

Third Five-Year Review Report
for the
Geneva Industries
Superfund Site
Houston, Harris County, Texas

September 2008



PREPARED BY:

United States Environmental Protection Agency
Region 6
Dallas, Texas



857294

**THIRD FIVE-YEAR REVIEW
GENEVA INDUSTRIES
SUPERFUND SITE
EPA ID# TXD980748453
Houston, Harris County, Texas**

This memorandum documents the United States Environmental Protection Agency's (EPA) performance, determinations, and approval of the Geneva Industries Superfund Site Third Five-Year Review, provided in the attached Third Five-Year Review Report prepared by the United States Army Corps of Engineers on behalf of EPA.

Summary of Five-Year Review Findings

The results of the Third Five-Year Review indicate that the remedy completed to date is currently protective of human health and the environment. Overall, the remedial actions performed are functioning as designed, and the site has been maintained appropriately. No deficiencies were noted that impact the protectiveness of the remedy, although several issues were identified that require further action to ensure the continued long-term protectiveness of the remedy.

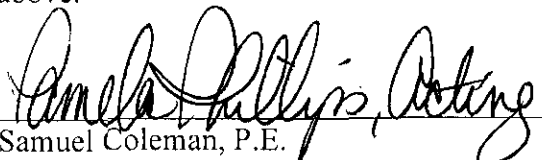
Actions Needed

In order to remain protective for the long-term, the following actions are required:

- Groundwater elevation measurements should be made at least quarterly.
- Well MW-26 should be monitored quarterly instead of annually. The TCE degradation products cis-1,2-dichloroethene (DCE) and vinyl chloride should be added to the MW-26 analyte list for two sampling events, and then reevaluated.
- Well MW-102 should be monitored for PCBs quarterly.
- The groundwater monitoring of shallow wells within the slurry wall should be resumed on an infrequent (every one or two years) basis. The wells to be sampled and the frequency of sampling should be determined by the Texas Commission on Environmental Quality (TCEQ).
- Continue to operate the pump and treat system to maintain an inward gradient across the slurry wall.
- Continue sampling the 100-foot sand unit. If contamination increases above acceptable levels, then additional action will be proposed.
- Update the O&M plan as necessary to incorporate the above recommendations.
- Institutional controls should be established for the site.
- Monitoring wells should be secured and locked.

Determinations

I have determined that the remedy for the Geneva Industries/Fuhrmann Industries Superfund Site is protective of human health and the environment in the short term, and will remain so provided the action items identified in the Third Five-Year Review Report are addressed as described above.



Samuel Coleman, P.E.

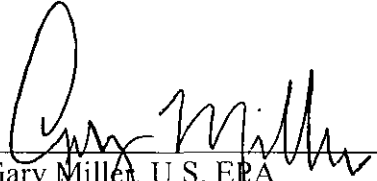
Director
Superfund Division


9/23/08


Date

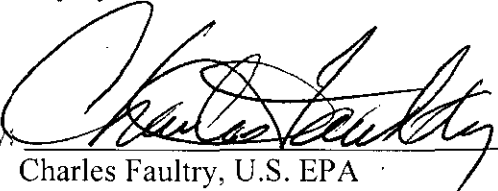
CONCURRENCES

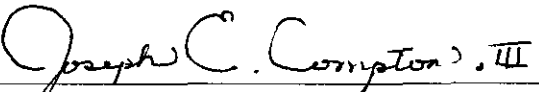
FIVE-YEAR REVIEW
Geneva Industries Superfund Site
EPA ID# TXD980748453

By:  _____ Date: 9/10/08
Gary Miller, U.S. EPA
Remedial Project Manager

By:  _____ Date: 9/10/08
Carlos Sanchez, U.S. EPA
Section Chief, Arkansas/Texas Section

By:  _____ Date: 9/10/08
Don Williams, U.S. EPA
Deputy Associate Director, Remedial Branch

By:  _____ Date: 9/10/08
Charles Faultry, U.S. EPA
Associate Director, Remedial Branch

By:  _____ Date: 9/11/08
Joseph Compton, U.S. EPA
Attorney, Office of Regional Counsel

By:  _____ Date: 09/16/08
Mark Peycke, U.S. EPA
Chief, Superfund Branch, Office of Regional Counsel

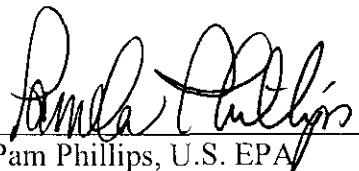
By:  _____ Date: 9/23/08
Pam Phillips, U.S. EPA
Deputy Director, Superfund Division

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List of Acronyms

ARARs	Applicable or Relevant and Appropriate Requirements
bgs	below ground surface
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COCs	Contaminants of Concern
CFR	Code of Federal Regulations
CWM	Chemical Waste Management, Inc.
DCE	Dichloroethene
DNAPL	Dense Nonaqueous Phase Liquid
EPA	Environmental Protection Agency
ESD	Explanation of Significant Differences
LNAPL	Light Nonaqueous Phase Liquid
MCL	Maximum Contaminant Level
mg/l	milligrams per liter
msl	mean sea level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&G	Oil and Grease
O&M	Operation and Maintenance
OUs	Operable Units
PAH	Polynuclear Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
ppb	parts per billion
ppm	parts per million
RA	Remedial Action
RAO	Remedial Action Objectives
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
TBC	To Be Considered
TCE	Trichloroethene
TCEQ	Texas Commission on Environmental Quality
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
TPDES	Texas Pollutant Discharge Elimination System
TWC	Texas Water Commission
WATEC	Waste Abandonment Technologies, Inc.
µg/L	micrograms per liter

Executive Summary

The third Five-Year Review of the Geneva Industries Superfund Site located in Houston, Harris County, Texas was completed in September 2008. The results of the Five-Year Review indicate that the remedy completed to date is currently protective of human health and the environment in the short term. However, there were several deficiencies that were identified that require further action to ensure the continued long-term protectiveness of the remedy.

The Geneva Industries site was a petrochemical production facility from 1967-1978. The facility produced a variety of organic compounds including polychlorinated biphenyls (PCBs). After the site closed, the U.S. Environmental Protection Agency (EPA) originally organized the work for this site into two Operable Units (OUs): soil (OU-1) and groundwater (OU-2). The Record of Decision (ROD) for the site was signed September 18, 1986.

A cutoff slurry wall that surrounds the perimeter of the site is in place to help prevent migration of affected groundwater from inside the wall, with inward gradients across the wall maintained by a groundwater extraction system. The operations and maintenance (O&M) of the site is ongoing; O&M activities include pumping of affected groundwater, treatment and discharge onsite of the extracted groundwater, performance and compliance monitoring to ensure the remedial action continues to perform as planned, and maintenance of the cap, slurry wall, and onsite groundwater treatment plant.

The remedy for the OU-1 (soil) at the Geneva Industries site is protective of human health and the environment because the waste has been removed or contained and is protected from erosion. The remedy for the OU-2 (groundwater) is protective of human health and the environment in the short term because there is no evidence that there is current exposure. In order to remain protective for the long term, the following recommendations should be implemented:

- Groundwater elevations should be measured at least quarterly.
- Well MW-26 should continue to be monitored quarterly for the current analyte list with the addition of cis-1,2-DCE and vinyl chloride for two sampling events, and then reevaluated.
- Well MW-102 should continue to be monitored quarterly for PCBs.
- The groundwater monitoring of shallow wells within the slurry wall should be resumed on an infrequent (every one or two years) basis. The wells to be sampled and the frequency of sampling should be determined by TCEQ.
- Continue to operate the pump and treat system to maintain an inward gradient across the slurry wall.
- Continue sampling the 100-foot sand unit. If contamination increases above acceptable levels, then additional action will be proposed.
- Update the O&M plan as necessary to incorporate the above recommendations.
- Institutional controls should be implemented.
- Monitoring wells should be secured and locked.

Five Year Review Summary Form

SITE IDENTIFICATION		
Site name (from WasteLAN): Geneva Industries/Fuhrmann Energy Superfund Site		
EPA ID (from WasteLAN): TXD980748453		
Region: EPA Region 6	State: Texas	City/County: Houston/Harris County
SITE STATUS		
NPL status: <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify)		
Remediation status (choose all that apply): <input type="checkbox"/> Under Construction <input type="checkbox"/> Operating <input checked="" type="checkbox"/> Complete		
Multiple OUs? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Construction completion date: 1993	
Has site been put into reuse? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
REVIEW STATUS		
Lead agency: <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency _____		
Author name: EPA Region 6, with support from USACE Tulsa District		
Review period:** January 2008 to August 2008		
Date(s) of site inspection: 3 / 18 / 2008		
Type of review: <input checked="" type="checkbox"/> Statutory <input type="checkbox"/> Policy <input type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal only <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> NPL State/Tribe-lead <input type="checkbox"/> Regional Discretion		
Review number: <input type="checkbox"/> 1 (first) <input type="checkbox"/> 2 (second) <input checked="" type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify) _____		
Triggering action: <input type="checkbox"/> Actual RA Onsite Construction <input type="checkbox"/> Actual RA Start <input type="checkbox"/> Construction Completion <input checked="" type="checkbox"/> Previous Five-Year Review Report <input type="checkbox"/> Other (specify)		
Triggering action date (from WasteLAN): September 25, 2003 (date of signing of last Five-year Review)		
Due date (five years after triggering action date): September 25, 2008 (five years after 2 nd review)		

*OU refers to operable unit

Five-Year Review Summary Form, cont'd.

Issues: The following issues were identified:

- 1) Groundwater elevation measurements were measured annually, except in 2007 when the groundwater elevations were measured quarterly. This left large gaps in time between measurements in which an inward gradient may not be maintained, as happened in 2006.
- 2) Trichloroethene concentrations in MW-26 were above their respective RAOs, and TCE degradation products cis-1,2-DCE and vinyl chloride concentrations are unknown.
- 3) Certain PCB isomers were detected in the last sampling event, January 2007.
- 4) No institutional controls are in place.
- 5) During the site inspection, it was noted that several monitoring wells were not locked.

Recommendations and Follow-up Actions: The following recommendations were made:

- 1) Groundwater elevation measurements should be made at least quarterly.
- 2) Well MW-26 should be monitored quarterly instead of annually. The TCE degradation products cis-1,2-DCE and vinyl chloride should be added to the MW-26 analyte list for two sampling events, and then reevaluated.
- 3) Well MW-102 should be monitored for PCBs quarterly.
- 4) The groundwater monitoring of shallow wells within the slurry wall should be resumed on an infrequent (every one or two years) basis. The wells to be sampled and the frequency of sampling should be determined by TCEQ.
- 5) Continue to operate the pump and treat system to maintain an inward gradient across the slurry wall.
- 6) Continue sampling the 100-foot sand unit. If contamination increases above acceptable levels, then additional action will be proposed.
- 7) Update the O&M plan as necessary to incorporate the above recommendations.
- 8) Institutional controls should be established for the site.
- 9) Monitoring wells should be secured and locked.

Protectiveness Statement(s): Because the completed remedial actions and monitoring program for the Geneva Industries site are protective in the short term, the remedy for the site is protective of human health and the environment and will continue to be protective if the action items identified in this report are addressed.

Other Comments: The site is well maintained.

1.0 Introduction

The purpose of a Five Year Review is to determine how well an existing remedial action is operating in order to protect human health and the environment, and to identify any problems or concerns that are affecting or may in the future affect the protectiveness of the remedy. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) call for Five-Year Reviews of certain remedial actions. The EPA policy also calls for a Five-Year Review of remedial actions in some other cases. The statutory requirement to conduct a Five-Year Review was added to CERCLA as part of the Superfund Amendments and Reauthorization Act (SARA) of 1986. The EPA classifies each Five-Year Review as either statutory or policy depending on whether it is being required by statute or is being conducted as a matter of policy. The Five-Year Review for the Geneva Industries site is required by statute.

As specified by CERCLA and the NCP, statutory reviews are required for sites where, after remedial actions are complete, hazardous substances, pollutants, or contaminants will remain onsite at levels that will not allow for unlimited use or unrestricted exposure. Statutory reviews are required for such sites if the Record of Decision (ROD) was signed on or after the effective date of SARA. CERCLA §121(c), as amended by SARA, states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.

Under the NCP, the Code of Federal Regulations (CFR) states, in 40 CFR §300.430(f)(4)(ii):

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

The Geneva Industries Superfund Site is organized into two Operable Units (OUs): one for soil (OU-1) and one for groundwater (OU-2). The ROD was signed in September 1986. The Five-Year Review for the Geneva Industries site is required by statute because materials remain onsite above levels that allow for unlimited use and unrestricted exposure. Because the Geneva Industries site is a Superfund site, the EPA has regulatory authority. The triggering action for this review is five years from the last Five-Year Review. The last Five-Year Review was accepted by the EPA on September 25, 2003. This is the third Five-Year Review for the Geneva Industries site and was conducted for the period of January 2008 through August 2008 by the U.S. Army Corps of Engineers, Tulsa District, on behalf of EPA Region 6.

2.0 Site Chronology

A chronology of events and dates is included in **Table 1**, provided at the end of the report.

3.0 Background

This section describes the physical setting of the site, a description of the land and resource use, and the environmental setting. This section also describes the history of contamination associated with the site, the initial response actions taken, and the basis for each action.

3.1 Physical Characteristics

The Geneva Industries site is approximately 13.5 acres and is located at 9334 Canniff Road in Houston, Texas. The site is less than 1 mile east of Interstate Highway 45 and approximately 2 miles east of Hobby Airport. Approximately 8,352 people live within 1 mile of the site and some residences are located less than 50 feet from the site boundary. The site and surrounding area are flat and have a maximum surface elevation of approximately 35 feet above mean sea level (msl). The site is drained by the Harris County Flood Control District Channel, which runs along the eastern boundary of the site. The channel flows in a northerly direction into Berry Bayou (EPA, 1986).

Five subsurface stratigraphic units have been identified beneath the site: (1) an upper silty clay and clay unit ranging from 0 to 19 feet below ground surface (bgs), (2) a sandy silt to silty sand unit (referred to as the 30-foot sand unit) extending from 19 to 35 feet bgs, (3) a clay unit extending from 35 to a maximum of 62 feet bgs, (4) a sand unit extending from 62 to a maximum of 140 feet bgs (referred to as the 100-foot sand unit), and (5) a lower clay unit that is approximately 100 feet thick and that begins between 107 and 140 feet bgs. The groundwater-bearing units below the site are the 30-foot sand unit and the 100-foot sand unit, which are both part of the upper Chicot Aquifer. The upper unit of the Chicot Aquifer is a minor water supply aquifer. The groundwater flow direction in the 30-foot sand unit was determined to be to the east toward the flood control channel. The groundwater flow direction in the 100-foot sand unit was reported to be to the west and southwest in the second 5-Year Review, but has not been evaluated since then.

3.2 Land and Resource Use

The primary land uses near the site are industrial and residential. No significant future change in land use near the site is anticipated. According to the Texas Water Development Board's database, the closest active well to the site is a domestic well located 0.59 miles northwest of the site. It is 286 feet

deep and completed in the Chicot Aquifer. There is also a City of South Houston public supply well field located 0.6 miles east-northeast from the site with well depths ranging from 600 feet to 1305 feet.

3.3 History of Contamination

Prior to 1967, the Geneva Industries site was used for petroleum exploration and production. Between 1967 and 1978, Geneva Industries operated a petrochemical production facility at the site. The facility produced a variety of organic compounds, including biphenyl, polychlorinated biphenyls (PCBs), phenyl phenol, naphtha, and No. 2 and 6 fuel oils. Geneva Industries began production of PCBs in June 1972 before declaring bankruptcy in November 1973. Pilot Industries operated the facility from February 1974 to December 1976. Intercoastal Refining owned the facility from December 1976 to December 1980, however, the facility ceased operation in September 1978. Facility operations never resumed. Lonestar Fuel Co. owned the property from December 1980 to May 1982. The current site owners are Fuhrmann Energy, Pasadena Independent School District, and Mrs. M.B. Arnett (who owns track 10 of Parcel 144)

As of 1981, the site and adjoining property to the south contained processing tanks and piping, a large wastewater lagoon, two smaller lagoons, a closed lagoon holding solid PCB-containing wastes, a diked tank area, several drum storage areas, a landfill, and a possible landfarm. As a result of past practices at the site, extensive soil and shallow groundwater contamination existed at the site.

3.4 Initial Response

A preliminary site investigation conducted by EPA revealed PCB concentrations of up to 9,000 parts per million (ppm) in soil at the site and up to 104 ppm in sediment in the adjacent flood control channel. PCBs and other organic compounds were also detected in groundwater samples collected from on-site groundwater monitoring wells. Based on the results of the investigation, the site was scored using the Hazard Ranking System and was proposed for inclusion to the National Priorities List (NPL) in September 1983. The site was placed on the NPL in September 1984.

A Planned Removal was performed by EPA from October 1983 to February 1984 to close out all three lagoons, remove all drummed waste on the surface, remove all off-property soils containing greater than 50 ppm PCBs, install a cap over all on-property soils containing greater than 50 ppm PCBs, and improve site drainage. Approximately 3,400 cubic yards of contaminated soil and sludge, 550 drums of waste, and 30 tons of asbestos were removed and transported to an approved facility in Emelle, Alabama. Other removal actions to plug abandoned wells and remove storage tank materials were performed in May and September 1984, respectively. The total cost of the removal actions performed was \$1,748,179. Fuhrmann Energy salvaged equipment from the site in 1984 and 1985.

A Remedial Investigation/Feasibility Study (RI/FS) was performed from September 1984 to December 1985. Soil borings and monitoring wells were installed on and off site during the RI.

On September 18, 1986, the ROD was signed for the Geneva Industries site. The ROD called for source control and groundwater remediation, and is further discussed in section 4.1. In May 2007, an Explanation of Significant Differences (ESD) was published that included institutional controls as part of the remedy.

3.5 Summary of Basis for Taking Action

Based on the data collected during the RI, it was determined that actual or threatened releases of hazardous substances from the Geneva Industries site, if not addressed by implementing the remedy selected in the ROD, could present an imminent and substantial endangerment to public health, welfare, or the environment.

4.0 Remedial Actions

This section provides a description of the remedial action objectives (RAO), selection, and implementation. It also describes the ongoing O&M, and the overall progress made at the Geneva Industries site. As previously described, the site was initially divided into two OUs; soil (OU-1) and groundwater (OU-2).

4.1 Remedial Action Objectives

The EPA signed the ROD for the Geneva Industries site on September 18, 1986. Specific remedial objectives were developed to aid in the development and screening of remedial action (RA) alternatives for the site. The remedial objectives for the Geneva Industries site are listed below:

- Prevent future contamination of the adjacent flood control channel.
- Minimize direct contact with contaminated soil on-site.
- Prevent degradation of off-site soil.
- Prevent further degradation of off-site groundwater in the 30-foot sand unit and reduce the risk of degradation of deeper sand units.
- Reduce contamination in the 100-foot sand unit.

In July 1993, the EPA issued an Explanation of Significant Differences that raised the remedial goal for TCE from 0.001 milligrams per liter (mg/L) to 0.005 mg/L, bringing it in line with the promulgated

Maximum Contaminant Level (MCL) for trichloroethene (TCE) (EPA, 1993). Another ESD was issued by the EPA May 2007, which added institutional controls to the selected remedy.

4.2 Remedy Selection

The remedy selected in the ROD included eight major components (1) remove and dispose of all surface facilities, (2) plug and abandon unnecessary monitoring wells, (3) excavate PCB-contaminated soil, (4) excavate all buried drums, (5) dispose of excavated materials off-site, (6) construct a slurry wall, (7) construct a permanent protective cap, and (8) recover and treat TCE contaminated groundwater (EPA 1998).

4.3 Remedy Implementation

Remedy implementation is discussed in terms of (1) source control and (2) groundwater remediation.

4.3.1 Source Control

On April 8, 1988, the Texas Water Commission (TWC) awarded the Superfund RA contract for OU-1 (the first seven of the eight major components of the selected remedy) to Chemical Waste Management, Inc. ENRAC-South (CWM). The TWC issued the notice to proceed to CWM on May 23, 1988, during the final preconstruction conference, and CWM began RA construction on May 24, 1988.

CWM performed the contract work until October 7, 1988, when TWC issued a delay notice for shipping of waste material. On October 21, 1988, the U.S. District Court for the Middle District of Alabama, Northern Division, issued a temporary restraining order. This order was appealed and resolved by the courts by June 7, 1989. On June 14, 1989, TWC issued a directive to CWM to resume performance of the contract by June 26, 1989, after a delay of approximately nine months. Transport of site waste to the Emelle, Alabama, disposal facility began on July 2, 1989, and continued through September 1989.

The RA for OU-1 was completed on September 28, 1990, when EPA approved the OU-1 RA report. Deviations from the ROD were stated in the July 1993 ESD (EPA, 1993). The 2007 ESD added institutional controls as part of the remedy (EPA, 1993).

The ROD estimate was that PCB concentrations in 22,500 cubic yards of soil would exceed the remedial goal of 100 ppm PCBs. At the completion of the source control remedial construction in September 1989, approximately 38,900 cubic yards of contaminated soil, a 73% exceedence over the ROD estimate, had been disposed off-site. The volume of PCB-contaminated soil at the site was not discovered until the RA was well underway, and soil tests indicated that more contaminated soil needed to be removed than was foreseen based on the information developed during the RI.

In addition, one portion of the selected remedy was disposal of all on-site drums in an off-site facility. However, during excavation, additional drums were found in three separate areas. Drums containing polynuclear aromatic hydrocarbons (PAH) were found in the slurry wall excavation and also in the anchor trench excavation. These drums were placed in the backfill beneath the permanent protective cap and remain on-site. Other drums, whose contents were not identified, but were referred to as PCB-contaminated material, were encountered during excavation in a third area and were also left on-site beneath the permanent protective cap.

The final remedial cost of the source control RA was \$20,624,984. All remedial objectives for OU-1 identified in the ROD were met by implementation of the remedy. The constructed OU-1 remedy is operational and is performing in accordance with engineering specifications.

4.3.2 Groundwater Remediation

On July 22, 1992, TWC awarded the RA contract for OU-2, the eighth major component of the selected remedy, to Waste Abatement Technologies, Inc. (WATEC). TWC issued a notice to proceed to WATEC on December 21, 1992. WATEC constructed 13 recovery and monitoring wells, 1,878 linear feet of aboveground supported piping, a treatment building containing an activated carbon filtration system, six 30,000-gallon storage tanks, related foundation facilities, service utilities, monitoring controls, asphalt paving, and fencing at the site. The recovery well system consists of nine recovery wells completed in the 30-foot sand unit, and one recovery well completed in the 100-foot sand unit (EPA 1998). **Figure 2** is a site layout map showing the monitoring and recovery well locations.

The RAO for TCE in on-site groundwater was established as 1.0 microgram per liter ($\mu\text{g/L}$) in the ROD. However, this remedial goal was later changed in the 1993 ESD to achieve the MCL of 5 $\mu\text{g/L}$.

Construction of the groundwater recovery and treatment system was completed on April 22, 1993. The treatment system was put into commission to verify that the discharge criteria could be met. By the end of June 1993, seven approved discharge events had occurred, which indicated that the treatment system was performing as designed. The treatment phase of the groundwater RA began on July 1, 1993. A post-remediation O&M plan dated July 1993 established the O&M activities that were implemented at the site.

Major groundwater recovery and treatment system modifications, including addition of a heavy-oil separator, related piping changes, charcoal filter material replacement, and system cleaning, were completed in September 1994. Groundwater recovery was performed in both the 30-foot sand unit and the 100-foot sand unit. Toward the end of 1999, several of the recovery wells were out of service because of lack of maintenance, and WATEC was repeatedly notified to remedy deficiencies and bring

the system back on-line. After numerous problems and periods of unscheduled system shutdowns, WATEC's contract was terminated in October 1999.

The current contractor, Shaw Environmental, Inc., was hired by the Texas Commission on Environmental Quality (TCEQ) in 2004 to rebuild the system and maintain the site. Groundwater pumping was resumed in the 30-foot sand unit intermittently in 2007, and on a regular basis in 2008. Groundwater pumping in the 100-foot sand unit was not resumed since the 100-foot sand unit continues to be in compliance and pumping would only increase the potential for downward migration from the 30-foot sand unit. Should contaminant levels in the 100-foot sand unit increase, this may indicate that contamination from the 30-foot sand unit has broken through the clay aquitard, in which case additional actions may be required. Currently, the operation involves pumping groundwater in order to maintain an inward gradient across the barrier wall. Groundwater elevation maps are created from sampling events to track the gradient (Figures 3 - 11). The remedy is primarily containment with engineering control coupled with a lesser remediation component (groundwater extraction and treatment). Approximately 30,000 gallons per month are pumped and treated. DNAPL is also being recovered in the process.

Monitoring well MW-26, a downgradient well in the 30-foot sand unit located outside of the slurry wall, has had TCE levels above the RAO. A previous study (*Corrigan, 1998*) noted that MW-26 has been contaminated since installation in early 1993. Contamination there may be the result of residual contamination outside of the slurry wall. The report also noted that the slurry wall may be leaking based on simulation modeling results. Recent results for this well show that TCE concentrations were low (7 µg/L) to non-detect in 2005 and 2006, but that the groundwater gradient was outward during this period. Subsequently, the concentration increased to 150-165 µg/L during 2007. In 2007, the groundwater pumping system was restarted intermittently and an inward gradient was re-established. As a result, the TCE concentration reduced to 7.1-32.5 µg/L in late 2007 and early 2008. It can be expected that the contaminants will be drawn back inside the slurry wall if an inward gradient is maintained. Because of the possible leaky slurry wall and the historic results at MW-26, it is important that an inward groundwater gradient be maintained.

4.4 Operations and Maintenance

Currently, approximately 30,000 gallons per month are pumped and treated in order to maintain an inward gradient across the barrier wall. As such, this acts primarily as an engineering control with a minor component of groundwater remediation. Groundwater is being pumped from the extraction wells and treated before being discharged to the flood control channel. The pumps are operated part of the month until the holding tanks are filled, and then shut down until discharge confirmation samples show that the treated water meets surface discharge requirements.

The groundwater is treated by passing it through a sediment trap followed by an oil/water separator to separate Light Nonaqueous Phase Liquid (LNAPL), Dense Nonaqueous Phase Liquid (DNAPL), and water. The water then passes through a bag filter followed by a carbon filter before being stored in a holding tank until lab results are received (Figure 12). If the lab results show that the concentrations of contaminants are below acceptable effluent levels, the groundwater is discharged to the flood control channel. Otherwise, the groundwater is re-treated until effluent levels are met. EPA effluent guidelines, 40 CFR 414, and Texas Water Quality Standards, 31 TAC 307, are used to determine effluent limits. O&M costs incurred by Shaw during the period of performance for the third five-year review have been approximately \$130,000 annually.

5.0 Progress Since Last Review

This section reviews the protectiveness statement and issues and recommendations from the last Five-Year Review, which was the second Five-Year Review for the Geneva Industries site. The status of the recommendations made in that report are also reviewed and discussed.

5.1 Protectiveness Statements from Last Review

The protectiveness statement from the last Five-Year Review is given as follows:

Based on the information available during the second five-year review, the selected remedy for the Geneva Industries site is currently protective of human health and the environment in the short term. However, site data and observations indicate that the long-term protectiveness of the remedy may be threatened.

5.2 Status of Recommendations

The previous Five-Year Review report stated that the remedy continues to be protective of human health and the environment in the short term. Ten issues, however, were identified that could potentially require further actions. The previous Five-Year Review recommended that these issues be monitored and re-evaluated to determine if they would adversely impact operations at the site. A summary of the issues and the re-evaluation and actions taken at the Geneva Industries site since the previous Five-Year Review are given below (*TetraTech, 2003*):

1. **Issue:** Recovery wells requiring maintenance: Recovery wells RW-4 and RW-6 were not properly covered. The well head covers should be replaced on RW-4 and RW-6 to eliminate infiltration of precipitation and surface runoff. According to Weston's 2003 report, RW-6 was obstructed in January

2003 and could not be sampled. The nature of the obstruction should be determined and the well should be cleared. If RW-6 cannot be cleared, it should be properly abandoned.

Actions: Well head covers for RW-4 and RW-6 have been replaced. RW-6 has been cleared and was sampled in January 2005 and January 2006.

- Issue:** Protective cap surface conditions: Numerous fire ant mounds were observed on the protective cap. The fire ants may burrow deep enough through the cap to create a conduit between the ground surface and the buried wastes. Fire ants can construct deeper tunnels in clay soils such as those used in the protective cap as opposed to sandy soils. Fire ant tunnels have been found in clay soils up to depths of 10 feet (U of A, 2003). The fire ant mounds should be mitigated.

Actions: Fire ant mounds have been mitigated through repeated application of insecticides during mowing of the protective cap.

- Issue:** Surface water protection issues: If the recovery well system is reactivated, discharges to the Harris County Flood Control District Channel should be monitored for all Contaminants of Concern (COCs) to meet the substantive requirements of Texas Pollution Discharge Elimination System (TPDES) criteria.

Actions: Off-site discharge criteria are monitored. Groundwater pumped from the recovery wells is held in holding tanks and tested to see if it meets the TPDES criteria before any discharge occurs.

- Issue:** Drums requiring proper disposal: According to Weston's 2003 report, six 55-gallon drums remain on-site and require proper disposal if the drums contain waste.

Actions: Drums have been transported off-site and disposed.

- Issue:** Groundwater elevations requiring monitoring: Survey data are not available for all the site monitoring and recovery wells, thus no potentiometric surface map have been generated. Well elevations should be surveyed so that groundwater elevations can be determined and monitored closely. Groundwater elevations should be monitored to determine whether an inward gradient to the protective cap area across the slurry wall is maintained so that contaminated groundwater does not migrate through the slurry wall.

Actions: Groundwater elevations are measured annually, except in 2007 when they were monitored quarterly.

- Issue:** Monitoring groundwater on-and off-site for all COCs: In order to determine that the remedy is protective to standards now in effect and based on-site historical and analytical data, PCBs, TCE, 1,1-dichloroethene (DCE), cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride should all be monitored in site groundwater. Drums containing PCBs are buried within the protective cap area. TCE is also present in the groundwater. TCE degradation products (1,1- DCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride) have not been monitored; however, they may be present in groundwater because of natural degradation of TCE. Vinyl chloride is more toxic than TCE and should be monitored in groundwater. Downgradient wells in the lower aquifer should be monitored for PCBs, TCE, and TCE degradation products.

Actions: Deeper wells are being monitored for benzene, toluene, ethylbenzene, and xylene (BTEX), TCE, and PCBs. TCE degradation products will be monitored in future sampling events.

7. **Issue:** Detection limits for some COCs exceeding MCLs: In order to determine that the remedy is protective to standards now in effect, laboratory analytical methods for downgradient wells in the lower aquifer should be adjusted to achieve analytical detection limits below the appropriate MCLs.

Actions: Quantitation limits are equal to or less than the MCLs, and in most cases, are less than one-half of the MCLs.

