SECOND FIVE-YEAR REVIEW REPORT

FOR THE

ODESSA CHROMIUM I SUPERFUND SITE
ODESSA, ECTOR COUNTY, TEXAS

September 2006

PREPARED BY:

United States Environmental Protection Agency
Region 6
Dallas, Texas

SECOND FIVE-YEAR REVIEW REPORT
Odessa Chromium I Superfund Site
EPA ID No. TXD980867279
Odessa, Ector County, Texas

This memorandum documents the United States Environmental Protection Agency's (EPA's) performance, determinations, and approval of the Odessa Chromium I Superfund site second five-year review under Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 United States Code Section 962 l(c), as documented in the attached Second Five-Year Review Report prepared by EA Engineering, Science, and Technology, Inc. on behalf of EPA.

Summary of Second Five-Year Review Findings

The second five-year review for the Odessa Chromium I Superfund site was performed through a review of site documents and site-specific requirements; a site inspection performed on June 15, 2006; interviews with personnel from the Texas Commission on Environmental Quality (TCEQ) and its contractor, Shaw Environmental & Infrastructure, Inc.; and a review of data collected at the site during the second five-year review period.

The site remedy addresses chromium-contaminated groundwater. The remedial action at the site has achieved the remediation goals in all monitoring wells with two exceptions: monitoring well RW-102 and treatment well TW-6C. The pump-and-treat system has been highly effective in removing and treating high chromium concentrations in the groundwater. It has been slower and less effective in treating the larger volume of less contaminated groundwater. Ferrous sulfate treatment (and subsequently Metals Remediation Compound [MRC™]) has been used to accelerate the achievement of the remediation goals.

The second five-year review found that the selected remedy is performing as intended, and is protective of human health and the environment. The remedy will be protective in the long term provided well TW-6C is purged, over-drilled, plugged, and abandoned; the EPA and TCEQ investigate whether the leach field area should be capped with an impervious liner overlain with asphalt base and surface; the operation and maintenance remedial activities continue to achieve and maintain site ground water remediation; and the other actions identified in this report are implemented.

Actions Recommended

The main deficiency noted during the site inspection was the integrity of well TW-6C. It was discussed during the inspection that TW-6C was the only well in the leach field that remained above the maximum contaminant level (MCL) for chromium. It was also discussed that the chromium concentrations previously increased in well RW-6 following heavy rain events or after continuous operations of a former leach field sprinkler system. A subsequent inspection of the well report for TW-6C revealed that this well was screened from 8 feet below ground surface (bgs) to 78 feet bgs for upper vadose zone MRC™ treatment injection. Monitoring wells MW-111 and RW-6 screens begin at 68 bgs and are likewise in the leach field area, and are located approximately 35 feet away from TW-6C; however, analytical results show their respective concentrations to be below the MCL for chromium. This vertical screened interval of TW-6C in conjunction with its highly permeable outer sand/gravel pack provides evidence of a

direct conduit for chromium to migrate from the upper contaminated leach field through the vadose zone directly to the underlying aquifer. It is recommended that well TW-6C be purged, plugged and abandoned by overdrilling (at least 10 inches in diameter), which is to remove the well materials, including the purge water, casing and sand pack. Additionally, to prevent future migration of chromium from the upper vadose zone soils to the aquifer, it is recommended that EPA and TCEQ investigate whether the leach field area should be capped with an impervious liner, and then an overlay with asphalt base and surface.

None of the other deficiencies noted during the site inspection were significant enough to warrant further immediate action, other than locking the unsecured well caps, scheduling semi-annual site inspections, and the continuance of O&M ground water treatment. It is also recommended that inspections continue to be performed at least twice per year to check the condition of the site access restrictions, namely, fencing and no-trespassing signs, and repairs and mowing are to be performed as necessary, no less than required by the city and/or existing neighborhood conditions. In accordance with the Record of Decision, the TCEQ should continue to sample monitoring wells that exceed the MCL for chromium, and prepare reports describing the analytical results and semi-annual inspections/mowing activities. It is suggested that MRC™ treatments continue directly into well RW-102 to reduce chromium concentrations. The inspection team commented that a revised treatment strategy for the injection point needed to be directly within the well itself, instead of using other distant up-gradient wells which was not as effective in treating and reducing the localized plume chromium source concentrations to below the MCL. If TCEQ reduces the sampling regimen to include only the wells that exceed the MCL for chromium, an update to the Operation and Maintenance Plan for the site should be made to reflect the reduced sampling efforts. In addition, institutional controls may be necessary to prevent drilling or other activities which would allow chromium from contaminated soils to migrate to the aquifer.

Determinations

I have determined that the remedy for the Odessa Chromium I Superfund site will be protective of human health and the environment upon completion, and that current human exposure is controlled and is thus protective in the short-term, and will remain so provided the action items herein are addressed and corrective actions implemented.

Pamela Phillips, Acting
Samuel Coleman, P.E.
Director
Superfund Division, Region 6
U.S. Environmental Protection Agency

Sept 28, 2006
Date

CONCURRENCES:

SECOND FIVE-YEAR REVIEW REPORT
ODESSA CHROMIUM I SUPERFUND SITE
EPA ID No. TXD980867279

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Deputy Director, Superfund Division
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Attachments

LIST OF TABLES

LIST OF ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
CFR	Code of Federal Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWA	Clean Water Act
EA	EA Engineering, Science, and Technology. Inc.
EPA	U.S. Environmental Protection Agency Region 6
ESD	Explanation of Significant Differences
$FeSO_4$	Ferrous Sulfate
IC	Institutional Controls
MCL	Maximum Contaminant Level
mg/L	Milligrams per liter
MRC™	Metals Remediation Compound
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
RA	Remedial Action
ROD	Record of Decision
SARA	Superfund Amendments and Reauthonzation Act
SDWA	Safe Drinking Water Act
Shaw	Shaw Environmental & Infrastructure, Inc.
TCEQ	Texas Commission on Environmental Quality
TRRP	Texas Risk Reduction Program

EXECUTIVE SUMMARY

The U.S. Environmental Protection Agency Region 6 (EPA) has conducted the second five-year review of the remedial action (RA) implemented at the Odessa Chromium I Superfund site in Odessa. Ector County, Texas. The purpose of this second five-year review was to determine whether the selected remedy for the site continues to protect human health and the environment. This review was conducted from June to September 2006, and its findings and conclusions are documented in this report. The first five-year review of the RA was signed on September 25, 2001.

Several documents were reviewed as part of this second five-year review, including those containing the following data: (1) ground-water sampling summaries, (2) monitoring well water levels, (3) analytical sampling results and (4) inspection summaries.

The Odessa Chromium I Superfund site was listed on the National Priorities List in September 1984. EPA divided the site into two operable units: Operable Unit (OU) 01, which extended the Odessa City water system to include service to affected areas, and OU 02, which addressed groundwater contaminated with chromium. The RA objectives, selected remedy, and implementation status for OU 01 and OU 02 are discussed in the following paragraphs.

OU 01

EPA signed the Record of Decision (ROD) for OU 01 on September 8, 1986.

The design of an alternate water supply system was completed during December 1987, and the alternate water supply contract notice to proceed was issued on May 23, 1988. On November 3, 1988, 5,370 linear feet of 8-inch water mains, 8 fire hydrants, necessary valves and fittings, 40 service taps and meter boxes, and 18 meters and service connections were installed during Texas Commission on Environmental Quality (TCEQ)/EPA RA activities, and the operation and maintenance (O&M) activities were assumed by the City of Odessa.

OU 02

EPA signed the ROD for OU 02 on March 18, 1988, which addressed groundwater contamination. The ROD listed the following requirements for the remedy:

- Demolition and disposal of the building located at 4318 Brazos Street
- Extraction of contaminated groundwater from the Trinity Aquifer
- Electrochemical treatment of groundwater that exceeds the Primary Drinking Water Standard (or maximum contaminant level [MCL] of 0.1 milligram per liter for chromium)
- Reinjection of the treated groundwater into the Trinity Aquifer
- Monitoring the site for a minimum of 30 years.

The selected remedy eliminated the principal threat posed by the site conditions by eliminating the possibility of human exposure to chromium.

The RA contract for OU 02 was awarded by TCEQ (then the Texas Natural Resources Conservation Commission) on October 31, 1991, to Waste Abatement Technologies of Marietta, Georgia. Contract activities were initiated on November 28, 1991. Site construction began on January 17, 1992, however, injection well plugging necessitated numerous treatment plant modifications to rectify and correct operational problems.

The EPA. TCEQ, and TCEQ's oversight engineer, IT Corporation (now Shaw Environmental & Infrastructure, Inc.), conducted the final inspection of the final treatment plant modifications on November 17, 1993, and issued the substantial completion certificate on November 21, 1993.

The electrochemical treatment process demonstrated its effectiveness in removing high chromium concentrations in recovered groundwater. However, it was slower and less effective in treating groundwater with lower chromium concentrations, which represents the larger volume of contaminated groundwater at the site.

As is common with groundwater pump-and-treat systems, the chromium concentration in the aquifer decreased significantly during the first year of treatment. After the first year, the chromium concentration in the recovered groundwater continued to decline throughout most of the aquifer, but at a slower rate. With the exception of Recovery Well 6 (RW-6), all of the recovery wells have followed this pattern. Chromium concentrations in RW-6 appeared to rise following periods of heavy rainfall or when the prior leach field was in operation, indicating that chromium may be leaching from vadose zone soils.

The delay in achieving the remediation goals at the site led TCEQ and EPA to add ferrous sulfate (and subsequently Metals Remediation Compound [MRC™]) treatment by an Explanation of Significant Differences (ESD) to the ROD. Circumstances that gave rise to the need for these treatments were as follows:

- Operation of the groundwater extraction system was estimated to have a 4-year or less duration. However, after extended operations at the site, remediation goals had not been achieved for several wells.

- With EPA's approval, TCEQ conducted an experimental in-situ treatment in a three-step process in December 1998 and January 1999. The well and leach field results, after treatment with ferrous sulfate, demonstrated that the treatment was highly successful in chromium concentration reduction, thereby demonstrating that accelerated achievement of the remediation goals was attainable with the addition of the in-situ ferrous sulfate treatment. An Explanation of Significant Differences was signed on October 25, 1999.

Four ferrous sulfate injections were implemented in September 2002 with effective results for several wells. However, in August 2003, a MRC™ pilot study injection test was conducted due to reduced injection capacity of ferrous sulfate.

