Carter : Burgess

February 16, 1999 Project No. 98-3268-010

Ms. Sherry Jones
City of Austin
Department of Public Works and Transportation
Architectural and Engineering Services
One Texas Center, 505 Barton Springs Road
Austin, Texas 78704

City of Austin
Private Landfill Environmental Assessment
CIP Project No. 5040-150-3210
Travis County, Texas

Dear Ms. Jones:

We have completed our assessment of the Austin Community Landfill (ACL), Texas Disposal Systems Landfill (TDS), and Browning-Ferris Industries Sunset Farms Landfill (BFI) sites located in Travis County being considered by the City of Austin for disposal of Municipal Solid Waste (MSW) collected by its residential and commercial solid waste collection programs, as well as MSW generated by other City departments. The scope of work, findings, and conclusions of our assessment are described in the attached report.

This work was authorized by the Professional Services Agreement entered into between the City of Austin and Carter & Burgess dated January 11, 1999. Subconsultants utilized by Carter & Burgess in the performance of this assessment include Baer Engineering and Environmental Consulting, Inc., ECO Southwest Environmental Corporation, and Pardue & Associates, Attorneys at Law.

Please note that six copies of the report contain a second binder which is an expanded Appendix B containing tables of the groundwater analytical data for the three landfills.

Carter & Burgess appreciates this opportunity to be of service to the City of Austin. Should you have any questions or comments regarding this report, please do not hesitate to call me (512-314-3165) or Clyde Bays (713-803-2149).

Sincerely,

CARTER & BURGESS, INC.

Craig M. Carter, P.G.
Project Manager

Clyde V. Bays, Ph.D., P.E.
Manager of Environmental Services
and Associate

Attachments: City of Austin Private Landfill
Assessment Report (35 Copies)

CITY OF AUSTIN
PRIVATE LANDFILL ENVIRONMENTAL ASSESSMENT
CIP PROJECT NO. 5040-150-3210
TRAVIS COUNTY, TEXAS

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C&B PROJECT NO. 98-3268-010

February, 1999

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BFI appears to be operating the Sunset Farms Landfill in a responsible manner protective of groundwater and surface water. The potential for future impacts to groundwater or surface water at the Sunset Farms Landfill is considered to be relatively low. Although the organic impacts detected in groundwater on the southwest portion of the property appear related to the ACL site, the Sunset Farms Landfill might be considered a potential source of contamination and be required to defend itself, if groundwater on surrounding properties was found to be impacted.

TDS Landfill

The TDS Landfill has been in operation for about 8 years. The original design specified in-situ soil liners for the landfill bottom and unweathered clay sidewalls. Weathered sidewall areas were to be lined with a minimum of 3 feet of compacted clay. The original final cover design consisted of 1.5 feet of compacted clay overlain by 1 foot of topsoil. A leachate collection system was not included in the original design. In 1994, the final cover design was changed to 4 feet of topsoil over 1.5 feet of compacted clay. Leachate collection systems were also installed in the post-Subtitle D sectors of the landfill.

Based on documents reviewed during this assessment, the TDS was constructed and has been operated in accordance with applicable regulatory requirements. No present groundwater impacts were observed or indicated by this assessment. Further, no evidence of surface water impacts was found. In addition, there is no evidence of landfill gas reaching the property boundary. TDS appears to be a very responsible operator and has implemented measures which appear to be protective of groundwater and surface water at the site.

Recommendations

It is the Carter & Burgess team's opinion that the former IWMM site at the ACL poses a substantial environmental risk and potential future liability to the owners and users of the site. Specific recommendations are made in ***Section 8*** of our report concerning further monitoring and investigations needed at the site in order to detect potential past and future releases to the environment.

Recommendations are also made to sample leachate seeps at the Phase 1 site on the ACL property as well as seeps on the Travis County Landfill to determine potential impacts to surface water in the tributary to Walnut Creek.

Carter & Burgess' team recommends removal and proper disposal of the waste at the former IWMM site in order to eliminate or substantially reduce the environmental risk associated with the site.

A recommendation is also made that the ACL work with Travis County to reduce leachate buildup in the Phase 1 area by operating the leachate recovery system in the Travis County Landfill in order to lower leachate levels in both areas.

EXECUTIVE SUMMARY

The City of Austin, Architectural and Engineering Services Division, Department of Public Works and Transportation, contracted with Carter & Burgess to perform an assessment of the environmental safety of the Austin Community Landfill (ACL), Texas Disposal Systems Landfill (TDS), and Browning-Ferris Industries Sunset Farms Landfill (BFI) sites located in Travis County. Carter & Burgess' team, which includes ECO-Southwest Environmental Corporation, Baer Engineering and Environmental Consulting, Inc., and Pardue & Associates, Attorneys at Law collected and performed technical review of all data available from TNRCC files, landfill records, and third party sources for these sites. Visual inspections of the landfill sites were also performed.

For this assessment, Carter & Burgess' team reviewed available information pertaining to permitting and siting of the various landfills, landfill design and construction, operating and regulatory compliance history, and the results of groundwater and methane gas monitoring programs. Meetings were also held with current and former landfill personnel, TNRCC representatives, and neighborhood associations in order to gather information needed to evaluate the environmental safety of the various sites. The Environmental Protection Agency (EPA) Region VI Office in Dallas was contacted concerning the status of the Petition for NPL Listing filed by concerned citizens for the ACL. Present environmental impacts, possible future impacts, potential migration pathways, overall environmental risks to groundwater and surface water, and other potential liabilities were evaluated for each landfill based on the information collected during our assessment. This information as well as the findings, conclusions, and recommendations arising from our assessment are discussed in various sections of the attached report.

As part of this assessment, we also reviewed changes in federal and state regulations in effect at different intervals throughout the past 35 years pertaining to Municipal Solid Waste (MSW) disposal facilities. A number of significant regulatory changes have occurred in the area of solid waste management, although the basic concepts as to proper siting, design and construction, and operation of landfills has remained essentially the same over the years.

A summary of the significant findings and observations made for each landfill is presented below.

Austin Community Landfill

Early in the life of the ACL site, the regulatory requirements for landfilling of MSW were in their early stages. Permission was requested and granted by the Texas Department of Health (TDH) to dispose of industrial waste at the Industrial Waste Materials Management (IWMM) site located within the boundaries of the landfill with few requirements stipulated except for cover thickness and clay keyways to control lateral seepage. After the IWMM site was closed and the ACL site continued to operate as a MSW landfill, formal regulations were written to manage the disposal of MSW.

The former IWMM site was operated during times when there were minimal technical requirements for liners and no prohibitions on landfilling drummed industrial or bulk industrial liquids. The portion of the site where these activities took place was not adequately protective of the environment and as a result there is a high probability that some environmental impacts may have resulted from the operations. Since the promulgation of the earliest landfill regulations and requirements, the MSW portion of the ACL site has been operated in general compliance with the regulations in existence at the time. Even when operated during times when there were no liner requirements, the MSW landfilling operations at the ACL site likely had minimal impact on the environment because of the low permeability typically associated with the Taylor Formation

Clays.

Potential groundwater impacts were historically reported in two monitoring wells located adjacent to the former IWMM site. These monitoring wells have not been sampled in recent times. There was no quantitative groundwater discovered in our assessment data that indicates the former IWMM site is currently causing environmental impacts. Groundwater on the MSW portion of the ACL site has been impacted by organic compounds. However, the recently detected organic compounds appear restricted to the western portion of the property at low concentrations and are likely associated with landfill gas as is typical of MSW landfills.

Data reviewed as part of this assessment showed no indication of impacts to surface water. However, based on the apparent leachate seeps observed adjacent to the unnamed tributary to Walnut Creek in the Phase 1 MSW area, surface water could potentially be impacted. Leachate management to reduce the hydraulic head in the adjacent closed Travis County Landfill and Phase 1 area should be performed before plans for additional cover are implemented.

Possible future impacts to the ACL site include lateral migration of leachate from the Phase 1 area into the unnamed tributary to Walnut Creek, and vertical and lateral migration of leachate from the former IWMM site. The existing Subtitle D monitoring program should be sufficient to detect and monitor groundwater impacts in the Weathered Taylor before they migrate offsite. However, no monitoring system has been put in place which could detect current or future vertical (downward) migration of solvents from the IWMM site. Although the possibility for vertical migration of contaminants from this site to the underlying groundwater is considered to be relatively low, the potential for impacts still exists. Given the above, the unknown contents and condition of the 21,000 buried drums at the former IWMM site presents a potential environmental risk. As long as the industrial waste remains buried at it's current location it will be a source of environmental risk. Operations on the remainder of the ACL facility appear to be protective of groundwater and surface water.

Methane will continue to be generated at the ACL site and should be managed throughout the life of the landfill. The Landfill Gas Recovery System appears to be effective at controlling the gas generated by the landfilled waste at this time.

A Petition for National Priority Listing (NPL) has been filed with the EPA Region VI Office for property now owned by Waste Management of Texas but not included in the TNRCC Permit currently in effect for the ACL. This property is the approximate site of the former IWMM facility, and was excluded from the currently active MSW landfill by virtue of a permit amendment approved in 1981. A Preliminary Assessment of this site has been completed, but the results of the assessment and any subsequent actions which may be taken by the EPA or other state agencies is unknown at this time.

<u>BFI Sunset Farms Landfill</u>

The Sunset Farms site is currently and historically has operated in substantial accordance with applicable state and federal MSW regulations established for Type I landfills. A limited area of organic impacts to groundwater is present near the southwest corner of the site. This area of impacts appears related to the landfill activities on the adjacent ACL site. Data reviewed as part of this assessment showed no indication of impacts to surface water. The Landfill Gas Recovery System and electric generating facility which has been in operation for two years are apparently effective at controlling gas buildup within the landfill.

CITY OF AUSTIN
PRIVATE LANDFILL ENVIRONMENTAL ASSESSMENT
CIP PROJECT NO. 5040-150-3210
TRAVIS COUNTY, TEXAS

1. INTRODUCTION

The City of Austin Solid Waste Services Department (SWS) will stop accepting putrescible waste at its F.M. 812 Landfill in early 1999 in order to comply with Federal Aviation Administration (FAA) and Texas Natural Resource Conservation Commission (TNRCC) regulations prohibiting the operation of landfills near airports. In order to provide for the disposal of Municipal Solid Waste (MSW) collected by its residential and commercial solid waste collection programs, as well as MSW generated by other City departments, the City of Austin is proposing to contract for disposal with one or more existing private landfills in Travis County. The City issued a Request for Proposals for landfill services, and in response to those proposals has negotiated separate 30-year contracts with the Austin Community Landfill (ACL) owned by Waste Management of Texas, Inc. located in northeast Austin (Giles Road north of U.S. 290) and the Texas Disposal Systems Landfill (TDS) located south of Austin on F.M. 1327 near Creedmore. Contracting for landfill services with these two geographically separated locations was judged by City staff to give a significant economic advantage to the City over a single contract. This is due to a significant saving in operating costs as a result of having disposal sites relatively close to the areas being served, thereby reducing distances traveled from collection areas to the disposal location.

Significant questions were raised during public review of these contracts before the Solid Waste Advisory Commission (SWAC) by interested parties regarding the environmental safety of a closed industrial waste disposal facility associated with the ACL site, the effect that site has on the overall environmental safety of the ACL facility, and the adequacy of existing operating and design standards at the site. Information reportedly obtained from TNRCC records and other sources has been presented by individuals regarding groundwater monitoring data and studies, with those individuals asserting that the information proves groundwater, surface water, and landfill gas contamination and migration. A Petition for Assessment and NPL Listing has been filed by interested parties with the United States Environmental Protection Agency (U.S. EPA) to designate the ACL facility a CERCLA (Superfund) site. Although indemnification clauses protecting the City of Austin from financial consequences are contained within both proposed contracts, SWAC recommended that the City hire an independent consultant to assess all available data and provide an opinion to the City regarding the extent (if any) of contamination and migration from the ACL site and the probability and consequences to the City of the site being listed under CERCLA. In order to assure that all alternatives receive equal scrutiny, it was recommended that the TDS and BFI sites also be examined.

On January 11, 1999, the City of Austin entered into a Professional Services Agreement with Carter & Burgess to assess all available data and provide an expert opinion regarding the environmental safety of the ACL, TDS, and BFI sites. The scope of work, findings, and conclusions of our assessment are described in various sections of this report.

2. SCOPE OF WORK AND TECHNICAL APPROACH

A. Scope of Work

The objective of this assessment was to review and evaluate all available data and provide an expert opinion to the City of Austin regarding the environmental safety of the Austin Community Landfill (ACL), Texas Disposal Systems Landfill (TDS), and Browning-Ferris Industries' Sunset Farms Landfill (BFI) sites. General information pertaining to the three landfills is presented in ***Section 3*** of this report.

The scope of work performed for this assessment included the collection and technical review of available data to determine if evidence exists that groundwater, surface water, air quality, or any other measure of environmental safety has been (or is likely to be) impacted beyond the boundaries of the various landfill sites and the significance of any impacts (if found) on surrounding properties. The scope of work included an evaluation of the adequacy of liner design and area geology to project future liner integrity and the probability of migration of contaminants from each landfill site. Past monitoring protocols and data for migration pathways were also evaluated to determine if they were appropriate and adequate.

All data available from regulatory agencies and data presented by other interested parties, including neighborhoods, was evaluated as part of the assessment. In addition, past sampling protocols and the results of such were evaluated to determine if the applied regulatory standards were appropriate. Any vital information which is currently unavailable and should be obtained to assess the adequacy of environmental protection measures at the landfill sites was identified. The financial risks to the City associated with a Superfund designation for the ACL site, the likelihood of a Superfund designation based on available data, the characteristics of the ACL which would indicate a Superfund designation, and any additional monitoring which would reduce the exposure of the City in the event of a CERCLA listing were also researched and evaluated.

The history of the ACL site is considerably longer and more complex than the BFI and TDS sites. As a result, an extensive discussion of the various aspects of the site history was prepared in order to present the information used by Carter & Burgess' team to evaluate the environmental safety of the landfill. This discussion included detailed information regarding the construction and regulatory compliance histories of the ACL site. Although the volume of information presented in this report is considerably less, the BFI and TDS landfills were given the same level of scrutiny as the ACL site in order that uniform conclusions and recommendations were reached regarding their environmental safety.

B. Technical Approach

The Carter & Burgess team's technical approach to evaluating the design, construction, and operating histories of the three landfills as related to regulatory compliance and environmental safety issues consisted of the following tasks:

1. An initial cursory review of all landfill design and construction information available from the Texas Natural Resource Conservation Commission (TNRCC), the landfill site management offices, and other relevant sources such as concerned citizen groups.

2. Sorting and classification of the available landfill design and construction information for detailed review of pertinent information.

3. Review of past and present Municipal Solid Waste (MSW) regulations to correlate applicable rules and regulations in effect at various times during construction and operation of each landfill.

4. Interviews with persons knowledgeable about construction of waste cells that pre-date the promulgation of MSW regulations or for which documentation of cell construction could not be found.

5. Detailed review of construction-related data contained in all available Soil and Liner Evaluation Reports (SLERs) and Flexible Membrane Liner Evaluation Reports (FMLERs) for waste cells constructed at each landfill.

6. Detailed review of the compliance of cell construction with previously established and current Soil and Liner Quality Control Plans (SLQCPs).

7. Detailed review of the Final Cover Quality Control Plans (FCQCP) for each landfill.

8. Review of historic topographic maps and aerial photographs to correlate landfill cell siting with respect to site geography.

9. Prepare a waste cell site plan layout by sector for each landfill based upon information contained in various liner evaluation reports.

10. Review and selection of representative cross-sections of the landfills for inclusion in this report.

11. Evaluation of the performance of constructed cells at each landfill based upon available surface water, groundwater, methane gas, and leachate collection system data.

A licensed professional engineer performed tasks 1 through 10. A professional geologist in conjunction with a licensed professional engineer performed task 11.

For all three landfills, on-site records were reviewed and past and/or present employees of each facility were interviewed. Each of the landfill facilities provided Carter & Burgess office space, use of their copier and facsimile machine, permission to interview employees and engineers-of-record, and open perusal of their records. With the exception of several engineering studies, work plans, and reports unrelated to permit reporting requirements, most information pertinent to this assessment was available and obtained from the records at the TNRCC.

To determine potential impacts to groundwater and surface water, Carter & Burgess' team relied on experience and knowledge of the hydrogeologic setting of the various landfill sites (as well as similar sites), information contained in published geologic and hydrogeologic studies, technical data contained in the various landfills permit applications and modifications, and the results of site-specific hydrogeologic investigations.

Groundwater sampling histories and analytical data were reviewed for each facility. This involved a review of groundwater sampling reports obtained from the TNRCC and/or facility files. Data summary tables were provided for the TDS and ACL sites. Data summary tables were constructed by Carter & Burgess' team for the BFI site. Data summary tables provided for the TDS and ACL sites were "spot" checked for accuracy and used to facilitate review of groundwater analytical and monitoring results. The ACL summary tables did not provide data prior to 1985. Therefore, sampling reports were reviewed for all sampling events not included in the data summaries. The groundwater and surface water data reviewed as part of this assessment may not represent a complete record of each facility's monitoring history. However, all data available from the files at the TNRCC and the various landfill facilities were reviewed and evaluated.

3. DESCRIPTION OF LANDFILLS

The Austin Community Landfill and BFI Sunset Farms Landfill are located east of Austin in Travis County. The Texas Disposal Systems Landfill is located southeast of Austin in Travis County. All are Type I Municipal Solid Waste (MSW) landfills which accept household waste, construction/demolition waste, and some nonhazardous and industrial waste with special approval from the TNRCC. ***Figure 1*** shows the relative locations of the three landfills. General information pertaining to each of the landfills is presented below.

A. Austin Community Landfill (ACL)

The ACL site is located near the intersection of Giles Road and U.S. 290 in Travis County. The facility consists of approximately 290 acres of land. Components of the site include a closed MSW landfill area (Phase I) located adjacent to the Travis County Landfill and a former 86-acre Industrial Waste Materials Management (IWMM) site which was used for the disposal of approximately 21,000 drums of industrial waste. The former IWMM site reportedly contained acid and solvent pits. The remainder of the ACL site consists of an active MSW landfill. A site layout is shown in ***Figure 2***.

B. Sunset Farms Landfill (BFI)

The BFI site is located at 9912 Giles Road approximately 5.3 miles from the intersection of I.H. 35 and U.S. 290 in Travis County. The landfill consists of an approximate 352.4-acre landfill which primarily serves residences and businesses located in Travis County. Major components of the landfill include a capped pre-Subtitle D MSW landfill area (Phase I), currently active MSW landfill area, public disposal/drop box area, gatehouse and office, maintenance/wash facility (shop building), and a landfill gas collection system. A site layout is shown on ***Figure 3***.

C. Texas Disposal Systems Landfill (TDS)

The TDS site is located at 7500 F.M. 1327 approximately 2.7 miles east of I.H. 35 and 3.8 miles west of U.S. 183 in southeast Travis County. The facility consists of a 341-acre regional MSW landfill on a 927-acre site. Components of the landfill include a citizen's drop-off center, a crusher for large recyclable items, a shear for processing scrap metal and tires, and shredders for recyclables and brush; a drop-off center for source separated recyclable materials, used motor oil, and reusable items; a large-scale compost center for leaves, grass, wood products, and other organic materials; a permitted recycling center for removal and processing of reusable items from the waste stream; and corporate and administrative offices and maintenance facilities. Ranching operations are conducted on portions of the site not used for landfilling. A site layout is shown in ***Figure 4***.

4. DOCUMENT EXCHANGE AND REVIEW PROCESS

A. Agency File and Records Review

Carter & Burgess' team retrieved the entire contents of the TNRCC Central Records Files for the ACL, BFI, and TDS sites. Contents of the files include records on microfiche, bound reports, correspondence, and other documents submitted to the TNRCC. The contents of the files were observed and indexes were made of all the records present in the files (***Appendix A***). Copies were made of key reports and correspondence which were critical to assessing the environmental safety of the three landfills. In many instances, the reports and correspondence on file in the TNRCC's Central Records were incomplete. The landfills were able to provide most of the additional information needed to fill in gaps in the data. Additional information was obtained from files in the Groundwater Section of the TNRCC's Municipal Solid Waste Division and from files at the TNRCC's Region 11 Office in Austin.

B. Review of Landfill Records and Files

Meetings were arranged with representatives of the three landfills in order to allow them to

present Carter & Burgess' team with relevant information and data related to environmental monitoring and the history of each landfill. Key information obtained from landfill representatives included groundwater monitoring data, Soil and Liner Evaluation Reports (SLERs), and other information pertaining to the history of environmental monitoring of the sites. Several meetings were required to review all of the reports kept at each site (particularly the ACL site).

C. Review of Third Party Files

A meeting was held on January 23, 1999 at the home of Joyce Best in Harris Branch in order to give concerned citizens the opportunity to present information to Carter & Burgess' team which might pertain to the environmental safety of the three landfills. Representatives of Carter & Burgess' team were presented with a video tape and several documents to aid our evaluation of the landfills.

D. Meetings and Communications With Regulatory Agencies

Members of Carter & Burgess' team also conducted interviews with several members of the TNRCC involved in monitoring environmental conditions at the three landfills. Carter & Burgess' team met with a Ben Milford, an inspector with the Region 11 Office of the TNRCC and Jeff Davis, a geologist with the Municipal Solid Waste Division, Groundwater Protection Section of the TNRCC. Thomas Collins of TNRCC was also contacted by telephone and provided information about the landfill gas collection systems at the ACL and BFI sites, and Ada Lichaa in the Groundwater Protection Section at the TNRCC was contacted by phone to discuss groundwater monitoring at the BFI site.

Carter & Burgess filed a request with the Environmental Protection Agency (EPA) under the Freedom of Information Act regarding the petition that the EPA has received for National Priority Listing (NPL) of the ACL site. This information is discussed in ***Section 7.A.5.***

5. LANDFILL SITE VISITS AND MEETINGS WITH THIRD PARTIES

A. Landfill Site Visits

Site visits were conducted at the three landfills in order to observe the site locations and to meet with the people most familiar with the landfill histories and operations. Visits were made to the BFI and TDS sites on December 30, 1998. The ACL site was visited on January 6, 1999. Several follow-up meetings have taken place at the ACL site in order to review the large volume of reports documenting the construction of various phases of the landfill. As part of the site visits conducted by Carter & Burgess' team, current landfilling operations and the locations of prominent features referred to in reports such as monitoring wells and landfill gas collection equipment were observed.

During one meeting at the ACL site, representatives from Carter & Burgess' team, Marcos Elizondo of Waste Management, and Rusty Fusilier (former WMI Landfill Manager) of SCS Engineering walked the drainageway between the closed Phase I MSW disposal area and the former IWMM site. The general condition of the landfill cover in this area was inspected and photographs were taken to document observations (***Appendix D***). During the same site visit, permission was obtained from Travis County to visit the Travis County Landfill site to the southwest. Team members drove and walked the western portion of the landfill near an unnamed tributary to Walnut Creek, and observed and photographed the general condition of the landfill cover in this area.

B. Meetings With Third Parties

During the January 23, 1999 meeting in Harris Branch, concerned citizens discussed their opinions regarding the environmental safety of the landfills as well as their observations of the sites. The neighbors who attended the meeting expressed concern about potential impacts to the environment caused by the Travis County Landfill, ACL, and BFI sites. Operations at the

landfills that negatively impact the area residents include items such as tracking mud onto Giles Road during wet weather, blowing trash, odors, and runoff of sediment in the area drainages. There are also concerns about the environmental safety of the Travis County Landfill and the former IWMM site and the potential impacts from buried waste at those sites.

6. REGULATORY AND TECHNICAL REVIEW

This section begins with an overview of federal and state regulations in effect at different intervals throughout the past 35 years pertaining to MSW disposal facilities. For each landfill considered in this assessment, information is next presented regarding siting and permitting of the facility, details of the facility design and construction, the operating history and regulatory compliance of the facility, and waste containment as well as potential migration pathways. Regional and area geology, the methodology for waste containment (liner type and final cover), monitoring systems to protect the environment, and other features of each landfill (i.e., systems for leachate collection) are also described. These factors were considered in arriving at the opinions regarding the "environmental safety" of each landfill presented in ***Section 7***.

A. Overview of Changes in Landfill Regulations

Changes over the past 35 years in the following topics pertaining to MSW disposal facilities were researched as part of this assessment: regulatory agency(s) and authority, type of regulation required (permit, registration, etc.), liner requirements, leachate collection, groundwater monitoring, landfill gas monitoring, closure requirements, and post-closure requirements. These changes have been summarized in ***Table 1***. The regulations have not changed substantially since the final date listed in each category.

As is evident from ***Table 1***, a number of significant regulatory changes have occurred in the area of solid waste management, although the basic concepts as to proper siting, design and construction, and operation of landfills has remained essentially the same over the years. Beginning in 1964, the Texas Department of Health (TDH) promulgated rules and standards regulating waste disposal which required site development and operation plans and adequate investigation of geologic characteristics at proposed landfill sites. These regulations also specified the need for a final cover (cap) and a post-closure monitoring and repair program for completed landfills.

In 1970, the TDH and Texas Water Quality Board (TWQB) jointly began sharing responsibility for overseeing regulations established in the Solid Waste Disposal Act (SWDA). The TWQB only became involved when water quality matters arose. The TDH was also directed to consult with the Texas Air Control Board (TACB) on issues relating to air pollution or ambient air quality. A Letter of Application for Approval was required from the TDH to conduct MSW activities. The use of a naturally occurring or artificially placed impervious barrier (liner) to minimize the possibility of leachate percolation into groundwater was required. Provisions for monitoring groundwater quality on a site specific basis were established. The final cover for landfills was extended to specify 2 feet of compacted clay (or other suitable earthen material) and revegetation to prevent erosion.

In 1974, the TDH began requiring a site permit and public hearing for landfills. A 1 year post-closure care period was established for closed landfills. Later in 1977, the TDH began requiring consultation with other state and federal agencies regarding siting of landfills. Formal procedures for estimating percolation of water into landfills (water balance method) were implemented. Landfill gas monitoring and a formal site closure plan were required by the TDH. The site closure plan had to be submitted at least 60 days prior to closure.

In 1980, the TWCB became the Texas Department of Water Resources (TDWR). A Soil and Liner Quality Control Plan (SLQCP) became a part of the Permit Application. Alternate liner

technologies (other than clay) could be approved by the TDH on a site specific basis. Handling and temporary storage of contaminated surface water must now be considered in landfill design. The need for groundwater monitoring wells and/or earth electrical resistivity surveys must also be evaluated, as well as the need for landfill gas controls. The post-closure care period was also extended beyond 1 year, if problems persist at a closed site.

In 1983, groundwater monitoring at landfills became mandatory (at least one upgradient and two downgradient wells). These requirements could be waived if a demonstration was made that groundwater would be protected. A site closure plan must now be provided in the Permit Application. This plan must be updated 1 year prior to site closure. The post-closure care period was extended to 5 years (longer if problems exist).

In 1990, provisions for diversion of surface water runoff from active disposal areas must be considered in the landfill design. Approval of discharges of contaminated water (water coming in contact with waste) was required by the TDWR. Structures built on landfills required provisions for venting of landfill gases. Methane concentrations less than 25% of the LEL (Lower Explosive Limit) in on-site structures and less than the LEL at the property boundary were required. Any monitoring programs in effect during operation of the landfill must now be continued during the post-closure care period.

On October 9, 1991, as a result of new requirements in Subtitle D of the Resource Conservation Recovery Act (RCRA) as amended by the Hazardous and Solid Waste Amendments (HSWA), the U.S. EPA excluded MSW landfills from Part 257 and established revised and more stringent MSW landfill criteria in Part 258 (commonly referred to as the Subtitle D criteria). On March 1, 1992, the MSW program was transferred from the TDH to the Texas Water Commission (TWC). On September 1, 1993, the TNRCC was created incorporating the TDH and TACB. On October 9, 1993, Subtitle D MSW landfill regulations went into effect (30 TAC Section 330). These regulations resulted in the incorporation of more stringent measures for groundwater protection, including the use of composite liner and final cover systems, leachate collection, and a Landfill Gas Management Plan (LGMP). The post-closure maintenance period was also extended to 30 years, and new financial assurances were required of landfill operators.

The current technical requirements for liners and other major landfill design components are largely the same since the enactment of Subtitle D regulations.

B. Austin Community Landfill

1. Permitting and Siting

Permits

The ACL site is currently owned and operated by Waste Management of Texas (Permit No. 249 A, B and C). A tremendous amount of information concerning this site dating back to 1970 was reviewed by Carter & Burgess' team for this assessment. Since that time, ownership of the property has changed a number of times and its development as a MSW Landfill facility has been scrutinized by various regulatory agencies. The ownership and permitting history of the ACL site are discussed in details in ***Section 6.B.2.***

Siting

The ACL site is located between the closed Travis County Landfill to the south-southwest and BFI Sunset Farms Landfill to the north. When landfill operations began at the site, it was generally flat farm land and pasture land. Over the life of the landfill, a subdivision has been built to the northeast (Harris Branch) and Applied Materials has built an electronics manufacturing facility across Giles Road to the east.

Physiography

The ACL site is located in the Blackland Prairie physiographic province, approximately 1.5 miles from the eastern limit of the Balcones Fault Zone. This fault zone separates the Blackland Prairie to the east from the uplifted Edwards Plateau to the west. The Blackland Prairie is a rolling prairie generally less than 800 feet above mean sea level (msl), with slightly to moderately dissected slopes (generally less than 5 percent). Natural vegetation consist of grasses with scattered oak and mesquite trees.

At the ACL site, the pre-landfill ground surface consisted of a series of gently rolling hills dissected by erosional valleys. Topographic relief ranged from 570 to 710 feet msl. Surface runoff over the western three fourths of the site is towards the southwest into an unnamed tributary which drains to Walnut Creek. A drainage divide is present on the eastern side of the property, which causes the eastern third of the site to drain to the east toward Gilleland Creek which flows into Lake Walter E. Long.

Geology

The ACL site lies within the outcrop area of the Taylor Group of the Cretaceous System. The Taylor consists of approximately 700 feet of blueish-gray to brown, calcareous, montmorillonitic clay and marly clay (Garner and Young 1976). The Taylor has inherently low permeability, low potential for groundwater development, and a high ion exchange capacity. At the ACL site, the Taylor is approximately 200 to 400 feet thick. Near the surface (typically within the upper 20 to 40 feet below ground surface (bgs)), the Taylor is tan to brown, with abundant fractures, iron staining, selenite (gypsum) and pyritic fracture fill. This upper portion of the Taylor is typically referred to as the "Weathered Zone".

Beneath the Weathered Zone, the Taylor is a blue-gray, very plastic clay and marly clay with very low permeability. Although this portion of the Taylor may well exhibit microfractures and is documented to be saturated, the horizontal and vertical permeability of the unweathered clay is very low. Hydraulic conductivity data included in the ACL Permit Application indicates that the permeability of the unweathered clay is on the order of 1.0×10^{-7} cm/sec or less. The Taylor exposed in the drainages at the ACL consists of a tan, fossiliferous, marly clay with abundant dessication fractures. Beneath the Taylor lies the Austin Chalk consisting of 350 to 500 feet of chalk, limestone, marly limestone and marl (Garner and Young 1976).

Major faulting is not known to occur at the site, although intraformation faulting with relatively small displacement along fault planes may occur. The outcrop area of the Taylor is generally considered to be a good siting location for a MSW landfill.

Hydrogeology

The Taylor Group is typically divided into two zones. The upper or "Weathered Zone" typically occurs within the upper 20 to 40 feet, and is a tan to brown "heavily weathered" clay and marly clay. Groundwater occurs in fractures of the weathered clay, and in some areas is of sufficient volume and quality for domestic use. This is typically considered a "perched" water table aquifer, which generally mimics the original surface topography. The source of recharge to the weathered clay is primarily from precipitation via surface infiltration. The tendency of the groundwater in the weathered Taylor to follow topography often results in groundwater discharge to creeks via seeps. The weathered portion of the Taylor provides base flow to creeks following wet periods. The Weathered Taylor Clay is subject to the formation of deep (potentially 30 to 40 foot) desiccation fractures during prolonged dry periods, which typically results in wide variations in water quality as well as rapid recharge during storm events.

Water wells in the area of the ACL site are generally large in diameter and shallow in nature.

These wells are completed in the weathered portion of the Taylor and in alluvium along Walnut Creek. However, published assessments of the Taylor Group indicate that water availability is limited and generally unfavorable for groundwater development. A search of domestic water wells was performed as part of the response to comments received on the "Comprehensive Hydrogeologic Assessment" performed for the ACL site (RUST, 1993). During this search twelve wells were found in the site vicinity. All but one were completed in the weathered Taylor or alluvium. The deeper well was completed in the Edwards at 1178 feet, and is located on the northern edge of BFI Sunset Farms property approximately 2800 feet north of the ACL's north property boundary and 4200 feet north of the IWMM site. Groundwater does exist in the unweathered clay beneath the weathered zone. However, the unweathered clay has extremely low permeability (in the range of 1×10^{-7} cm/sec). Groundwater in the unweathered portion of the Taylor exists in microfractures and other localized fractures which have little interconnection.

The Austin Chalk, which lies beneath the Taylor, is known to sustain groundwater locally. However, this is primarily the case on and near the outcrop area of the Austin Chalk, where secondary porosity from fracturing and solutioning of the limestone sustains saturation. The documents reviewed as part of this assessment found no water wells completed in the Austin Chalk in the vicinity of ACL. The site is very near the "bad water line" of the Edwards Aquifer, where groundwater east of this line becomes increasingly mineralized. The one water well completed in the Edwards at a total depth of 1178 feet is reportedly used for irrigation. The lower Trinity Aquifer, which is approximately 3100 feet below the landfill, is not likely potable.

2. Landfill Design and Construction

The ACL site has a long and complex history dating back almost 30 years. Jack Arsenault, owner of Universal Disposal, Inc., applied for approval of a 108.34-acre sanitary landfill at this site on December 4, 1970. The subsurface investigation prepared by Trinity Engineering Testing Corporation (TETCO) for this application included a total of four soil borings, each drilled to a depth of 20 feet below existing ground surface. TETCO collected undisturbed soil samples for laboratory testing to determine Atterberg Limits and gradation. The locations of the borings appear to coincide with the areas now known as the closed Phase I cell, the old wet weather cell, and the industrial waste cell. No shallow groundwater was encountered. The soil was classified as inorganic clays of high plasticity (CH). Permeability was not measured, but the soils were considered practically impervious (permeability coefficients ranging from 1×10^{-5} cm/sec to 1×10^{-8} cm/sec) based on the type of subsurface materials at the site. The rules in force at the time did not specify Atterberg Limits, gradation, or permeability requirements. The generally accepted limits for these parameters, however, were liquid limit ≥ 50, plasticity index ≥ 25, gradation $\geq 50\%$ (-200 mesh), and permeability $\leq 1 \times 10^{-7}$ cm/sec. The soils and engineer's proposed plan for constructing the landfill at this site were considered adequate at the time of construction.

After reviews by the Austin-Travis County Health Department, the City of Austin, Travis County, and the Texas State Department of Health (TDH), Universal Disposal, Inc.'s application for approval of a sanitary landfill was approved on December 22, 1970. This was not a permit to operate the landfill, since the state had not yet established a permit process and there were no regulations for landfills at the time. The approval was granted contingent on the construction of dikes reinforced with riprap to address drainage. The TDH found the application was compliant with respect to equipment and operational vehicles, location, land use, zoning, access, sanitary design, water pollution, storage of solid waste, fire protection, ventilation, windblown material, noise pollution, employee sanitation facilities, and operational standards. Landfilling in the old Phase 1 cell and wet weather cell commenced about this time.

In early 1971, Jack Arsenault of Industrial Waste Materials Management, Inc. (IWMM), a separate corporate entity from Universal Disposal, Inc., applied for approval to dispose various chemical wastes on a surveyed portion (approximately 26 acres) of the original 108.34-acre tract. The chemical wastes were reported to be "spent acids, caustics, spent solvents, waste hydrocarbons, contaminated industrial process water." From the application, the proposed site

construction consisted of lagoons or storage facilities "constructed in the naturally-occuring soils of the site" for chemical, biological, and physical treatment of waste materials along with segregation and recovery of certain materials. Excerpted proposed treatment descriptions are as follows:

- Chemical treatment included 1) neutralization of acids with lime to produce insoluble salts that could be landfilled; 2) oxidation to reduce certain organic compounds to produce stable, non-toxic compounds; and 3) chemical flocculation and sedimentation of dissolved or colloidal materials from waste liquids.

- Biological treatment included aeration and evaporation of slightly contaminated wash waters.

- Physical treatment and disposal included 1) landfilling 5 to 7 foot thick compacted lifts of dry wastes in trenches, with 6 inches of compacted soil cover for each lift and 2 feet of compacted soil for final cover; 2) placement of drummed waste in trenches covered with 4 feet of compacted clay and permanent markers upon closure; 3) placement of bulk solvents in 18-inch wide trenches subject to evaporation followed by cover; and 4) plowing in or landfilling of diatomaceous earth.

- Segregation and recovery included 1) unsophisticated physical segregation of paper, metals, battery cases, glass, etc., and 2) skimming of waste oils from waste oil water lagoons.

After reviews by the TDH and the Texas Water Quality Board (TWQB), IWMM's application for operation of a commercial industrial solid waste facility was approved by the TWQB under Emergency Waste Control Order #71-9E. This order was dated May 3, 1971, although industrial waste disposal reportedly began in April 1971. The soils and the engineer's proposed plan for constructing the landfill at this site were in compliance with applicable regulations at the time. This emergency order expired on August 20, 1971, necessitating IWMM filing an application for continuation of the existing facility on February 11, 1972. This application was for a "larger facility with greater disposal capabilities, including incineration and physical/chemical treatment." The application reported that, at the time, bulk liquids were disposed in 10 feet deep, diked, in-situ clay pits, as follows:

- Pit #1 contained spent solvents and paint residues and had a capacity of 206,000 gallons.

- Pit # 2 contained spent acids (primarily H_2SO^4 and HCl) and had a capacity of 270,000 gallons.

- Pit #3 contained industrial process washwater and had a capacity of 472,000 gallons.

- Pit #4 contained spent solvents and had a capacity of 840,000 gallons. Solvents and washwater was allowed to evaporate. The acid was neutralized periodically with waste caustic or lime.

Drummed wastes were stored on site until a large number of drums accumulated. Once accumulated, stacked drums were buried in trenches and covered with 3 feet of dirt. It is estimated that more than 21,000 drums of waste were buried at the IWMM site.

The TWQB conducted an investigation of the IWMM site on April 12 and 13, 1972 to collect

additional data. The results of the investigation (dated May 15, 1972) reported "Industrial waste acids are currently placed in three unlined pits. Most of the other industrial wastes are placed in 55-gallon drums and then landfilled. The excavation where 55-gallon drums currently are placed is near the crest of a small hill on the company's tract of land. The bottom of the excavation is approximately 15 to 20 feet below the original land surface and coincides with the base of the weathered zone in the Pecan Gap Formation. The four sides of the pit consequently are formed by weathered clay. Three pits in which industrial waste acid is disposed of were observed during the investigation April 12 and 13, 1972. The dimensions of these pits were approximately 30 feet wide by 40 feet long. The depths of the pits are approximately 5 to 10 feet."

The report concluded "the occurrence of groundwater in the zones of weathered clay in the area indicates that liquids can seep or migrate within the shallow clay. Wastes that are buried in the zone of weathered, uncompacted clay may eventually seep onto the land surface downslope. After periods of rainfall, water that flows in the small tributary to Walnut Creek could then become contaminated. Groundwater in the terrace and alluvial deposits along Walnut Creek consequently could become contaminated. In order to prevent subsurface seepage from the pits, the wastes should be buried in the unweathered, lithified gray clay or shale that occurs below the base of the weathered, tan to gray clay. Field permeability tests, such as shallow-well permeameter tests, should be conducted within the unweathered gray clay or shale to confirm no seepage will occur. These tests should be conducted throughout the applicant's tract at sites selected for burial of wastes. The clay that is used to cover the wastes should be compacted so that the buried wastes, particularly volatile hydrocarbons, cannot escape upward. In addition, although the above recommendation should prevent subsurface seepage, surface erosion may eventually expose the buried wastes and allow surfacewater contamination to occur. Surfacewater flow erodes the clays at the site relatively easily not only because of the steep slope of the land but also because of the physical character of the clay. If erosion occurs and the buried wastes are exposed, contaminants would flow into Walnut Creek. The groundwater in the alluvium consequently could become contaminated."

In April 1972, TETCO prepared a subsurface investigation report for the chemical storage pits. TETCO drilled two borings were drilled to depths ranging from 36.5 to 37.5 feet below the bottom of the chemical storage pit. Groundwater was not encountered. The report concluded "the clays are impervious and are satisfactory for compacted impervious fill." A TWQD investigation report dated August 22, 1972, states that "Due to numerous complaints concerning the operation, and concern over possible groundwater contamination, a cease and desist order (TWQB Order 72-3E) was issued to IWMM on May 4, 1972 to terminate operation until further orders from the Board. A Hearing Commission report, dated May 17, 1972 recommended the Board deny the application for a permit. On May 22, 1972, the company withdrew its request for a permit and by letter dated June 19, 1972, the Board directed IWMM on proper close-out procedures for the industrial portion of the landfill."

On February 12, 1973, individuals from IWMM, the TWQB, the Austin-Travis County Health Department, the TWDB, and the TDH met to evaluate the history of the operation and the results of a backhoe investigation of a source of seepage. In the meeting, it was determined (from the previous backhoe investigation of the IWMM cell) "the seepage at the site would be stopped by removing the black dirt and replacing it with a clay key. In addition, the facility should be covered with at least 15 feet of clay. The trenches (clay key) should be on two sides of the disposal site and should extend below the level of the barrels." During the meeting, it was noted "that the disposal of municipal solid waste and industrial solid waste has occurred on the same land and in effect, is a double decked operation."

As a result of this meeting, Mr. Yantis of the TWQB directed IWMM to take remedial action consisting of the following:

- Remove the black dirt around the barrel disposal area as close as possible to the

barrels.

- Replace the black dirt with compacted key clay.
- Both industrial solid waste sites should be mounded over to about 15 feet above ground level.
- As promptly as possible with no foot dragging, provisions should be made to prevent the washout of the clay, including the grass sodding of both sites.
- The municipal solid waste areas should be marked.
- Prepare plans for the permanent markers for the industrial areas.
- Neutralize and cover the existing acid and solvent ponds.

Mr. Yantis noted that the company would retain responsibility for any future seepage or leakage from the site.

On July 23, 1973, Jack Arsenault sold the 108.34 acres of land from Universal Disposal, Inc. along with other assets to Ira D. Moore of Longhorn Disposal Service, Inc. The Austin-Travis County Health Department determined from an inspection on August 28, 1973 that not only that the site had changed ownership, but also that "the site was being operated in apparent violation of this Department's regulations in that large areas of exposed garbage and numerous flies were observed." On January 11, 1974, the TDH advised Mr. Moore and Mr. Prock of Longhorn Disposal, Inc. "of the necessity for their meeting the requirements of the TWQB regarding the previously approved and subsequently closed industrial site at this location."

On January 17, 1974, Mr. Moore wrote the Texas Air Control Board (in response to an accidental fire at the facility) that "[Any regulatory error [it] was due to ignorance since we have just purchased the landfill and have no experience from which to draw. Please note that we are learning very fast and we will comply with all regulations concerning solid waste disposal." On January 18, 1974, Mr. Prock transmitted "a copy of the survey outlining the industrial waste dumping at the Universal landfill ..." After satisfactory reports from several inspections by the TDH and approval by Universal Disposal, Inc., the TDH transferred the approval granted to Universal Disposal, Inc. on December 22, 1970 to Longhorn Disposal, Inc. The effective date of this transfer was October 10, 1974. However, they were also made aware that on October 16, 1974, new regulations would provide for issuance of "permits" instead of "approvals". Landfilling in the old Phase I cell and wet weather cell had continued uninterrupted from July 23, 1973 through the date of approval of the transfer. In the interim, an engineering firm hired by Austin Community Disposal, Co. in June 1974 studied the soil characteristics of an adjacent 108-acre site proposed for expansion of the landfill. The engineer's report presents general soil characteristics taken from the Soil Survey of Travis County and one boring log. The firm classified soils as CH and CL. They encountered groundwater at 48.7 feet below surface.

On July 17, 1974, Mr. Yantis of the TWQB called for an investigation of the closed industrial site "to see if there is any indication of seepage by various chemicals and oily materials." This investigation did not occur until February 23, 1977. On this day, the TWQB continuously cored three test holes at the abandoned IWMM cell (also known as drum disposal site No. 1). This is an approximate area measuring 200 feet by 400 feet. The borings were advanced to a depth 13 to 19 feet. One soil sample collected from each of these borings was analyzed for arsenic, barium, cadmium, copper, chromium, lead, manganese, mercury, nickel, selenium, silver, and zinc. The study concluded "subsurface or surface leakage from drum disposal site No. 1 was not detected during the investigation. No subsurface migration of waste is expected to occur at this site as engineering tests on selected samples of the Taylor clay indicate horizontal and vertical

permeabilities of less than 1 X 10-7 cm/sec. It appears that the keyway which was constructed in 1973 has been effective in preventing horizontal migration of waste."

On March 31, 1975, Longhorn Disposal filed for a Type I MSW Landfill Permit for the existing landfill. This permit (Permit No. 249) is finally granted on September 26, 1977. On April 9, 1976, Longhorn Disposal, Inc. requested the TDH to approve the company's authority to receive, handle, and dispose of "a broader type of waste material than it is presently handling." These wastes included acetone, polyester resin, methylene chloride, used printer's ink in drums, styrene, pigmented resin and liquid resin, foam process, foam soap, polyethylene film, lube oil, freon waste with water, and ring oil. Longhorn Disposal, Inc. submitted an engineer's report on "how to properly dispose of the subject waste items in its landfill." Longhorn Disposal Inc.'s request further stated, "The subject items herein above set out will all be catalogued and their exact location horizontally and vertically will be maintained in a permanent log for immediate reference at any time by any agency entitled to inspect the records and the landfill of the company."

On April 9, 1976, the TDH stated Longhorn Disposal, Inc. could accept nonhazardous industrial wastes which are incidental to the municipal type waste already being accepted, but that hazardous materials incidental to the municipal type waste already being accepted would require permission from the Department. Specifically, acetone should not be accepted. On May 3, 1976, the Texas Department of Health Resources (TDHR) approved Longhorn Disposal, Inc.'s request to accept and dispose of all of the wastes included in their April 9, 1976 letter with the stipulation that "a separate pit or trench shall be provided for the disposal of the methylene chloride and all resin drums which contain acetone in order to segregate these materials from the remaining municipal solid waste where unintentional fires are not uncommon. When sufficient number of drums are accumulated, they should be deposited in the bottom of the pit or trench and promptly covered with sufficient earth to eliminate fire and explosion hazards."

In an internal office memorandum dated May 7, 1976, the TWQB agreed that the TDHR had jurisdiction, but stated "that there is a good possibility for a problem area to develop at the Longhorn Disposal site." On August 13, 1976, the TDHR granted approval to Longhorn Disposal, Inc. to accept and dispose additional non-hazardous wastes from Jefferson Chemical Co. These reported non-hazardous wastes consisted of diatomaceous earth solids, polyol, pigments, methanol, phenyl mercuric propionate (<0.5%), dibutylparacresol (<0.3%), long-chain fatty alcohols, high molecular weight ethylene oxide adducts, and samples of laboratory chemicals.

These wastes were to be received in sealed metal drums. It is not clear from the information available if these drums would be placed "in cells of approximately ten barrels lots," "handled along with your regular municipal waste" or "best to scatter the drums and not put them in bunches" or "worked into the active disposal area without removing the waste from the drums to accomplish direct mixing." The TDHR did stipulate, however, that disposal excavations were to be "in a clay soil having a permeability of not more that 1 x 10^{-7} cm/sec, a Liquid Limit of not less than 30, and a Plasticity Index of not less than 15". The soils and the engineer's proposed plan for constructing the landfill at this site were considered adequate at the time of construction. However, Carter & Burgess' team was unable to locate any type of catalog or permanent log with the exact nature or location horizontally and vertically of this waste. In the August 22, 1977 investigation of drum disposal site No. 1, it was reported that "none has been disposed of near drum disposal site No. 1."