8. **Issue:** TCE's toxicity currently being reviewed by EPA: TCE is currently being subjected to a lifetime exposure carcinogenicity assessment, and the threat that it poses at the site should be re-evaluated after further information becomes available.

Actions: There has been no new change to the TCE toxicity data.

9. **Issue:** Groundwater substantive requirements: Groundwater monitoring should be performed in accordance with the substantive requirements of 30 TAC 335.163 to include development of a groundwater sampling and analysis plan to establish a consistent groundwater monitoring approach.

Actions: A Sampling and Analysis Plan has not been prepared although sampling procedures are discussed in the O&M Manual.

10. **Issue:** No formal institutional controls: Institutional controls should be established for the site to prohibit use of groundwater and to eliminate the potential for destruction of the protective cap by excavation.

Actions: EPA issued an ESD in May 2007 to add institutional controls to the remedy. TCEQ is currently working to implement the institutional controls for the site.

6.0 Five-Year Review Process

This Five-Year Review has been conducted in accordance with the EPA's Comprehensive Five-Year Review Guidance (*EPA, 2001*). The Five-Year Review for this site was initiated by the EPA which tasked the U.S. Army Corps of Engineers to perform the technical components of the multidisciplinary review. The scheduled completion date for this review is September 25, 2008; five years after completion of the last Five-Year Review. Interviews were conducted with relevant parties; a site inspection was conducted; and applicable data and documentation covering the period of the review were evaluated. The findings of the review are described in the following sections.

6.1 Community Involvement

A public notice announcing initiation of the Five-Year Review was published in the Houston Chronicle on October 11, 2007. Upon signature, the Five-Year Review will be placed in the information repositories for the site, including the M.D. Anderson Library at the University of Houston and the TCEQ office in Austin, Texas. A notice will be published in the Houston Chronicle to summarize the findings of the review and

announce the availability of the report at the information repositories. A copy of the first public notice is provided as **Attachment 6** to this report.

6.2 Document Review

This Five-Year Review included a review of relevant site documents, including decision documents, construction and implementation reports, quarterly and annual reports, and related monitoring data. Documents that were reviewed are listed in **Attachment 1**.

6.3 Data Review

Compliance monitoring data collected as part of the operations and maintenance were reviewed as part of this Five-Year Review. The data consist of groundwater quality data and groundwater level measurements. In 2004, the monitoring and recovery well system was repaired and restarted. Groundwater quality data and groundwater elevations were collected annually in 2005 and 2006, and were collected quarterly in 2007 and will be collected quarterly in 2008. The Groundwater Annual Reports from 2005 to 2006, and the data from the 2007 and January 2008 sampling event were reviewed for this report.

Groundwater elevation data was collected in January 2005, January 2006; February, May, June, October, December 2007; January and February 2008. Groundwater elevation maps for these sampling events are seen in **Figures 3 through 11**. The potentiometric surface maps, as drawn, are not conclusive due to insufficient data points. Inspection of the groundwater data showed that an inward gradient was maintained most of the time. The October 2007 map (Figure 8) shows groundwater inside the wall draining to the west, with no recovery well at the center of the drainage. The contour map requires that groundwater goes somewhere, and with no continuously operating recovery well to extract it, it is either flowing laterally or down into the next aquifer. Therefore, as drawn, Figure 8 also shows lack of containment. Additionally, the January 2005 and February 2007 maps (Figures 3 and 5) show outward gradients: to the east in January with west being indeterminable due to lack of data, and to the east and west in February with no evidence to support the interpretation shown on the north side. With respect to vertical gradients, available data indicate that there is a strong downward gradient. In order to establish containment, gradients should be inward. The groundwater gradient is downward from the 30-foot sand unit to the 100-foot sand unit, but the 100-foot sand unit monitoring wells do not have any detectable TCE contaminant levels. Should contaminant levels in the 100-foot sand unit increase, this may indicate that contamination from the 30-foot sand unit has broken through the clay aquitard, in which case additional actions may be required such as establishing an upward gradient or resumption of pumping in the 100-foot sand unit.

Groundwater quality data for the monitoring wells were collected January 2005, January 2006, January 2007, May 2007, October 2007, and January 2008. The monitoring wells sampled were MW-8, MW-10, MW-11, MW-17, MW-22, MW-23, MW-24, MW-25, MW-26, and MW-102. In addition, groundwater quality data for the recovery wells were collected January 2005 and January 2006. The recovery wells are RW-1, RW-2, RW-3, RW-4, RW-5, RW-6, RW-7, RW-8, RW-9, and RW-10. All of the wells were sampled and analyzed for BTEX, trichloroethene, total dissolved solids (TDS), oil and grease (O&G), total organic carbon (TOC), and PCBs. A summary of the data results is given in **Attachment 5** and water levels are in Attachment 6.

The monitoring well analytical results are summarized below. There was not enough data from the recovery wells to determine any trends in changes in concentration. The ROD did not specify any RAOs except for TCE. This was established as 5 ppb (parts per billion) in the 1993 ESD.

Benzene –Results from all wells were non-detect except for the May 2007 result for well MW-102 (0.0013 mg/L) and all results, except January 2005, for well MW-26.

Toluene –The majority of the results were non-detect with a few scattered detections in well MW-26.

Ethylbenzene –The majority of the results were non-detect. Detections occurred relatively consistently in wells MW-26 and MW-102.

Xylene –The majority of the results were non-detect. Detections occurred relatively consistently in wells MW-26 and MW-102.

Trichloroethene –The majority of the results were non-detect. The only detections were in well MW-26. Well MW-26 had concentrations above the RAO during the January 2006, January 2007, May 2007, and January 2008 sampling events.

Oil and Grease –The results have been non-detect for the last two sampling events.

PCBs –PCBs were analyzed as separate Aroclor isomers. The majority of the results were non-detect. Wells MW-26 and MW-102 showed detections of Aroclor-1221 and Aroclor-1232 a during the January 2008 sampling event. Due to the lack of mobility of PCBs, it is likely that these detections are anomalous. Nevertheless, these parameters should be closely watched in the future.

6.4 Interviews

An interview was conducted with the site O&M manager, Russell Perry, during the site visit conducted on March 18, 2008. The TCEQ Project Manager, Barry Lands, submitted an interview form in July 2008 via e-mail. The completed interview record forms are presented in **Attachment 2**.

6.5 Site Inspection

An inspection was conducted at the site on March 18, 2008. The completed site inspection checklist is provided in **Attachment 3**. Site inspection tasks included a visual inspection of site features including the

water treatment facility, the cap, monitoring wells, fences and gates, and the treatment plant monitoring equipment and protocol. During the site inspection, an interview was conducted with the site manager, and the site logs, documents, and records were reviewed. Photographs taken during the Geneva Industries site inspection are provided in **Attachment 4**. The site inspection indicated that the remedy was effective and operating as intended. No concerns were noted. The inspection was conducted by Cliff Murray of the U.S. Army Corps of Engineers. He was accompanied by Russell Perry (Geneva Industries site manager), Will Hudgins (Geneva Industries site staff), and Barry Lands (TCEQ Project Manager).

7.0 Technical Assessment

The Five-Year Review must determine whether the remedy at a site is protective of human health and the environment. The EPA guidance describes three questions used to provide a framework for organizing and evaluating data and information, and to ensure all relevant issues are considered when determining the protectiveness of a remedy.

7.1 Question A: Is the Remedy Functioning as Intended by the Decision Documents?

The documents that detail the remedial decisions for the site are the September 1986 ROD, the September 1986 ESD, the July 1993 ESD, and the May 2007 ESD. The remedy is ongoing, and based on the data review, the site inspection, and interviews; the remedy is functioning as intended by the decision documents since the resumption of the pump and treat operations in the 30-foot sand unit. Remedial action performance and monitoring results, O&M operations, and O&M costs are discussed in Sections 4 and 6. Opportunities for optimization, early indicators of potential remedy problems, and implementation of institutional controls are discussed below.

Opportunities for Optimization. Opportunities for recovery and treatment system optimization exist. Groundwater monitoring should be optimized to provide enough data to assess the quality of site groundwater. Specifically, steps should be taken to produce more reliable potentiometric data of the groundwater such as more frequent measurements. The current groundwater data suggests that a downward gradient exists rather than an upward gradient. The 100-foot sand unit continues to be monitored. Currently, no TCE has been detected in this aquifer. Additional actions will be taken if contaminant levels in the 100-foot sand unit increase. The groundwater monitoring of shallow wells within the slurry wall have not been sampled since January 2006 and, therefore, sampling should be resumed on an infrequent (every one or two years) basis. The wells to be sampled and the frequency of sampling should be determined by the regulatory community.

Early Indicators of Potential Remedy Problems. Groundwater elevation data do not show that a negative gradient has been consistently maintained within the cutoff barrier and thus preventing contaminated groundwater from leaving the slurry wall. Better groundwater elevation data needs to be collected in order to be able to determine early on whether a problem with contaminated groundwater leaving the property exists.

Groundwater quality data shows that detections of benzene, ethylbenzene, toluene, and TCE occurred in monitoring well MW-26. The concentrations for TCE in this well have also been above the RAO of 0.005 mg/L for a majority of the sampling events. Since MW-26 is a monitoring well outside of the slurry wall adjacent to the Harrison County Flood Control District Channel, these observations may indicate a failure in the slurry wall and extraction system to contain the contaminated groundwater. The groundwater quality data also show that PCB isomers Aroclor-1221 and Aroclor-1232 in monitoring wells MW-26 and MW-102 were detected during the latest (January 2008) sampling event. This may be a one-time anomaly but the data from future sampling events should be closely watched.

Implementation of Institutional Controls. The May 2007 ESD mandated institutional controls as part of the remedy. No institutional controls are currently established for the site. Institutional controls should be established to prohibit use of groundwater and to maintain cap integrity.

7.2 Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives (RAOs) Used at the Time of the Remedy Selection Still Valid?

The purpose of this question is to evaluate the effects of any significant changes in standards or assumptions used at the time of remedy selection. Changes in promulgated standards or "to be considered" (TBC) and assumptions used in the original definition of the remedial action may indicate that an adjustment in the remedy is necessary to ensure the protectiveness of the remedy.

Changes in ARARs. Applicable or Relevant and Appropriate Requirements (ARARs) for this site were identified in the ROD dated September 1986. They include:

- TCE concentrations less than 1.0 µg/L in the 30-foot sand unit.
- TCE concentrations less than 1.0 µg/L in the 100-foot sand unit.
- PCB concentrations less than 1.0 µg/L in surface water runoff.

The 1993 ESD changed the TCE ARAR for groundwater from 1.0 µg/L to 5.0 µg/L. There has been no further change in the TCE ARAR for groundwater.

The TCEQ and the Federal regulations have not been revised to the extent that the effectiveness of the remedy at the site would be called into question. The Texas Administrative Code Title 31, which deals with environmental regulations, is now codified under Title 30; however, no significant changes have been made that would question the site remedy effectiveness.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics. There have been no changes in exposure pathways, toxicity characteristics, or other contaminant characteristics for the Geneva Industries site. There has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy.

7.3 Question C: Has Any Other Information Come to Light That Could Call into Question the Protectiveness of the Remedy?

No other information has been identified that calls the protectiveness of the selected remedy into question with the exception of the lack of institutional controls as required by the 2007 ESD.

8.0 Issues

Several issues are identified for this site, as described in the following table.

No.	Issues	Affects Protectiveness (Y/N)	
		Current	Future
1	Groundwater elevations measurements were measured annually, except in 2007 when the groundwater elevations were measured quarterly. This left large gaps in time between measurements in which an inward gradient may not be maintained, as happened in 2006.	N	Y
2	TCE concentrations in MW-26 were above the RAO; and the presence of TCE degradation products is undetermined.	N	Y
3	Certain PCB isomers were detected in the last sampling event, January 2008.	N	Y
4	No institutional controls are in place.	N	Y
5	Several monitoring wells were not locked.	N	Y
6	Downward contamination from the 30-foot sand unit to the 100-foot sand unit is a concern.	N	Y

9.0 Recommendations and Follow-Up Actions

Recommended further actions are listed in the table below.

No.	Recommendations/Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
					Current	Future
1	Measure groundwater elevations at least quarterly	TCEQ	EPA	within 3 months of final report date	N	Y
2	Monitoring frequency for MW-26 should be increased to quarterly and the data used to determine if any of the detected analytes, particularly TCE, show an increasing or decreasing trend. Vinyl chloride and cis-1,2-DCE should be sampled and evaluated.	TCEQ	EPA	within 3 months of final report date	N	Y
3	Continue monitoring for MW-102 for PCBs quarterly	TCEQ	EPA	within 3 months of final report date	N	Y
4	Establish institutional controls for the site	TCEQ	EPA	within 12 months of final report date	N	Y
5	Ensure all wells are secure and locked.	TCEQ	EPA	within 3 months of final report date	N	Y
6	Continue to operate the pump and treat system to maintain an inward gradient across the slurry wall.	TCEQ	EPA	ongoing operation	N	Y
7	The groundwater monitoring of shallow wells within the slurry wall should be resumed on an infrequent (every one or two years) basis. The wells to be sampled and the frequency of sampling should be determined by TCEQ.	TCEQ	EPA	within 12 months of final report date	N	Y
8	Continue sampling the 100-foot sand unit. If contamination increases above acceptable	TCEQ	EPA	ongoing sampling	N	Y

	levels, then additional action will be proposed.					
9	Update the O&M plan as necessary to incorporate the above recommendations.	TCEQ	EPA	within 3 months of final report date	N	Y

10.0 Protectiveness Statement

The remedy for OU-1 concerning contaminated soil at the Geneva Industries site is protective of human health and the environment because the waste has been removed or contained and is protected from erosion. The remedy for OU-2 concerning contaminated groundwater is protective of human health and the environment in the short term because there is no evidence that there is current exposure. However, in order to remain protective for the long term, the recommendations listed in Section 9.0 should be implemented. Ongoing implementation of performance and compliance monitoring will ensure that the migration of contamination continues to be restricted.

Because the completed remedial actions and monitoring program for the Geneva Industries site are protective for the short term, the remedy for the site is protective of human health and the environment and will continue to be protective if the action items identified in this report are addressed.

11.0 Next Review

The next Five-Year Review, the fourth for this site, should be completed by September 2013. Key issues to be considered, in addition to the ongoing performance of the remedy, are:

- 1) Groundwater elevation measurements were measured annually, except in 2007 when the groundwater elevations were measured quarterly. This left large gaps in time between measurements in which an inward gradient may not be maintained, as happened in 2006.
- 2) TCE concentrations in MW-26 were above the RAO of 5 ppb.
- 3) Certain PCB isomers were detected in the last sampling event, January 2007.
- 4) No institutional controls are in place.
- 5) Several monitoring wells were not locked.

Figures and Tables



Figure 1. Geneva Superfund Site Aerial Photograph

DRAWING NUMBER
118831-B1

APPROVED BY

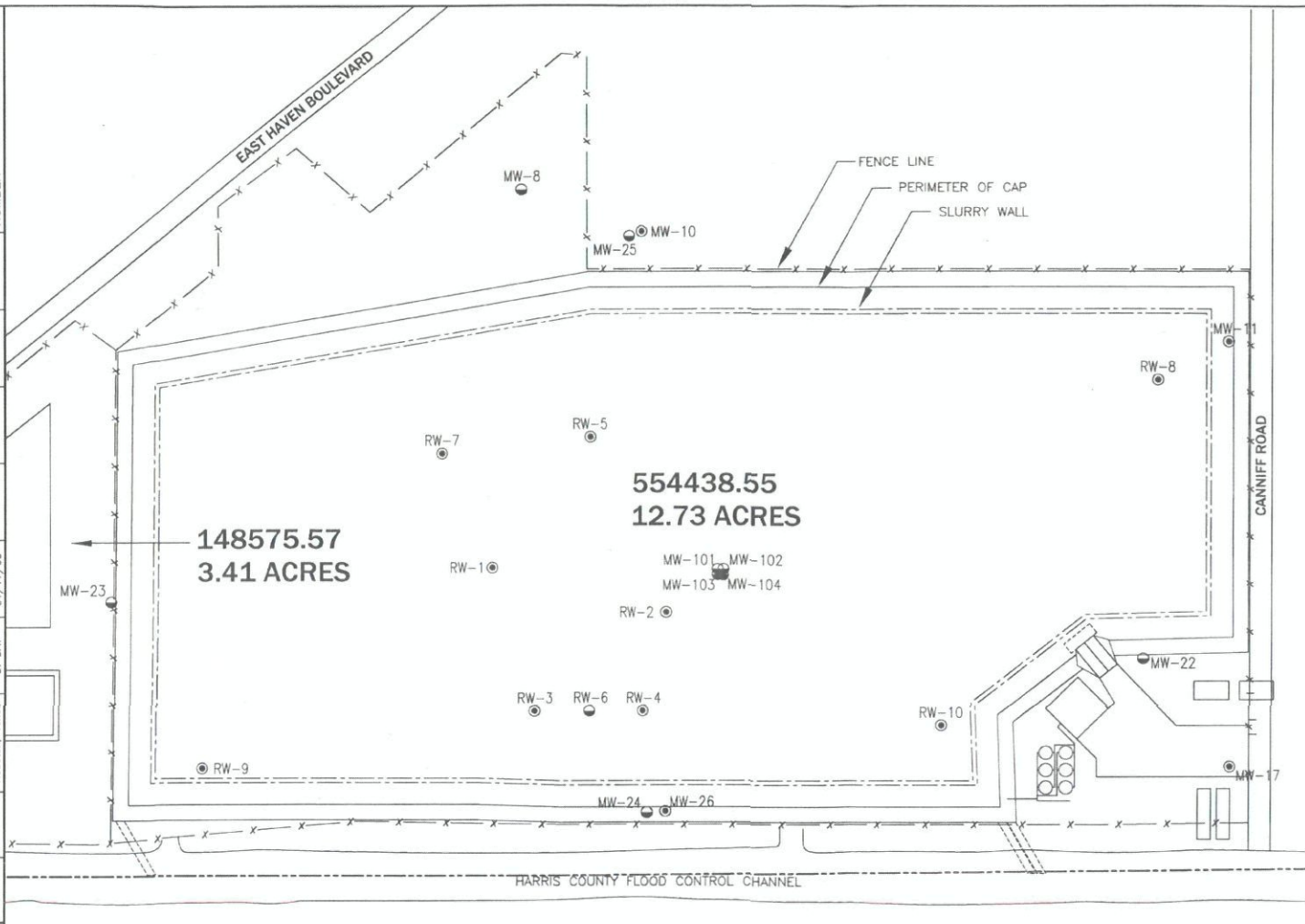
CHECKED BY

DRAWN BY
D. DAY
01/17/05

OFFICE
Houston, Texas

X-REF

PLOT DATE: 01/17/05
FORMAT REVISION: 3/25/99



- LEGEND:
- DEEP WELL
 - SHALLOW WELL
 - MW MONITORING WELL
 - RW RECOVERY WELL

NOTE:
1. AREA WITHIN FENCED PORTION OF SITE IS 12.6 ACRES.

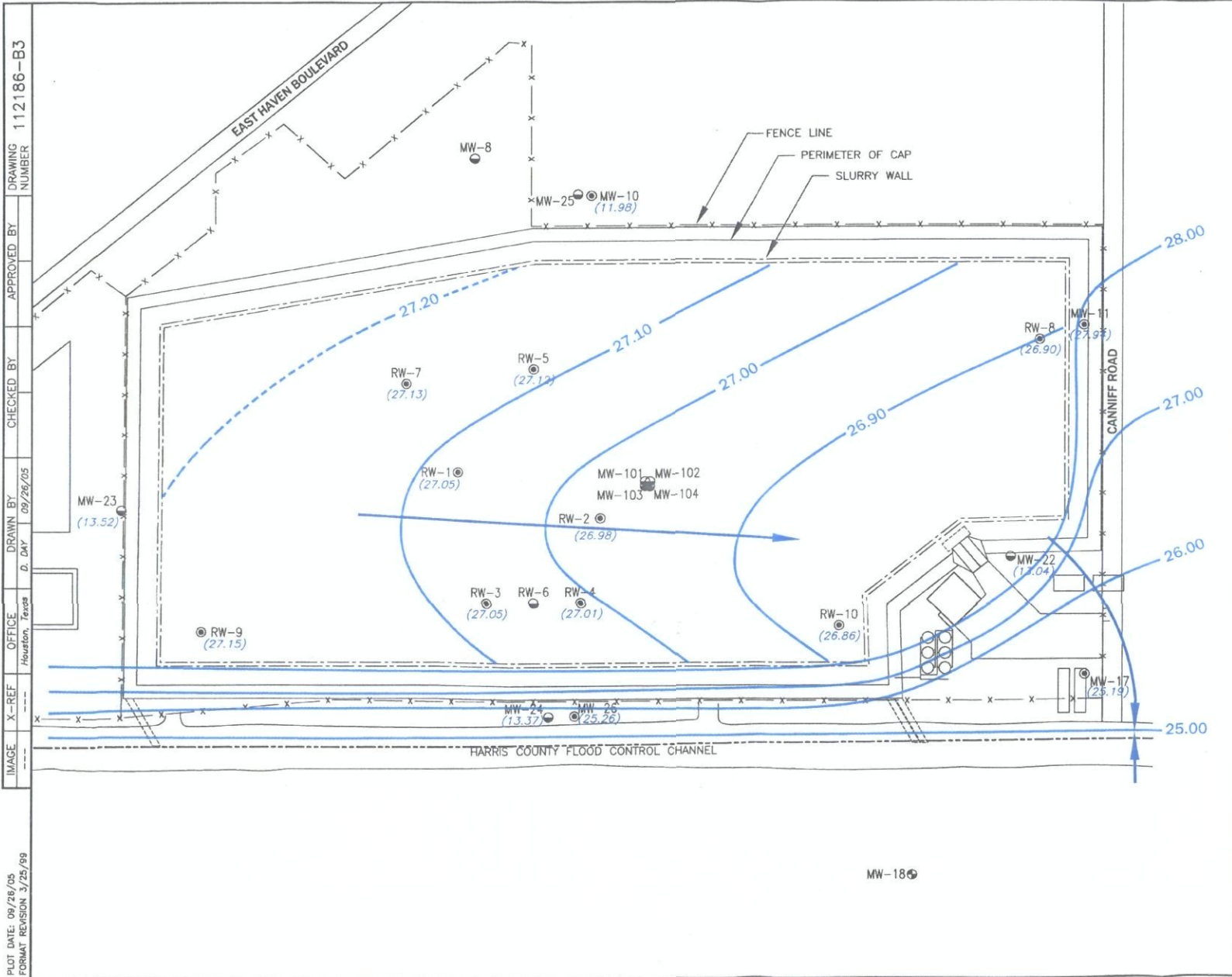


TEXAS COMMISSION OF ENVIRONMENTAL QUALITY
12100 PARK 35 CIRCLE BUILDING D
AUSTIN, TEXAS 78753

Figure 2

SITE LAYOUT MAP
GENEVA INDUSTRIES SITE
HOUSTON, TEXAS

MW-18



DRAWING NUMBER
112186-B3

APPROVED BY

CHECKED BY

DRAWN BY
D. DAY
09/26/05

OFFICE
Houston, Texas

X-REF

IMAGE

PLOT DATE: 09/28/05
FORMAT REVISION: 3/25/99



LEGEND:

- DEEP WELL
- SHALLOW WELL
- MW MONITORING WELL
- RW RECOVERY WELL
- ← GROUNDWATER FLOW DIRECTION
- POTENTIOMETRIC CONTOUR (INFERRED WHERE DASHED)

NOTES:

1. AREA WITHIN FENCED PORTION OF SITE IS 12.6 ACRES.
2. GROUNDWATER ELEVATIONS WERE MEASURED ON 1/11/05.



TEXAS COMMISSION OF ENVIRONMENTAL QUALITY
12100 PARK 35 CIRCLE BUILDING D
AUSTIN, TEXAS 78753

Figure 3
POTENTIOMETRIC SHALLOW WELLS MAP

GENEVA INDUSTRIES SITE
HOUSTON, TEXAS

DRAWING NUMBER
118831-B2

APPROVED BY

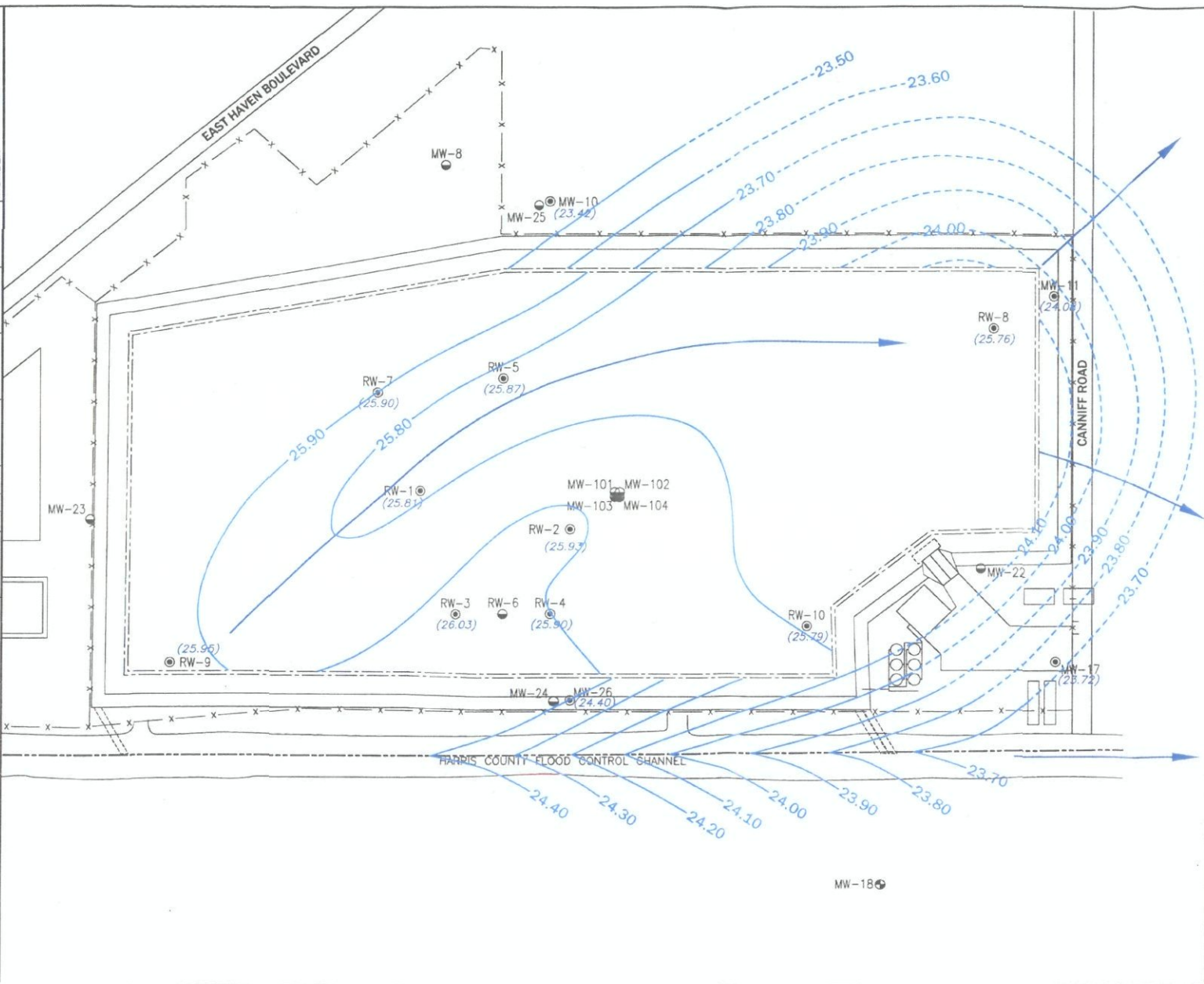
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DRAWN BY
J. RDZ 09/21/06

OFFICE
Houston, Texas

X-REF

IMAGE
PLOT DATE: 08/21/06
FORMAT REVISION: 3/25/99



- LEGEND:
- DEEP WELL
 - ⊙ SHALLOW WELL
 - MW MONITORING WELL
 - RW RECOVERY WELL
 - GROUNDWATER FLOW DIRECTION
 - POTENTIOMETRIC CONTOUR (INFERRED WHERE DASHED)
 - === SLURRY WALL

- NOTES:
1. AREA WITHIN FENCED PORTION OF SITE IS 12.6 ACRES.
 2. GROUNDWATER ELEVATIONS WERE MEASURED ON 1/23/06



TEXAS COMMISSION OF ENVIRONMENTAL QUALITY
12100 PARK 35 CIRCLE BUILDING D
AUSTIN, TEXAS 78753

Figure 4
POTENTIOMETRIC SHALLOW WELLS MAP
HOUSTON, TEXAS

DRAWING NUMBER 124518-B1

APPROVED BY L. DUTY 3/07/07

CHECKED BY M. BROWN 3/07/07

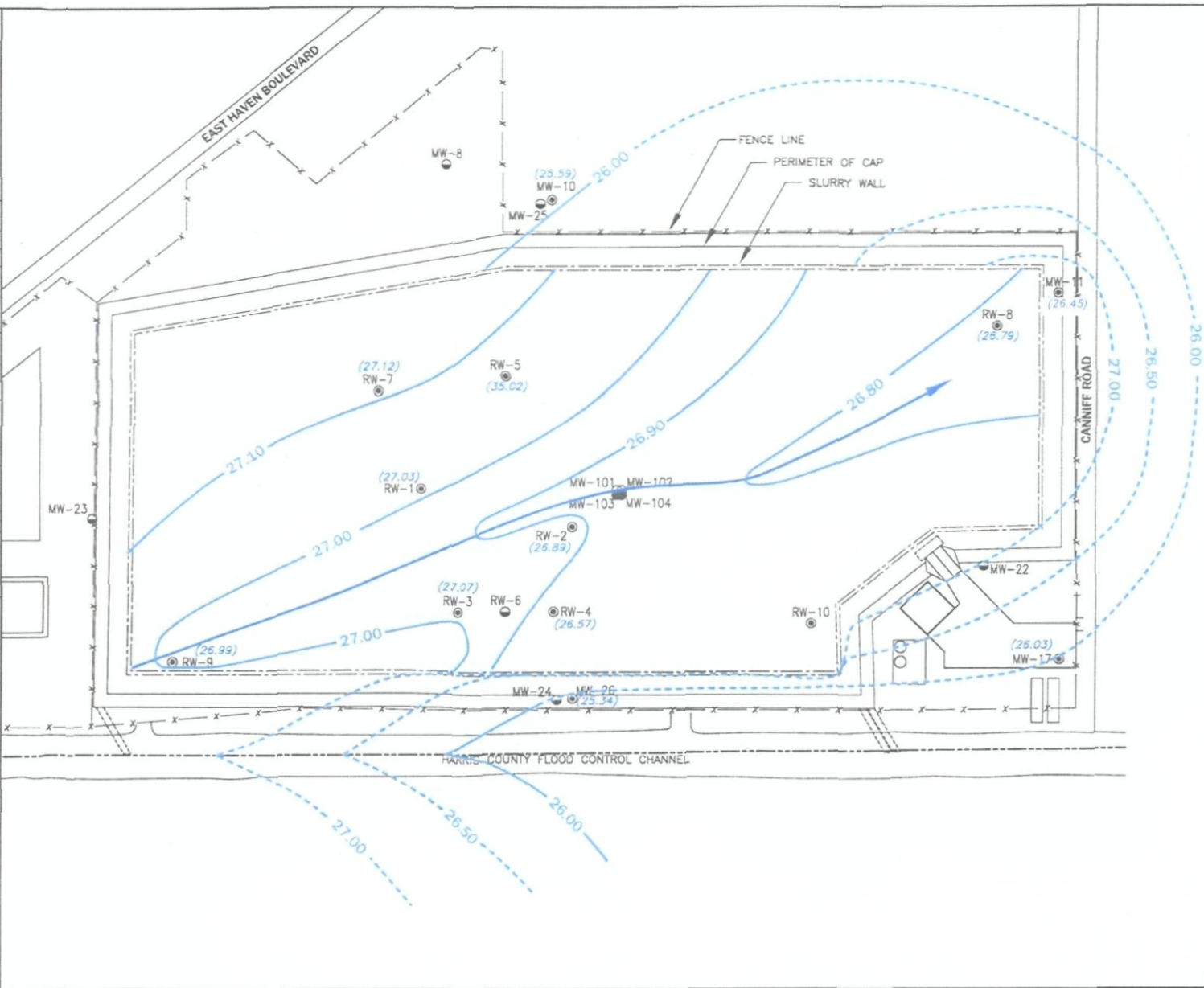
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OFFICE Houston, Texas

X-REF

IMAGE

PLOT DATE: 03/07/07
FORMAT REVISION 3/25/99



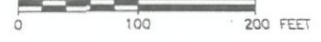
LEGEND:

- DEEP WELL
- ⊙ SHALLOW WELL
- MW MONITORING WELL
- RW RECOVERY WELL
- ➔ GROUNDWATER FLOW DIRECTION
- POTENTIOMETRIC CONTOUR (INFERRED WHERE DASHED)
- === SLURRY WALL

NOTES:

1. AREA WITHIN FENCED PORTION OF SITE IS 12.6 ACRES.
2. GROUNDWATER ELEVATIONS WERE MEASURED ON 2/13/07.
3. RW-5 HAD AN ANOMALOUS FIELD MEASUREMENT.
4. RW-10 WAS UNINTENTIONALLY NOT MEASURED IN THE FIELD.