The second five-year review focused on data obtained during routine inspections and sampling events conducted at the Odessa Chromium I Superfund site during the second five-year review period. At this time, the selected remedy appears to be performing as intended.

The following issues were noted.

1. **O&M**— The site inspection revealed that not all of the monitoring wells had locking caps. It is recommended that all wells be secured with padlocks.

2. **Integrity of Monitoring Well TW-6C**— A review of the data shows that the only well in the vicinity of the leach field that remains above the MCL for chromium is TW-6C. A subsequent inspection of the well report for TW-6C revealed that this well was screened from 8 feet below ground surface (bgs) to 78 feet bgs for upper vadose zone MRC™ treatment injection. Monitoring wells MW-111 and RW-6 screens begin at 68 bgs and are

likewise in the leach field area, and are located approximately 35 feet away from TW-6C; however, analytical results show their respective concentrations to be below the MCL for chromium. This vertical screened interval of TW-6C in conjunction with its highly permeable outer sand/gravel pack provides evidence of a direct conduit for chromium to migrate from the upper contaminated leach field through the vadose zone directly to the underlying aquifer.

The following actions are recommended in response to these issues:

1. Purge, plug and abandon monitoring well TW-6C by overdrilling the well and its sand pack to reduce the migration of chromium into the underlying aquifer.

2. Investigate whether to install an impervious liner and cap over the leach field area. The cap would be overlaid with an asphalt base and surface material, to prevent any chromium in the vadose soils from migrating into the underlying aquifer. A source area investigation may be warranted to support this investigation. If a cap or other remedial actions are appropriate, a ROD amendment would be required.

3. Due to recorded detected concentrations below the MCL for chromium, plug and abandon wells MW-111, RW-4, and RW-6.

4. Install locks on all existing remaining unsecured monitoring well caps.

5. Continue site inspections and maintenance on a semi-annual basis to check the condition of the site.

6. Continue to sample the existing monitoring wells that exceed the MCL for chromium.

7. Continue MRC™ treatments directly into RW-102.

8. Revise/update the O&M Plan to make it applicable to the current conditions at the site and reduce the quantity of monitoring well sampling (if implemented).

9. Institutional controls (ICs) in the form of a deed notice are to be filed if site remediation of the ground water cleanup continues to be delayed. ICs may be necessary to prevent drilling or other activities which would allow chromium from contaminated soils to migrate to the aquifer.

10. Investigate the potential source of chromium from current operations at 2104 West 42nd Street.

At this time, based on the information available during the second five-year review, the selected remedy will be protective of human health and the environment in the long term, provided the actions identified in this review are implemented.

Five-Year Review Summary Form

SITE IDENTIFICATION

Site Name (from WasteLAN): Odessa Chromium I Superfund Site

EPA ID (from WasteLAN): TXD980867279

Region: 6	**State:** Texas	**City/County:** Odessa/Ector County

SITE STATUS

NPL Status: ☒ Final ☐ Deleted ☐ Other (specify) _____

Remediation Status (choose all that apply): ☐ Under Construction ☒ Operating ☐ Complete

Multiple OUs?* ☒ YES ☐ NO **Construction Completion Date:** 9/9/1994

Has site been put into reuse? ☒ YES ☐ NO

REVIEW STATUS

Reviewing Agency: ☒ EPA ☐ State ☐ Tribe ☐ Other Federal Agency _____

Author Name: Ernest Franke, P.E., RPLS

Author Title: Remedial Project Manager	**Author Affiliation:** EPA Region 6

Review Period:** 9/2001 to 9/2006

Date(s) of Site Inspection: 6/15/2006

Type of Review:
☒ Statutory
☐ Policy ☒ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only
☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead
☐ Regional Discretion

Review Number: ☐ 1 (first) ☒ 2 (second) ☐ 3 (third) ☐ Other (specify) _____

Triggering Action:
☐ Actual RA Onsite Construction at OU ☐ Actual RA Start
☐ Construction Completion ☒ Previous Five-Year Review Report
☐ Other (specify) _____

Triggering Action Date (from WasteLAN): 09/2001

Due Date (Five Years After Triggering Action Date): 09/2006

* "OU" refers to operable unit.

** The review period refers to the period during which the five-year review was conducted.

Five-Year Review Summary Form (Continued)

Issues:

1. **Operation and Maintenance**— The site inspection revealed that not all of the monitoring wells had locking caps. It is recommended that all wells be secured with padlocks.

2. **Integrity of Monitoring Well TW-6C**— A review of the data shows that TW-6C is the only well in the vicinity of the leach field that remains above the MCL for chromium. A subsequent inspection of the well report for TW-6C revealed that this well was screened from 8 feet below ground surface (bgs) to 78 feet bgs for upper vadose zone MRC™ treatment injection. Monitoring wells MW-111 and RW-6 screens begin at 68 bgs and are likewise in the leach field area, and are located approximately 35 feet away from TW-6C; however, analytical results show their respective concentrations to be below the MCL for chromium. This vertical screened interval of TW-6C in conjunction with its highly permeable outer sand/gravel pack provides evidence of a direct conduit for chromium to migrate from the upper contaminated leach field through the vadose zone directly to the underlying aquifer.

Recommendations and Follow-up Actions:

1. Purge, plug and abandon monitoring well TW-6C to minimize a direct conduit for the migration of chromium into the underlying aquifer.

2. Investigate whether to install an impervious liner and cap in the leach field area to prevent the migration of chromium in the soils into the underlying aquifer.

3. Due to concentrations below the MCL for chromium, plug and abandon wells MW-111, RW-4, and RW-6.

4. Install and secure locks on the caps of the remaining existing monitoring wells.

5. Continue site inspections and maintenance on a semi-annual basis to check the condition of the site.

6. Continue to sample the existing monitoring wells that continue to exceed the MCL for chromium.

7. Continue MRC™ treatments directly into well RW-102 until remediated.

8. Revise/update the O&M Plan to make it applicable to the current conditions at the site and reduce the quantity of monitoring well sampling (if implemented).

9. Institutional controls (ICs) in the form of a deed notice are to be filed if site remediation of the ground water cleanup continues to be delayed. ICs may be necessary to prevent drilling or other activities which would allow chromium from contaminated soil to migrate to the aquifer.

10. Investigate the potential source of chromium from current operations at 2104 West 42nd Street.

Protectiveness Statement:

Based on the information available during the second five-year review, the selected remedy for the Odessa Chromium I Superfund site will be protective of human health and the environment upon completion. Current human exposure is controlled and it is thus protective in the short term, and will remain so, provided the action items herein are addressed and implemented.

Long-Term Protectiveness:

The second five-year review found that the selected remedy is performing as intended. The remedy will be protective in the long term provided monitoring well TW-6C is purged, plugged and abandoned by overdrilling; the leach field is addressed; TCEQ's O&M remedial activities continue until well RW-102 is remediated; and the other actions identified in this report are implemented.

1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) Region 6 has conducted a second five-year review of the remedial actions (RAs) implemented at the Odessa Chromium I Superfund site, located in Odessa, Ector County, Texas, for the period between the completion of the first five-year review in September 2001 through June 2006. The purpose of a five-year review is to determine whether the remedy at a site remains protective of human health and the environment, and to document the methods, findings, and conclusions of the five-year review in a five-year review report. Five-Year Review Reports identify issues found during the review, if any, and make recommendations to address the issues. This Second Five-Year Review Report documents the results of the review for the Odessa Chromium I Superfund site, conducted in accordance with EPA guidance on five-year reviews.

The five-year review process is required by federal statute. EPA must implement five-year reviews consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA Section 121(c), as amended, states the following:

> "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."

NCP Section 300.430(f)(4)(ii) states the following:

> "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 EPA five-year review guidance further states that a five-year review should be conducted as a matter of policy for the following types of actions:

- A pre-Superfund Amendments and Reauthorization Act (SARA) RA that leaves hazardous substances, pollutants, or contaminants onsite above levels that allow for unlimited use and unrestricted exposure
- A pre- or post-SARA RA that, once completed, will not leave hazardous substances, pollutants, or contaminants onsite above levels that allow for unlimited use and unrestricted exposure but will require more than five years to complete
- A removal-only site on the National Priorities List (NPL) where the removal action leaves hazardous substances, pollutants, or contaminants onsite above levels that allow for unlimited use and unrestricted exposure and no RA has or will be conducted.

Because hazardous substances, pollutants, or contaminants remain at the Odessa Chromium I Superfund site above levels that allow for unlimited use and unrestricted exposure, a five-year review is required.

The Odessa Chromium I Superfund site includes two operable units: (1) Operable Unit (OU) 01, which provided City water to the affected residents; and (2) OU 02, which addressed ground water remediation. This second five-year review addresses the remedy for OU 02 only. The period addressed

by this five-year review for Odessa Chromium I extended from September 25, 2001 to September 25, 2006. The triggering action for this review was the completion of the first five-year review in September 2001. The second five-year review was conducted from June through September 2006, and its methods, findings, conclusions, and recommendations are documented in this report.

This report documents the five-year review for the Odessa Chromium I Superfund site by providing the following information: site chronology (Section 2.0), background information (Section 3.0), an overview of the RAs (Section 4.0), progress since the first five-year review (Section 5.0), the five-year review process (Section 6.0), technical assessment of the site (Section 7.0), institutional controls (ICs) (Section 8.0), issues (Section 9.0), recommendations and follow-up activities (Section 10.0), protectiveness statement (Section 11.0), and discussion of the next review (Section 12.0). Attachment 1 provides the site location map. Attachment 2 provides a site map and deed notice details. Attachment 3 provides a list of documents reviewed. Attachment 4 provides the site inspection checklist. Attachment 5 provides the interview records. Attachment 6 provides the site inspection photographs. Attachment 7 provides a historical total chromium data table. Attachment 8 provides chromium concentration trend graphs.

2.0 SITE CHRONOLOGY

A chronology of site events for the Odessa Chromium I Superfund site is provided in Table 1. Additional historical information for the site is available online at http://www.epa.gov/eartlilr6/6sf/pdffiles/0602943.pdf (EPA 2006).

3.0 BACKGROUND

This section discusses the site's physical characteristics, land and resource use near the site, history of site contamination, initial response to the site, and the basis for the response.

