to prevent potential use of contaminated ground water.

Ground Water Monitoring

Ground water will be monitored to ensure compliance with ACLs and the three conditions listed at the beginning of Section 8.1. Compliance monitoring will be conducted quarterly for the first year. The frequency of monitoring may then be modified by EPA.

The first time an ACL for a particular contaminant is exceeded, the well will be resampled. If the second analysis confirms that the ACLs are being exceeded, EPA will determine whether the corrective action program outlined below will be implemented.

Finally, additional wells will be monitored quarterly to ensure that the Brazos River continues to act as a discharge point and hydrological barrier to ground water flow. The monitoring frequency of these wells may be modified by EPA.

Surface Water Monitoring

The surface water from the Brazos River will be monitored to ensure that there is no statistically significant increase in contamination due to the ground water recharge to the River. Samples will be obtained in the river immediately adjacent of the point of projected entry of effected ground water and upgradient of the site.

B. Corrective Action and Contingency Planning

In the event ACLs are exceeded, if any of the three conditions outlined at the beginning of section 8.1.A. are not met, or if changes in receptors

40 C.F.R. §264.100 will be implemented. As part of the design of the remedial action, a corrective action contingency plan will be developed. Under the corrective action program, contaminated ground water will be extracted and treated, or other necessary and appropriate action will be undertaken, to reduce contaminant levels to ensure that ACLs are not exceeded at the compliance point and that the remedy is protective of human health and the environment at the point of exposure.

If ground water needs to be treated at the site, different process options, including a combination of treatment technologies, will be considered during the design of the treatment system. The process presented in the FS for the pump and treat alternatives is one possible process configuration that could be utilized. During design of the treatment system, the particular tecology or technologies will be chosen on the basis of performance goals that EPA sets for the treatment system.

C. Monitoring, Operation and Maintenance (MOM)

1. The site will be secured to meet the requirements of 40 C.F.R. §264.14 during post-closure.

2. The ground water monitoring system will be monitored and maintained to comply with the requirements of 40 C.F.R. Part 264, Subpart F.

3. A written MOM plan will be developed to define the activities which will be necessary to ensure the remedy will continue to be effective.

Additionally, because hazardous substances will remain on-site, EPA will re-evaluate this site at least once every five years after the commencement of the remedial action to assure that human health and the environment continue to be protected.

8.2. RATIONALE FOR SELECTION OF THE REMEDY

In accordance with Section 121 of CERCLA, to be considered as a candidate for selection, an alternative must be protective of human health and the environment and attain ARARs. For ground water, attainment of ARARs requires that a ground water protection standard be set at either Maximum Contaminant Levels (MCLs), ACLs or at background levels. To meet the ground water protection standards, both pump and treat and natural attenuation alternatives were evaluated.

Because Alternative #4, No-action, is not protective and does not attain ARARs, it was rejected from further consideration.

The remaining three alternatives, which utilize natural attenuation or ground water recovery and treatment, all meet the statutory threshold criteria of protectiveness and attainment of ARARs. To select among them, EPA focused on other criteria, including: short-term effectiveness, long-term effectiveness, implementability, reduction of mobility, toxicity or volume of waste, community acceptance and State acceptance.

The advantages of the ground water recovery and treatment alternatives is that they will achieve safe levels more quickly and utilize treatment to permanently

reduce the toxicity of contaminants. However, the magnitude of these potential benefits is quite small; the cleanup timeframes are estimated to be about 10-15% (i.e., 75 vs. 90 years) faster than for natural attenuation, and a maximum of eight pounds per year of total contaminants will be treated annually by sorption onto GAC.

The first disadvantage of the ground water recovery and treatment alternatives (Alternatives 2 and 3) is that their operation and maintenance poses greater potential short-term risk to on-site workers during construction and operation of the extraction and treatment systems. Second, Alternative 3 (recovery wells), and to an even greater extent alternative 2 (partial slurry wall), are more difficult to implement than natural attenuation. Third, the costs of alternatives 2 and 3 are between ten and twenty times greater than the costs of natural attenuation. Finally, the State and the community have expressed limited support of the natural attenuation alternative. In light of these considerations, EPA has determined that Alternative 1, Natural Attenuation, best satisfies the nine criteria for remedy selection.