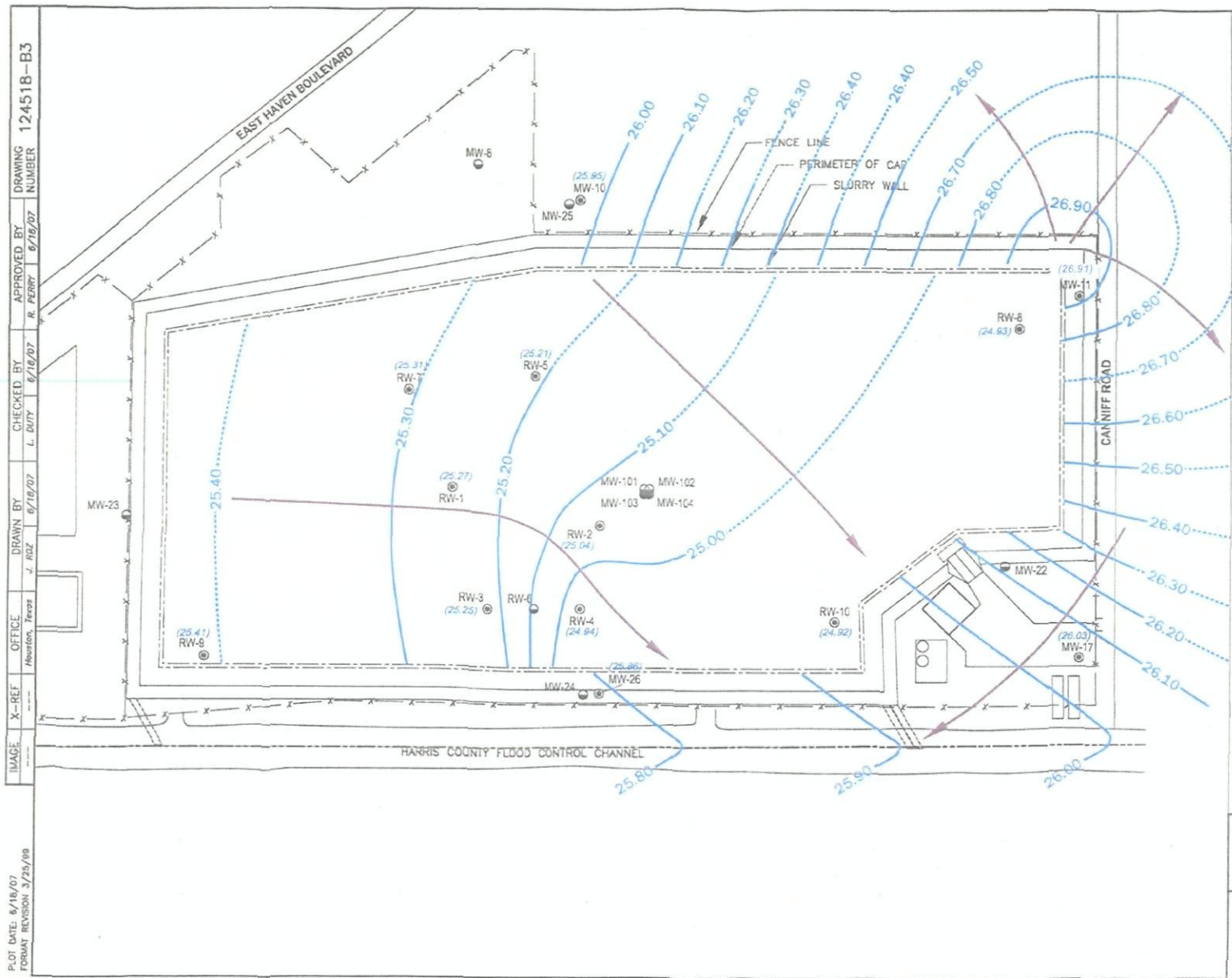
SCALE



TEXAS COMMISSION OF ENVIRONMENTAL QUALITY
12100 PARK 35 CIRCLE BUILDING D
AUSTIN, TEXAS 78753

Figure 5
POTENTIOMETRIC SHALLOW WELLS MAP
GENEVA INDUSTRIES SITE
HOUSTON, TEXAS

DRAWING NUMBER 12451B-B3
 APPROVED BY R. FEERY 6/15/07
 CHECKED BY L. BUTY 6/18/07
 DRAWN BY J. ROZ 6/19/07
 OFFICE Houston, Texas
 X-REF
 IMAGE
 PLOT DATE: 6/18/07
 FORMAT REVISION: 3/25/08



LEGEND:

- DEEP WELL
- ⊙ SHALLOW WELL
- MW MONITORING WELL
- RW RECOVERY WELL
- GROUNDWATER FLOW DIRECTION
- POTENTIOMETRIC CONTOUR (INFERRED WHERE DASHED)
- === SLURRY WALL

NOTES:

1. AREA WITHIN FENCED PORTION OF SITE IS 12.6 ACRES.
2. GROUNDWATER ELEVATIONS WERE MEASURED ON 5/24/07.



TEXAS COMMISSION OF ENVIRONMENTAL QUALITY
 12100 PARK 35 CIRCLE BUILDING D
 AUSTIN, TEXAS 78753

Figure 6
 POTENTIOMETRIC SHALLOW WELLS MAP
 GENEVA INDUSTRIES SITE
 HOUSTON, TEXAS

DRAWING NUMBER
124518-B3

APPROVED BY
R. PERRY 7/11/07

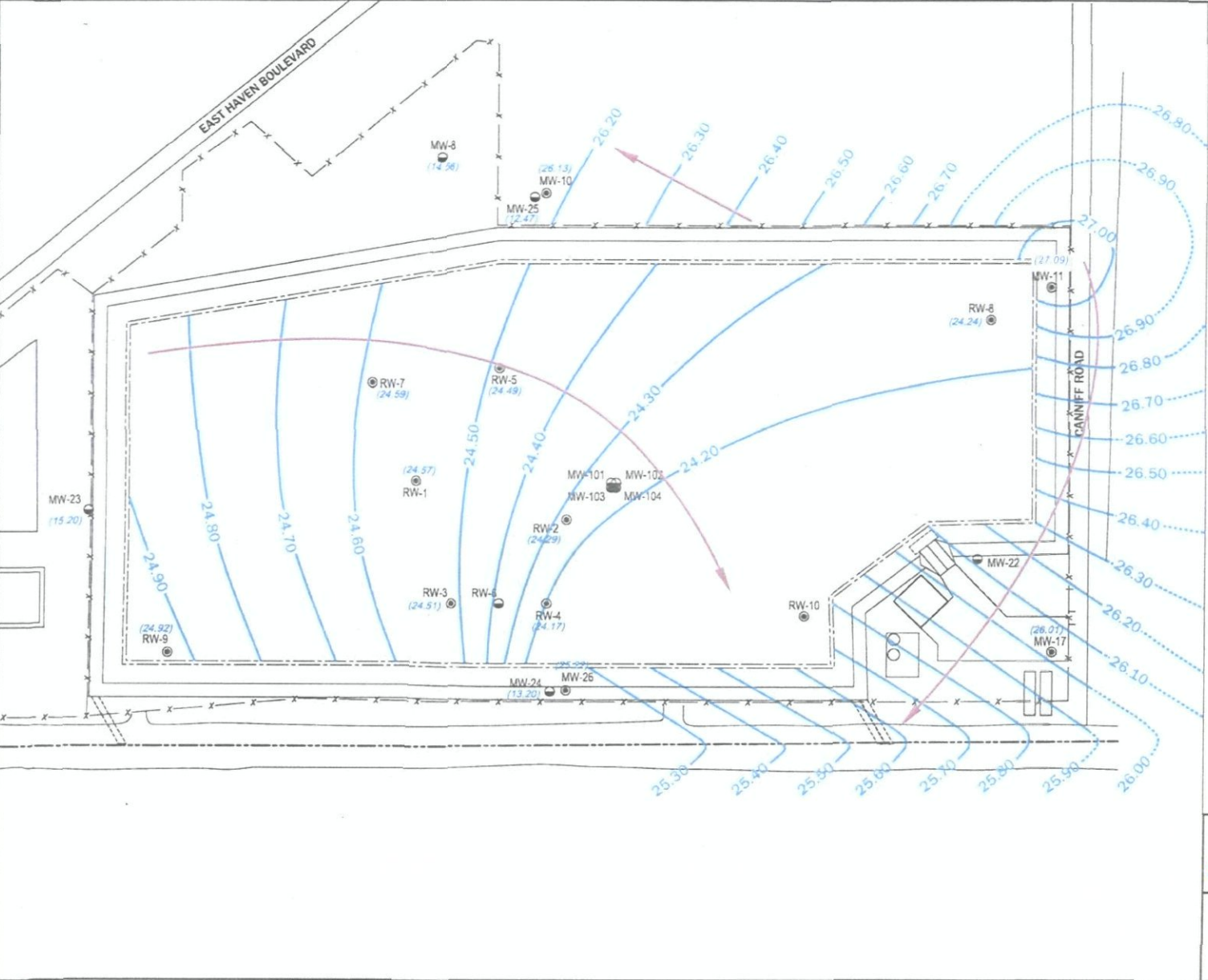
CHECKED BY
L. DUTY 7/11/07

DRAWN BY
J. ROZ 7/11/07

OFFICE
Houston, Texas

X-REF

IMAGE
PLOT DATE: 7/12/07
FORMAT REVISION: 3/25/99



LEGEND:

- DEEP WELL
- ⊙ SHALLOW WELL
- MW MONITORING WELL
- RW RECOVERY WELL
- GROUNDWATER FLOW DIRECTION
- POTENTIOMETRIC CONTOUR (INFERRED WHERE DASHED)
- SLURRY WALL

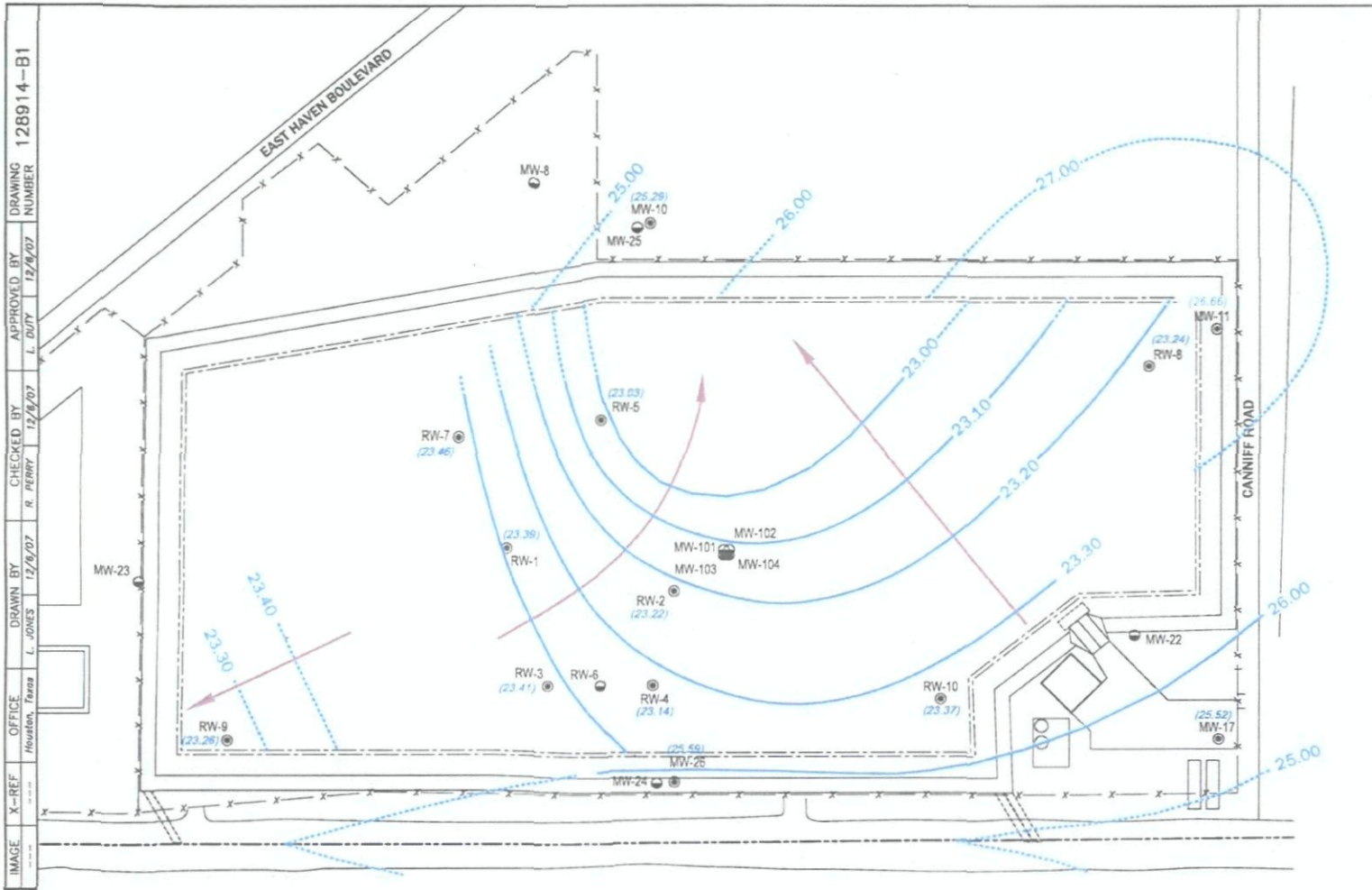
NOTES:

1. AREA WITHIN FENCED PORTION OF SITE IS 12.6 ACRES.
2. GROUNDWATER ELEVATIONS WERE MEASURED ON 6/22/07.



TEXAS COMMISSION OF ENVIRONMENTAL QUALITY
12100 PARK 35 CIRCLE BUILDING D
AUSTIN, TEXAS 78753

Figure 7
POTENTIOMETRIC SHALLOW WELLS MAP
GENEVA INDUSTRIES SITE
HOUSTON, TEXAS



DRAWING NUMBER: 128914-B1
 APPROVED BY: L. DOUTY 12/9/07
 CHECKED BY: R. PENNY 12/9/07
 DRAWN BY: L. JONES 12/9/07
 OFFICE: Houston, Texas
 X-REF:

PLOT DATE: 12/13/07
 FORMAT REVISION: 3/25/99



- LEGEND:
- DEEP WELL
 - ⊙ SHALLOW WELL
 - MW MONITORING WELL
 - RW RECOVERY WELL
 - GROUNDWATER FLOW DIRECTION
 - POTENTIOMETRIC CONTOUR (INFERRED WHERE DASHED)
 - SLURRY WALL

- NOTES:
1. AREA WITHIN FENCED PORTION OF SITE IS 12.6 ACRES.
 2. GROUNDWATER ELEVATIONS WERE MEASURED ON 10/08/07.





 TEXAS COMMISSION OF ENVIRONMENTAL QUALITY
 12100 PARK 35 CIRCLE BUILDING D
 AUSTIN, TEXAS 78753

Figure 8
 POTENTIOMETRIC SHALLOW WELLS MAP
 OCTOBER 2007
 GENEVA INDUSTRIES SITE
 HOUSTON, TEXAS

DRAWING NUMBER 128914-B2

APPROVED BY R. PERRY 01/09/08

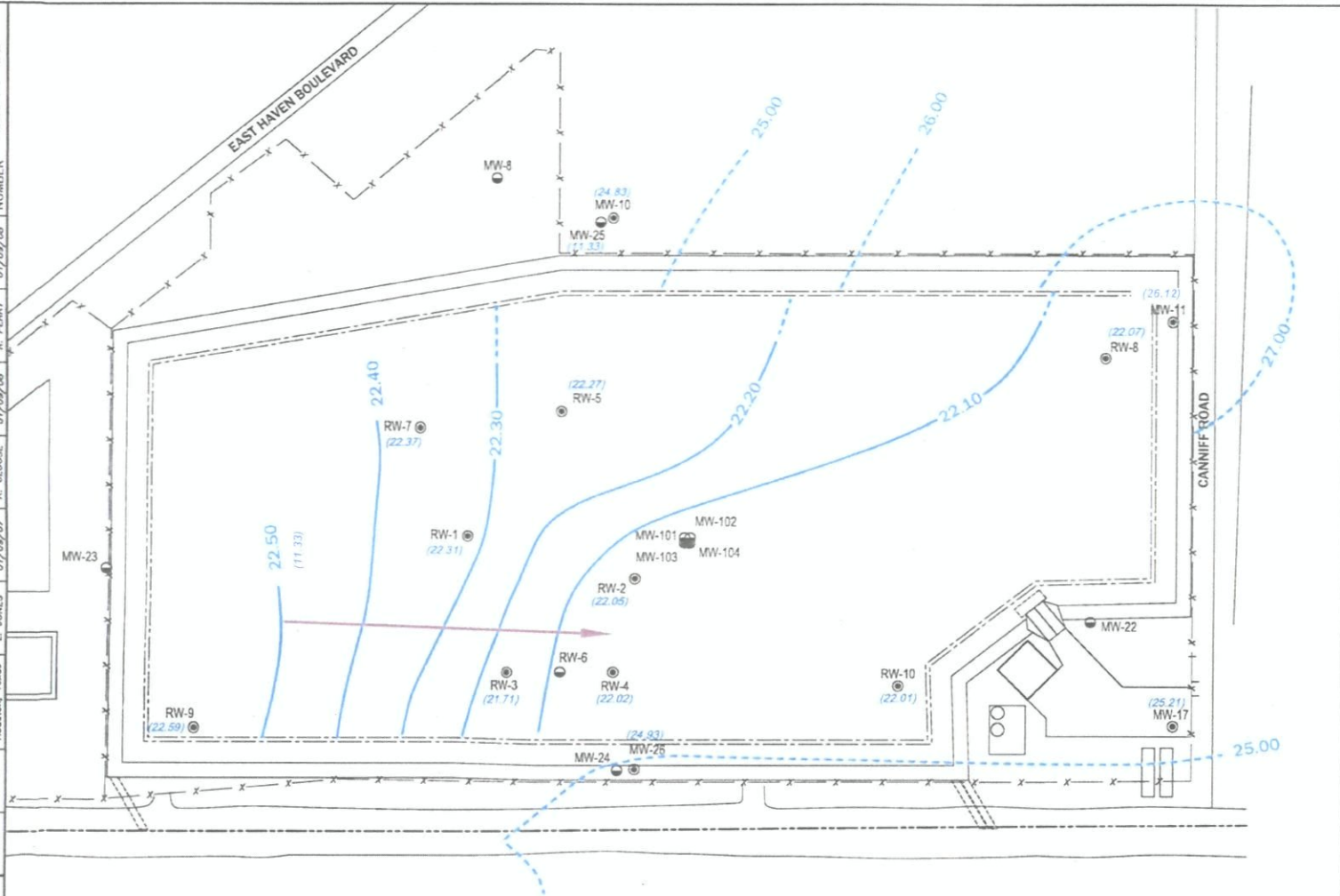
CHECKED BY R. CLOUSE 01/09/08

DRAWN BY L. JONES 01/09/07

OFFICE Houston, Texas

X-REF

IMAGE
PLOT DATE: 01/10/08
FORMAT REVISION 3/25/99



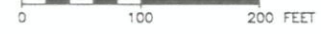
LEGEND:

- DEEP WELL
- ⊗ SHALLOW WELL
- MW MONITORING WELL
- RW RECOVERY WELL
- GROUNDWATER FLOW DIRECTION
- POTENTIOMETRIC CONTOUR (INFERRED WHERE DASHED)
- == SLURRY WALL

NOTES:

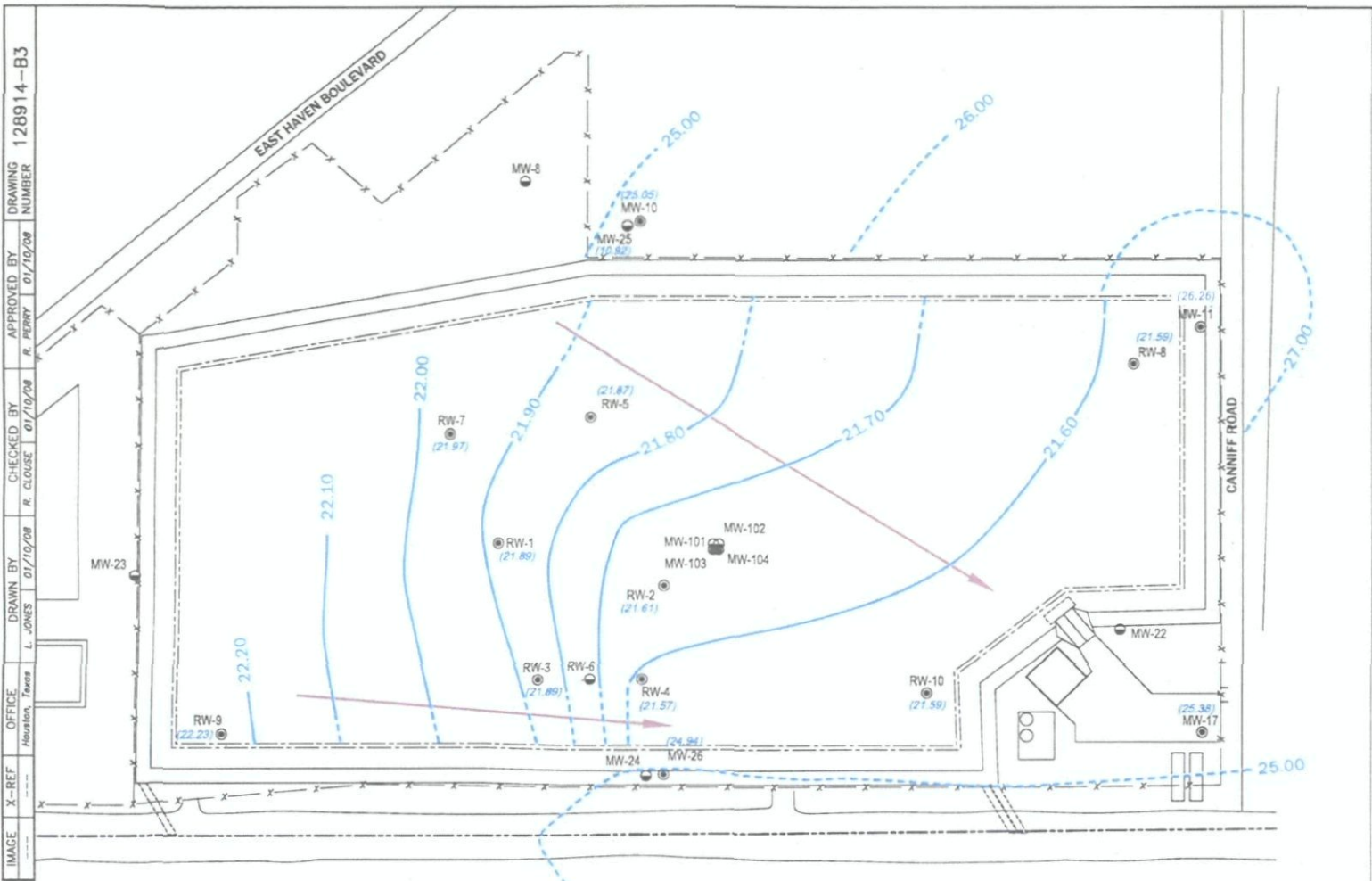
1. AREA WITHIN FENCED PORTION OF SITE IS 12.6 ACRES.
2. GROUNDWATER ELEVATIONS WERE MEASURED ON 10/08/07.
3. RW-3 HAD AN ANOMALOUS FIELD MEASUREMENT.

SCALE



TEXAS COMMISSION OF ENVIRONMENTAL QUALITY
12100 PARK 35 CIRCLE BUILDING D
AUSTIN, TEXAS 78753

Figure 9
POTENTIOMETRIC SHALLOW WELLS MAP
DECEMBER 2007
GENEVA INDUSTRIES SITE
HOUSTON, TEXAS



DRAWING NUMBER
128914-B3

APPROVED BY
R. PERRY 01/10/08

CHECKED BY
R. CLOUSE 01/10/08

DRAWN BY
L. JONES 01/10/08

OFFICE
Houston, Texas

X-REF

PLOT DATE: 01/10/08
FORMAT REVISION 3/25/99



LEGEND:

- DEEP WELL
- ⊙ SHALLOW WELL
- MW MONITORING WELL
- RW RECOVERY WELL
- GROUNDWATER FLOW DIRECTION
- POTENTIOMETRIC CONTOUR (INFERRED WHERE DASHED)
- ==== SLURRY WALL

NOTES:

1. AREA WITHIN FENCED PORTION OF SITE IS 12.6 ACRES.
2. GROUNDWATER ELEVATIONS WERE MEASURED ON 01/07/08.

SCALE



TEXAS COMMISSION OF ENVIRONMENTAL QUALITY
12100 PARK 35 CIRCLE BUILDING D
AUSTIN, TEXAS 78753

Figure 10
POTENTIOMETRIC SHALLOW WELLS MAP
JANUARY 2008
GENEVA INDUSTRIES SITE
HOUSTON, TEXAS

DRAWING NUMBER 124518-B7

APPROVED BY R. PERRY 02/26/08

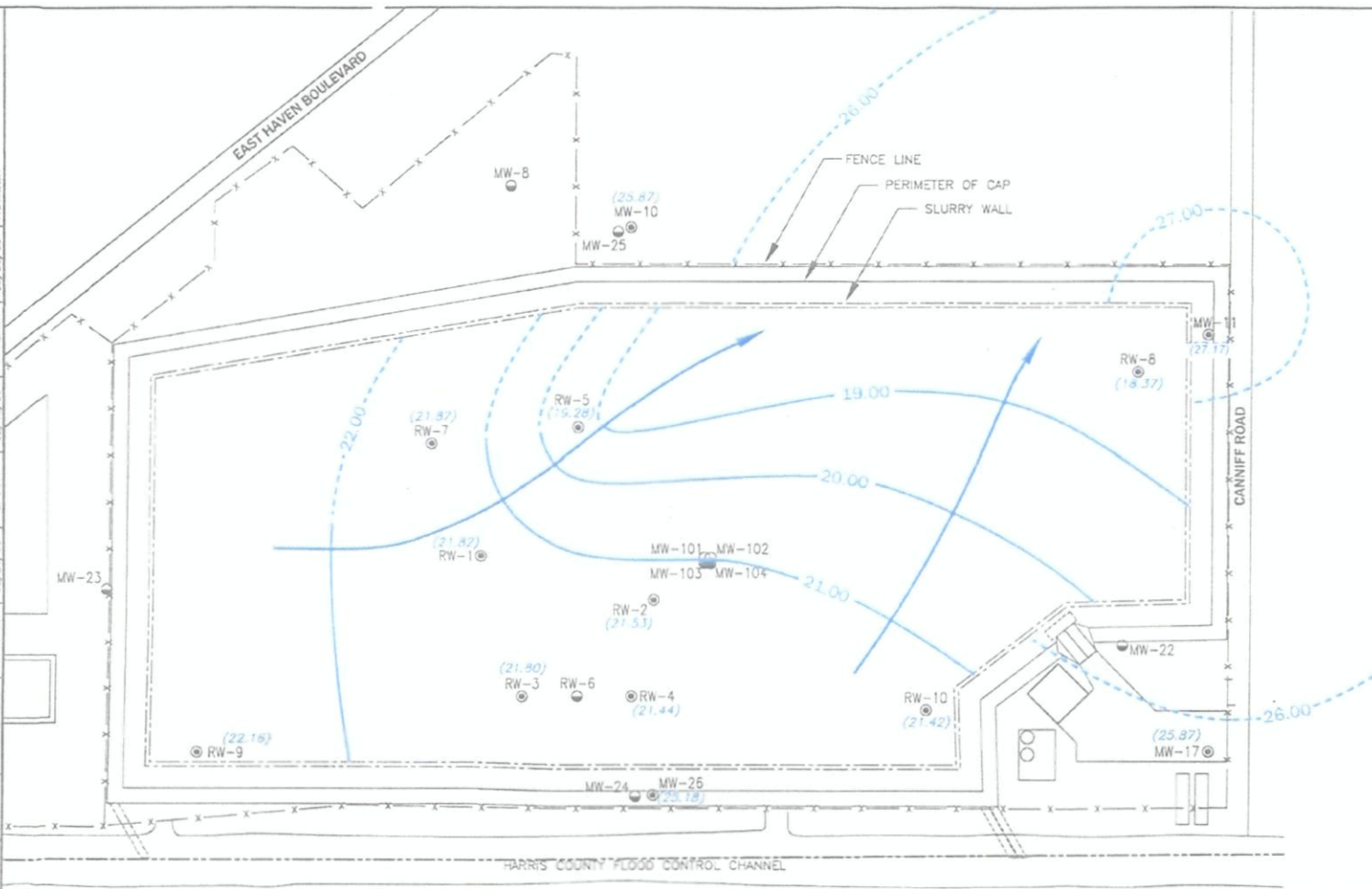
CHECKED BY L. DUTY 02/16/08

DRAWN BY L. JONES 02/26/08

OFFICE Houston, Texas

IMAGE X-REF

PLOT DATE: 02/19/08
FORMAT REVISION 3/25/09



LEGEND:

- DEEP WELL
- ⊙ SHALLOW WELL
- MW MONITORING WELL
- RW RECOVERY WELL
- GROUNDWATER FLOW DIRECTION
- POTENTIOMETRIC CONTOUR (INFERRED WHERE DASHED)
- SLURRY WALL

NOTES:

1. AREA WITHIN FENCED PORTION OF SITE IS 12.6 ACRES.
2. GROUNDWATER ELEVATIONS WERE MEASURED ON 2/9/08.

SCALE

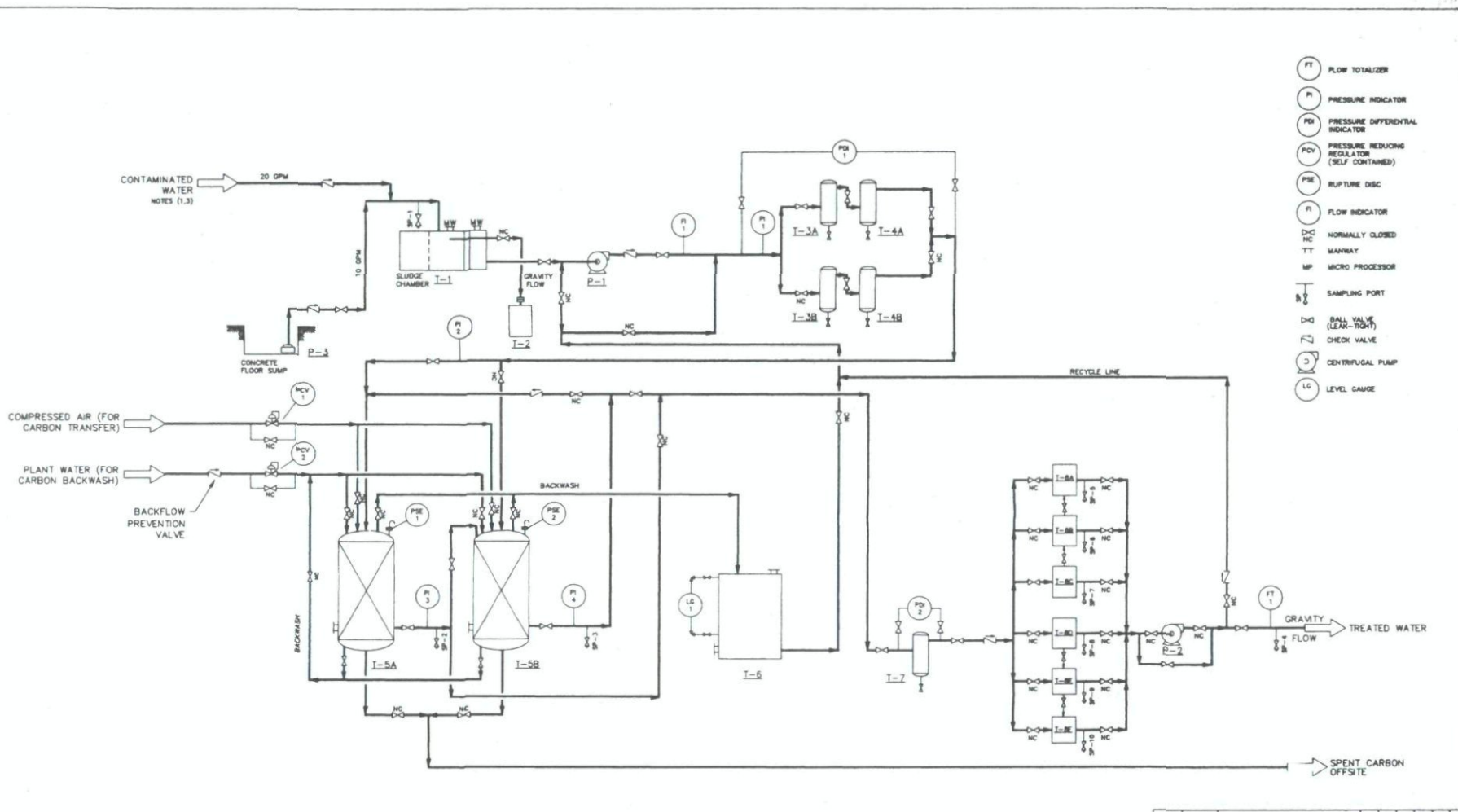


TEXAS COMMISSION OF ENVIRONMENTAL QUALITY
12100 PARK 35 CIRCLE BUILDING D
AUSTIN, TEXAS 78753

Figure 11

POTENTIOMETRIC SURFACE MAP
GENEVA INDUSTRIES SITE
HOUSTON, TEXAS

G:\TWC\421488\1488P6.DWG 04-20-92 11:53am FWP *



- FT FLOW TOTALIZER
- PI PRESSURE INDICATOR
- PDI PRESSURE DIFFERENTIAL INDICATOR
- PCV PRESSURE REDUCING REGULATOR (SELF CONTAINED)
- PRC RUPTURE DISC
- FI FLOW INDICATOR
- NC NORMALLY CLOSED
- TT MANNHAT
- MP MICRO PROCESSOR
- SP SAMPLING PORT
- BV BALL VALVE (LEAK-TIGHT)
- CV CHECK VALVE
- CP CENTRIFUGAL PUMP
- LG LEVEL GAUGE

- P-1 FEED PUMP
- P-2 RECYCLE PUMP
- P-3 SUMP PUMP
- I-1 OIL/WATER SEPARATOR
- I-2 PRODUCT DRUM
- I-3 A,B 25 MICRON FILTERS
- I-4 A,B 10 MICRON FILTERS
- I-5 A,B CARBON ADSORBERS
- I-6 BACKWASH TANK
- I-7 POLISHING FILTER
- I-8 A-F STORAGE TANKS

- NOTES:**
- (1) CONTAMINATED WATER CONSISTS OF CONTAMINATED GROUNDWATER RECOVERED FROM RECOVERY WELLS.
 - (2) ALL BLOCK VALVES AND SAMPLING PORTS OPEN TO THE ATMOSPHERE WILL BE EQUIPPED WITH A CAP.
 - (3) EACH WELL IS EQUIPPED WITH A FLOW TOTALIZER.



2	6-27-92	REVISED	BY	DATE	DATE	DATE	DATE
GROUNDWATER REMEDIATION GENEVA INDUSTRIES SITE							
PROCESS FLOW DIAGRAM							
				Figure 12			
DESIGNED BY: MZ				IT APPROVAL: DP 1-27-92			
DRAWN BY: BSM				TWC APPROVAL:			
CHECKED BY: PB				EPA APPROVAL:			
PROJECT NO. 421488		DWG. NO. 421488-079		SCALE: NONE			

Table 1
Chronology of Site Events
Geneva Superfund Site
Houston, Texas

Date	Event
1967-1978	Site operated by Geneva Industries as a petrochemical production facility.
June 1972 - September 1978	PCB production begun at site.
November 1973	Geneva Industries declares bankruptcy.
February 1974 – December 1976	Site operated by Pilot Industries.
December 1976 – December 1980	Site owned by Intercoastal Refining.
September 1978	Facility operations end.
December 1980 – May 1982	Site owned by Lonestar Fuel Co.
May 1982 – present	Site owned by Fuhrmann Energy.
September 1983	Site proposed for inclusion in NPL.
September 1984	Site placed on NPL.
October 1983 – February 1984	Planned Removal performed by EPA.
September 1984 – December 1985	RI/FS performed.
September 18, 1986	ROD signed by EPA.
September 18, 1986	ESD approved by EPA which clarifies amount of waste found and removed.
July 1993	ESD approved by EPA raising the TCE action level from 1 ppb to 5 ppb.
April 1998	First 5-Year Review completed.
September 2003	Second 5-Year Review completed.
May 2007	ESD approved by EPA including institutional controls as part of the remedy.

Attachment 1

Documents Reviewed

Corrigan Consulting, Inc., 2008. *Preliminary Groundwater Remediation Assessment Geneva Industries Superfund Site*, November 1998.

Shaw Environmental Inc, 2006. *Final Operations and Maintenance Manual Process Treatment System*, September 2006.

Shaw Environmental Inc., 2005. *Annual Groundwater Monitoring Event and Monthly Inspections, Geneva Industries Superfund Site*, October 2005.

Shaw Environmental Inc., 2006. *Annual Groundwater Monitoring Event and Monthly Inspections – Final Report, Geneva Industries Superfund Site*, August 2005.

Shaw Environmental Inc., 2007. *Annual Groundwater Monitoring Event and Monthly Inspections, Geneva Industries Superfund Site*, October 2005.

Tetratech, 2003. *Second Five-Year Review for the Geneva Industries Superfund Site, Houston, Harris County, Texas*, September 2003.

U.S. Environmental Protection Agency (EPA), 1986. *Record of Decision, Geneva Industries*. September 18, 1986.

U.S. Environmental Protection Agency (EPA), 1993. *Explanation of Significant Differences, Geneva Industries Superfund Site*. July 1993.

U.S. Environmental Protection Agency (EPA), 1998. *First Five-Year Review, Geneva Industries Superfund Site, Houston, Harris County, Texas*, April 1998.

U.S. Environmental Protection Agency (EPA), 2001. *Comprehensive Five-Year Review Guidance*. OSWER No. 9355.7-03B-P. June 2001.

U.S. Environmental Protection Agency (EPA), 2007. *Explanation of Significant Differences, Geneva Industries Superfund Site*. May 2007.

Attachment 2

Interview Record Forms

Five-Year Review Interview Record Geneva Superfund Site Houston, Texas		Interviewee: Russell Perry Phone: (713) 996-4571 email: Russell.perry@shawgrp.com		
Site Name: Geneva Superfund Site	EPA ID No. TXD980748453	Date of Interview 6/20/08		Interview Method e-mail form completion
Interview Contacts	Organization	Phone	Email	Address
Gary Miller	EPA Region 6	214-665-8318	Miller.Garyg@epamail.epa.gov	EPA Region 6 Superfund (6SF-AP) Dallas, TX 75202-2733
Frank Roepke	U.S. Army Corps of Engineers	918-669-7444	Frank.Roepke@usace.army.mil	Corps of Engineers CESWT-EC-EA 1645 S. 101 st E. Ave Tulsa, OK 74128
Interview Questions (scope of the interview is from 2003 to present)				
1. What is your overall impression of the work conducted at the site since 2003?				
<p>Response: Work at the site began with assessment of an inoperable treatment system, and work by Shaw was subsequently performed to jet and develop the recovery wells; retrofit the recovery wells with new down-hole electric centrifugal pumps; replace the oil/water separators; controls; piping and transfer pumps in the treatment plant; and demolish damaged clean water storage tanks and re-set salvageable clean water storage tanks in the secondary containment area. Stored waste was also removed, and Shaw continued to maintain the grounds. The objective of retrofitting the treatment system was to make it operable again, and switch from an objective of pumping and treating waste, to an objective of pumping as an engineering control to maintain negative groundwater elevations within the slurry wall relative to natural water levels outside of the slurry wall. The down-hole pumps were purposely installed at a higher elevation within the water column to help reduce the amount of DNAPL recovery and still maintain the negative groundwater elevation described above. My impression of the work conducted since 2003 is that good work was performed, and that the intended goals of the retrofit and ongoing O&M were/are successful.</p>				
2. From your perspective, what effect have remedial operations at the site had on the surrounding community? Are you aware of any ongoing community concerns regarding the site or its operation and maintenance?				
<p>Response: To my knowledge, no effect or community concerns have occurred since Shaw began work in 2003.</p>				
3. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please describe purpose and results.				
<p>Response: Routine site inspections are performed on an approximate monthly schedule, and site visits are performed during the monthly O&M periods. Site inspection forms are completed to document the condition of the containment cell, grass, and fence lines and vandalism (if any).</p>				
4. Are you aware of any events, incidents, or activities that have occurred at the site such as				

dumping, vandalism, or anything that required emergency response from local authorities? If so, please give details.

Response: To my knowledge, there have been no reportable emergency response incidents at the site. No dumping has occurred on-site, but dumping has occurred in the area on other properties and in road right-of-way of Canniff street (access road to the site). Some minor fence cutting has occurred, but there has been no sign of vandalism or theft as a result of the fence cutting.

5. Have there been any complaints, violations, or other incidents related to the site that required a response by your office? If so, please summarize the events and result.

Response: There have been no direct complaints to Shaw's office. However, at one time one of the residents called the TCEQ to notify that a few of the clean water storage tanks blew over in a storm with high winds. The tanks were subsequently demolished and the remaining tanks were re-anchored to prevent the incident from happening again.

6. Are you aware of any problems or difficulties encountered which impacted the effectiveness of the remedial action, or a change in O&M procedures? If so, please describe changes and impacts.

Response: As stated in Item #1, the original order was to remediate the site by pumping DNAPL from the recovery wells. The original remedy was determined to be impractical (through experience at the site and other Superfund sites), and the remedy was modified to engineering control (hydraulic containment). The retrofits appear to have met the requirements of the engineering control remedy.

7. Have there been any changes in state or federal environmental standards since 2003 which may call into question the protectiveness or effectiveness of the remedial action?

Response: None to my knowledge.

8. Do you know of opportunities to optimize the operation, maintenance, or sampling efforts at the site since 2003, and have such changes been implemented?

Response: Recent increase in the groundwater sampling frequency (from annual to semi-annual to current quarterly events) was requested by the TCEQ per recommendations by EPA. No obvious O&M optimization changes have been considered, as groundwater elevations within the slurry wall appear to be maintained under the current extraction well operation schedule.

9. Do you feel well-informed about the site's activities and progress?

Response: Yes.

10. Do you have any comments, suggestions, or recommendations regarding the site?

Response: No.

Five-Year Review Interview Record Geneva Superfund Site Houston, Texas		Interviewee: Barry Lands PM TCEQ Phone: (512) 239-6547 email: blands@tceq.state.tx.us		
Site Name: Geneva Superfund Site	EPA ID No. TXD980748453	Date of Interview 8/1/08		Interview Method
Interview Contacts	Organization	Phone	Email	Address
Gary Miller	EPA Region 6	214-665-8318	Miller.Garyg@epamail.epa.gov	EPA Region 6 Superfund (6SF-AP) Dallas, TX 75202-2733
Frank Roepke	U.S. Army Corps of Engineers	918-669-7444	Frank.Roepke@usace.army.mil	Corps of Engineers CESWT-EC-EA 1645 S. 101 st E. Ave Tulsa, OK 74128
Interview Questions (scope of the interview is from 2003 to present)				
1. What is your overall impression of the work conducted at the site since 2003?				
Response: The system is now operable and is working as intended. The monthly pumping of the recovery system has maintained a negative gradient inward through the slurry wall.				
2. From your perspective, what effect have remedial operations at the site had on the surrounding community? Are you aware of any ongoing community concerns regarding the site or its operation and maintenance?				
Response: No citizen concerns have been noted.				
3. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please describe purpose and results.				
Response: My contractor visits the site every month and does an evaluation of the site conditions and operates the ground water treatment system.				
4. Are you aware of any events, incidents, or activities that have occurred at the site such as dumping, vandalism, or anything that required emergency response from local authorities? If so, please give details.				
Response: No incidents.				
5. Have there been any complaints, violations, or other incidents related to the site that required a response by your office? If so, please summarize the events and result.				
Response: No incidents				
6. Are you aware of any problems or difficulties encountered which impacted the effectiveness of the remedial action, or a change in O&M procedures? If so, please describe changes and				

impacts.

Response: The original scope of work has been changed. Initially the system was intended to operate 24/7 365 days a year to treat the groundwater located inside the engineer control at the 30 foot level. Currently the intention is to maintain an inward gradient to draw any leakage into the onsite cell and to treat the water collected during the pumping event in the treatment system. The collected water is analyzed and if passes the criteria for release is then released into the adjacent Harris Co. flood control ditch.

7. Have there been any changes in state or federal environmental standards since 2003 which may call into question the protectiveness or effectiveness of the remedial action?

Response: None

8. Do you know of opportunities to optimize the operation, maintenance, or sampling efforts at the site since 2003, and have such changes been implemented?

Response: Additional testing, on an abbreviated schedule, will be completed for the monitoring the deep well water at the 100' level that is inside the slurry wall to see if any changes have occurred in the unimpacted ground water.

9. Do you feel well-informed about the site's activities and progress?

Response: Yes

10. Do you have any comments, suggestions, or recommendations regarding the site?

Response: No.

Attachment 3

Site Inspection Checklist

Five-Year Review Site Inspection Checklist

I. SITE INFORMATION																	
Site name: Geneva Superfund Site	Date of inspection: March 18, 2008																
Location and Region: Houston, TX	EPA ID: TXD980748453																
Agency, office, or company leading the five-year review: USACE	Weather/temperature: overcast, windy																
Remedy Includes: (Check all that apply) <table style="width: 100%; border: none;"> <tr> <td><input checked="" type="checkbox"/> Landfill cover/containment</td> <td><input type="checkbox"/> Monitored natural attenuation</td> </tr> <tr> <td><input checked="" type="checkbox"/> Access controls</td> <td><input checked="" type="checkbox"/> Groundwater containment</td> </tr> <tr> <td><input checked="" type="checkbox"/> Institutional controls</td> <td><input checked="" type="checkbox"/> Vertical barrier walls</td> </tr> <tr> <td><input checked="" type="checkbox"/> Groundwater pump and treatment</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Surface water collection</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Other:</td> <td></td> </tr> </table>		<input checked="" type="checkbox"/> Landfill cover/containment	<input type="checkbox"/> Monitored natural attenuation	<input checked="" type="checkbox"/> Access controls	<input checked="" type="checkbox"/> Groundwater containment	<input checked="" type="checkbox"/> Institutional controls	<input checked="" type="checkbox"/> Vertical barrier walls	<input checked="" type="checkbox"/> Groundwater pump and treatment		<input type="checkbox"/> Surface water collection		<input type="checkbox"/> Other:					
<input checked="" type="checkbox"/> Landfill cover/containment	<input type="checkbox"/> Monitored natural attenuation																
<input checked="" type="checkbox"/> Access controls	<input checked="" type="checkbox"/> Groundwater containment																
<input checked="" type="checkbox"/> Institutional controls	<input checked="" type="checkbox"/> Vertical barrier walls																
<input checked="" type="checkbox"/> Groundwater pump and treatment																	
<input type="checkbox"/> Surface water collection																	
<input type="checkbox"/> Other:																	
Attachments: <input type="checkbox"/> Inspection team roster attached <input type="checkbox"/> Site map attached																	
II. INTERVIEWS (Check all that apply)																	
1. O&M site manager <table style="width: 100%; border: none;"> <tr> <td style="width: 20%;">Name</td> <td style="width: 40%;">Russell Perry</td> <td style="width: 20%;">Title</td> <td style="width: 20%;">Date</td> </tr> <tr> <td>Interviewed</td> <td><input type="checkbox"/> at site <input checked="" type="checkbox"/> at office <input type="checkbox"/> by phone</td> <td>Phone no.</td> <td></td> </tr> <tr> <td colspan="4">Problems, suggestions:</td> </tr> <tr> <td colspan="4">_____</td> </tr> </table>		Name	Russell Perry	Title	Date	Interviewed	<input type="checkbox"/> at site <input checked="" type="checkbox"/> at office <input type="checkbox"/> by phone	Phone no.		Problems, suggestions:				_____			
Name	Russell Perry	Title	Date														
Interviewed	<input type="checkbox"/> at site <input checked="" type="checkbox"/> at office <input type="checkbox"/> by phone	Phone no.															
Problems, suggestions:																	

2. O&M staff <table style="width: 100%; border: none;"> <tr> <td style="width: 20%;">Name</td> <td style="width: 40%;">Mike Martinez, Will Hudgins</td> <td style="width: 20%;">Title</td> <td style="width: 20%;">Date</td> </tr> <tr> <td>Interviewed</td> <td><input type="checkbox"/> at site <input checked="" type="checkbox"/> at office <input type="checkbox"/> by phone</td> <td>Phone no.</td> <td></td> </tr> <tr> <td colspan="4">Problems, suggestions:</td> </tr> <tr> <td colspan="4">_____</td> </tr> </table>		Name	Mike Martinez, Will Hudgins	Title	Date	Interviewed	<input type="checkbox"/> at site <input checked="" type="checkbox"/> at office <input type="checkbox"/> by phone	Phone no.		Problems, suggestions:				_____			
Name	Mike Martinez, Will Hudgins	Title	Date														
Interviewed	<input type="checkbox"/> at site <input checked="" type="checkbox"/> at office <input type="checkbox"/> by phone	Phone no.															
Problems, suggestions:																	

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency EPA Region 6
Contact
Name Gary Miller Title Date Phone no.
Problems; suggestions:

Agency Texas Commission on Environmental Quality
Contact
Name Barry Lands Title Date Phone no.
Problems; suggestions:

Agency _____
Contact _____
Name _____ Title _____ Date _____ Phone no. _____
Problems; suggestions; Report attached _____

Agency _____
Contact _____
Name _____ Title _____ Date _____ Phone no. _____
Problems; suggestions; Report attached _____

4. **Other interviews (optional)** Report attached.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)			
1.	O&M Documents <input type="checkbox"/> O&M manual <input type="checkbox"/> As-built drawings <input type="checkbox"/> O&M logs Remarks:	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input checked="" type="checkbox"/> Up to date <input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A <input type="checkbox"/> N/A <input type="checkbox"/> N/A
2.	Site-Specific Health and Safety Plan <input type="checkbox"/> Contingency plan/emergency response plan Remarks	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date <input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A <input type="checkbox"/> N/A
3.	O&M and OSHA Training Records Remarks <u>located offsite at Shaw office</u>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> N/A
4.	Permits and Service Agreements <input type="checkbox"/> Air discharge permit <input type="checkbox"/> Effluent discharge <input type="checkbox"/> Waste disposal, POTW <input type="checkbox"/> Other permits _____ Remarks:	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A <input type="checkbox"/> N/A
5.	Gas Generation Records Remarks:	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
6.	Settlement Monument Records Remarks:	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
7.	Groundwater Monitoring Records Remarks: Annual reports; 2007 and 2008 reports will be combined due to contracting and funding constraints.	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> N/A
8.	Leachate Extraction Records Remarks:	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A
9.	Discharge Compliance Records <input type="checkbox"/> Air <input type="checkbox"/> Water (effluent) Remarks	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
10.	Daily Access/Security Logs Remarks: Security hired; motion/sound sensor hooked to security firm. Security notifies Shaw if alert issued.	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A

IV. O&M COSTS																												
1.	O&M Organization	<input type="checkbox"/> State in-house <input type="checkbox"/> PRP in-house <input type="checkbox"/> Federal Facility in-house	<input checked="" type="checkbox"/> Contractor for State <input type="checkbox"/> Contractor for PRP <input type="checkbox"/> Contractor for Federal Facility Remarks: Currently, Shaw is between contracts. TCEQ is working on an O&M contract award but Shaw is not funded at the moment.																									
2.	O&M Cost Records	<input type="checkbox"/> Readily available <input type="checkbox"/> Funding mechanism/agreement in place Original O&M cost estimate	<input checked="" type="checkbox"/> Up to date <input type="checkbox"/> Breakdown attached Total annual cost by year for review period if available <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">From</td> <td style="width: 15%;"><input type="checkbox"/> Breakdown attached</td> <td style="width: 15%;">Date</td> <td style="width: 15%;">Date</td> <td style="width: 40%;">Total cost</td> </tr> <tr> <td>From</td> <td><input type="checkbox"/> Breakdown attached</td> <td>Date</td> <td>Date</td> <td>Total cost</td> </tr> <tr> <td>From</td> <td><input type="checkbox"/> Breakdown attached</td> <td>Date</td> <td>Date</td> <td>Total cost</td> </tr> <tr> <td>From</td> <td><input type="checkbox"/> Breakdown attached</td> <td>Date</td> <td>Date</td> <td>Total cost</td> </tr> <tr> <td>From</td> <td><input type="checkbox"/> Breakdown attached</td> <td>Date</td> <td>Date</td> <td>Total cost</td> </tr> </table>	From	<input type="checkbox"/> Breakdown attached	Date	Date	Total cost	From	<input type="checkbox"/> Breakdown attached	Date	Date	Total cost	From	<input type="checkbox"/> Breakdown attached	Date	Date	Total cost	From	<input type="checkbox"/> Breakdown attached	Date	Date	Total cost	From	<input type="checkbox"/> Breakdown attached	Date	Date	Total cost
From	<input type="checkbox"/> Breakdown attached	Date	Date	Total cost																								
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From	<input type="checkbox"/> Breakdown attached	Date	Date	Total cost																								
From	<input type="checkbox"/> Breakdown attached	Date	Date	Total cost																								
3.	Unanticipated or Unusually High O&M Costs During Review Period Describe costs and reasons: Rebuilding of systems.																											
V. ACCESS AND INSTITUTIONAL CONTROLS <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A																												
A. Fencing																												
1.	Fencing damaged	<input type="checkbox"/> Location shown on site map Remarks: Inspected monthly. Occasional fence breaks and locals play soccer on cap.	<input checked="" type="checkbox"/> Gates secured <input type="checkbox"/> N/A																									
B. Other Access Restrictions																												
1.	Signs and other security measures	<input type="checkbox"/> Location shown on site map Remarks: Signs on fence and gate.	<input type="checkbox"/> N/A																									

C. Institutional Controls (ICs)			
1.	Implementation and enforcement		
	Site conditions imply ICs not properly implemented	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
	Site conditions imply ICs not being fully enforced	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
	Type of monitoring: self-monitoring		
	Frequency: monthly		
	Responsible party/agency: TCEQ		
	Contact:		
	Name Barry Lands	Title	Date Phone no. (512) 239-6547
	Reporting is up-to-date	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
	Reports are verified by the lead agency	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
	Specific requirements in deed or decision documents have been met	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
	Violations have been reported	<input type="checkbox"/> Yes	<input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
	Remarks: Surveying recently performed to 1) verify parcels requiring deed notification or restriction, 2) Establish accurate reference elevations for potentiometric surface determination. Establishment of deed notification/restriction is in progress.		
2.	Adequacy	<input type="checkbox"/> ICs are adequate	<input checked="" type="checkbox"/> ICs are inadequate <input type="checkbox"/> N/A
	Remarks: At the current time, only restricted access is in effect. Deed notification/restriction is currently being pursued.		
D. General			
1.	Vandalism/trespassing	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No vandalism evident
	Remarks Fences have been reported to have been vandalized.		
2.	Land use changes on site	<input checked="" type="checkbox"/> N/A	
	Remarks		
3.	Land use changes off site	<input type="checkbox"/> N/A	
	Remarks None.		
VI. GENERAL SITE CONDITIONS			
A. Roads	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A	
1.	Roads damaged	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Roads adequate <input checked="" type="checkbox"/> N/A
	Remarks:		

B. Other Site Conditions			
Remarks Fire ant mounds evident but minor. Grass obscures mounds to some extent but no mounds are extensive enough to be seen over grass. Poison for ants is applied during mowing.			
VII. LANDFILL COVERS <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
A. Landfill Surface			
1.	Settlement (Low spots) Areal extent _____ Remarks: _____	<input type="checkbox"/> Location shown on site map Depth _____	<input checked="" type="checkbox"/> Settlement not evident
2.	Cracks Lengths _____ Widths _____ Depths _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Cracking not evident
3.	Erosion Areal extent _____ Remarks: _____	<input type="checkbox"/> Location shown on site map Depth _____	<input checked="" type="checkbox"/> Erosion not evident
4.	Holes Areal extent _____ Remarks Occasional fire ant mounds _____	<input type="checkbox"/> Location shown on site map Depth _____	<input checked="" type="checkbox"/> Holes not evident
5.	Vegetative Cover <input checked="" type="checkbox"/> Grass <input type="checkbox"/> Cover properly established <input checked="" type="checkbox"/> No signs of stress <input type="checkbox"/> Trees/Shrubs (indicate size and locations on a diagram)	Remarks: Good coverage of grass.	
6.	Alternative Cover (armored rock, concrete, etc.) <input checked="" type="checkbox"/> N/A Remarks _____		
7.	Bulges Areal extent _____ Remarks _____	<input type="checkbox"/> Location shown on site map Height _____	<input checked="" type="checkbox"/> Bulges not evident

8.	Wet Areas/Water Damage	<input checked="" type="checkbox"/> Wet areas/water damage not evident	
	<input type="checkbox"/> Wet areas	<input type="checkbox"/> Location shown on site map	Areal extent _____
	<input type="checkbox"/> Ponding	<input type="checkbox"/> Location shown on site map	Areal extent _____
	<input type="checkbox"/> Seeps	<input type="checkbox"/> Location shown on site map	Areal extent _____
	<input type="checkbox"/> Soft subgrade	<input type="checkbox"/> Location shown on site map	Areal extent _____
Remarks: _____			
9.	Slope Instability	<input type="checkbox"/> Slides	<input type="checkbox"/> Location shown on site map
	Areal extent _____		<input checked="" type="checkbox"/> No evidence of slope instability
Remarks: _____			
B. Benches			
	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A	
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)			
1.	Flows Bypass Bench	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> okay
Remarks: _____			
2.	Bench Breached	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> okay
Remarks: _____			
3.	Bench Overtopped	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> okay
Remarks: _____			
C. Letdown Channels			
	<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A	
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.) Located below cap on corners			
1.	Settlement	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No evidence of settlement
	Areal extent _____	Depth _____	
Remarks: _____			
2.	Material Degradation	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No evidence of degradation
	Material type _____	Areal extent _____	
Remarks: _____			
3.	Erosion	<input type="checkbox"/> Evidence of Erosion	<input checked="" type="checkbox"/> No evidence of erosion
	Areal extent _____	Depth _____	
Remarks: _____			

4.	Undercutting	<input type="checkbox"/> Evidence of undercutting	<input checked="" type="checkbox"/> No evidence of undercutting
Remarks: _____			
5.	Obstructions Type _____	<input checked="" type="checkbox"/> No obstructions	
<input type="checkbox"/> Location shown on site map		Areal extent _____	
Size _____		Remarks _____	
6.	Excessive Vegetative Growth Type _____	<input checked="" type="checkbox"/> No evidence of excessive growth	
<input type="checkbox"/> Vegetation in channels does not obstruct flow		Areal extent _____	
<input type="checkbox"/> Location shown on site map		Remarks _____	
D. Cover Penetrations <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
1.	Gas Vents <input type="checkbox"/> Active <input type="checkbox"/> Passive	<input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition	
<input type="checkbox"/> Evidence of leakage at penetration		<input type="checkbox"/> Needs Maintenance	
<input checked="" type="checkbox"/> N/A		Remarks: _____	
2.	Gas Monitoring Probes	<input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition	
<input type="checkbox"/> Evidence of leakage at penetration		<input type="checkbox"/> Needs Maintenance <input checked="" type="checkbox"/> N/A	
Remarks _____		_____	
3.	Monitoring Wells (within surface area of landfill)	<input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition	
<input type="checkbox"/> Evidence of leakage at penetration		<input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A	
Remarks No locks evident on monitoring wells _____		_____	
4.	Leachate Extraction Wells (dual purpose: same as gas vent wells)	<input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition	
<input type="checkbox"/> Evidence of leakage at penetration		<input type="checkbox"/> Needs Maintenance <input checked="" type="checkbox"/> N/A	
Remarks _____		_____	
5.	Settlement Monuments	<input type="checkbox"/> Located	<input type="checkbox"/> Routinely surveyed <input checked="" type="checkbox"/> N/A
Remarks: _____			