In 1978, Austin Community Disposal Company, Inc. bought Longhorn Disposal and formed Longhorn Community Disposal. In 1979, Longhorn submitted an application and permit amendment to expand the site by an additional 108 acres (total of 216 acres). On May 2, 1979, TETCO presented their findings of a subsurface investigation and soil testing in the old wet weather area. TETCO drilled one boring to a depth of 40 feet below ground surface.

Groundwater was not encountered. Atterberg limits, gradation, and permeability tests indicated the soil was suitable for landfilling. The engineer certified the suitability of the soils. On May 15, 1980, an engineering report presented the results of a geotechnical investigation and laboratory analysis of soil samples from 17 borings to depths ranging from 40 to 65 feet in the proposed 108-acre expansion area. Atterberg limits, gradation, and permeability tests indicated the soil was suitable for landfilling. The engineer certified the soils suitable for landfilling.

On June 24, 1980, the TDWR collected soil and groundwater samples from the abandoned IWMM cell (drum disposal site No. 1). The Department collected groundwater samples from monitoring wells #1 and #2 located at the disposal site designated as Site #1. Carter & Burgess' team found no record of these wells having been drilled. Chemical analyses from monitoring well #1 "indicate the presence of xylene, benzene, naphthalene, decahydronaphthalene and hydrocarbons." Analyses indicated "no significant concentration of heavy metals."

On November 26, 1980, the TDWR wrote the TDH to notify them of lateral migration of waste from the IWMM cells and to suggest they may want to assume jurisdiction and take corrective action. The TDWR offered to provide technical assistance. On December 17, 1980, the TDH responded to the TDWR stating they believed the TDWR was the "logical agency to provide surveillance over the industrial portions of the site." The TDH believed "joint surveillance and enforcement with clearly understood areas of primary interest will be in the State's best interest, but if this appears too cumbersome to the TDWR, we can initiate permit amendment proceedings to carve out the areas containing industrial waste".

From November 26, 1980 until March 5, 1981, dialogue between the two agencies about which agency should have jurisdiction continued. As a result of conversations between the TDH and the TDWR, it was decided that the TDWR would assume responsibility for that portion of the Longhorn Community Disposal Company which was initially authorized by TWQB Order No. 71-9E issued on May 3, 1970 (that is, the IWMM cells). The TDH would assume responsibility for the remainder of the landfill operations. In the interim, Austin Community Disposal Company, Inc. (also known as Longhorn Community Trash Disposal) submitted a formal request to the TDH to exclude the IWMM cells from its application for an amended permit. The TDH agreed to this request. The TDWR requested postponement of TDH's processing the application.

On March 5, 1981, the TDWR directed Longhorn Community Disposal Co. to submit plans and specifications for recapping, slope stabilization, establishment of a vegetative cover, and site monitoring within 30 days. On March 12, 1981, Austin Community Disposal Co., Inc. responded to the TDWR's request by providing an engineering report entitled "Austin Community Disposal Company, Inc.–Maintenance Improvements in Old Industrial Waste Area." This report describes improvements the company proposed to implement to close the old industrial area. The proposed improvements included the following activities:

- Additional cover was needed to eliminate ponding and minimize infiltration in the area of Drum Disposal Site #2 and the surrounding municipal waste.
- Disposal Site # 2 and the surrounding area should be graded to drain and leveled to allow mowing.
- Additional cover is needed on the sides of Drum Disposal Site #1 to reduce side slopes and all mowing.
- All areas which are disturbed by the above operations (1-3) should be re-topsoiled and revegetated.
- Drainage channels surrounding the industrial area should be graded to drain. The flow lines should be raised where possible to allow flattening side slopes on

adjoining municipal waste disposal areas which surround the industrial area."

Additional improvements included the following:

- Adding additional compacted clay cover, re-sloping, top-soiling, and revegetation of Drum Disposal Site #1 after purchase of adjacent property.
- Completing final grading and adding additional compacted clay cover, re-sloping, topsoiling, and revegetation to Drum Disposal Site #2.
- Reworking drainage channels surrounding the IWMM cells to improve and shift drainage away from the site, after purchase of adjacent property.

The proposed plan also included quarterly monitoring of surface water quality flowing into and out of the site. The monitoring would include upgradient and downgradient points to be analyzed for pH, conductivity, COD, TOC, and total dissolved solids. These proposed improvements were accompanied by engineering plans and specifications.

The TDWR responded on April 3, 1981 to both the TDH and Austin Community Disposal Co. that it was their opinion "that if this work is carried out as directed, existing problems at the IWMM site should be alleviated." The TDWR added copper and chromium to the list of parameters to be monitored, and directed that a "construction certification" certifying that all facility components have been constructed in accordance with specifications set forth in the proposal presented to TDWR on March 13, 1981. On July 31, 1981, the TDH granted Longhorn Disposal Service, Inc. a permit amendment to expand the landfill by an additional 108 acres (Permit No. 249A). In September 1981, Waste Management of North America purchased the Austin Community Landfill from Ira Moore (Longhorn Community Disposal Service, Inc.) and called their operation Longhorn Disposal Corporation.

On October 5, 1981, TDWR inspected the progress of the remedial work in the Old Industrial Waste Area. The inspector noted the "back side of Site #1 has not been reshaped since the TDH Permit for extending the municipal landfill has not been issued. Also, final work on the headwaters of the drainage between the industrial site and the Travis County Landfill has not been completed because the county anticipates some changes at its facility which would affect Austin Community Disposal. It did appear, however, that all work accomplished to this point has been done so to comply with the intent of the agreement. With the exception of the needed work on the back side of Site 1 it is my opinion that the site is secure at this time." Additionally, the TDWR gave permission to plug and abandon the three monitoring wells adjacent to Site #1.

In October 1981, Waste Management of North America began constructing cells in the area now referred to as the West hill. Carter & Burgess' team tabulated detailed information regarding design and construction of these cells from individual Soil Liner Evaluation Reports (SLERs) and Flexible Membrane Liner Evaluation Reports (FLMERs). The details can be found in ***Table 2***. ***Figure 5*** is a map of the different areas of the landfill showing the arrangement of the liners used in each cell. ***Figure 6*** shows the type of liner construction used in the different parts of the landfill. The cells which were constructed included: D-II-1, D-II-2, D-II-3, W-I-3, W-I-4, D-III-1, D-III-2, and D-III-3. These cells have constructed exterior sidewall liners and in-situ bottom liners.

On March 24, 1982, Austin Community Landfill's engineer notified the TDWR that drum site #1 and #2 had been topsoiled and seeded in September 1981. The report outlined a proposal for further maintenance in the area contingent on the county's completion of their adjacent areas in May or June and the result of legal proceedings against the TDH by other parties regarding the issuance of the permit for the expanded landfill. On April 20, 1982, the TDWR deleted surface water and soil sampling requirements at point A-2, but continued surface water sampling at

points A-1, A-3, and B. On October 7, 1982, the TDWR modified monitoring to include cover inspections quarterly, installation of, and quarterly monitoring from, a shallow groundwater monitoring well downslope of the IWMM cells, surface water monitoring until the groundwater well is installed.

On June 16, 1983, Austin Community Disposal Co., Inc.'s engineer prepared a Soil and Liner Evaluation Report (SLER) for a portion of cell W-I-1. This cell has in-situ sidewall and bottom liners. Atterberg limits, gradation, and permeability tests indicated the soil was suitable for landfilling. The engineer certified the soils suitable for landfilling. This report also references previous engineer's certifications for cells W-I-1, W-I-2, W-I-3, and W-I-4, but Carter & Burgess' team was unable to locate these certifications or the SLERs. During this period July 1983 to November 1984, Waste Management of North America constructed the following cells: D-II-3, D-II-4, D-II-5, D-III-2, and D-III-3. These cells had in-situ sidewall and bottom liners.

During the period November 1984 to December 1986, Waste Management of North America constructed the following cells: W-II-4, W-II-5, D-II-5, D-II-6, D-III-3, and D-III-4. These cells had constructed exterior sidewall liners and in-situ bottom liners.

On July 11, 1986, Waste Management of North America, Inc. contracted the services of an engineering firm to prepare an evaluation of the geotechnical character of the closed disposal areas to determine if the IWMM area could be used for stockpiling soil. The engineering study evaluated the stability of the earthen cap and underlying waste bodies, surface settlement, and migration of fluids from the waste. The study concluded "... these areas may be utilized for stockpiles providing that the stockpiles are constructed according to recommendations contained herein, and the stockpile construction is monitored relative to settlement and slope stability." The TDH and the TWC approved the stockpiling plan.

During the period December 1986 to August 1990, Waste Management of North America constructed the following cells: W-II-4, W-II-5, W-II-6, W-II-7, D-II-6, D-III-5, and D-IV-I. The cells bearing a W-designation had constructed exterior sidewall and bottom liners. The cells bearing a D-designation had constructed exterior sidewall liners and in-situ bottom liners. During a 1987 internal compliance review, Waste Management of North America noted that the "construction certification" of maintenance improvements required of the Austin Community Disposal Company, Inc. had never been provided. On December 11, 1987, Waste Management of North America provided the "construction certification". On July 15, 1988, WMI was granted a permit amendment from the TDH to install a methane gas collection system (Permit No. 249B).

In August 1990, Waste Management of North America conducted a fact-finding mission to obtain as much written and anecdotal evidence about the IWMM cells as possible. This mission included contacting residents in surrounding neighborhoods, chemical manufacturers, the TWC and other related agencies, the EPA and the Texas Attorney General's Office. Reportedly, records about the IWMM site's operation from 1971 through 1972 "were picked up at the EPA and the Attorney General's Office for their work in prosecuting Arsenault and never returned." Waste Management of North America was told that Arsenault had left the country, but was still being pursued by the State.

During the period August 1990 to October 1993 (effective date of Subtitle D), Waste Management of North America constructed the following cells: D-IV-1, D-IV-2, D-IV-3, W-II-4, W-II-5, W-II-6, and W-II-7. The cells bearing a W-designation have constructed exterior sidewall liners and constructed bottom liners. The cells bearing a D-designation have constructed exterior sidewall liners and in-situ bottom liners. On July 22, 1991, WMI was granted a permit amendment to expand their landfill by and additional 74 acres (Permit No. 249C).

During the period October 1993 to present, Waste Management of North America constructed the following cells: IV-3-D, WD-1, and WD-2. These cells are constructed with Subtitle D-type

composite liners. Cell IV-3-D has a 2-feet thick compacted clay liner, a 60-mil HDPE membrane, a leachate collection system, and 24 inches of protective cover which also serves as leachate filter media. Cell WD-1 has a prepared subgrade, a geosynthetic clay liner, a 60-mil HDPE textured (both sides) liner, a layer of geonet, a layer of geotextile, 2 feet of protective cover, and a leachate collection system. WD-2 has a prepared subgrade, a geosynthetic clay liner, a 60-mil HDPE smooth floor liner and a 60-mil textured slope liner, a layer of geonet, a layer of geotextile, a 2 feet of protective cover, and a leachate collection system. Cell WD-3 has a 3-feet recompacted cohesive soil liner, a 60-mil HDPE smooth floor liner and a 60-mil textured slope liner, a layer of geonet, a layer of geotextile, a 2 feet of protective cover, and a leachate collection system. This cell is not being used at this time. Waste Management of Texas reports this cell is being reserved for proper disposition of the IWMM cell's nonhazardous wastes proposed for exhumation, characterization, and management.

On May 1, 1995, WMI submitted a groundwater monitoring system design report recommending replacement of the existing 6 monitoring well network with one consisting of 11 new wells. Ten of the new monitoring wells, including two adjacent to the industrial/hazardous waste disposal area, would be conversions of piezometers that had been installed earlier. In June 1995, Waste Management of North America contracted the services of an engineering firm to prepare a work plan for evaluation of subsurface conditions in the Austin Community Landfill Phase I area. In August 1995, the engineering firm conducted a subsurface evaluation of the Phase I area. The investigation assessed the extent and possible mechanisms of generation and storage of landfill liquids in and around the Phase I and old wet weather areas, and proposed alternatives for addressing potential problems associated with these liquids. The investigation included 30 borings, five of which were converted to temporary piezometers.

The report included cross-sections of the areas that showed clay cap thickness, waste body volumes, liquid head levels, and topography. The report concluded that reduction of the hydrostatic head by placement of extraction wells could possibly prevent breakthrough of the cover material by liquids. Waste Management of Texas plans to provide additional cover to the old Phase I area, but has been unable to implement these plans because the adjacent Travis County Landfill plans for leachate removal have never been implemented by the county. Historic co-mingling of waste by Universal Disposal, Inc., Longhorn Disposal Service, Inc., and the county in the old Phase 1 area and the Travis County Landfill may cause the two areas to behave as a single cell. The county's portion comprises approximately 70% of the waste volume. Austin Community Landfill's portion comprises approximately 30% of the waste volume.

In 1996, the county constructed a leachate removal system at the Travis County Landfill but has never operated it for any extended period of time. Until the county reduces the hydrostatic head in the county-owned portion of this area, leachate reduction and placement of additional cover in the old Phase 1 area will not be effective. Representatives of Waste Management of Texas reportedly have been meeting with the county to determine what the county has planned, but have been unable to obtain a firm plan from the county.

On December 20, 1995, the TNRCC disapproved a proposed revision to the groundwater monitoring systems design report, expressing concern that groundwater flow at the industrial/hazardous waste disposal area had not been adequately characterized and recommended expansion of the groundwater monitoring system by 6 wells (total of 16). On March 15, 1996, WMI submitted a revised groundwater monitoring system design report proposing a groundwater monitoring system consisting of 10 wells and deleting the two monitor wells located adjacent to the industrial waste disposal area.

On April 10, 1996, the TNRCC approved WMI's Groundwater Monitoring System Design (GWMSD). On April 23, 1996, WMI requested a Class I Modification of the GWMSD to replace the six existing monitor wells with 10 new ones (none of the new ones are directly by the industrial waste disposal site). On July 24, 1996, The TNRCC approved the April 23rd

modification request after it is established that five of the six existing wells would not be plugged, but also will not be monitored (this includes the wells immediately adjacent to the industrial waste disposal site).

In October 1997, Waste Management of Texas met with the Texas Natural Resource Conservation Commission (TNRCC) to discuss a Waste Management of North America-sponsored remediation of the IWMM cells. On December 4, 1997, Waste Management of Texas provided the TNRCC with a work plan to characterize materials disposed in the IWMM cells. The plan described a Phase 1 study to characterize the wastes and to establish appropriate options for treatment and disposal of these wastes. On December 16, 1997, the TNRCC approved Waste Management of Texas' work plan. Waste Management of Texas coordinated their work effort with the TNRCC's Pollution Cleanup Division.

On May 4, 1998, Waste Management of Texas provided the TNRCC with a comprehensive report of the results of the evaluation. The report contained analytical results of samples collected and tested from 20 borings. The samples were tested for anions, metals, nonhalogenated organics, volatile organics, cyanide, and pH. The study did not define the vertical and lateral extent of the waste and based upon the results of this study, Waste Management of Texas contracted the services of an engineering firm to prepare a sampling and analysis plan and a work plan for removal of the closed IWMM cell. These plans were prepared in May and June of 1998.

The May 1998 plan presents a comprehensive and detailed sampling and analysis program to characterize the waste as it is exhumed to determine which wastes are hazardous and which wastes are non-hazardous in accordance with the Resource Conservation and Recovery Act (RCRA). The June 1998 plan presents a comprehensive and detailed program for excavation, treatment, transportation, and disposal of wastes from the acid pits and the two buried drum sites. The plan includes site safety and health monitoring (including air) by a certified industrial hygienist, project organization, and project schedule. The project budget was estimated to be in excess of $20 million. Conceptually, the plan proposes to dispose Class I non-hazardous wastes in a Subtitle D industrial waste cell constructed adjacent to the IWMM cells in 1998, and to transport all hazardous wastes to a licensed hazardous waste facility for incineration or landfill.

In September 1998, Waste Management of Texas contracted the services of an engineering firm to perform a geophysical survey of the IWMM cells. The geophysical method selected for this survey was a measurement of low-frequency electromagnetic induction. The goal of the survey was to more accurately delineate the buried drum disposal areas. The survey was conducted on an approximate 9.2-acre area. The report includes a three-dimensional view of the results. To date, Waste Management of Texas has not implemented the remediation plans prepared in May and June 1998.

The currently available disposal capacity and corresponding remaining useful life of the ACL based on projected waste disposal rates and reports made to the TNRCC are shown in Table 5.

3. Operating and Compliance History

Based on our review of this data, it appears that waste cells at the Austin Community Landfill have been generally constructed in accordance with applicable rules and regulations in force at the time of their construction. It is evident from the data that as the rules became more thoroughly developed, the numbers of tests for soil characteristics increased. The geotechnical properties of the soils has remained fairly consistent with expansion of the landfill over time, indicating a relatively uniform subsurface stratigraphy.

As with any engineered system, sound operation and maintenance programs are critical to the successful performance of landfills. From our review of historic regulatory inspection reports and other documents, it is clear that the IWMM cell was not operated by Industrial Waste Materials

Management, Inc. in accordance with the plans that had been designed by their consulting engineer. With the exception of the brief period of time just after Longhorn Disposal Services, Inc. purchased the landfill from Universal Disposal, Inc., the old Phase 1 area and old wet weather area appear to have been operated by Longhorn Disposal Services, Inc. In accordance with the plans that have been designed by their consulting engineer. The current owner, Waste Management of Texas, has kept better operation and maintenance records for the landfill than either of the previous two owners.

There have been several violations cited by environmental regulators during the history of the ACL site. ***Table 3*** is a summary of inspections at the ACL during the last seven years showing the inspection results and action taken, if any. During this time period, 17 inspections were conducted. Violations were noted during nine of the inspections. Violations included the presence of upgradient ponded water, inadequate daily cover, erosion of intermediate cover, problems with windblown litter, sediment runoff, and insufficient personnel on site. In 1996 Waste Management was fined in excess of $6,000 for failing to maintain adequate cover on portions of the landfill. In cases of the remaining violations, letters were sent to ACL by the TNRCC describing the nature of the violation(s) and corrective actions which needed to be taken. ***Table 4*** lists complaints filed with the Region II Office of the TNRCC against the ACL site in the last five years. Other complaints may have been filed more than five years ago, or with different divisions of the TNRCC not contacted during this assessment. Both complaints listed on ***Table 4*** were responded to by the TNRCC and satisfactorily addressed by ACL representatives.

Our findings and conclusions regarding the ACL fill site are discussed in greater detail in ***Section 7***. Our recommendations developed by Carter & Burgess' team for the ACL site are discussed in ***Section 8***.

4. Environmental Monitoring History and Potential Migration Pathways

Groundwater

Groundwater monitoring was initiated at the ACL site in 1982 as a result of concerns associated primarily with the old IWMM site. Some monitoring of groundwater was apparently conducted at the site in the 1970's, but no data were found on the earlier monitoring during this assessment. As discussed in ***Section 6.B.1***, the Texas Department of Water Resources reportedly sampled two wells at the IWMM site in 1980 and found hydrocarbons in Well #1.

The site groundwater monitoring system was upgraded in 1996 with the installation of new monitoring wells in accordance with Subtitle D monitoring requirements. Beginning in 1997, groundwater monitoring has included the collection of groundwater samples on a quarterly basis for establishing "background" concentrations at the site. The facility is now ready to begin detection monitoring pending approval of statistical analysis of the background monitoring events. It was noted during this assessment that the TNRCC had rejected ACL's initial statistical submittal. A revised analysis of the data has not yet been submitted. Pre-Subtitle D data, as well as the Subtitle D background monitoring events, were reviewed as part of this assessment.

The groundwater monitoring system at the ACL currently includes eight groundwater monitoring wells installed in the weathered portion of the Taylor. Two wells are located upgradient (MW-5A and MW-15) and six wells are located downgradient (MW-2B, MW-11, MW-12, MW-13, MW-20, and MW-21) of past and current landfilling operations. Two additional wells (MW-1B and MW-19) will be included as part of the monitoring system as landfill operations expand to the eastern part of the site. The final monitoring system will include ten groundwater monitoring wells. Water table contours with the locations of pre-Subtitle D and post-Subtitle D monitoring wells are shown on ***Figure 7***. ***Figures 8 and 9*** are cross sections of the ACL site showing groundwater levels from monitoring well data.

A summary of groundwater monitoring data is provided in ***Appendix B***. In order to evaluate possible changes in groundwater quality over time, certain groundwater quality parameters (chloride, sulfate, nitrate, and total organic carbon) were graphed. These graphs represent a direct data comparison over time and are also presented in ***Appendix B***. The pre-Subtitle D wells provide the longest monitoring history at the site. However, many of these wells were not constructed to current standards and as such are only good for comparison of data over time. As seen on the graphical presentations and analytical tables of the groundwater quality parameters, the general trends observed in groundwater quality data show relatively consistent quality over time. Some reductions were observed in the concentration of certain inorganic parameters over time.

Some of the variation in results between sampling events are typical for the Weathered Taylor clay, in that organic compounds become concentrated (concentrations increase) during periods corresponding to low water levels in the Taylor and become diluted (concentrations decrease) during wet periods corresponding to high water levels in the Taylor. However, the long-term trend for water quality parameters has been an overall reduction in the concentrations of inorganic compounds. This may be due to an increased amount of recharge by percolation of rainwater from the surface as a result of the retention of stormwater during operation in the landfill.

Organic Compounds and TOC

Groundwater samples were collected at the ACL facility in order to detect potential releases of organic compounds from the IWMM site and/or pre-Subtitle D area of the landfill. A review of the analytical data tables and graph of the TOC data shows frequent changes from one sampling event to the next, with an overall trend showing a general reduction in TOC concentrations over time in all of the monitoring wells except MW-6 and MW-3. The frequent variation in TOC concentrations in most of the wells is likely associated with drought/storm events (discussed in ***Section 6.B.1***).

Exceptions to the general trends observed in TOC concentrations were monitoring wells MW-6 (located near the west end of the IWMM site) and MW-3 (located near the east end of the IWMM site). MW-6 is directly downgradient of the IWMM site and MW-3 is crossgradient to upgradient from the IWMM site. TOC concentrations in these wells have historically been higher than the other monitoring wells at the ACL site. However, TOC concentrations prior to 1988 were apparently still influenced by storm events as is typical in the Weathered Taylor. Beginning in 1988 at MW-6 and in late 1989 at MW-3, TOC concentrations in these two wells began to show little variation from one sampling event to the next and have shown a general increase in TOC concentrations over time (especially in MW-6). This type of trend in TOC concentrations could indicate impacts from organic compounds, such as the type reportedly disposed of at the IWMM site.

Analysis for specific volatile organic compounds (VOCs) was performed on samples collected from MW-6 and MW-3 during 1988. This sampling event was apparently focused on concerns at the IWMM site. Samples were analyzed for priority pollutant VOCs in those two wells only. No VOCs were detected in the samples collected in 1988. No other data was found documenting the analysis of specific VOCs prior to 1988. Analysis for an expanded VOC list began on all site monitoring wells in 1991. Total organic halogens were detected once in MW-6 (1ug/l) and vinyl-chloride was detected once in July 1994 (1ug/l). Since these are extremely low concentrations and isolated detections, they are not considered significant. MW-6 and MW-3 have apparently not been sampled since installation of the Subtitle D monitoring wells in 1995. Vinyl chloride (at 5 μg/l) was detected at a concentration above its MCL (2 μg/l) in July 1997 in MW-2 located southwest of the IWMM site but has not been detected since. Cis-1,2-DCE has also been detected in MW-21 at concentrations below it's MCL of 70 micrograms per

liter.

Organic compounds consisting of dissolved chlorinated hydrocarbons have also been detected in MW-5, which is located immediately upgradient from a pre-Subtitle D fill area on the northwest portion of the site. Concentrations of organic compounds have been below MCLs, except for trichloroethane at 6 μg/l (MCL=5 μg/l) in three sampling events in the mid 1990's. Although located upgradient from landfill operations, this well is likely detecting organic compounds associated with diffusion and dispersion from the landfill. The presence of VOCs such as those detected in MW-5 are typically associated with landfill gas (personal communication with Jeff Davis, TNRCC Groundwater Protection). It should also be noted that MW-5 was replaced and renamed MW-5A as part of the Subtitle D upgrade. Organics have not been detected since that upgrade in 1995.

A review of metals concentrations over time in the pre-Subtitle D wells indicates little change in the concentrations of metals since groundwater monitoring was initiated. However, some metals have been detected above their respective MCLs although detections have been sporadic in distribution and not consistently detected. Sediments of the type observed in the Taylor typically contain highly mineralized water. As with other inorganic groundwater quality parameters, this could simply reflect a temporary concentrating of metals when water levels in the weathered clay are low due to dry climate conditions or dewatering associated with landfill activities. The statistical analysis of metals to be performed as part of the Subtitle D monitoring should establish background concentrations for metals in the weathered Taylor at the site. An expanded study of background metals in the Weathered Taylor could also be performed to include off-site wells.

Potential Migration Pathway

The weathered portion of the Taylor is the primary potential migration pathway for contaminants in groundwater at the ACL site. Although low transmisivity should prevent widespread off-site migration in the weathered zone, discharge of groundwater from this zone to surface water in adjacent streams could result in migration of contaminants via surface water.

An additional potential migration pathway is downward through the Taylor Clay to the underlying groundwater. Chlorinated solvents which were apparently included in the industrial waste material disposed of at the IWMM site are known to migrate readily downward through clay in some environments. It is unlikely that activities at the IWMM site have impacted deep groundwater beneath the site. However, numerous cases have been documented where chlorinated solvents have migrated through thick clays to underlying aquifers.

Surface Water

Releases to surface water are the most likely potential migration pathway to potential receptors at the ACL site. No surface water monitoring data was not found in our review of the TNRCC files. The ACL site engineer indicated that the site outfalls are sampled semiannually. However, data from these sampling events were not available for review.

Following the initial site visit to the ACL, Carter & Burgess' team (Tim Jennings and Craig Carter) were able to gain access to the City of Austin property which lies immediately south of the ACL and immediately east of the old Travis County Landfill. The purpose of this field inspection was to determine conditions along a small drainage (unnamed tributary to Walnut Creek) which flows onto the City property from the south under U.S. 290, then along the west side of the City property just inside the fence between the City property and the Travis County Landfill property. The toe of the old Travis County Landfill comes right up to the fence. The drainage then flows south onto the ACL site.

During this field inspection, water in the creek was clear with no visible signs of leachate.

However, two areas of standing liquid were observed west of the fence on the Travis County Landfill property. The water in these areas was "milky" in appearance, with iron staining and an "organic looking" sheen typical of landfill leachate seeps. Cattails growing in this area indicates it is likely wet all of time. During a second site visit at the ACL on January 11, 1999, an inspection was conducted along the drainage which flows onto the ACL property from the south (described above during initial site visit) and borders the north side of the Phase 1 area. The site inspection was conducted by Tim Jennings, Craig Carter, and Paul Schuman. Marcos Elizondo and Rusty Fusilier accompanied the Carter & Burgess team members while on the WMI property.

The entire reach of the unnamed drainage described above was inspected, where present on ACL property. Minor iron staining was observed in the streambed near the north fence line (east end of the Phase 1 area). Groundwater seeps began to appear at approximately the mid-point between the east and west ends of the drainage reach on the ACL property. These seeps did not exhibit iron staining or other indication of leachate, but were more or less continuous to the west side of the Phase 1 area. On the west end of the Phase 1 area water from the seeps had a "milky" appearance and iron staining became common likely indicating leachate seeps. The approximate location of seeps on the Phase 1 area are shown on ***Figure 2***. No indications of leachate seeps were observed in the vicinity of the IWMM site.

In order to make a determination as to the primary of source of alleged "leachate" seeps into the unnamed tributary to Walnut Creek, a drive through inspection was also made of the old Travis County Landfill located immediately adjacent to the southern boundary of the ACL. Although not part of the scope of this assessment, this was considered a critical issue for neighbors living in the area of the ACL site. The old Travis County Landfill and the ACL Phase 1 area are known to have contiguous wastes.

During the drive through at the Travis County Landfill, numerous seeps of what appeared to be landfill leachate were observed starting on the southwest flank of the landfill and continuing along the west side all the way to the common fence with the ACL. Associated with the leachate seeps was widespread erosion and localized slumping of the landfill cover. A locally strong hydrogen sulfide odor was also noted, indicating that the landfill is apparently degassing. The approximate location of seeps observed at the old Travis County Landfill are shown on ***Figure 2*** and are displayed in the photographs in ***Appendix C***.

Samples were collected by the TNRCC inspector from seeps at the ACL and Travis County Landfill in December 1998. Although the exact sample locations are unknown, these data do provide a "snap shot" of the quality of water seeping from the ACL Phase 1 area and the Travis County Landfill, which are contiguous. No organic compounds were detected in either sample collected. However, nitrogen levels (74.84 mg/l and 53.16 mg/l) were elevated above recommended safe drinking water levels (50 mg/l). Total organic carbon levels (89.5 mg/l and 95.5 mg/l) and chemical oxygen demand levels (240 mg/l and 234 mg/l) were also relatively high.

Landfill Gas

The ACL site has a landfill gas collection System (***Figure 10)*** which is tied into a similar system at BFI's Sunset Farms Landfill on the adjacent property to the northeast. The Landfill Gas Management Plan for the ACL (dated April 1994) calls for a contingency plan to be implemented if methane readings at any location exceed the allowable maximum percent LEL (5% methane). The plan calls for the immediate notification of the Executive Director of the TNRCC, the Section Manager of the Compliance and Enforcement Section of the TNRCC MSW Division, neighboring residents within approximately 1,000 feet of the location of the reading, and owners of underground utilities which cross the facility within approximately 1,000 feet of the location of the reading. The plan further calls for action to be taken within 60 days to determine the extent of the gas migration problem, and to prepare a remediation plan which may include passive

perimeter interceptor trenches or gas extraction systems.

In approximately July 1993, the ACL activated a gas recovery system consisting of gas extraction wells, collection piping, a blower system, and a flare station. Waste Management has since requested (and was granted in March 1998) a Class I Modification to MSW Permit No. 249-C to add a section of pipe to connect the ACL system to the adjacent BFI gas collection system. This connection allows the ACL to sell landfill gas to BFI for use in operating their recovery plant and for generation of electricity.

Methane concentrations measured in perimeter gas monitoring probes at the ACL site commonly exceed the LEL. The exceedences most commonly occur in the probes located along the property boundary with the adjacent BFI Landfill. Methane levels have frequently exceeded the LEL in gas probes P-6A, P-7, P-14, and P-16 (***Figure 10***). In July, 1997 a gas control trench was installed in the vicinity of Probe P-6A in an attempt to lower the methane concentrations in the area. Exceedences of the LEL in the perimeter gas monitoring probes are greatly reduced or eliminated when the landfill gas recovery system operates.

C. BFI Sunset Farms Landfill

1. Permitting and Siting

Permits

The Sunset Farms site is currently owned and operated by Browning-Ferris Industries, Inc. (BFI). The TDH issued a permit (Permit No. 1447) for the landfill on October 20, 1981, with Sunset Farms (a Joint Venture of BFI and Tiger Corporation) as the permittee and Tiger Corporation as the site owner. On November 19, 1982, the TDH approved the transfer of Permit No. 1447 to BFI. A Class I Permit Modification was submitted to the TNRCC for this site in April 1994 outlining procedures for bringing the facility into compliance with new TNRCC and Subtitle D requirements promulgated by the EPA.

Siting

The Sunset Farms site is located in an area absent of topographic features which would restrict its development as a solid waste disposal facility. Land use in this area is varied. Harris Branch Subdivision is located approximately one-half mile northeast of the landfill, but had not been built at the time of permitting of the landfill. Applied Materials, a manufacturer of electronic computer components, has a facility to the east directly across Giles Road from the landfill. Robert F. Mueller Airport is located approximately 5 miles southwest of the site, and the TIMS and Bird Nest Airports are located more than 4 miles from the site. The development and operation of the site has not resulted in the destruction or adverse modification of the critical habitat of any endangered or threatened species.

The Sunset Farms site is located immediately adjacent and to the north of the Austin Community Landfill (ACL). The physiographic province of the area is the same as described for the ACL in ***Section 6.B.1***. The pre-landfill ground surface at the Sunset Farms site consisted of a series of gently rolling hills dissected by erosional valleys. Topographic relief ranged from 618 feet to 700 feet msl. Surface runoff from the southwestern portion of the site is towards the south across the ACL into an unnamed tributary which drains to Walnut Creek. A drainage divide is present on the western side of the property, which causes the eastern and northern portions of the site to drain to the east toward Gilleland Creek which flows into Lake Walter E. Long. A 100-year floodplain is designated in the northeastern portion of the site. This area has been given back to the original land owner and is used for feed crop agriculture.

Geology/Hydrogeology

The Sunset Farms Landfill is also located within the outcrop area of the Taylor Group. The site geology and hydrogeology is identical to that described for the ACL in ***Section 6.B.1***.

2. Landfill Design and Construction

Design

As conceived in the original Permit Application, the landfill was to be developed in four phases. Phase 1 was to consist of a 101-acre section on the southeast portion of the site. Upon completion of Phase 1, disposal operations were to progress to Phases II, III and IV. Disposal activities were not to begin in a new phase until operations were completed in the existing phase. The Permit Application projected an estimated life for Phase 1 of 15 years and a total site life (276.9 acres) of approximately 50 years. These estimates were based on an assumed average disposal rate of 600 tons per day. Recent conversations with landfill management personnel indicate that the current plan calls for development of the site in two phases.

The Site Development Plan (SDP) outlined in the original Permit Application called for excavation to an average depth of 10 to 15 feet below grade and filling to an average height of 50 feet. Compacted clay sidewalls and bottom areas would be used to protect the underlying groundwater table (reported to be perched). Landfilling was to be accomplished by the area method. The facility design included a special area for wet weather disposal. A leachate collection system was not specified for any of the landfill disposal areas at the facility.

Although a program for periodic monitoring of methane gas was specified for the landfill, the SDP did not call for a permanent methane venting system until Phase 1 was completely filled. The methane gas monitoring program consisted of gas monitoring probes which were placed around the landfill perimeter and interior. Probes were generally placed in the ground between landfill areas and off-site structures located within 1,000 feet of a waste unit footprint, in backfilled utility trenches, in areas with localized soils having a relatively high permeability, and other high risk zones. Approximately 19 probes were installed at the facility in the early 1980's and monitored quarterly.

On April 8, 1994, BFI submitted a Class I Permit Modification to the TNRCC MSW Division for the landfill pursuant to 30 TAC Section 305.20. The purpose of this modification was to upgrade the facility to satisfy Subtitle D requirements which went into effect on October 9, 1993. The modified Permit Application documents indicated that at the time the Subtitle D regulations went into effect approximately 100% of the total permitted landfill area remained open and that approximately 71% was listed as being unused. The document further indicated that approximately 14% of the total permitted area had final cover in place. The modified Permit Application projected a remaining landfill life of 22.6 years based on an average waste disposal rate of 1,300 tons per day. The disposal rate is twice that cited in the original Permit Application. The total permitted volume of the landfill assuming disposal to a depth of 15 feet below grade was approximately 29.5 million cubic yards. At the time of the Permit Modification, approximately 7.75 million cubic yards had been filled leaving about 21.75 million cubic yards in remaining capacity. According to the Annual report filed with TNRCC the BFI landfill receives approximately 1,777 tons of waster per day. The landfill has used a total volume of 5,784,268 c.y. and has a remaining volume of 12,910,339 c.y. (7,100,686 tons) which translates into a remaining useful life of about 13.30 remaining years. ***Table 5*** compares the estimated capacities of the three landfills.

The post-Subtitle D Site Development Plan (SDP) prepared for the Sunset Farms site calls for a composite liner (clay and FML) with a leachate collection system. The FML used at this site

consisted of a 60-mil thick high density polyethylene (HDPE) geomembrane placed directly over the clay liner of the cell bottom and side slopes. The liner for the bottom and sides of fill areas was to consist of 2 feet of compacted clay having a laboratory permeability not exceeding 1.0 x 10^{-7} cm/sec. An updated SLDQCP was included in the Permit Modification which addressed installation of the upgraded liner system. The leachate collection system constructed over the geomembrane consisted of a granular drainage layer (wash sand), two collector drains, and a 12-inch thick protective cover (shredded tires). The collector drains consist of 6-inch diameter welded perforated HDPE pipe surrounded by gravel and a nonwoven geotextile filter fabric installed directly on top of the geomembrane liner. Twin 18-inch diameter HDPE upslope risers extend down into the leachate collection sump where a submersible pump is located for removal of leachate from the cell.

As part of the modified Permit Application, the facility design was revised to show a final cap consisting of an 18-inch thick infiltration layer with a maximum permeability of 1 X 10^{-7} cm/sec, a 6 to 12-inch thick drainage layer with minimum permeability of 1 X 10^{-7} cm/sec and a minimum 6-inch thick erosion layer consisting of earthen material capable of sustaining plant growth. This final cover system was expected to reduce the volume of leachate generated due to infiltration through the improved landfill cap. Other Subtitle D upgrade provisions include a Site Operating Plan, Landfill Gas Management Plan, Leachate and Contaminated Water Plan, and a Post-Closure Care Plan. The post-closure care period was extended to 30 years after closure. The site is currently being monitored by 16 newly installed groundwater monitoring wells which are sampled and analyzed in accordance with TNRCC regulations and the Groundwater Sampling and Analysis Plan for the site. An Annual Earth Electrical Resistivity Survey (EERS) is currently required for this site for the determination of the presence of groundwater. The stormwater controls for the landfill have been designed consistent with the current TNRCC MSWMR for Type I landfills.

Construction

Carter & Burgess' team reviewed the Soils and Liner Evaluation Reports (SLERs) retrieved from the TNRCC files for the Sunset Farms site. The purpose of the SLERs is to assure that soils encountered at the Sunset Farms site meet agency permeability requirements. In addition to the verification of general soil permeability, the evaluation includes a visual inspection by a registered professional engineer of professional geologist of trenches and other areas to receive solid waste for features such as cracks, fissures, sand lenses, or other problems that could not be anticipated or known from the data provided in the original soils information (Permit Application). The type and frequency of tests required to verify soil and liner suitability at the Sunset Farms site was originally specified in the Quality Control Plan (SLQCP) approved by the TDH in 1981 as part of the permitting process.

The initial SLERs prepared for the Sunset Farms site primarily involved visual inspection of excavations and documentation of overexcavation and recompaction activities in areas where secondary features were observed. Data included in the reports consisted of field density test results and compaction curves for the materials used as liners. The SLERs addressed the construction of bottom, sidewall, and periphery liners and perimeter berms. A listing of the various reports reviewed by Carter & Burgess' team is summarized below:

Date of Report	Reviewing Agency	Approval Letter Received
4/2/82	TDH	No
8/6/82	TDH	No
1/3/83	TDH	No
4/12/83	TDH	No

7/25/83	TDH	Yes
11/7/83	TDH	No
1/20/84	TDH	No
5/10/84	TDH	No
7/25/84	TDH	Yes
11/26/84	TDH	Yes
2/26/85	TDH	Yes
3/25/85	TDH	Yes
6/11/85	TDH	Yes
11/12/85	TDH	No
1/8/86	TDH	No
3/10/86	TDH	Yes
3/9/87	TDH	Yes
10/4/90	TDH	Yes
12/1/91	TDH	Yes
6/29/92	TWC	No
8/31/92	TWC	Yes
4/27/93	TWC	Yes
6/28/93	TWC	Yes
9/20/93	TNRCC	Yes

The approval letter received from the TDH in response to the SLER submitted on March 10, 1986 requested updating of the SLQCP to meet new testing requirements established by the Department. The new requirements expanded the types and frequency of testing performed on clay liner materials. Additional changes in testing required for SLERs became necessary when revisions to the TNRCC Technical Guidance document (TG-3) became effective (October 1, 1992).

A majority of the SLERs reviewed for the period 1982-1993 addressed over-excavation of the Stratum II soils present in the base of proposed land disposal areas to a depth of approximately 2.5 feet below the planned depth of disposal (top of liner elevation). These soils consisted of low permeability clay characterized by shrinkage cracks, fissures, and joints. The remaining 6 inches of soil was then scarified and recompacted in-place to an acceptable density which would produce a permeability of $1x10^{-7}$ cm/sec or lower. The 2.5 feet of over-excavated soil was replaced in individual lifts and compacted to acceptable density as required. Compacted liner material which did not meet density requirements as determined by field testing was reworked and retested until acceptable.

Carter & Burgess' team also reviewed all Flexible Membrane Liner Evaluation Reports (FMLERs) retrieved from the TNRCC files for sections of the landfill constructed after the promulgation of Subtitle D regulations (October 1993). The FMLERs summarize Quality Assurance monitoring during installation of the geomembrane and leachate collection system for various sectors of the landfill. Each report contains a certification that the installation of the geomembrane, leachate collection system, and protective cover was in substantial compliance with the project plans and

specifications.

Only one FMLER was retrieved from the TNRCC files and reviewed by Carter & Burgess' team. This FMLER (dated August 22, 1996) was for Phase 1 - Sections 5 and 6. An approval letter for this FMLER was issued by the TNRCC. The SLER for these landfill sectors could not be located. Documentation indicating TNRCC approval of the SLERs and FMLERs for the other post Subtitle D landfill areas was located, although the reports could not be found. According to the documentation we found, the SLER and FMLER for Phase 1 - Sectors 1 and 2 were approved by the TNRCC in January, 1995 and March, 1995, respectively. The SLER and FMLER for Phase 1 - Sectors 3 and 4 were approved by the TNRCC in December, 1995 and January, 1996, respectively. The SLER and FMLER for Phase 1 - Sectors 7 and 8 were both approved by the TNRCC in June, 1998.

3. Operating and Compliance History

In August 1991, BFI submitted a proposal to the TDH for stabilization of nonhazardous bulk liquids at their landfill. The documents submitted included a Quality Control and Operational Plan for the Stabilization Process (QCOPSP). Upon review of these documents, the TDH granted approval to install and operate the proposed facility. The stabilization area consisted of an approximate 50-foot square area covered with a 2-foot thick compacted clay pad surrounded by 3-foot high earthen berms.

Carter & Burgess' team also discovered and reviewed a Management Plan for the Acceptance and Treatment of Liquid Wastes at the Sunset Farms site submitted to the TNRCC on August 19, 1994. This plan outlined specific operational and technical procedures to be utilized for the stabilization of bulk, nonhazardous liquid wastes prior to landfill disposal at their facility. Liquid waste means any material that is determined to contain "free liquids" as determined by the Paint Filter Liquids Test, which are prohibited from disposal by federal Subtitle D landfill regulations. The wastes to be accepted under this plan include grease trap wastes, automobile sand (grit) trap wastes, and other selected bulk liquid wastes including nonindustrial bulk liquids and/or Class 2 or Class 3 industrial solid wastes which contain free liquids, but will not include septic tank wastes or other TNRCC prohibited or permit restricted wastes. The plan specified stabilization of the waste by the addition of a bulking agent such as flyash, kiln dust, wood chips, saw dust, hay, soil, and/or other suitable materials that have been approved by the TNRCC for use in liquid stabilization.

Correspondence retrieved from the TNRCC files dated July 29, 1992, from the TWC MSW Division, Special Waste Evaluation Team (Dr. L.E. Mohrmann) to BFI indicated approval was granted for disposal of approximately 50 cubic yards of contaminated soil generated during the removal of diesel and fuel USTs at the City of Austin Old Seaholm Power Plant on Barton Springs Road in Austin. Documents retrieved from the TNRCC files indicated other requests for disposal of special waste at the Sunset Farms site had been made. Correspondence dated October and June 1996 indicated that the Department of the Air Force petitioned the TNRCC to approve disposal of Class 2 non-hazardous waste (concrete and metal debris) and rinsate from the closure of a number of oil/water separators at Bergstrom AFB. Additional correspondence reviewed by Carter & Burgess' team revealed that in early June 1982 a small quantity (several bottles) of combustible chemicals was inadvertently picked up from a dumpster at the Medical Arts Complex by one of BFI's trucks and taken to their landfill for disposal. Following reporting and a review of the incident by TDH, it was decided to leave the material at the landfill since the quantities were too small to pose an environmental threat.

From November 1992 to the present, only one violation was noted at the Sunset Farms site during routine inspections performed by the TNRCC or other state agency inspectors. On July 10, 1997, a violation of MSW regulation 30 TAC 330.130 (Landfill Gas Control - methane readings exceeded the regulatory limit) was recorded. A letter was sent to BFI describing corrective action to be taken. During all other inspections on record, the Sunset Farms site was

found to be in compliance. A review of complaints filed with the TNRCC over the last five years found four complaints for activities associated with the Sunset Farms site. The subjects of the complaints included truck washing activities, uncovered trucks, a truck leaking hydraulic fluid, and discharges from an aboveground storage tank flowing towards a storm drain. In each case, the complaint resulted in visits by the TNRCC and resolution of the matter except for the complaint concerning the uncovered truck which was handled with a phone call to BFI and resolution of the matter without a visit from the TNRCC. ***Table 6*** lists landfill inspections at the Sunset Farms site and ***Table 7*** is a summary of the complaints filed against the site during the last 5 years.

4. Environmental Monitoring History and Potential Migration Pathways

Groundwater

Groundwater monitoring was initiated at the Sunset Farms site in 1981. The site groundwater monitoring system has recently been upgraded with the installation of new monitoring wells as shown on ***Figure 11*** in accordance with Subtitle D monitoring requirements. No data was available for the new groundwater monitoring system as of the date of this report. Pre-Subtitle D monitoring wells have been monitored semi-annually since 1982. This data was used to evaluate groundwater quality at the Sunset Farms site. A summary of available groundwater monitoring data is provided in ***Appendix B*** of this report.

In order to evaluate changes in groundwater quality over time, certain groundwater quality parameters (chloride, sulfate, nitrate, and total organic carbon) were graphed. These graphs are also presented in ***Appendix B***. Most groundwater quality parameters have shown a great deal of variability with time, as seen in the graphical presentation of the groundwater quality parameters. This trend appears to be typical of the Weathered Taylor Clay in that inorganic compounds become concentrated (concentrations increase) during dry periods corresponding to low water levels and become diluted (concentrations decrease) during wet periods corresponding to high water levels in the Taylor.

A review of metals concentrations over time in the pre-Subtitle D wells indicates little change in the concentrations since groundwater monitoring was commenced. However, some metals have been detected above their respective Maximum Contaminant Levels (MCLs). Most notable is selenium, which has consistently been measured at concentrations above its MCL in some wells. Other metals have been detected above their MCL periodically, but typically for one sampling event only. Metals have been detected in upgradient as well as downgradient monitoring wells. Sediments of the type observed in the Taylor typically contain highly mineralized water. As with other inorganic groundwater quality parameters, this could simply reflect temporary concentrating of metals when water levels in the weathered clay are low due to dry climate conditions or dewatering associated with landfill activities. The statistical analysis of metals concentrations required as part of Subtitle D groundwater monitoring should establish background concentrations for metals in the weathered Taylor at the Sunset Farms site.

Organic Compounds and TOC

Total Organic Carbon (TOC) concentrations have also been consistently variable at the site, as is expected in the Weathered Taylor soils. An exception was a period of elevated TOC concentrations in 1989 and 1990. This occurred in all monitoring wells and is likely the result of influences on groundwater conditions (possibly climatic) other than landfill operations.

Volatile Organic Compounds (VOCs) have been detected in monitoring well MW-9 since 1993. It is unclear from historic records as to why the facility began to monitor this well for VOCs, since

no other data for organic compounds were found for wells during the data search conducted for this assessment. Speculation is that VOCs were detected on the adjacent portion of the ACL facility, so Sunset Farms began monitoring for VOCs. Detected VOCs have consisted of chlorinated hydrocarbons typically at concentrations below their respective MCLs (1,1-dichloroehtane MCL=3650 ug/l, cis-1,2-dichloroethene MCL=70 ug/l, trichloroethene MCL=5 ug/l, and tetrachloroethene MCL=5 ug/l). The exception is trichloroethene (TCE), which has been detected slightly above its MCL (6 ug/l to 9.4 ug/l). The "old" monitoring wells at the Sunset Farms site (including MW-9) have all been plugged. New wells in this area of the facility include MW-16, MW-29, and MW-30. No data were available for the new wells at the time of this assessment.