3.1 PHYSICAL CHARACTERISTICS

The Odessa Chromium I Superfund site is located within the City limits of Odessa, Texas (Attachment 1) and is located on the southern edge of the Texas High Plains region. The surficial soil in the site area is principally Amarillo loam. Generally, it is fine sandy loam which ranges in depth from 8 to 10 inches. Below that, to depths from 18 to 24 inches, the subsoil is fine sandy loam to sandy clay. Pleistocene windblown sand, clay deposits, and alluvium deposits underlie the soil section. Beneath the Pleistocene are 25 to 35 feet of caliche deposits, which can be relatively impermeable in local areas.

Underlying the caliche are scattered erosional remnants of the Ogallala formation composed of gravels, sands, silts, and clays. This formation does not generally extend to depths below 75 feet in the area.

The Trinity formation, the main fresh water producing aquifer in the area, underlies the Ogallala interval. The thickness of this formation ranges from 55 to 70 feet. It is composed of sands and sandstones with minor amounts of siltstone, clay, and gravel. Beneath the Trinity formation is the Dockum Group of Tnassic age, which serves as an effective aquiclude. The upper unit of the Dockum Group, the Chinle Formation, consists of up to 600 feet of clays and shales, which prevents downward migration of contaminants.

TABLE 1
CHRONOLOGY OF SITE EVENTS
ODESSA CHROMIUM I SUPERFUND SITE

Date	Event
September 1984	Site added to the NPL
September 1984 - December 1987	Remedial Investigation/Feasibility Study Conducted
March 18, 1988	Record of Decision Issued for Operable Unit 02
January 1, 1991	MCL for Chromium Revised
October 31, 1991	General Construction Contract Awarded
November 25, 1991	Notice to Proceed Issued
January 17, 1992	Construction Phase Begins
July 19, 1992	Initial Treatment Plant Start-Up Begins
January 8, 1993	Treatment System Shutdown after Continuing Problems of Injection Well Plugging; Treatment Plant Re-Designed
December 25, 1993	Re-Design Completed; Long-Term Pump-and-Treat Operations - 30 days of continuous successful operations. Begin LTRA
September 9, 1994	EPA Approved Final Construction Report
August 1995	Operation Begins with Treatment Plant Effluent
February 1997	Operation Ceases at Request of TCEQ
March 20, 1998	Operation Restarts with Effluent
December 26, 1998	Leach Field $FeSO_4$ Treatment
February 26, 1999	Begin 24-Hour Operation of Leach Field $FeSO_4$ Treatment
April 22, 1999	In-Situ Ferrous Sulfate Treatment Begins in Wells
October 25, 1999	Explanation of Significant Differences Issued
January 2000	Treatment Plant Removed From Operation to Extend Leach Field
August 3, 2001	Operation of Original Leach Field Restarted with $FeSO_4$ Added
September 1,2001	Operation of Extended Leach Field Started with $FeSO_4$ Added
September 2002	$FeSO_4$ Injection into Leach Fields Discontinued due to Reduced Injection Capacity
August 18-25,2003	MRC™ Pilot Test
December 10-25, 2003	MRC™ Treatment Event I , O&M began Dec 26,2003
May 10, 2004	MRC™ Treatment Event II
May 24, 2004	Treatment Plant Shutdown and Placed in Standby Mode per TCEQ Request
June 4-14, 2004	Treatment Plant Deactivation Activities Completed
May 11-12, 2005	MRC™ Treatment Event III
May 26, 2006	MRC™ Treatment Event IV

The hydrologic units containing potable water in the site area are the Ogallala formation at approximately 70 feet below the site, and the Trinity sand at approximately 90 feet below the site. In general, the Ogallala is hydrologically connected with the underlying Trinity and has little or no saturated thickness. A few miles to the southwest, the Ogallala has been totally eroded, and within the site area is only a thin remnant containing little water. Groundwater occurs beneath the site mainly in the Trinity Sand. Groundwater within this unit moves in a generally northern direction at 50-100 feet per year.

3.2 LAND AND RESOURCE USE

Historical land use is unknown prior to the establishment of chrome plating operations in the early 1950s. The district surrounding the Odessa Chromium I Superfund site is primarily zoned as industrial, with some residential properties located within close proximity of the site. A site location map and site layout map are provided in Attachments 1 and 2, respectively.

3.3 HISTORY OF CONTAMINATION

Two potential sources of groundwater contamination have been identified at the site. They are the past operations at the 4318 Brazos property and current operations at 2104 West 42nd Street. The 4318 Brazos property was first developed between 1954 and 1961. Several chrome plating operations functioned at the Brazos property between 1972 and 1977. EPA and/or TCEQ needs to investigate the potential source on 2104 West 42nd Street.

3.4 INITIAL RESPONSE

Prior to 1979, a water well at 4313 West County Road became contaminated with chromium and was abandoned. In December 1979, the Texas Department of Water Resources, the predecessor agency to the Texas Commission on Environmental Quality (TCEQ), identified 4318 Brazos as a potential source of chromium contamination. A water well at the property was contaminated with 190.0 milligrams per liter (mg/L) chromium. Prior to 1979, surface spills and discharge of waste into a septic tank had been occurring. In 1979, the company modified its wastewater facilities in an attempt to alleviate the problem.

In September 1984, the Odessa Chromium I Superfund site was added to the NPL. The State of Texas entered into a Cooperative Agreement with EPA on September 26, 1984 to perform a remedial investigation and feasibility study.

3.5 BASIS FOR TAKING ACTION

Based on the data collected during the remedial investigation, it was determined that if the remedies selected in the Record of Decision (ROD) were not implemented, hazardous substances could be released from the Odessa Chromium I Superfund site and endanger public health, welfare, or the environment. The most significant risks to human health and the environment included the following:

- Residents in trailers and homes utilizing contaminated groundwater
- Employees of businesses utilizing contaminated groundwater
- Workers at the 4318 Brazos property

Additionally, the risk assessment data indicated that RA was required to reduce the potential for exposure through the consumption of contaminated groundwater. The Agency for Toxic Substances and

Disease Registry supported this interpretation of the risk assessment.

4.0 REMEDIAL ACTIONS

This section discusses the selected remedy, remedy implementation, operation and maintenance (O&M) activities, and O&M costs.

4.1 SELECTED REMEDY

OU01 EPA signed the ROD for OU 01 on September 8, 1986. The remedy selected was an extension of the Odessa City water system to include service to the affected areas.

The design of an alternate water supply system was completed during December 1987, and the alternate water supply contract notice to proceed was issued on May 23, 1988. On November 3, 1988, 5,370 linear feet of 8-inch water mains, 8 fire hydrants, necessary valves and fittings, 40 service taps and meter boxes, and 18 meters and service connections were installed under TCEQ/EPA RA activities, and the O&M was assumed by the City of Odessa.

OU02 EPA signed the ROD for OU 02 on March 18, 1988, which addressed ground water contamination. The ROD listed the following requirements for the remedy:

- Demolition and disposal of the building located at 4318 Brazos Street
- Extraction of contaminated groundwater from the Trinity Aquifer
- Electrochemical treatment of groundwater that exceeds the Primary Drinking Water Standard (Maximum Contaminant Level [MCL]) for chromium
- Reinjection of the treated groundwater into the Trinity Aquifer
- Monitoring the site for a minimum of 30 years.

The selected remedy reduces the principal threat posed by the site conditions by reducing the possibility of human exposure to chromium.

4.2 REMEDY IMPLEMENTATION

The RA contract for OU 02 was awarded by TCEQ (then the Texas Natural Resources Conservation Commission) on October 31, 1991 to Waste Abatement Technologies of Marietta, Georgia. Contract activities were initiated on November 28, 1991. Site construction began on January 17, 1992; however, injection well plugging necessitated numerous treatment plant modifications to correct operational problems.

The EPA, TCEQ, and TCEQ's oversight engineer, IT Corporation, conducted the final inspection of the final treatment plant modifications on November 17, 1993, and issued the substantial completion certificate on November 21, 1993. The Long Term Remedial Action began December 25, 1993.

The electrochemical treatment process initially demonstrated its effectiveness in removing high chromium concentrations in recovered groundwater. However, it was slower and less effective in treating groundwater with lower chromium concentrations, which represents the larger volume of contaminated groundwater at the site.

As is common with groundwater pump-and-treat systems, the chromium concentration in the aquifer decreased significantly during the first year of treatment. After the first year, the chromium

concentration in the recovered groundwater continued to decline throughout most of the aquifer, but at a slower rate. With the exception of Recovery Well 6 (RW-6), all of the recovery wells have followed this pattern. The Chromium concentrations in RW-6 appeared to rise following periods of heavy rainfall or when the prior leach field was in operation, indicating that chromium may be leaching from vadose zone soils.

The delay in achieving the remediation goals at the site led TCEQ and EPA to add ferrous sulfate and subsequently, Metals Remediation Compound (MRC™) treatment by an Explanation of Significant Differences (ESD) to the ROD. Circumstances that gave rise to the need for these treatments were as follows:

- The site RA was estimated to have a 4-year duration, or less, of groundwater extraction system operations. However, after extended operations at the site, remediation goals had not been achieved for several wells, and there were large decreases in the rate of chromium contaminant reduction.

- With EPA's approval, TCEQ conducted an experimental in-situ ferrous sulfate treatment in a three-step process in December 1998 and January 1999. The well and leach field results demonstrated that the treatment was highly successful in chromium concentration reduction, thereby demonstrating that accelerated achievement of the remediation goals was attainable with the addition of the in-situ ferrous sulfate treatment. An Explanation of Significant Differences (ESD) was signed on October 25, 1999.

Four ferrous sulfate injections were implemented in September 2002 with effective results for several wells. However, in August 2003 a MRC™ pilot study injection test was conducted due to reduced injection capacity of ferrous sulfate. The Long Term Remedial Action (LTRA) ten-year funding period terminated on December 25, 2003.

4.3 OPERATION AND MAINTENANCE

Pursuant to Section 300.435(f)(3), the State of Texas, TCEQ, took over 100% site funding or Operation and Maintenance (O&M) activities on December 26, 2003. Currently, Shaw Environmental & Infrastructure, Inc. (Shaw) is TCEQ's Contractor that is conducting O&M activities.

Below is a summary of major milestones during the five year review period of this report:

- **Groundwater treatment**— From July 2001 to May 2004, approximately 61 million gallons of groundwater were treated. Of this, approximately 200 pounds of chromium were removed. The treatment plant was shut down on May 24, 2004 per TCEQ request. Treatment plant deactivation activities were completed on June 14, 2004.