E. Gas Collection and Treatment		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	Gas Treatment Facilities	<input type="checkbox"/> Flaring	<input type="checkbox"/> Thermal destruction
		<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs Maintenance
		<input type="checkbox"/> Collection for reuse	
	Remarks _____		
2.	Gas Collection Wells, Manifolds and Piping	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs Maintenance
	Remarks _____		
3.	Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings)	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs Maintenance
		<input type="checkbox"/> N/A	
	Remarks _____		
F. Cover Drainage Layer		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	Outlet Pipes Inspected	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
	Remarks _____		
2.	Outlet Rock Inspected	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
	Remarks: _____		
G. Detention/Sedimentation Ponds		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	Siltation Areal extent _____	Depth _____	<input type="checkbox"/> N/A
	<input type="checkbox"/> Siltation not evident		
	Remarks _____		
2.	Erosion Areal extent _____	Depth _____	
	<input type="checkbox"/> Erosion not evident		
	Remarks _____		
3.	Outlet Works	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
	Remarks _____		
4.	Dam	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
	Remarks _____		

H. Retaining Walls		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	Deformations	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Deformation not evident
	Horizontal displacement _____	Vertical displacement _____	
	Rotational displacement _____		
	Remarks _____		
2.	Degradation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Degradation not evident
	Remarks _____		
I. Perimeter Ditches/Off-Site Discharge		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	Siltation	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Siltation not evident
	Areal extent _____	Depth _____	
	Remarks _____		
2.	Vegetative Growth	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A
	<input checked="" type="checkbox"/> Vegetation does not impede flow		
	Areal extent _____	Type _____	
	Remarks: _____		
3.	Erosion	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Erosion not evident
	Areal extent _____	Depth _____	
	Remarks _____		
4.	Discharge Structure	<input checked="" type="checkbox"/> Functioning	<input type="checkbox"/> N/A
	Remarks _____		
VIII. VERTICAL BARRIER WALLS		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	Settlement	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Settlement not evident
	Areal extent _____	Depth _____	
	Remarks _____		
2.	Performance Monitoring	Type of monitoring Performance monitoring using monitoring and extraction wells	
	<input type="checkbox"/> Performance not monitored		
	Frequency Monthly _____	<input type="checkbox"/> Evidence of breaching	
	Head differential _____		
	Remarks _____		

IX. GROUNDWATER/SURFACE WATER REMEDIES <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A	
A. Groundwater Extraction Wells, Pumps, and Pipelines <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A	
1.	Pumps, Wellhead Plumbing, and Electrical <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> All required wells properly operating <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks _____ _____ _____
2.	Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____
3.	Spare Parts and Equipment <input checked="" type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks _____ _____
B. Surface Water Collection Structures, Pumps, and Pipelines <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A	
1.	Collection Structures, Pumps, and Electrical <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks Rainwater captured in containment area is pumped directly to ditch _____ _____
2.	Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____
3.	Spare Parts and Equipment <input checked="" type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks: _____ _____

C. Treatment System		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	Treatment Train (Check components that apply) <input type="checkbox"/> Metals removal <input checked="" type="checkbox"/> Oil/water separation <input type="checkbox"/> Bioremediation <input type="checkbox"/> Air stripping <input checked="" type="checkbox"/> Carbon adsorbers <input checked="" type="checkbox"/> Filters bag filters _____ <input type="checkbox"/> Additive (e.g., chelation agent, flocculent) _____ <input type="checkbox"/> Others _____ <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> Sampling ports properly marked and functional <input checked="" type="checkbox"/> Sampling/maintenance log displayed and up to date <input checked="" type="checkbox"/> Equipment properly identified Remarks: Sitation (funnel tank) also included in process		
2.	Electrical Enclosures and Panels (properly rated and functional) <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____		
3.	Tanks, Vaults, Storage Vessels <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Proper secondary containment <input type="checkbox"/> Needs Maintenance Remarks Secondary containment not evident in building _____		
4.	Discharge Structure and Appurtenances <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____		
5.	Treatment Building(s) <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition (esp. roof and doorways) <input type="checkbox"/> Needs repair <input type="checkbox"/> Chemicals and equipment properly stored Remarks _____		
6.	Monitoring Wells (pump and treatment remedy) <input type="checkbox"/> Properly secured/locked <input checked="" type="checkbox"/> Functioning <input checked="" type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks Several wells had no locks. _____		
D. Monitoring Data			
1.	Monitoring Data <input checked="" type="checkbox"/> Is routinely submitted on time <input checked="" type="checkbox"/> Is of acceptable quality		
2.	Monitoring data suggests <input checked="" type="checkbox"/> Groundwater plume is effectively contained <input type="checkbox"/> Contaminant concentrations are declining		

E. Monitored Natural Attenuation			
1.	Monitoring Wells (natural attenuation remedy)		
	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled
	<input type="checkbox"/> All required wells located	<input type="checkbox"/> Needs Maintenance	<input type="checkbox"/> Good condition
	Remarks		<input checked="" type="checkbox"/> N/A
<hr/>			
X. OTHER REMEDIES			
If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.			
XI. OVERALL OBSERVATIONS			
A. Implementation of the Remedy			
Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).			
B. Adequacy of O&M			
Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.			

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

3.1.1. D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Donald
Williams/R6/USEPA/US
09/23/2008 02:11 PM

To Carlos Sanchez, Mark Peycke
cc
bcc
Subject Geneva Industries Inspection

I just got a voice mail from Gary Miller regarding today's TCEQ inspection of the remedy at Geneva Industries in South Houston, Texas. TCEQ inspected the site to determine whether or not the remedy had been damaged as a result of Hurricane Ike.

The TCEQ project manager told Gary that all of the components of the remedy remained intact and that the hurricane had no impact on the determination of protectiveness of the remedy made by EPA in the Five Year Review currently being routed for signature.

I will attach this email to the Five Year Review package and forward the document for signature.

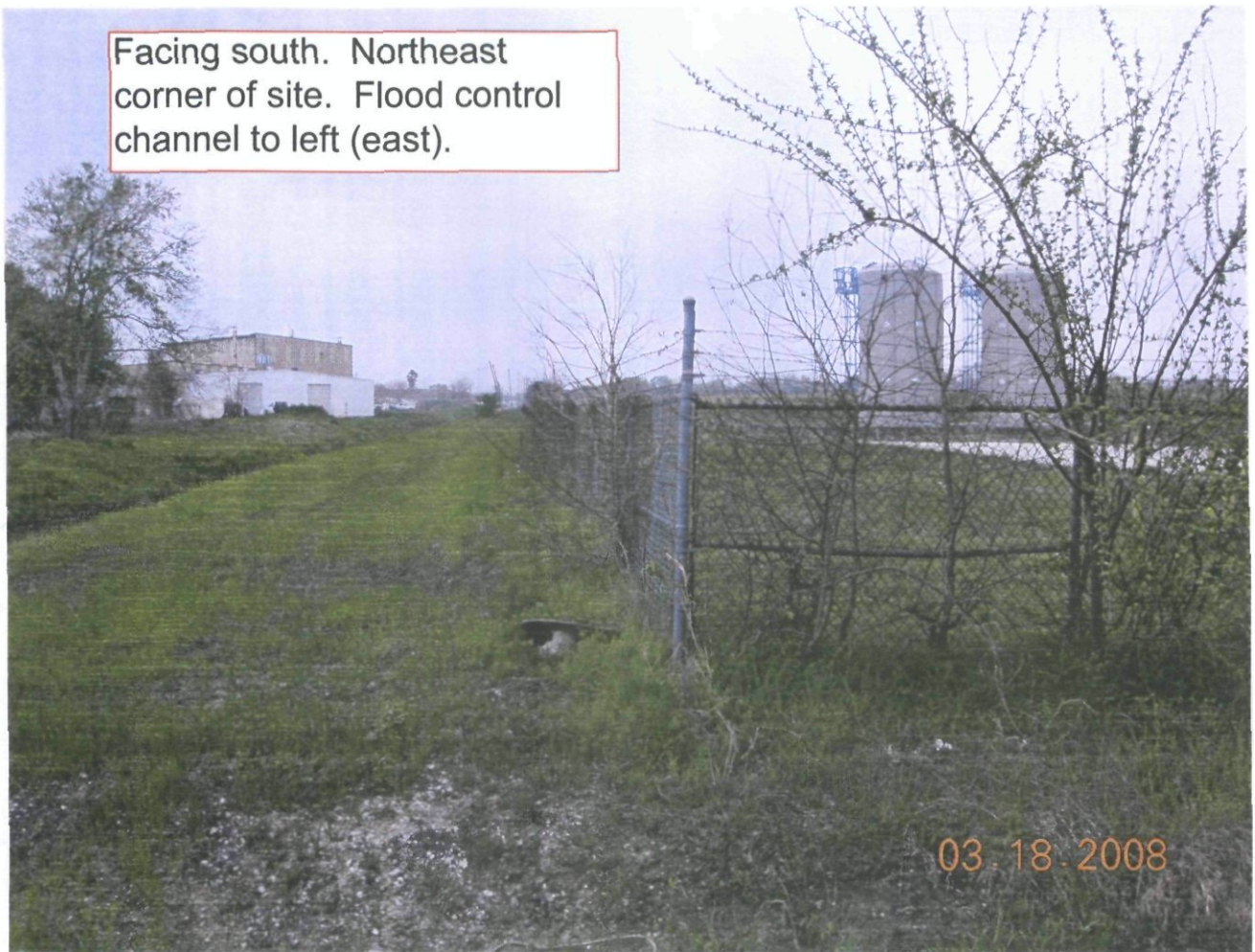
Thanks,

Don Williams
Deputy Associate Director
Superfund Remedial Branch
EPA Region 6
(214) 665-2197

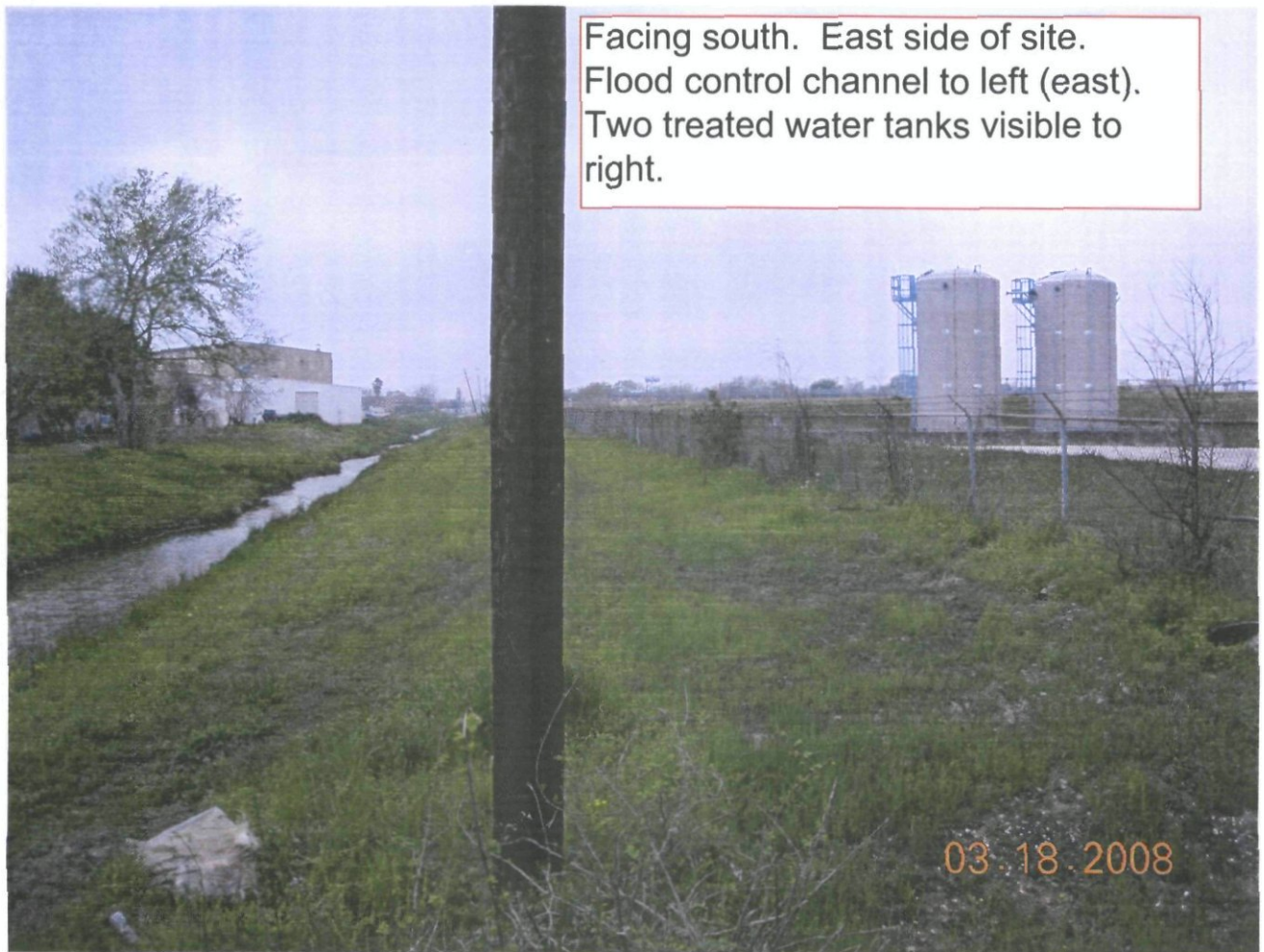
Attachment 4

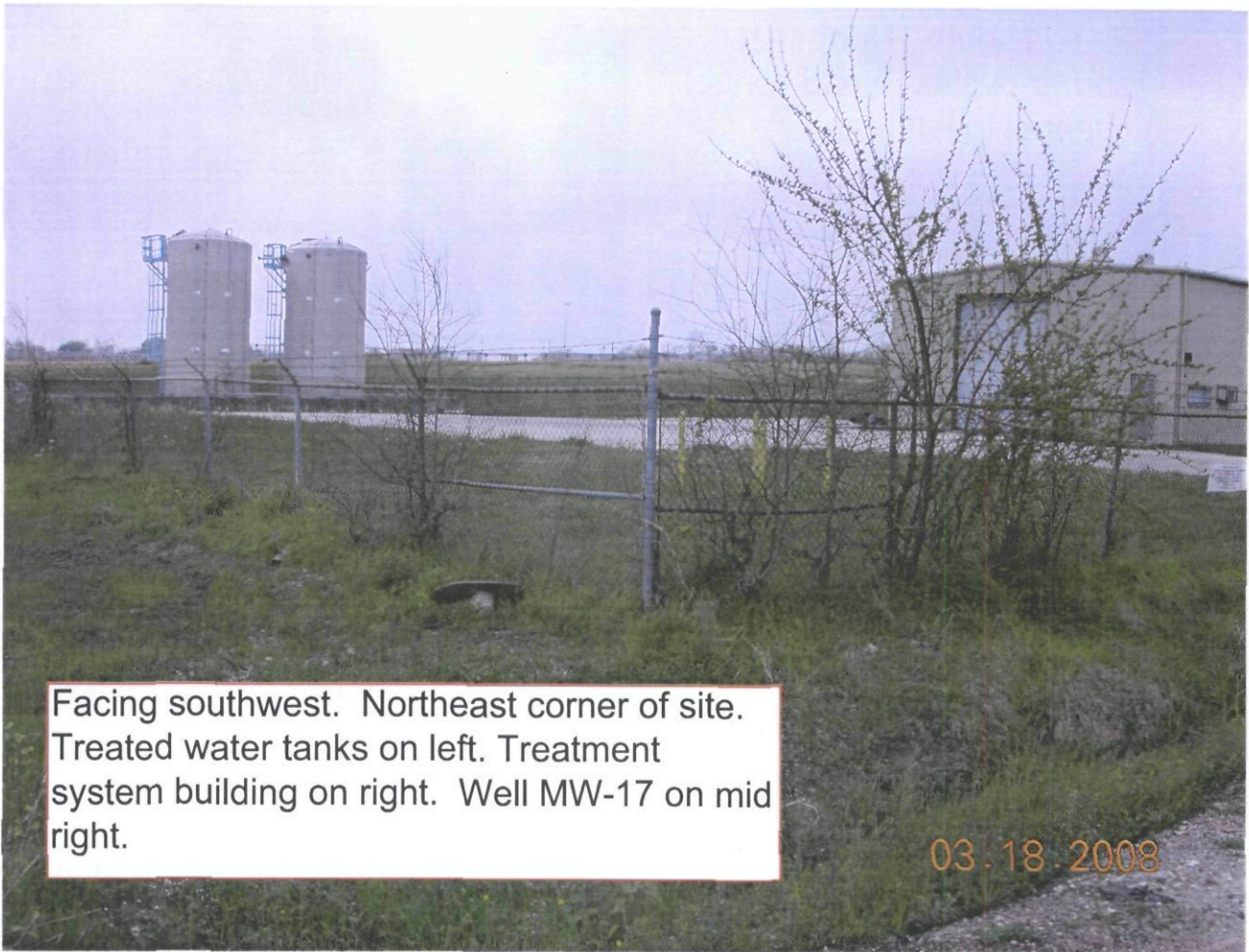
Site Inspection Photographs

Facing south. Northeast corner of site. Flood control channel to left (east).



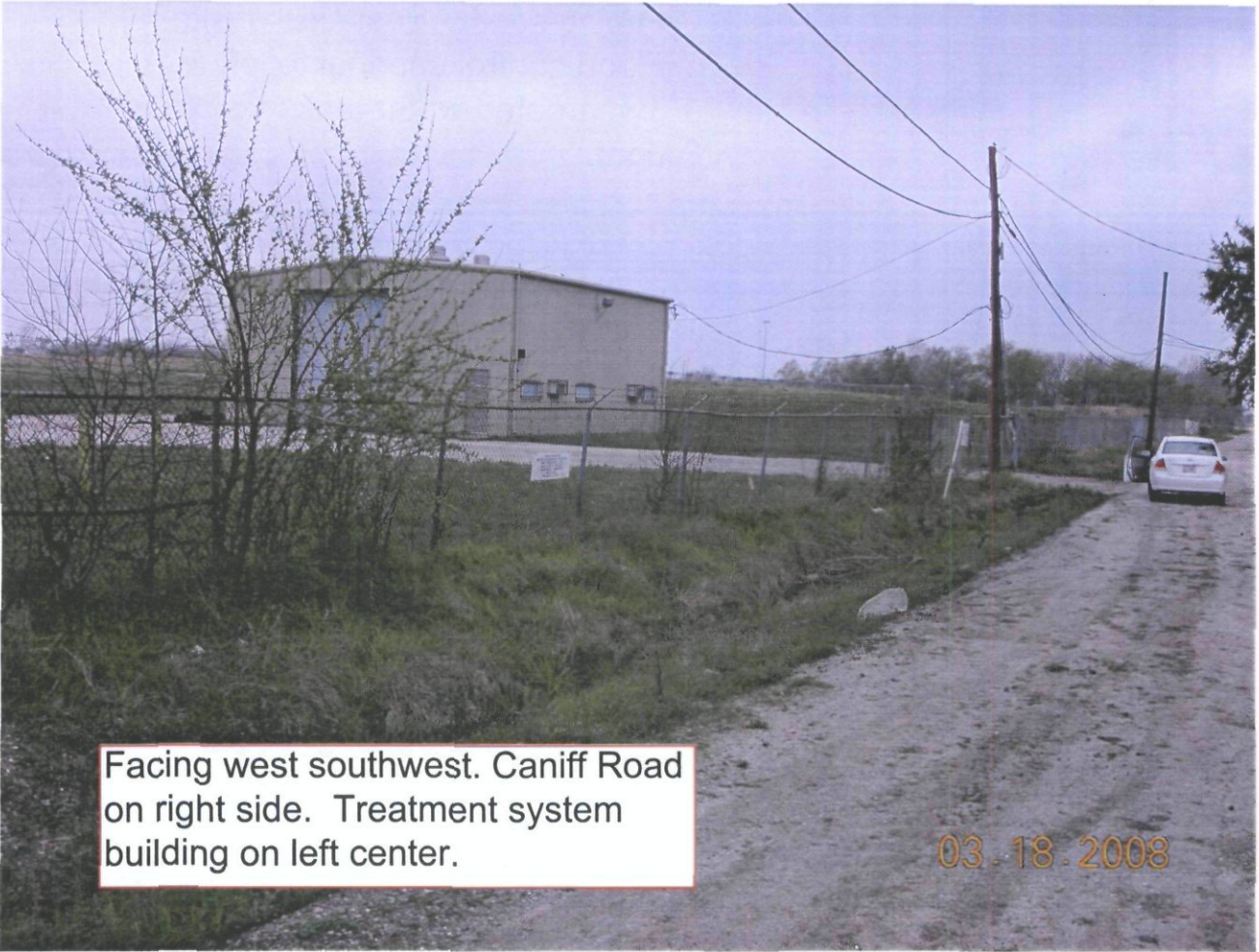
Facing south. East side of site. Flood control channel to left (east). Two treated water tanks visible to right.





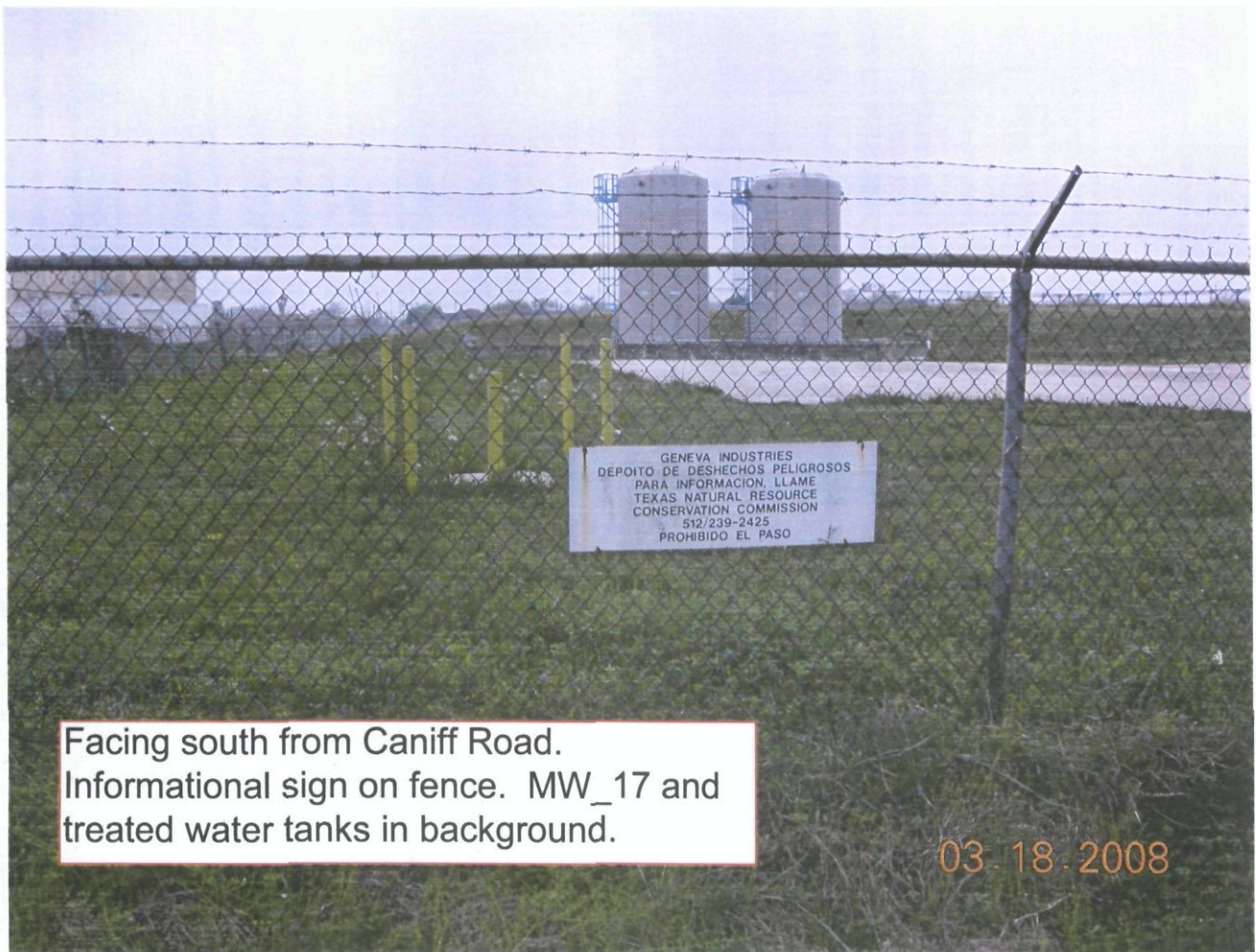
Facing southwest. Northeast corner of site. Treated water tanks on left. Treatment system building on right. Well MW-17 on mid right.

03.18.2008



Facing west southwest. Caniff Road on right side. Treatment system building on left center.

03.18.2008



GENEVA INDUSTRIES
DEPOTO DE DESHECHOS PELIGROSOS
PARA INFORMACION LLAME
TEXAS NATURAL RESOURCE
CONSERVATION COMMISSION
512/239-2425
PROHIBIDO EL PASO

Facing south from Caniff Road.
Informational sign on fence. MW_17 and
treated water tanks in background.

03.18.2008



NO SE PERMITEN
ACCEDER AL
DEPOTO DE DESHECHOS PELIGROSOS
CONSERVACION NATURAL
TEXAS
512/239-2425
PROHIBIDO EL PASO

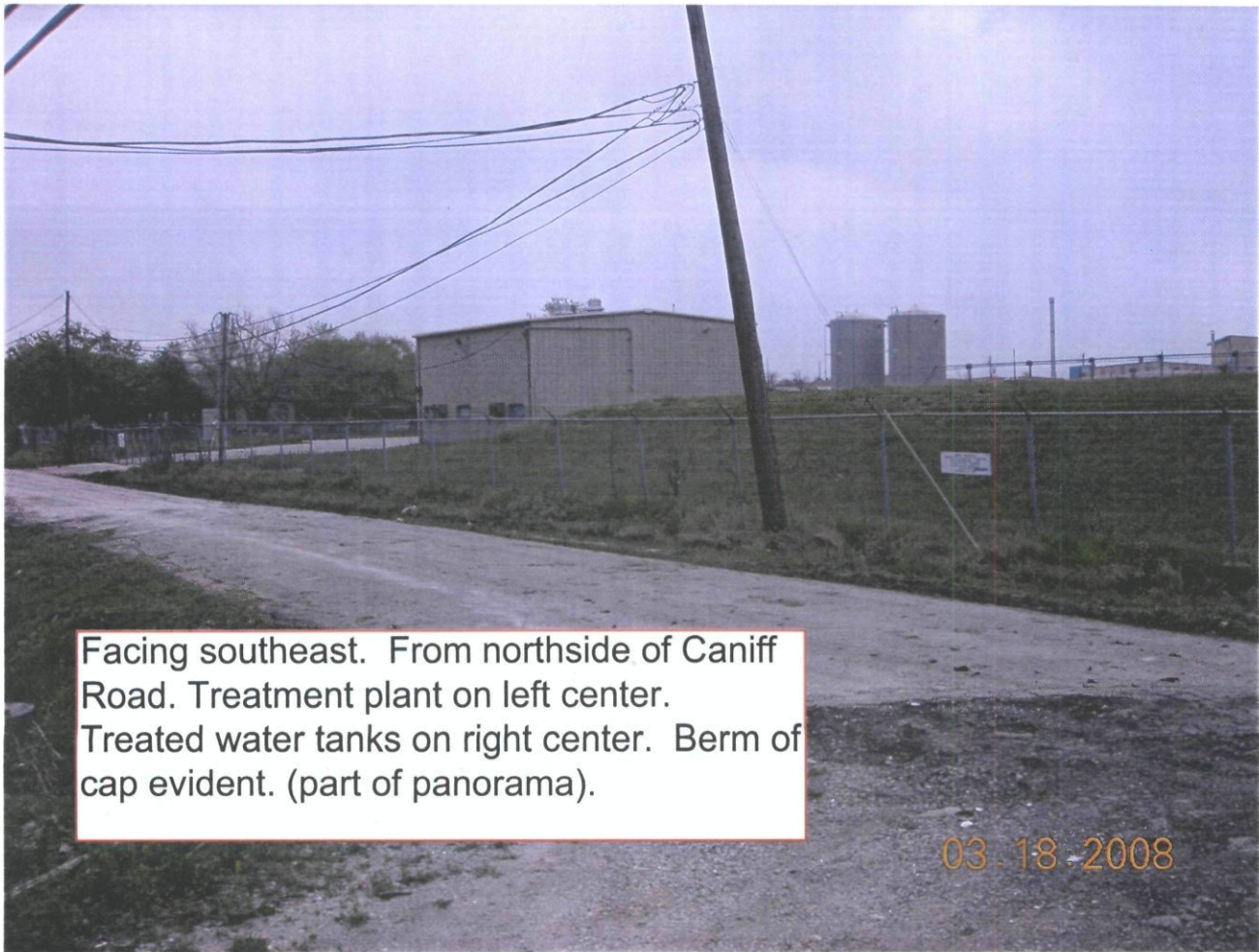
Facing southwest. Gate at
treatment plant. Top sign in
English. Bottom sign in Spanish.

03.18.2008



Facing south-southeast.
Gate at treatment plant.
Top sign in English. Bottom
sign in Spanish.