Potential Migration Pathway

The weathered portion of the Taylor is the primary potential migration pathway for contaminants in groundwater at the Sunset Farms site. Although low transmisivity should prevent widespread migration in the weathered zone, discharge of groundwater from this zone to surface water in adjacent streams could result in migration of contaminants via surface water. During this assessment there was no evidence found that potentially impacted groundwater is migrating off-site or that it has (or will) discharge to the surface via seeps at the Sunset Farms site.

Surface Water

Releases to surface water are the most likely migration pathway to potential receptors. However, no evidence of leachate seeps at the surface was observed during this assessment, nor were any noted in the information we received.

Landfill Gas

The Sunset Farms site has a network of 22 landfill boundary gas monitoring probes that were installed between 1981 and 1991. A landfill gas collection system (***Figure 12)*** is used to gather landfill gas generated at the facility. This gas is converted to electricity and used to operate the on-site maintenance facility or is sold to the City of Austin. The only exceedence recorded in any of the monitoring probes since the installation of the gas collection system at the site was during an inspection on July 10, 1997. A reading of 42% methane was recorded in GMP 9, while the probes on either side (GMP 8A and GMP 9A) showed 0% methane. GMP 9 is located along the boundary between the BFI and ACL sites.

D. Texas Disposal Systems Landfill

1. Permitting and Siting

Permits

The Texas Disposal Systems Landfill is owned and operated by Texas Disposal Systems Landfill, Inc. (TDS) of Austin, Texas. TDS submitted an application for a Type I Municipal Solid Waste (MSW) Disposal Facility to the Texas Department of Health (TDH) by letter dated September 26,1988. The TDS Landfill was granted an operating permit (Permit No. 2123) by the TDH on September 4, 1990. The landfill actually opened on February 1, 1991.

Siting

The facility encompasses 341.46 acres of land in southeast Travis County near the City of Creedmoor. The TDS Landfill is accessed by F.M. 1327 from either I.H. 35 or U.S. 183. At the time of the permit application submittal, there were 27 residences living within 1/4 mile of the TDS site. There were no active commercial enterprises within one mile of the TDS site. The

Creedmoor-Maha Water Supply Corporation has a water storage and distribution facilities located approximately 400 feet south and 0.6 miles northwest of the TDS site.

The TDS site is also located in the Blackland Prairie physiographic province, approximately 10 miles from the eastern limit of the Balcones Fault Zone. Characteristics of this physiographic province are described in ***Section 6.B.1***. At the TDS site, the pre-landfill topographic relief ranged from approximately 670 feet to 752 feet msl. Surface runoff over the western portion of the site is towards the south to a tributary of Maha Creek. A drainage divide is present through the center of the property, which causes the eastern portion of the site to drain to the east toward Marble Creek. A small portion of the site along Marble Creek is within the 100-year floodplain. All waste disposal operations are outside this flood prone area.

Geology/Hydrogeology

The TDS site is also located within the outcrop area of the Taylor Group. At the TDS site, the Taylor is approximately 300 to 400 feet thick. The geology/hydrogeology at the TDS site is basically identical to that described for the ACL and BFI sites in ***Section 6.B.1***. Similar to the area of the ACL and BFI sites, water wells in the area of the TDS site are generally large diameter and shallow in nature. These wells are completed in the weathered portion of the Taylor. Present-day use of this water source is restricted to lawn watering and light irrigation. The TDS site is east of the "bad water line" of the Edwards Aquifer, where groundwater is highly mineralized. Therefore, the shallowest potable water aquifer beneath the Taylor at the TDS site is likely the Lower Trinity Aquifer. This aquifer is approximately 2000 feet below the site.

2. Design and Construction

Design

The TDS Site Development Plan indicates that the landfill will be developed in four phases on 305.15 acres of the 341.46 acre permitted area. Phase 1 encompasses 105.85 acres and is expected to be filled in about the year 2020. Phase II, III, and IV contain 98.78 acres, 84.99 acres, and 15.53 acres, respectively (***Figure 4***). TDS site facilities include an all-weather hot-mix asphaltic concrete pavement interior service road leading from the public access roadway (F.M. 1327) to the area of active operations. Crushed stone/gravel surface access roads will be maintained from the end of the asphaltic concrete service road to the sectorized fill locations. The crushed stone/gravel access roads will be utilized by conventional waste hauling trucks. Buildings include an administrative office and maintenance shop, a gatehouse, recycling station, and a citizen's collection station.

According to annual reports filed by landfills and compiled in TNRCC's Annual Reporting Program for Permitted MSW Facilities (1997), the TDS site receives approximately 1,492 tons of waste per day. The landfill has used a total volume of approximately 3,405,409 c.y. and has a remaining volume of approximately 40,262,591 c.y. (26,430,122 tons), which translates into a remaining useful life of 58.4 years (see Table 5). ***Table 5*** compares the estimated capacities of the three landfills.

The TDS site is designed as an area fill-type landfill with a planned maximum excavation depth of 55 feet below natural grade and an ultimate maximum height of 75 feet above natural grade. Individuals cells have bottom liners of in-situ shale material. Any secondary structures present in the shale are removed and the excavated areas filled and compacted. Where the weathered Stratums I and II form portions of the sidewalls, these areas will be lined. Sidewall liners must be keyed a minimum of 5 feet below the weathered/unweathered contact.

The design and evaluation criteria established for liners at the TDS site include:

- Minimum thickness of 3 feet of compacted clay measured perpendicular to the area being lined
- Permeability of $1x10^{-7}$ cm/sec by the falling head method
- Liquid limit of not less than 30
- Plasticity index of not less than 15
- No less than 30% of fines passing a No. 200 mesh sieve

In addition, the liner thickness must be increased by one foot for every two feet of groundwater hydrostatic head measured above the weathered/unweathered contact.

Construction

In-situ soil liners are evaluated for sieve analysis and Atterberg Limits by selecting one sample for each 50,000 square feet and every 12 inches of liner depth. Evaluations of the coefficient of permeability for in-situ liners is one representative sample for each 50,000 square feet and 12 inches of liner depth. Permeability testing of in-situ liners may be waived based on the approval of historical data by the TNRCC. Liner thickness must be verified by one test for each 5,000 square feet of liner placed.

Constructed liners at the TDS site must be placed in lifts parallel to the surface being lined where the surface slope is less than or equal to three horizontal to one vertical (3H:1V). Liners on steeper slopes must be placed in horizontal lifts in a plane not parallel to the surface being lined. Field moisture-density testing must be performed for every 1,000 cubic feet (horizontal lifts), and every 4,000 cubic feet (parallel lifts), with a minimum of one test for each lined area constructed. Atterberg Limits and sieve analyses must be conducted every 10,000 cubic feet (horizontal lifts) and every 50,000 cubic feet (parallel lifts), with a minimum of four tests for each lined area constructed. Coefficient of permeability testing must be performed every 10,000 cubic feet (horizontal lifts) and every 50,000 cubic feet (parallel lifts), with a minimum of four tests for each area of liner constructed. Thicknesses for horizontal lifts must be verified by tape measurements from the slope face to the edge of the clay liner. Cross-sections must be developed on 50-foot stations to illustrate the liner thickness. Thicknesses for parallel lifts must be verified by surveying techniques on 50-foot stations. For bottom in-situ soil liner patches, thicknesses must be verified by surveying (one point per 5,000 square feet of patch surface area) or by taping if the patch area is less than 5,000 square feet. Liner protective cover is not necessary where the bottom liner exceeds 4 feet in thickness or the sidewall liner exceeds 3.5 feet in thickness.

All liners must be tested after construction but before any waste is placed in that area. The testing is documented in Soil and Liner Evaluation Reports (SLERs) that are submitted to the regulatory agency for acceptance before any waste is placed on the liner. The TDS site has prepared and submitted a number of SLERs during the course of its operation. SLERs have been submitted thus far for Sectors 1, 2, and 3 of Phase 1 of the landfill. A summary of SLER submittal and approval dates is given below. It was a policy of the TDS landfill to allow 14 days after SLER submittal for agency review. If no comments from the agency were received, the SLER was assumed to be acceptable.

SLER No.	Area Evaluated	Date Submitted	Reviewing Agency	Date Accepted

91-01	Phase 1, Sector 1 R+00 to V+00, 3+00 to 6+00 Bottom, West and North Sidewall	01/29/91	TDH	01/30/91
91-02	Phase 1, Sector 1 R+00 to V+00, 3+00 to 6+00 West and North Sidewall Extensions from 662 to 674 MSL	02/25/91	TDH	03/04/91
91-03	Phase 1, Sector 1 T+00 to W+00, 2+00 to 6+00 West and North Sidewall Extensions from 674 to 715 MSL	03/21/91	TDH	
91-04	Phase 1, Sector 1 S+75 to U+75, 5+35 to 6+60 Bottom only	05/08/91	TDH	
91-05	Phase 1, Sector 1 U+75 to V+25, 5+35 to 7+30 Bottom, North Sidewall	07/09/91	TDH	
91-06	Phase 1, Sector 1 R+20 to S+75, 2+75 to 6+20 Bottom, West Sidewall, North Sidewall Repair	08/14/91	TDH	
92-01	Phase 1, Sector 1 P+05 to R+20 Bottom, West Sidewall	01/21/92	TDH	01/24/92
92-02	Phase 1, Sector 1 P+05 to V+76 West Sidewall Extension	01/01/92	TWC	08/04/92
92-03	Phase 1, Sector 1 P+05 to V+50 West Sidewall Extension	09/15/92	TWC	09/25/92
92-04	Phase 1, Sector 1 L+80 to O+85, 3+13 to 5+75 Bottom only	11/20/92	TWC	
93-01	Phase 1, Sector 1 L+80 to S+50 West Sidewall	03/04/93	TWC	
93-02	Phase 1 Sector 1 M+80 to R+50 West Sidewall Extension	05/04/93	TWC	05/18/93
93-03	Phase 1 Sector 1 M to Q West Sidewall Extension	07/27/93	TWC	08/06/93
93-04	Phase 1 Sector 1 and 2 Bottom only	08/19/93	TWC	08/30/93
93-05	Phase 1 Sector 2 Bottom only	09/15/93	TNRCC	09/20/93
93-06	Phase 1 Sector 2 Bottom only	09/29/93	TNRCC	10/28/93
94-01	Phase 1 Sector 1 M+00 to P+00 West Sidewall Extension	07/18/94	TNRCC	
94-02	Phase 1 Sector 2 Bottom only	11/04/94	TNRCC	11/16/94

94-02 Supp. 1	Phase 1 Sector 2 Leachate collection system	12/05/94	TNRCC	12/07/94
95-01	Phase 1 Sector 1 and 2 5+20 to 8+35 North Sidewall	02/10/95	TNRCC	02/14/95
95-02	Phase 1 Sector 2 5+80 to 12+38 Bottom and North Sidewall	05/11/95	TNRCC	
95-02 Supp.1	Phase 1 Sector 2 Leachate collection system	06/12/95		
95-03	Phase 1 Sector 2 5+80 to 12+38 North Sidewall	09/22/95	TNRCC	09/28/95
95-04	Phase 1 Sector 2 7+50 to 12+38 North Sidewall	11/22/95	TNRCC	12/01/95
95-05	Phase 1 Sector 3 Bottom, West Sidewall	12/19/95	TNRCC	01/11/96
96-01	Phase 1 Sector 3 J+40 to N+90 West Sidewall	03/05/96	TNRCC	03/07/96
96-02	Phase 1 Sector 3 Bottom, West Sidewall	06/17/96	TNRCC	
96-03	Phase 1 Sector 1 and 3 I+05 to N+80 West Sidewall	08/26/96	TNRCC	
96-04	Phase 1 Sector 3 Bottom, West Sidewall	01/09/97	TNRCC	
97-01	Phase 1 Sector 3 Bottom only	08/07/97	TNRCC	08/19/97
97-02	Phase 1 Sector 3 Bottom, South and West Sidewall	12/31/97	TNRCC	01/08/98
97-02 Add. 1	Phase 1 Sector 3 Leachate Collection System	03/27/98	TNRCC	04/09/98
98-01	Phase 1 Sector 3 South and West Sidewall	03/31/98	TNRCC	04/09/98
98-02	Phase 1 Sector 3 South and West Sidewall	06/05/98	TNRCC	

As noted from the preceding table, an acceptance letter from the appropriate regulatory agency could not be located for every SLER. Based on the acceptance letters reviewed, every SLER was accepted by the appropriate regulatory agency as complete or with certain conditions. Conditions of acceptance were typically addressed in a SLER supplement. It was noted that significant expansions of the landfill bottom area increased markedly in 1993 and 1994. This increase was due to an increased waste volume from the Austin metropolitan area and waste being transported from San Antonio. The larger bottom areas submitted for acceptance appeared to have a sufficient frequency of testing.

Leachate collection was not part of the original Operating Plan contained in the Permit Application. Due to Subtitle D requirements, leachate collection systems were designed and installed at the site beginning in 1994. The leachate collection systems consisted of a 15-foot wide by 1-foot deep lateral trenches excavated by a tractor-mounted backhoe or dozer and

sloped toward a central collector drain. The lateral drains were spaced about 250 feet apart and were surveyed to grades ranging from about 1 to 4 percent. The drains were lined with a non-woven geotextile filter fabric and filled with a washed coarse river gravel. The coarse gravel is overlain with a protective layer of pea gravel. The gravel-filled drain slopes toward a sump where accumulated leachate would be pumped to the surface by a submersible pump. In late 1995, the filter media in the drains was changed from gravel to chipped tires in order to preclude calcium carbonate deposition in the drains which might impede flow.

In addition to leachate collection systems, leachate modeling pursuant to Subtitle D requirements revealed that leachate could be minimized by thickened topsoil cover on closed portions of the landfill. The final cover design was then modified from 1 foot of topsoil overlying 1.5 feet of compacted clay to 4 feet of topsoil overlying 1.5 feet of compacted clay. The thicker topsoil layer reduces leachate by providing more soil material for the adsorption and evapotranspiration of rainfall infiltration. An additional benefit is that the thicker topsoil cover will reduce the possibility that roots or vegetation will cause degradation of the final cover. The final cover plan states that the landfill final cover will be restored with native vegetation. This plan should be modified with a maintenance plan to prevent the establishment of deep-rooted native species such as cedar or mesquite, which may tend to degrade the final cover. A modified final cover maintenance plan for improved pastureland use might be more appropriate.

Once disposal areas are constructed, waste must be placed in 2-foot thick lifts and compacted by the dozer/landfill compactor. Successive lifts will be deposited and compacted until a 10-foot thick zone of waste is achieved. The 10-foot thick zone of waste will be shaped and overlain by a 6-inch thick layer of daily soil cover.

3. Operating and Compliance History

Since the TDS site opened in February 1991, there have been only two violations noted during routine inspections by the TNRCC. One violation was recorded during an inspection on June 11, 1992, when it was noted that intermediate cover had not been properly placed. The second violation was recorded during an inspection on December 22, 1992. This violation involved MSW regulation TAC 330.145 (a) and was a result of mud being tracked onto F.M. 1327 from the site access roads. In both cases, enforcement letters were sent to TDS requiring immediate action to bring the site into compliance. During the TNRCC inspections following each of the above-mentioned violations, the site was found to be in compliance. No other violations have been recorded to date during routine inspections by the TNRCC. ***Table 8*** is a summary of inspections conducted at the TDS site. Several complaints have been filed against the TDS site. ***Table 9*** is a summary of complaints filed for the TDS site with the Region 11 Office of the TNRCC. Complaints received prior to five years ago are not listed in the table.

4. Environmental Monitoring History and Potential Migration Pathways

Groundwater

Groundwater monitoring was initiated at the TDS site in 1990. The site groundwater monitoring system was upgraded in 1997 in accordance with Subtitle D monitoring requirements, which included the collection of groundwater samples on a quarterly basis for establishing "background" concentrations at the site. The pre-Subtitle D and post-Subtitle D background monitoring events were reviewed as part of this assessment. The groundwater monitoring system at the TDS site currently includes three groundwater monitoring wells installed in the weathered portion of the Taylor, upgradient (OB-1 and OB-9) and downgradient (OB-8) of the Phase 1 operations. Additional wells will be included in the monitoring system as landfill operations expand. The final monitoring system will include ten groundwater monitoring wells. Water table contours and the locations of monitoring wells are shown on ***Figure 13***.

A summary of groundwater monitoring data is provided in ***Appendix B***. In order to evaluate changes in groundwater quality over time, certain groundwater quality parameters (chloride, sulfate, nitrate, and total organic carbon) were graphed. These graphs represent a direct data comparison over time and are presented in ***Appendix B***. As seen on the graphical presentation and analytical tables of the groundwater quality parameters, general trends observed in groundwater quality data indicate relatively consistent quality from well to well. Variation in analytical results between sampling events is generally typical for the Weathered Taylor since inorganic compounds tend to become concentrated (concentrations increase) during dry periods corresponding to low water levels in the Taylor and become diluted (concentrations decrease) during wet periods corresponding to high water levels in the Taylor.

Organic Compounds and TOC

Groundwater samples collected at the TDS site have not been analyzed for specific organic compounds. However, Total Organic Carbon (TOC) has been included in all sampling events conducted at the site. A general increase in TOC concentrations has been observed in all three monitoring wells sampled at the TDS site. Some of the high data "outliers" (specifically the sampling event on June 23, 1995) may be associated with storm events, which provided rapid recharge to the weathered clay resulting in a increase in TOC concentrations and a coincidental decrease in concentrations of chloride and other inorganics. As discussed in ***Section 6.B.1***, the tendency of the Weathered Taylor Clay to form deep (potentially 30 to 40 foot) desiccation fractures during prolonged dry periods may result in wide variations in water quality as well as rapid recharge during storm events.

The general increase in TOC concentrations that began in 1995 could potentially be related to landfill operations. However, this seems unlikely since TOC results from monitoring well OB-9 (located upgradient from all site operations) are almost identical to those measured in OB-1 (crossgradient) and OB-8 (downgradient). The concentration of metals detected in groundwater samples has also remained relatively consistent. This further supports a case that groundwater is not likely being impacted by landfill operations at the TDS facility.

Potential Migration Pathway

The weathered portion of the Taylor is the primary potential migration pathway for any contaminants released to groundwater at the TDS site. Although low transmisivity should prevent widespread migration in the weathered zone, discharge of groundwater from this zone to surface water in adjacent streams could result in migration of contaminants.

Surface Water

Releases to surface water are the most likely migration pathway to potential receptors. No evidence of leachate seeps at the surface were observed during this assessment, nor were any noted in the information we reviewed.

Landfill Gas

Two landfill gas monitoring wells were installed along the western property line at the TDS site on January 3, 1994. Methane has not been detected in either well in any of the quarterly monitoring events since installation of the wells.

7. RESULTS AND CONCLUSIONS

Based on our review of available regulatory agency records and files, information provided by third parties, data obtained from the various landfill operators, and observations made during site

visits at each facility, the following findings and conclusions are made regarding the environmental safety of the ACL, BFI, and TDS sites:

A. Austin Community Landfill

1. Regulatory Compliance

Early in the life of the ACL site the regulatory requirements for landfilling of MSW were in their early stages. Permission was requested and granted by TDH to dispose of industrial waste at the IWMM site with few requirements stipulated except for cover thickness and clay key ways to control surface water runoff. After the IWMM site was closed and the site continued to operate as a MSW landfill, formal regulations were written to manage the disposal of MSW.

Since promulgation of the earliest MSW landfill regulatory requirements ACL has been in general compliance with the regulations in existence at the time. All of the SLERs submitted for ACL been evaluated and were found to be in general compliance with the requirements for MSW landfills at the time of construction. However, there are environmental risks associated with the early history of the site that should be considered. These potential risks are discussed in ***Sections 7.3 and 7.4***.

The Phase 1 and IWMM sites were operated during times when there were minimal technical requirements for liners and no prohibitions on landfilling drummed industrial or bulk industrial liquids. The portion of the site where these activities took place was not adequately protective of the environment and as a result, there is a high probability that environmental impacts resulted from the operations. The MSW landfilling operations, even when operated during times when there were no liner requirements, likely had minimal impact on the environment because of the ability of the Taylor Formation clays to prevent migration of liquids. In-situ clay liners based in the Taylor Formation clays have been approved for current MSW landfills when they are proven to meet the performance based standards required by TNRCC.

In addition ACL has remained in general regulatory compliance with respect to surface water, groundwater, and landfill gas monitoring. No enforcement actions have resulted from exceedences recorded by the groundwater monitoring system or the gas monitoring probes at ACL. When exceedences have occurred in gas probes, the ACL has been able to come into compliance within 60 days. (as required in the Landfill Gas Management Plan) by operating the landfill gas recovery system. The TNRCC's position is that the landfill gas recovery system is effective at reducing the methane concentrations at the monitoring probes along the property boundary with the BFI landfill to the northeast. There is no perceived immediate threat to public health due to landfill gas and no further action has been recommended by TNRCC.

2. Present Environmental Impacts

Groundwater

Groundwater at the ACL site has been impacted by organic compounds. However, as discussed in ***Section 6.B.4*** recently detected organic compounds have been restricted to the western portion of the property at low concentrations, and are likely associated with landfill gas.

Potential groundwater impacts were also observed as elevated TOC concentrations in the two monitoring wells adjacent the IWMM site where historic reports indicate impacts had occurred. However, specific VOCs analysis from these wells have not detected any VOC above its MCL. These wells were not sampled for SVOCs and have not been sampled at all since 1995 as part of the current Subtitle D monitoring program. Downgradient migration of potential impacts from the IWMM site should be detected by the current monitoring system. There is no quantitative data that indicates the IWMM site is currently causing environmental impacts.

Sedimentary environments such as the Taylor Clay are typically highly mineralized geologic formations. When groundwater is present in such formations, it is common for the groundwater to contain elevated levels of metals and other inorganic compounds. This likely explains the inconsistent and variable analytical results for metals and other inorganic compounds in the weathered Taylor Clay at the site as discussed in ***Section 6.B.4***. Unless the compounds (especially metals) are detected as statistically significant changes (SSCs) from background on a consistent basis, they are not likely of environmental concern.

Under the Subtitle D monitoring program, if concentrations of organic compounds do exceed MCLs in the future, or if there are two events with SSC, then the TNRCC will likely require some corrective action. For the organic compounds, increased collection of landfill gas typically reduces organic concentrations; however, the TNRCC typically deals with this type of problem on a case-by-case basis. Based on interviews with TNRCC personnel, no action is expected at the present time with respect to groundwater at ACL.

Surface Water

Data reviewed as part of this assessment showed no indication of impacts to surface water; however, based on the apparent leachate seeps observed adjacent to the unnamed tributary to Walnut Creek, on the Phase 1 area, surface water could potentially be impacted. In addition, possible organic impacts observed as elevated TOC in the groundwater monitoring data from MW-6 and MW-3, could potentially migrate downgradient far enough to discharge to the surface. This is of particular concern since there is no program in place for monitoring leachate seeps, other than outfall monitoring.

Landfill Gas

Gas monitoring probes along the property boundary between the ACL and BFI Landfill commonly measure methane at concentrations greater than the LEL. Since there are no residences or other neighbors within 1,000 feet of the probes recording the exceedences, there does not appear to be an immediate threat to public health. The methane concentrations at the gas probes are significantly reduced or reduced to zero when the gas recovery system is operated regularly.

Other

WMI has an ongoing maintenance plan for the Phase 1 area. The plan generally consists of making repairs to the cover as the need arises to stop lateral migration of leachate.

WMI has sponsored intensive studies of the old Phase 1 area. Reportedly, it is their desire implement further post-closure care in this area. However, since the adjacent Travis County Landfill operates in unison with this area. WMI will be unable implement their plans for additional cover until Travis County makes necessary corrections the southern portion of this waste cell. Specifically, leachate management to reduce the hydraulic head on the Travis County portion of the waste cell must be accomplished before the construction of a final cover infiltration layer on the old Phase 1 area will be effective.

The Carter & Burgess team's review of the ACL "Soil and Liner Quality Control Plan" and "Final Cover Quality Control Plan" found these plans be compliant with current rules and regulations. If properly implemented, these plans should provide adequate control for liners and final covers.

3. Possible Future Impacts

Possible future impacts include lateral migration of leachate from the old Phase 1 area into Walnut Creek and its tributaries, and vertical migration of leachate from the IWMM cell.

The ACL ongoing maintenance plan of making necessary repairs to the sidewall liners of the old Phase 1 area appears to have this possible impact in check. However, the Carter & Burgess team believes this method of controlling lateral migration of leachate does not use best management practices. Reduction of the hydraulic head and proper leachate management by treatment provides a more desirable and long-term alternative to "as needed repairs". Unless some action is taken to remove leachate from the Travis County Landfill, the seeps on the west end of Phase 1 will continue to require maintenance. Saturated conditions in the soil of the cap have the potential to cause failure by slumping, as can be seen along the west end of the Travis County landfill and on the west end of Phase 1.

Groundwater

Based on personnel interviews, site inspections, and review of available documentation, the potential for future impacts to groundwater and surface water does exist at the ACL site as discussed in ***Section 6.B.4***. These potential impacts are however, associated with historic not current operations. The current owners of the ACL appear to be responsible operators interested in maintaining compliance with TNRCC Regulations.

The existing Subtitle D monitoring program should be sufficient to detect and monitor groundwater impacts in the weathered Taylor before they migrate offsite. However, no system has been put in place which could detect current or possible future vertical (downward) migration of solvents from the IWMM site. The migration of contaminants from this site to underlying groundwater is considered a relatively low risk.

Surface Water

Potential future impacts to surface water could come from two areas. One is the Phase 1 area, which is contiguous with the Travis County Landfill and may be impacting surface water now. Although recent samples collected from the leachate seeping from the Travis County Landfill showed no contaminants which should cause immediate concern, the sampling was apparently limited to only two locations on the site. In addition, the potential exists that contaminants may appear at some point in the future, if leachate is allowed to continue to seep into the adjacent tributary.

The second potential cause of future surface water impacts is a release from the IWMM site. Although no evidence of groundwater seeps from the area of the IWMM site was observed during the site visits conducted as part of this assessment, there is future potential (or risk) that dissolved contaminants could migrate via groundwater in the weathered Taylor to surface discharge points along the unnamed tributary of Walnut Creek. This is also considered to be a relatively low risk.

Operations on the remainder of the ACL facility appear to be protective of surface water.

Landfill Gas

Methane will continue to be generated by the landfill and should be managed throughout the life of the landfill. The Landfill Gas Recovery System appears to be effective at controlling the gas generated by the landfilled waste at this time.

4. Environmental Risks

IWMM Site

Borings taken prior to the construction of the IWMM site indicate that it is underlain by low permeability Taylor Formation clays which are relatively impervious to vertical migration of liquids. Because a complete list of the chemicals disposed of in these cells is unavailable, the composition of the solvents and other chemicals in drums that were landfilled at IWMM is not entirely known and therefore presents some environmental risk. Certain chemicals, particularly chlorinated solvents, have the potential migrate easily through soils and clays and would pose an environmental threat where present.

The unknown contents and condition of the 21,000 buried drums presents a potential environmental risk. If the contents of the drums are still present at the site, but no longer contained by the drums, there is risk that the material could enter groundwater or surface water and leave the site. Currently there are no monitoring wells being sampled in the vicinity of the former IWMM site and no certain way to determine whether the IWMM site has released contaminants, although there is some evidence that the groundwater may have been impacted locally (***Section 7.A.2***). As long as the industrial waste remains buried at the current location it will be a source of environmental risk.

5. Other Potential Liabilities

NPL Listing

A Petition for National Priority Listing (NPL) has been filed with the EPA Region VI Office concerning property which is located adjacent to the Austin Community Landfill. It is Carter & Burgess' understanding that the property is now owned by Waste Management of Texas but is not included within the property boundaries of TNRCC permit currently in effect for the Austin Community Landfill (TNRCC Permit 249-C). The subject property is the approximate site of the former IWMM facility. The IWMM facility was originally part of the ACL site, but became an excluded portion by virtue of a permit amendment approved by the TDH in July 1981 shortly thereafter, Waste Management of North America purchased the permitted portion of the ACL site as well as the area known as the former IWMM site.

Legal counsel retained by Carter & Burgess has requested all documents related to the matter pursuant to the Freedom of Information Act. As of the date of this report the EPA representatives have informed our legal counsel that a Preliminary Assessment of the site has been completed. The results of this assessment and any subsequent actions which may be taken by the EPA or State Agencies were not provided to our legal counsel who are researching this issue.

Carter & Burgess understands that potential liability for the City of Austin could arise if a portion of the ACL itself were declared to be a federal or state superfund site. This would appear possible only if contaminants from the former IWMM site migrated onto the ACL or if contaminants from the ACL migrated onto the IWMM site. We also understand that the EPA does not generally identify generators and transporters of MSW as potentially responsible parties (PRPs) at NPL sites. However, municipalities are still responsible under §107 of CERCLA for contribution claims by PRPs. This liability would only arise if Waste Management's financial cleanup reserves proved inadequate for the cleanup.

Under state law, a site not meeting the federal guidelines for NPL listing could still be named a state superfund site. In that event the City of Austin could be named as a PRP to perform cleanup if the City of Austin's wastes were comingled with wastes determined to be part of the state superfund site. If the City of Austin could show that its wastes were divisible from the superfund wastes, then it would only be responsible for the cleanup of its own wastes.

Liability for the City of Austin would only arise if Waste Management's financial reserves proved inadequate.

Phase 1 Seeps

The leachate seeps on the Phase 1 area will continue to be a problem requiring management by Waste Management of Texas. With time the seeps will worsen and the condition of the Phase 1 cap and cover will worsen if the leachate is not removed from the Travis County Landfill. This situation presents long term risks and is a potential liability to the operators of the landfill.

B. BFI Sunset Farms Landfill

1. Regulatory Compliance

The Sunset Farms site is currently and historically has operated in substantial compliance with applicable state and federal MSW regulations established for Type I landfills. Only one violation was noted for the site for the period in which agency inspection records were available (November 1992 to present). This violation occurred on July 10, 1997, and involved the exceedance of regulatory levels for methane gas (30 TAC 330.130). A letter was sent to BFI describing corrective actions to be taken. No further incidences of this type have been reported at the site. Only four relatively minor complaints were noted (involving items such as truck washing activities, uncovered trucks, a leak of hydraulic fluid from one truck, and discharges from an AST flowing towards a storm drain). Records indicated that all of the complaints were satisfactorily addressed and resolved.

2. Present Environmental Impacts

Groundwater

Organic Impacts

Organic constituents have been detected in monitoring well MW-9 near the southwest corner of the site. These organic constituents have been present in this well since before BFI expanded landfill operations onto that portion of the property. The impacted groundwater occurs in the weathered Taylor Clay, and is likely associated with similar impacts observed in monitoring well MW-5 located near the northwest corner of the ACL site (adjacent to the southwest portion of Sunset Farms facility). Organic constituents were first detected in MW-9 in 1993 and were present in groundwater samples collected from this well until it was plugged in 1998. Only TCE has been detected at concentrations slightly above its MCL and is apparently restricted to this portion of the property, and may be associated with landfill gas generation on the ACL site.

Inorganic Impacts

Although metals concentrations were detected on occasion at concentrations above their respective MCLs in some of the pre-Subtitle D monitoring wells, these observations may be typical for the weathered Taylor Clay and a result of the concentration of inorganics due to dry weather conditions or possible dewatering of the aquifer. A better assessment of the significance of the inorganic concentrations measured in groundwater may be possible after the facility has completed background monitoring and statistical data analysis required by Subtitle D regulations (in about two years).

Surface Water

Data reviewed as part of this assessment showed no indication of impacts to surface water.

Landfill Gas

The Landfill Gas Recovery System, and electric generating facility which has been in operation for two years, are apparently effective at controlling the gas buildup within the landfill. Since the installation of the generating facility there has been one sampling event when methane was detected in one gas monitoring probe at a concentration above the LEL.

3. Possible Future Impacts

Groundwater

Based on personnel interviews, a site inspection, and review of available documentation, BFI appears to operate the Sunset Farms Landfill in a responsible manner protective of groundwater and surface water. The potential for future impacts to groundwater at the Sunset Farms Landfill is considered to be relatively low. Continued monitoring for VOCs and statistical determination of background metals concentrations as part of the Subtitle D monitoring program, should provide data to make a more thorough assessment of potential future impacts.

Surface Water

The likelihood of future impacts to surface water at the Sunset Farms Landfill is considered to be relatively low.

4. Environmental Risks

Based on the hydrogeologic setting, landfill design and construction, and operating practices observed at the Sunset Farms site, environmental risk related to groundwater and surface water are considered to be low.

5. Other Potential Liabilities

Potential exists for groundwater beneath the BFI facility to be impacted as a result of operations at the ACL to the southwest. It has already been noted ***(Section 7.B.2)*** that MW-9 had detected organic constituents before BFI had landfilling operations in the area and that the most likely source is the ACL to the south. If the groundwater were found to be impacted beneath some of the surrounding properties the BFI landfill might be considered a potential source of contamination and would be required to defend itself against possible future claims.

C. Texas Disposal Systems Landfill

1. Regulatory Compliance

The TDS landfill has been in operation for about 8 years. The Landfill was designed in accordance with pre-Subtitle D regulations and was placed into service in 1991. The original design specified in-situ soil liners for the landfill bottom and unweathered clay sidewalls. Weathered sidewall areas, as identified in the geologic study, were to be lined with a minimum of three feet of compacted clay. The sidewall liner thickness is increased to compensate for potentiometric head from adjacent undisturbed areas. The original final cover design included 1.5 feet of compacted clay overlain with 1 foot of topsoil. No leachate collection system was originally proposed for the landfill. In 1994, TDS submitted permit modification documents to comply with Subtitle D. These modifications made no changes to the bottom and sidewall liner designs. The final cover design was changed to 4 feet of topsoil over the 1.5-foot compacted clay cover. Leachate collection systems were designed and installed in post-Subtitle D sectors. Based on a review of SLERs and permit documents, TDS has constructed the landfill in substantial compliance with its approved permit.

During the period of operation of the landfill, two violations were cited by the regulatory

agency in 1992. One violation was for lack of intermediate cover on the waste materials and the second violation was for tracking mud onto F.M. 1327 by trucks leaving the landfill. To the best of our knowledge, both violations were promptly corrected without further enforcement action. No fines are known to have been levied. During the course of the landfill life, a total of seven complaints have been reported to the regulatory agencies. Each complaint was investigated by an agency inspector who met with TDS over the alleged problem conditions. No violations were found as a result of the complaint investigations.

2. Present Environmental Impacts

Groundwater

No present environmental impacts were observed or indicated by this assessment. The review of groundwater data indicated that groundwater quality has changed little since operation of the landfill began. The only potential indicator of impact is the increase in TOC concentrations since 1995; however, based on the distribution of TOC concentrations (very consistent in all wells sampled), the increase in TOC is likely the result of something other than landfill operations, such as climatic events (drought/storm events).

Surface Water

No evidence of surface water impacts were indicated by this assessment.

Landfill Gas

No evidence of landfill gas reaching the property boundary were indicated by this assessment.

3. Possible Future Impacts

Based on personnel interviews, a site inspection, and review of available documentation, indications are that TDS is a very responsible operator, and will continue to take all necessary measures to protect groundwater and surface water at the site.

Based on the types of waste managed and disposed at the TDS facility, the liner design used should prevent migration of leachate from the landfill cells. The concern about leachate noted during the assessment of this site is associated with the pre-Subtitle D portion of the Phase 1 area, which has no leachate collection system; however, the design of the landfill should allow the leachate from this area to drain into areas with leachate collection or to sumps where the leachate will be pumped out. The current and future groundwater monitoring system should be adequate to detect any potential problems before contaminants leave the site.

4. Environmental Risks

Based on the hydrogeologic setting, landfill design and construction, and operating practices observed at the TDS Landfill, environmental risks related to groundwater water, surface water or any other medium are considered to be relatively low.

8. RECOMMENDATIONS

A. Need for Additional Studies

It is the Carter & Burgess team's opinion that the former IWMM site at the ACL poses a substantial environmental risk and future liability to the owners of the site and potential users of

the site and should be investigated and monitored more thoroughly than it is now to reduce these potential risks.

Although any releases to groundwater and surface water from the site may be detected by the existing network of downgradient monitoring wells, it is possible that contaminants could be released to surface water or deep groundwater without detection. A more thorough assessment would be required to determine the potential for (or prior occurrence of) vertical migration of solvents and other chemicals previously disposed of at the IWMM site. This assessment should include an up-to-date and independent search of water wells in the area to determine if contaminants associated with the IWMM site have been detected in these wells or if deeper water-bearing zones have been impacted. The assessment should also include the installation of two to four exploratory borings to the first water-bearing zone directly beneath the IWMM site (possibly the Austin Chalk or the Edwards). These borings should be completed as permanent groundwater monitoring wells and be sampled for contaminants known to be present at the IWMM site. It would be best to perform this investigation in conjunction with waste excavation at the IWMM site if the site is remediated in the future. This would make it possible for the wells be drilled directly through the former IWMM location rather than around it's perimeter and would provide a more accurate assessment of possible vertical migration.

Leachate seeps from the ACL Phase 1 MSW area adjacent to the Travis County Landfill are a constant threat to surface water runoff. It is recommended that the leachate level in the Phase 1 area be monitored to act as a warning for potential increased seepage activity. It is also recommended that the leachate from the seeps at the Phase 1 site be sampled and analyzed regularly to determine potential impacts to surface water in the tributary to Walnut Creek. Although the Travis County Landfill is not the subject of this assessment, it has a direct effect on environmental conditions of the area. The numerous seeps at the Travis County Landfill site indicate that the leachate level is high within the landfill and should be monitored to warn of potential increased seepage activity. It is also recommended that leachate from the monitoring wells at the site be sampled and analyzed.

Continued monitoring of the western portion of the ACL site (southwest portion of BFI site) in the vicinity of MW-5 and near MW-21 should continue in order to monitor the concentrations of chlorinated solvents in these areas. Additional monitoring wells should be required to more precisely determine the extent and source of chlorinated hydrocarbons present in groundwater at concentrations above the MCLs. The BFI landfill has just completed installation of a 16-well groundwater monitoring system from which background data will be gathered for the next two years, followed by quarterly monitoring. Statistical analysis of the groundwater data will provide more information regarding possible impacts to groundwater. To date there have been no SSCs that would indicate impacts to groundwater.

Monitoring systems at the TDS Landfill are considered to be adequate for that site.

8. Need for Corrective Action

Carter & Burgess' team has concluded that the former IWMM site will continue to pose an environmental threat as long as the drummed and other industrial waste remain buried at its present location. Waste Management has submitted a Work Plan to the TNRCC to uncover the buried waste and properly dispose of it either offsite or in a Class I nonhazardous cell which is already permitted at the ACL. Removal and proper disposal of this waste would eliminate or substantially reduce the environmental risks associated with the site. This work would involve excavation of the soil above the waste followed by sampling and analysis of the waste to determine proper disposal requirements. Waste determined be hazardous should be handled accordingly and prepared for shipment to a licensed hazardous waste disposal facility (landfill or other). Waste determined to be nonhazardous could be transported the approved Class I nonhazardous waste cell at the ACL. The removal action should be supervised by an experienced environmental professional, and could include oversight by an impartial independent

environmental professional to satisfy concerns expressed by neighborhood groups. All necessary precautions should be taken to prevent releases to the environment (air and surface water) during the removal action. Upon removal and proper disposal of all waste and impacted soils, the site should be backfilled with clean fill.

Carter & Burgess also recommends that the ACL work with Travis County to reduce leachate buildup in the Phase 1 area which is directly influenced by conditions at the Travis County Landfill.
It is our understanding that the waste (and most likely, leachate) is contiguous between the Travis County Landfill and Phase 1 area. In order to alleviate the problem of leachate seeps in the Phase 1 area, it would be necessary to perform maintenance work on the Travis County Landfill as well. We recommend that leachate recovery be initiated through the existing system at the Travis County Landfill in order to lower the leachate levels, thus mitigating leachate seeps in the Phase 1 area as well as the Travis County Landfill.

Once the fluid level within the landfill is lowered, repair work could be done on the cap and cover of the Travis County Landfill and on the seeps in the Phase 1 area. The thickness of the cover should be increased to properly cover exposed waste, and the cap and cover should be seeded and vegetative cover maintained to reduce future infiltration of rainwater into the landfill and to prevent possible erosion of the final landfill cover. Repair and proper maintenance of the Travis County Landfill and Phase 1 area would reduce the potential for major impacts to surface water quality in the area. The potential also exists that after water levels are lowered in the landfill, concentrations of landfill gas could accumulate. Therefore, monitoring of landfill gas should be conducted as the landfill is dewatered.

9. LIMITATIONS OF ASSESSMENT

The findings and conclusions expressed in this report were prepared by Carter & Burgess' for the sole and exclusive use of the City of Austin. The information presented in this report was obtained from a variety of sources, including regulatory agency files and records, documents provided by third parties, data collected from the landfill operators, and site visual inspections. This material represents all available factual information related to the environmental safety of the various landfills. The information and data obtained from these sources was assumed to be correct and valid, and independent verification of the information and data was not performed by Carter & Burgess. Carter & Burgess assumes no responsibility for inaccuracies or the completeness of data and other information reviewed as part of this assessment.

The environmental assessment described herein was based on the specific and limited objectives set forth in the Professional Services Agreement entered into with the City of Austin. The assessment was conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the environmental and engineering professions practicing contemporaneously under similar conditions in the locality of the project. No other warranty or guarantee, expressed or implied is made, other than the work was performed in a competent and professional manner.

FIGURES

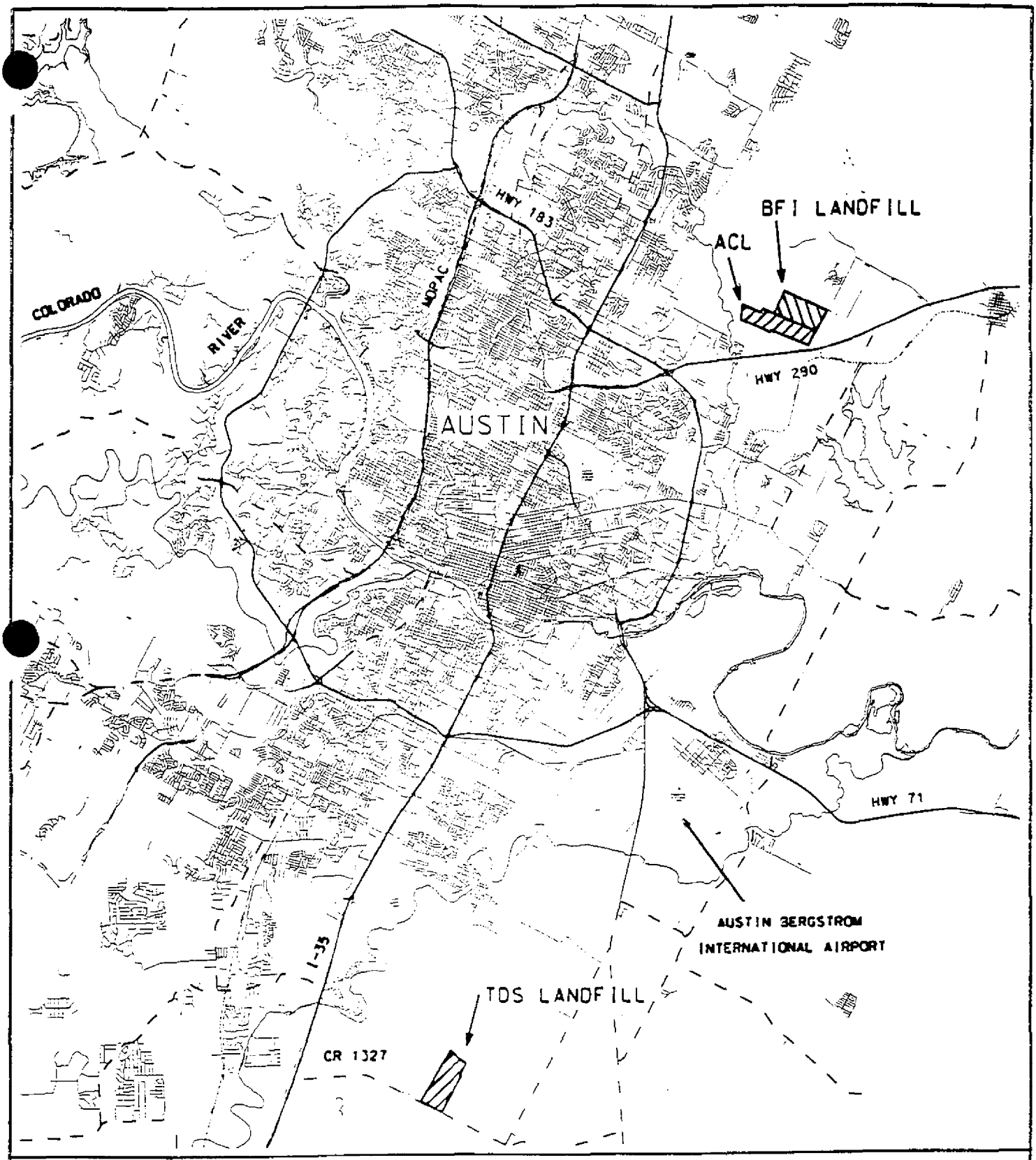


FIGURE 1: LOCATION MAP

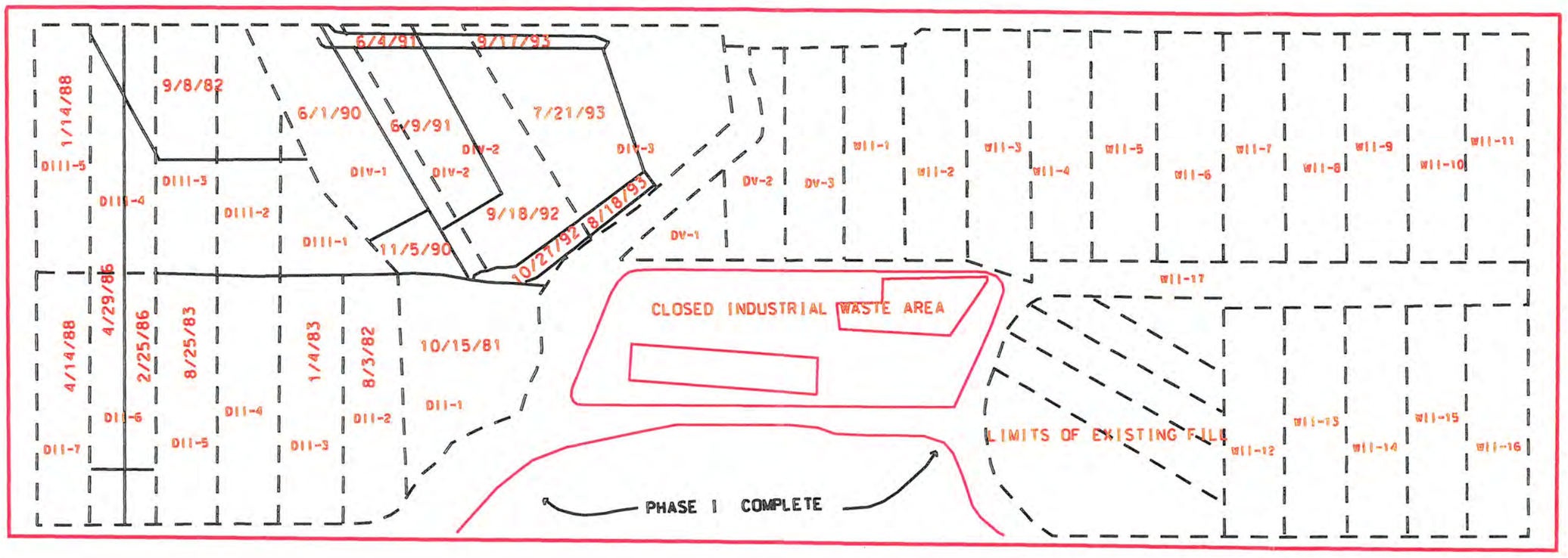
AUSTIN AREA LANDFILLS

Carter :: Burgess

FIGURE 4: SITE LAYOUT
TEXAS DISPOSAL SYSTEMS LANDFILL

Carter :: Burgess

SOURCE: USGS (1995)



NOTE:

IN ACCORDANCE WITH TEXAS DEPARTMENT OF HEALTH REGULATION NO. 325.602 (c). GRID MARKERS WILL BE SPACED ALONG SITE BOUNDARIES AT 100 FOOT STATIONS. THESE MARKERS WILL BE INSTALLED TO ENCOMPASS THE CURRENT FILL AREAS AND THE AREAS TO BE FILLED WITHIN A THREE YEAR PERIOD AND EXPANDED PROGRESSIVELY AS NEEDED.