- **MRC™ injections**— One pilot test and four full-scale MRC™ treatment events were conducted to address residual chromium contamination in the soil and aquifer.

- **Monitor well sampling**— Well sampling has occurred on a monthly basis (with some exceptions) since the MRC™ injections began.

- **Monitoring well plugging and abandonment**— Six wells were plugged and abandoned in April 2006. Attachments 7 and 8 summarize the analytical data in more detailed tabular and graphical formats, respectively.

4.4 OPERATION AND MAINTENANCE COST

TCEQ and Shaw provided approximate associated costs for the Odessa Chromium I Superfund site during O&M activities since the last five-year review. The costs include the following:

- Operate and maintain the water treatment plant
- Conduct sampling and analysis
- MRC™ injections
- Consulting costs

Table 2 provides the approximate costs for the years stated.

TABLE 2
ANNUAL OPERATION AND MAINTENANCE COSTS
ODESSA CHROMIUM I SUPERFUND SITE

Dates		Total Cost Rounded to Nearest $1,000	
From	**To**	**Contractor Costs**	**TCEQ Costs**
9/2001	8/2002	$344,000	$9,000
9/2002	8/2003	$433,000	$9,000
9/2003	8/2004	$572,000	$8,000
9/2004	8/2005	$113,000	$13,000
9/2005	8/2006	$33,000	$11,000

5.0 PROGRESS SINCE THE FIRST FIVE-YEAR REVIEW

This is the second five-year review for the Odessa Chromium I Superfund site. The first five-year review was conducted in September 2001. The site appears to have been properly maintained during the period between reports. The scheduled date for the third five-year report is September 25, 2011.

5.1 PROTECTIVENESS STATEMENT FROM FIRST FIVE-YEAR REVIEW

The First Five-Year Review Report concluded that because the RAs implemented at the Odessa Chromium I Superfund site continue to be protective, the remedy for the site continues to be protective of human health and the environment. The First Five-Year Review Report also stated that the remedy continues to function as intended by the ROD and is expected to be protective of human health and the environment upon completion (EPA 2001b).

5.2 FIRST FIVE-YEAR REVIEW RECOMMENDATIONS AND FOLLOW-UP ACTIONS

The first five-year review of the Odessa Chromium I Superfund site, completed in July 2001, recommended the following follow-up actions:

- Continued use of ferrous sulfate treatment in the leach field and wells exceeding cleanup standard

- Operation of pump and treat plant for circulation following ferrous sulfate treatment intervals.
- Well sampling to be conducted at three 30-day sampling intervals to confirm the analytical chromium results. Once it has been confirmed that the remedial goals have been achieved, the process of cleanup completion will be initiated (EPA 2001b).

5.3 STATUS OF RECOMMENDED ACTIONS

This section describes the current status of implementation of the recommendations included in the First Five-Year Review Report.

O&M activities have continued at the site. Due to the ineffectiveness of the pump-and-treat remedy, the water treatment system has been shut down at the request of TCEQ. The contaminant plume continues to be treated; however, MRC™ has replaced ferrous sulfate as the most proficient and thus the preferred method of treatment. Six monitoring wells were plugged and abandoned in April 2006 due to total chromium sample results that were consistently below the MCL for long periods of time. Five remaining wells continue to be sampled; however; analysis of samples from three of these wells detected chromium at concentrations below the MCL for at least 3 consecutive sampling events.

6.0 FIVE-YEAR REVIEW PROCESS

This section presents the process and findings of the second five-year review. Specifically, this section presents the findings of surveys, a site inspection, an applicable or relevant and appropriate requirements (ARARs) review, and a data review.

6.1 ADMINISTRATIVE COMPONENTS

The Odessa Chromium I Superfund site second five-year review team was lead by Mr. Ernest Franke of EPA, Remedial Project Manager for the Odessa Chromium I Superfund site, with participation from Mr. Alvie Nichols, the TCEQ project manager. Mr. Tim Startz, representative from EA Engineering, Science, and Technology, Inc. (EA), assisted in the review process.

In June 2006, the review team established the review schedule, which included the following components:

- Community Involvement
- Site Inspection
- Local Interviews
- ARAR Review
- Data Review
- Five-Year Review Report Development and Review

6.2 COMMUNITY INVOLVEMENT

Upon signature, the Second Five-Year Review Report will be placed in the information repositories for the site, including the Ector County Library, the TCEQ office in Austin, Texas, and the EPA Region 6 office in Dallas, Texas. A notice will then be published in the local newspaper to summarize the findings of the review and announce the availability of the report at the information repositories.

6.3 DOCUMENT REVIEW

This second five-year review for the site included a review of relevant site documents, including decision documents, construction and implementation reports, sampling reports, and related monitoring data.

The complete list of documents reviewed during this second five-year review is provided in Attachment 3.

6.4 DATA REVIEW

A review of site groundwater data prepared for the five-year review (Shaw 2006) indicates a general reduction in chromium concentrations after the MRC™ injections began. Because chromium concentrations in groundwater had reduced significantly across the site, the decision was made to plug and abandon many of the monitoring wells. An analysis of the wells that were plugged and abandoned in April 2006 is discussed below:

- RW-2— Well RW-2 exceeded the MCL for chromium during one sampling event during this second five-year review period, and none since January 2003.

- RW-3— Well RW-3 exceeded the MCL for chromium during one sampling event during this second five-year review period, and none since March 2002.

- RW-5— Well RW-5 exceeded the MCL for chromium during two sampling events during this second five-year review period, and none since May 2004.

- RW-106— Well RW-106 exceeded the MCL for chromium during several sampling events during this second five-year review period; however, it responded well to the MRC™ treatment events and chromium concentrations remained below the MCL between the June 2004 and August 2005 sampling events (the decision was made to discontinue sampling this well after 12 consecutive sampling events).

- MW-108— Analytical data for well RW-108 show that chromium concentrations in this well had not exceeded the MCL during this second five-year review period.

- MW-112— Well MW-112 exceeded the MCL for chromium during one sampling event during this second five-year review period, and none since July 2002.

Five monitoring wells continue to be sampled to determine the effectiveness of the MRC™ treatments. A brief analysis of the five wells is discussed as follows:

- MW-111— Chromium concentrations for MW-111 initially exceeded the MCL but have declined significantly. The chromium concentrations in this well dropped below the MCL during the July 2005 sampling event and have remained below the MCL during the last 5 consecutive sampling events.

- RW-4— Well RW-4 has responded positively to the MRC™ treatments; however, it experienced rebound after the first three treatments. The chromium concentrations dropped below the MCL during the July 2005 sampling event and have remained below the MCL during the last 5 consecutive sampling events.

- RW-6— Chromium concentrations in well RW-6 remained above the MCL during several sampling events following the introduction of MRC™ treatments; however, this well dropped below the MCL during the January 2006 sampling event and has remained below the MCL during the last 3 consecutive sampling events.

- RW-102— Chromium concentrations in well RW-102 have exceeded the MCL since the July 2004 sampling event.

- TW-6C— Chromium concentrations in well TW-6C have exceeded the MCL since the January 2004 sampling event.

As of the March 2006 sampling event (the latest data received from the laboratory), only two wells (RW-102 and TW-6C) remain in exceedance of the MCL for chromium.

6.5 ARAR REVIEW

ARARs for this site were identified in the OU 02 ROD dated March 18, 1988. On October 25, 1999, an BSD in the ROD was implemented to add in-situ treatment to the existing RA. No changes in ARARs were identified at the time of the ESD implementation. The first five-year review was performed by EPA on September 25, 2001, in which no changes in ARARs were identified.

As part of this second five-year review, ARARs identified in the ROD were reviewed to determine if any newly promulgated or modified requirements of federal and state environmental laws have significantly changed the protectiveness of the remedies implemented at the site since the last five-year review was conducted. The ARARs reviewed were those included in the site's decision documents as they apply to the selected Alternative (5) Electrochemical Treatment of Groundwater; and followed by in-situ treatment of affected wells. ARARs that still must be met at this time and that have been evaluated include the following:

- Safe Drinking Water Act (SDWA): Establishes drinking water standards (40 Code of Federal Regulations [CFR] 141.11)
- Clean Water Act (CWA): Sets water quality standards (40 CFR 301, 307, 403).

Overall, no newly promulgated or modified ARARs were found during this review that would change the protectiveness of the remedies implemented at the site. Under the Federal SDWA, the current clean-up standard or MCL established for chromium is 0.1 mg/L. EPA will continue to monitor this site and any future changes in ARARS will be reported in the next five-year review.

6.6 SITE INSPECTION

A site inspection was conducted on June 15, 2006, to assess the condition of the site and the measures employed to protect human health and the environment from the contaminants still present at the site. Attendees included: (1) Ernest Franke of EPA; (2) Alvie Nichols of TCEQ; (3) John Sullivan and Tom Smith of Shaw; (4) Rick Gillespie of REGENESIS; and (5) Tim Startz of EA Engineering, Science, and Technology, Inc. The site inspection checklist is included in Attachment 4. Site survey forms are provided in Attachment 5. A photographic log of the inspection is included in Attachment 6.

No evidence of contamination was visible at the site. The site's general appearance is good, with a stand of summer vegetation. The inspection team investigated the site within the boundary of the fence as well

as the well field on the perimeter of the site (outside of the fence). In addition, the team observed the groundwater monitoring wells, including the injection and extraction wells.

The vegetation at the site appeared to be in good condition. The wells appeared to be in good condition, although not all of the existing monitoring wells had locked caps. Site access appeared to be sufficiently restricted because no vandalism was observed and the lock, gate, and building were in good condition.

6.7 SITE INTERVIEWS

In accordance with the community involvement requirements of the five-year review process, key individuals to be surveyed were identified by EPA. Completed survey forms for the following individuals are included in Attachment 5:

- Alvie Nichols, TCEQ
- Gabriel Irigoyen, Shaw

A list of continuing or unresolved issues discovered during the interview process are as follows.

Comments received from Mr. Alvie Nichols (TCEQ):

- "I suggest that the ground water treatment processes continue. I also suggest that an investigation be conducted on the appropriateness of sampling the current wells: does the current well configuration, locations, screening depth, etc. provide an adequate representation of the groundwater? If not, what changes should be made to provide an adequate representation?"

- "Investigate the possibility of a continued source of chromium in the soils that is still leaching into the groundwater (especially near well No. TW-6C)."