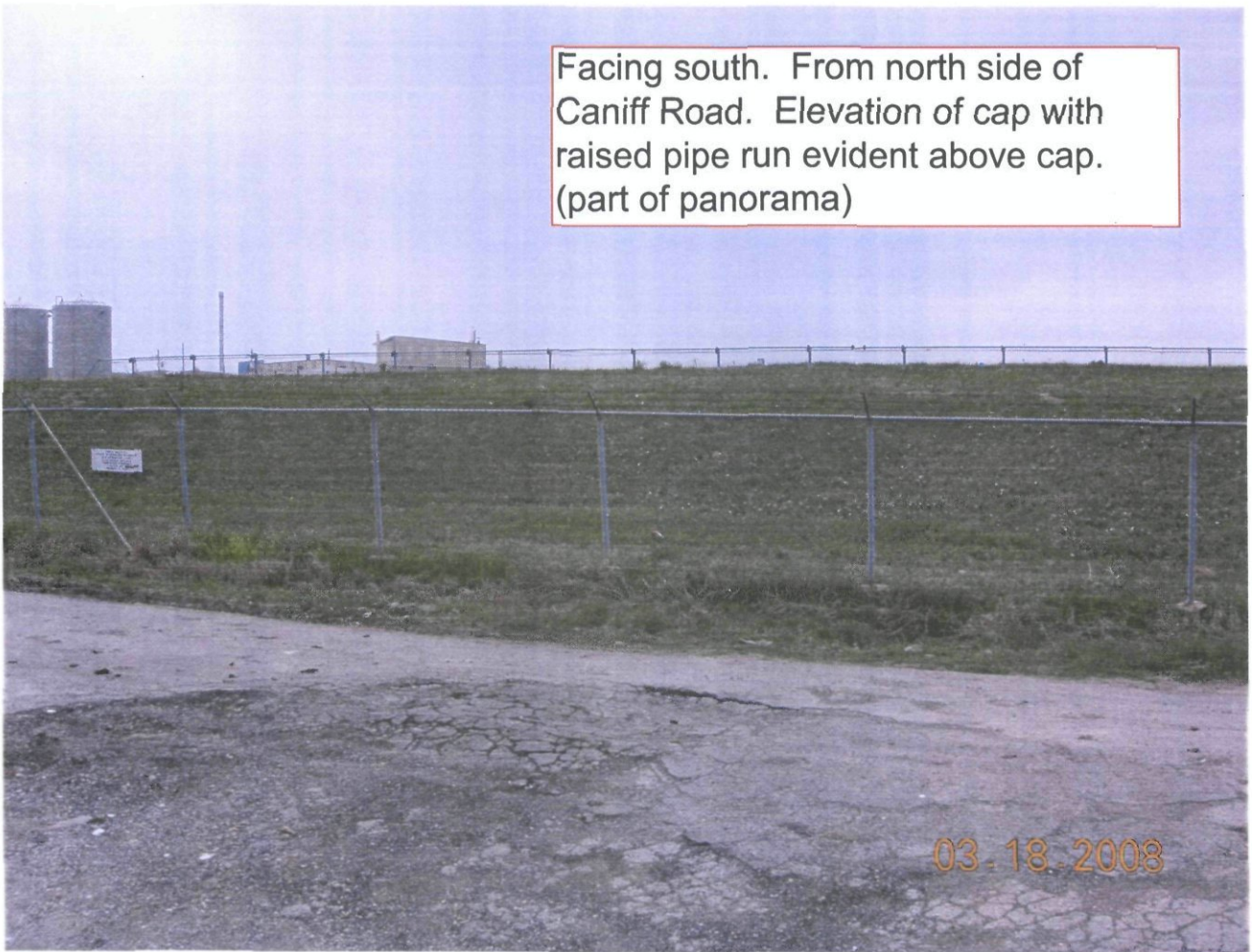
03.18.2008



Facing southeast. From northside of Caniff
Road. Treatment plant on left center.
Treated water tanks on right center. Berm of
cap evident. (part of panorama).

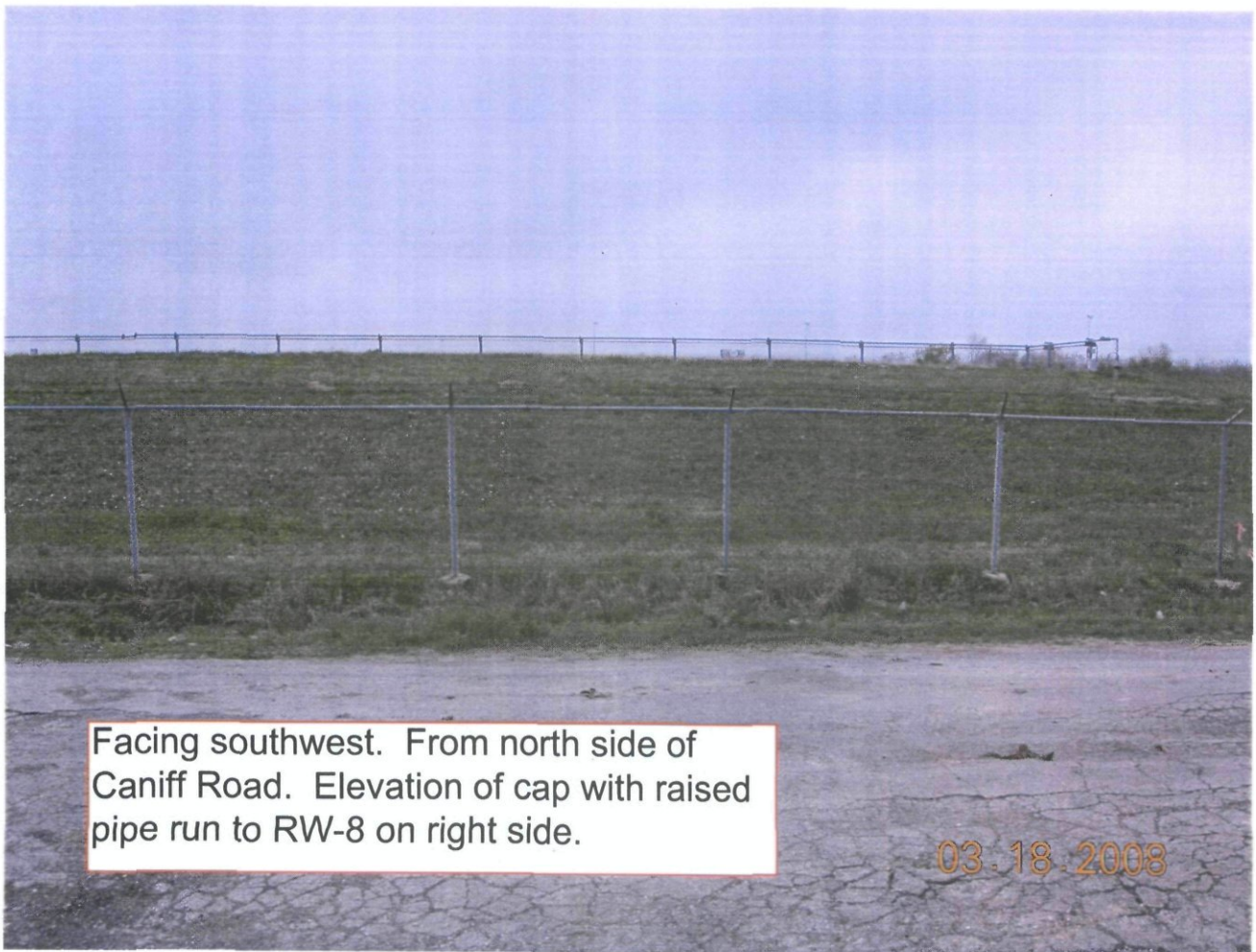
03.18.2008

Facing south. From north side of Caniff Road. Elevation of cap with raised pipe run evident above cap. (part of panorama)

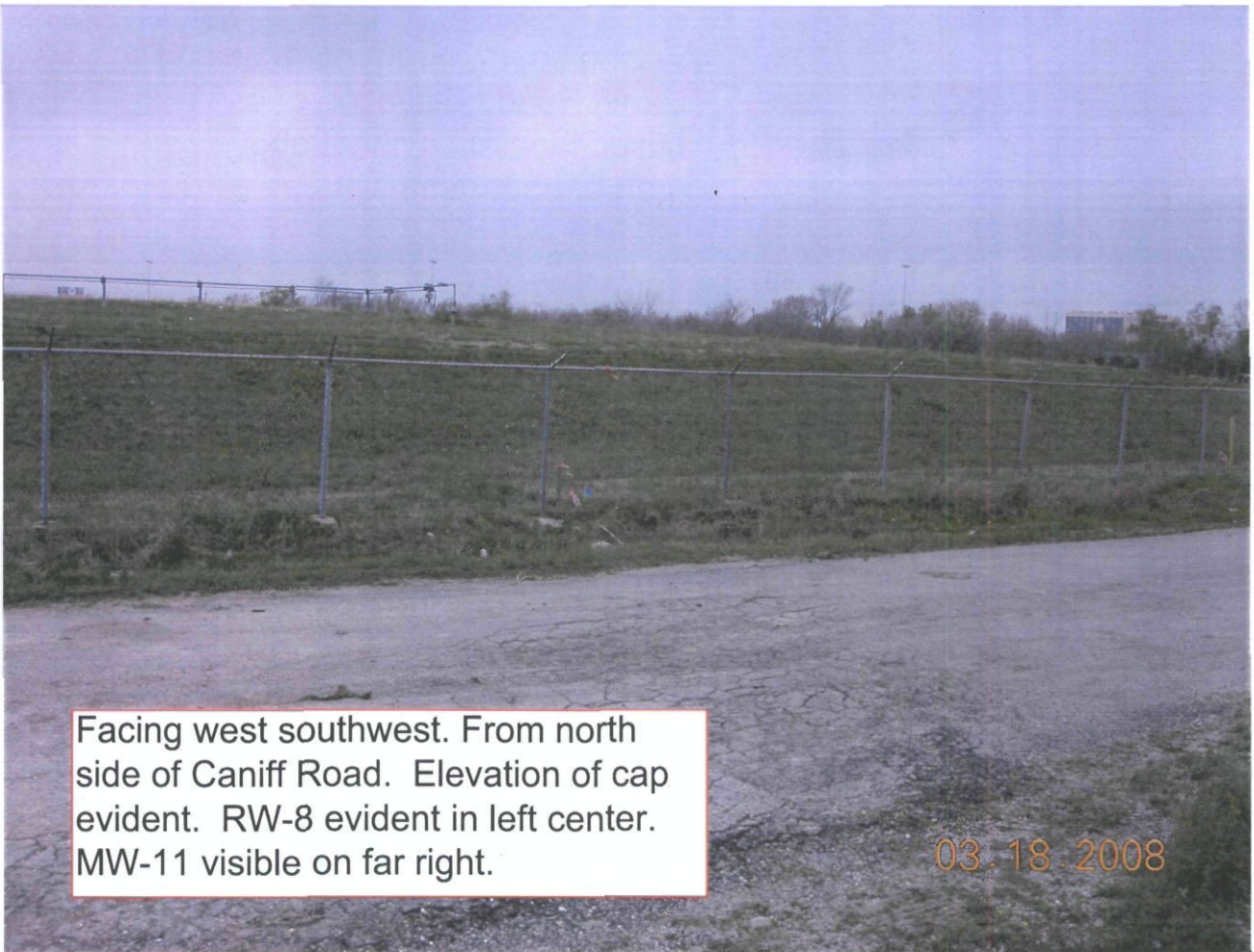


03.18.2008

Facing southwest. From north side of Caniff Road. Elevation of cap with raised pipe run to RW-8 on right side.



03.18.2008



Facing west southwest. From north side of Caniff Road. Elevation of cap evident. RW-8 evident in left center. MW-11 visible on far right.

03.18.2008



Facing south.
Treatment tanks.

03.18.2008



Facing north northeast. Treatment plant. Pipe runs entering building. MW-22 at southwest corner of building.



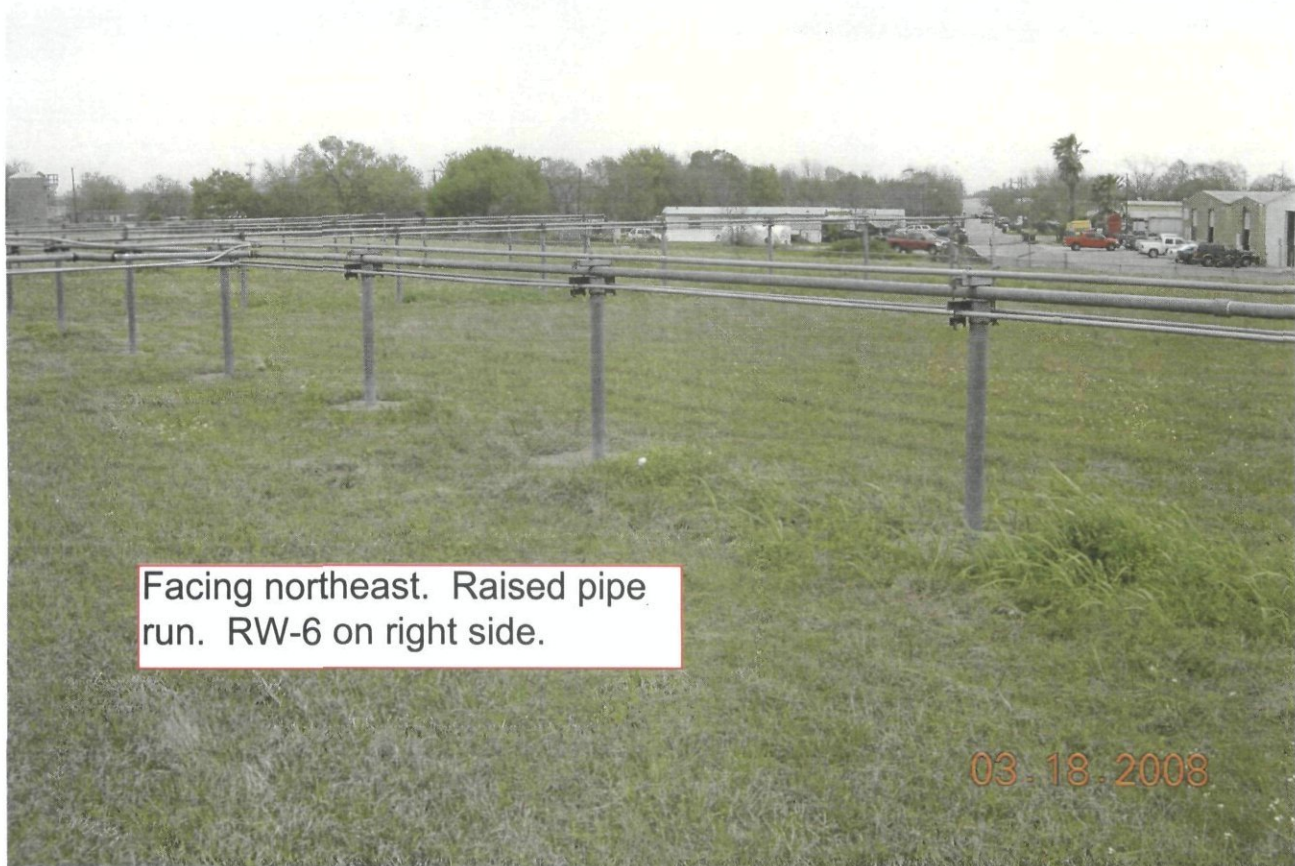
Facing southeast. Raised pipe run. Monitoring wells MW-101, 102, 103 and 104 at top rear.

03.18.2008



Facing southwest.
Monitoring wells MW-101,
102, 103 and 104.

03.18.2008



Facing northeast. Raised pipe
run. RW-6 on right side.

03.18.2008



Facing north northeast. MW-17 as found. Note: no lock on well casing.

03.18.2008



Facing north. MW-17 with cap opened for picture.

03.18.2008

Facing south southwest inside treatment plant. Bag filters. Will is preparing to change filter cartridges. Note water flowing out after retaining nuts have been loosened.



Facing south southwest inside treatment plant. Filter cartridge assembly. Cartridges are hanging down. New cartridges are white.

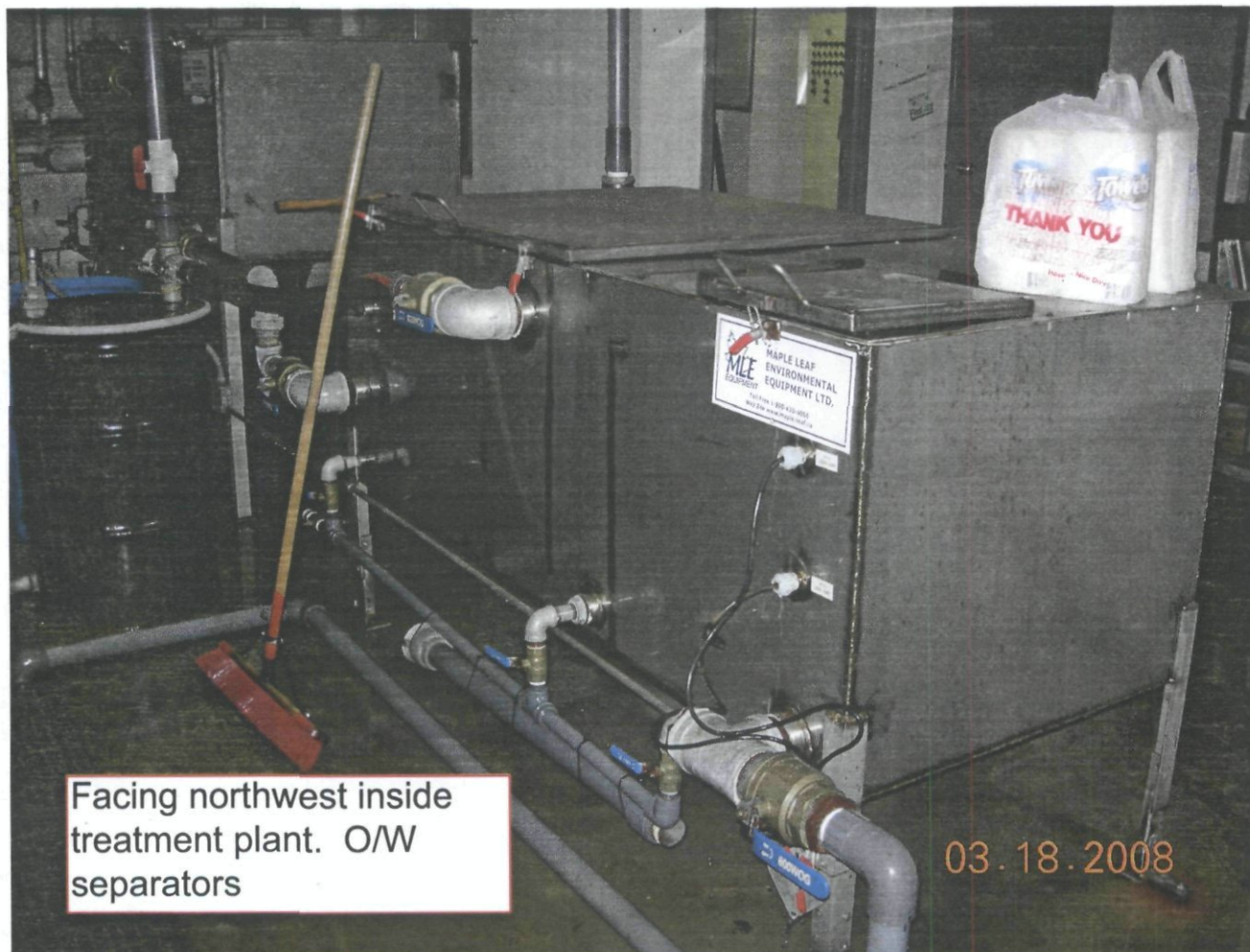




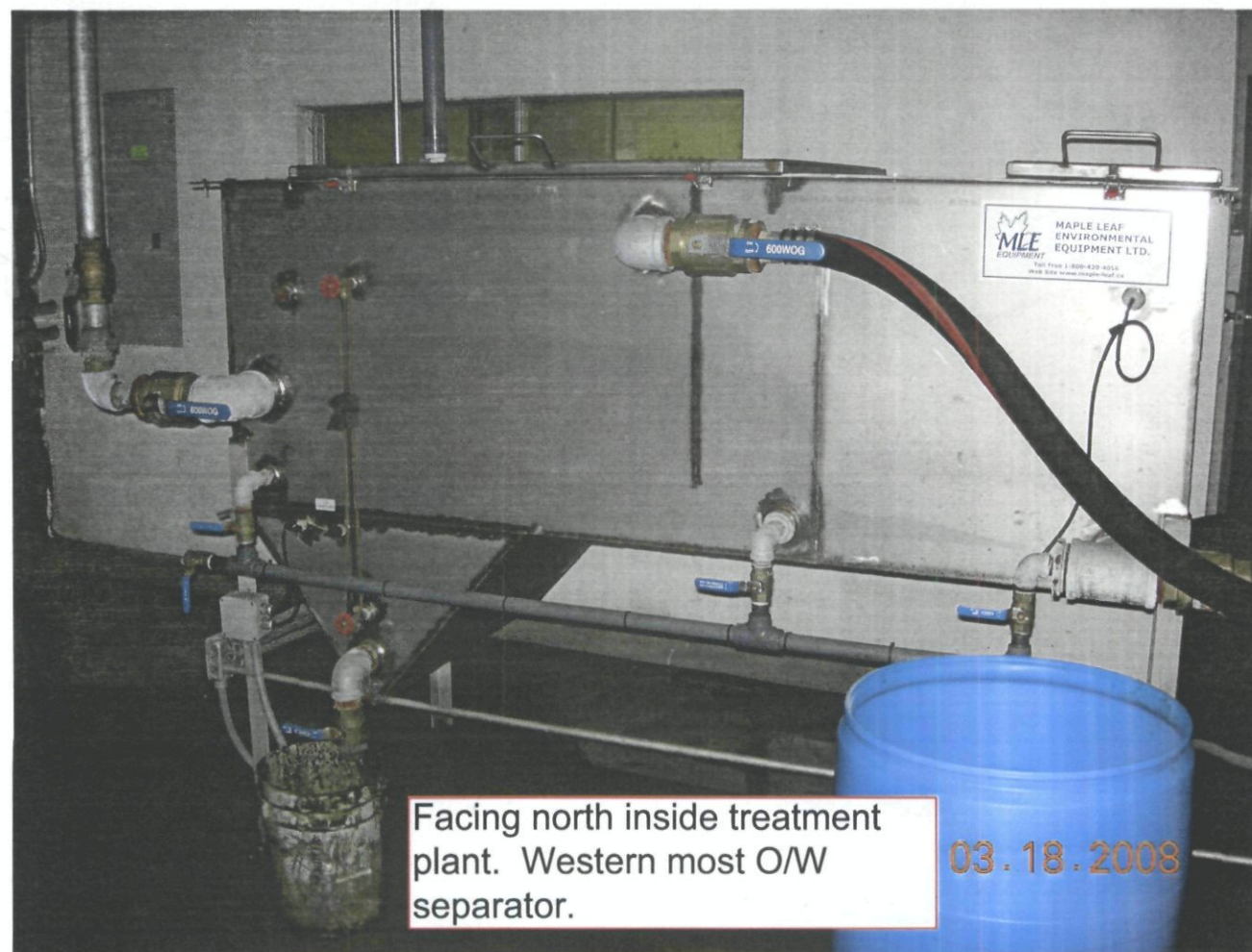
Facing south inside treatment plant. Tank T-5A.



Facing south inside treatment plant. Tank T-5A.



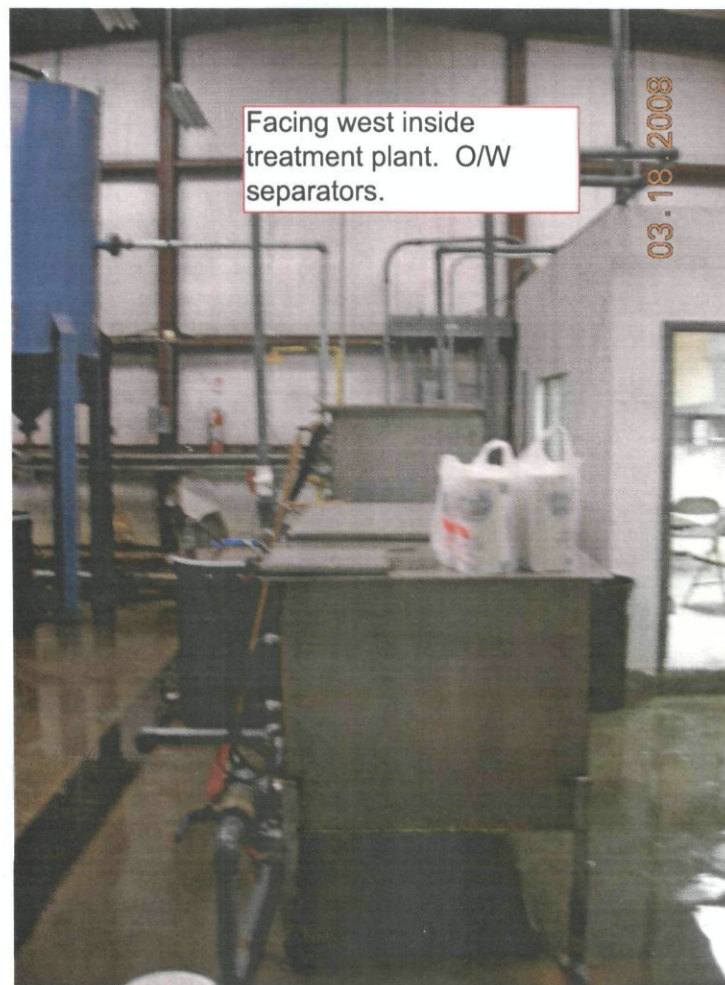
Facing northwest inside treatment plant. O/W separators



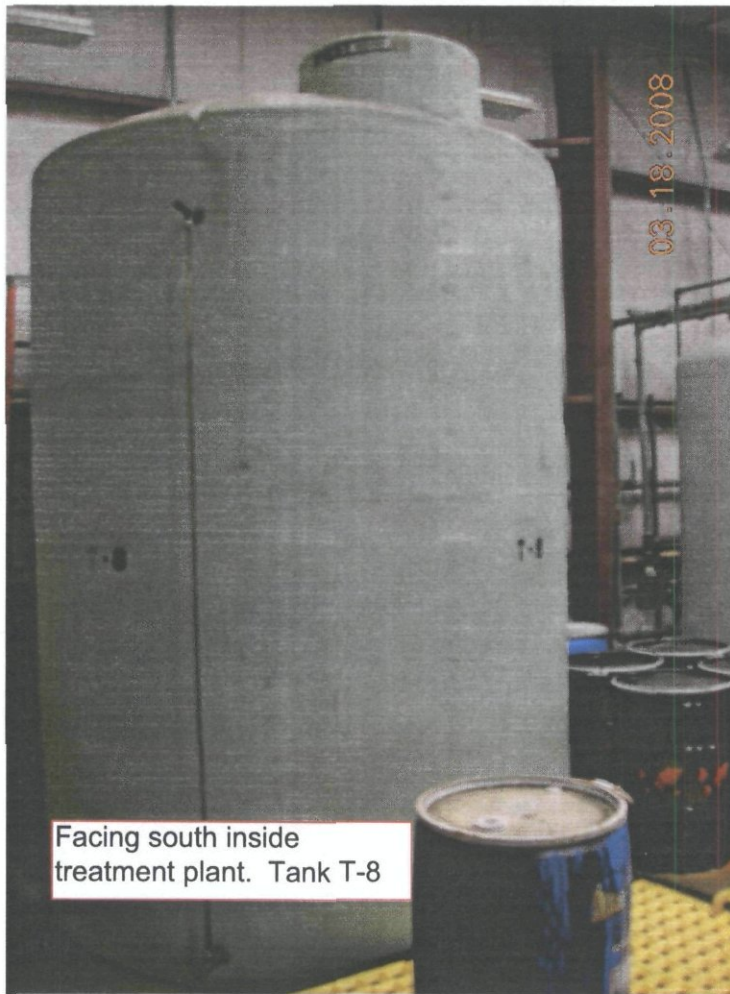
Facing north inside treatment plant. Western most O/W separator.



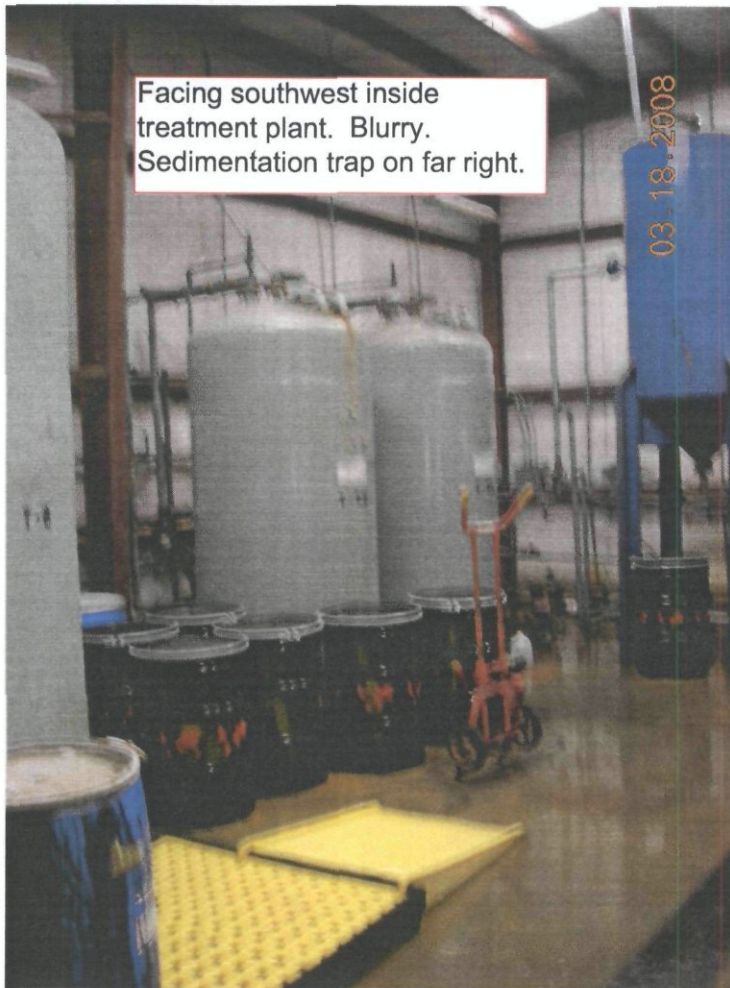
Facing west southwest inside treatment plant. Blurry. Sedimentation trap in center. O/W separators barely visible on right.