LEGEND

PROPERTY LINE

LIMITS OF FILL SECTORS

FIGURE 5: AUSTIN COMMUNITY LANDFILL
SECTORIZED FILL LAYOUT

Carter::Burgess
901 South MoPac Expressway
Barton Oaks Plaza V, Suite 200
Austin, Texas 78746
(512) 314-3100

SOURCE: PITTMAN ENGINEERING

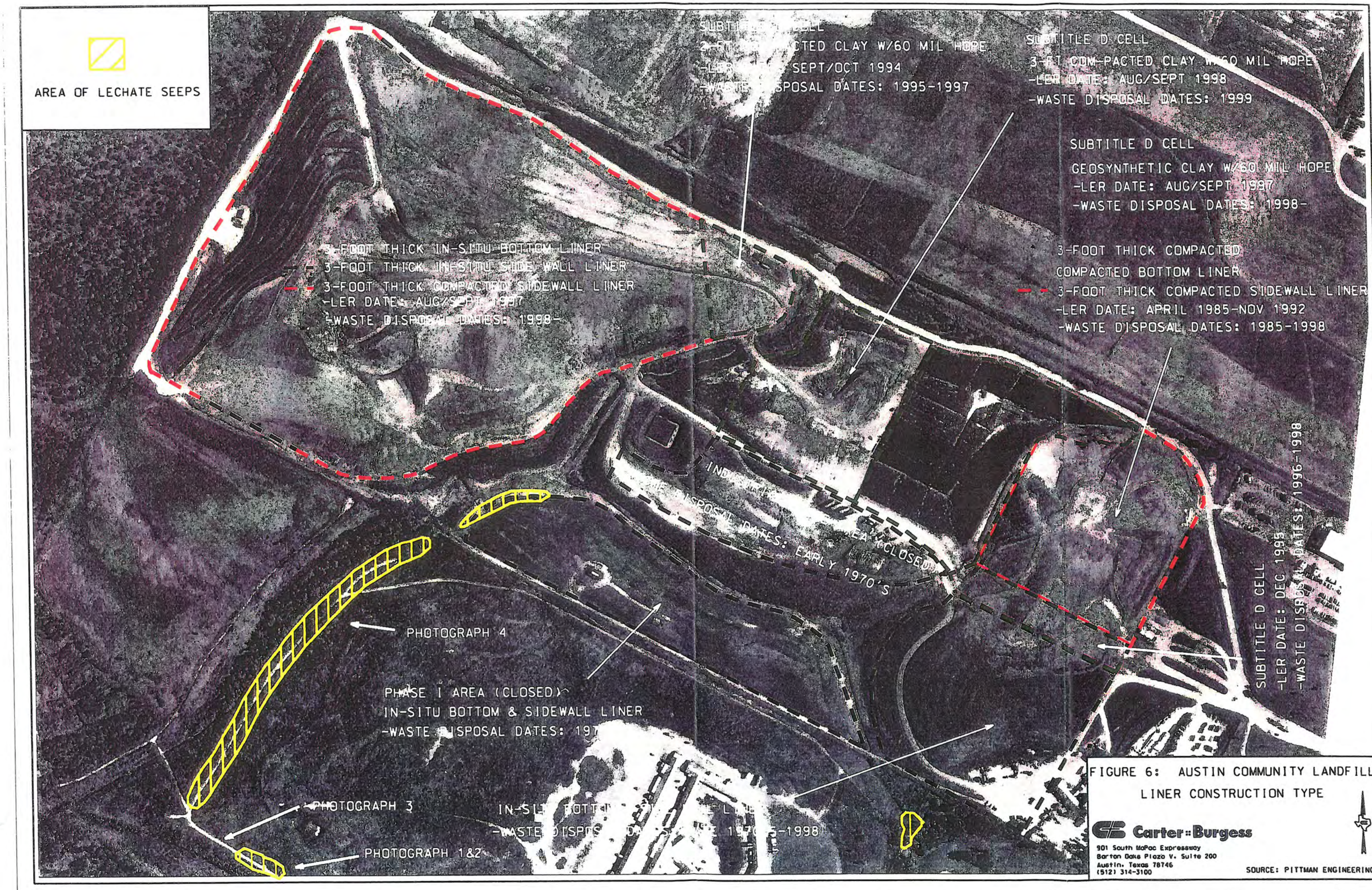
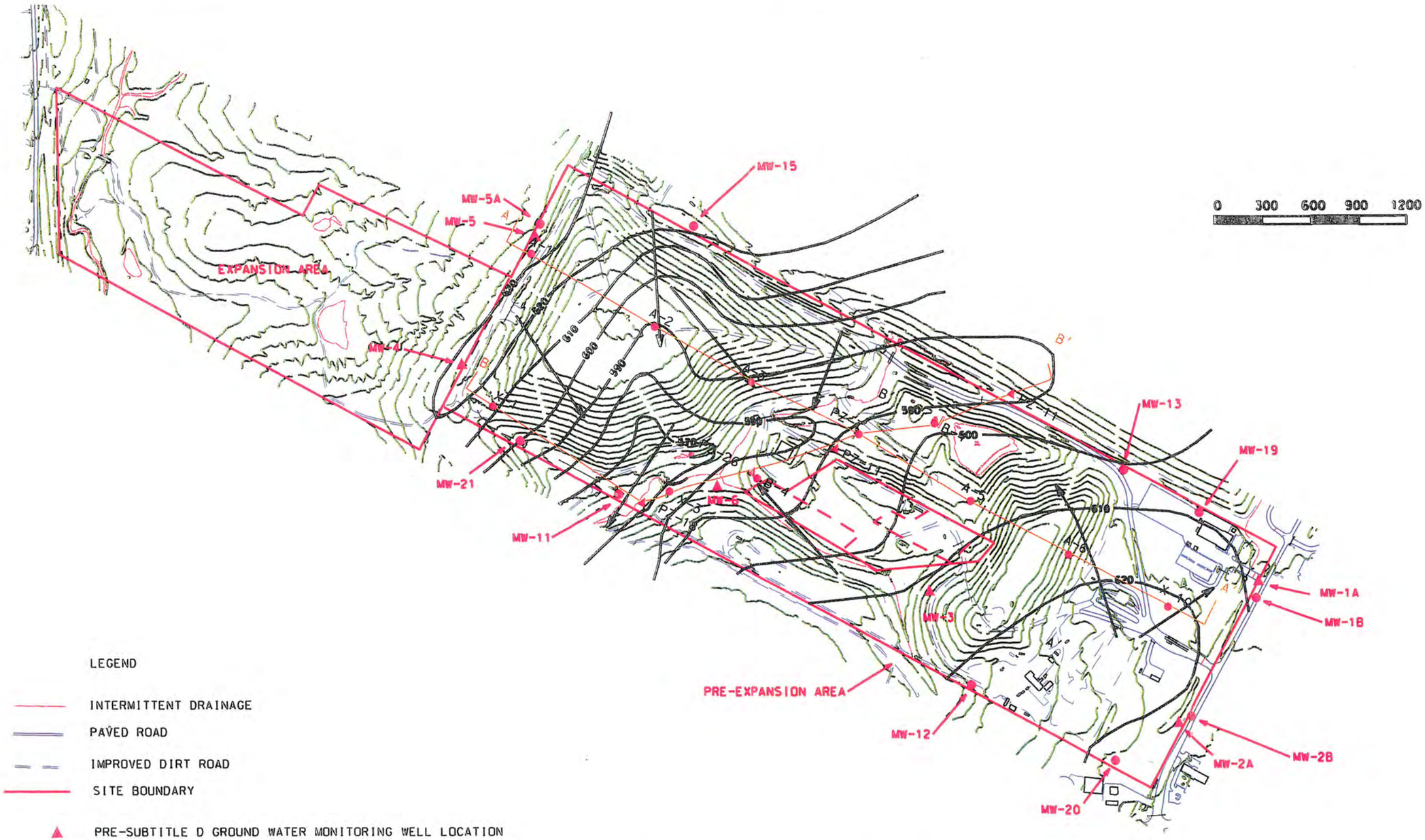


FIGURE 6: AUSTIN COMMUNITY LANDFILL
LINER CONSTRUCTION TYPE

Carter:Burgess
901 South MoPac Expressway
Barton Oaks Plaza V, Suite 200
Austin, Texas 78746
(512) 314-3100

SOURCE: PITTMAN ENGINEERING



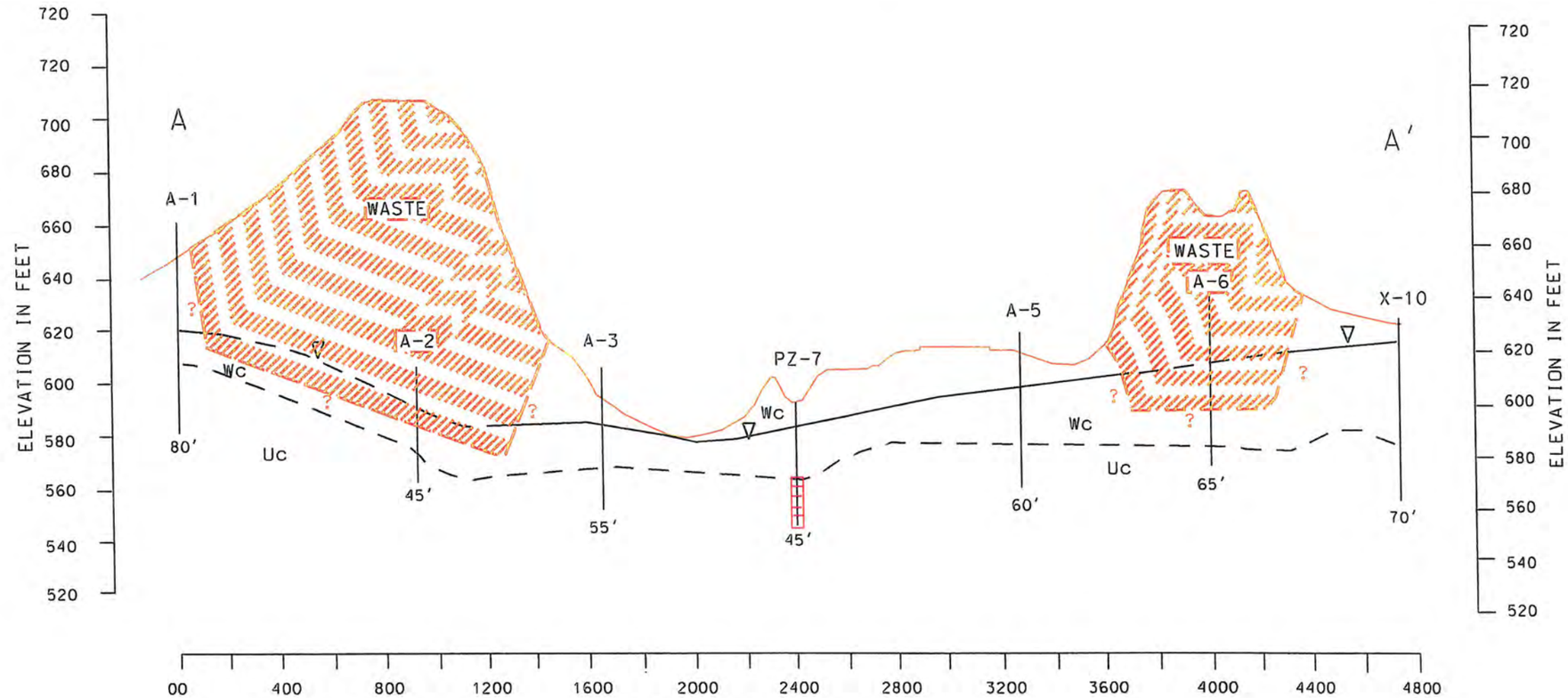
LEGEND

- INTERMITTENT DRAINAGE
- PAVED ROAD
- IMPROVED DIRT ROAD
- SITE BOUNDARY
- ▲ PRE-SUBTITLE D GROUND WATER MONITORING WELL LOCATION
- ● SUBTITLE D GROUND WATER MONITORING WELL LOCATION
- ESTIMATED CLOSED BARREL DISPOSAL AREA
- ESTIMATED CLOSED INDUSTRIAL WASTE AREA
- GROUND WATER LEVEL CONTOURS AS MEASURED
- GROUND WATER FLOW DIRECTION
- CROSS SECTION

FIGURE 7: AUSTIN COMMUNITY LANDFILL
GROUNDWATER MONITORING SYSTEM

Carter=Burgess
901 South MoPac Expressway
Barton Oaks Plaza V, Suite 200
Austin, Texas 78746
(512) 314-3100

SOURCE: SAM SYRVEYING & MAPPING
RUST ENVIRONMENT & INFRASTRUCTURE



LEGEND

SITE BOUNDARY

GROUND WATER ELEVATION OBSERVATION (8/11/94)
GROUND WATER LEVEL DASHED WHERE ESTIMATED BECAUSE OF LACK OF CONTROL POINTS, AND BECAUSE OF INTERSECTION WITH WASTE UNIT BOUNDARY.

Wc WEATHERED CLAY

Uc UNWEATHERED CLAYSTONE

SCREENED INTERVAL

APPROXIMATE CONTACT BETWEEN WEATHERED AND UNWEATHERED CLAY (FROM RUST 1995)

APPROXIMATE EXTENT OF WASTE TAKEN FROM McBRIDE-RATCLIFF AND ASSOCIATES INC. REPORT, 1992.

NOTES:

GEOLOGY TAKEN FROM RUST E&I-HOUSTON CROSS SECTION AND FIRGURE 5.

GROUND SURFACE ELEVATIONS FROM AN AERO-METRIC 1992 SURFACE TOPOGRAPHY MAP.

FIGURE 8: AUSTIN COMMUNITY LANDFILL
CROSS SECTION A-A'

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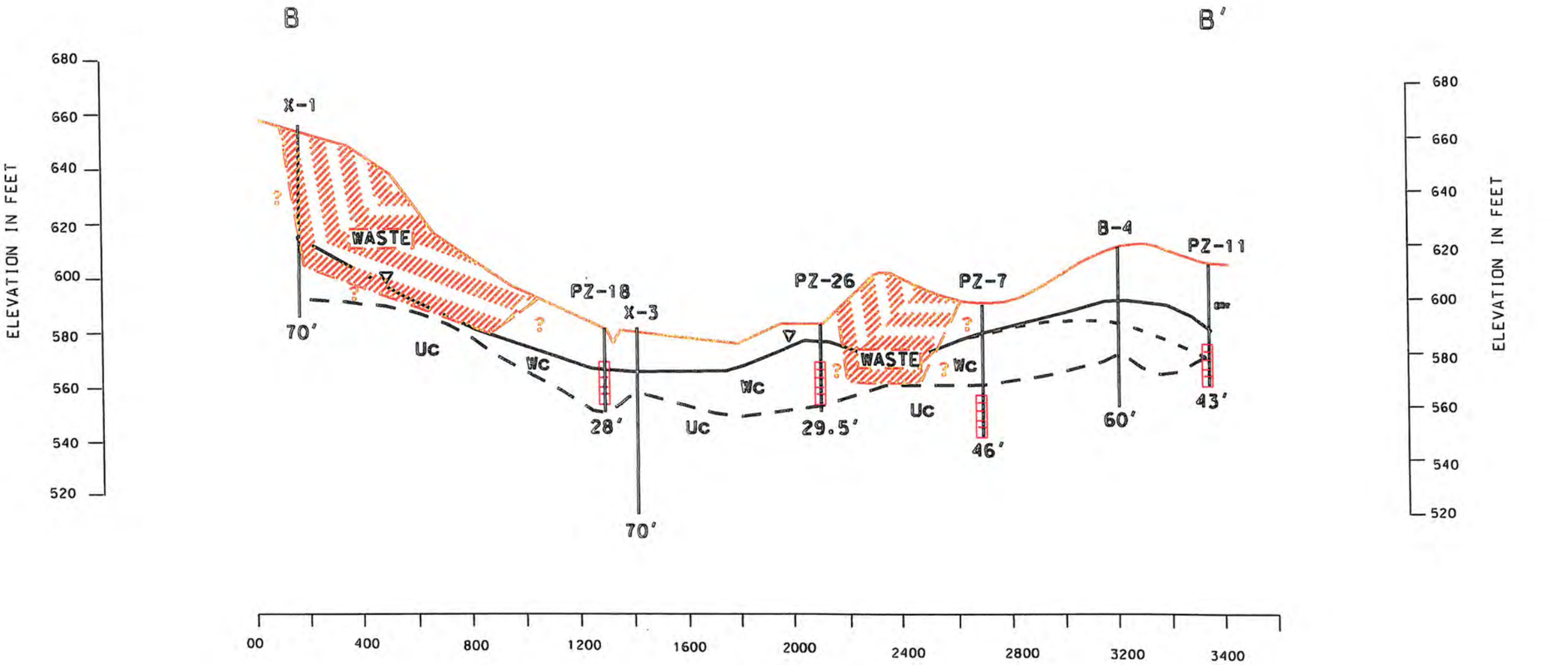
901 South MoPac Expressway
Barton Oaks Plaza V, Suite 200
Austin, Texas 78746
(512) 314-3100



LEGEND

SITE BOUNDARY

GROUND WATER ELEVATION OBSERVATION (8/11/94)
GROUND WATER LEVEL DASHED WHERE ESTIMATED BECAUSE OF LACK OF CONTROL POINTS. AND BECAUSE OF INTERSECTION WITH WASTE UNIT BOUNDARY.

Wc WEATHERED CLAY

Uc UNWEATHERED CLAYSTONE

SCREENED INTERVAL

APPROXIMATE CONTACT BETWEEN WEATHERED AND UNWEATHERED CLAY (FROM RUST 1995)

APPROXIMATE EXTENT OF WASTE TAKEN FROM McBRIDE-RATCLIFF AND ASSOCIATES INC. REPORT. 1992.

NOTES:

GEOLOGY TAKEN FROM RUST E&I-HOUSTON CROSS SECTION AND FIRGURE 5.

GROUND SURFACE ELEVATIONS FROM AN AERO-METRIC 1992 SURFACE TOPOGRAPHY MAP.

FIGURE 9: AUSTIN COMMUNITY LANDFILL
CROSS SECTION B-B'

Carter:Burgess
901 South MoPac Expressway
Barton Oaks Plaza V. Suite 200
Austin. Texas 78746
(512) 314-3100

SOURCE: RUST ENVIRONMENT & INFRASTRUCTURE

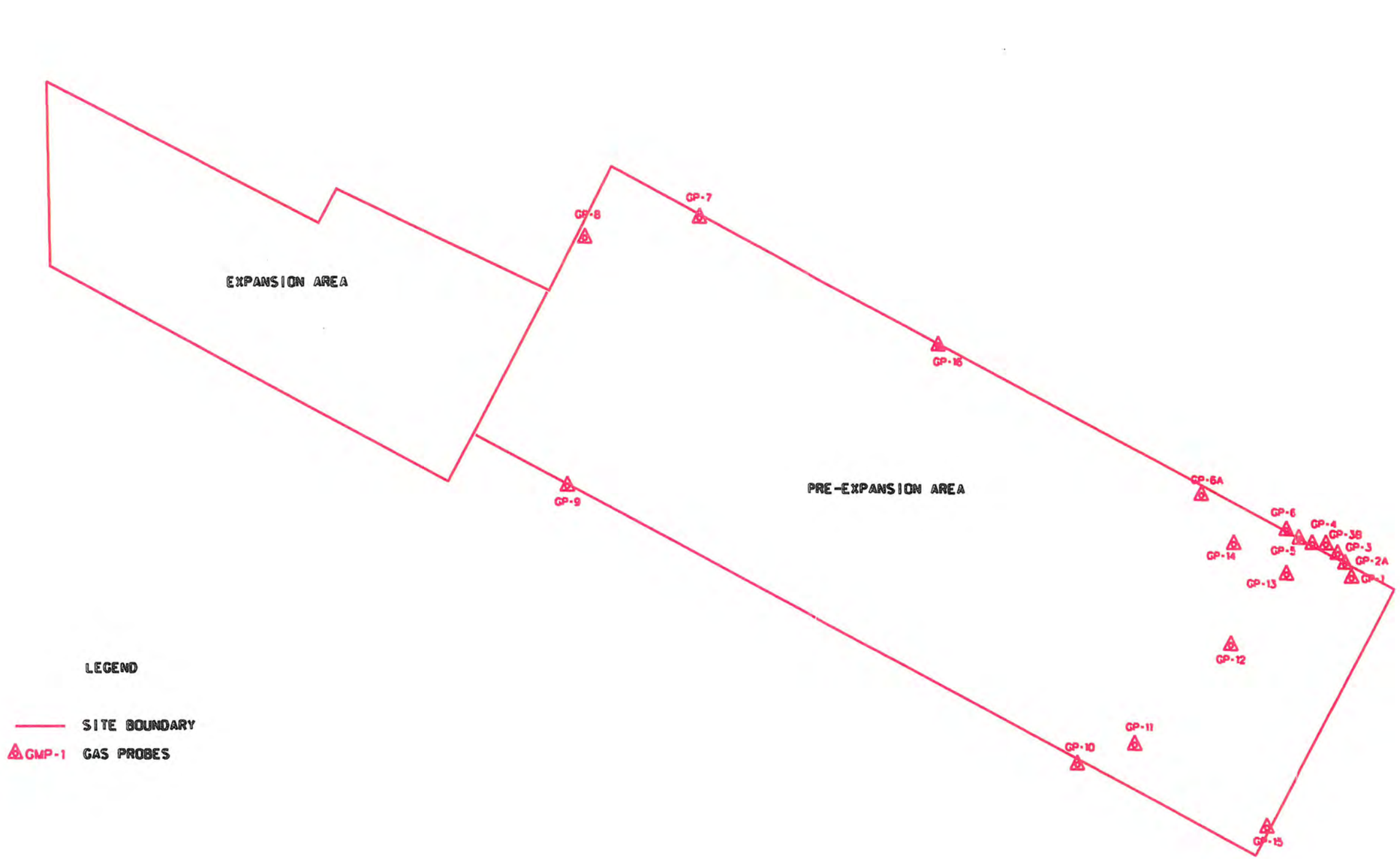
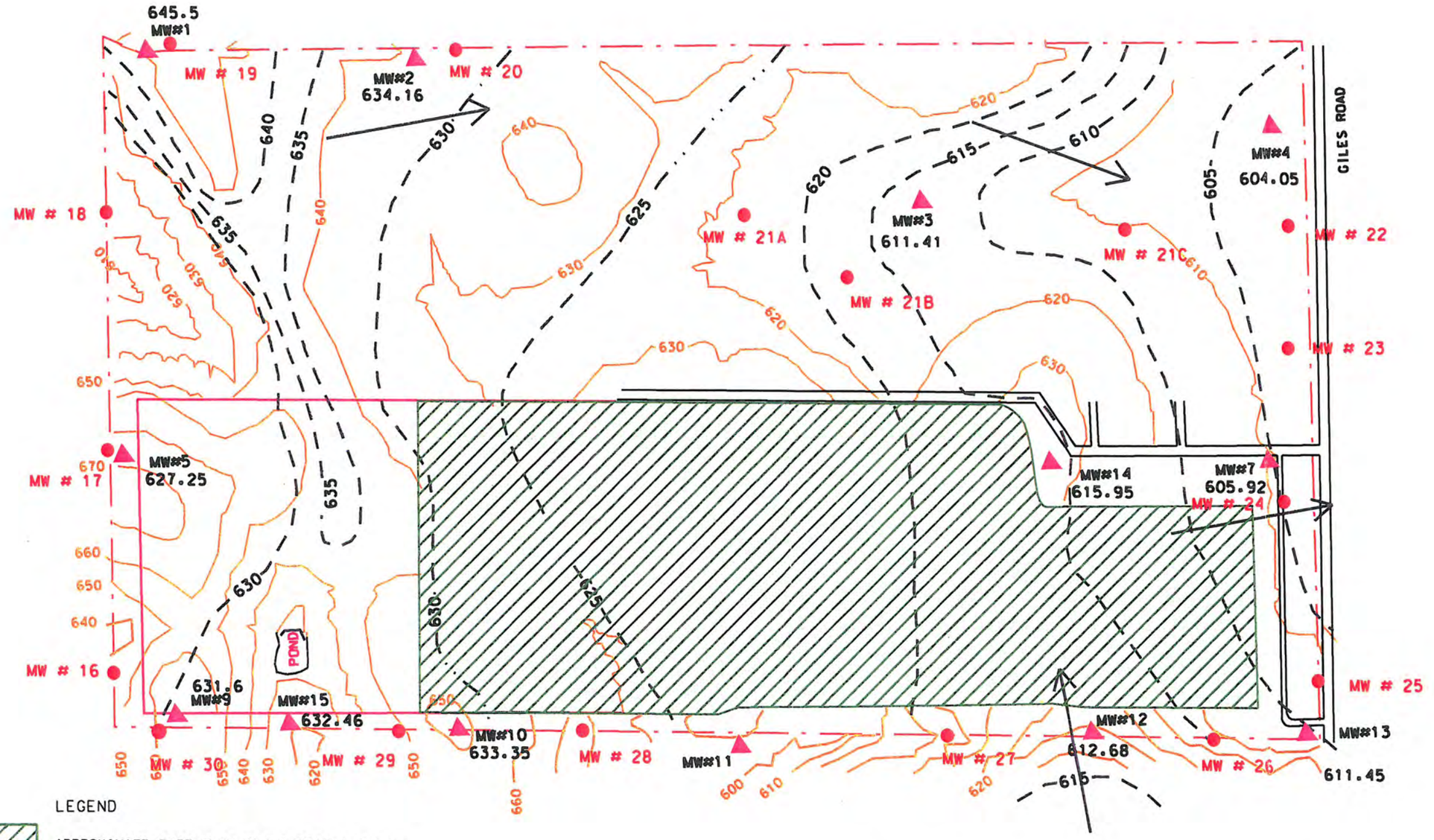


FIGURE 10: AUSTIN COMMUNITY LANDFILL
GAS MONITORING PROBE LOCTIONS

Carter:Burgess
901 South MoPac Expressway
Barton Oaks Plaza V. Suite 200
Austin, Texas 78746
(512) 314-3100

SOURCE: RUST ENVIRONMENT & INFRASTRUCTURE



SOURCE: SAM SURVEYING & MAPPING, RUST ENVIRONMENT & INFRASTRUCTURE

FIGURE 11: BFI SUNSET FARMS LANDFILL
GROUNDWATER MONITORING SYSTEM

Carter=Burgess
901 South MoPac Expressway
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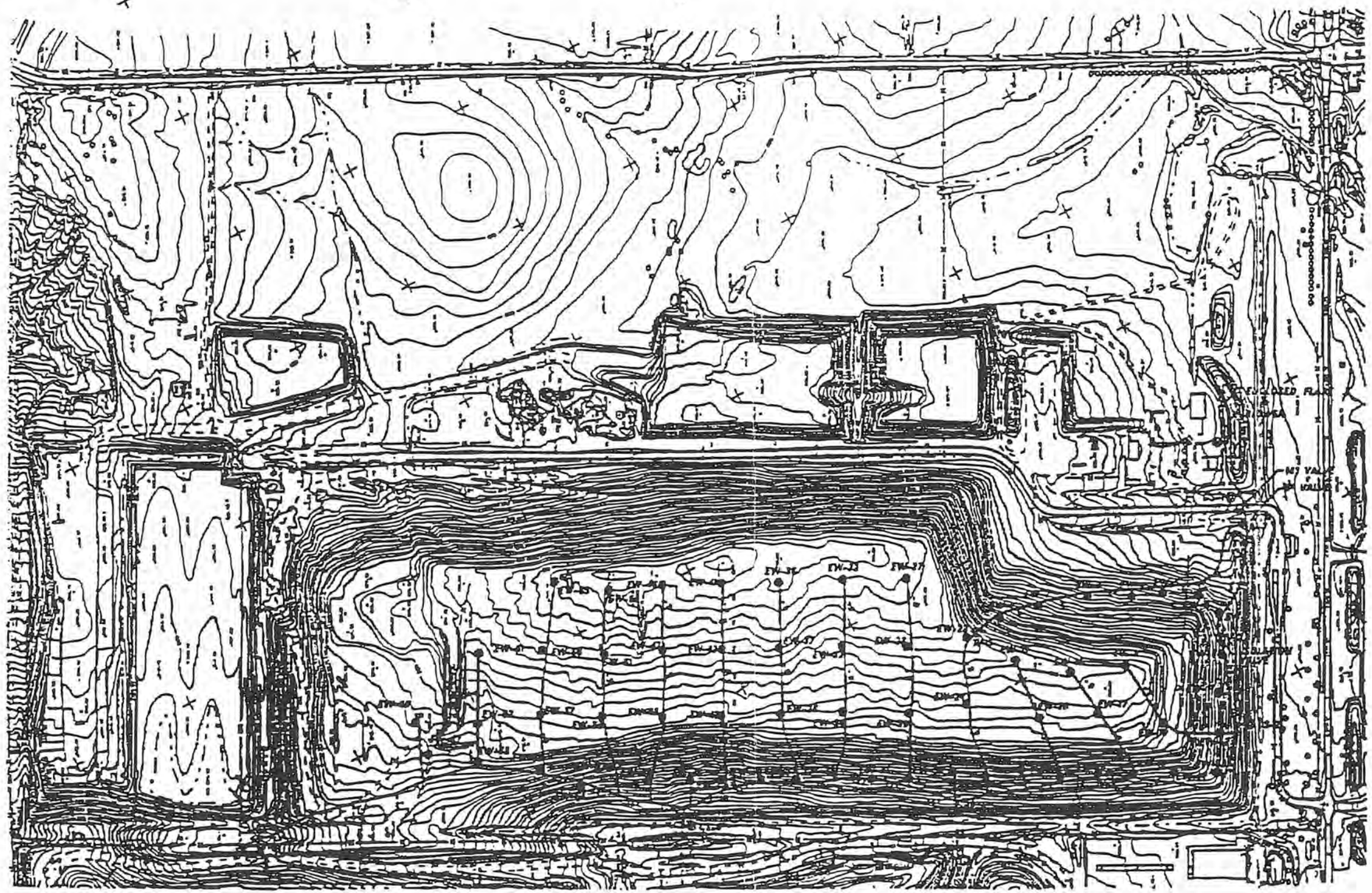
Austin, Texas 78746
(512) 314-3100



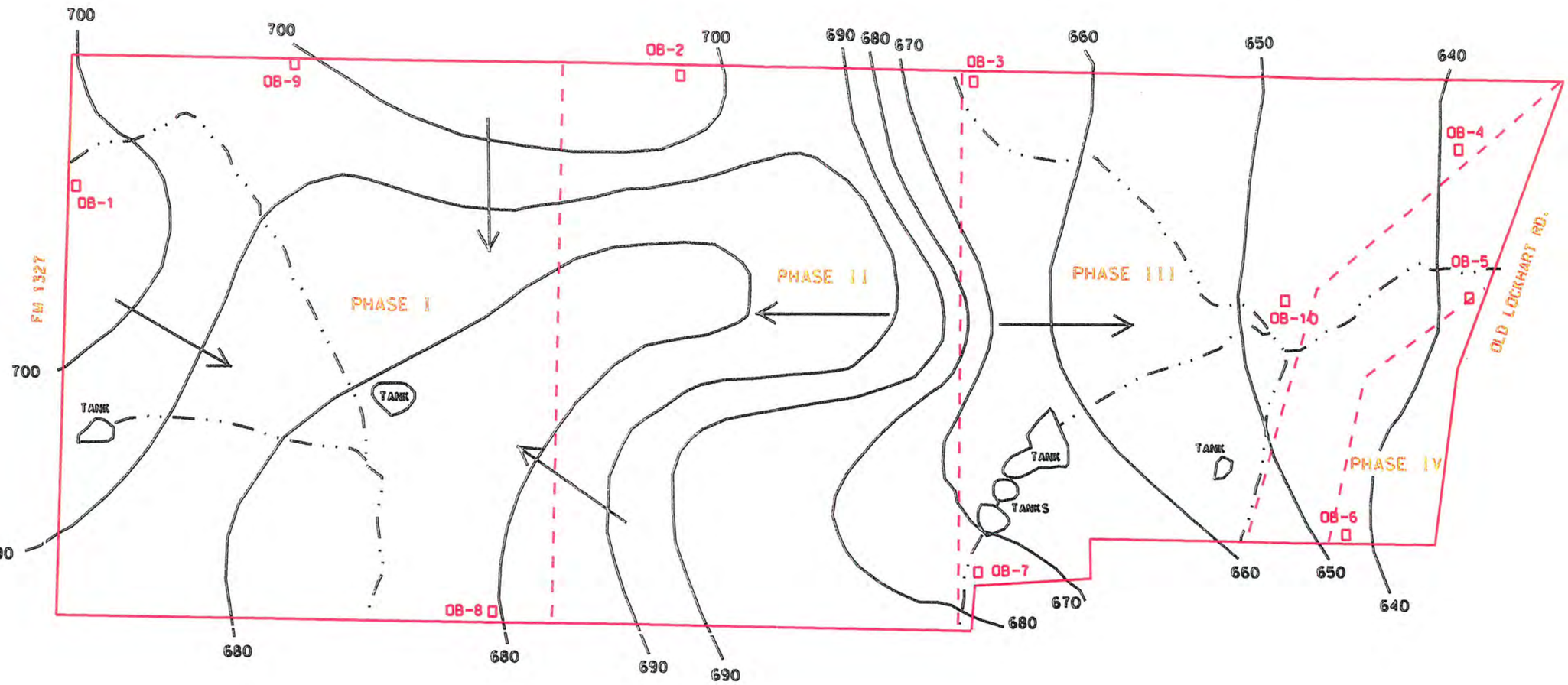
LEGEND

- GAS COLLECTION LINE
- EW-64 GAS WELL
- VALVE
- SUMP
- FLANGE

FIGURE 12: BFI LANDFILL GAS COLLECTION SYSTEM

Carter=Burgess
901 South MoPac Expressway
Barton Oaks Plaza V, Suite 200
Austin, Texas 78746
(512) 314-3100

SOURCE: BFI



LEGEND

- GROUNDWATER ELEVATIONS
- INTERMITTENT DRAINAGE
- 08-7 MONITOR WELL LOCATIONS
- GROUNDWATER FLOW DIRECTION

0 160 320 640 960 1280

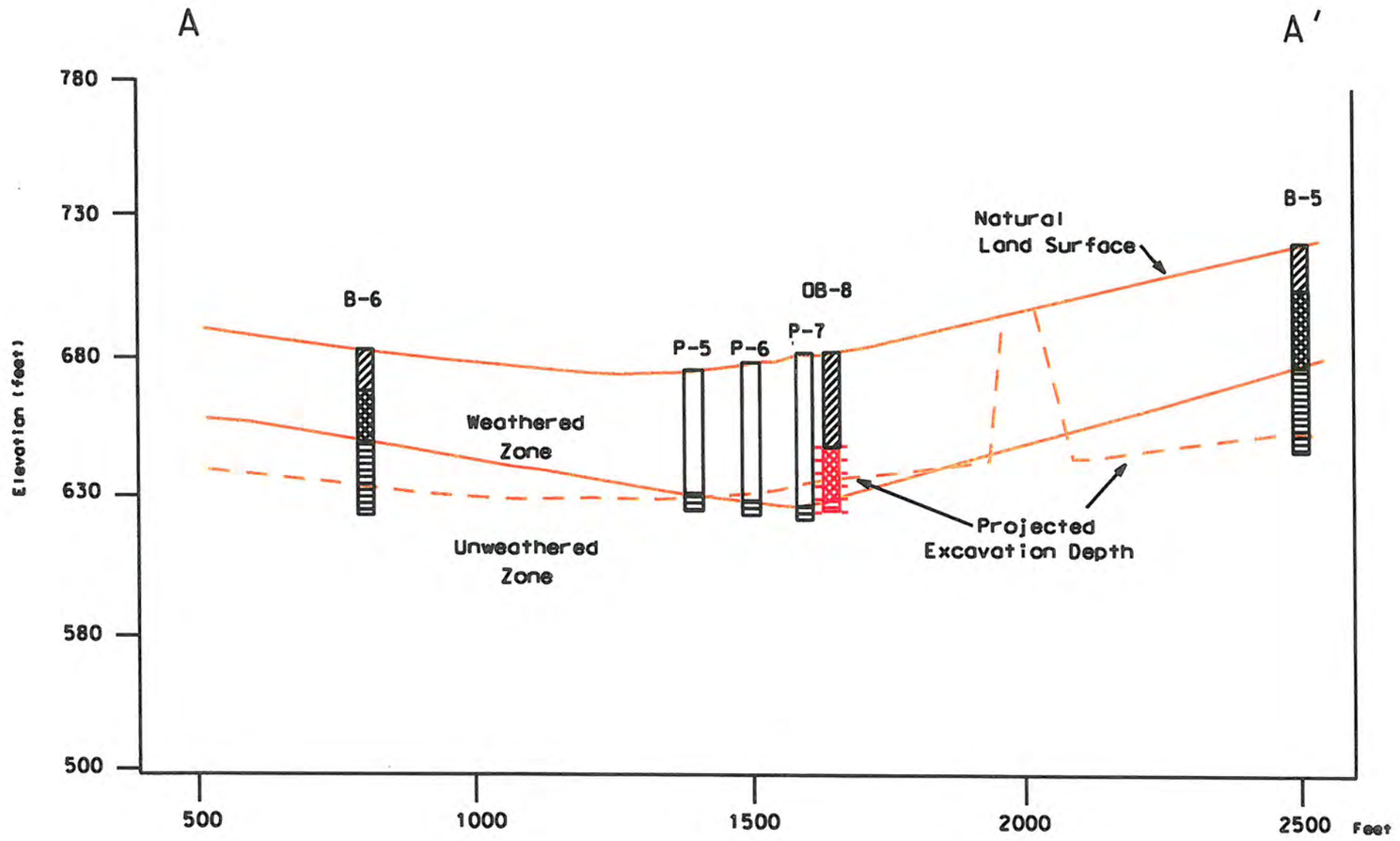
SCALE FEET

FIGURE 13: TEXAS DISPOSAL SYSTEMS LANDFILL

GROUNDWATER MONITORING SYSTEM

Carter-Burgess
901 South MoPac Expressway
Barton Oaks Plaza V, Suite 200
Austin, Texas 78746
(512) 314-3100

SOURCE: DIPPEL ULMANN
ROBERT S. KIER CONSULTING



Legend

Screened Interval

Clay

Weathered Shale

Shale

P-5, P-6, P-7 borings logged only for shale contact

Location map

FIGURE 15: TEXAS DISPOSAL SYSTEMS LANDFILL
CROSS SECTION A-A'

Carter:Burgess
901 South MoPac Expressway
Barton Oaks Plaza V, Suite 200
Austin, Texas 78746
(512) 314-3100

SOURCE: NOT PROVIDED

CITY OF AUSTIN
PRIVATE LANDFILL ENVIRONMENTAL ASSESSMENT
CIP PROJECT NO. 5040-150-3210
TRAVIS COUNTY, TEXAS

Prepared by:

CARTER & BURGESS, INC.
ENVIRONMENTAL SERVICES DIVISION
Barton Oaks Plaza V, Suite 200
901 South MoPac Expressway
Austin, Texas

Prepared for:

The City of Austin
Department of Public Works and Transportation
Architectural and Engineering Services
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505 Barton Springs Road
Austin, Texas 78704

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PROJECT MANAGER

C&B PROJECT NO. 98-3268-010

February, 1999

TABLES

Table 1
HISTORY OF SELECTED REGULATIONS OF SOLID WASTE IN TEXAS

DATE	REGULATION	CITATION	QUOTE OR COMMENT
1963	General	Article 696a, Annotated Penal Code of Texas, §2	Directed the TSDH to "promulgate rules and standards regulating the processing and treating of refuse, garbage, rubbish or junk dumped, deposited or left within 300 yards of any public highway in the state.
1964	Regulatory Authority	Rules and Standards Regulating the Disposal of Refuse, Garbage, Rubbish, or Junk, January 13, 1964, Section A.	"The State Department of Health shall promulgate rules and standards regulating the processing and treating of refuse, garbage, rubbish, or junk dumped, deposited, or left within or nearer than 300 yards of any public highway in this State."
1964	Regulation Required	Rules and Standards Regulating the Disposal of Refuse, Garbage, Rubbish, or Junk, January 13, 1964, Section B, Item 1.	"The facility for the processing and treatment of refuse, garbage, rubbish, or junk ... shall be planned for orderly development and operation. The municipal corporation, private corporation, firm, or person providing a facility shall, upon request, furnish satisfactory evidence to the Texas Department of Health that the facility is planned for orderly development and operation, that geological characteristics have been adequately investigated; and that adequate cover material that compacts well is available."
1964	Liner Requirements	Rules and Standards Regulating the Disposal of Refuse, Garbage, Rubbish, or Junk, January 13, 1964, Section B, Item 1.	"The municipal corporation, private corporation, firm, or person providing a facility ... shall, upon request, furnish satisfactory evidence to the Texas Department of Health that ... that geological characteristics have been adequately investigated."
1964	Closure	Rules and Standards Regulating the Disposal of Refuse, Garbage, Rubbish, or Junk, January 13, 1964, Section B, Item 8.	"A final cover of compacted suitable material shall be placed over the entire surface of each completed portion of the treatment area not later than one week following the placement of refuse within that portion."
1964	Post-Closure Care	Rules and Standards Regulating the Disposal of Refuse, Garbage, Rubbish, or Junk, January 13, 1964, Section B, Item 8.	"Arrangements shall be made for the repair of all cracked or eroded areas in the final cover during the year following final use of the site."

1970	Regulatory Authority	1. Municipal Solid Waste Rules, Standards, and Regulations, § A-5 (2).	1. "The Texas State Department of Health shares joint responsibility with the Texas Water Quality Board in the supervision of the Solid Waste Disposal Act. As stipulated in the law, the Health Department shall have jurisdiction over all solid waste activities concerned with municipal solid waste or with a combination of both municipal and industrial solid waste and shall consult with the Board when water quality matters are involved."
		2. Municipal Solid Waste Rules, Standards, and Regulations, § A-5 (3).	2. "The Texas State Department of Health shall consult with the Texas Air Control Board on aspects of solid waste management that relate to air pollution control and ambient air quality."
		3. Municipal Solid Waste Rules, Standards, and Regulations, § A-5 (3) – (7).	3. The landfill must also comply with any county government regulations, special districts regulations, municipal governments regulations, regional planning councils regulations.
1970	Regulation Required	Municipal Solid Waste Rules, Standards, and Regulations, § B-2.1.	A letter of application for approval from the Texas Department of Health is required in order to conduct Municipal Solid Waste Activities.
1970	Liner Requirements	Municipal Solid Waste Rules, Standards, and Regulations, § E-1.4 (c).	"Solid waste shall be deposited in such a manner that the possibility of leachate percolating into the groundwater is minimized. An impervious barrier may be either naturally occurring or artificially placed. The following procedures are acceptable: 1. Placement of three feet of clay. 2. Placement and compaction of one foot of selected clayey material under optimum moisture conditions. 3. Placement of an impervious membrane of asphaltic, plastic, or other approved material. 4. Any procedure other than 1, 2, or 3 above, if approved by the Texas State Department of Health."

1970	Groundwater Monitoring	Municipal Solid Waste Rules, Standards, and Regulations, § E-1.4 (f).	"If deemed necessary by the Department, monitor wells will be drilled by the operating agency in the configuration and number set by the Texas Water Quality Board to observe changes in the quality of groundwater."
1970	Closure	Municipal Solid Waste Rules, Standards, and Regulations, § E-3.1 (c)(3)(c).	In addition to the 1964 requirements: "The final cover shall be of a clay type or other earthen material of satisfactory quality. Each completed portion of the site shall be covered with at least two feet of well compacted material within a week."
1970	Post-Closure Care	Municipal Solid Waste Rules, Standards, and Regulations, § E-3.1 (c)(3)(f).	"It is recommended that the completed surface of the landfill be planted with vegetation to prevent erosion and enhance the appearance of the site."
1974	Regulation Required	Municipal Solid Waste Regulations, October 16, 1974, § C-1.	A site permit from the Department is required. The permit is issued only after a required public hearing. The landowners "immediately surrounding" the landfill site must be provided notice of the hearing.
1974	Liner Requirements	Municipal Solid Waste Rules, Standards, and Regulations, § E-1.3 (b).	"Solid waste shall be deposited in such a manner that the possibility of leachate percolating into the groundwater is minimized. An artificially placed restrictive barrier may be required in soils with unacceptable permeability."
1974	Closure	Municipal Solid Waste Rules, Standards, and Regulations, § E-2.8 (a).	"A final cover of at least two feet of well-compacted suitable material shall be placed over the entire surface of each completed portion of the treatment area."
1974	Post-Closure Care	1. Municipal Solid Waste Rules, Standards, and Regulations, § E-2.8 (a). 2. Municipal Solid Waste Rules, Standards, and Regulations, § E-2.8 (a).	1. "For a period of one year following closure of the site, the entire surface of the final cover shall be inspected monthly, and all cracked, eroded, and uneven areas shall be repaired and graded to drain." 2. "The Department may require that the completed surface of the landfill be planted with vegetation to prevent erosion and enhance the appearance of the site."

1975	Regulatory Authority	Municipal Solid Waste Regulations, July, 1975, Preamble.	Only change was that the Texas Department of Health changed its name to the Texas Department of Health Resources.
1976	Regulation Required	Municipal Solid Waste Management Regulations, January 2, 1976, § C-2.	Required public hearing. Notice published in newspaper but no particular individuals noticed individually
1976	Liner Requirements	Municipal Solid Waste Management Regulations, January 2, 1976, § E-1.4 (a).	"Solid waste shall be deposited in such a manner that the possibility of leachate percolating into the groundwater is minimized. A minimum thickness of three feet of relatively impermeable soil ... must separate deposited solid waste from groundwater. These characteristics may be provided either by the natural soil or through a compacted liner of clay or other suitable material."
1977	Regulatory Authority	Municipal Solid Waste Management Regulations, April 20, 1977, § A-6.3 – 6.6.	Name changed back to Texas Department of Health, along with the addition of consultation with the following agencies: Texas Water Development Board (floodplains), State Department of Highways and Public Transportation (roads), U.S. Army Corps of Engineers (navigable waters and wetlands), and the Federal Aviation Administration (birds and aircraft).
1977	Regulation Required	Municipal Solid Waste Management Regulations, April 20, 1977, § E-2.8.	Notice of application required to be published. Rule states that "all citizens" have the right to be present and comment on the permit application. Administrative Procedure and Texas Register Act rules apply to hearing.
1977	Liner Requirements	Municipal Solid Waste Management Regulations, April 20, 1977, § E-2.8.	Added to the 1976 requirement were these requirements: "As an aid in determining the amount of protective lining necessary for disposal areas or trenches, or for eliminating the requirement for such lining, calculations should be submitted indicating the potential percolation of precipitation into deposited solid waste and potential for leachate generation using the water balance method based on rainfall, evapotranspiration, and soils data as developed by C.W. Thornthwaite of Drexel Institute of Technology and in use in the soil and water conservation field."

1977	Landfill Gas Monitoring	Municipal Solid Waste Management Regulations, April 20, 1977, § F-2.12.	"Decomposition gases shall not be allowed to migrate laterally from the landfill site to endanger occupants of adjacent properties. Any structures subsequently constructed on the landfill site should contain provisions for the venting of decomposition gases to preclude their accumulation in explosive or toxic concentrations beneath or within the structures."
1977	Closure	1. Municipal Solid Waste Management Regulations, April 20, 1977, § F-2.13.	1. "A final cover of at least two feet of earthen material, compacted in layers of no more than 12 inches, shall be placed over the entire surface of each completed portion of the fill within 30 days after completion unless inclement weather would prevent the application of dry cover material. The top six inches of final cover shall consist of a suitable topsoil which will sustain the growth of vegetation."
		2. Municipal Solid Waste Management Regulations, April 20, 1977, § F-2.15.	2. Site operator must provide closure plan 60 days prior to completion of disposal operations. Site operator must prepare an "Affidavit to the Public" and file it in the real property records of the county.
1980	Regulatory Authority	Municipal Solid Waste Management Regulations, November 19, 1980, § A-6.1.	Only change was name of Texas Water Control Board became Texas Department of Water Resources.
1980	Liner Requirements	Municipal Solid Waste Management Regulations, November 19, 1980, § E-2.3e (4)(c).	This was the first time that a soil and liner quality control plan (SLQCP) was required to be a part of the permit application. Also provided for constructed lining other than compacted clay if written approval obtained from the Department during the design phase of the application.
1980	Leachate Collection	Municipal Solid Waste Management Regulations, November 19, 1980 § E, Paragraph 2.3e (6)(d).	"Handling and temporary storage of contaminated surface water shall be considered. If required, contaminated surface water storage areas shall be designed with regard to size, locations, and methods, and amounts of lining of the sides and bottoms of the storage areas."