Comments received from Mr. Gabriel Irigoyen (Shaw):

- "The application of MRC™ to the site has produced an overall positive effect in reducing the elevated chromium levels found in some wells. It appears that a sourcing problem may be hampering efforts to reduce or control the remaining chromium at the site. Further MRC™ application is recommended for the remaining hot spots along with possible source area investigation, treatment and/or removal."

7.0 TECHNICAL ASSESSMENT

The conclusions presented in this section support the determination that the selected remedy for the Odessa Chromium I Superfund site will be protective of human health and the environment upon completion. EPA Guidance indicates that to assess the protectiveness of a remedy, three questions (Questions A, B, and C) shall be answered.

7.1 QUESTION A: IS THE REMEDY FUNCTIONING AS INTENDED BY THE DECISION DOCUMENTS?

- **RA performance**— Based on review of documents, ARARs, the site inspection, the selected remedy for OU 02 (EPA 1988), and the ESD (EPA 1999) have been completed in accordance with the ROD. Cleanup goals and performance standards have been achieved in all but two of the monitoring wells.

- **Cost of system and O&M**— O&M cost information for fiscal years 2001 through 2006 was an average of approximately $299,000, annually. Current O&M activities (as described in Section 4.3) appear sufficient to maintain the effectiveness of the current remedy.

- **Opportunities for optimization**— A reduction in the quantity of monitoring wells that are being sampled (only sample wells that continue to exceed MCLs) could reduce overall project cost.

- **Early indicators of potential issues**— The ferrous sulfate and subsequent MRC™ treatment were approved and added to the remedy to accelerate attainment of established remediation goals. Additional source area investigation may be warranted

- **Implementation of ICs and other measures**— ICs may be necessary at this site to prevent drilling or other activities should chromium be found to be migrating from the contaminated soils to the aquifer.

7.2 QUESTION B: ARE THE ASSUMPTIONS USED AT THE TIME OF REMEDY SELECTION STILL VALID?

- **Changes in exposure pathways**— There have been no changes that bear on the protectiveness of the selected remedy.

- **Changes in standards, newly promulgated standards, and to-be-considereds**— No new laws or regulations have been promulgated or enacted that would call into question the effectiveness of the remedy at the site to protect human health and the environment.

- **Changes in toxicity and other contaminant characteristics**— There have been no changes during the past 5 years that bear on the protectiveness of the selected remedy.

- **Changes in land use**— There have been no changes in land use that bear on the protectiveness of the selected remedy.

- **New contaminants and/or contaminant sources**— There have been no new contaminants identified at the site. A potential source area investigation may be warranted.

- **Expected progress toward meeting RA Objectives**— The RA objectives relating to contaminated groundwater have been met in all but two monitoring wells. Further groundwater monitoring is needed to establish that the RA objective is being met.

7.3 QUESTION C: HAS ANY OTHER INFORMATION COME TO LIGHT THAT COULD CALL INTO QUESTION THE PROTECTIVENESS OF THE REMEDY?

The type of other information that might call into question the protectiveness of the remedy includes potential future land use changes that directly effect and impact the site, or other unexpected changes in site conditions or exposure pathways. No other information has come to light as part of this second five-year review for the site that would call into question the protectiveness of the site remedy.

7.4 TECHNICAL ASSESSMENT SUMMARY

According to documents and data reviewed, the site inspection, and interviews, the remedy appears to be functioning as intended by the 1988 ROD and 1999 ESD. There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. The ARARs cited in the ROD have been met in most of the wells. There have been no changes in toxicity factors for the primary contaminants of concern during the five-year review period, and there has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy. Additional actions are necessary to investigate whether chromium from upper soils is migrating to the ground water.

8.0 INSTITUTIONAL CONTROLS

ICs are generally defined as non-engineered instruments such as administrative and legal tools that do not involve construction or physically changing the site and that help minimize the potential for human exposure to contamination and/or protect the integrity of a remedy by limiting land and/or resource use (EPA 2005). ICs can be used for many reasons including restriction of site use, modifying behavior, and providing information to individuals (EPA 2000). ICs may include easements, covenants, restrictions or other conditions on deeds, and/or groundwater and/or land use restriction documents (EPA 200la). The following sections describe the ICs implemented at the site, the potential effect of future land use plans on ICs, and any plans for changes to site contamination status.

8.1 TYPES OF INSTITUTIONAL CONTROLS IN PLACE AT THE SITE

ICs are not currently in place and are not currently planned, as both EPA and TCEQ have evidence ground water remediation/cleanup appears to be achievable in two unremediated wells in the area. However, institutional controls may be necessary to prevent drilling or other surface activities which would allow chromium to migrate from contaminated soils to the ground water.

Although not of themselves considered ICs, a portion of the site is secured by a fence, entrance to the treatment facility is restricted by a locked gate, and warning signs which are visible on each side of the fence.

8.2 EFFECT OF FUTURE LAND USE PLANS ON INSTITUTIONAL CONTROLS

No future land uses have been established or are anticipated for the site that would require additional ICs being implemented.

8.3 PLANS FOR CHANGES TO SITE CONTAMINATION STATUS

No changes to the status of the contamination at the site are anticipated, except a decrease in ground water concentrations to below the MCL, and the achievement of site remediation by scheduled continuing O&M ground water treatment.

9.0 ISSUES

This section describes issues associated with the Odessa Chromium I Superfund site identified during the second five-year review:

- **O&M**— The site inspection revealed that not all of the existing monitoring wells had locked caps. It is recommended that all existing wells be secured with padlocks.

- **Integrity of Monitoring Well TW-6C**— A review of the data shows that TW-6C is the only well in the vicinity of the leach field that remains above the MCL for chromium. It was also discussed that the chromium concentrations tended to increase in RW-6 well following prior rain events or after prior leach field sprinkler operations. A subsequent inspection of the well report for TW-6C revealed that this well was screened from 8 feet below ground surface (bgs) to 78 feet bgs for upper vadose zone MRC™ treatment injection. Monitoring wells MW-111 and RW-6 screens begin at 68 bgs and are likewise in the leach field area, and are located approximately 35 feet away from TW-6C; however, analytical results reflect evidence their respective concentrations to be below the MCL for chromium.

- **Soils**— Data collected from the RFFS, and laid out in the ROD, indicate that no soils measured at the site exceeded human health risk, nor was E P toxicity testing greater than 5 mg/L. The effect of capping areas of concern with an impermeable liner and asphaltic base and surface cap would remove any risk of human exposure to dust and would prevent infiltration of rainfall or runoff water, eliminating the capped area from leaching. Thus, it seems unwise and unnecessary to expend the effort and monies to remove soils and the demolition of the treatment building from the areas of concern. However, a source area investigation is warranted to address these issues. This Item of soils removal was addressed in further detail in Section 3.0 - Background, page 5- paragraph 2 of the prior Five-Year review report.

- **A SUMMARY TABLE OF ISSUES IDENTIFIED AND IF THEY CURRENTLY AFFECT THE REMEDY PROTECTIVENESS (TABLE 3) IS PROVIDED BELOW.**

TABLE 3
ISSUES IDENTIFIED
ODESSA CHROMIUM I SUPERFUND SITE

Issue	Currently Affects Remedy Protectiveness (Yes/No)
O&M	No
Integrity of Monitoring Well TW-6C	Yes
Leach Field Soils/Building Removal	No
Leach Field Soils	Yes

10.0 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

The major deficiency noted during the site inspection was the integrity of monitoring well TW-6C. It was discussed during the inspection that the vertical screened interval of TW-6C in conjunction with its highly permeable outer sand/gravel pack, provides evidence of a direct conduit for chromium to migrate from the upper contaminated leach field through the vadose zone directly to the underlying aquifer. Because chromium concentrations were detected below the MCL for chromium for at least three consecutive sampling events, it is also suggested that wells MW-111, RW-4, and RW-6 be plugged and

abandoned. Additionally, to prevent future migration of chromium from the soils to the aquifer, it is recommended that EPA and TCEQ investigate whether the leach field area should be capped with an impervious liner first and overlain by asphalt base and surface.

None of the minor deficiencies noted during the site inspection were significant enough to warrant further action, other than well locks, continued site inspections, and maintenance. Inspections should continue to be performed at least twice per year to check the condition of the site access restrictions (fencing and no trespassing signs), and repairs and mowing should be performed as necessary to maintain current conditions at a minimum. In accordance with the ROD, TCEQ should continue to sample monitoring wells that exceed the MCL for chromium, and prepare reports describing the analytical results and annual inspection/mowing activities. It is recommended that MRC™ treatments continue directly into well RW-102 to reduce chromium concentrations in the localized vicinity. The inspection team commented that a revised treatment strategy for the injection point needed to be directly within the well itself, instead of using other distant up-gradient wells, which was not as effective in treating and reducing the localized plume chromium source concentrations to below the MCL. If TCEQ reduces the sampling regimen to include only the wells that exceed the MCL for chromium, an update to the Operation and Maintenance Plan for the site should be made to reflect the reduced sampling efforts. EPA and TCEQ have evidence that site cleanup or remediation appears to be achievable. Institutional controls may be necessary to prevent drilling or other utilities which would allow chromium to migrate from contaminated soils to the aquifer. Table 4 summarizes the recommendations and follow-up actions for the Odessa Chromium I Superfund site.

11.0 PROTECTIVENESS STATEMENT

Based on the information available during the second five-year review, the selected remedy for the Odessa Chromium I Superfund site will be protective of human health and the environment in the long term provided monitoring well TW-6C is plugged and abandoned, the leach field area is addressed and TCEQ's O&M activities continue, and the other actions identified in this report are implemented.

12.0 NEXT REVIEW

The Odessa Chromium I Superfund site requires ongoing five-year reviews. The next review will be conducted within the next five years, but no later than five years from this report's signature date.