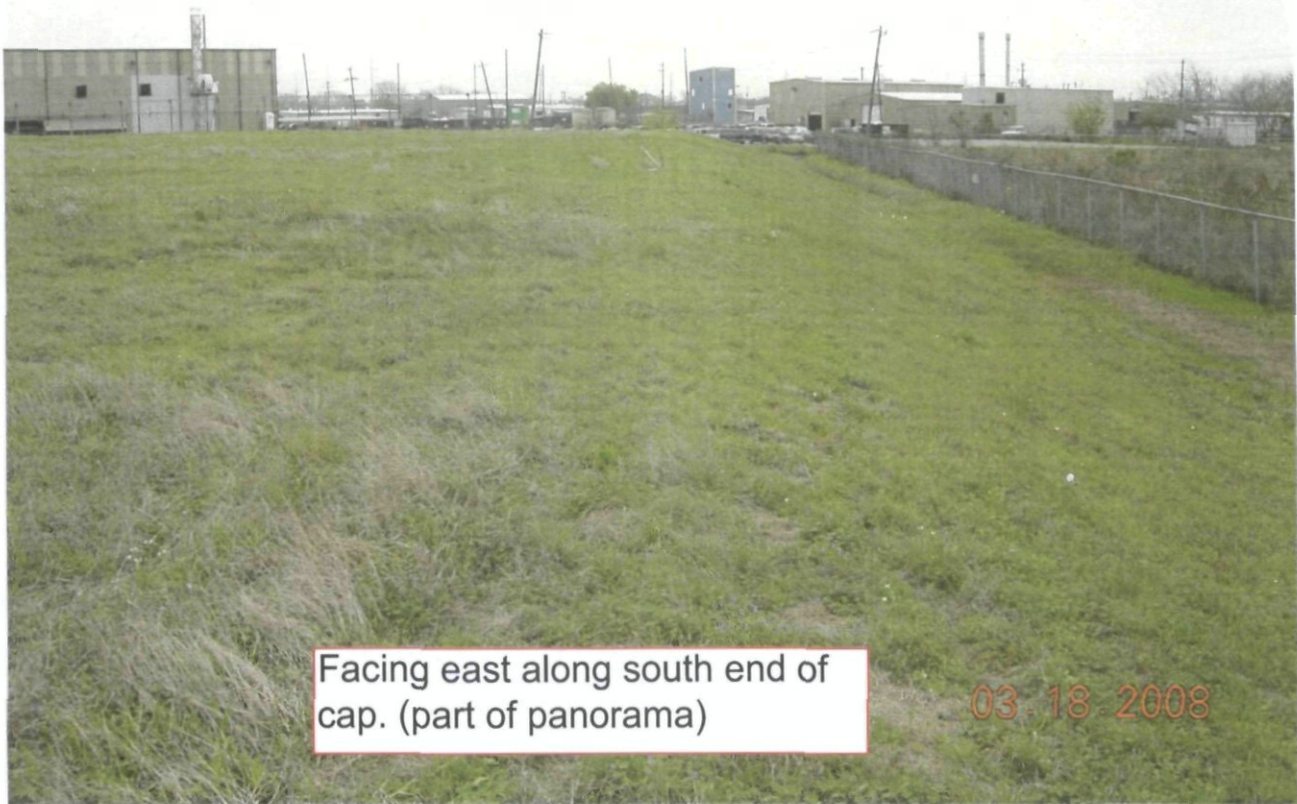
Facing west inside treatment plant. O/W separators.



Facing south inside treatment plant. Tank T-8



Facing southwest inside treatment plant. Blurry. Sedimentation trap on far right.



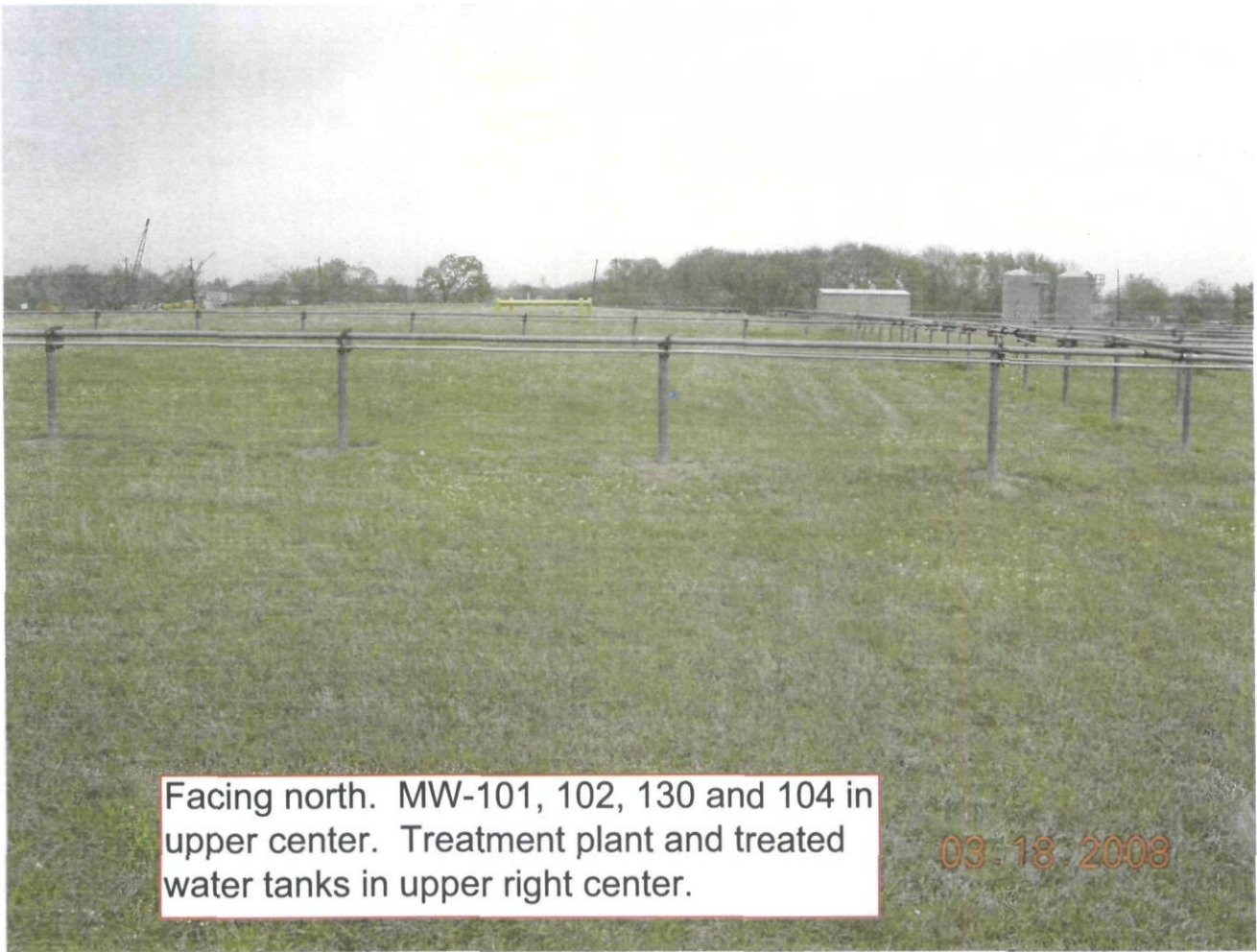
Facing east along south end of cap. (part of panorama)

03.18.2008



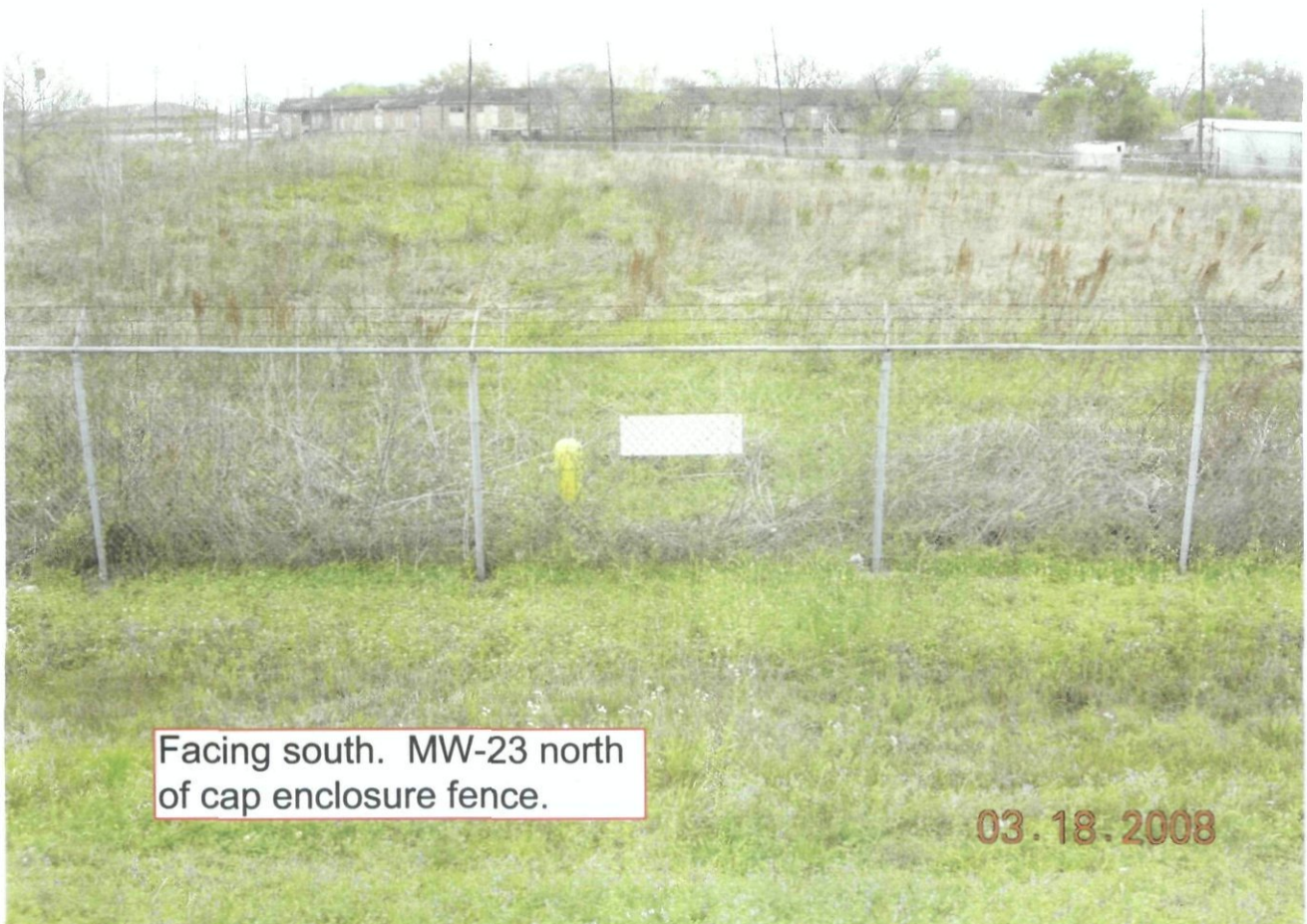
Facing northeast. From south end of cap. (part of panorama)

03.18.2008



Facing north. MW-101, 102, 130 and 104 in upper center. Treatment plant and treated water tanks in upper right center.

03.18.2008



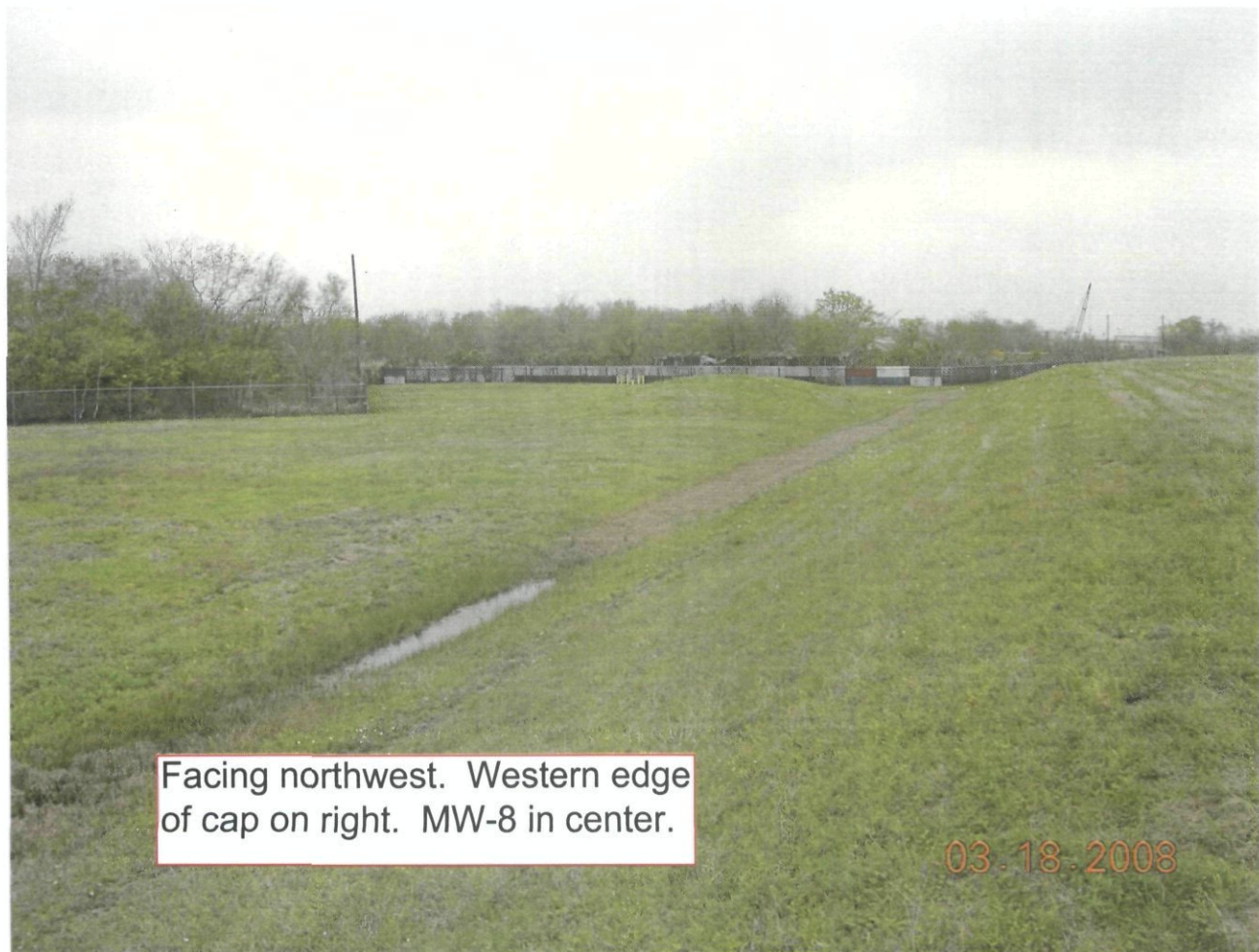
Facing south. MW-23 north of cap enclosure fence.

03.18.2008



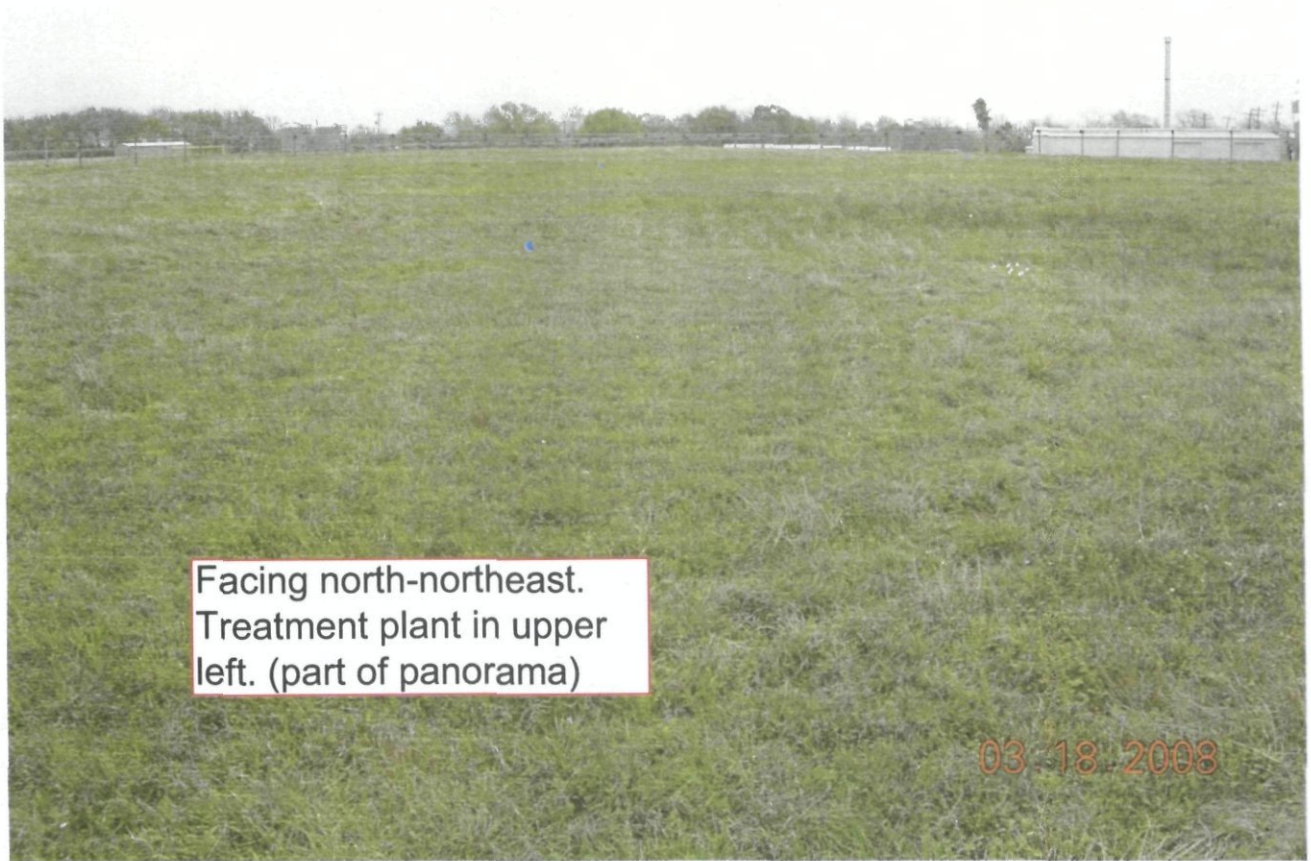
Facing north northwest along western edge of cap.

03.18.2008



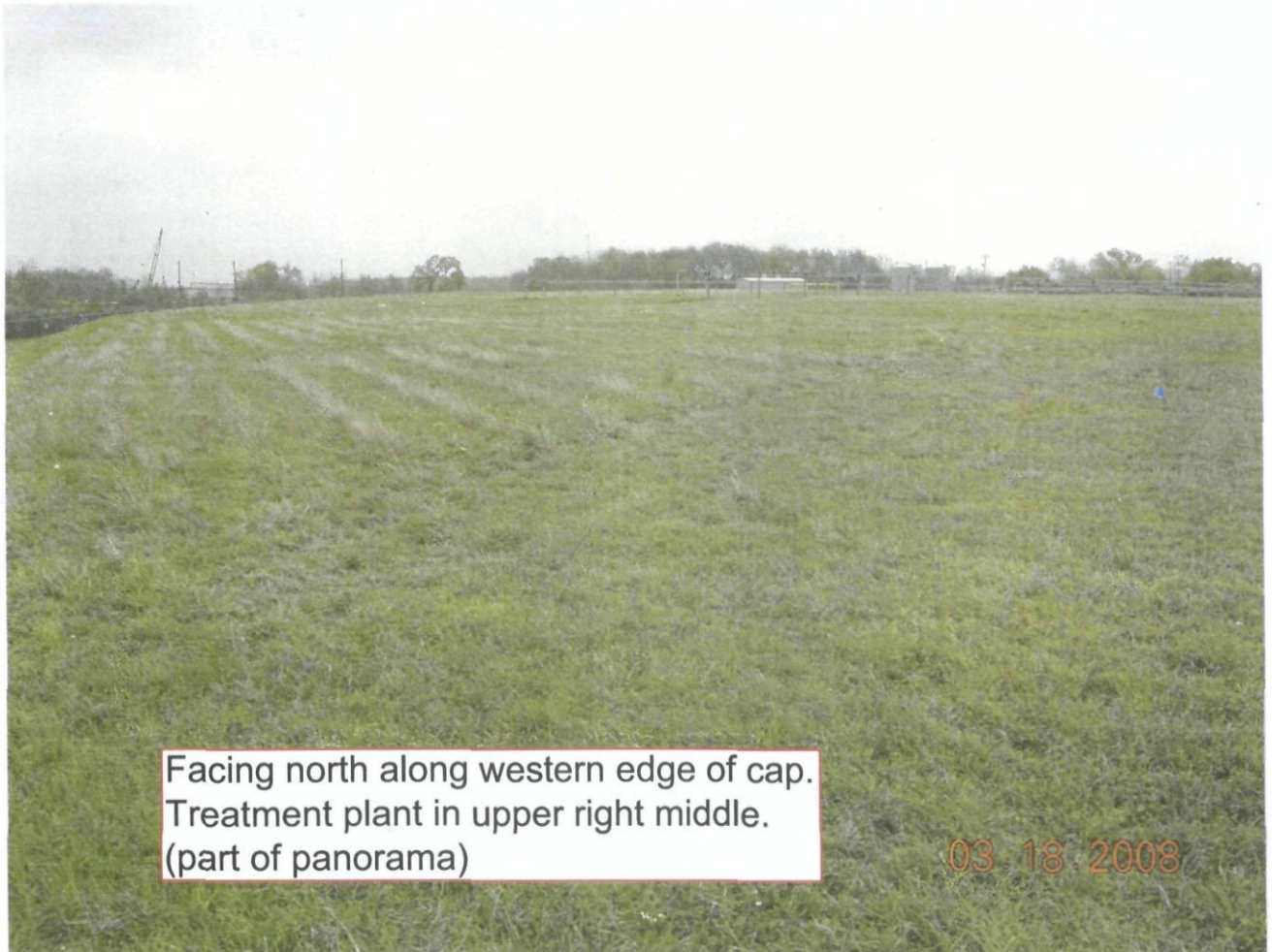
Facing northwest. Western edge of cap on right. MW-8 in center.

03.18.2008



Facing north-northeast.
Treatment plant in upper
left. (part of panorama)

03.18.2008



Facing north along western edge of cap.
Treatment plant in upper right middle.
(part of panorama)

03.18.2008



Fire ant mound on west side of cap.

03.18.2008



Facing west. MW-8.

03.18.2008



Facing southwest. Southwest corner of cap enclosure.

03.18.2008



Facing east northeast.
RW-7 in center.

03.18.2008



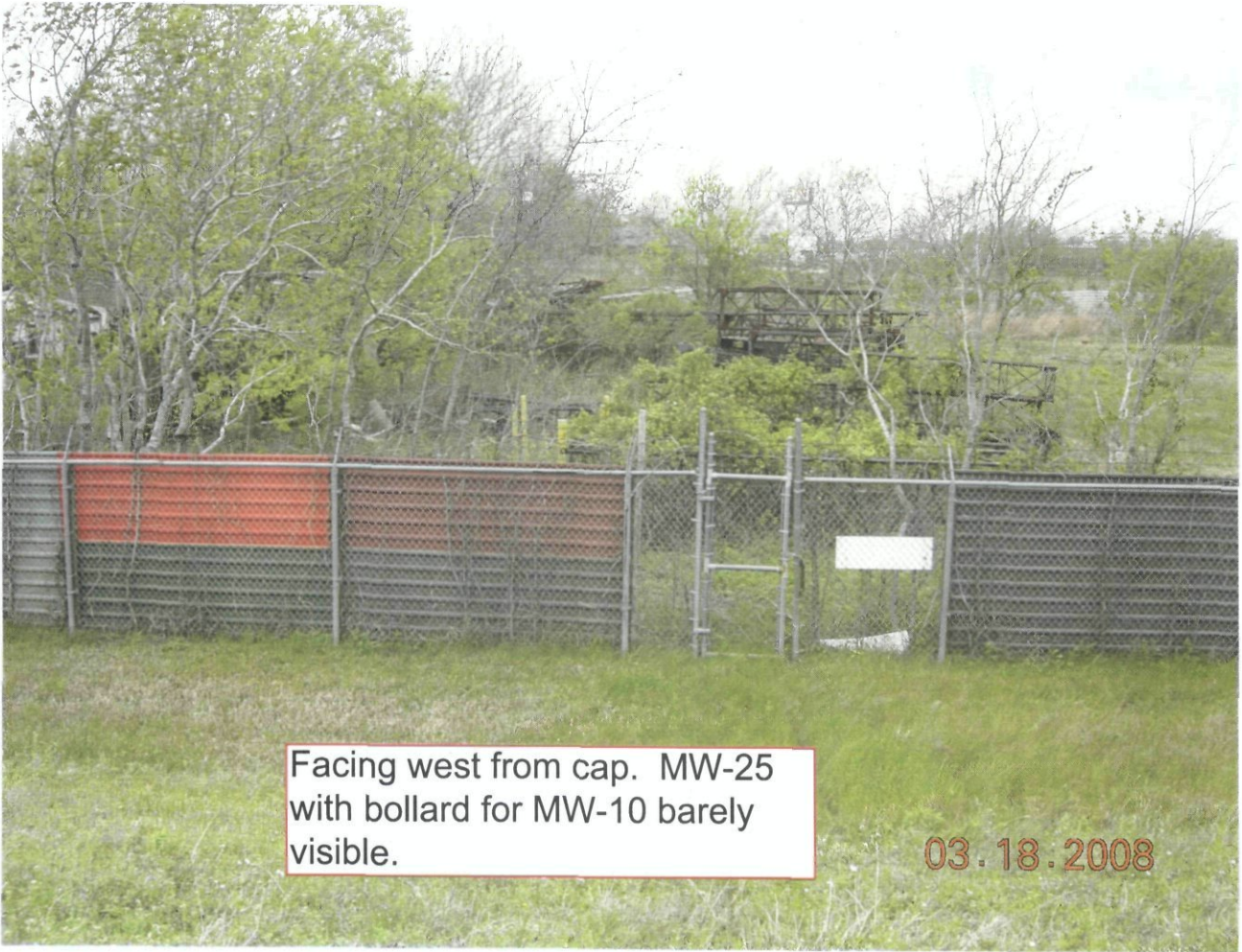
Facing east northeast. RW-5
in left center.

03.18.2008



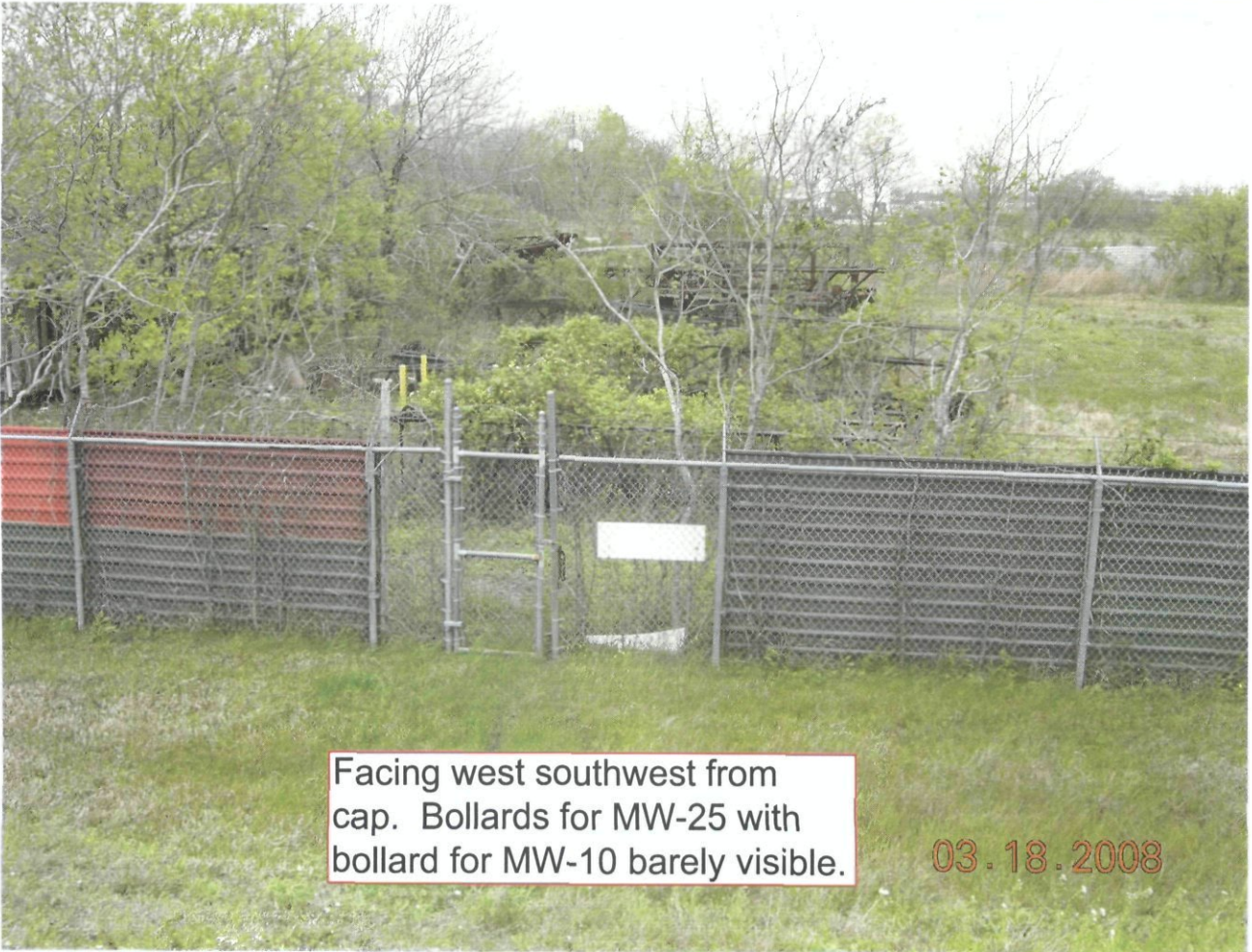
Facing west from cap.
MW-25.

03.18.2008



Facing west from cap. MW-25
with bollard for MW-10 barely
visible.

03.18.2008



Facing west southwest from
cap. Bollards for MW-25 with
bollard for MW-10 barely visible.