1980	Groundwater Monitoring	Municipal Solid Waste Management Regulations, November 19, 1980, § E-2.3e (4)(d).	"The need for monitor wells shall be considered. If Departmental evaluation deems it necessary, monitor wells will be required. The Department may require that earth electrical resistivity surveys be used in lieu of or as a supplement to monitor wells."
1980	Landfill Gas Monitoring	Municipal Solid Waste Management Regulations, November 19, 1980, § E-2.3e (8).	"The potential for generation and migration of methane from the site shall be considered, and an appropriate venting system or other control measures shall be designed if necessary. If a determination is made that gas migration will not be a problem and a control plan is not necessary, the basis for such determination shall be provided. The design for control measures shall be in accordance with Departmental guidelines and included as an appendix to the Site Development Plan."
1980	Post-Closure Care	Municipal Solid Waste Management Regulations, November 19, 1980, § F-2.16 (g).	"For the first year after closure, the site operator shall periodically inspect his closed site and correct as necessary any problems associated with erosion, vegetative growth, leachate or methane migration, subsidence and ponding of water on the site. If any of these problems persist for longer than the first year, the site operator shall be responsible for their correction until the Department determines that the problem areas have been adequately resolved."
1983	Regulation Required	Municipal Solid Waste Management Regulations, July 12, 1983, § 325.93 (a)(1)-(2).	Public hearing no longer required. Any "person affected" has a right to request a hearing. Department may conduct a hearing on its own motion.

1983	Groundwater Monitoring	1. Municipal Solid Waste Management Regulations, July 12, 1983, § 325.74 (b)(5)(D)(vii).	1. Except as may be authorized by subclause (VIII) of this clause, groundwater monitor wells shall be installed for surface impoundments, landfills, and land treatment sites. A groundwater monitoring system will consist of at least one monitor well hydraulically upgradient of the site to obtain representative background groundwater samples and at least two monitor wells hydraulically downgradient of the site to obtain representative groundwater samples that may contain contaminants from leachate. The department may require additional monitor wells when conditions warrant, particularly for large sites. The design engineer shall determine the number, location, and depth of monitor wells based on such groundwater information as depth to the water table, direction and rate of groundwater flow, recharge area in relation to the site, static water elevation with dynamic head characteristics, and depth to the first potable aquifer."
		2. Municipal Solid Waste Management Regulations, July 12, 1983, § 325.74 (b)(5)(D)(vii)(VIII).	2. "All or part of the groundwater monitoring requirements may be waived by the department if it can be demonstrated that there is low potential for the creation and migration of leachate from the site via aquifers to water supply wells or to surface water. Potential for the creation and migration of leachate may be evaluated using the water balance of precipitation, evapotranspiration, runoff, and infiltration and the evaluation of the hydrogeological and physical properties characteristics of the saturated and unsaturated zone and the proximity of the site to water supply wells or surface water."
1983	Closure	Municipal Solid Waste Management Regulations, July 12, 1983, § 325.152 (a)-(b).	First year that application required to contain a closure plan for the site. Site operator must provide updated closure plan one year prior to closure of site. Other requirements above also apply.

1983	Post-Closure Care	1. Municipal Solid Waste Management Regulations, July 12, 1983, § 325.153.	1. "For at least the first five years after closure, the site operator shall maintain the right-of-entry and periodically inspect his closed site and correct as necessary any problems associated with erosion of cover material, vegetative growth, leachate or methane migration, subsidence and ponding of water on the site. If any of these problems persist for longer than the first five years, the site operator shall be responsible for their correction until the Department determines that the problem areas have been adequately resolved."
		2. Municipal Solid Waste Management Regulations, July 12, 1983, § 325.154 (a)-(b).	2. Municipal Solid Waste Management Regulations, July 12, 1983, § 325.154 (a)-(b). This is also the first year that the Department retained regulatory control over any activity which could disturb the integrity of the closed landfill.
1990	Leachate Collection	1. Municipal Solid Waste Management Regulations, August 7, 1990, § 325.123 (d).	1. "Suitable drainage structures shall be provided to divert the flow of rainfall runoff or other surface water away from active disposal areas and to contain any water that has come in contact with solid waste."
		2. Municipal Solid Waste Management Regulations, August 7, 1990, § 325.123 (e).	2. "Rainfall water within the landfill area that has come in contact with solid waste and other polluted waters shall not be discharged without prior specific approval of Texas Department of Water Resources."

1990	Landfill Gas Monitoring	Municipal Solid Waste Management Regulations, August 7, 1990, § 325.148.	Methane and other decomposition gases shall not be allowed to migrate laterally from the landfill site so as to endanger structures, vegetation, or occupants of adjacent properties. Any structures subsequently constructed on the landfill site should contain provisions for the venting of decomposition gases to preclude their accumulation in explosive or toxic concentrations beneath or within the structures. The concentration of methane generated by the solid waste site should not exceed 25% of its lower explosive limit in on-site structures (excluding gas control or recovery system components) and it shall not exceed its lower explosive limit at the property boundary. The lower explosive limit is the lowest percent by volume of a mixture of methane which will propagate a flame in air at or above 25° C and atmospheric pressure
1990	Post-Closure Care	1. Municipal Solid Waste Management Regulations, August 7, 1990, § 325.153 (b).	In addition to all of the above requirements of 1983 is the following: 1. "Any monitoring programs (groundwater monitoring, resistivity studies, methane monitoring, etc.) in effect during the life of the site shall be continued during the post-closure maintenance period, unless otherwise approved by the department."
		2. Municipal Solid Waste Management Regulations, August 7, 1990, § 325.154.	2. The Department retained regulatory control over specific activities that may take place on a closed landfill: relocating waste from a closed landfill, extracting materials for energy, or material and gas recovery. The Department also gave guidance for other activities.
10/9/91	General	Amendments to 40 CFR Part 257 and new 40 CFR Part 258	As a result of new requirements in Subtitle D of RCRA as amended by the Hazardous and Solid Waste Amendments (HSWA), USEPA excluded municipal solid waste landfills from Part 257 and established revised and more stringent MSWLF criteria in Part 258 (commonly referred to as the Subtitle D criteria).

1991	General	Amendments to the Texas Solid Waste Disposal Act (Senate Bill 2, 72nd Legislature, Regular Session	Transferred the municipal solid waste program from the Texas Department of Health to the Texas Water Commission effective March 1, 1992, and created the Texas Natural Resource Conservation Commission effective September 1, 1993, incorporating the Texas Air Control Board.
1993	General	30 TAC, Chapter 330, MSW (formerly, municipal solid waste rules were found at 25 TAC, Chapter 325).	Revision to the municipal solid waste regulations for consistency with the federal municipal solid waste program and to reflect transfer in jurisdiction from the TDH to TWC/TNRCC.
1994	Liner Requirements	30 TAC 330 §§ 205-206.	The current technical requirements for liners is largely the same since the inaction of Subtitle 'D' of the Resource Conservation and Recovery Act (RCRA). The requirements are set forth today in 30 TAC 330 §§ 205-206.
1994	Leachate Collection	1. 30 TAC § 330.55 (b)(3).	1. "The owner or operator shall design, construct, and maintain a run-off management system from the active portion of the landfill to collect and control at least the water volume resulting from a 24-hour, 25-year storm. The run-off from the active portion shall be discharged in compliance with paragraph (1) of this subsection or disposed of in an authorized manner."
		2. 30 TAC § 330.55 (b)(6).	2. "The owner or operator shall handle, store, treat, and dispose of surface or groundwater that has become contaminated by contact with the working face of the landfill or with leachate in accordance with § 330.139 of this title (relating to Contaminated Water Discharge). Storage areas for this contaminated water shall be designed with regard to size (verifying calculations included), treatment (supporting documentation and calculations included), locations, and methods and shall have an approved liner covering the bottom and side slopes. Other surface run-off water shall be handled in accordance with paragraph (3) of this subsection.
1994	Landfill Gas Monitoring	30 TAC § 330.56 (n) 30 TAC § 330.130	In addition to the 1990 requirements above, a Landfill Gas Management Plan (LGMP) is required to be a part of the application.

1994	Closure	30 TAC § 330.253	In addition to adherence to a closure plan, the TNRCC now requires that the site operator give public notice of closure and that signs be posted denoting the boundaries of the landfill site.
1994	Post-Closure Care	1. 30 TAC § 330.254	1. The post-closure maintenance period is now 30 years. The site operator is required to operate the groundwater and gas monitoring systems for the duration of the period.
		2. 30 TAC § 330.255	2. Post closure construction is more strictly regulated. Gas sensors must be installed in any structure on the site and no part of the construction can jeopardize the integrity of the liner.
		3. 30 TAC § 330.280-286	3. Finally, financial assurance for operation of the landfill, for closure, for post-closure maintenance, and for environmental contamination are required to be posted by the site owner.

TABLE 2
TABULATION OF SOIL AND LINER EVALUATION REPORTS
AUSTIN COMMUNITY LANDFILL

ogic Unit of oil Class	LAB TESTING				FIELD TESTING		Lift Thickness/ Method of Determination	FREUENCY OF TESTS PER LIFT	PROTECTIVE COVER OVER LINER	ENGINEERS SEAL/DATE	REGULATORY CONCURRENCE DOCUMENTED
	Dry Density Proctor/ Moisture Content	Gradations (% passing No 200 Sieve)	Liquid Limit/Plasticity Index	Hydraulic Conductivity	Std Proc. Density/Moisture Content	# Visits by Certifying Engineer					
	105-106/18 7-26 7	96-99	64-72 40-46	10(-8)		4				10/16/81	Yes
	98-106/18 7-1 29 4	96-99	58-72 31-46	10(-8) - 10(-9)		4				10/16/84	Yes
	/24 8-1 26 2	84 3-86 4	58 3-58 7 33 9-34 5	4 5x10(-8)		2	6"			8/3/82	Yes
	98 3-105 4/23 3-26 3	84 3-96 9	59-63 33 5-45	10(-8) - 10(-9)		2				8/3/82	Yes
	100 8/24 6	84 3	58 3,24 2	3 2 x 10(-9)		2	6"			8/3/82	Yes
	98 3-99 2/23 3-26 3	91 8-96 9	59-64 18 2-25 5	6 1x 10(-9)		2				8/3/82	Yes
	98 9-105 8/14 8-19 1	89 6-91 4	57 1-58 5/34 5-36 9			3	6"			9/8/82	Yes
	94 3-102/16 4-21 6	89 6-93 6	68 2-81 6/42 2-53 7			3				9/8/82	Yes
	91 5-105 8/14 8-27 7	89 6-92 2	57 1-79 3/34 5-51 6		96 6-103 6(6)	2	6"			1/4/83	Yes
	91 5-99 25/	90 8-93 2	62 3-79 3/38-51 6		96 8-98(6)	2				1/4/83	Yes
	97 6-107 8/	90 6-98 7	54 6-74 0/32 9-49 7			5				8/18/83	Yes
	98 4-101 6/	89 4-96 4	57-71 8/33 7-39 1			5				8/18/83	Yes
		89 8	60-33 9			4				6/15/84	Yes
		89 1	58 9/33 6			4				6/15/84	Yes
		96 3	56/35			3				9/28/84	Yes
		92 8-95 6	57-67/35-43			3				9/28/84	Yes
	104 3/20 3	87 6-90 6	65/38-41		ASTMD1557 (52)	19	8"	2-3		4/25/85	Yes
	95 5/25 7	87 6-90 6	49-53/27-29		ASTM D1557	19	8"	4-8		4/25/85	Yes
		88 5-91 3	62-73 5/33 7/43 3			10				8/2/85	Yes
		91 7	71 5/45 7			15				9/13/85	Yes
		79 3-92 2	64-68 7/38 9-43 4			15				9/13/85	Yes

TABLE 2
TABULATION OF SOIL AND LINER EVALUATION R TS
AUSTIN COMMUNITY LANDFILL

c Unit of Class	LAB TESTING				FIELD TESTING		Lift Thickness/ Method of Determination	FREUENCY OF TESTS PER LIFT	PROTECTIVE COVER OVER LINER	ENGINEERS SEAL/DATE	REGULATORY CONCURRENCE DOCUMENTED
	Dry Density Proctor/ Moisture Content	Gradations (% passing No 200 Sieve)	Liquid Limit/Plasticity Index	Hydraulic Conductivity	Std Proc Density/Moisture Content	# Visits by Certifying Engineer					
		86 6-90 2	82-74/33-42			6				10/25/85	Yes
		86 4-90 6	58-74 8/33-46			6				10/25/85	Yes
						1		3		11/22/85	Yes
						1		3		12/3/85	Yes
						1		3		12/5/85	Yes
					ASTMD1557(12 tot)	4		3		12/6/85	Yes
	Same source as 1-3-85 data		64-65/36-41			6	8"	3		1/21/86	Yes
		87 6-90 6	49-53/27-29		ASTMD1557 (9 tot)	6	8"	3	1'	1/21/86	Yes
		78 4-80 9	56-77/31-46			4				2/25/86	Yes
						10	8"	3		3/3/86	Yes
		90 9	73/44		ASTMD 1557 (19 tot)	10	8"	3	1'	3/3/86	Yes
		77 4-80 2	59-82/33-47			10				4/29/86	Yes
	100 2-101 9/20 8-22 2	71 5-90 9	60-73/33-44		ASTMD 1557 (9 tot)	10	6"-surveyed	4-6		5/12/86	Yes
	99 7-103 8/19 4-70 3	71 5-90 9	60-73/33-44		ASTMD 1557 (30 tot)	10	6"-12" -surveyed	6	1 1/2	5/12/86	Yes
	100 2-103 8/19 4-20 3	71 5-74 6	60-66/33-40		ASTMD 1557(6 tot)	8		3		7/2/86	Yes
	100 2-103 8/19 4-20 3	71 5-74 6	60-66/33-40		ASTMD 1557 (6 tot)	8		3	1'	7/2/86	Yes

TABLE 2
TABULATION OF SOIL AND LINER EVALUATION REPORTS
AUSTIN COMMUNITY LANDFILL

ic Unit of Class	LAB TESTING				FIELD TESTING		Lift Thickness/ Method of Determination	FREUENCY OF TESTS PER LIFT	PROTECTIVE COVER OVER LINER	ENGINEERS SEAL/DATE	REGULATORY CONCURRENCE DOCUMENTED
	Dry Density Proctor/ Moisture Content	Gradations (% passing No 200 Sieve)	Liquid Limit/Plasticity Index	Hydraulic Conductivity	Std Proc Density/Moisture Content	# Visits by Certifying Engineer					
	104 1/19 3	81 6	66/43		ASTMD 1557(25 tot)	8	6"-12"-surveyed	6-7		9/16/86	Yes
	ASTMD 698	81 6	66/43		ASTMD 1557 (25 tot)	8	6"-12"-surveyed	6-7	1'	9/16/86	Yes
	104 3/19 4	91 7-92 6	61-63/39-41		ASTMD 1557 (33 tot)	11	8"-9" surveyed	3		2/6/87	Yes
	102 7/20 7	91 7-92 6	61-63/39-41		ASTMD 1557 (26 tot)	11	6"-12"-surveyed	6-8	1'	2/6/87	Yes
	101 8-103 5/17 6-19 6	93 2-94 7	50-52/32-35		ASTMD 1557 (28 tot)	8	6"-surveyed	6-10	1'	5/5/87	Yes
	103 0/17 3	74 6-83 9	56-59/33-35		ASTMD 1557 (15 tot)	8	8"-9"-surveyed	3		9/22/86	Yes
		78 7-90 9	56-58/35-47			8				9/22/86	Yes
	102 1/20 1	90 5-93 0	62-64/41-42		ASTMD 1557 (9 tot)	6	6"-8" -surveyed	3		10/14/87	Yes
	102 1/20 1	95 2	59/36		ASTMD 1557 (39 tot)	6	6"-8" -surveyed	8-14	1'	10/14/87	Yes
	102 1/20 1	90 5-93 0	62-64/41-42		ASTMD 1557 (39 tot)	9	6"-8" -surveyed	3		10/26/87	Yes
	102 1/20 1	95 2	59/36		ASTMD 1557 (45tot)	9	6"-8" -surveyed	5-10	1'	10/26/87	Yes
	103 4/19 8	88 4-94 3	61/37-41		ASTMD 1557 (79 tot)	11	6"-8" -surveyed	5-7		1/14/88	Yes
		90 0-95 9	61-71/47-49			11				1/14/88	Yes
	97 8-100 5/18 9-22 4	93 2-96 7	63-72/36-46		ASTMD 1557 (86 tot)	18	8"-9" -surveyed	7-8		4/14/88	Yes
		88 4-97 7	61-67/37-46			18				4/14/88	Yes
	100 9-104 5/18 6-20 3	91 2-97 7	57-69/32-43		ASTMD 1557 (44 tot)	16	8"-9" -surveyed	3		9/6/88	Yes
	100 9-104 5/18 6-20 3	91 2-97 7	57-69/32-43		ASTMD 1557 (37 tot)	16	6"-7" -surveyed	3-6	1'	9/6/88	Yes
	99 2-99 6/20 7-22 7	94 2-98 8	61-69/37-44		ASTMD 1557 (90 tot)	16	8"-9" -surveyed	3-5		6/1/90	Yes
		94 2-98 8	61-69/37-44			16				6/1/90	Yes
		97 3-97 5	63-71/37-39			2				11/8/90	Yes
		97 3-97 5	63-71/37-39			2				11/8/90	Yes

TABLE 2
TABULATION OF SOIL AND LINER EVALUATION REPORTS
AUSTIN COMMUNITY LANDFILL

logic Unit of oil Class	LAB TESTING				FIELD TESTING		Lift Thickness/ Method of Determination	FREUENCY OF TESTS PER LIFT	PROTECTIVE COVER OVER LINER	ENGINEERS SEAL/DATE	REGULATORY CONCURRENCE DOCUMENTED
	Dry Density Proctor/ Moisture Content	Gradations (% passing No 200 Sieve)	Liquid Limit/Plasticity Index	Hydraulic Conductivity	Std Proc Density/Moisture Content	# Visits by Certifying Engineer					
				10(-8) - 10(-9)				8	1'	6/28/91	Yes
				10(-8) - 10(-9)						6/28/91	Yes
	ASTMD 698 (73 tot)	ASTMD 422 (15 tot)	ASTMD 4318 (15 tot)	10(-8)-10(-9)(15 tot)	ASTMD 1557 (73 tot)	22	6"-9"-surveyed	3-9	1'	6/4/91	Yes
	ASTMD 698 (81 tot)	ASTMD 422 (8 tot)	ASTMD 4318 (8 tot)	10(-8) - 10(-9)(8 tot)	ASTMD 1557 (81 tot)	17	6"-12"-surveyed	4-21	6" Constructed	12/12/91	Yes
										8/10/62	Yes
	ASTMD 698 (179 tot)	ASTMD 422 (25 tot)	ASTMD 4318 (25 tot)	10(-8) - 10(-9) (25 tot)	ASTMD 1557 (179 tot)	34	6"-9"-surveyed	9-14	1'	9/17/92	Yes
		ASTMD 422 (48 tot)	ASTMD 4318 (45 tot)	10(-8) (48 tot)		8				9/18/92	Yes
		ASTMD 422 (15 tot)	ASTMD 4318 (15 tot)	10(-8) - 10(-9) (15 tot)	ASTMD 1557 (47 tot)	24	6"-9"-surveyed		1'	10/27/92	Yes
	ASTMD 698 (289 tot)	ASTMD 422 (33 tot)	ASTMD 4318 (33 tot)	10(-8) - 10(-9) (33 tot)	ASTMD 1557 (289 tot)	38	6"-9"-surveyed	3-14	1'	11/19/92	Yes
		96 7 67/43		10(-8) (1 tot)	ASTMD 1557 (21 tot)	6				11/19/92	Yes
		94 3-98 8(45)		10(-8)-10(-9) (45 tot)	ASTMD 1557 (46 tot)	13			Re-Certification	7/21/93	Yes
	ASTMD 698 (85 tot)	ASTMD 422 (14 tot)		10(-8) (14 tot)	ASTMD 1557 (85 tot)	18	6"	3-8	1'	8/19/93	Yes

TABLE 2
TABULATION OF SOIL AND LINER EVALUATION REPORTS
AUSTIN COMMUNITY LANDFILL

ogic Unit of ɔil Class	LAB TESTING				FIELD TESTING		Lift Thickness/ Method of Determination	FREUENCY OF TESTS PER LIFT	PROTECTIVE COVER OVER LINER	ENGINEERS SEAL/DATE	REGULATORY CONCURRENCE DOCUMENTED
	Dry Density Proctor/ Moisture Content	Gradations (% passing No.200 Sieve)	Liquid Limit/Plasticity Index	Hydraulic Conductivity	Std. Proc Density/Moisture Content	# Visits by Certifying Engineer					
	ASTMD 698 (4 tot)	86.5-96.7		10(-8) (2 tot)	ASTMD 1557 (4 tot)	4			1'	9/7/93	Yes
	ASTMD 698 (11 tot)	96.7			ASTMD 1557 (11 tot)	4				9/7/93	Yes
	ASTMD 698	ASTMD 422	ASTMD 4318	ASTMD 5084	ASTMD 1557 (106 tot)	PE=12/Tech=Fulltime	6"	2-8		9/16/94	Yes
				Geosynthetic Clay Liner ASTMD 5084		PE=7/Tech=Fulltime				GCLER 12-28-95	Yes
										GCLER 12-28-95	Yes
										GCLER 9-29-97	Yes
						PE=13/Tech=Fulltime					
										8/21/98	Yes
		ASTMD 422 (27 tot)	ASTMD 4318 (26 tot)	ASTMD 5084 (26 tot)	ASTMD 1557 (658 tot)	PE=9/Tech=Fulltime	8"			8/21/98	Yes

TABLE 2, continued
FLEXIBLE MEMBRANE LINER EVALUATION REPORTS
AUSTIN COMMUNITY LANDFILL

Field Construction Quality Assurance									
Pre-Construction Conformance			Installation Conformance						
acturer QC	Material Conformation Sampling		Trial Weld	Panel Placement	Panel Seaming	Destructive Testing	Non-Destructive Testing	Repairs	Comments
	Geotechnical	Geosynthetic							
liant	ASTM compliant	ASTM compliant	ASTM compliant	ASTM compliant	ASTM compliant	ASTM compliant	ASTM compliant	ASTM compliant	7/23/98, 1 5ac
liant s addressed to construction									
liant	ASTM compliant	ASTM compliant	ASTM compliant	ASTM compliant	ASTM compliant	ASTM compliant	ASTM compliant	ASTM compliant	clayliner (SLER) re-cert of SW HDPE liner corrections on FCQA (Add. #1) ong FMLER; POR=9, Tech=25+;DWGS
2, &3 replaced original cells proposed as DV-1, 2, &3, WII-1, 2 &3 and WII-17 and northern portion of WII-4 /6/98 Only Class I non haz ind waste will be placed in below-grade areas of cell WD-3 t Mod Design for cells and revision to Leachate Mgmt System s include HELP, pipe strength analysis, geotextile filtration and clogging, anchor trench, protective cover stability, leachate evaporation pond, waste volume, DWGS									
liant	ASTM compliant	ASTM compliant	ASTM compliant	ASTM compliant	ASTM compliant	ASTM compliant	ASTM compliant	ASTM compliant	
liant	ASTM compliant	ASTM compliant	ASTM compliant	ASTM compliant	ASTM compliant	ASTM compliant	ASTM compliant	ASTM compliant	Documentation for construction below water table provided
2 liant	ASTM compliant	ASTM compliant	ASTM compliant	ASTM compliant	ASTM compliant	ASTM compliant	ASTM compliant	ASTM compliant	Addendum to address TNRCC questions/NODs provided

Table 3
Austin Community Landfill
Summary of Landfill Inspections
1991-1998

Inspection Date	Purpose of Inspection	County	Inspection Type	Inspection Results	Action
8/9/91	Routine	Travis	Announced	The site was in compliance.	General compliance letter sent by TNRCC 8/14/91.
10/17/91	Routine	Travis		The site was in compliance.	General compliance letter sent by TNRCC 10/23/91.
7/2/92	Routine	Travis	Unannounced	The site was in compliance.	General compliance letter sent by TNRCC 7/7/92.
10/20/92	Routine	Travis	Unannounced	Violation: 330.136(b), Special Wastes From Health Care Facilities, found uncovered medical waste.	Letter sent to ACL by TNRCC 10/26/92, corrective action by ACL due 11/25/92.
1/27/93	Routine	Travis		The site was in compliance.	General compliance letter sent by TNRCC 2/4/93.
5/3/93	Routine	Travis		Violations: 330.150(b) Intermediate Cover S.2, cover not adequate in area DIV-2, 330.150(d) Upgradient Ponded Water S.8, areas which would allow for upgradient ponded water were observed.	Enforcement letter sent to ACL noting violations by TNRCC 5/13/93. Corrective actions to be implemented by ACL by 6/30/93.
11/15/93	Routine	Travis		The site was in compliance.	General compliance letter sent by TNRCC 12/3/93.
1/25/94	Routine	Travis		The site was in compliance.	General compliance letter sent by TNRCC 2/4/94.
7/4/94	Routine	Travis		The site was in compliance.	General compliance letter sent by TNRCC 7/7/94.
8/17/94	Routine	Travis		Violations: 330.133 (a,d) Daily cover was not adequate, 330.133(f) Erosion of cover.	Letter sent to ACL noting violations by TNRCC 9/19/98 Corrective actions to be implemented by 11/18/94.
2/20/95	Routine	Travis		Violation: 330.133(a,d) Daily cover was not adequate.	Letter sent to ACL noting violation by TNRCC 4/24/95 Corrective actions to be implemented by 5/24/95.
5/17/95	Routine	Travis		Violations: 330.120 Control of Wind Blown Waste and Litter, 330.133 (a,d) Daily Cover, 330.133(b) Intermediate Cover, 330.133(f) Erosion of Cover	Enforcement letter sent to ACL and Enforcement Personnel to resolve these violations. ACL to maintain and repair the final cover of area as necessary 6/16/95.
7/26/95	Routine	Travis		The site was in compliance.	General compliance letter sent by TNRCC 8/16/95.

·pection	Purpose of Inspection	County	Inspection Type	Inspection Results	Action
11/29/95	Routine	Travis		Violations: 330.133(a,d) Daily Cover, 330.133(b) Intermediate Cover.	Letter sent to ACL to resolve violations, corrective action is to cover inactive areasand all waste must be covered at least once each 24 hour period of operation, to be implemented by 1/12/96.
5/7/97	Routine	Travis	Announced	Violation: 330.133(b) Intermediate Cover, erosion of the intermediate cover.	Letter sent to ACL and corrective action taken by ACL 5/21/97.
12/18/97	Routine	Travis		Violations: 330.114, Site Operating Plan, SOP, 1.2-Personnel, no personnel on site, 330.114 Site Operating Plan, SOP, 1.27 Special Waste, use of unapproved materials, 330.117(a) Internal Control, to attendant present to monitor unloading of waste, 330.130, Landfill Gas, over lel.	Letter sent to ACL noting violations, submittal of compliance plan and schedule required to TNRCC by 2/2/1998.
11/24/98	Routine	Travis	Announced	Violation: 330.133(e) Final Cover, not completed, deep erosion was noted, waste exposed.	ACL was given 14 days to resolve violations during the exit interview, on 12/9/98 a schedule for final cover was received from ACL.

Seventeen (17) inspections have been conducted at the ACL Landfill during the last seven (7) years. Of the seventeen (17) inspections violations were noted during nine (9) of the inspections. All violations have been addressed.

Table 4
Austin Community Landfill
Summary of Complaints
1993-1998

Date	Complaint Number	County	Complaint Type	Notes	Action
5/12/95	119500578	Travis	Compliance	Landfill is alleged to be pumping leachate into a creek. Also, they are mixing human waste with fly ash and putting it into the landfill.	Site visit by TNRCC Inspector, site appeared to be in full compliance. Resolved 6/09/95
11/24/98	119900090	Travis	Compliance	Erosion and exposed waste on south side of west hill.	Site visit by TNRCC Inspector, site had been repaired. Resolved 12/7/98

Two (2) complaints have been filed against Austin Community Landfill. during the last five (5) years.
All complaints have been resolved.

Table 5
Landfill Volume Estimates

Landfill	Tons/ day (1)	1997 tons	Used Volume (c.y.)	Remaining Volume (c.y.)	Remaining Tons	Remaining Years
ACL	1,417	425,012	13,467,500	14,097,500	10,573,125	24.90
BFI	1,777	533,097	5,784,268	12,910,339	7,100,686	13.30
TDS	1,492	447,559	3,405,409	40,262,591	26,430,122	58.40

Assumptions:
(1) Tons/day = 1997 tons/300 days

Sources:
TNRCC Annual Reporting Program for Permitted MSW Facilities, 1997 Data Report, Waste Planning Section, November, 1998

1997 Form G submitted for each landfill

Table 6
BFI/Sunset Farms Landfill
Summary of Landfill Inspections
1992-1998

Inspection Date	Purpose of Inspection	County	Inspection Type	Inspection Results	Action
11/9/92	Routine	Travis	Unannounced	The site was in compliance.	General compliance letter sent by TNRCC 11/11/92.
1/27/93	Routine	Travis	Announced	The site was in compliance.	General compliance letter sent by TNRCC 1/29/93.
5/25/93	Routine	Travis	Unannounced	The site was in compliance.	General compliance letter sent by TNRCC 5/26/93.
7/9/93	Routine	Travis		The site was in compliance.	General compliance letter sent by TNRCC 7/12/93.
11/15/93	Routine	Travis		The site was in compliance.	General compliance letter sent by TNRCC 12/3/93.
2/8/94	Routine	Travis		The site was in compliance.	General compliance letter sent by TNRCC 2/28/94.
5/24/94	Routine	Travis		The site was in compliance.	General compliance letter sent by TNRCC 6/10/94.
5/17/95	Routine	Travis		The site was in compliance.	General compliance letter sent by TNRCC 6/16/95.
7/2/95	Routine	Travis		The site was in compliance.	General compliance letter sent by TNRCC 8/16/95.
11/30/95	Routine	Travis		The site was in compliance.	General compliance letter sent by TNRCC 12/13/95.
5/17/96	Routine	Travis	Announced	The site was in compliance.	General compliance letter sent by TNRCC 6/6/96.
11/21/96	Routine	Travis	Announced	The site was in compliance.	General compliance letter sent by TNRCC 12/19/96.
5/21/97	Routine	Travis	Announced	The site was in compliance.	General compliance letter sent by TNRCC 7/3/97.
7/10/97	Routine	Travis		Violations: 330.130 Landfill Gas Control, methane readings exceeded the regulatory limit.	Letter sent to BFI on corrective action to be taken by BFI. Letter noting corrective measures to address violation sent 7/24/97
7/14/98	Routine	Travis	Announced	The site was in compliance.	General compliance letter sent by TNRCC 7/27/98.

Fifteen (15) inspections have been conducted at the BFI Landfill during the last six (6) years. Of the fifteen (15) inspections violations were noted during one (1) of the inspections. All violations have been addressed.

Table 7
BFI/Sunset Farms Landfill
Summary of Complaints
1993-1998

Date	Complaint Number	County	Complaint Type	Notes	Action
12/5/95	119600161	Travis	Pollution	BFI is cleaning their trucks with something that generates a greenish gray smoke that smells.	Site visit by TNRCC Inspector, no violation found. Resolved 1/04/96
10/2/96	1197000476	Travis	Pollution	Trash truck was not covered, trash was flying out of bed, notably tiny bits of insulation.	Call to BFI of concerns expressed. Resolved 10/02/96
12/12/97	119800015	Travis	Pollution	BFI truck was leaking hydraulic fluid.	Site visit by TNRCC Inspector, BFI crew was spreading pebble grave on oil. Truck was taken out of service and truck operator dismissed. Resolved 9/19/97
1/9/98	119800164	Travis	Pollution	BFI discharges water/diesel contaminant from aboveground storage tank (AST) containment area. Contaminant is flowing across the ground into a storm drain.	Site visit by TNRCC Inspector, found no discharges beyond the containment barrier. Resolved 1/19/98

Four (4) complaints have been filed against BFI/Sunset Farms Landfill during the last five (5) years. All complaints have been resolved.

Table 8
Texas Disposal Systems Landfill
Summary of Landfill Inspections
1992-1998

Inspection Date	Purpose of Inspection	County	Inspection Type	Inspection Results	Action
6/11/92	Routine	Travis		Violation: Intermediate Cover was not properly applied.	Enforcement letter sent to TDS for improper application of intermediate cover. Site must be in compliance prior to 7/31/92.
10/2/92	Routine	Travis	Unannounced	The site was in compliance.	General compliance letter sent by TNRCC 13/13/92.
12/22/92	Routine	Travis	Announced	Violation: 330.145(a) Access Roads, mud traced onto FM1327	Enforcement letter sent to TDS, immediate action must be taken to minimize the amount of mud being tracked onto FM1327 Letter sent 1/8/93
5/11/93	Routine	Travis	Unannounced	The site was in compliance.	General compliance letter sent by TNRCC 5/17/93.
7/7/93	Routine	Travis	Unannounced	The site was in compliance.	General compliance letter sent by TNRCC 7/8/93.
10/5/93	Routine	Travis	Announced	The site was in compliance.	General compliance letter sent by TNRCC 10/15/93.
2/1194	Routine	Travis		The site was in compliance.	General compliance letter sent by TNRCC 3/7/94.
11/21/94	Routine	Travis		The site was in compliance.	General compliance letter sent by TNRCC 12/6/94.
2/28/95	Routine	Travis		The site was in compliance.	General compliance letter sent by TNRCC 3/1/95.
5/5/95	Routine	Travis		The site was in compliance.	General compliance letter sent by TNRCC 6/7/95.
7/5/95	Routine	Travis		The site was in compliance.	General compliance letter sent by TNRCC 7/6/95.
2/26/96	Routine	Travis	Announced	The site was in compliance.	General compliance letter sent by TNRCC 3/1396.
8/15/96	Routine	Travis	Announced	The site was in compliance.	General compliance letter sent by TNRCC 8/19/96.
2/11/97	Routine	Travis		The site was in compliance.	General compliance letter sent by TNRCC 2/14/97
8/21/97	Routine	Travis		The site was in compliance.	General compliance letter sent by TNRCC 9/4/97.
9/98	Routine	Travis	Announced	The site was in compliance.	General compliance letter sent by TNRCC 5/21/98.

Sixteen (16) inspections have been conducted at the Texas Disposal Systems Landfill during the last six (6) years. Of the sixteen (16) inspections violations were noted during two (2) of the inspections. All violations have been addressed.

Table 9
Texas Disposal Systems Landfill
Summary of Complaints
1993-1998

Date	Complaint Number	County	Complaint Type	Notes	Action
8/18/93	930800711	Travis	Compliance	Intermediate cover is not being properly applied, the waste was being spread thin creating a large working face.	Site visit by TNRCC Inspector, found that the working face was larger than normal due to limited fill space. A new SLER was at TNRCC waiting on approval, once approved working face area will be reduced Resolved 8/23/93
10/5/95	119500228	Travis	Pollution	Creeks on property have a petroleum sheen and smell, and pond on the property has a septic odor.	Site investigation was conducted on 11/10/94 by TNRCC Inspector, no violations were noted in the investigation. Resolved 11/22/94.
1 '98	119900060	Travis	Pollution	Truck drivers spilling diesel, used oil is spilled near the used oil tank and freon escapes into the atmosphere, and compressor oil spilled.	Site inspection did not appear that TDS has neglected their responsibility, during the inspection ways to improve the operation was discussed. Resolved 12/18/98.

Three (3) complaints have been filed against Texas Disposal Systems Landfill during the last five (5) years. All complaints have been resolved.

APPENDICES

Austin Community Landfill
Con't Texas Waste Systems - EHX File
249 - Sheet 1

#1 Texas Department of Health - Bureau of Solid Waste Management - Hearing Examiners File - Permit Application No. 249 (July 29, 1977) - Longhorn Disposal

WMI/Texas Waste Systems & Travis County

A. Universal Disposal, Inc. - Application for Approval of Sanitary Landfill to TDH (12/4/70)
    1. Subsurface Investigation - Sanitary Landfill Area - Austin, Texas - Trinity Engineering (1970)
    2. Deed to Property (December 1969)
B. TDH letters to Court, Judge , (12/7/70)
Texas Water Quality Board, Travis County Dept. Health, Austin LaRue, Universal
C. City of Austin Reply (12/9/70)
D. Travis County Reply (12/10/70)
E. Austin Mayor Reply (12/16/70)
F. TDH Approval of Proposed (12/22/70)
G. TDH Interoffice Memo - Industrial Waste Disposal (3/17/71)*
H. TDH request for Evaluation of Site for Industrial Waste to TWOB (4/15/71)
I. TWQB letter to TDH (4/16/71)*
J. TDH Recommendation for additional cover (7/16/71)
K. TDH Inspection Report (1/5/72)*
    1. TDH Lab Report (11/18/71)*
L. TDB Interoffice memo (5/3/72)*
M. TWQB Interoffice memo - Investigation (2/3/73)*
N. Travis Co. Investigative Report - (Longhorn Disposal) (9/4/73)*
O. TDH Notification of Travis Co. Health Department (10/12/73)
P. TDH Acknowledgment of Ownership Change (10/12/73)
    1. Notification of Ownership Change (10/3/73)

249 - Sheet 2

A. Texas Air Control Board Notification of Borough Violation (1/3/74)
B. Site Ownership - Info. needed - TWQB (1/11/74)
C. Texas Air Control Board memo on burning (1/25/74)
    1. Longhorn reply to burning (1/17/74)
D. TWQB Interoffice memo - Longhorn proposed to old industrial waste site as Municipal Waste Site (3/24/74)
E. TWQB Investigation of seepage complaint (4/18/74)*

F. Meeting notes on proposed municipal landfill (3/27/74)
G. TDH letter on Water Quality Concerns (5/23/74)
H. TWQB approval of pumping out and pit #4 (6/19/74)*
    1. TDH Inspection Report (7/16/74)
I. Application for Type I Municipal Solid Waste Disposal permit (8/5/74)
J. Subsurface Investigation - Chemical Storage Pits - Trinity Engineering (8/5/74)
K. TDH Application Evaluation checklist for Solid Waste Disposal Site (9/5/74)
L. Survey Field Notes (10/9/70)
M. TDH Bacteriological Water Analysis (9/27/74)
N. TDH Request of TWQB to review landfill application (9/16/74)
    " " " Texas Water Development Board landfill application
    " " " Texas Air Control Board landfill application
    " " " County Judge landfill application
    " " " Mayor of Austin landfill application
    " " " Travis Co. Health Dept. landfill application
O. Reply by Mayor (9/27/74)
P. Reply by TWDB (9/30/74)
Q. TDH Interoffice Memo - Transfer of Site Approval from Universal to Longhorn (10/10/74)
R. TDH Notification of Transfer Approval (10/10/74)
S. City of Austin Reply to Transfer (10/11/74)

249 Sheet 3

1. TACB Review of Landfill Permit (10/11/74)
2. TWCB Review of Landfill Permit (10/23/74)
3. TDH Survey & Industrial Waste Report (9/25/74)*
4. File Notes - Landfill Ownership Transfer (8/28/73)
5. Newspaper Clips on Improper Disposal (2/12 & 13/75)*
6. TDH Interoffice Memo (3/17/75)
7. Kemp & Spilker letter to TDH (3/28/75)
8. TDH Application for a Permit to Operate a Municipal Solid Waste Facility (No.249) (3/31/75)
9. Del-Worth Industries, Inc. Letter to TDH-drum removal (6/30/75)*
10. TDH site visit memo (2/5/76)
11. TDH letter to Kemp, Ournstreet & Spiller - acceptable wastes (4/9/76)
12. Kemp, Ournstreet & Spiller request of TDH to accept wider variety of wastes (4/9/76)*
13. Hancock & Associates request to dispose (4/7/76)*
14. Gleatron disposal request (4/7/76)*
15. Austin American Statesman disposal request (4/8/76)*
16. W.C. Colten Waste Evaluation (4/19/76)*
17. TDH Telephone memo on new waste streams (4/20/76)
18. TDH letters to KOS on new waste handling (5/3/76)*
19. KOS request of TDH for additional waste disposal (4/22/76)
20. KOS request of TDH-additional waste (5/11/76)

21. TDH letter to Longhorn (5/14/76)
    a. Longhorn info request to TDH (5/12/76)
22. Woodward Inc. Request to dispose waste (5/13/76)*
23. TDH letter to Longhorn on waste handling (6/3/76)*
    a. Longhorn request to dispose additional waste (6/1/76)
24. W.C. Cotten report on waste disposal (5/29/76)
25. W.C. Cotten report on waste disposal (6/27/76)
26. Handwritten date (unknown)
27. Longhorn disposal request to TDH (8/12/76)
28. W.C. Cotten report on waste disposal (8/12/76)
29. TDH request reply (8/13/76)*
25. TDH inspection report (8/10/76)
26. Longhorn request of TDH (8/3/76)
27. TDH reply to Longhorn request (7/12/76)*
28. Longhorn request of TDH - additional waste (7/7/76)
29. Jefferson Chemical request of Longhorn (7/2/76)

249 Sheet 4

1. Jefferson Chemical Co. request (6/8/76)
2. TDH phone memo - additional waste (8/12/76)*
3. TDH phone memo - additional waste (8/19/76)
4. TDH interoffice memo (8/20/76)
5. TDH letter to TWQB - permit review (8/20/76)
6. TACB
7. TWDB
8. Travis C. Health Dept.
9. Mayor of Austin
10. FAA
11. USACE
12. Reafuro - County Judge
13. TDH & PT
14. TDH letter to Longhorn - permit delay (8/23/76)
15. TDH telephone memo (8/23/76)
16. FAA reply (8/30/76)
17. TDH approval of waste disposal (8/30/76)*
18. TACB reply (9/8/76)
19. Dept. Of Highways reply (9/8/76)
20. TDH interoffice memo (9/15/76)
21. Texas WDB reply (9/17/76)
22. TWGB reply (9/16/76)
23. COA reply (9/17/76)
24. COA reply (9/20/76)
25. Memo from M. McReynolds to Holver Reed - landfill inspection (9/16/76)*

26. TDH letter to IRS (11/18/76)
27. Longhorn request of info from TDH from IRS (11/4/76)
28. Longhorn letter to TDH (9/7/76)
29. TWQB request of Longhorn to do a subsurface study (1/7/77)
30. TDH interoffice memo - problems (2/25/77)*
31. TDH interoffice memo - public hearing announcement (6/20/77)
32. Notice of Hearing (6/77)
33. Notice of Public Hearing (7/25/77)
34. TDH Notice of Public Hearing (6/24/77)
35. TDH Site visit memo (7/6/77)
36. TDH Interoffice memo & site inspection report (7/13/77)

249-A Sheet 4

1. TDH letter to Austin Community Disposal Company - Notice for Filing Application (1/13/81)*
2. TDH interoffice memo - Notice for Filing Application (1/31/81)*
3. Austin American Statesman - Affidavit of Publication (1/16/81)
4. TDH checklist for classifications on Solid Waste Disposal Facilities (1/23/81)
5. TDH Site Evaluation Report (1/23/81)
6. TX Dept. Of Highways letters (1/22/81)
7. COA Mayor letter to TDH (1/27/81)
8. TDWR letter to TDH (2/9/81)
9. Austin Community Disposal Company (ACDC) letter to TDH (2/11/81)
10. TDH letter to ACDC - Notice of Public Hearing (2/10/81)
11. TDH letter to TDWR (2/18/81)
12. TxDH & PT approval (2/11/81)
13. Longhorn letter to TDH - Clarification of Permit (2/16/81)
14. Survey Report (2/17/81)
15. Pittman letter to TDH - Clarification of Permit (2/16/81)
16. TDH letter to TDWR - Permit Amendment (2/19/81)
17. TDH Notification of Change in Public Hearing (2/23/81)
18. TDH Notice of Public Hearing (2/23/81)
19. TACB comments on Permit (2/25/81)
20. Councilman Goodman letter to TDH - Warning of Expansion (2/24/81)*
21. TDH reply to Councilman Goodman (2/27/81)

249-A Sheet 5

1. ACDC - Maintenance Improvements on Old Industrial Waste Site - Pittman Engineering (3/81)*
2. TDH interoffice memo - Public Hearing (3/3/81)
3. TDWR Assumes Regulatory responsibility of original landfill (3/5/81)
4. TDWR to TDH Approval of Amending Permit (3/5/81)
5. TDWR to TDH Supervision of Remediation (3/5/81)

6. Official Permit Notice 249-A
7. E. Wild letter to TDH - Landfill concern
8. TDH interoffice memo - site evaluation (4/10/81)
9. Press release from TDH (3/11/81)
10. Pittman Eng - Cover letter from Maintenance improvements in Old Industrial Waste area (3/12/81)
11. Travis Co. Engineer comments on Permit 249-A (3/12/81)*
12. Permit checklist

249-A Sheet 6

1. Permit checklist
2. TDH interoffice memo (3/12/81)
3. TDH request of TDWR invorcant (3/12//81)
4. TDH receipt of order (3/12/81)
5. Legal pocket for motion to halt permit - before the dump committee (3/19/81)
6. Letter from Mayor to TDH withdrawing approval for Permit 249-A (3/19/81)
7. Letter from E. Sumdeck to Dr. Bernstein
8. Frank Eck letter to TDH (3/19/81)
9. TxDH &PT letter to TDH - Traffic (3/19/81)
10. Engineering report of ACDC, Inc. - Pittman Engineering (12/80)
11. Travis County Commissioner - Road Improvements (12/15/80)
12. TX Dept. Of Hwys & Public Trans. - Refusal of Approved (11/19/80)
13. TDH dismissal of motion (3/23/81)
14. TDH announcement to consolidate motions (3/26/81)
15. Councilwoman Himmelban letter to TDH (3/17/81)

249 Sheet 5

1. TDH Inspection Report (7/13/77)
2. TDH Violation letter to Longhorn (7/19/77)
3. TDH interoffice memo - Geologist Report (7/28/77)
4. TDH interoffice memo - Public Hearing (7/29/77)
5. TDH approval of site - Permit Application (7/29/77)
6. TDH letter of Approval to Longhorn (9/30/77)
7. TDH Permit 249 (9/26/77)
8. TDH Inspection Report (11/10/77)
9. Permit Transfer (4/6/78)
10. Glastrous Waste (7/12/78)
11. TDH Inspection Report (8/15/78)
12. TDH Inspection Report (10/23/78)

249 Sheet 6

1. TDH Inspection Report (10/14/78)

2. TDH Letter to Longhorn - Review Disposed (10/10/78)
3. TDH to Longhorn - Trench soils (2/13/79)
4. Longhorn to TDH - Assignment of Engineer (3/29/79)
5. TDH Forms (5/30/79)
6. TDH Request for Certification (6/12/79)
7. Pittman Certification of Soils (6/18/79) with
8. TDH to Longhorn - Landfill classification (8/30/79)
9. TDH to Mitro Corporation - list of Municipal Landfills in Texas Accepting Hazardous or Special Wastes (10/10/79)*
10. Mitro mailgrams to TDH. Hazardous & special wastes list request (8/28/79)
11. TDH Inspection Report (10/5/79)
12. TDH Inspection Report (11/29/79)
13. TDH Longhorn - New Report Form (4/16/80)

249-A Sheet 7

1. TDH to TDWR (3/30/81)
2. Motion of Consolidation (3/30/81)
3. TDH Overviews of Consolidations with flow (4/1/81)*
4. TDWB Evaluation of Permit Revision (4/3/81)
5. TWDB to TDH (2/27/81)
6. TWDB to ACDC - IWMM site evaluation (4/3/81)
7. TWDB to TDH - (4/3/81)*