TABLE 4

RECOMMENDATIONS AND FOLLOW-UP ACTIONS
ODESSA CHROMIUM I SUPERFUND SITE

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions Affect Long-Term Remedy Protectiveness (Yes/No)
Integrity of Monitoring Well TW-6C	Plug and abandon monitoring well TW-6C to minimize the migration of chromium into the underlying aquifer	TCEQ/EPA	EPA	Within 1 year of submittal of this report	Yes
Migration of Chromium in Soils to Underlying Aquifer	Investigate whether to install an impervious liner and cap in the leach field area to prevent the migration of chromium in the soils into the underlying aquifer	TCEQ/EPA	EPA	Within 1 year of submittal of this report	Yes
Plug and Abandon Wells	Plug and Abandon Wells MW-111, RW-4, and RW-6	TCEQ/EPA	EPA	Within 1 year of submittal of this report	No
Well Locks	Install locks on all monitoring wells	TCEQ/EPA	EPA	Within 1 year of submittal of this report	No
Site Inspections and Maintenance	Continue site inspections and maintenance on a regular basis to check the condition of the site	TCEQ/EPA	EPA	Within 1 year of submittal of this report	No
Monitoring Well Sampling	Continue to sample the monitoring wells that exceed the MCL for chromium	TCEQ/EPA	EPA	Within 1 year of submittal of this report	No
MRC™ Treatments	Continue MRC™ treatments in the vicinity of RW-102	TCEQ/EPA	EPA	Within 1 year of submittal of this report	Yes
Updated O&M Plan	Revise/update the O&M plan to make it applicable to the current conditions at the site and include a reduction in the quantity of monitoring well sampling (if implemented)	TCEQ/EPA	EPA	Within 1 year of submittal of this report	No

Notes:

EPA U.S. Environmental Protection Agency
MRC™ Metals Remediation Compound
O&M Operation and maintenance
TCEQ Texas Commission on Environmental Quality

Attachment 1

Site Location Map

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

ODESSA CHROMIUM #1
SUPERFUND SITE
ODESSA, ECTOR COUNTY, TEXAS

SITE LOCATION MAP

Attachment 2

Site Map and Deed Notice Details

Odessa Chromium #1 Superfund Site
Ector County, Texas
Deed Notices

Restricted Private Well Installation or Well Pumping in Shown Deed Restricted Areas

** Well RW-102
Owner H&T Auger Company, Lot #4, Block #8
as recorded in Volume 3, page 129, Ector County
Deed Records. Address: 4519 Brazos Avenue.

* Well NTW-6C Treatment Plant & Lot
Owner Ector County Trustee, Lot #10 less N74', Block #10
as recorded in Volume 1250, page 468, Ector County
Deed Records. Address: 4318 Brazos Avenue.

Deed Notices
EPA ID# TXD980867279
Congressional District 11

0 125 250 500 750 1,000
Feet

N W E S

Image from GlobeXplorer
01/08/1996 1:12,000

Map Created 04/12/06

EPA Region 6
GIS Support Team
Dallas, TX

LOCKHEED MARTIN

20060412ML02

Attachment 3

Documents Reviewed

DOCUMENTS REVIEWED

U.S. Environmental Protection Agency (EPA). 1988. "EPA Superfund Record of Decision: Odessa Chromium I, EPA ID: TXD0980867279, OU 02, Odessa, TX." March 18.

EPA. 1990. "CERCLA Compliance with the CWA and SDWA." Office of Solid Waste and Emergency Response. 9234.2-06/FS. February 1990.

EPA. 1999. "EPA Superfund Explanation of Significant Differences: Odessa Chromium I Superfund Site, EPA ID: TXD0980867279, OU 02, Odessa,, TX." October 25.

EPA. 2000. Institutional Controls: "A Site Manager's Guide to Identifying, Evaluating and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups". EPA 540-F-00-005. September 2000.

EPA. 2001a. "Comprehensive Five-Year Review Guidance." EPA 540-R-01-007. June 2001.

EPA. 2001b. "First Five-Year Review Report for Odessa Chromium I Site, Odessa, Ector County, Texas." July.

EPA. 2005. "Institutional Controls: A Citizen's Guide to Understanding Institutional Controls at Superfund, Brownfields, Federal Facilities, Underground Storage Tank, and Resource Conservation and Recovery Act Cleanups." EPA-540-R-04-003. February, 2005.

EPA. 2006. "Odessa Chromium I. Ector County, Texas, EPA ID#980867279, Site ID: 0602943." On-line Address: http://www.epa.gov/earthlr6/6sf/pdffiles/06Q2943.pdf. Accessed June 8, 2006. Publication date: April.

Shaw Environmental & Infrastructure, Inc. 2006. "Site Data for EPA Five-Year Review July 2001 - August 2006, 4318 Brazos Odessa, TX." June 15.

Attachment 4

Site Inspection Checklist

FIVE-YEAR REVIEW SITE VISIT CHECKLIST

I. SITE INFORMATION

Site Name: Odessa Chromium I Superfund Site	**Date of Inspection:** June 15, 2006
Location and Region: Odessa, Texas	**EPA ID:** TXD980867279
Agency leading the five-year review: EPA Region 6	**Weather/temperature:** Sunny, 90-95 °F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump-and-treatment
- ☐ Surface water collection and treatment
- ☐ Other-Leachate collection and treatment

Attachments: ☒ Inspection team roster attached ☒ Site map attached to report

II. INTERVIEWS (Check all that apply)

1. O&M Site Manager Gabriel Irigoyen (Name) Project Manager/Shaw (Title) 6/15/2006 (Date)

Interviewed: ☒ by mail ☐ at site ☐ by phone Phone no. 432-520-6046

Problems, suggestions: ☒ Report attached Survey form attached to report

2. O&M Staff N/A (Name) (Title) (Date)

Interviewed: ☐ by mail ☐ at office ☐ by phone Phone no. _____

Problems, suggestions: ☐ Report attached

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 Texas Commission on Environmental Quality (TCEQ)

Contact Alvie Nichols (Name) Project Manager (Title) 6/15/2006 (Date) 512-239-2439 (Phone no.)

Problems, suggestions: ☒ Report attached Survey form attached to report

Agency N/A

Contact _____ (Name) (Title) (Date) (Phone no.)

Problems, suggestions: ☐ Report attached _____

4. Other interviews (optional): ☒ Report attached Survey form (1)

Rick Gillespie, REGENESIS, consultant to Shaw Environmental & Infrastructure, survey form attached

III. ONSITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. O&M Documents

☐ O&M manual (long term monitoring plan)	☐ Readily available	☐ Up to date	☒ N/A
☐ As-built drawings	☐ Readily available	☐ Up to date	☒ N/A
☒ Maintenance logs (current and cumulative monitoring reports)	☒ Readily available	☐ Up to date	☐ N/A

Remarks: The treatment system has been shutdown; therefore, the groundwater sampling data was reviewed

2. Site-Specific Health and Safety Plan	☐ Readily available	☐ Up to date	☒ N/A
☐ Contingency plan/emergency response plan	☐ Readily available	☐ Up to date	☒ N/A

Remarks: Site-specific health and safety plan was not reviewed

3. O&M and OSHA Training Records	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

4. Permits and Service Agreements

☐ Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
☐ Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
☐ Other permits _____	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

5. Gas Generation Records	☐ Readily available	☐ Up to date	☒ N/A
6. Settlement Monument Records	☐ Readily available	☐ Up to date	☒ N/A
7. Groundwater Monitoring Records	☒ Readily available	☐ Up to date	☐ N/A
8. Leachate Extraction Records	☐ Readily available	☐ Up to date	☒ N/A

9. Discharge Compliance Records

☐ Air	☐ Readily available	☐ Up to date	☒ N/A
☐ Water (effluent)	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

10. Daily Access/Security Logs	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

IV. O&M COSTS

1. O&M Organization

☐ State in-house ☒ Contractor for State ☐ PRP in-house

☐ Contractor for PRP ☐ Other _____

2. O&M Cost Records

☐ Readily available ☐ Up to date ☒ Funding mechanism/agreement in place

☐ Original O&M cost estimate ☐ Breakdown attached

Total annual cost by year for review period, if available

	Date		Date	Total Cost		
From	9/2001	to	8/2002	$353, 000	- ☐	Breakdown attached
From	9/2002	to	8/2003	$442,000	- ☐	Breakdown attached
From	9/2003	to	8/2004	$580,000	- ☐	Breakdown attached
From	9/2004	to	8/2005	$126,000	- ☐	Breakdown attached
From	9/2005	to	6/21/2006	$44,000	- ☐	Breakdown attached
From		to			- ☐	Breakdown attached
From		to			- ☐	Breakdown attached
From		to			- ☐	Breakdown attached

3. Unanticipated or Unusually High O&M Costs During Review Period

No

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. Fencing damaged ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: Gates, water treatment building, and site was secure behind locked gate

B. Other Access Restrictions

1. Signs and other security measures ☐ Location shown on site map ☐ N/A

Remarks: Site sign was clearly visible by gate

C. Institutional Controls

1. Implementation and enforcement

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (e.g., self-reporting, drive by) during site activities

Frequency _____

Responsible party/agency TCEQ/Shaw

Contact Gabriel Irigoyen Project Manager/Shaw 6/15/06 432-520-6046
Name Title Date Phone no.

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A

Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☒ N/A

Violations have been reported ☐ Yes ☐ No ☒ N/A

Other problems or suggestions: ☐ Report attached

2. Adequacy ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

Remarks: evidence shows site cleanup to be achievable

D. General

1. Vandalism/trespassing ☐ Location shown on site map ☒ No vandalism evident

Remarks: _____

2. Land use changes onsite ☒ N/A

Remarks: _____

3. Land use changes offsite ☒ N/A

Remarks: _____

VI. GENERAL SITE CONDITIONS

A. Roads ☐ Applicable ☒ N/A

Remarks: _____

B. Other Site Conditions ☐ Applicable ☒ N/A

Remarks: _____

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

A. Landfill Surface

1. Settlement (Low spots) ☐ Location shown on site map ☐ Settlement not evident

Areal extent _____ Depth _____

Remarks: _____

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
Lengths _____ Widths _____ Depths _____
Remarks: _____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent _____ Depth _____
Remarks: _____

4. **Holes** ☐ Holes evident ☐ Holes not evident
Areal extent _____ Depth _____
Remarks: _____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
☐ Trees/Shrubs (indicate size and locations on a diagram) (None)
Remarks: _____

6. **Alternative Cover** (armored rock, concrete, etc.) ☐ N/A
Remarks: _____

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
Areal extent _____ Depth _____
Remarks: _____

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident

☐ Wet areas	☐ Location shown on site map	☐ Areal extent _____
☐ Ponding	☐ Location shown on site map	☐ Areal extent _____
☐ Seeps	☐ Location shown on site map	☐ Areal extent _____
☐ Soft subgrade	☐ Location shown on site map	☐ Areal extent _____

Remarks: _____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map
☐ No evidence of slope instability Areal extent _____
Remarks: _____

B. **Benches** ☐ Applicable ☐ 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** ☐ Location shown on site map ☐ N/A or okay
Remarks: _____