03.18.2008



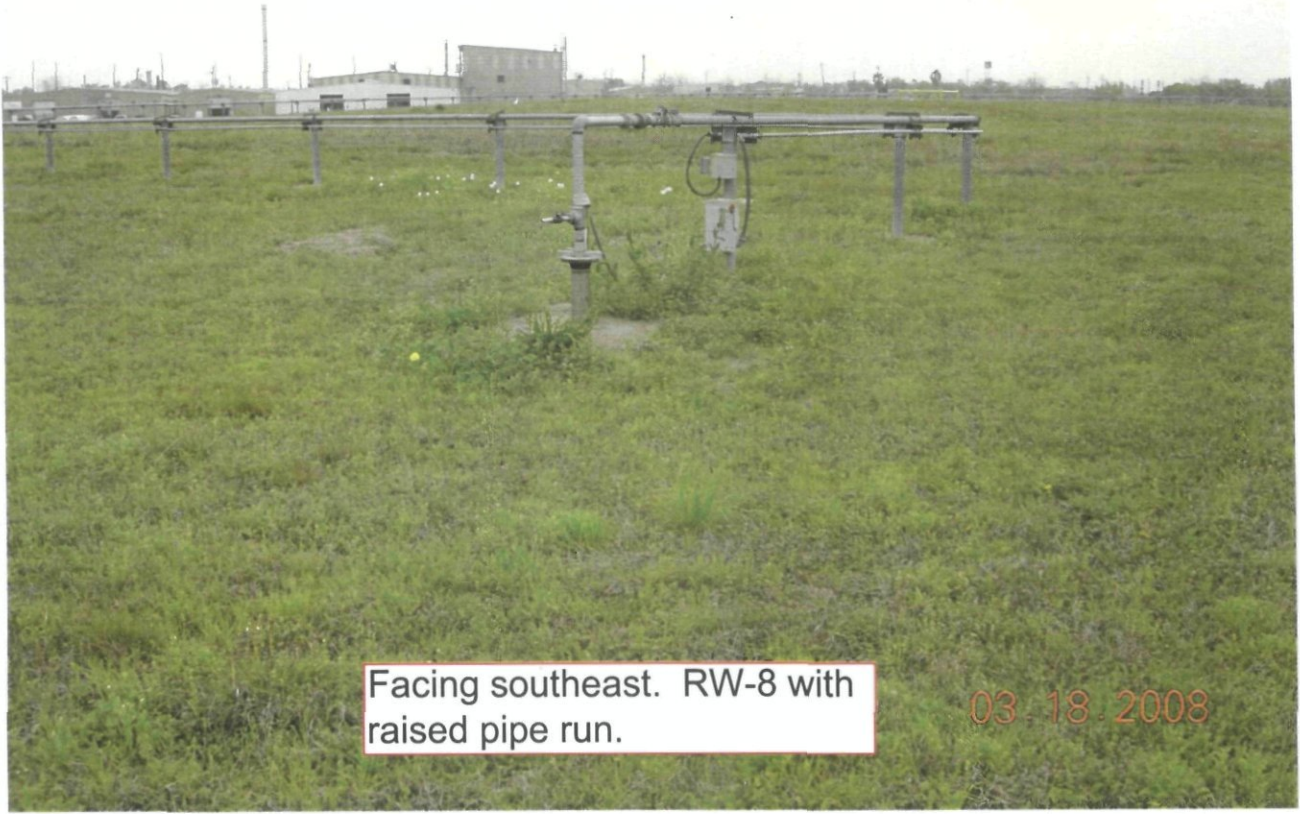
Northwest corner of cap enclosure. Concrete curbing to prevent erosion due to run off.

03.18.2008



Facing northeast. MW-11. Caniff Road in background.

03.18.2008



Facing southeast. RW-8 with raised pipe run.

03.18.2008



03.18.2008

Facing south. RW-8 close up.

03.18.2008



Facing east southeast. Treated water tanks.



Facing south southeast. Discharge ditch with discharge pipe from treated water tank containment area.

03.18.2008



Facing south southeast. MW-26 and MW-24. Note: no locks on casing.

03-18-2008

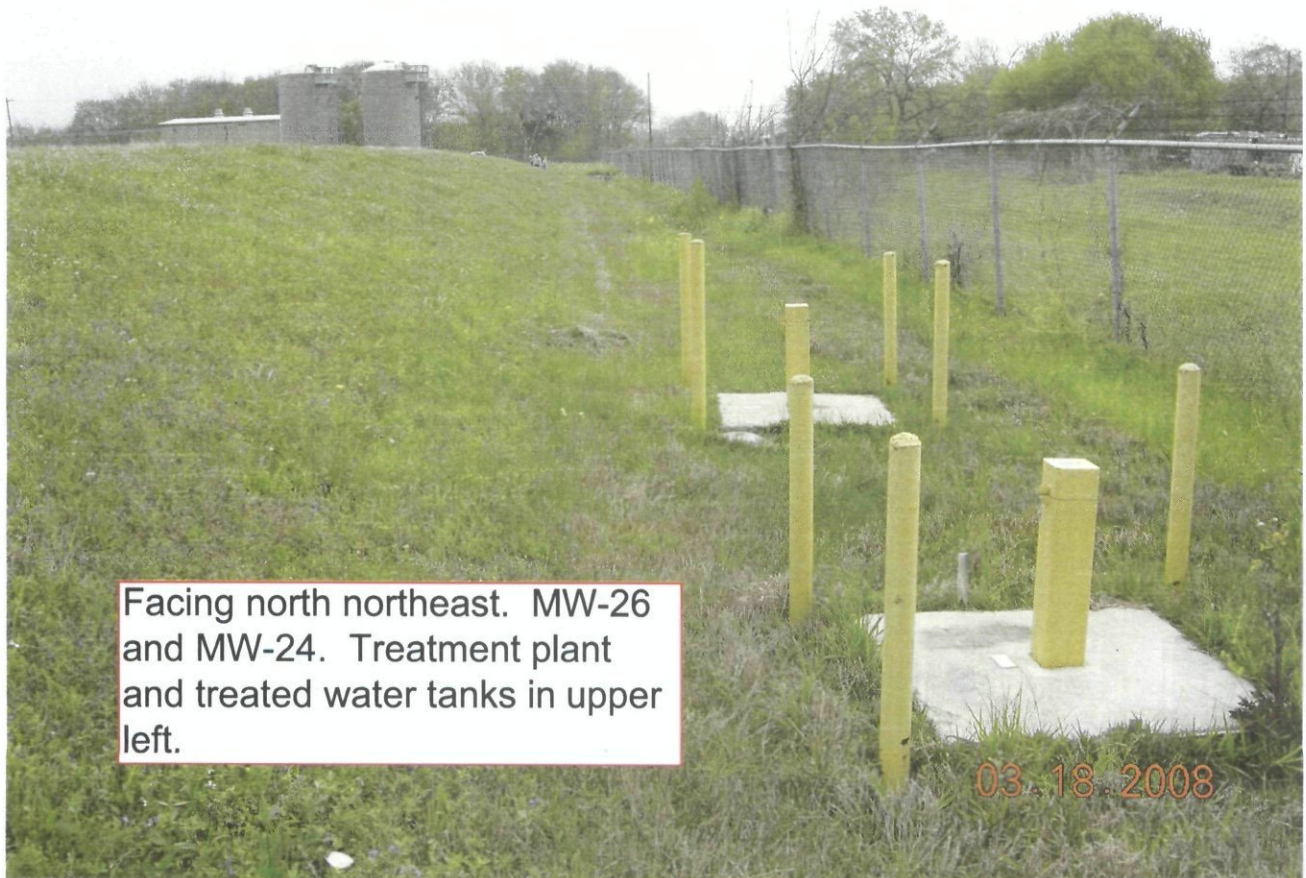


Facing east. MW-26 closeup.

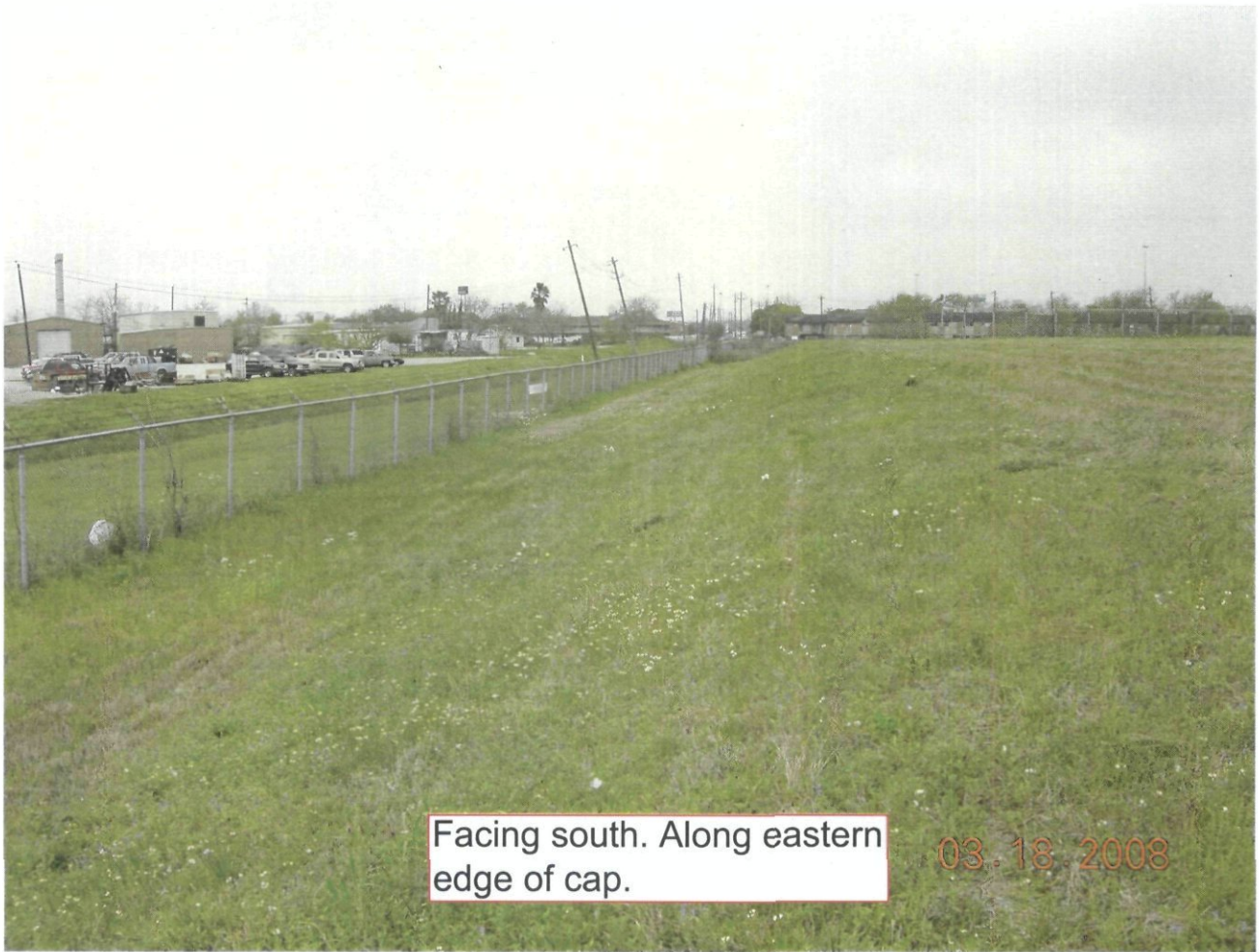
03-18-2008



Facing east. MW-24 closeup.

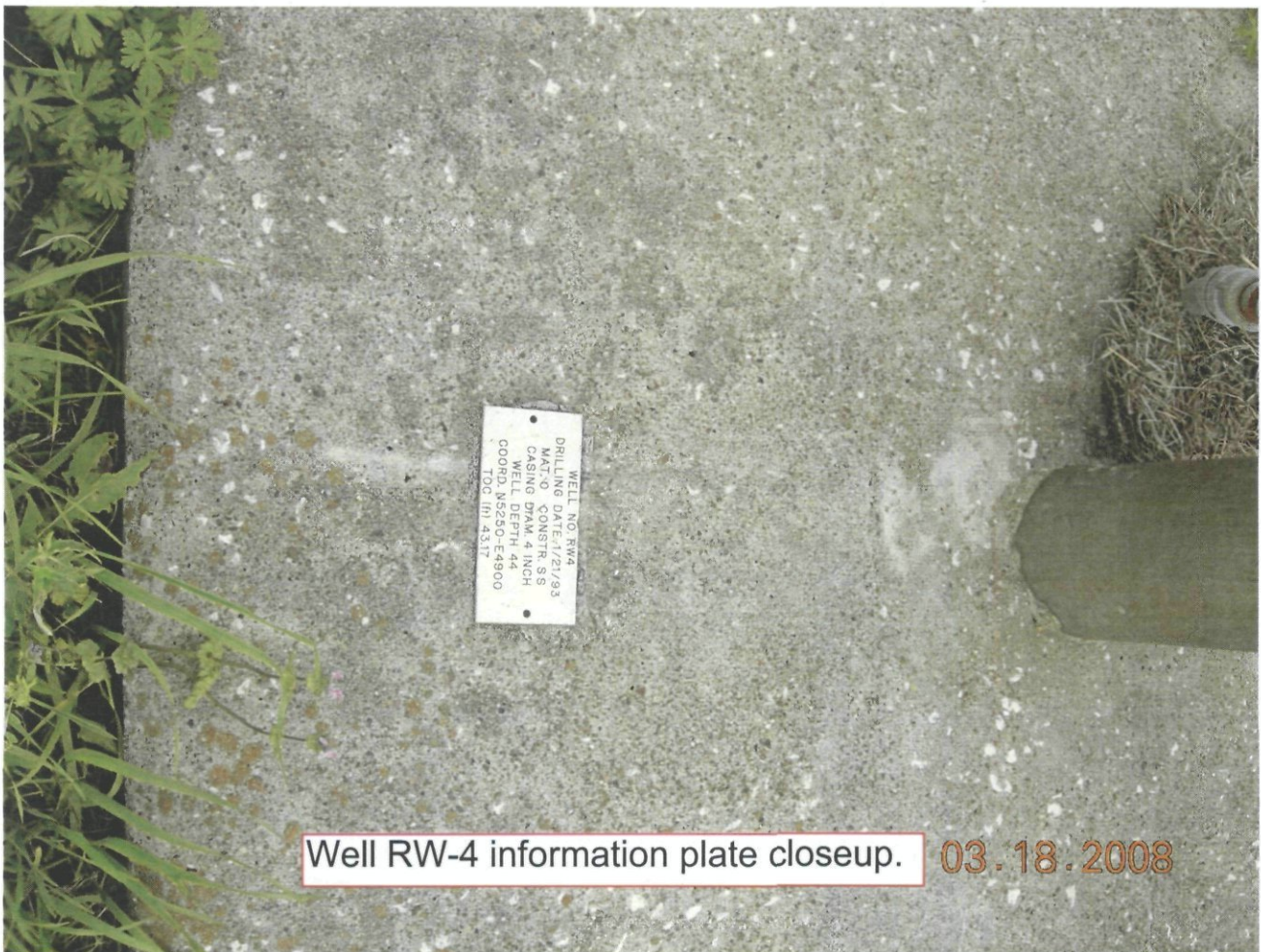


Facing north northeast. MW-26 and MW-24. Treatment plant and treated water tanks in upper left.



Facing south. Along eastern edge of cap.

03.18.2008



Well RW-4 information plate closeup.

03.18.2008



Facing west.
RW-4



Well RW-6
information plate.



Facing west. RW-6.
non operational.

03.18.2008



WELL NO. RW3
DRILLING DATE 1/18/93
MAT. OF CONSTR. SS
CASING DIAM. 4 INCH
WELL DEPTH 45
COORD. N5150-E4900
TCC (H) 43.10

Well RW-3 information plate.

03.18.2008



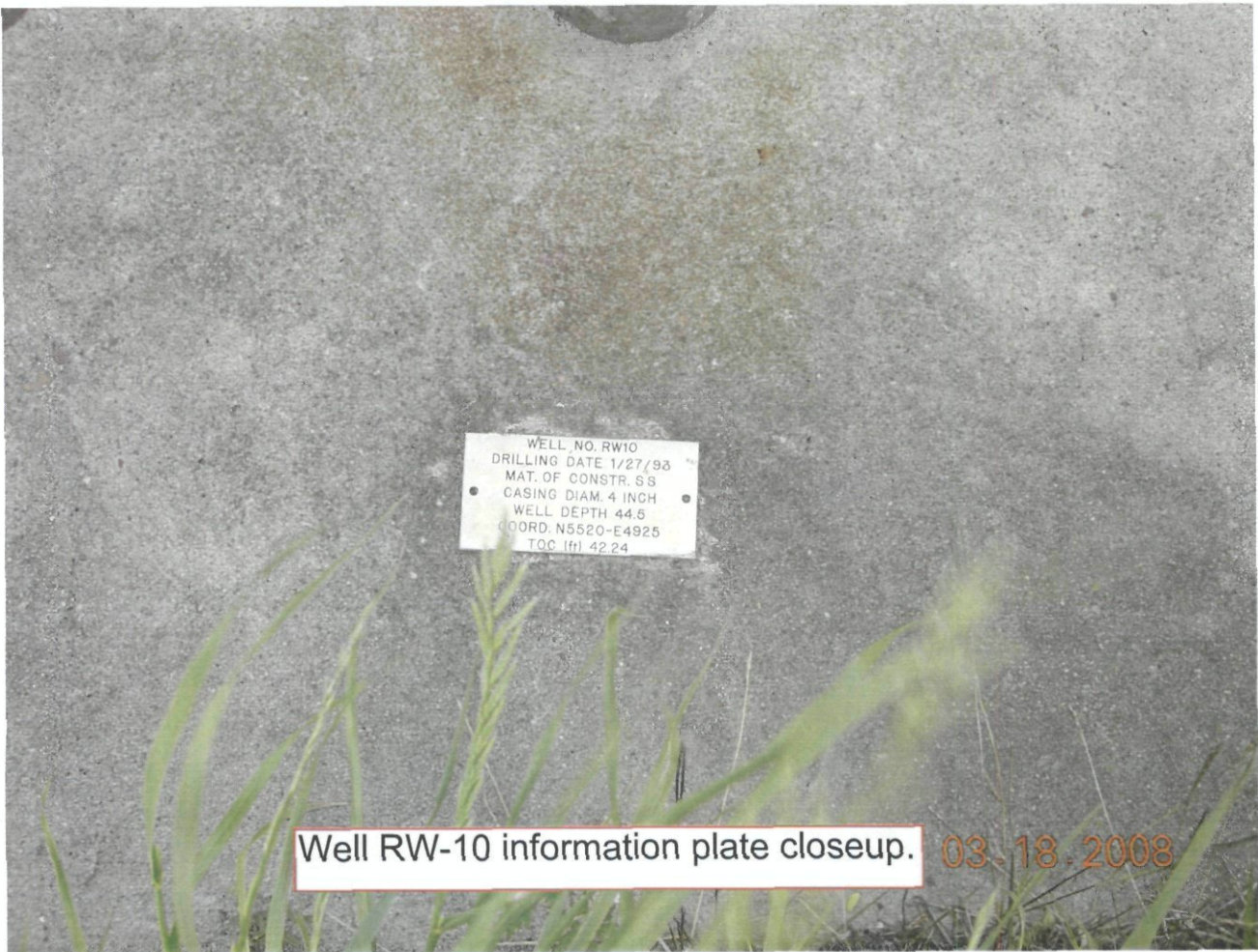
Facing west northwest.
RW-3 with pipe run.



Well RW-9 information
plate close up.



Facing west southwest.
RW-9 with pipe run.



Well RW-10 information plate closeup.

03.18.2008



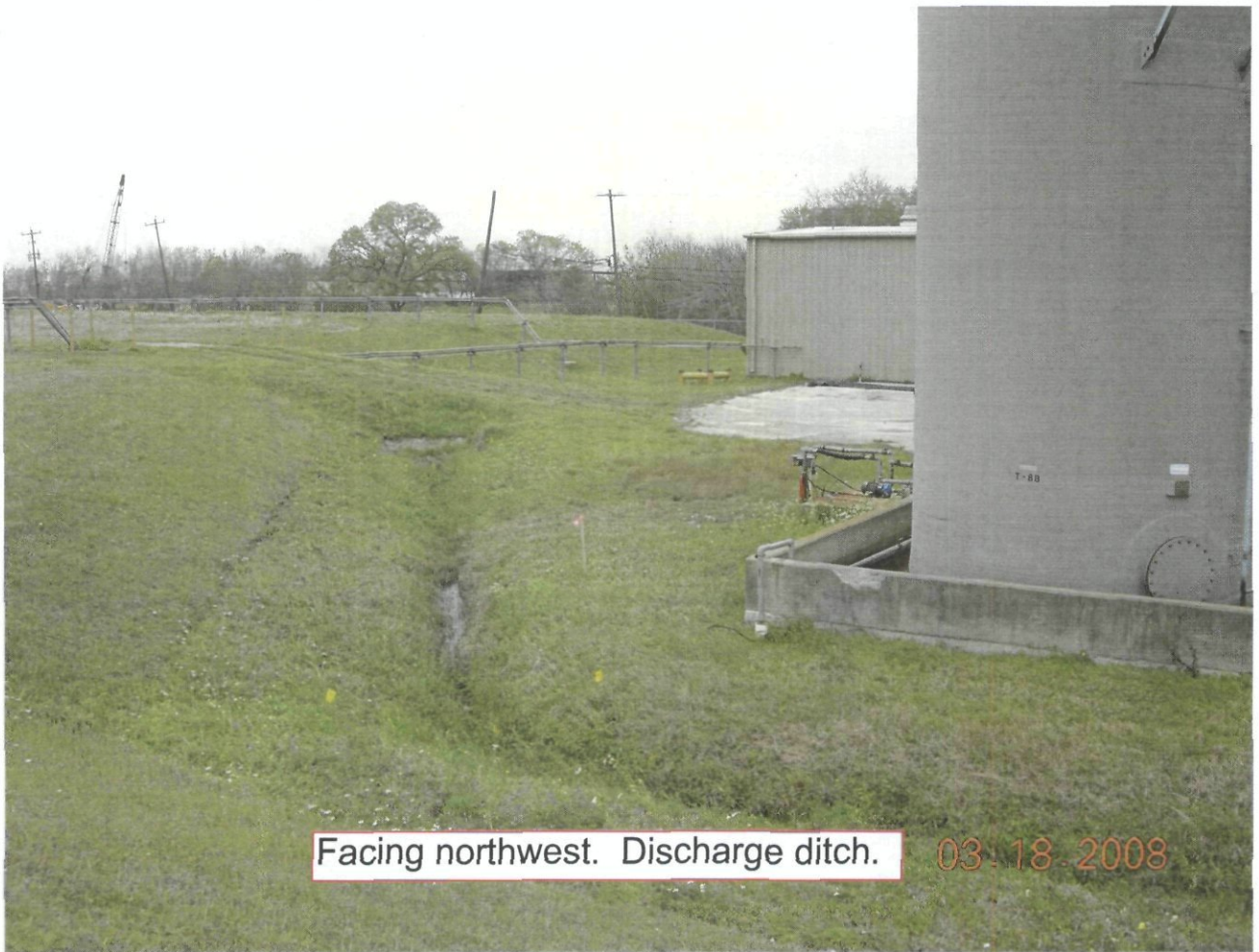
03.18.2008

Facing northwest.
Well RW-10



03.18.2008

Facing north. RW-10
with treated water
tanks behind. Note
stick up tube in well
casing used for water
level measurement.



Facing northwest. Discharge ditch.

03.18.2008



Facing north. MW-22 closeup.

03.18.2008



Facing southeast. MW-2

03.18.2008



Facing northeast. MW-2. Note: no lock on well outside of enclosure fence.

03.18.2008



Facing northwest. East side of treatment plant.

03.18.2008



Panorama picture taken from north end of cap.

03.18.2008

Attachment 5

Compliance Monitoring Chemical Data

TCE (mg/L)	Shallow Wells (30 ft Sand)				Deep Wells (100 ft Sand)						
	Date	MW-10	MW-11	MW-17	MW-26	MW-8	MW-22	MW-23	MW-24	MW-25	MW-102
	Jan-05	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002
	Jan-06	<0.00025	<0.00025	<0.00025	0.007	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025
	Jan-07	<0.00025	<0.00025	<0.00025	0.15	<0.00025	<0.00025	<0.00025	0.001	<0.00025	
	May-07	<0.00063	<0.00063	<0.00063	0.165	<0.00063	<0.00063	<0.00063	0.0011	<0.00063	<0.00063
	Oct-07	<0.00063	<0.00063	<0.00063	0.00071	<0.00063	<0.00063	<0.00063	<0.00063	<0.00063	<0.00063
	Jan-08	<0.002	<0.002	<0.002	0.0325	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002

TDS (mg/L)	Date	MW-10	MW-11	MW-17	MW-26	MW-8	MW-22	MW-23	MW-24	MW-25	MW-102
		Jan-05	2210	1330	3880	10700	769	389	458	1210	
	Jan-06	15000	895	4310	31700	833	423	431	1350	2840	326
	Jan-07	13500	2750	5240	50200	1410	482	445	4830	4910	
	May-07	12400	1360	5190	3930	1230	381	416	50100	4940	560
	Oct-07	890	10	4060	18300	12500	439	474	1340	3170	346
	Jan-08	6580	995	1830	24400	1620	378	436	1290	2380	549

O&G (mg/L)	Date	MW-10	MW-11	MW-17	MW-26	MW-8	MW-22	MW-23	MW-24	MW-25	MW-102
		Jan-05	1.3	2.9	1.7	1.4	1.1	3.7	2	2.5	
	Jan-06	0.7	<0.51	<0.51	1.6	<0.51	0.6	0.7	<0.51	0.6	1.5
	Jan-07	<0.51	<0.51	<0.51	2.1	<0.51	<0.51	<0.51	<0.51	<0.51	
	May-07	<1.4	<1.4	<1.4	2.8	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4
	Oct-07	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4
	Jan-08	<2.2	<2.2	<2.3	<2.1	<2.3	<2.2	<2.2	<2.1	<2.3	<2.3

TOC (mg/L)	Date	MW-10	MW-11	MW-17	MW-26	MW-8	MW-22	MW-23	MW-24	MW-25	MW-102
		Jan-05	1.4	1.3	1.8	1.2	0.2	2	0.3	0.2	
	Jan-06	2.68	3.11	<1.61	6.21	<1.66	0.781	<1.25	<1.14	<1.95	0.938
	Jan-07	2.34	2.6	1.78	4.56	0.771	0.775	0.52	0.753	0.386	
	May-07	2	2	2	5	0.5	0.5	0.4	1	0.4	1
	Oct-07	2.2	2.5	1.7	6.9	0.94	1	0.73	4.2	1.9	3
	Jan-08	2.4	2.5	1.8	5.3	1.4	0.56	0.78	4.7	1.6	1.1

Shallow Wells (30 ft Sand)											Deep Wells (100 ft Sand)
Date	RW-1	RW-2	RW-3	RW-4	RW-5	RW-7	RW-8	RW-9	RW-10	RW-6	
Jan-05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.0025	<0.001	<0.05	
Jan-06	<0.00014	<0.00014	<0.00014	<0.00014	<0.00014	<0.00014	<0.00014	<0.00014	<0.00014	<0.00014	
Jan-07											
May-07											
Oct-07											
Jan-08											

Date	RW-1	RW-2	RW-3	RW-4	RW-5	RW-7	RW-8	RW-9	RW-10	RW-6
Jan-05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.0025	<0.001	<0.05
Jan-06	<0.00011	<0.00011	<0.00011	<0.00011	<0.00011	<0.00011	<0.00011	<0.00011	<0.00011	<0.00011
Jan-07										
May-07										
Oct-07										
Jan-08										

Date	RW-1	RW-2	RW-3	RW-4	RW-5	RW-7	RW-8	RW-9	RW-10	RW-6
Jan-05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.0025	<0.001	<0.05
Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Jan-07										
May-07										
Oct-07										
Jan-08										

Aroclor-1248 (mg/L)

Aroclor-1254 (mg/L)

Aroclor-1260 (mg/L)

Attachment 6

Water Level Measurement Data

Water Elevation (ft above/below msl)

Well ID	30' Sand	100' Sand	Total Depth of Well (ft)	Sampled 1/23/2006	Sampled 2/13/2007	Sampled 3/28/2007	Sampled 6/22/2007	Sampled 10/8/2007	Sampled 12/11/2007	Sampled 1/7/2008	Sampled 2/9/2008	Sampled 4/15/2008
MW-8		X	99.58	NM	12.91	NM	14.56	11.92	11.19	11.03	11.51	11.63
MW-10	X		20.34	22.92	25.59	25.70	26.13	25.29	24.83	25.05	25.87	24.63
MW-11	X		35.11	23.58	26.45	26.50	27.09	26.66	26.12	26.26	27.17	25.72
MW-17	X		34.26	23.22	26.03	25.81	26.01	25.52	25.21	25.38	25.87	24.97
MW-22		X	138.57	NM	12.77	NM	34.74	12.06	11.15	10.98	11.48	11.68
MW-23		X	109.06	NM	13.62	NM	15.20	13.21	12.52	12.38	12.87	12.97
MW-24		X	110.94	NM	13.04	NM	13.20	12.47	11.43	11.30	11.77	8.84
MW-25		X	107.13	NM	11.06	NM	12.47	11.83	11.33	10.92	11.42	11.55
MW-26	X		35.29	23.90	25.34	25.50	25.22	25.59	24.93	24.94	25.18	24.97
MW-101		X	NM	NM	NM	NM	-177.12	-119.27	-130.00	-129.73	NM	NM
MW-102		X	115.58	NM	NM	NM	-29.65	18.04	11.48	11.11	11.61	11.63
MW-103		X	NM	NM	NM	NM	-179.91	-109.38	-133.13	-132.82	NM	NM
MW-104		X	NM	NM	NM	NM	-136.42	-84.31	-90.94	-90.55	NM	NM
Well ID	30' Sand	100' Sand	Total Depth of Well (ft)	Sampled 1/23/2006	Sampled 2/13/2007	Sampled 3/28/2007	Sampled 6/22/2007	Sampled 10/8/2007	Sampled 12/11/2007	Sampled 1/7/2008	Sampled 2/9/2008	Sampled 4/15/2008
RW-1	X		46.59	25.81	27.03	25.97	24.57	23.39	22.31	21.89	21.82	21.84
RW-2	X		44.27	25.93	26.89	25.72	24.29	23.22	22.05	21.61	21.53	21.56
RW-3	X		46.21	26.03	27.07	25.91	24.51	23.41	21.71	21.89	21.80	21.81
RW-4	X		44.05	25.90	26.57	25.61	24.17	23.14	22.02	21.57	21.44	21.53
RW-5	X		44.91	25.87	35.02	25.89	24.49	23.03	22.27	21.87	19.28	21.79
RW-6		X	114.22	NM	NM	NM	-28.43	NM	NM	NM	NM	-29.33
RW-7	X		45.23	25.90	27.12	25.97	24.59	23.46	22.37	21.97	21.87	21.88
RW-8	X		40.56	25.76	26.79	25.60	24.24	23.24	22.07	21.59	18.37	21.28
RW-9	X		44.45	25.96	26.99	26.09	24.92	23.26	22.59	22.23	22.16	22.10
RW-10	X		46.29	25.79	NM	25.76	42.74	23.37	22.01	21.59	21.42	21.42

NM - Not Measured

Attachment 7
Notice to the Public Regarding the
Five-Year Review



**Geneva Industries Superfund Site
Public Notice
U.S. EPA Regions 6 Begins
Third Five-Year Review of Site Remedy
October 1, 2007**



The U.S. Environmental Protection Agency (EPA) Region 6 has begun a Third Five-Year Review of the remedy for the Geneva Industries Superfund site in Houston, Harris County, Texas. The review will evaluate the ability of the remedy to correct contamination problems and protect public health and the environment. The site is located at 9334 Canniff Street in Houston, Texas, immediately adjacent to the city limit of South Houston. The Site is within one-mile of Interstate Highway 45 and within two miles of Hobby Airport. Once completed, the results of the Third Five-Year Review will be made available to the public at the following information repository.

**M.D. Anderson Library
University of Houston
Main Campus
4800 Calhoun Road
Houston, Texas 77004
(713) 743-9772**

Information about the Geneva Industries site is also available on the Internet at:

<http://www.epa.gov/earth1r6/6sf/pdf/files/0602809.pdf>

Questions or comments concerning the Geneva Industries Superfund site should be directed to Gary Miller at (214) 665-8318 or 1-800-533-3508 (toll free).

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