249 Sheet 7

1. Surveys Report (4/29/80)
2. Pittman Engineering - Geotechnical Investigations (5/15/80)
3. TDH Field Investigation memo (6/25/80)*
4. TDH interoffice memo (6/23/80)
5. Groundwater Analysis Reports (6/13/80)
6. Pittman transmittal letter to Holt & Assoc. (7/16/80)
7. TDH deposit of revenue from sale (7/18/80)
8. TDH phone log (7/17/80)
9. TDH memo to file - Permit Amendment (7/18/80)
10. Pittman Sub-surface Investigations (8/4/80)
11. Pittman Sub-surface Investigations (9/9/80)*

249 Sheet 8

1. Pittman Sub-surface Investigation (Con't.) (9/9/80)
2. Office memo (2/10/80)
3. Letter to TDH from TDWR (no date)*

249-A Sheet 1

1. Application for Permit 249-A (9/16/80)
2. SCS Soils Report (6/74)
3. Sale Contract (1980)
4. Survey's Report (1980)
5. TDH Interoffice Memo - RAJ Associates Phase II Report (10/9/80)
6. TDH Interoffice Memo - Sub-surface Investigation (10/10/80)
7. TDH letter to J. Wilde (10/30/80)
8. TDH letter to Pittman - Review of Reports (11/19/80)
9. TWCB letter to TDH (11/26/80)
10. TDWR Interoffice memo - Leaking at Landfill (8/22/80)
11. TDWR Interoffice memo - Landfill seepage (8/22/80)
12. TX DPH & PT to Pittman - Traffic evaluation (12/5/80)
13. Travis Co. Commission to Pittman (12/15/80)
14. TDH to Pittman - Report Review (12/18/80)
15. Pittman Engineering Report for ACDA Landfill (12/80)

249-A Sheet 2

1. Pittman Engineering Report (Con't) (12/80)
2. TxDH & PT to Pittman - Traffic (12/5/80)
3. Notice of Appointment of Pittman Eng (9/12/80)
4. Survey Field Notes (4/29/80)
5. Pittman Geotechnical Investigation (5/15/80)
6. Pittman Sub-surface Investigation (8/4/80)

249-A Sheet 3

1. Pittman Sub-surface Investigation (Con't) (8/4/80)
2. Pittman Sub-surface Investigation (9/9/80)
3. Pittman concept of Operative Reports (12/80)
4. Travis Co. To Pittman - Giles Land Improvements (12/17/80)
5. Travis Co. To Pittman - Aews to Giles Land (12/16/80)
6. Travis Co. To TxDH & PT - Mud on Roadway (12/16/80)
7. TxDH & PT to Pittman - application denied (11/19/80)
8. Pittman to TxDH & PT (9/5/80)
9. TDH interoffice memo (1/12/81)
10. Request for comments worksheet (1/8/81)
11. TDH Interval request for Site Evaluation & Inspection (1/12/81)
12. TDH transmittal letter to TACB (1/12/81)
13. TDH to TDWR transmittal letter (1/12/81)
14. TDH transmittal to TxDH & PT (1/12/81)
15. TDH transmittal to Travis Co. Health Dept. (1/12/81)
16. " " " City Mayor " "

17. TDH transmittal to County Judge
18. TDH memo to File (1/13/81)
19. TDWR to TDH - Approval (1/14/81)
20. TDH to TDWR (3/30/81)

249-A Sheet 8

1. Pittrad Plan - comments (3/12/81)
2. Mayor letter to TDH - Letter of Acceptance (1/27/81)
3. Mayor withdrawal of Approval (3/19/81)
4. R. Goodman to TDH (2/24/81)
5. Comments on Permit (2/27/81)
6. TDH reply to W. Dulco (4/17/81)
7. W. Dulco to TDH (4/8/81)
8. TDH interoffice Memo (4/17/81)
9. TDH reply to P. Moore (4/21/81)
10. TDH Geology Report (5/22/81)*
11. TDH Permit Application Review Hearing Notes (5/26/81)
12. Scralan, Buckle & Fleckman Brief (6/8/81)
13. Doggett & Jacks Response Brief (6/9/81)

249-A Sheet 9

1. Dogget & Jacks Brief (con't) (6/9/81)
2. TDH Proposal for Decision (6/18/81)
3. Hooper, Robinson & Moeller - Request for Clarification of Proposed Decision (7/3/81)
4. Pittman to TDH - Clarification of Permit (2/16/81)
5. Doggett & Jacks - Opponents Response to Brief (7/6/81)

249-A Sheet 10

1. Hooper, Robinson & Moeller - Reply to Opponents Exception to the Proposed for Decision (7/20/81)
2. H, R & M Corrections to Reply (7/21/81)
3. Permit / Denial Checklist (8/6/81)
4. TDH interoffice memo - Permit Finalization (7/31/81)
5. TDH Finalized Permit 249-A (8/6/81)

249-A Sheet 11

1. Marstin motion for rehearing (8/14/81)
2. H,R & M Reply to motions for Rehearing (8/21/81)
3. TDH Denial of Rehearing (9/3/81)
4. TDH memo to file - W. Pelco office (9/9/81)
5. COA to TDH (8/18/81)

6. COA to TDH (9/81)
7. San Antonio Express Article (9/28/81)
8. TDH to Mark White, Attorney General - Right for Petition (10/6/81)
9. Citation of TDH (10/28/81)
10. Ban the Pump Committee Petition (10/81)
11. TDH to Doggett & Jacks (10/7/81)
12. Attorney General Assignment of Laws (10/9/81)
13. Certificate relation to Exhibits (5/5/81)
14. TDH - reply to W. Delco Request (10/14/81)
15. W. Delco Request of Landill moving (9/22/81)
16. TDH letter to ACDC - deadline (10/15/81)
17. TDH site inspections report (9/18/81)
18. TDH memo to file (9/14/81)

249-A Sheet 12

1. Pittman Trench Certification (10/19/81)
2. Jack Holt & Assoc. - Soil Evaluation (10/15/81)
3. TDH Review of Pittman Reports (10/26/81)
4. Waste Management Plan for Resistivity Survey (10/19/81)
5. TDH Soils and Line Evaluation Questionaire (10/16/81)
6. TDH Memo to File (10/28/81)
7. Landfill Permit Board (10/21//81)
8. Longhorn Notification of Corporate Status (10/23/81)
9. W. Delco letter to TDH(10/22/81)
10. Transmittal of Engineering Design Plans to Seligman O'Pyle (11/6/81)
11. TDH Memo to File (11/5/81)
12. TDH letter to ACDC - Gile Road Reconstruction (11/12/81)
13. SW labs Initiated Earth Resistivity Study (12/1/81)

249-A Sheet 13

1. SW labs Initial Earth Resistivity Study con't.

249-A Sheet 14

1. SW labs con't.
2. Waste Management to TDH-Proposed GW monitoring plan (1/3/82)
3. URM Analytical Report (1/5/82)
4. Augaleb Report (11/30/81)
5. Scanlon, Buichle & Fleckman to E. Wilder & M. Wooten (1/28/82)
6. Waste Management to TDH - Proposed Wells (1/29/82)
7. TDH Memo to File - Record of Interviews (1/28/82)
8. " " " " " " " "
9. " " " " " " " "

10. " " " " " " " "
11. TDH Interoffice Memo - Review of Sale Information to E. Wilder (2/1/82)
12. TDH transmittal of information to KVUE (2/1/82)
13. TDH Review of Resistivity Survey (2/17/82)
14. TDH letter to E. Wilder (2/26/82)
15. E. Wilder letter to TDH (2/9/82)
16. TDH file transmittal to KVUE (4/5/82)
17. TDH letter to ACDC (4/7/82)
18. TDH Site Inspection Report (3/8/82)
19. TDH Groundwater Reports (4/15/82)
20. Water Management to TDH - Personnel List (7/1/82)
21. TDH Groundwater Reports (7/21/82)
22. TDH Memo to File - Discolored Iron count (8/13/82)

249-A Sheet 15

1. TDH to Waste Management - Evaluation of Truck FireWaste (8/4/82)
2. TDH Memo to file - Red Arrow Disposal Request (8/3/82)
3. TDH to Applied Research Lab - Permission to Dispose foam (8/13/82)
4. TDH to Waste Management - Review of Soils & Line Evaluation Questionarie (8/19/82)
5. Community Engineering Company Trench Certification (8/3/82)
6. Pretest Labs - Soil Permeability Tests (7/29/82)
7. URM Groundwater Report (8/31/82)
8. TDH to Waste Management - Site Investigation (9/10/82)
9. TDH Site Inspection Report (8/31/82)
10. TDH to Waste Management - Questionare Review (9/16/82)
11. URM Plan Modifications (8/3/82)*
12. TDH to Waste Management - Changes needed in Permit (9/21/82)
13. TDH to S. Carollina DH - Commendation of Waste Management (9/27/82)*
14. S. Carolina DH to TDH (9/14/82)

249-A Sheet 16

1. URM Surface Water Monitoring Report (11/9/82)
2. Waste Management to TDH - Permit Transfer (11/30/82)
3. TDH transmittal of Formal Permit (12/9/82)
4. URM transmittal to TDH of Monitoring Wall Installation Report (1/6/83)
5. Waste Management Annual Earth Resistivity Survey (12/22/82)

249-A Sheet 17

1. TDH to Longhorn - Motorola Conteminated Soil (1/11/83)
2. Longhorn to TDH - Morotoral Contaminated Soil (1/5/83)
3. TDH Review of Soils Questionaire (1/14/83)
4. Community Engineering Truck Certification (1/4/83)

5. Pre-test Laboratory Soil Tests (12/28/83)
6. TDH Memo to File - Extension for Sampling Deadline (1/17/83)
7. TDH confirmation of Resistivity Survey (1/24/83)
8. TDH transmittal of permit to Texas Waste Systems (12/1/83)
9. TDH approval of permit transfer (12/18/83)
10. TDH Interoffice Memo - File transmittal to H. Clinton (8/19/83)
11. URM reporting of GW samples (3/14/83)*
12. URM monitor wall installation report (12/8/82)
13. TDH Memo - Record of interview with Austin-American Statesman
14. TDH Memo (3/17/83)
15. TDH Memo - Record of interview with Austin-American Statesman (2/28/83)

249-A Sheet 18

1. TDH record of interviw with Austin-American Statesman (4/18/83)
2. TDH Complaint form - Round Rock Waste Disposal (1983)
3. TDH interview with Channel 36 News (5/4/82)
4. TDH to Waste Management - Inspection Results (5/9/83)
5. TDH Site Inspection Report (4/11/83)
6. TDH Groundwater Analysis
7. TDH Review of Evaluation Questionnaire (7/8/83)
8. Community Engineering Certification (6/16/83)
9. Pretest Lab Soil Testing Results (6/10/83)
10. Waste Management Groundwater Report (7/8/83)
11. TDH Analytical Report (7/18/83)
12. TDH Comments of Evaluation Questionaire (7/6/83)
13. Community Engineering sods & liners evaluation Report (8/19/83)
14. Pre-test lab soil report (8/15/83)
15. TDH Groundwater Reports (9/19/83)
16. Chubb & Sons - Federal Insurance Company Ride to TDH (10/21/83)
17. TDH memo to file - Request for disposal of paint sludge (10/20/83)
18. TDH Complaint form - Burning at landfill (11/7/83)

249-A Sheet 19

1. TDH groundwater analysis requests (12/1/83) (12/8-9/83)
2. TDH Site Inspectin Report (11/7/83)
3. Waste Management Groundwater report (12/30/83)
4. TDH Review of Annual Resistivity Survey (1/6/84)
5. Waste Management Resisitivity Survey (12/9/83)

249-A Sheet 20

1. Resistivity Survey (con't.) (12/9/83)
2. TDH memo to file - suggestion of WWTP sludge disposal (3/9/84)
3. TDH Notification of dificulty of GW Monitoring Report (3/13/84)
4. TDH Site Inspection Report (3/1/84)
5. TDH comments on soils and line Quality Control Plan (SLQCP) (4/20/84)

249-A Sheet 21

1. Soil and Liner Quality Control Plan (3/23/84)
2. Notification of Revised due Dates of SLQCRs (4/23/84)
3. URM Groundwater Report (4/26/84)
4. TDH Memo to File - COA Request for 290 cleanup (5/7/84)
5. TDH Approval for Trash Burning for brush (5/21/84)
6. Lloyd, Gorselink & Ryan request of trench burning to TDH (4/21/84)
7. THCB comments on trench burning (4/3/83)
8. THCB permission for exemption (3/13/84)
9. TDH Review of SLQCR (5/31/84)
10. SLQCR (6/15/84)
11. TPH comments on SLQCR (7/3/84)
12. SLQCR (6/15/84)
13. Groundwater monitoring report (7/11/84)
14. TDH Site Inspection Report (6/29/84)
15. Groundwater Monitoring Report (9/10/84)

249-A Sheet 22

1. Groundwater Report (con't.)
2. TDH review of SLER (10/16/84)
3. Pittman Engineering trench Certification (9/28/84)
4. Summary Judgement - Permit (10/15/84)
5. TDH Meeting notes on Litter Reduction (11/9/84)
6. TDH Groundwater - Analysis Requests (11/28/84)
7. TDH Site Inspection Report (11/9/84)
8. Waste Management Environmenatl Policy Statement - Banning of Non-Hazardous Liquids from Municipal Landfills (12/12/84)*
9. Waste Management Annual Earth Resistivity Survey (1/17/85)

249-A Sheet 23

1. Resistivity Survey (con't.)
2. TDH Reception of Survey (2/8/85)
3. Monitoring Wall Sample Analysis (3/5/85)*
4. Monitoring Wall Sample Analysis (3/26/85)*

5. Waste Management Soils and Liner Evaluation Report (5/1/85)

249-A Sheet 24

1. TDH Site Inspection Report (5/8/85)
2. TDH SLER Acceptance (6/14/85)
3. SLER (6/7/85)
4. Monitoring Wall Analysis (6/25/85)*
5. TDH Authorization of Asbestos Waste Disposal (7/25/85)
6. Waste Management Request to Dispose Asbestos (7/16/85)
7. TDH Notice of Violation - Cover (7/31/85)
8. TDH Site Inspection Report (7/10/85)
9. SLER (8/2/85)
10. TDH Approval of disposal of Soil from the 100 Longview site (8/6/85)*

#9

1984,5	SLER forms, OW monitoring forms
1985	11/13 letter - violation - water discharge
1985	Operating hours letters
11/85	GWMR form letters
11/85	Acceptance letter for SLER
11/85	SLER Report, SLER Questionaire
3/85	SLER Report forms
8/85	Notice of Compliance from TDH
9/26/77	Permit - TDH
3/84	SLER Report
1/86	Trench evaluation reports, compaction reports
84	SLER report

#10

1/86	SLER report
1/86	Violation - letter - markers needed
12/85	Trench inspect reports
1/14/86	GW monitoring results, mw data sheets
	Landill completion plan - maps
12/85	Design Modification - ACL - drawings for

#11

9/86	Trench inspection reports
9/86	SLER
3/86	SLER
9/86	Accept fire clean-up debris - fuel area
2/86	Soil tests, trench inspections

	3/86	SLER
	9/86	Letter about policing roads
	3/86	More soil compaction tests, SLER

#12

	3/86	GW monitoring report

#16

Gas recovery project information
Permit application - gas recovery facility
Monitor well installation logs

#17

WMI Annual Report

249-C

#1 Hearing Examiners File

1. Permit App. Expansion (5/26/81)
2. Proposal for Decision (6/18/81) copied
3. Findings of Fact
4. Special Provisions
5. Permit Issuance (8/27/81)
6. Letter to Appeal (10/7/81)
7. Clarification of Proposal /Decision (7/20/81)
8. Hearing Exhibits
9. Bill of Exception
10. Brief

#2

1. Exception to clarification on Proposal for decision
2. Application Amendment (2/16/81)
3. Field Notes
4. Opponents exception to to Proposal /Decision (includes request for new hearing) (7/81)
5. Applicants reply to opponents exception
6. Motion for rehearing (8/12/81)

#3

1. Reply to motions for rehearing (8/21/81)
2. Order - rehearing (denied)

3. Appeal (10/1/81)
4. Appeal (9/11/81)
5. Exhibit 4 - ACL Part A application
6. Exhibit 5 - ACL Part B
7. TX Dept. Of Hwy letter - re adequacy of highways (11/80)
8. Pittman Eng - letter response to above

#4

1. Maps - Site/Existing/Proposed
2. Field Notes
3. Atterberg limits & Permability
4. Geotechnical Investigations Report and Lab Analysis (5/80)
5. Subsurface Investigations & Lab Analysis (8/80)
6. Concept of Operation - Rpt

#5

1. Cont'd of above
2. Exhibit 6 - Type I Amendment
3. Memo Request

#6

1. Letter from concern neighbor
2. Permit Application #249A
3. Motions
4. Soil Survey

#7

1. Soil Survey

#8

1. Soil Survey

#9

1. Soil Survey

#10

1. Soil Survey
2. Motions (8/80)

3. Hydrogeologic evaluation URM (3/81)
4. Complaints
5. Leakage into trib
6. Memo TX Dept. Of Water Resources Hist. Of site

#11 Memo - Hist of Industrial site

1. Cease & desist (5/72)
2. Complaint letter from COA (9/73)
3. Complaint letter from Air Control Board
4. Inspection Report from TDH
5. Complaint letter from Air Control Board (9/76)
6. Permit Appl. - prob/landfill (9/76)
7. Violation letter by COA (9/76)
8. Violation letter by COA (7/77)
9. TDH Inspection Report (5/77)
10. TDH Inspection Report (10/79)
11. TDH Inspection Report (3/81)
12. TDH Acceptance of Methylene Chloride Acetone (5/76)
13. Land Sale Report (3/81)

ACL Landfill

#13

1. Memo (5/76)
2. Disapproval memo from Water Quality Development Board (5/74)
   - concern receiving industrial waste
3. Type of Waste (4/76)

#14

1. Injunction on Jack Arsenoult
2. Order on Jack Arsenoult
3. Default Judgement on Jack Arsenoult

#1

Permit Application Court Proceeding (9/91)
Exhibits enter into evidence (4/81)

#2

Direct examination Permit Application court proceeding
Hearing examiner files

#3

Hearing examiner files
Land fill construction. Compaction & erosion

#4

Same as above
Hearing examiner files TDH & Austin Community Dispos. (4/91)
Acid pits
Hearing examiner files (5/26)

#28 Hearing (10/89)

#29 - #32

Hearing

#33

Hearing
Commitment for title

#34

Letter of conformation
Hearing
Travis Co. Resolution

#35

Hearing

#36

Petitions/Oppostitions (9/89)
Interrogations/Answers 1st set, 2nd set

#37

Deposition (11/89)
Discovery Deposition
Opponents Interrogatories
Motions

#38

Hearing Items

#39

Hearing Items

#40 - #56

Hearing Items/Files

#57

Hearing Files

#58 - #68

Hearing Files

#69

Complaint (4/2/91)
Hearing Files

#70 - #73

Hearing Files

#18

10/19/87	SLER Acceptance letter
	Compaction tests
	OW monitoring report
	WMI Annual Report

#19

10/87	Trench inspectio reports, SLER
11/5/87	Acceptance letter for SLER
9/25/87	Geotech study - proposed expansion

#20

	Permit Application letter, transmittal
11/30/87	
4/1/87	Deed recordation - Industrial solid waste disposal site
3/81	Proposed improvements on Industrial waste area #1

#21

Groundwater monitoring, Marcch, 1988

#22

Soil compaction and SLER stuff

#23		
		Groundwater monitoring 4/88 (TOC in MW - 5, MW - 6)
#27		
	12/28/89	4th quarter GW monitoring reports
	11/3/89	C.O.A. comments on permit app. for expansion of ACL
	10/89	Correspondence about MSW permit applications
#28		
	3/5	1st quarter GW monitoring results
		Compliance summary - TDH
	4/90	TDH report - notes cover erosion
#29		
	7/90	SLER - compaction tests, seive, atterburg, etc.
	2/90	Complaint letter - blowing trash, dogs
	6/90	TDH letter - SLER response letter - complies with GW protection requirements
	4/90	GW monitoring
#30		
	7/90	GW monitoring reports
	7/90	Letter of credit to TDH
	8/90	Waste received summary
	8/90	SLER acceptance letter
	3/90	Arthur Andersen reports of statement of income
#31		
	9/15/89	Part A, Site Development Plan - ACL Expansion - Cook-Joyce
#32		
		Soils report - ACL expansion - Cook-Joyce
	9/87	Geotechnical study - ACL Expansion - McBride Ratcliff
#33		
	9/87	Getechnical study - ACL Expansion - McBride Ratcliff
#34		
	9/89	Site Operating Plan - Cook-Joyce
		Landfill Gas Management Plan
#35		
	12/90	Complaint discharge/resolved; COA recommendations
		Abestos disposal form; soil test perm

Geotechnical Study - McBride Ratcliff

#36		Evidence of Competency; monitoring report, permit
#37	9/5/90	Notice of Withdrawal
	12/90	Inspection (good), Permit
#38		Permit
		Groundwater monitoring report
#39	3/93	Groundwater monitoring reports
		Permit Application
		Incident with 55 gallon drum of Haz. Waste
#40		Permit Application
		Finding fact & conclusions of low
#41	7/91	Line test & report - Pittman Engineering & Development Co.
	4/91	Compaction test, pretest laboratory
		Permit
#42	6/91	Compaction test, pretest laboratory
	6/91	Liner inspection - Pittman Eng.
#43		Liner inspection
	6/91	Soil Compaction test pretest lab
	8/91	TDH acceptance of permit 249-C
	8/91	Finding facts & conclusion of low
#44		TDH Sample report
	7/91	Special provisions for permit 249-C

WMI INDEX

ACTIVE RECORD DETAIL REPORT
TEXAS NATURAL RESOURCE CONSERVATION COMM

DATE: 04/23/98
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DEPT. CODE	RECORD IDENTIFICATION	REF. ID	CREATION DATE	EVENT DATE	SUBMIT DATE	VITAL REC.	RETENTION PERIOD	MEDIA CODE
MSW	MSW -000000247-CO VOL: 001	00204916	07/14/95		07/14/95	NO		P
	CORRESPONDENCE 1991 -							
MSW	MSW -000000247-MA VOL: 001	00204918	07/14/95		07/14/95	NO		P
	MAPS 1983 -							
MSW	MSW -000000247-RP VOL: 001	00204920	07/14/95		07/14/95	NO		P
	REPORTS 1991 SOIL AND LINER EVALUATION REPORT							
MSW	MSW -000000247-RP VOL: 002	00204921	07/14/95		07/14/95	NO		P
	REPORTS 1992 SOIL AND LINER EVALUATION REPORT ACCEPTANCE							
SW	MSW -000000248-CO VOL: 001	00204923	07/14/95		07/14/95	NO		P
	CORRESPONDENCE 1991 -							
MSW	MSW -000000249-CO VOL: 001	00204927	07/14/95		07/14/95	NO		P
	CORRESPONDENCE 1981 - 1991 AMENDMENT C							
MSW	MSW -000000249-CO VOL: 002	00204935	07/14/95		07/14/95	NO		P
	CORRESPONDENCE 1/92 - 12/92 AMENDMENT C							
MSW	MSW -000000249-CO VOL: 003	00204963	07/14/95		07/14/95	NO		P
	CORRESPONDENCE 1/93 - 7/93 AMENDMENT C							
MSW	MSW -000000249-CO VOL: 004	00204967	07/14/95		07/14/95	NO		P
	CORRESPONDENCE 8/93 - 8/94 AMENDMENT C							
W	MSW -000000249-CO VOL: 005	00204969	09/11/97		09/11/97	NO		P
	CORRESPONDENCE 4/7/94—6/20/95 C AMENDMENT C							

ACTIVE RECORD DETAIL REPORT
TEXAS NATURAL RESOURCE CONSERVATION COMM

DEPT. CODE	RECORD IDENTIFICATION	REF. ID	CREATION DATE	EVENT DATE	SUBMIT DATE	VITAL REC.	RETENTION PERIOD	MEDIA CODE
MSW	MSW -000000249-CO VOL: 006	00209209	09/11/97		09/11/97	NO		P
	CORRESPONDENCE 7/21/95—12/29/95 C AMENDMENT C							
MSW	MSW -000000249-CO VOL: 007	00230086	09/11/97		09/11/97	NO		P
	CORRESPONDENCE 1/11/96—9/30/96 C AMENDMENT C							
MSW	MSW -000000249-CO VOL: 008	00240908	09/11/97		09/11/97	NO		P
	CORRESPONDENCE 10/2/96—12/23/96 C AMENDMENT C							
MSW	MSW -000000249-CO VOL: 009	00260641	02/19/98		09/11/97	NO		P
	CORRESPONDENCE 1/10/97—12/16/97 AMENDMENT C							
MSW	MSW -000000249-CO VOL: 010	00277776	02/19/98		02/19/98	NO		P
	CORRESPONDENCE 01/05/98 -- AMMENDMENT C							
MSW	MSW -000000249-EX VOL: 001	00231877	08/08/95		08/08/95	NO		P
	EXHIBIT HEARING FILES APPLICATION FOR TEXAS DEPARTMENT OF HEALTH - TEXAS WASTE SYSTEMS INC AMENDMENT A AND C							
MSW	MSW -000000249-MA VOL: 001	00205054	07/17/95		07/17/95	NO		F
	MAPS 1973 - 83 AMENDMENT C							
MSW	MSW -000000249-MA VOL: 002	00237764	07/17/95		07/17/95	NO		F
	MAPS 1973 -							
MSW	MSW -000000249-RP VOL: 000	00259357	08/12/97		08/12/97	NO		P
	REPORTS 1989 PART A AND SITE DEVELOPMENT PLAN PERMIT AMENDMENT APPLICATION 249-C							
W	MSW -000000249-RP VOL: 001	00236283	09/25/96		09/25/96	NO		P
	REPORTS 1992 SOIL AND LINER EVALUATION REPORT ACCEPTANCE							

ACTIVE RECORD DETAIL REPORT
TEXAS NATURAL RESOURCE CONSERVATION COMM

DEPT. CODE	RECORD IDENTIFICATION	REF. ID	CREATION DATE	EVENT DATE	SUBMIT DATE	VITAL REC.	RETENTION PERIOD	MEDIA CODE
MSW	MSW -000000249-RP VOL: 002	00236284	09/25/96		09/25/96	NO		P
	REPORTS 1992 ANNUAL RESISTIVITY SURVEY							
MSW	MSW -000000249-RP VOL: 003	00236285	09/25/96		09/25/96	NO		P
	REPORTS 1992 SOIL AND LINER EVALUATION REPORT AMENDMENT C							
MSW	MSW -000000249-RP VOL: 004	00236286	09/25/96		09/25/96	NO		P
	REPORTS 1992 SOIL AND LINER EVALUATION REPORT							
MSW	MSW -000000249-RP VOL: 005	00236287	09/25/96		09/25/96	NO		P
	REPORTS 1992 COMPREHENSIVE HYDROGEOLOGICAL ASSESSMENT							
MSW	MSW -000000249-RP VOL: 006	00236288	09/25/96		09/25/96	NO		P
	REPORTS 1992 SOIL AND LINER EVALUATION REPORT ACCEPTANCE							
MSW	MSW -000000249-RP VOL: 007	00236289	09/25/96		09/25/96	NO		P
	REPORTS 1992 SOIL AND LINER EVALUATION REPORT ACCEPTANCE							
MSW	MSW -000000249-RP VOL: 008	00236290	09/25/96		09/25/96	NO		P
	REPORTS 1992 ANNUAL EARTH ELECTRICAL RESISIVITY SURVEY							
MSW	MSW -000000249-RP VOL: 009	00236291	09/25/96		09/25/96	NO		P
	REPORTS 1993 ANNUAL EARTH ELECTRICAL RESISTIVITY SURVEY							
MSW	MSW -000000249-RP VOL: 010	00236292	08/15/97		08/15/97	NO		P
	REPORTS 1993 SOIL AND LINER EVALUATION REPORT ACCEPTANCE							
MSW	MSW -000000249-RP VOL: 011	00236295	09/25/96		09/25/96	NO		P
	REPORTS 1993 SOIL AND LINER EVALUATION REPORT ACCEPTANCE							

ACTIVE RECORD DETAIL REPORT
TEXAS NATURAL RESOURCE CONSERVATION COMM

DEPT. CODE	RECORD IDENTIFICATION	REF. ID	CREATION DATE	EVENT DATE	SUBMIT DATE	VITAL REC.	RETENTION PERIOD	MEDIA CODE
MSW	MSW -000000249-RP VOL: 012	00236296	08/12/97		08/12/97	NO		P
	REPORTS 1993 CLASS I MODIFICATION AMENDMENT C							
MSW	MSW -000000249-RP VOL: 013	00236297	09/25/96		09/25/96	NO		P
	REPORTS 1993 COMPREHENSIVE HYDROGEOLOGIC ASSESSMENT							
MSW	MSW -000000249-RP VOL: 014	00236298	09/25/96		09/25/96	NO		P
	REPORTS 1994 1993 ANNUAL EARTH ELECTRICAL RESISTIVITY SURVEY							
MSW	MSW -000000249-RP VOL: 015	00236299	09/25/96		09/25/96	NO		P
	REPORTS 1994 SITE OPERATING PLAN AMENDMENT C							
SW	MSW -000000249-RP VOL: 016	00236300	09/25/96		09/25/96	NO		P
	REPORTS 1994 CHAPTER 330, SUBCHAPTER L LOCATION RESTRICTION DEMONSTRATIONS							
MSW	MSW -000000249-RP VOL: 017	00236301	09/25/96		09/25/96	NO		P
	REPORTS 1994 CLASS I PERMIT MODIFICATION AMENDMENT C							
MSW	MSW -000000249-RP VOL: 018	00236302	09/25/96		09/25/96	NO		P
	REPORTS 1994 POTENTIAL GAS MIGRATION AMENDMENT C							
MSW	MSW -000000249-RP VOL: 019	00236303	09/25/96		09/25/96	NO		P
	REPORTS 1994 GROUNDWATER MONITORING REPORTS FOR SECOND QUARTER							
MSW	MSW -000000249-RP VOL: 020	00236305	09/25/96		09/25/96	NO		P
	REPORTS 1994 GAS PIEZOMETER INSTALLATION REPORT							
SW	MSW -000000249-RP VOL: 021	00236304	09/25/96		09/25/96	NO		P
	REPORTS 1994 GAS MONITORING PROBE INSTALLATIONS							

ACTIVE RECORD DETAIL REPORT
TEXAS NATURAL RESOURCE CONSERVATION COMM

DEPT. CODE	RECORD IDENTIFICATION	REF. ID	CREATION DATE	EVENT DATE	SUBMIT DATE	VITAL REC.	RETENTION PERIOD	MEDIA CODE
MSW	MSW -000000249-RP VOL: 022	00236306	09/25/96		09/25/96	NO		P
	REPORTS 1994 GROUNDWATER SAMPLING AND ANALYSIS PLAN AMENDMENT C							
MSW	MSW -000000249-RP VOL: 023	00236307	09/25/96		09/25/96	NO		P
	REPORTS 1994 SOIL AND LINER EVALUATION REPORT AMENDMENT C							
MSW	MSW -000000249-RP VOL: 024	00236308	09/25/96		09/25/96	NO		P
	REPORTS 1994 AUTHORIZATION TO ACCEPT A SPECIAL WASTE							
MSW	MSW -000000249-RP VOL: 025	00236309	09/25/96		09/25/96	NO		P
	REPORTS 1994 GROUNDWATER MONITORING REPORTS FOR THE THIRD QUARTER 1994 EVENT							
MSW	MSW -000000249-RP VOL: 026	00236310	09/25/96		09/25/96	NO		P
	REPORTS 1994 FLEXIBLE MEMBRANE LINER EVALUATION REPORT AMENDMENT C							
MSW	MSW -000000249-RP VOL: 027	00236311	09/25/96		09/25/96	NO		P
	REPORTS 1994 SUBTITLE D SUBMITTAL AMENDMENT C							
MSW	MSW -000000249-RP VOL: 028	00236312	09/25/96		09/25/96	NO		P
	REPORTS 1994 1994 ANNUAL EARTH ELECTRICAL RESISTIVITY SURVEY							
MSW	MSW -000000249-RP VOL: 029	00236313	09/25/96		09/25/96	NO		P
	REPORTS 1995 GROUNDWATER SAMPLING AND ANALYSIS PLAN AMENDMENT C							
MSW	MSW -000000249-RP VOL: 030	00236314	09/25/96		09/25/96	NO		P
	REPORTS 1995 PERMIT MODIFICATION CELLS WD-1,2, AND 3 AMENDMENT C							
MSW	MSW -000000249-RP VOL: 031	00236315	09/25/96		09/25/96	NO		P
	REPORTS 1995 DELIVERY ORDER 21 SWMU CLOSURES AMENDMENT C							

ACTIVE RECORD DETAIL REPORT
TEXAS NATURAL RESOURCE CONSERVATION COMM

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DEPT. CODE	RECORD IDENTIFICATION	REF. ID	CREATION DATE	EVENT DATE	SUBMIT DATE	VITAL REC.	RETENTION PERIOD	MEDIA CODE
MSW	MSW -000000249-RP VOL: 032	00236316	09/25/96		09/25/96	NO		P
	REPORTS 1995 ALTERNATE LINER DESIGN DEMONSTRATION AMENDMENT C							
MSW	MSW -000000249-RP VOL: 033	00236317	09/25/96		09/25/96	NO		P
	REPORTS 1995 SOIL AND LINER QUALITY CONTROL PLAN AMENDMENT C							
MSW	MSW -000000249-RP VOL: 034	00236318	09/25/96		09/25/96	NO		P
	REPORTS 1995 SOIL AND LINER QUALITY CONTROL PLAN AMENDMENT C							
MSW	MSW -000000249-RP VOL: 035	00236319	09/25/96		09/25/96	NO		P
	REPORTS 1995 1995 ANNUAL EARTH ELECTRICAL RESISTIVITY SURVEY							
SW	MSW -000000249-RP VOL: 036	00236320	09/25/96		09/25/96	NO		P
	REPORTS 1995 LINER EVALUATION REPORT CELL WD-1 AMENDMENT C							
MSW	MSW -000000249-RP VOL: 037	00236322	09/25/96		09/25/96	NO		P
	REPORTS 1995 SPECIAL WASTE AMENDMENT C							
MSW	MSW -000000249-RP VOL: 038	00237482	10/07/96		10/07/96	NO		P
	REPORTS 1996 PHASE I SUBSURFACE EVALUATION AMENDMENT C							
MSW	MSW -000000249-RP VOL: 039	00236324	09/25/96		09/25/96	NO		P
	REPORTS 1996 GROUNDWATER MONITORING REPORTS AMENDMENT C							
MSW	MSW -000000249-RP VOL: 040	00236323	12/06/96		12/06/96	NO		P
	REPORTS 1996 CLASS I PERMIT MODIFICATION REQUEST FINAL LANDFILL CONTOURS AND DRAINAGE SYSTEM MODIFICATION							
SW	MSW -000000249-RP VOL: 041	00236331	09/25/96		09/25/96	NO		P
	REPORTS 1996 APPENDIX E ——SPECIAL WASTE AMENDMENT C							

ACTIVE RECORD DETAIL REPORT
TEXAS NATURAL RESOURCE CONSERVATION COMM

DEPT. CODE	RECORD IDENTIFICATION	REF. ID	CREATION DATE	EVENT DATE	SUBMIT DATE	VITAL REC.	RETENTION PERIOD	MEDIA CODE
MSW	MSW -000000249-RP VOL: 042	00240823	11/06/96		11/06/96	NO		P
	REPORTS 1996 GROUNDWATER MONITORING REPORTS THIRD QUARTER 1996 SECOND BACKGROUND EVENT							
MSW	MSW -000000249-RP VOL: 043	00242773	12/02/96		12/02/96	NO		P
	REPORTS 1996 SPECIAL WASTER AUTHORIZED							
MSW	MSW -000000249-RP VOL: 044	00243325	12/09/96		12/09/96	NO		P
	REPORTS 1996 SPECIAL WASTES APPENDIX E							
MSW	MSW -000000249-RP VOL: 045	00247266	01/21/97		01/21/97	NO		P
	REPORTS 1996 ANNUAL EARTH ELECTRICAL RESISTIVITY SURVEY AMENDMENT C							
	MSW -000000249-RP VOL: 046	00247984	01/28/97		01/28/97	NO		P
	REPORTS 1997 GROUND WATER MONITORING REPORTS FOURTH QUARTER 1996\THIRD BACKGROUND EVENT							
MSW	MSW -000000249-RP VOL: 047	00250028	02/21/97		02/21/97	NO		P
	REPORTS 1997 REVISION OF SOIL ESTIMATE FOR FILE NO. 0735-96 AMENDMENT C							
MSW	MSW -000000249-RP VOL: 048	00253065	05/06/97		05/06/97	NO		P
	REPORTS 1997 GROUND WATER MONITORING REPORTS FIRST QUARTER 1997//FOURTH BACKGROUND EVENT							
MSW	MSW -000000249-RP VOL: 049	00256786	07/01/97		07/01/97	NO		P
	REPORTS 1997 SITE OPERATING PLAN —REVISIED AMENDMENT C							
MSW	MSW -000000249-RP VOL: 050	00260228	08/27/97		08/27/97	NO		P
	REPORTS 1997 GROUNDWATER MONITORING REPORTS-SECOND QUARTER 1997/ FIFTHE BACKGROUND EVENT							
	MSW -000000249-RP VOL: 051	00264994	10/22/97		10/22/97	NO		P
	REPORTS 1997 LINER EVALUATION REPORT :CELL WD-2 AMENDMENT C							

ACTIVE RECORD DETAIL REPORT
TEXAS NATURAL RESOURCE CONSERVATION COMM

DEPT. CODE	RECORD IDENTIFICATION	REF. ID	CREATION DATE	EVENT DATE	SUBMIT DATE	VITAL REC.	RETENTION PERIOD	MEDIA CODE
MSW	MSW -000000249-RP VOL: 052	00267510	11/06/97		11/06/97	NO		P
	SOIL AND LINER QUALITY CONTROL PLAN REV.2B,AND THE CELL WD 2 LINER EVALUATION REPORT 9/22/1997							
MSW	MSW -000000249-RP VOL: 053	00267930	11/14/97		11/14/97	NO		P
	1997 REPORT SOIL AND LINER QUALITY CONTROL PLAN OCT/95 REV. 11/1/97 REV.2B 9/97 FINAL APPROVAL 11/6/97							
MSW	MSW -000000250-CO VOL: 001	00203239	07/11/95		07/11/95	NO		P
	CORRESPONDENCE 1986 -							
MSW	MSW -000000251-CO VOL: 001	00203240	07/11/95		07/11/95	NO		P
	CORRESPONDENCE 1989 -							
MSW	MSW -000000252-CO VOL: 001	00203241	07/11/95		07/11/95	NO		P
	CORRESPONDENCE 1977 -							
MSW	MSW -000000252-MA VOL: 001	00203242	07/11/95		07/11/95	NO		P
	MAPS 1976 -							
MSW	MSW -000000253-CO VOL: 001	00203244	07/11/95		07/11/95	NO		P
	CORRESPONDENCE 1991 -							
MSW	MSW -000000254-CO VOL: 001	00203245	07/11/95		07/11/95	NO		P
	CORRESPONDENCE 1976 -							
MSW	MSW -000000255-CO VOL: 001	00203246	07/11/95		07/11/95	NO		P
	CORRESPONDENCE 1974 -							
MSW	MSW -000000256-CO VOL: 001	00203247	07/11/95		07/11/95	NO		P
	CORRESPONDENCE 1992 -							

BFI Landfill
MSW - PA# 1447 - Brown, Ferris, Inc., Travis Co.

Sheet 1

1. Permit 1447 (11/19/82) and supporting documents including permit application and comments from other agencies

Sheet 2

1. Additional Permit supporting documents, including:
    - A. Review letters
    - B. Notice for Filing
    - C. Discovery Schedule
    - D. Application Amendments
    - E. Engineering Report Corrections

Sheet 3

1. Additional Permit supporting documents, including:
    - A. Engineering Report corrections
    - B. TDH Permit checklist
    - C. Correspondence
    - D. TDH Site Inspection Report (5/29/81)
    - E. Trench & Soils data
    - F. Site Evaluation checklist (5/29/81)
    - E. Classification checklist (6/12/81)
    - F. Land Use Elements Report (6/24/81)

Sheet 4

1. Additional Permit supporting documents, including:
    - A. Land Use Elements Report (con't)
    - B. Option Agreement (7/30/81)
    - C. Survey Notes
    - D. Document Evidence Listing (6/25/81)

Sheet 5

1. Additional Permit Supporting Documents, including:
    - A. Correspondence
    - B. Permit Review Comments
    - C. Brief in support of Permit Application (7/29/81)
    - C. Bam the Dump Committees Brief (7/31/81)
    - D. Applicants reply Brief
    - E. TDH Proposal for Decision (8/21/81)
    - F. Soil Interpretation and Vegitation Establishment And Management Report (8/7/81)

Sheet 6

1. Additional Permit Supporting Documents, including:
    - A. Soil Interpretation ... (con't)
    - B. TDH Memos to file
    - C. Ban the Dump Committee - Exceptions to proposal for decision (9/11/81)
    - D. Correspondence
    - E. Applicants Reply to Exceptions to Proposal for decision (10/7/81)
    - F. TDH Inter-Office Memo
    - E. Permit - I Special Provision (10/20/81)
    - F. Surveryors Notes
    - G. Finding of Fact
    - H. Motion of Rehearing (11/2/81)
    - G. Applicants reply to Motion for Rehearing (11/12/81)
    - H. Order of Witnesses
    - G. Appeal to TDH (12/9/81)

Sheet 7

1. Permit Supporting Documents, including:
    - A. Motion for Rehearing (11/2/81)
    - B. Preconstruction Meeting (12/11/81)
    - C. Correspondence
    - D. Citation of TDH (12/11/81)
    - E. Permit 1447 (10/20/81)
    - F. Site Work Specifications (12/10/81)

Sheet 8

1. Permit Supporting Documents, including:
    - A. Reply to Appeal to the Board of the TDH (12/21/81)
    - B. TDH Board Meeting Minutes (5/21/78)
    - C. Correspondence
    - D. Permit Review
    - E. TDH Memo's to File
    - F. Groundwater Monitoring (2/5/82)* & (6/21/81)*
    - G. TDH Site Visit Memo
    - H. Soils & Liner Evaluation Report (SLER) (4/21/82)

Sheet 9

1. Permits Supporting Documents, including:
    - A. SLER (cont)
    - B. Correspondence
    - C. TDH Site Inspection Report (4/15/82)
    - D. Field Inspection Reports (4/23/82)

Sheet 10

1. Field Inspection Reports (cont)
2. Correspondence
3. Letter on Disposal of Special Waste (6/18/82)*
4. Well Sampling Results (7/21/82)
5. SLER (8/6/82)

Sheet 11

1. Groundwater Sampling (8/30/82)
2. Correspondence
3. Groundwater Sampling (8/5/82)*
4. TDH Site Inspection Reports (8/17/82) (10/26/82)

Sheets 12 & 13

1. SLER (9/24/82)
2. Correspondence
3. Letter of Credit (2/3/82)
4. Groundwater Monitoring Reports (1/24/83)* (9/20/83)*
5. SLERs (1/28/83) (4/12/83) (7/25/83) (11/23/83)
6. TDH Site Inspection Reports (4/6/83) (5/11/83)

Sheet 14

1. SLER (11/23/83) (1/30/84) (5/10/84)
2. TDH Inspection Reports (11/16/83) (5/1/84)
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4. Telephone Complaint to TDH (2/8/84)
5. GW report (3/5/84)*

Sheet 15

1. TDH Site Inspection Report (5/23/84) (11/9/84)
2. Correspondence
3. SLER (7/24/84) (11/26/84)
4. GW Monitoring Plan (8/22/84)
5. TDH Notice of Compliance (2/4/85)

Sheet 16

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2. TDH Interoffice Memos

3. SLER (3/12/85) (4/10/85) (7/17/85)
4. Groundwater Monitoring Report (3/25/85)*
5. TDH Notice of Compliance (4/18/85)
6. TDH Inspection Report (3/27/85)

Sheet 17

1. TDH Notice of Compliance (7/26/85)
2. TDH Inspection Report (7/10/85) (10/22/85) (1/7/86)
3. TDH Authorization of Contaminated Soil Disposal (8/6/85)*
4. TDH Interoffice Memos
5. Permit Bonds
6. Groundwater Monitoring Report (10/16/85)*
7. Correspondence
8. SLER (11/2/83)
9. Raba-Kistner to TDH - Well replacment (11/21/85)*

Sheet 18

1. Earth Electrical Resistivity Survey (5/5/86)
2. Correspondence

Sheet 19

1. SLER (1/9/86)
2. Groundwater Monitoring Report (3/5/86)*
3. TDH Inspection Report (4/8/86)

Sheet 20

1. Correspondence
2. Spec'd Water Authorization (8/1/86)
   - Tracor Soil

Sheet 21

1. URM Tracor Soil Report (4/17/86)
2. URM Tracor Closure Plan (4/31/86)
3. URM Denial of Tracor Soil Disposal (8/1/86)
4. Correspondence

Sheet 22

1. SLQCP (7/9/86)
2. Groundwater Monitoring Report (8/20/86)*
3. TDH Inspection Report (7/24/86)
4. TDH Interoffice Memos
5. TDH Correspondence

Sheet 23
1. TDH Inspections Field Report (10/16/86)
2. TDH Interoffice Memos
3. TDH Correspondence

Sheet 24
1. Groundwater Monitoring Report (3/4/87)
2. SLER (3/11/87)
3. TDH Interoffice Memos
4. Letters of Credit
5. TDH Correspondence
6. TDH Inspectors Field Report (4/8/87)
7. Annual EERS (4/27/87)

Sheet 25
1. TDH Correspondence - Spec'd Waste (Flint Abrasive) (6/22/87)
2. TDH Interoffice Memos
3. TDH Inspectors Field Report (7/29/87)

Sheet 26
1. Groundwater Monitoring Report (9/8/87)*
2. TDH Correspondence
3. SLER (9/24/87)

Sheet 27
1. TDH Interoffice Memos
2. Permit Bond
3. TDH Correspondence
4. TDH Inspectors Field Report (11/24/87)

Sheet 28
1. Listing of Disposal Projs

Sheet 29
1. Listing of Disposal Projs
2. TDH Correspondence
3. Groundwater Sampling Notice (1/29/88)*
4. TDH Inspectors Field Report (2/9/88)
5. TDH Interoffice Memos
6. Permit Bond

Sheet 30
1. TDH Correspondence
2. Groundwater Monitoring Report (2/29/88)*
3. TWC Correspondence

Sheet 31
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TEXAS NATURAL RESOURCE CONSERVATION COMM

DATE: 04/24/98
TIME: 08:13:10

DEPT. CODE	RECORD IDENTIFICATION	REF. ID	CREATION DATE	EVENT DATE	SUBMIT DATE	VITAL REC.	RETENTION PERIOD	MEDIA CODE
MSW	MSW -000001446-RP VOL: 015	00280845	04/09/98		04/09/98	NO		P
	REPORT 1998 RESISTIVITY SURVEY REPORT							
MSW	MSW -000001446-TR VOL: 001	00214203	08/28/95		08/28/95	NO		P
	TRANSCRIPT 1982 BEFORE THE TEXAS DEPARTMENT OF HEALTH APPLICATION VOLUME I AND VI							
MSW	MSW -000001447-CO VOL: 001	00214184	08/25/95		08/25/95	NO		P
	CORRESPONDENCE 1991 - 1992							
MSW	MSW -000001447-CO VOL: 002	00214185	08/25/95		08/25/95	NO		P
	CORRESPONDENCE 1993							
MSW	MSW -000001447-CO VOL: 003	00214186	08/25/95		08/25/95	NO		P
	CORRESPONDENCE 1/1994 - 8/1994							
MSW	MSW -000001447-CO VOL: 004	00214187	08/25/95		08/25/95	NO		P
	CORRESPONDENCE 9/1994 - 12/1994							
MSW	MSW -000001447-CO VOL: 005	00214188	08/25/95		08/25/95	NO		P
	CORRESPONDENCE 1/1995 - 6/1995							
MSW	MSW -000001447-CO VOL: 006	00214189	08/25/95		08/25/95	NO		P
	CORRESPONDENCE 7/1995 -							
MSW	MSW -000001447-CO VOL: 007	00230858	08/25/95		08/25/95	NO		P
	CORRESPONDENCE 10/1995 - 2/1996							
MSW	MSW -000001447-CO VOL: 008	00230859	12/13/96		12/13/96	NO		P
	CORRESPONDENCE 1996							