2. Bench Breached ☐ Location shown on site map ☐ N/A or okay
Remarks: _____

3. Bench Overtopped ☐ Location shown on site map ☐ N/A or okay
Remarks: _____

C. Letdown Channels ☐ Applicable ☒ N/A

1. Settlement ☐ Location shown on site map ☐ No evidence of settlement
Areal extent _____ Depth _____
Remarks: _____

2. Material Degradation ☐ Location shown on site map ☐ No evidence of degradation
Material type _____ Areal extent _____
Remarks: _____

3. Erosion ☐ Location shown on site map ☐ No evidence of erosion
Areal extent _____ Depth _____
Remarks: _____

4. Undercutting ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent _____ Depth _____
Remarks: _____

5. Obstructions Type _____
☐ No obstructions ☐ Location shown on site map
Areal extent _____ Size _____
Remarks: _____

6. Excessive Vegetative Growth Type _____
☐ No evidence of excessive growth ☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent _____
Remarks: _____

D. Cover Penetrations ☐ Applicable ☐ N/A

1. Gas Vents ☐ Active ☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs O&M ☐ N/A
Remarks: _____

2. Gas Monitoring Probes
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ Evidence of leakage at penetration ☐ Needs O&M ☐ N/A
Remarks: _____

3. **Monitoring Wells** (within surface area of landfill)
☐ Evidence of leakage at penetration ☐ Needs O&M ☐ N/A
Remarks: _____

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs O&M ☐ N/A
Remarks: _____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A
Remarks: _____

E. Gas Collection and Treatment ☐ Applicable ☐ N/A

1. **Gas Treatment Facilities**
☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
☐ Good condition ☐ Needs O&M
Remarks: _____

2. **Gas Collection Wells, Manifolds, and Piping** ☐ Good condition ☐ Needs O&M
Remarks: _____

3. **Gas Monitoring Facilities** (e.g., gas monitoring of adjacent homes or buildings)
☐ Good condition ☐ Needs O&M ☐ N/A
Remarks: _____

F. Cover Drainage Layer ☐ Applicable ☐ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
Remarks: _____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
Remarks: _____

G. Detention/Sedimentation Ponds ☐ Applicable ☐ N/A

1. **Siltation** Areal extent _____ Size _____
☐ N/A ☐ Siltation not evident
Remarks: _____

2. **Erosion** Areal extent _____ Depth _____
☐ Erosion not evident
Remarks: _____

3. **Outlet Works** ☐ Functioning ☐ N/A

Remarks: _____

4. **Dam** ☐ Functioning ☐ N/A
Remarks: _____

H. Retaining Walls ☐ Applicable ☐ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
Horizontal displacement _____ Vertical displacement _____
Rotational displacement _____
Remarks: _____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
Remarks: _____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☐ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
Areal extent _____ Depth _____
Remarks: _____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
☐ Vegetation does not impede flow
Areal extent _____ Type _____
Remarks: _____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent _____ Depth _____
Remarks: _____

4. **Discharge Structure** ☐ Functioning ☐ N/A
Remarks: _____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
Areal extent _____ Depth _____
Remarks: _____

2. **Performance Monitoring** Type of monitoring _____
☐ Performance not monitored Frequency _____ ☐ Evidence of breaching
Head differential _____
Remarks: _____

IX. GROUNDWATER/SURFACE WATER REMEDIES	☒ Applicable	☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. Pumps, Wellhead Plumbing, and Electrical

☐ Good condition ☐ All required wells located ☐ Needs O&M ☒ N/A

Remarks: Groundwater pump-and-treat system is no longer in operation. Well network is now being used for metals remediation compound (MRC™) injection and treatment.

2. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances

☐ Good condition ☐ Needs O&M

Remarks: _____

3. Spare Parts and Equipment

☐ Readily available ☐ Good condition ☐ Requires upgrade ☒ Needs to be provided

Remarks: _____

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. Collection Structures, Pumps, and Electrical

☐ Good condition ☐ Needs O&M

Remarks: _____

2. Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances

☐ Good condition ☐ Needs O&M

Remarks: _____

3. Spare Parts and Equipment

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

C. Treatment System ☐ Applicable ☒ N/A

1. Treatment Train (Check components that apply)

☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
☐ Air stripping ☐ Carbon absorbers
☐ Filters _____
☐ Additive (e.g., chelation agent, flocculent) _____
☐ Others _____
☐ Good condition ☐ Needs O&M
☐ Sampling ports properly marked and functional
☐ Sampling/maintenance log displayed and up to date
☐ Equipment properly identified
☐ Quantity of groundwater treated annually _____
☐ Quantity of surface water treated annually _____

Remarks: _____

2. Electrical Enclosures and Panels (Properly rated and functional)

☐ N/A ☐ Good condition ☐ Needs O&M

Remarks: _____

3. Tanks, Vaults, Storage Vessels

☐ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs O&M

Remarks: _____

4. Discharge Structure and Appurtenances

☐ N/A ☐ Good condition ☐ Needs O&M

Remarks: _____

5. Treatment Building(s)

☐ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair
☐ Chemicals and equipment properly stored

Remarks: _____

6. Monitoring Wells (Pump-and-treatment remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs O&M ☐ N/A

Remarks: _____

D. Monitored Natural Attenuation ☒ Applicable ☐ N/A

1. Monitoring Wells (Natural attenuation remedy)

☐ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition
☐ All required wells located ☒ Needs O&M ☐ N/A

Remarks: Wells are in good condition; however, all wells need to be secured by padlocks.

X. OTHER REMEDIES

If there are remedies applied at the site that 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.).

The current MRC™ remedy is making progress at remediating the groundwater chromium contamination. The site is well maintained and the front gate was locked. However, all monitoring wells need to be secured with a padlock.

B. Adequacy of O&M

Current O&M activities are adequate; however, see opportunities for optimization below.

C. Early Indicators of Potential Remedy Failure

There are no early indicators of potential remedy failure.

D. Opportunities for Optimization

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

Continue with the MRC™ treatment until all wells are below the MCL for chromium. Recommend plugging and abandoning well TW-6C. Also recommend capping the site leach field to prevent chromium migration from soils into aquifer during rain events.

INSPECTION TEAM ROSTER

Name	Organization	Title
Ernest Franke	US EPA Region 6	Remedial Project Manager
Alvie Nichols	TCEQ	Project Manager
John S. Sullivan	Shaw	Contractor to TCEQ
Tom Smith	Shaw	Contractor to TCEQ
Rick Gillespie	REGENESIS	Contractor to Shaw
Tim Startz	EA	Contractor to EPA

Attachment 5

Interview Records

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY		
Site Name: Odessa Chromium I Superfund Site	**EPA ID No.:** TXD980867279	
Location: Odessa, Texas	**Date:** 6/15/2006	
Contact Made By:		
Name: Ernest Franke, P.E., RPLS	**Title:** Remedial Project Manager	**Organization:** U.S. EPA
Telephone No.: (214) 665-8521 **E-Mail:** franke.ernest@epa.gov	**Street Address:** 1455 Ross Avenue, Suite 1200 **City, State, Zip:** Dallas, Texas 75202	
Name: Tim Startz	**Title:** Project Manager	**Organization:** EA
Telephone No.: (972) 459-5042 **E-Mail:** tstartz@eaest.com	**Street Address:** 405 S. Highway 121, Building C, Suite 100 **City, State, Zip:** Lewisville, Texas 75067	
Individual Contacted:		
Name: Alvie Nichols	**Title:** Project Manager	**Organization:** Texas Commission on Environmental Quality (TCEQ)
Telephone No.: 512-239-2439 **E-Mail:** anichols@tceq.state.tx.us	**Street Address:** PO Box 13087 **City, State, Zip:** Austin, Texas 78711-3087	

Survey Questions

1. What is your general impression of the work conducted at the site since the first Five-Year Review period (since September 2001)?

   Satisfactory

2. What effect have site operations had on the surrounding community since the first Five-Year Review?

   I am not aware of any negative affects that the site operations have had on the surrounding community.

3. In the past five years, are you aware of any community concerns regarding the site or its operation and administration? If so, please provide details.

   No

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY (continued)	
Site Name: Odessa Chromium I Superfund Site	**EPA ID No.:** TXD980867279
Location: Odessa, Texas	**Date:** 6/15/2006

Alvie Nichols Survey Questions (Cont.)

4. Are you aware of any events, incidents, or activities at the site in the past five years such as vandalism, trespassing, or emergency responses from local authorities? If so, please provide details.

   No

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

   Yes, the contractor visits the site on a frequent basis. The contractor is conducting groundwater treatment and prepares a report about 6 times a year.

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

   I suggest that the groundwater treatment processes continue. I also suggest that an investigation be conducted on the appropriateness of sampling the current wells: does the current well configuration, locations, screening depth, etc. provide an adequate representation of the groundwater? If not, what changes should be made to provide an adequate representation?

   Investigate the possibility of a continued source of chromium in the soils that is still leaching into the groundwater (especially near well No. TW-6C).

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY		
Site Name: Odessa Chromium I Superfund Site	**EPA ID No.:** TXD980867279	
Location: Odessa, Texas	**Date:** 6/15/2006	
Contact Made By:		
Name: Ernest Franke, P.E., RPLS	**Title:** Remedial Project Manager	**Organization:** U.S. EPA
Telephone No.: (214) 665-8521 **E-Mail:** franke.ernestl@epa.gov	**Street Address:** 1455 Ross Avenue, Suite 1200 **City, State, Zip:** Dallas, Texas 75202	
Name: Tim Startz	**Title:** Project Manager	**Organization:** EA
Telephone No.: (972) 459-5042 **E-Mail:** tstartz@eaest.com	**Street Address:** 405 S. Highway 121, Building C, Suite 100 **City, State, Zip:** Lewisville, Texas 75067	
Individual Contacted:		
Name: Gabriel Irigoyen, P.G.	**Title:** Project Manager	**Organization:** Shaw Environmental, Inc.
Telephone No.: 432-520-6046 **E-Mail Address:** gabriel.irigoyen@shawgrp.com	**Street Address:** 2101 S Loop 250 W **City, State, Zip:** Midland, TX 79703	

Survey Questions

1. What is your general impression of the work conducted at the site since the first Five-Year Review period (since September 2001)?

   In the time period since the previous Five-Year Review all work conducted has been completed correctly and efficiently. Overall, the work has been completed in a satisfactory manner.