As discussed in the description of the Selected Remedy, the natural attenuation alternative requires the implementation and enforcement of ACLs as the appropriate ground water protection standard for ground water in the area of attainment. The rationale for selection of this standard is described in the paragraphs which follow.

Under RCRA regulations, the ground water protection standard establishes a safe level of contamination in ground water in the vicinity of a waste disposal site. Under these regulations, the protection standard can be set at MCLs, ACLs, or at background levels. ACLs are based on the premise that, although ground water is contaminated around a waste disposal site, at a point where a potential receptor may come into contact with ground water, levels of contaminants are not found at unsafe levels. At locations where exposure to ground water may not be safe, enforceable controls to prevent exposure may be implemented. At the Sheridan site, that basic premise is satisfied. Ground water around the site is contaminated, however, the river and other site features contain and attenuate contamination in the ground water to protective levels and enforceable controls can be implemented.

In addition to the RCRA requirements, under Section 121(d)(2)(B)(ii) of CERCLA, 42 U.S.C. §9612(d)(2)(ii), EPA may not establish ACLs as the ground water protection standard for a Superfund site if human exposure to hazardous constituents will occur beyond the site boundary (as that boundary is defined in the RI/FS), unless EPA had determined that:

a. there are known or projected points where the ground water will enter into the surface water;

b. there is or will be no statistically significant increase in the level of hazardous constituents in the surface water at the points of entry of contaminated ground water into the river.

c. the remedial action includes enforceable remedial measures to preclude human exposure to ground water between the site boundary and all known or projected points of entry.

The RCRA requirements and the CERCLA prerequisites for an ACL are met at the Sheridan site because of the following reasons:

1. The ground water characterization study completed in the RI concluded the Brazos River is a hydraulic barrier. Contaminated ground water from the site discharges into the river. Thus, there are known or projected points where site ground water will enter into the river.

2. Sampling and analysis conducted by EPA indicates that the Brazos River acts as a hydrologic barrier that will tend to dilute and disperse contaminants. Sampling also indicates that there is no statistically significant increase in hazardous constituents in the river which can be attributed to the site.

3. Ground water that is contaminated by the site is not currently used as a source of drinking water. Deed recording, when applied in conjunction with the assumptions described in Subsection 6.1.A., will be used to ensure that contaminated ground water is not consumed.

4. Because the impermeable cap required by the Source Control ROD will prevent infiltration of rainwater into the waste lagoon, flushing of lagoon contaminants into ground water will be significantly decreased in the long-term.

5. The setting of ACLs for individual contaminants at the points of compliance will ensure that human and environmental receptors are not exposed to unsafe levels of contaminants at the points of exposure. In the event an ACL for an individual contaminant is exceeded, corrective action at the site will be implemented consistent with Section 6.1. Thus, setting ACLs provides EPA with an enforceable mechanism that sets into motion corrective action.

ACLs will be effective and protective of human health and the environment in the long-term. Although the development of ACLs as the ground water protection standard will not reduce contaminants in ground water, their enforcement will ensure protection of public health and the environment at each and every point of exposure. Further, the corrective action program will ensure that the remedy continues to be effective.

Alternatives 2 and 3 which call for pumping and treating ground water, are no more protective than the selected remedy because they will still require the implementation of controls to prevent the use of ground water until safe levels are met. Furthermore, site conditions may prevent the attainment of MCLs within a reasonable timeframe. These conditions include 1) the potential for continued leaching of contaminants sorbed to the aquifer (particularly clay layers) 2) the low hydraulic gradient across the site and the potential that capping the lagoon area as required by the Source Control ROD may further reduce these gradients, and 3) the low yield and small radii of influence of pumping wells in the affected aquifer. In view of these conditions, EPA has determined that cleanup to MCLs is not practicable. Therefore, the development and enforcement of ACLs is necessary. However, pumping and treating ground water may be implemented under the corrective action plan to ensure that ACLs are not exceeded.