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TEXAS NATURAL RESOURCE CONSERVATION COMM

DATE: 04/24/98
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DEPT. CODE	RECORD IDENTIFICATION	REF. ID	CREATION DATE	EVENT DATE	SUBMIT DATE	VITAL REC.	RETENTION PERIOD	MEDIA CODE
MSW	MSW -000001447-CO VOL: 009	00240545	04/16/97		04/16/97	NO		P
	CORRESPONDENCE 08/28/1996--12/31/1996							
MSW	MSW -000001447-CO VOL: 010	00252157	07/16/97		07/16/97	NO		P
	CORRESPONDENCE 01/15/97--2/28/97							
MSW	MSW -000001447-CO VOL: 011	00257741	07/16/97		07/16/97	NO		P
	CORRESPONDENCE 5/1/97--12/16/97							
MSW	MSW -000001447-CO VOL: 012	00281075	04/15/98		04/15/98	NO		P
	CORRESPONDENCE 1998 01/19/98 --							
MSW	MSW -000001447-EX VOL: 001	00214208	08/28/95		08/28/95	NO		P
	EXHIBITS 1981 - HEARINGS NO. 1							
MSW	MSW -000001447-EX VOL: 002	00214209	08/28/95		08/28/95	NO		P
	EXHIBITS 1981 -							
MSW	MSW -000001447-EX VOL: 003	00214210	08/28/95		08/28/95	NO		P
	EXHIBITS 1982 - BREIFS							
MSW	MSW -000001447-MA VOL: 001	00214179	08/25/95		08/25/95	NO		P
	MAPS 1981 - 1 OF 2							
MSW	MSW -000001447-MA VOL: 002	00214180	08/25/95		08/25/95	NO		P
	MAPS 1981 - 2 OF 2							
MSW	MSW -000001447-RP VOL: 001	00214136	08/25/95		08/25/95	NO		P
	REPORTS 1981 SITE PERMIT APPLICATION / VOL 1 OF 2							

ACTIVE RECORD DETAIL REPORT
TEXAS NATURAL RESOURCE CONSERVATION COMM

DATE: 04/24/98
TIME: 08:13:12

DEPT. CODE	RECORD IDENTIFICATION	REF. ID	CREATION DATE	EVENT DATE	SUBMIT DATE	VITAL REC.	RETENTION PERIOD	MEDIA CODE
MSW	MSW -000001447-RP VOL: 002	00214137	08/25/95		08/25/95	NO		P
	REPORTS 1981 SITE PERMIT APPLICATION / VOL 2 OF 2							
MSW	MSW -000001447-RP VOL: 003	00214139	08/25/95		08/25/95	NO		P
	REPORTS 1992 OCTOBER 1992 EARTH ELECTRICAL RESISTIVITY SURVEY							
MSW	MSW -000001447-RP VOL: 004	00214143	08/25/95		08/25/95	NO		P
	REPORTS 1993 SOIL AND LINER EVALUATION REPORT / ACCEPTANCE							
MSW	MSW -000001447-RP VOL: 005	00214147	08/25/95		08/25/95	NO		P
	REPORTS 1993 SOIL AND LINER EVALUATION REPORT / ACCEPTANCE							
MSW	MSW -000001447-RP VOL: 006	00214153	08/25/95		08/25/95	NO		P
	REPORTS 1993 ANALYTICAL REPORT / SEMI-ANNUAL GROUNDWATER ANALYSIS							
MSW	MSW -000001447-RP VOL: 007	00214154	08/25/95		08/25/95	NO		P
	REPORTS 1993 AUTHORIZATION TO ACCEPT COMTAMINATED SOIL							
MSW	MSW -000001447-RP VOL: 008	00214155	08/25/95		08/25/95	NO		P
	REPORTS 1993 SOIL AND LINER EVALUATION REPORT ACCEPTANCE							
MSW	MSW -000001447-RP VOL: 009	00214156	08/25/95		08/25/95	NO		P
	REPORTS 1994 GROUNDWATER MONITORING							
MSW	MSW -000001447-RP VOL: 010	00214157	08/25/95		08/25/95	NO		P
	REPORTS 1994 GROUNDWATER MONITORING DATA							
	MSW -000001447-RP VOL: 011	00214158	08/25/95		08/25/95	NO		P
	REPORTS 1994 JANUARY 1994 EARTH ELECTRICAL RESISTIVITY SURVEY							

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TEXAS NATURAL RESOURCE CONSERVATION COMM

DATE: 04/24/98
TIME: 08:13:14

DEPT. CODE	RECORD IDENTIFICATION	REF. ID	CREATION DATE	EVENT DATE	SUBMIT DATE	VITAL REC.	RETENTION PERIOD	MEDIA CODE
MSW	MSW -000001447-RP VOL: 012	00214159	08/25/95		08/25/95	NO		P
	REPORTS 1994 GROUNDWATER MONITORING DATA							
MSW	MSW -000001447-RP VOL: 013	00214164	08/25/95		08/25/95	NO		P
	REPORTS 1994 GROUNDWATER SAMPLING AND ANALYSIS PLAN							
MSW	MSW -000001447-RP VOL: 014	00214160	08/25/95		08/25/95	NO		P
	REPORTS 1994 SUBTITLE D UPGRADE PERMIT MODIFICATION / CLASS 1 PERMIT MODIFICATION							
MSW	MSW -000001447-RP VOL: 015	00214161	08/25/95		08/25/95	NO		P
	REPORTS 1994 SITE DEVELOPMENT PLAN NARRATIVE							
MSW	MSW -000001447-RP VOL: 016	00214163	08/25/95		08/25/95	NO		P
	REPORTS 1994 ANALYTICAL REPORT / SEMI-ANNUAL GROUNDWATER ANALYSIS							
MSW	MSW -000001447-RP VOL: 017	00214165	08/25/95		08/25/95	NO		P
	REPORTS 1994 TNRCC STANDARD EXEMPTION APPLICATION							
MSW	MSW -000001447-RP VOL: 018	00214166	08/25/95		08/25/95	NO		P
	REPORTS 1995 QUALITY ASSURANCE OF CLAY LINER CONSTRUCTION							
MSW	MSW -000001447-RP VOL: 019	00214167	08/25/95		08/25/95	NO		P
	REPORTS 1995 QUALITY ASSURANCE OF GEOMEMBRANE LINER INSTALLATION PHASE 1, STATION 13+00 - 17+00							
MSW	MSW -000001447-RP VOL: 020	00214168	08/25/95		08/25/95	NO		P
	REPORTS 1995 GROUNDWATER MONITORING DATA							
MSW	MSW -000001447-RP VOL: 021	00214169	08/25/95		08/25/95	NO		P
	REPORTS 1995 GROUNDWATER SAMPLING AND ANALYSIS PLAN REVISION							

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DEPT. CODE	RECORD IDENTIFICATION	REF. ID	CREATION DATE	EVENT DATE	SUBMIT DATE	VITAL REC.	RETENTION PERIOD	MEDIA CODE
MSW	MSW -000001447-RP VOL: 022	00214170	08/25/95		08/25/95	NO		P
	REPORTS 1995 ANALYTICAL REPORT / SEMI-ANNUAL GROUNDWATER ANALYSIS							
MSW	MSW -000001447-RP VOL: 023	00230854	08/25/95		08/25/95	NO		P
	REPORT 1995 PIEZOMETER INSTALLATION							
MSW	MSW -000001447-RP VOL: 024	00230855	08/25/95		08/25/95	NO		P
	REPORT 1995 QUALITY ASSURANCE OF CLAY LINER CONSTRUCTION							
MSW	MSW -000001447-RP VOL: 025	00230856	08/25/95		08/25/95	NO		P
	REPORT 1995 QUALITY ASSURANCE OF GEOMEMBRANE CONSTRUCTION							
SW	MSW -000001447-RP VOL: 026	00230857	08/25/95		08/25/95	NO		P
	REPORT 1996 ANALYTICAL REPORT SEMI-ANNUAL GROUNDWATER ANALYSIS							
MSW	MSW -000001447-RP VOL: 027	00233203	08/20/96		08/20/96	NO		P
	REPORT 1996 QUALITY ASSURANCE OF GEOMEMBRANE INSTALLATION PHASE 1, SECTORS 5 AND 6							
MSW	MSW -000001447-RP VOL: 028	00251787	04/07/97		04/07/97	NO		P
	REPORT 1996 SWMU 13 SOIL ANALYTICAL DATA AND MONITORING WELL 01307MW, SM18GW, AND SM20GW GROUNDWATER ANALYTICAL DATA							
MSW	MSW -000001447-RP VOL: 029	00251788	04/07/97		04/07/97	NO		P
	REPORT 1996 SWMU 13 SOIL ANALYTICAL DATA AND MONITORING WELL 01307MW, SM18GW, AND SM20GW GROUNDWATER ANALYTICAL DATA							
MSW	MSW -000001447-RP VOL: 030	00233555	04/07/97		04/07/97	NO		P
	REPORT 1996 APPENDIX B BULK LIQUIDS WASTES							
W	MSW -000001447-RP VOL: 031	00233696	04/07/97		04/07/97	NO		P
	REPORT 1996 ANALYTICAL REPORT SEMI-ANNUAL GROUNDWATER ANALYSIS							

ACTIVE RECORD DETAIL REPORT
TEXAS NATURAL RESOURCE CONSERVATION COMM

DEPT. CODE	RECORD IDENTIFICATION	REF. ID	CREATION DATE	EVENT DATE	SUBMIT DATE	VITAL REC.	RETENTION PERIOD	MEDIA CODE
MSW	MSW -000001447-RP VOL: 032	00236261	04/07/97		04/07/97	NO		P
	REPORT 1996 QUALITY ASSURANCE OF GEOMEMBRANE INSTALLATION PHASE 1, SECTORS 5 AND 6							
MSW	MSW -000001447-RP VOL: 033	00240526	04/07/97		04/07/97	NO		P
	REPORT 1996 ADDITIONAL INFORMATION FOR AUTHORIZATION FOR DISPOSAL OF SPECIAL WASTE							
MSW	MSW -000001447-RP VOL: 034	00243273	04/07/97		04/07/97	NO		P
	REPORT 1996 SPECIAL WASTES APPENDIX E							
MSW	MSW -000001447-RP VOL: 035	00242335	04/07/97		04/07/97	NO		P
	REPORT 1996 AUTHORIZATION FOR SPECIAL WASTE							
MSW	MSW -000001447-RP VOL: 036	00246385	04/07/97		04/07/97	NO		P
	REPORT 1996 APPENDIX E SPECIAL WASTE							
MSW	MSW -000001447-RP VOL: 037	00250045	04/07/97		04/07/97	NO		P
	REPORT 1997 APPENDIX BI BULK LIQUID WASTES							
MSW	MSW -000001447-RP VOL: 038	00250670	04/07/97		04/07/97	NO		P
	REPORT 1997 ANALYTICAL REPORT --- SEMI-ANNUAL GROUNDWATER ANALYSIS : SAMPLED JANUARY 28-30, 1997							
MSW	MSW -000001447-RP VOL: 039	00251513	04/07/97		04/07/97	NO		P
	REPORT 1997 APPENDIX A--- PETROLEUM SUBSTANCE CONTAMINATED SOILS							
MSW	MSW -000001447-RP VOL: 040	00251687	04/07/97		04/07/97	NO		P
	REPORT 1997 APPENDIX E---SPECIAL WASTE							
MSW	MSW -000001447-RP VOL: 041	00251784	04/07/97		04/07/97	NO		P
	REPORT 1997 APPENDIX E---SPECIAL WASTE							

ACTIVE RECORD DETAIL REPORT
TEXAS NATURAL RESOURCE CONSERVATION COMM

DEPT. CODE	RECORD IDENTIFICATION	REF. ID	CREATION DATE	EVENT DATE	SUBMIT DATE	VITAL REC.	RETENTION PERIOD	MEDIA CODE
MSW	MSW -000001447-RP VOL: 042	00251785	04/07/97		04/07/97	NO		P
	REPORT 1997 APPENDIX E---SPECIAL WASTE							
MSW	MSW -000001447-RP VOL: 043	00251720	04/07/97		04/07/97	NO		P
	REPORT 1997 APPENDIX E---SPECIAL WASTE							
MSW	MSW -000001447-RP VOL: 044	00251721	04/07/97		04/07/97	NO		P
	REPORT 1997 APPENDIX E---SPECIAL WASTE							
MSW	MSW -000001447-RP VOL: 045	00253054	05/06/97		05/06/97	NO		P
	REPORT 1997 REQUEST FOR AUTHORIZATION FOR DISPOSAL OF SPECIAL WASTE							
	MSW -000001447-RP VOL: 046	00260168	08/27/97		08/27/97	NO		P
	REPORT 1997 APPENDIX B----CONTAINERIZED LIQUIDS							
MSW	MSW -000001447-RP VOL: 047	00260170	08/27/97		08/27/97	NO		P
	REPORT 1997 APPENDIX E --- SPECIAL WASTES							
MSW	MSW -000001447-RP VOL: 048	00260378	09/03/97		09/03/97	NO		P
	REPORT 1997 SEMI-ANNUAL GROUNDWATER DATA DATE SAMPLED 7/1-2/97							
MSW	MSW -000001447-RP VOL: 049	00267371	11/05/97		11/05/97	NO		P
	REPORT 1997 APPENDIX E SPECIAL WASTE							
MSW	MSW -000001447-RP VOL: 050	00279855	03/19/98		03/19/98	NO		P
	REPORT 1998 GROUND WATER MONITORING DATA							
	MSW -000001448-CO VOL: 001	00214221	08/28/95		08/28/95	NO		P
	CORRESPONDENCE 1992 -							

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2. Permit 2123 (7/89)
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3. Permit (8/88)
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6. Resolution Travis County Commissioners Court
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7. Continued (5/77)
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9. SLER - continued (8/91)
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GW Monitoring Report (11/91)
GW Monitoring Report (12/91)

GW Sampling Results (11/91)
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11. Complaint cont'd (12/91)

12. Letter re: Recommendations for landilling - permit application (2/89)
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13. Continuation of above re: Permit Application

14. Press Release - Public Hearing (6/89)
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15. Continuation of Permit App. (6/89)
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17. Hearing (8/89)

18. Hearing (8/89)
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19. Suplemental Witness list (9/89)
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20. Hearing (8/89)
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22. Hearing Interragations (9/89)

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24. Hearings (10/89)
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26. Groundwater Report
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ACTIVE RECORD DETAIL REPORT
TEXAS NATURAL RESOURCE CONSERVATION COMM

DATE: 04/24/98
TIME: 08:56:08

DEPT. CODE	RECORD IDENTIFICATION	REF. ID	CREATION DATE	EVENT DATE	SUBMIT DATE	VITAL REC.	RETENTION PERIOD	MEDIA CODE
MSW	MSW -000002122-EX VOL: 013	00228468	07/01/96		07/01/96	NO		P
	EXHIBIT 1989 HEARING NOTES							
MSW	MSW -000002122-RP VOL: 001	00228432	07/01/96		07/01/96	NO		P
	REPORT 1987 SANITARY LANDFILL PERMIT APPLICATION							
MSW	MSW -000002123-CO VOL: 001	00228515	06/17/97		06/17/97	NO		P
	CORRESPONDENCE 12/27/91--9/25/92							
MSW	MSW -000002123-CO VOL: 002	00228516	06/17/97		06/17/97	NO		P
	CORRESPONDENCE 10/2/92--8/30/93							
MSW	MSW -000002123-CO VOL: 003	00228518	06/17/97		06/17/97	NO		P
	CORRESPONDENCE 9/20/93--8/21/94							
MSW	MSW -000002123-CO VOL: 004	00255407	06/17/97		06/17/97	NO		P
	CORRESPONDENCE 9/07/94--12/30/94							
MSW	MSW -000002123-CO VOL: 005	00255410	06/17/97		06/17/97	NO		P
	CORRESPONDENCE 2/1/95--8/11/95							
MSW	MSW -000002123-CO VOL: 006	00255411	06/17/97		06/17/97	NO		P
	CORRESPONDENCE 9/7/95--12/19/95							
MSW	MSW -000002123-CO VOL: 007	00255412	06/17/97		06/17/97	NO		P
	CORRESPONDENCE 1/4/96--12/31/96							
	MSW -000002123-CO VOL: 008	00255413	06/17/97		06/17/97	NO		P
	CORRESPONDENCE 1/24/97—							

ACTIVE RECORD DETAIL REPORT
TEXAS NATURAL RESOURCE CONSERVATION COMM

DATE: 04/24/98
TIME: 08:56:09

DEPT. CODE	RECORD IDENTIFICATION	REF. ID	CREATION DATE	EVENT DATE	SUBMIT DATE	VITAL REC.	RETENTION PERIOD	MEDIA CODE
MSW	MSW -000002123-EX VOL: 001	00228551	07/01/96		07/01/96	NO		P
	EXHIBIT 1987 - 1991 HEARING FILES							
MSW	MSW -000002123-EX VOL: 002	00232629	07/01/96		07/01/96	NO		P
	EXHIBIT 1989 HEARING FILES BOX 1							
MSW	MSW -000002123-EX VOL: 003	00233315	08/21/96		08/21/96	NO		P
	EXHIBIT 1990 JANUARY 1990 POSITION STATEMENT ON THE MUNICIPAL SOLID WASTE PROCESSING FACILITY IN TRAVIS COUNTY							
MSW	MSW -000002123-RP VOL: 001	00228527	07/01/96		07/01/96	NO		P
	REPORT 1988 GENERAL INFORMATION PART A AND B PERMIT APPLICATION FOR TYPE I							
W	MSW -000002123-RP VOL: 002	00233316	07/01/96		07/01/96	NO		P
	REPORT 1988 GENERAL INFORMATION PART A AND B PERMIT APPLICATION FOR TYPE I							
MSW	MSW -000002123-RP VOL: 003	00228528	07/01/96		07/01/96	NO		P
	REPORT 1992 AUTHORIZATION TO ACCEPT SPECIAL WASTE							
MSW	MSW -000002123-RP VOL: 004	00228530	07/01/96		07/01/96	NO		P
	REPORT 1994 PERFORMANCE STANDARD DESIGN CRITERIA AND BASIS TEXAS DISPOSAL SYSTEMS LANDFILL INC TYPE I MUNICIPAL							
MSW	MSW -000002123-RP VOL: 005	00228531	08/21/96		08/21/96	NO		P
	REPORT 1994 MODIFICATION OF PERMIT TO INCORPORATE REQUIREMENTS OF RCRA SUBTITLE D CRITERIA							
MSW	MSW -000002123-RP VOL: 006	00233335	08/21/96		08/21/96	NO		P
	REPORT 1994 TECHNICAL INFORMATION PART B AS REVISED TO INCORPORATE RCRA SUBTITLE D							
W	MSW -000002123-RP VOL: 007	00233336	08/21/96		08/21/96	NO		P
	REPORT 1994 TECHNICAL INFORMATION PART B AS REVISED TO INCORPORATE RCRA SUBTITLE D							

ACTIVE RECORD DETAIL REPORT
TEXAS NATURAL RESOURCE CONSERVATION COMM

DATE: 04/24/98
TIME: 08:56:10

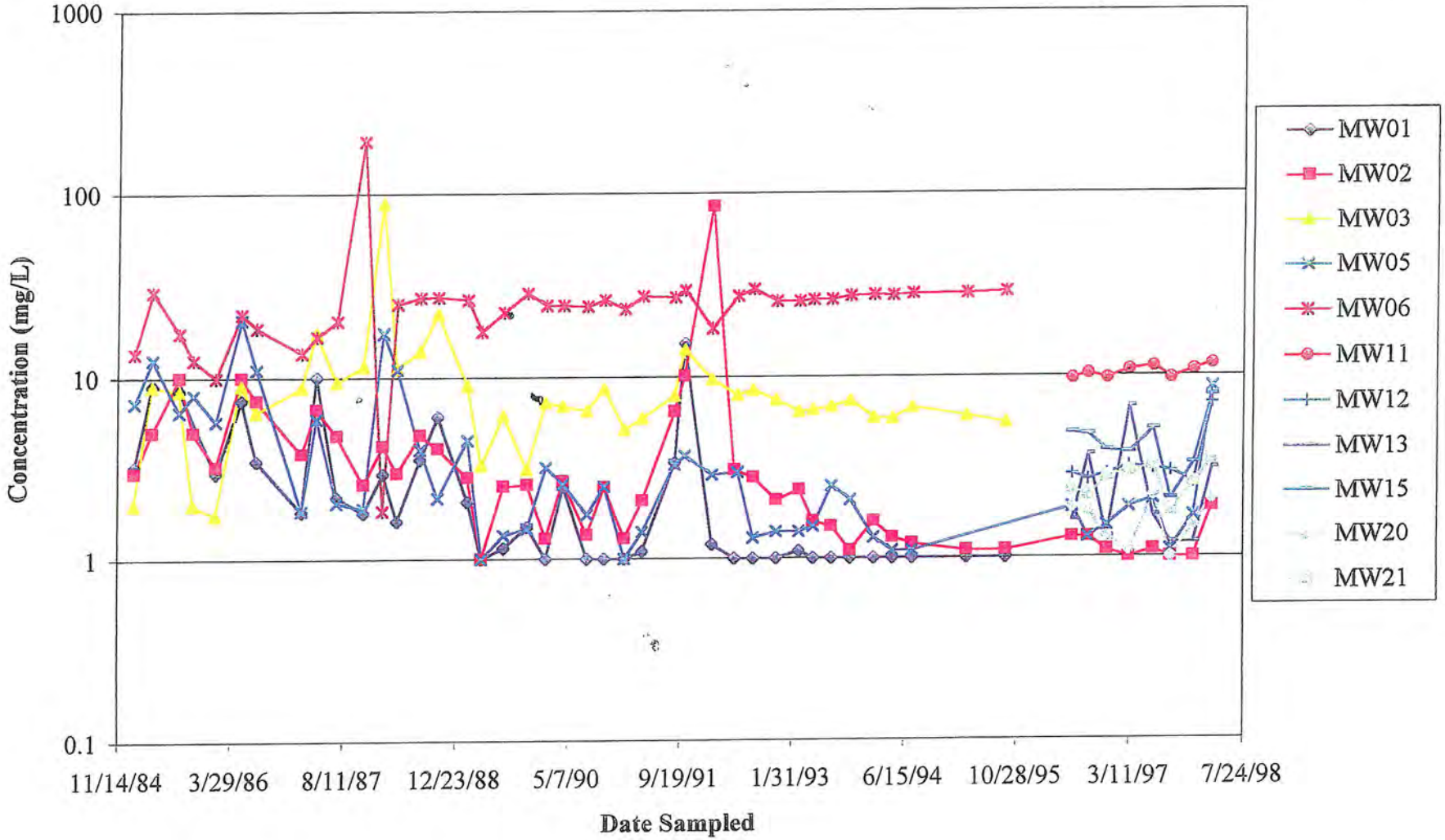
DEPT. CODE	RECORD IDENTIFICATION	REF. ID	CREATION DATE	EVENT DATE	SUBMIT DATE	VITAL REC.	RETENTION PERIOD	MEDIA CODE
MSW	MSW -000002123-RP VOL: 008	00233337	08/21/96		08/21/96	NO		P
	REPORT 1994 TECHNICAL INFORMATION PART B AS REVISED TO INCORPORATE RCRA SUBTITLE D							
MSW	MSW -000002123-RP VOL: 009	00233338	08/21/96		08/21/96	NO		P
	REPORT 1994 SUPPLEMENT TO PERFORMANCE STANDARD DESIGN CRITERIA AND BASIS NORTH TEXAS MUNICIPAL WATER DISTRICT							
MSW	MSW -000002123-RP VOL: 010	00233339	08/21/96		08/21/96	NO		P
	REPORT 1994 SUPPLEMENT TO PERFORMANCE STANDARD DESIGN CRITERIA AND BASIS TEXAS DISPOSAL SYSTEMS LANDFILL INC							
MSW	MSW -000002123-RP VOL: 011	00233340	08/21/96		08/21/96	NO		P
	REPORT 1994 OCTOBER 17, 1994 RESPONSE TO TNRCC COMMENTS MODIFICATION OF PERMIT TO INCORPORATE REQUIREMENTS OF RCRA							
W	MSW -000002123-RP VOL: 012	00233344	08/21/96		08/21/96	NO		P
	REPORT 1994 SLER #94-02 NOVEMBER 4 1994							
MSW	MSW -000002123-RP VOL: 013	00233350	08/21/96		08/21/96	NO		P
	REPORT 1994 SUBTITLE D PERMIT MODIFICATION							
MSW	MSW -000002123-RP VOL: 014	00233362	09/06/96		09/06/96	NO		P
	REPORT 1994 MODELING FATE & CONTAMINANT TRANSPORT OF LEACHATE FROM THE LANDFILL TO THE POINT OF COMPLIANCE							
MSW	MSW -000002123-RP VOL: 015	00233365	09/06/96		09/06/96	NO		P
	REPORT 1995 SLER #95-02 MAY 11 1995							
MSW	MSW -000002123-RP VOL: 016	00233367	09/06/96		09/06/96	NO		P
	REPORT 1995 CERTIFICATION OF COMPLIANCE WITH GROUND-WATER MONITORING REQUIREMENTS							
W	MSW -000002123-RP VOL: 017	00233372	09/06/96		09/06/96	NO		P
	REPORT 1995 GROUND-WATER SAMPLING AND ANALYSIS PLAN							

ACTIVE RECORD DETAIL REPORT
TEXAS NATURAL RESOURCE CONSERVATION COMM

DATE: 04/24/98
TIME: 08:56:11

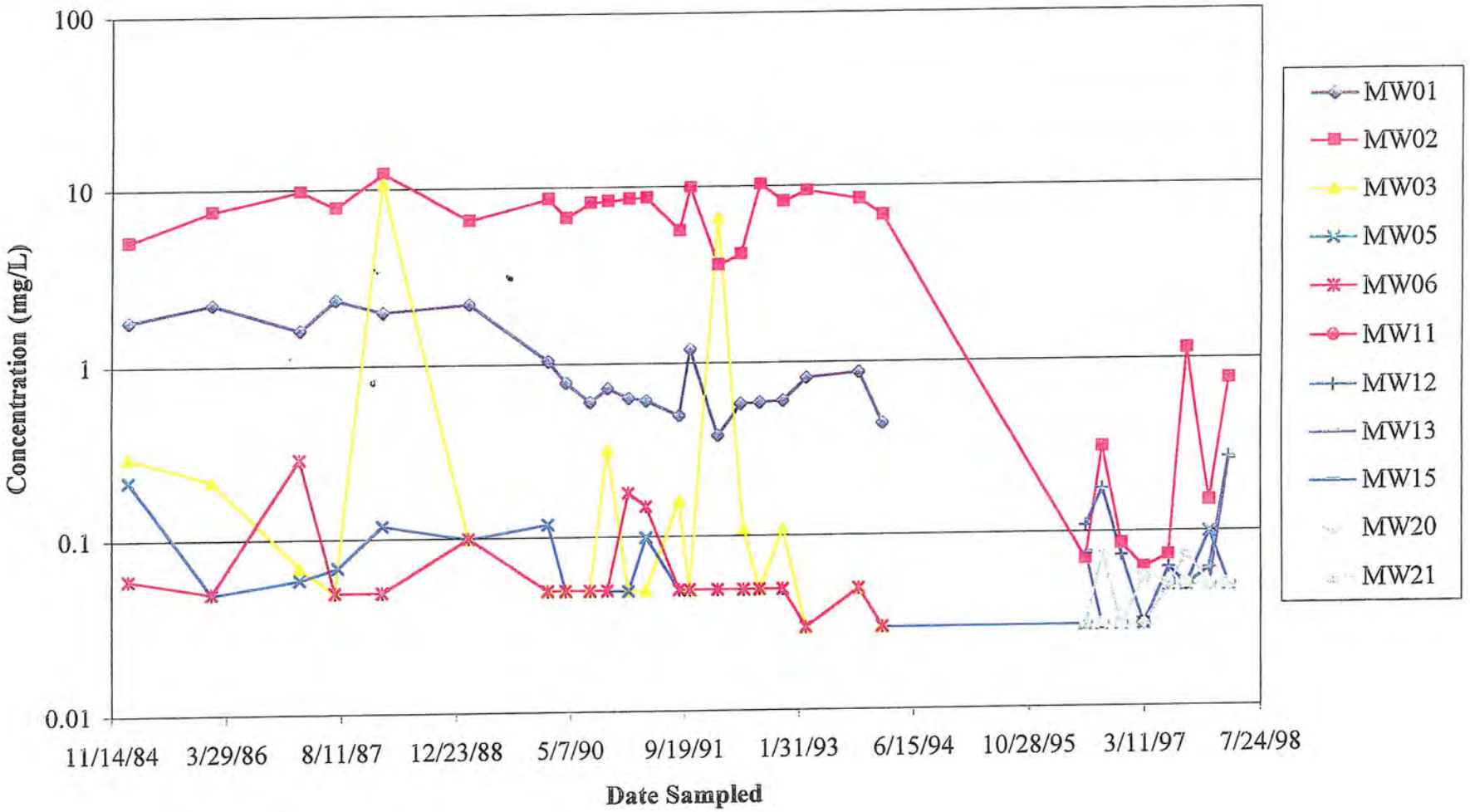
DEPT. CODE	RECORD IDENTIFICATION	REF. ID	CREATION DATE	EVENT DATE	SUBMIT DATE	VITAL REC.	RETENTION PERIOD	MEDIA CODE
MSW	MSW -000002123-RP VOL: 018	00233374	09/06/96		09/06/96	NO		P
	REPORT 1995 SOIL LINER EVALUATION REPORT SUBMITTAL SLER #95-05							
MSW	MSW -000002123-RP VOL: 019	00233375	09/06/96		09/06/96	NO		P
	REPORT 1996 CERTIFICATION OF COMPLIANCE WITH GROUND-WATER MONITORING REQUIREMENTS OCTOBER 9 1995 REVISED							
MSW	MSW -000002123-RP VOL: 020	00233377	09/06/96		09/06/96	NO		P
	REPORT 1996 GROUND-WATER SAMPLING AND ANALYSIS PLAN OCTOBER 9 1995 REVISED							
MSW	MSW -000002123-RP VOL: 021	00233379	06/12/97		06/12/97	NO		P
	REPORT 1996 SOIL LINER EVALUATION REPORT #96-02							
MW	MSW -000002123-RP VOL: 022	00248024	06/12/97		06/12/97	NO		P
	REPORT 1997 SOIL LINER EVALUATION REPORT #96-04							
MSW	MSW -000002123-RP VOL: 023	00254966	06/11/97		06/11/97	NO		P
	REPORT 1997 CLASS I PERMIT MODIFICATION							
MSW	MSW -000002123-RP VOL: 024	00254890	06/11/97		06/11/97	NO		P
	REPORT 1997 GROUND WATER SAMPLING RESULTS FIRST SUBTITLE D DETECTION MONITORING EVENT:BACKGROUND							
MSW	MSW -000002123-RP VOL: 025	00260163	08/27/97		08/27/97	NO		P
	REPORT 1997 SOIL LINER EVALUATION REPORT							
MSW	MSW -000002123-RP VOL: 026	00275682	01/30/98		01/29/98	NO		
	SOIL LINER EVALUATION REPORT 12/31/97							
MW	MSW -000002123-RP VOL: 027	00280869	04/09/98		04/09/98	NO		P
	REPORT 1998 SOIL AND LINER EVALUATION REPORT							

Waste Management
Total Organic Carbon in Groundwater

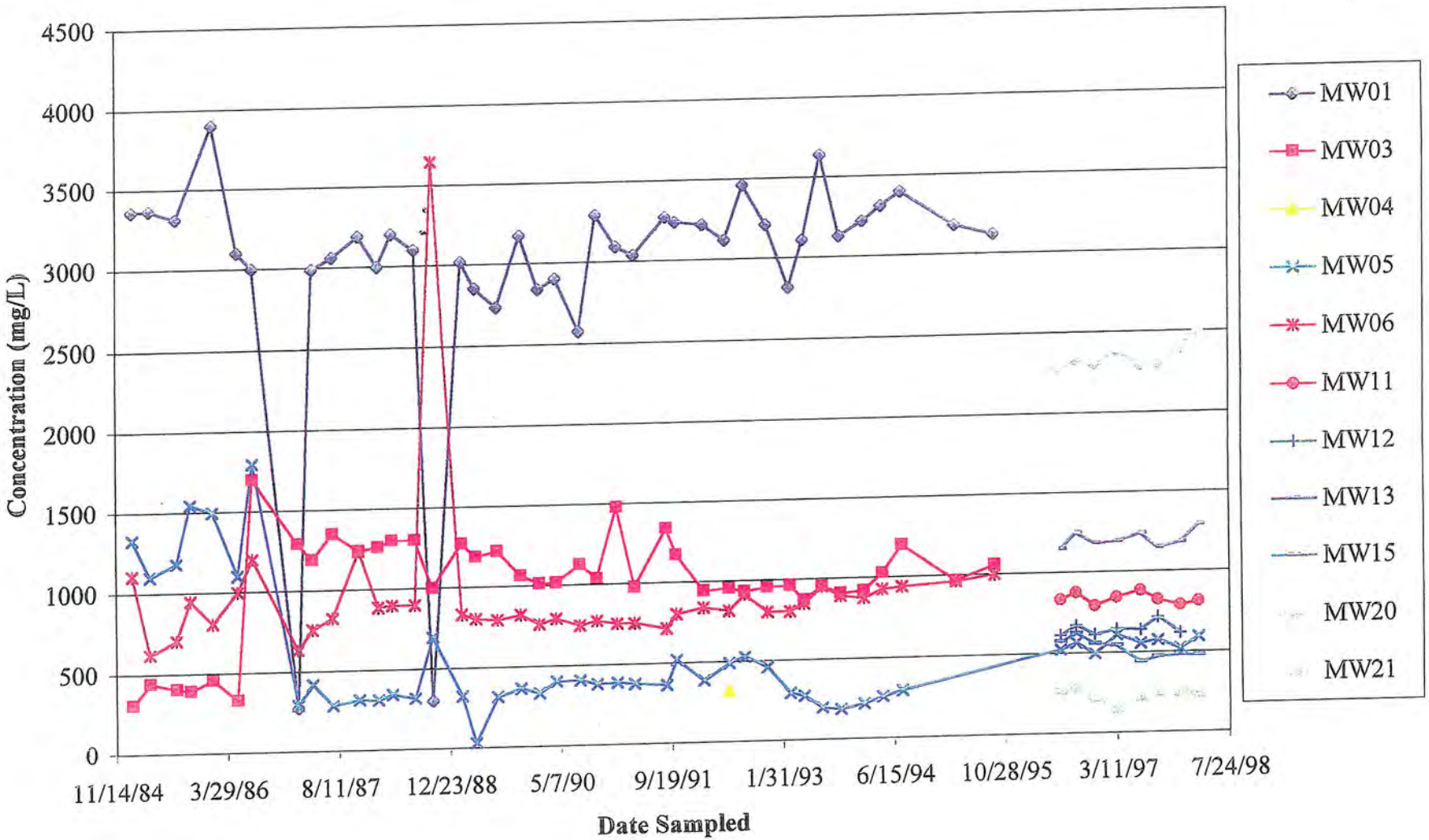


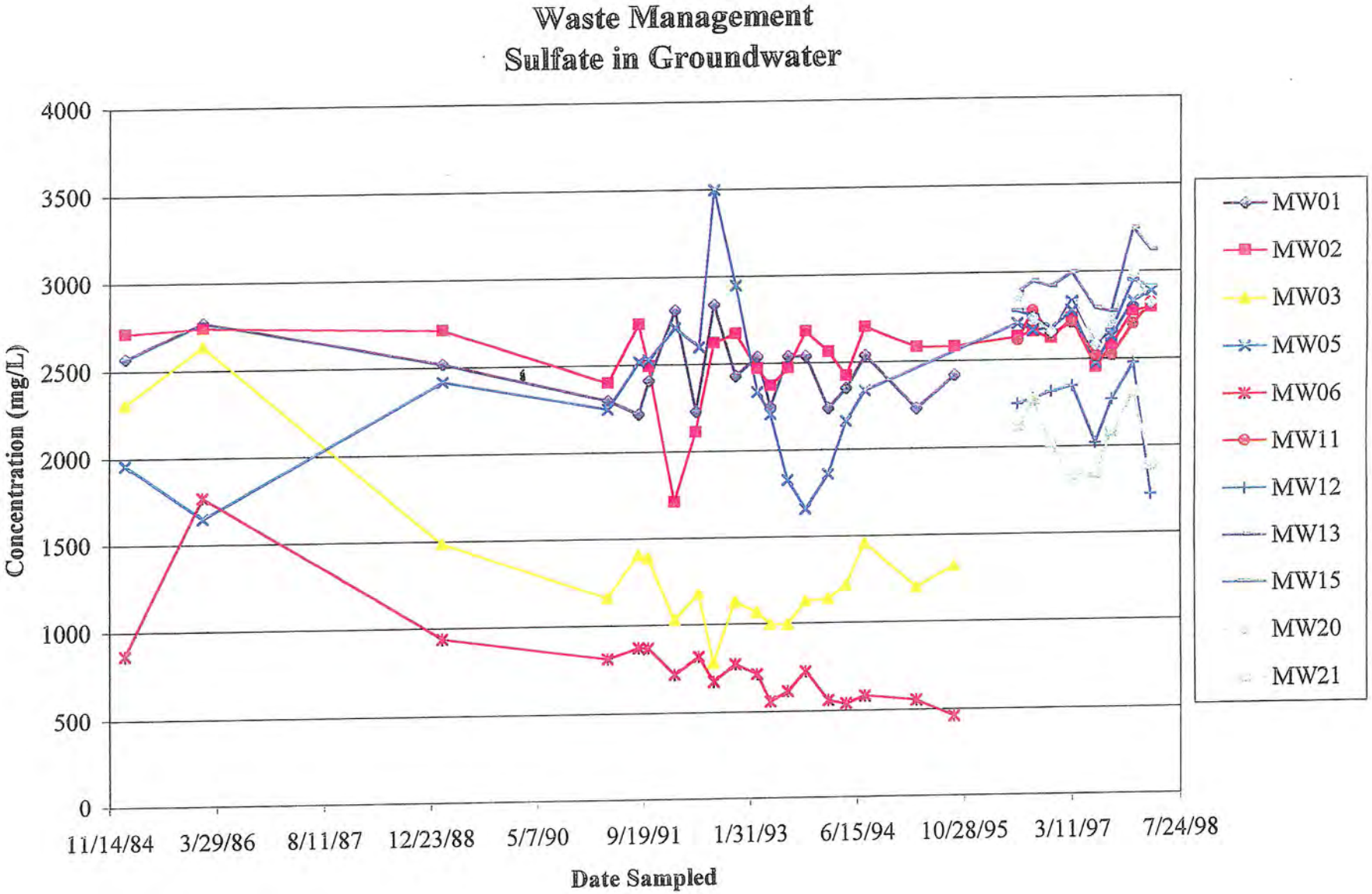
Note: All concentrations below the detection limit were plotted at 1 mg/L

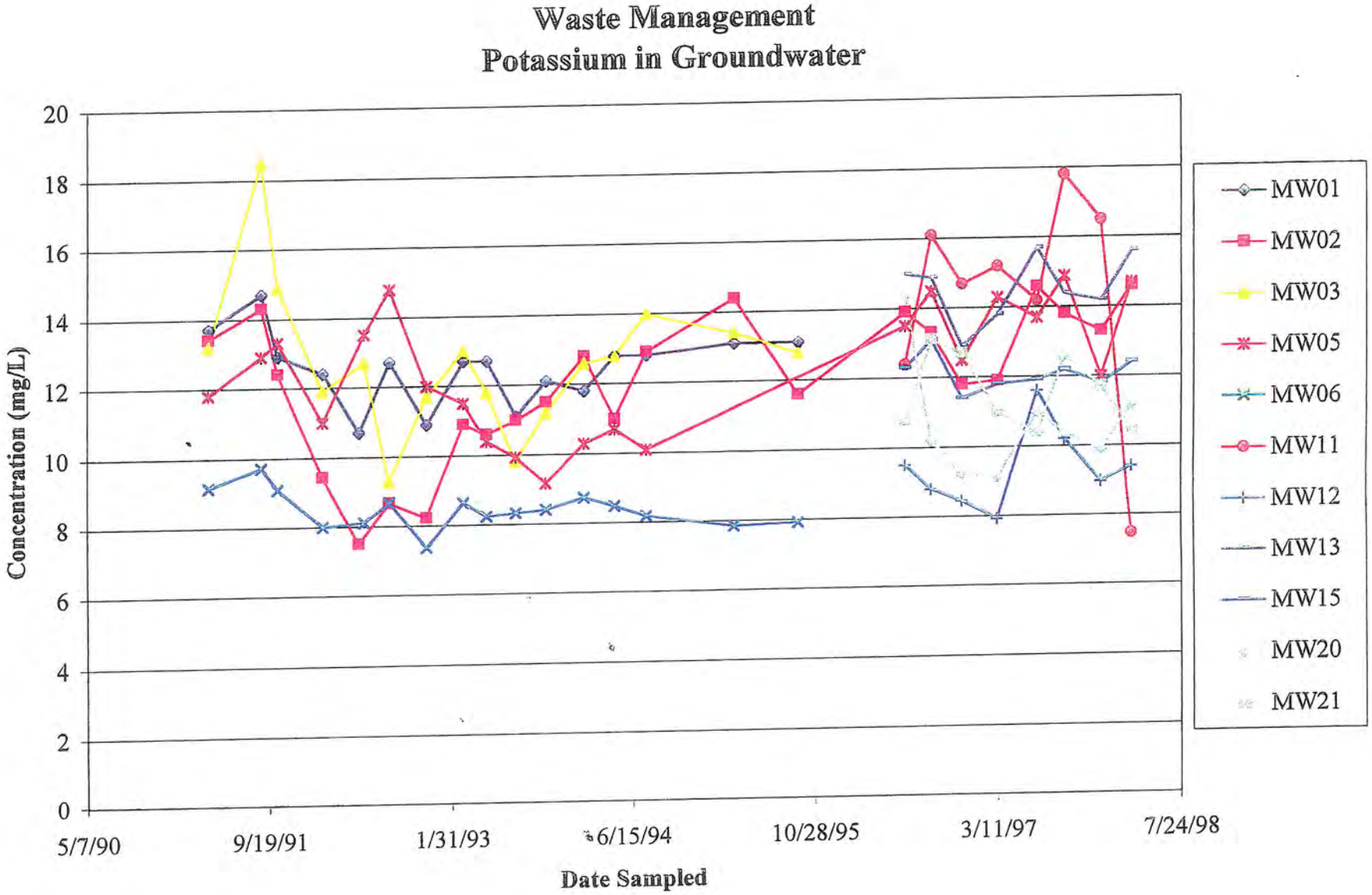
Waste Management
Nitrate in Groundwater



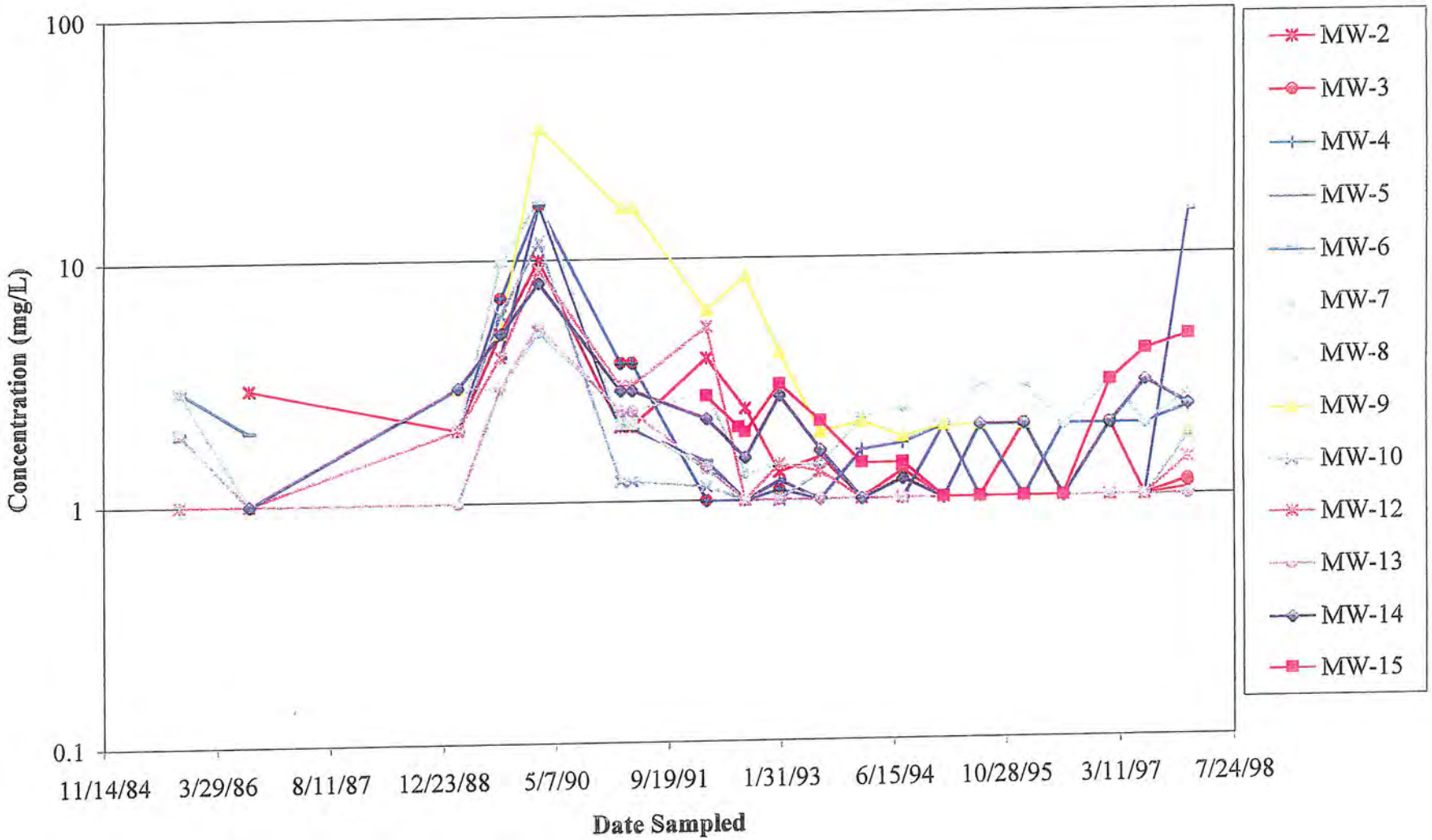
Waste Management
Chloride in Groundwater




Waste Management
Sulfate in Groundwater
Concentration (mg/L)
4000
3500
3000
2500
2000
1500
1000
500
0
11/14/84
3/29/86
8/11/87
12/23/88
5/7/90
9/19/91
1/31/93
6/15/94
10/28/95
3/11/97
7/24/98
Date Sampled
MW01
MW02
MW03
MW05
MW06
MW11
MW12
MW13
MW15
MW20
MW21