IX. STATUTORY DETERMINATIONS

Under its legal authorities, EPA's primary responsibility at Superfund sites is to undertake remedial actions which are protective of human health and the

environment. In addition, Section 121 of CERCLA established several other statutory requirements and preferences. These specify that when complete, the selected remedial action for this site must comply with applicable or relevant and appropriate environmental standards established under Federal and State environmental laws unless a statutory waiver is justified. The selected remedy also must be cost-effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes as their principal element.

9.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

The selected remedy protects human health and the environment through the implementation of ground water use restrictions on-site and the enforcement of ACLs to ensure safe levels are maintained at the first point of potential exposure in the Brazos River. The implementation of the selected remedy will effectively reduce any potential excess cancer risk associated with ingestion of contaminated ground water.

9.2 COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)

The selected remedy will attain all applicable or relevant and appropriate federal and state environmental requirements at the site. Federal environmental laws that are applicable or relevant and appropriate to the selected remedial action at the site include the:

- Resource Conservation and Recovery Act (RCRA);
- Clean Water Act (CWA);
- Safe Drinking Water Act (SDWA); and
- Executive Order 11988 (Floodplain Management)

State environmental laws that are applicable or relevant and appropriate to the selected remedial action at the site are:

- Texas Clean Air Act; and
- Texas Administrative Code Relating to State Water Quality Standard

A discussion of how the selected remedy meets those requirements follows.

Ground Water

RCRA ground water protection standards (GWPS), 40 C.F.R. Part 264, Subpart F, are established for constituents entering ground water from a regulated hazardous waste unit. Although RCRA is not applicable to the Sheridan site, the waste lagoon presents problems that are similar to those that the requirements address, and thus, the requirements are relevant and appropriate. Ground water protection standards under the RCRA regulations are set at MCLs, ACLs, or at background levels. Because the Brazos River acts as a hydrologic barrier for site ground water, EPA has determined that ACLs are the relevant and appropriate standards at the site. If hydrogeologic conditions at the site change significantly and contaminated ground water was to no longer discharge to the Brazos then MCLs, promulgated pursuant to the Safe Drinking Water Act, are ARARs. These standards

are relevant and appropriate for ground water at the point where exposure to ground water may occur.

Surface Water

The reach of the Brazos River adjacent to the site is classified by the State as suitable for public water supply and recreational use. Therefore, MCLs and State and Federal Water Quality Criteria promulgated pursuant to the Clean Water Act are relevant and appropriate in the Brazos River. Further, all actions will meet the applicable requirements of 31 Texas Administrative Code Sections 329, 21-29, 307.1 to 307.10. Finally, if corrective action is required, all discharges will be treated to satisfy the requirements of the Clean Water Act application of best available technology (BAT) and best conventional technology (BCT).

Air

If a corrective action is required, the treatment facility will be designed to meet the requirements of Section 4.01 of the Texas Clean Air Act.

Post-Closure Care

Monitoring of ground water will be conducted in accordance with the relevant and appropriate RCRA ground water monitoring requirements under 40 CFR Part 264, Subpart F. In addition, site reviews will be conducted at least once every five years to ensure that the remedy is continuing to be protective of human health and the environment.

Corrective Action and Contingency Planning

If a ground water corrective action becomes necessary then these activities will be conducted in accordance with the corrective action regulations 40 CFR Section 264.100. Such action will also be conducted in accordance with any relevant and appropriate requirements of the general facility standards in 40 CFR part 264, Subpart B.

9.3 COST-EFFECTIVENESS

The selected remedy is cost-effective because it has been determined to provide overall effectiveness proportional to its costs, the net present worth value being $194,000. It is the least costly alternative which is fully protective of human health and the environment and attains ARARs.