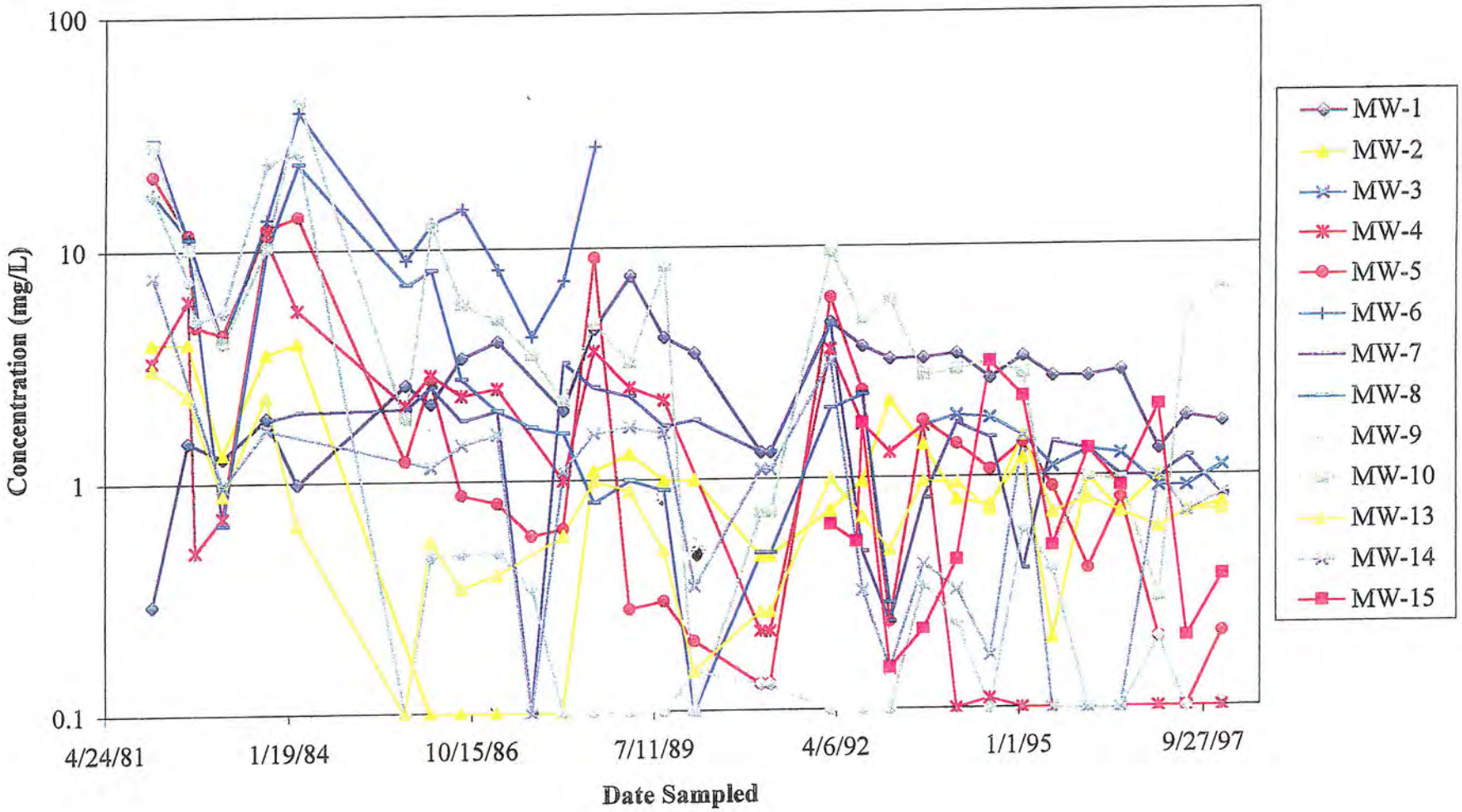

Waste Management
Potassium in Groundwater
Concentration (mg/L)
20
18
16
14
12
10
8
6
4
2
0
5/7/90
9/19/91
1/31/93
6/15/94
10/28/95
3/11/97
7/24/98
Date Sampled
MW01
MW02
MW03
MW05
MW06
MW11
MW12
MW13
MW15
MW20
MW21

Browning-Ferris
Total Organic Carbon in Groundwater

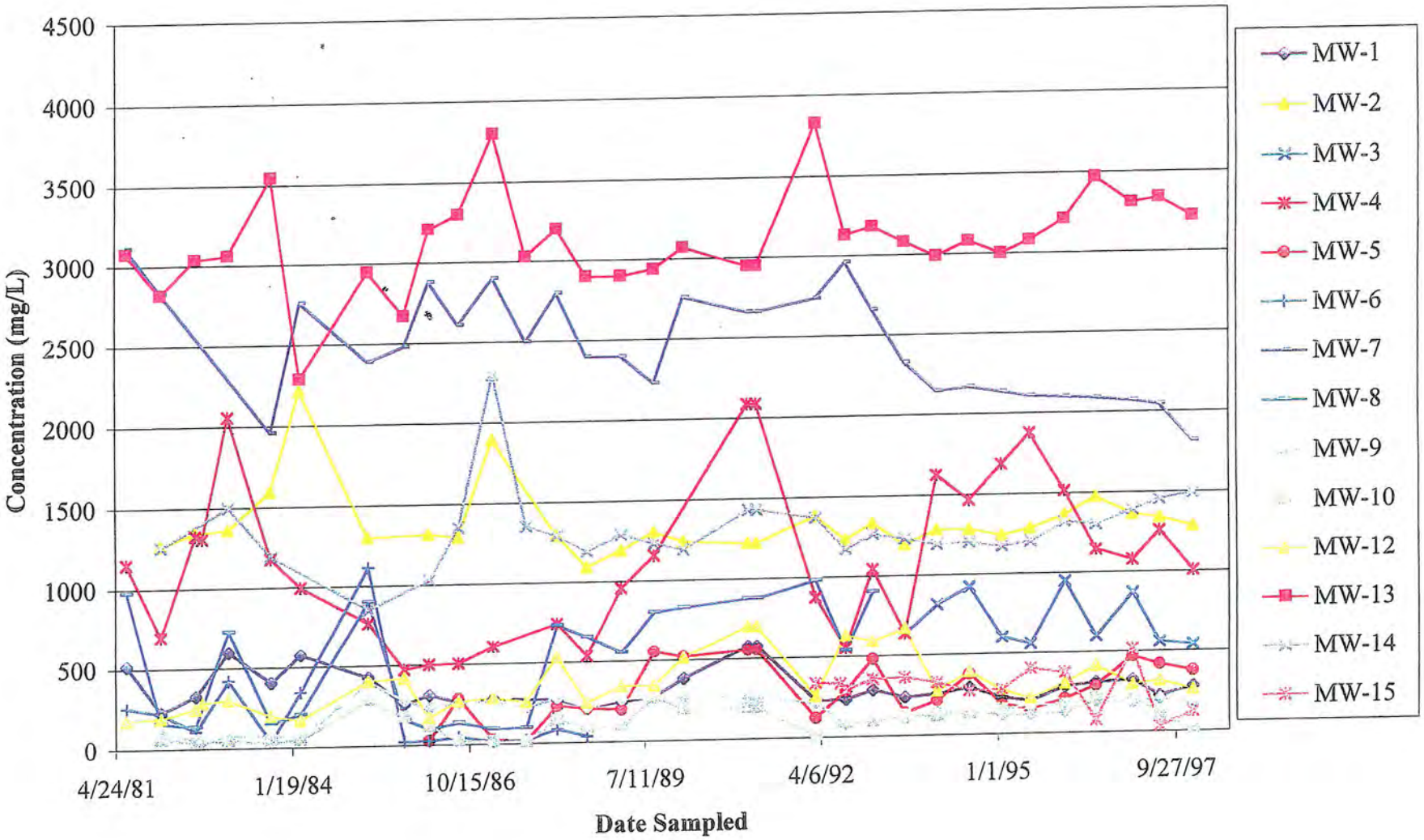


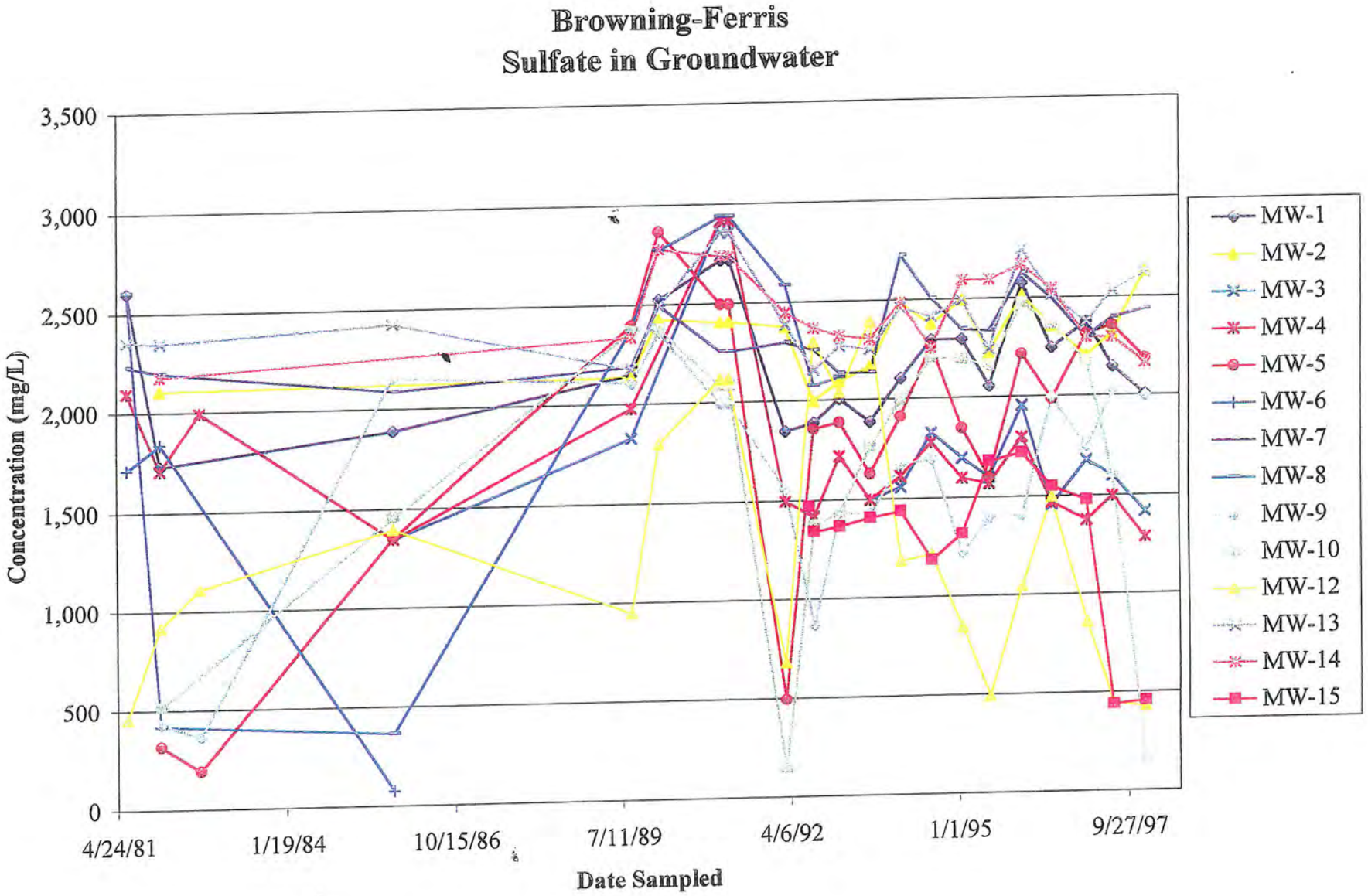
Note: All concentrations below the detection limit were plotted at 1 mg/L

Browning-Ferris
Nitrate in Groundwater

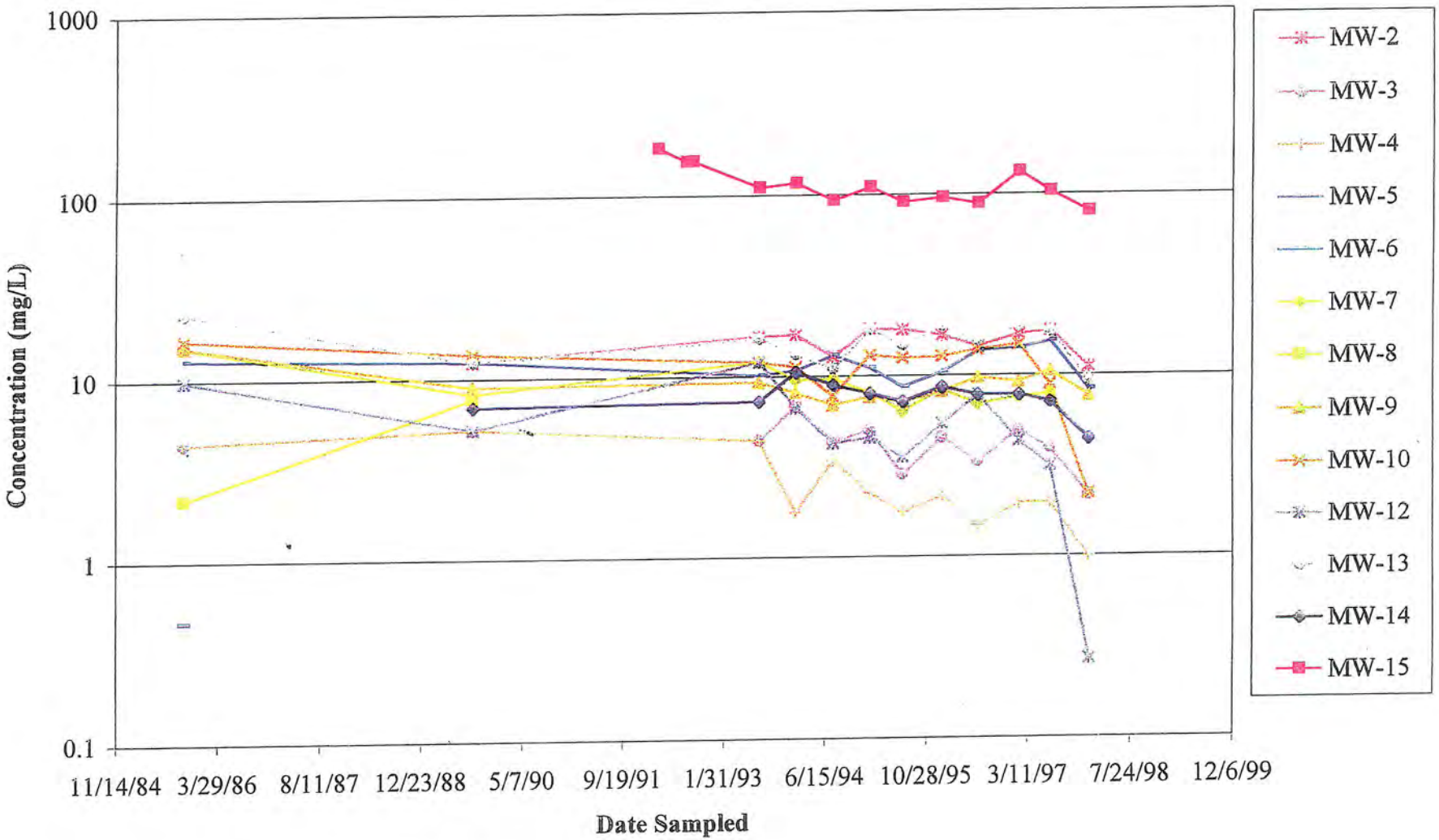


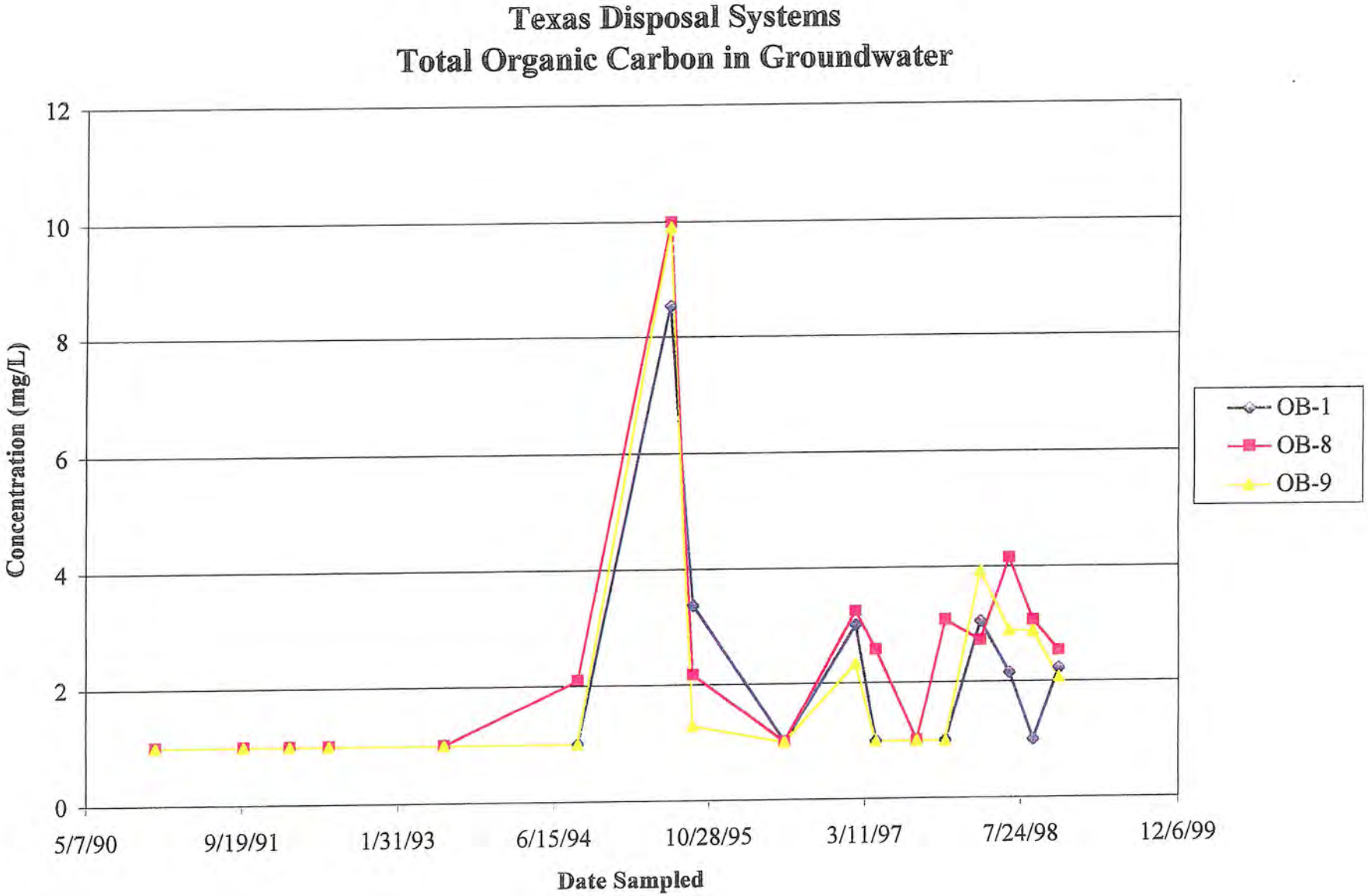
Browning-Ferris
Chloride in Groundwater




Browning-Ferris
Sulfate in Groundwater
Concentration (mg/L)
3,500
3,000
2,500
2,000
1,500
1,000
500
0
4/24/81
1/19/84
10/15/86
7/11/89
4/6/92
1/1/95
9/27/97
Date Sampled
MW-1
MW-2
MW-3
MW-4
MW-5
MW-6
MW-7
MW-8
MW-9
MW-10
MW-12
MW-13
MW-14
MW-15

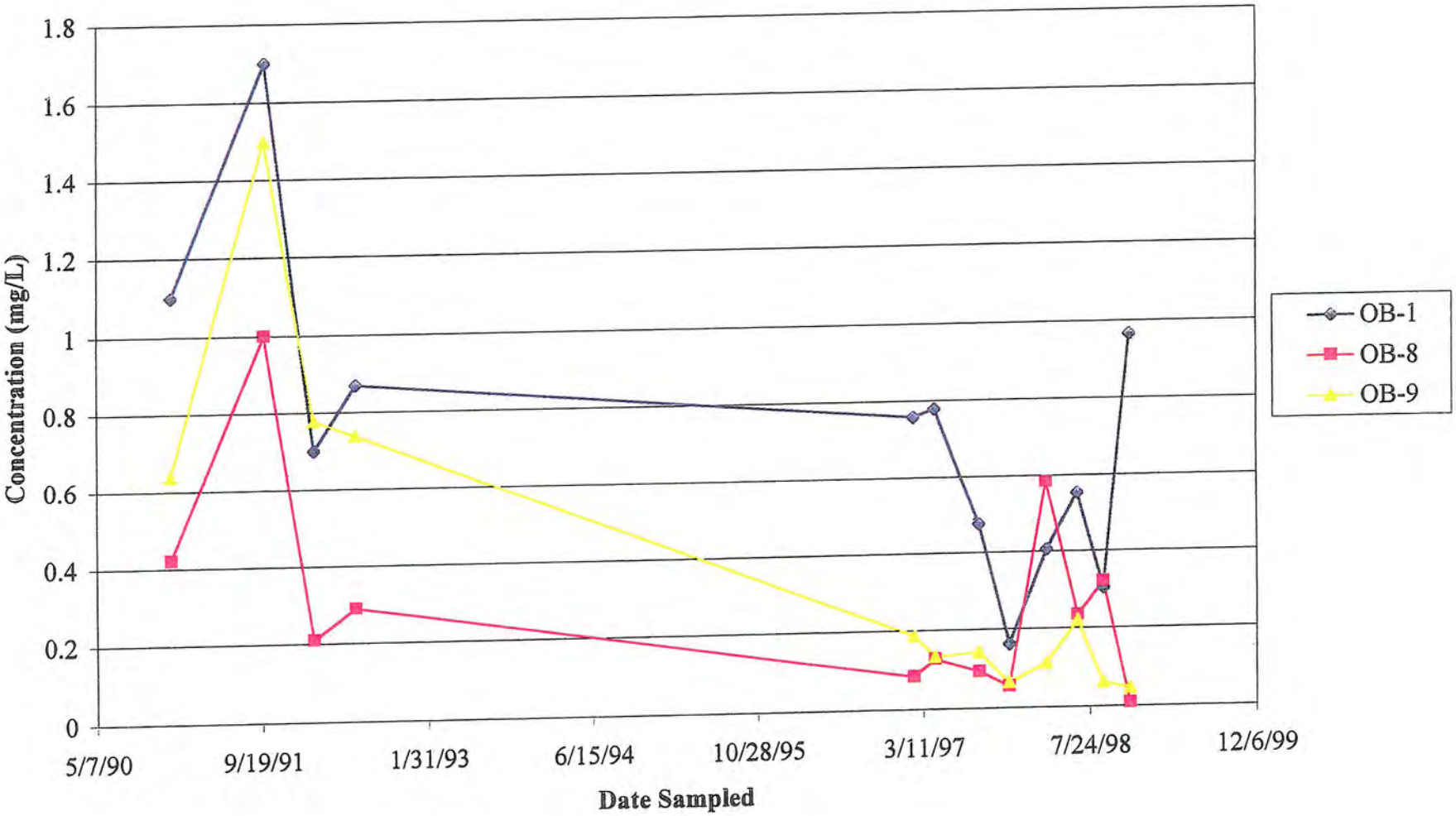
Browning-Ferris
Potassium in Groundwater

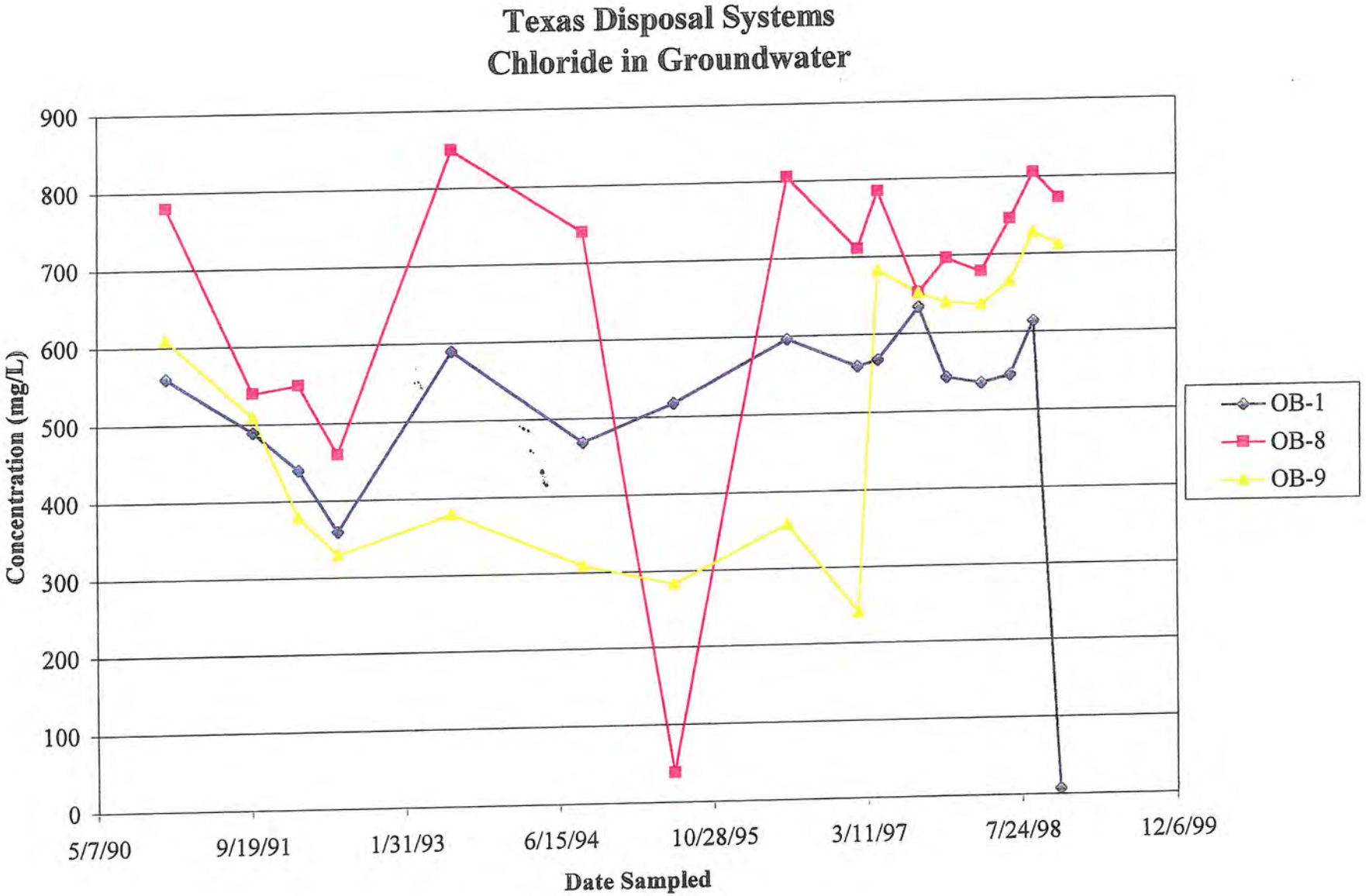


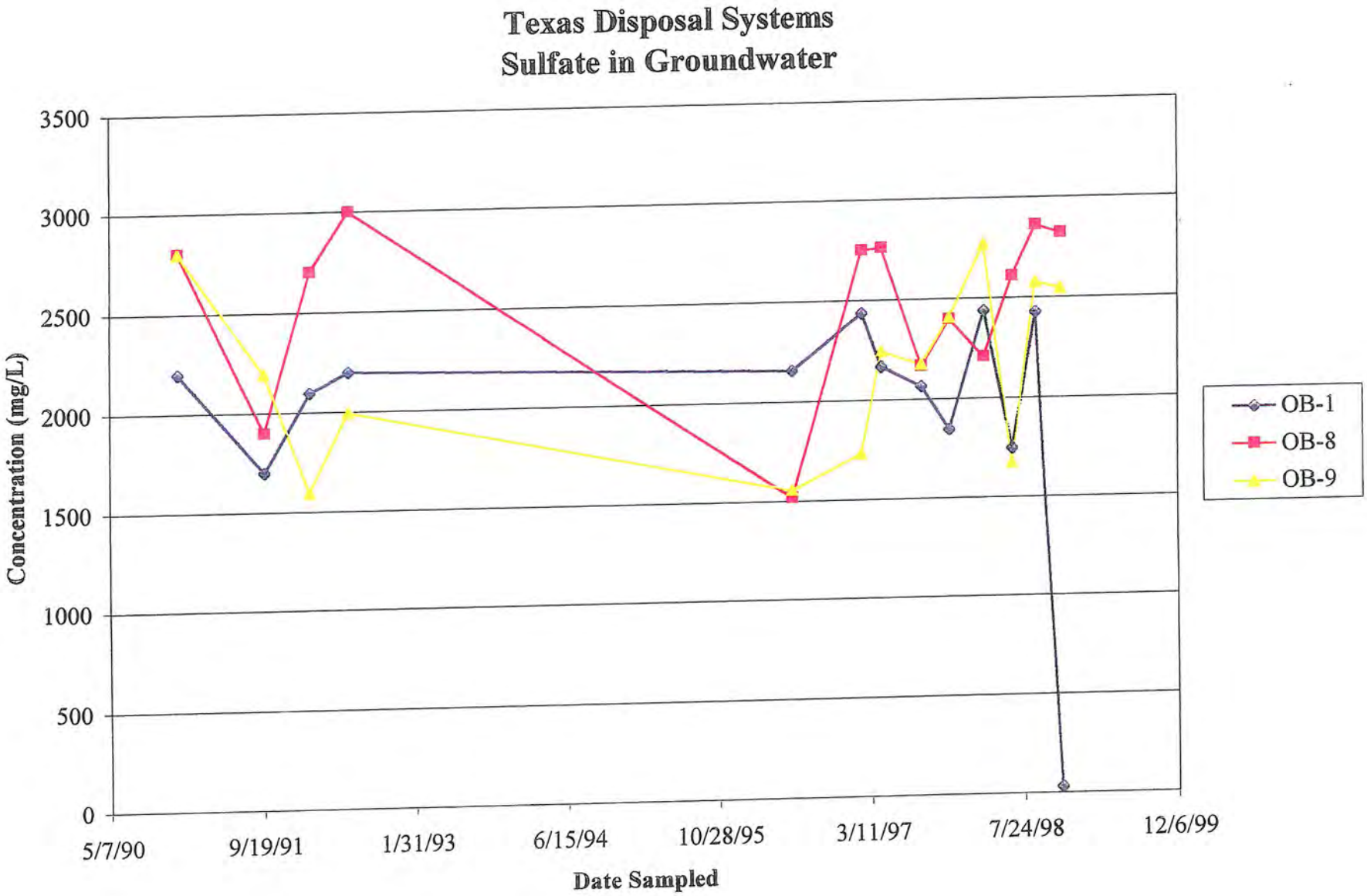


Note: All concentrations below the detection limit were plotted at 1 mg/L

Texas Disposal Systems
Nitrate in Groundwater




Texas Disposal Systems
Chloride in Groundwater
Concentration (mg/L)
900
800
700
600
500
400
300
200
100
0
5/7/90
9/19/91
1/31/93
6/15/94
10/28/95
3/11/97
7/24/98
12/6/99
Date Sampled
OB-1
OB-8
OB-9


Texas Disposal Systems
Sulfate in Groundwater
Concentration (mg/L)
3500
3000
2500
2000
1500
1000
500
0
5/7/90
9/19/91
1/31/93
6/15/94
10/28/95
3/11/97
7/24/98
12/6/99
Date Sampled
OB-1
OB-8
OB-9

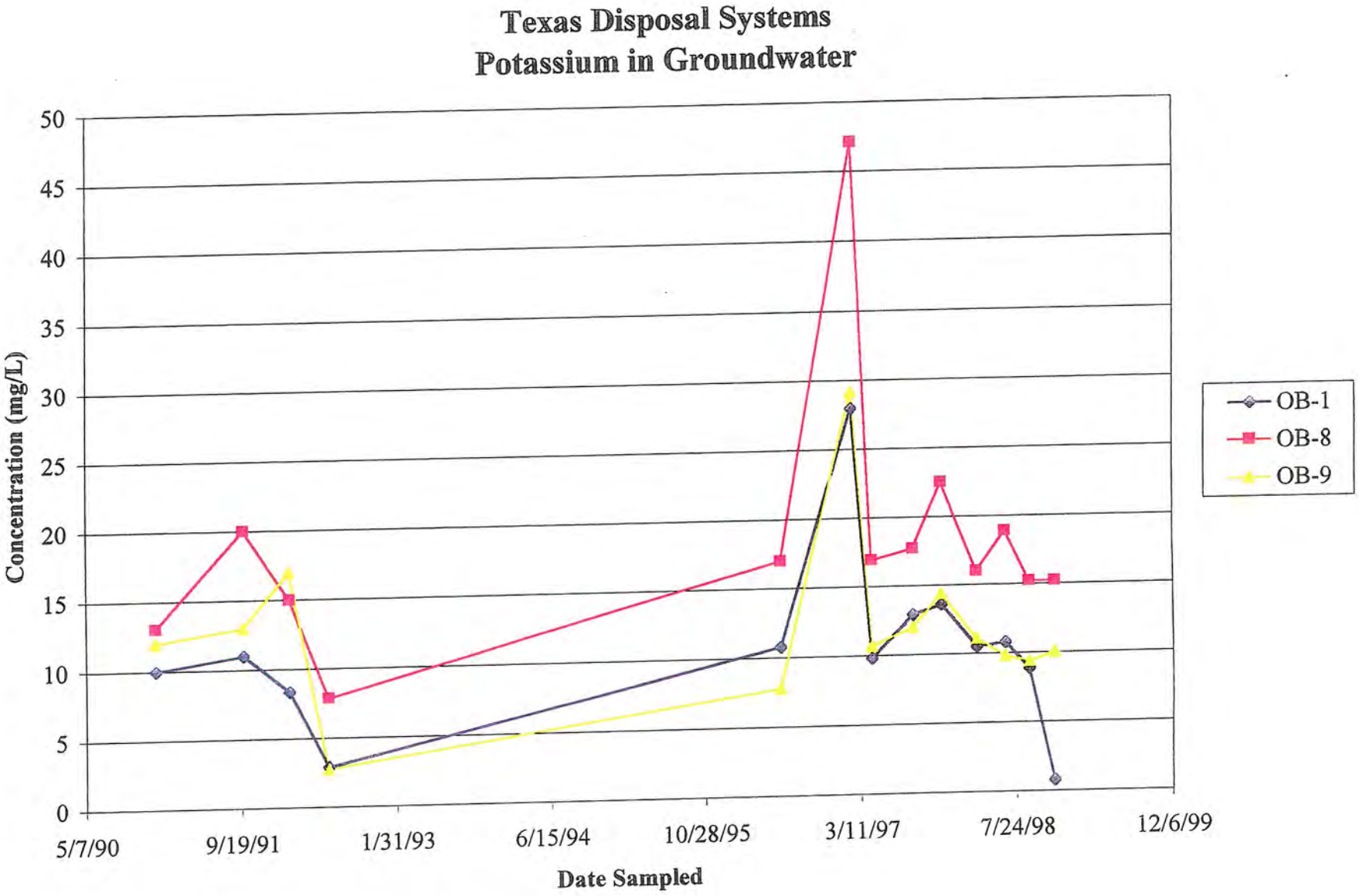

Texas Disposal Systems
Potassium in Groundwater
Concentration (mg/L)
50
45
40
35
30
25
20
15
10
5
0
5/7/90
9/19/91
1/31/93
6/15/94
10/28/95
3/11/97
7/24/98
12/6/99
Date Sampled
OB-1
OB-8
OB-9

Photo No. 1: View of Travis County Landfill erosion of cover at leachate seep.

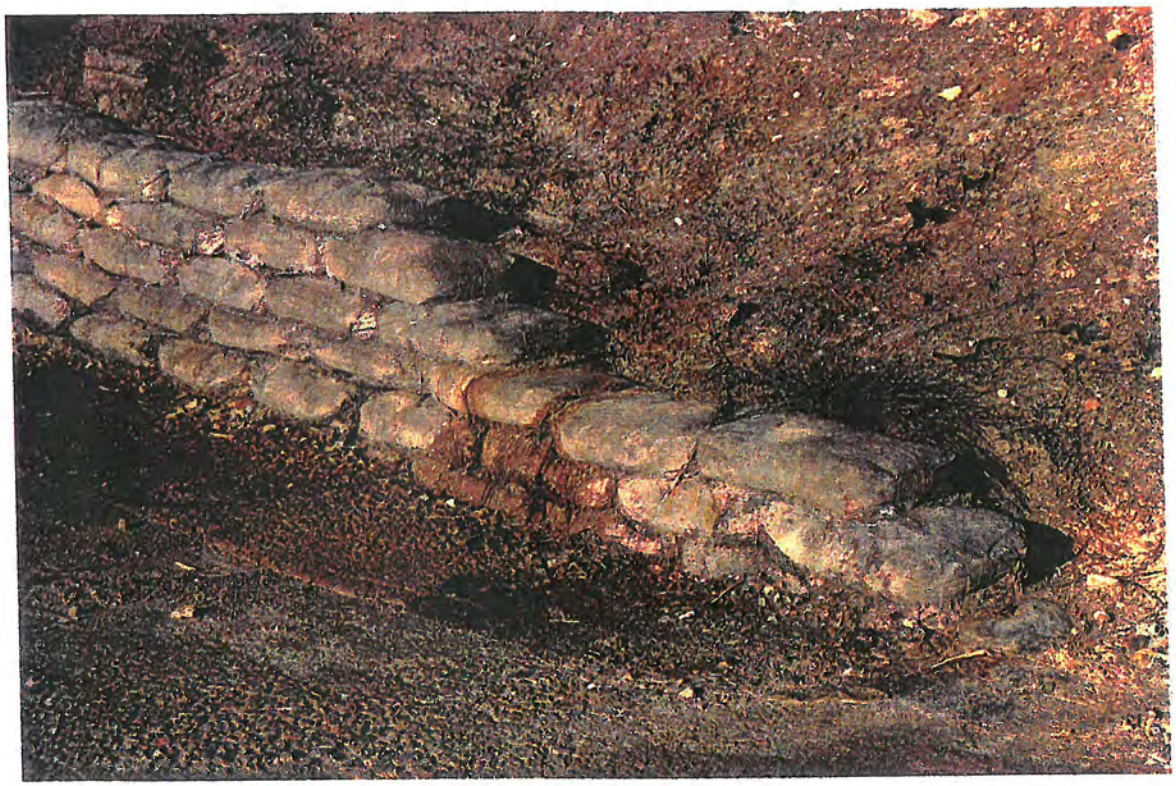


Photo No. 2: View of Travis County Landfill erosion of cover at leachate seep.

Photo No. 3: View of Travis County Landfill erosion of cover.

Photo No. 4: View of Travis County Landfill leachate seep.

Carter : Burgess

Consultants in Civil Engineering, Architecture, Construction Management and Related Services

February 16, 1999

Project No. 98-3268-010

Ms. Sherry Jones
City of Austin
Department of Public Works and Transportation
Architectural and Engineering Services
One Texas Center, 505 Barton Springs Road
Austin, Texas 78704

City of Austin
Private Landfill Environmental Assessment
CIP Project No. 5040-150-3210
Travis County, Texas

Dear Ms. Jones:

We have completed our assessment of the Austin Community Landfill (ACL), Texas Disposal Systems Landfill (TDS), and Browning-Ferris Industries Sunset Farms Landfill (BFI) sites located in Travis County being considered by the City of Austin for disposal of Municipal Solid Waste (MSW) collected by its residential and commercial solid waste collection programs, as well as MSW generated by other City departments. The scope of work, findings, and conclusions of our assessment are described in the attached report.

This work was authorized by the Professional Services Agreement entered into between the City of Austin and Carter & Burgess dated January 11, 1999. Subconsultants utilized by Carter & Burgess in the performance of this assessment include Baer Engineering and Environmental Consulting, Inc., ECO Southwest Environmental Corporation, and Pardue & Associates, Attorneys at Law.

Please note that six copies of the report contain a second binder which is an expanded Appendix B containing tables of the groundwater analytical data for the three landfills.

Carter & Burgess appreciates this opportunity to be of service to the City of Austin. Should you have any questions or comments regarding this report, please do not hesitate to call me (512-314-3165) or Clyde Bays (713-803-2149).

Sincerely,

CARTER & BURGESS, INC.

Craig M. Carter, P.G.
Project Manager

Clyde V. Bays, Ph.D., P.E.
Manager of Environmental Services
and Associate

Attachments: City of Austin Private Landfill
Assessment Report (35 Copies)

CITY OF AUSTIN
PRIVATE LANDFILL ENVIRONMENTAL ASSESSMENT
CIP PROJECT NO. 5040-150-3210
TRAVIS COUNTY, TEXAS

Prepared by:

CARTER & BURGESS, INC.
ENVIRONMENTAL SERVICES DIVISION
Barton Oaks Plaza V, Suite 200
901 South MoPac Expressway
Austin, Texas

Prepared for:

The City of Austin
Department of Public Works and Transportation
Architectural and Engineering Services
One Texas Center
505 Barton Springs Road
Austin, Texas 78704

CLYDE V. BAYS, Ph.D., P.E.
MANAGER OF ENVIRONMENTAL SERVICES
AND ASSOCIATE

CRAIG M. CARTER, P.G.
PROJECT MANAGER

C&B PROJECT NO. 98-3268-010

February, 1999

EXECUTIVE SUMMARY

The City of Austin, Architectural and Engineering Services Division, Department of Public Works and Transportation, contracted with Carter & Burgess to perform an assessment of the environmental safety of the Austin Community Landfill (ACL), Texas Disposal Systems Landfill (TDS), and Browning-Ferris Industries Sunset Farms Landfill (BFI) sites located in Travis County. Carter & Burgess' team, which includes ECO-Southwest Environmental Corporation, Baer Engineering and Environmental Consulting, Inc., and Pardue & Associates, Attorneys at Law collected and performed technical review of all data available from TNRCC files, landfill records, and third party sources for these sites. Visual inspections of the landfill sites were also performed.

For this assessment, Carter & Burgess' team reviewed available information pertaining to permitting and siting of the various landfills, landfill design and construction, operating and regulatory compliance history, and the results of groundwater and methane gas monitoring programs. Meetings were also held with current and former landfill personnel, TNRCC representatives, and neighborhood associations in order to gather information needed to evaluate the environmental safety of the various sites. The Environmental Protection Agency (EPA) Region VI Office in Dallas was contacted concerning the status of the Petition for NPL Listing filed by concerned citizens for the ACL. Present environmental impacts, possible future impacts, potential migration pathways, overall environmental risks to groundwater and surface water, and other potential liabilities were evaluated for each landfill based on the information collected during our assessment. This information as well as the findings, conclusions, and recommendations arising from our assessment are discussed in various sections of the attached report.

As part of this assessment, we also reviewed changes in federal and state regulations in effect at different intervals throughout the past 35 years pertaining to Municipal Solid Waste (MSW) disposal facilities. A number of significant regulatory changes have occurred in the area of solid waste management, although the basic concepts as to proper siting, design and construction, and operation of landfills has remained essentially the same over the years.

A summary of the significant findings and observations made for each landfill is presented below.

Austin Community Landfill

Early in the life of the ACL site, the regulatory requirements for landfilling of MSW were in their early stages. Permission was requested and granted by the Texas Department of Health (TDH) to dispose of industrial waste at the Industrial Waste Materials Management (IWMM) site located within the boundaries of the landfill with few requirements stipulated except for cover thickness and clay keyways to control lateral seepage. After the IWMM site was closed and the ACL site continued to operate as a MSW landfill, formal regulations were written to manage the disposal of MSW.

The former IWMM site was operated during times when there were minimal technical requirements for liners and no prohibitions on landfilling drummed industrial or bulk industrial liquids. The portion of the site where these activities took place was not adequately protective of the environment and as a result there is a high probability that some environmental impacts may have resulted from the operations. Since the promulgation of the earliest landfill regulations and requirements, the MSW portion of the ACL site has been operated in general compliance with the regulations in existence at the time. Even when operated during times when there were no liner requirements, the MSW landfilling operations at the ACL site likely had minimal impact on the environment because of the low permeability typically associated with the Taylor Formation

Clays.

Potential groundwater impacts were historically reported in two monitoring wells located adjacent to the former IWMM site. These monitoring wells have not been sampled in recent times. There was no quantitative groundwater discovered in our assessment data that indicates the former IWMM site is currently causing environmental impacts. Groundwater on the MSW portion of the ACL site has been impacted by organic compounds. However, the recently detected organic compounds appear restricted to the western portion of the property at low concentrations and are likely associated with landfill gas as is typical of MSW landfills.

Data reviewed as part of this assessment showed no indication of impacts to surface water. However, based on the apparent leachate seeps observed adjacent to the unnamed tributary to Walnut Creek in the Phase 1 MSW area, surface water could potentially be impacted. Leachate management to reduce the hydraulic head in the adjacent closed Travis County Landfill and Phase 1 area should be performed before plans for additional cover are implemented.

Possible future impacts to the ACL site include lateral migration of leachate from the Phase 1 area into the unnamed tributary to Walnut Creek, and vertical and lateral migration of leachate from the former IWMM site. The existing Subtitle D monitoring program should be sufficient to detect and monitor groundwater impacts in the Weathered Taylor before they migrate offsite. However, no monitoring system has been put in place which could detect current or future vertical (downward) migration of solvents from the IWMM site. Although the possibility for vertical migration of contaminants from this site to the underlying groundwater is considered to be relatively low, the potential for impacts still exists. Given the above, the unknown contents and condition of the 21,000 buried drums at the former IWMM site presents a potential environmental risk. As long as the industrial waste remains buried at it's current location it will be a source of environmental risk. Operations on the remainder of the ACL facility appear to be protective of groundwater and surface water.

Methane will continue to be generated at the ACL site and should be managed throughout the life of the landfill. The Landfill Gas Recovery System appears to be effective at controlling the gas generated by the landfilled waste at this time.

A Petition for National Priority Listing (NPL) has been filed with the EPA Region VI Office for property now owned by Waste Management of Texas but not included in the TNRCC Permit currently in effect for the ACL. This property is the approximate site of the former IWMM facility, and was excluded from the currently active MSW landfill by virtue of a permit amendment approved in 1981. A Preliminary Assessment of this site has been completed, but the results of the assessment and any subsequent actions which may be taken by the EPA or other state agencies is unknown at this time.

BFI Sunset Farms Landfill

The Sunset Farms site is currently and historically has operated in substantial accordance with applicable state and federal MSW regulations established for Type I landfills. A limited area of organic impacts to groundwater is present near the southwest corner of the site. This area of impacts appears related to the landfill activities on the adjacent ACL site. Data reviewed as part of this assessment showed no indication of impacts to surface water. The Landfill Gas Recovery System and electric generating facility which has been in operation for two years are apparently effective at controlling gas buildup within the landfill.

BFI appears to be operating the Sunset Farms Landfill in a responsible manner protective of groundwater and surface water. The potential for future impacts to groundwater or surface water at the Sunset Farms Landfill is considered to be relatively low. Although the organic impacts detected in groundwater on the southwest portion of the property appear related to the ACL site, the Sunset Farms Landfill might be considered a potential source of contamination and be required to defend itself, if groundwater on surrounding properties was found to be impacted.

TDS Landfill

The TDS Landfill has been in operation for about 8 years. The original design specified in-situ soil liners for the landfill bottom and unweathered clay sidewalls. Weathered sidewall areas were to be lined with a minimum of 3 feet of compacted clay. The original final cover design consisted of 1.5 feet of compacted clay overlain by 1 foot of topsoil. A leachate collection system was not included in the original design. In 1994, the final cover design was changed to 4 feet of topsoil over 1.5 feet of compacted clay. Leachate collection systems were also installed in the post-Subtitle D sectors of the landfill.

Based on documents reviewed during this assessment, the TDS was constructed and has been operated in accordance with applicable regulatory requirements. No present groundwater impacts were observed or indicated by this assessment. Further, no evidence of surface water impacts was found. In addition, there is no evidence of landfill gas reaching the property boundary. TDS appears to be a very responsible operator and has implemented measures which appear to be protective of groundwater and surface water at the site.

Recommendations

It is the Carter & Burgess team's opinion that the former IWMM site at the ACL poses a substantial environmental risk and potential future liability to the owners and users of the site. Specific recommendations are made in ***Section 8*** of our report concerning further monitoring and investigations needed at the site in order to detect potential past and future releases to the environment.

Recommendations are also made to sample leachate seeps at the Phase 1 site on the ACL property as well as seeps on the Travis County Landfill to determine potential impacts to surface water in the tributary to Walnut Creek.

Carter & Burgess' team recommends removal and proper disposal of the waste at the former IWMM site in order to eliminate or substantially reduce the environmental risk associated with the site.

A recommendation is also made that the ACL work with Travis County to reduce leachate buildup in the Phase 1 area by operating the leachate recovery system in the Travis County Landfill in order to lower leachate levels in both areas.