9.4 UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES (OR RESOURCE RECOVERY TECHNOLOGIES) TO THE MAXIMUM EXTENT PRACTICABLE

EPA has determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner for the GWMM operable unit at the site. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA has determined that the natural attenuation alternative provides the best balance of tradeoffs in terms of balancing and modifying criteria for remedy selection. As described in section 6.2, it is not practicable to treat ground

water because pumping and treating the ground water will not appreciably decrease the cleanup timeframes compared to natural attenuation. Further, attaining drinking water standards in, for example, 75 years, is highly unlikely due to site-specific hydrogeological conditions which include low ground water flow velocities and the presence of numerous clay strata which may act as a continuing source of contaminants to ground water.

9.5 PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

The operable unit does not utilize treatment to address the principal threat posed by the contaminated water because the implementation of treatment alternatives was found to not be practicable, due to site-specific constraints. However, the Source Control ROD utilizes treatment to address contaminated soils and sludges which act as a source of contaminants to ground water. The quantity of contaminants which could potentially be treated in ground water (a maximum of 8 pounds per year) is very small when compared to approximately 500,000 pounds of contaminants which will be treated as part of the source control remedy.

X. DOCUMENTATION OF NO SIGNIFICANT CHANGES

EPA issued a Proposed Plan (preferred alternative) for remediation of the site on July 31, 1989. The selected remedy does not differ from the Proposed Plan.

(Available upon request)

APPENDIX A

ADMINISTRATIVE RECORD INDEX

FINAL

SITE NAME: SHERIDAN DISPOSAL SERVICE

SITE NUMBER: TXD 062132147

INDEX DATE: 09/29/89

APPENDIX B

SHERIDAN DISPOSAL SERVICES
COMMUNITY RELATIONS RESPONSIVENESS SUMMARY

This Community Relations Responsiveness Summary has been prepared to provide written responses to comments submitted regarding the proposed plan of action for the ground water portion of the Sheridan Disposal Services hazardous waste site. The Summary is divided into two sections:

Section I. Background of Community Involvement and Concerns. This section provides a brief history of community interest and concerns raised during the remedial planning activities at the Sheridan site.

Section II. Summary of Major Comments Received. Any written or oral comments are summarized and EPA's responses are provided.

I. Background

In general, there has been a long history of citizen awareness of the Sheridan Disposal Services site. In the early 1970s when incineration at the site resulted in air emissions, people living within a 7-mile radius complained. In 1971 a citizens' group submitted a petition with over 500 signatures to the Texas Water Quality Board calling for its closure. However, community concerns of either the area residents or local officials are now very low, probably because the site has been inactive since 1984. Also the site is relatively remote and there are no residences within a mile.

II. Summary of Major Comments Received

The proposed plan fact sheet announcing the public comment period and opportunity for a public meeting for the ground water portion of the site was distributed on July 31, 1989. The comment period began on August 14, 1989 and ended on September 11, 1989. No one responded to the offer of a public meeting and none was held. No written comments or questions were received by EPA.

APPENDIX C

Garcia
Tipple
Feeley
Ferguson
Eden
Beinke
1400GG04.LTR

September 22, 1989

Allyn M. Davis, Ph.D., Director
Hazardous Waste Management Division
U.S. Environmental Protection Agency
Region VI
1445 Ross Avenue
Dallas, Texas 75202-2733

Re: Sheridan Disposal Service Superfund Site
Draft Record of Decision
Ground Water Migration Management Operable Unit

Dear Dr. Davis:

We have reviewed the proposed Record of Decision (ROD) for the Sheridan Disposal Service Superfund site. We have no objection to the selected remedy for the Ground Water Migration Management Operable Unit as described in the draft ROD of September 15, 1989. The selected remedy described as the natural attenuation alternative requires the establishment of Alternate Concentration Limits (ACLs), ground water monitoring, sampling and analysis of the Brazos River, implementation of controls to preclude the use of contaminated ground water, and implementation of a corrective action plan in the event that ACLs are exceeded at some time in the future.

Sincerely,

Allen Beinke
Executive Director