2. What effect have site operations had on the surrounding community since the first Five-Year Review?

   Based on my observations and participation in the site operations at the site, I would say that effects to the surrounding community have been very minimal.

3. In the past five years, are you aware of any community concerns regarding the site or its operation and administration? If so, please provide details.

   No, I am not aware of any community concerns during the last five years with regards to the operation of the Odessa Chromium I site. To my knowledge, no complaints or concerns were received by Shaw during this period.

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY (continued)	
Site Name: Odessa Chromium I Superfund Site	**EPA ID No.:** TXD980867279
Location: Odessa, Texas	**Date:** 6/15/2006

Gabriel Irigoyen Survey Questions (Cont.)

4. Are you aware of any events, incidents, or activities at the site in the past five years such as vandalism, trespassing, or emergency responses from local authorities? If so, please provide details.

   To my knowledge no such events occurred.

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

   Yes, I feel that information regarding the site's activities and progress is communicated well between the TCEQ and Shaw.

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

   The application of MRC™ to the site has produced an overall positive effect in reducing the elevated chromium levels found in some wells. It appears that a sourcing problem may be hampering efforts to reduce or control the remaining chromium at the site. Further MRC™ application is recommended for the remaining hot spots along with possible source area investigation, treatment and/or removal.

Attachment 6

Site Inspection Photographs

Photograph No. 1 Site: Odessa Chromium I Superfund Site
Description: Entrance gate to site with warning sign Date: June 15, 2006

Photograph No. 2 Site: Odessa Chromium I Superfund Site
Description: Western portion of the site Date: June 15, 2006

Photograph No. 3 Site: Odessa Chromium I Superfund Site
Description: Eastern portion of the site Date: June 15, 2006

Photograph No. 4 Site: Odessa Chromium I Superfund Site
Description: Northeastern portion of the site Date: June 15, 2006

Photograph No. 5 Site: Odessa Chromium I Superfund Site
Description: Water treatment plant building Date: June 15, 2006

Photograph No. 6 Site: Odessa Chromium I Superfund Site
Description: East portion of the site Date: June 15, 2006

Photograph No. 7 Site: Odessa Chromium I Superfund Site
Description: Monitoring well TW-6C Date: June 15, 2006

Photograph No. 8 Site: Odessa Chromium I Superfund Site
Description: Monitoring well TW-6C Date: June 15, 2006

Photograph No. 9 Site: Odessa Chromium I Superfund Site
Description: One of the monitoring wells without padlocks Date: June 15, 2006

Photograph No. 10 Site: Odessa Chromium I Superfund Site
Description: Monitoring well RW-102 Date: June 15, 2006

Attachment 7

Historical Total Chromium Data Table

(Source: Shaw Environmental & Infrastructure, Inc. "Site Data for EPA Five-Year Review July 2001 August 2006, 4318 Brazos Odessa, TX." June 15, 2006.)

TOTAL CHROMIUM ANALYSES

Date	MW-101	MW-108	MW-111	MW-112	MW-117	RW-1 (MW-1)	RW-2	RW-3	RW-4	RW-5	RW-6	RW-102	RW-106	TW-6A	TW-6B	TW-6C	TW-102	TW-106
Jan-01	NS	NS	0.36	NS	NS	NS	<0.05	<0.05	0.35	NS	0.61	0.18	0.34	NS	NS	NS	NS	NS
Feb-01	NS	NS	0.37	NS	NS	NS	<0.05	<0.05	0.37	NS	0.55	0.17	0.31	NS	NS	NS	NS	NS
Mar-01	NS	NS	0.41	NS	NS	NS	<0.05	<0.05	0.28	NS	0.61	0.18	0.33	NS	NS	NS	NS	NS
Apr-01	<0.05	<0.05	0.32	NS	<0.05	<0.05	<0.05	<0.05	0.23	NS	0.61	0.21	0.29	NS	NS	NS	NS	NS
May-01	NS	NS	0.38	NS	NS	NS	<0.05	<0.05	0.24	NS	0.59	0.18	0.28	NS	NS	NS	NS	NS
Jun-01	NS	NS	0.38	<0.05	NS	NS	<0.05	<0.05	0.24	NS	0.55	0.16	0.26	NS	NS	NS	NS	NS
Jul-01	NS	NS	0.56	NS	NS	NS	<0.05	<0.05	0.23	NS	0.75	0.16	0.20	NS	NS	NS	NS	NS
Aug-01	NS	NS	0.66	NS	NS	NS	<0.05	<0.05	0.28	NS	0.71	0.16	0.18	NS	NS	NS	NS	NS
Sep-01	NS	NS	0.99	NS	NS	NS	<0.05	<0.05	0.23	NS	0.78	0.15	0.20	NS	NS	NS	NS	NS
Oct-01	NS	NS	1.96	NS	NS	NS	<0.05	<0.05	0.15	NS	1.27	0.11	0.20	NS	NS	NS	NS	NS
Nov-01	NS	NS	NS	NS	NS	NS	<0.05	<0.05	0.20	NS	NS	0.14	0.25	NS	NS	NS	NS	NS
Dec-01	<0.05	NS	4.79	<0.05	<0.05	NS	<0.05	NS	0.18	NS	2.04	0.15	NS	NS	NS	NS	NS	NS
Jan-02	NS	NS	11.3	NS	NS	NS	<0.05	<0.05	0.19	NS	1.40	0.17	0.26	NS	NS	NS	NS	NS
Feb-02	NS	NS	11.9	NS	NS	NS	0.02	0.009	0.17	NS	3.09	0.14	0.27	NS	NS	NS	NS	NS
Mar-02	NS	NS	11.8	NS	NS	NS	0.02	0.18	0.16	NS	2.66	0.14	0.33	NS	NS	NS	NS	NS
Apr-02	NS	NS	10.6	NS	NS	NS	0.01	0.01	0.15	NS	NS	0.14	0.50	NS	NS	3.70	NS	NS
May-02	NS	NS	8.46	NS	NS	NS	0.02	0.01	0.2	NS	1.83	0.13	0.54	NS	NS	2.49	NS	NS
Jun-02	NS	NS	6.75	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Jul-02	0.017	0.08	5.20	0.63	0.03	0.005	0.01	0.008	0.12	NS	1.01	0.11	0.53	NS	NS	1.57	NS	NS
Aug-02	NS	NS	4.09	NS	NS	NS	0.01	0.01	0.13	NS	0.86	0.11	0.58	NS	NS	1.29	NS	NS
Sep-02	NS	NS	2.67	NS	NS	NS	0.01	0.009	0.19	NS	0.52	0.11	0.38	NS	NS	1.78	NS	NS
Oct-02	NS	NS	3.58	NS	NS	NS	0.01	0.008	0.35	NS	0.57	0.11	0.59	NS	NS	2.70	NS	NS
Nov-02	NS	NS	4.75	NS	NS	NS	0.006	0.005	0.14	NS	0.73	0.10	0.64	NS	NS	1.69	NS	NS
Dec-02	0.0108	<0.05	4.01	0.025	<.005	NS	0.006	0.006	0.15	NS	0.73	0.11	0.77	NS	NS	1.06	NS	NS
Jan-03	NS	NS	0.703	NS	NS	NS	0.11	0.005	0.005	NS	0.69	<.005	0.13	NS	NS	3.36	NS	NS
Feb-03	NS	NS	3.04	NS	NS	NS	0.05	<.005	0.13	NS	0.71	0.113	0.66	NS	NS	0.60	0.01	0.111
Mar-03	0.321	NS	2.70	0.0068	0.091	NS	0.008	<.005	0.12	0.111	0.603	0.11	0.699	0.006	0.006	0.672	NS	NS
Apr-03	NS	NS	2.37	NS	NS	NS	0.005	<.005	0.11	NS	0.53	0.09	0.63	NS	NS	0.63	NS	NS
May-03	NS	NS	2.00	NS	NS	NS	0.008	<.005	0.113	NS	0.52	0.140	0.617	NS	NS	0.555	NS	NS
Jun-03	NS	NS	2.14	NS	NS	NS	<0.005	<.005	0.13	NS	0.524	0.11	0.56	NS	NS	0.42	NS	NS
Jul-03	NS	NS	1.40	NS	NS	NS	<0.005	0.006	0.107	NS	0.475	0.103	0.531	NS	NS	0.786	NS	NS
Aug-03	NS	0.0064	1.17	0.0167	NS	NS	<0.005	<.005	0.104	0.0701	0.416	0.0905	0.416	NS	NS	0.0874	NS	NS
Sep-03	NS	0.00550	NS	NS	NS	NS	0.0193	0.0158	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Oct-03	NS	NS	0.529	0.0118	NS	NS	0.0154	0.0130	0.0705	0.0767	1.32	0.0326	0.129	NS	NS	0.00790	NS	NS
Nov-03	NS	<0.00500	0.387	0.00900	NS	NS	NS	NS	0.0731	0.0608	1.61	0.0298	0.142	NS	NS	0.00520	NS	NS
Nov-03	NS	<0.00500	1.24	<0.00500	NS	NS	NS	NS	0.0662	0.0786	0.6040	0.0251	0.140	NS	NS	0.0307	NS	NS
Jan-04	NS	<0.00500	0.295	<0.00500	NS	NS	NS	NS	0.0522	0.0688	0.944	0.0202	0.0774	NS	NS	0.261	NS	NS
Apr-04	NS	0.004	0.252	0.009	NS	NS	NS	NS	0.0765	0.0549	0.708	0.0223	0.0452	NS	NS	0.506	NS	NS
May-04	NS	<0.00500	0.449	0.00560	NS	NS	NS	NS	0.0673	0.132	0.357	0.0458	0.234	NS	NS	1.36	NS	NS
Jun-04	NS	0.0027	0.500	0.00235	NS	NS	NS	NS	0.0769	0.0577	0.576	0.1050	0.0154	NS	NS	0.8960	NS	NS
Jul-04	NS	0.00305	0.530	0.00230	NS	NS	NS	NS	0.0646	0.0445	0.614	0.0662	0.0416	NS	NS	0.9450	NS	NS
Aug-04	NS	<0.00250	0.186	0.00300	NS	NS	NS	NS	0.0754	0.0384	0.509	0.123	0.0300	NS	NS	0.596	NS	NS
Oct-04	NS	0.0136	0.0861	0.0034	NS	NS	NS	NS	0.173	0.0286	0.317	0.239	0.0238	NS	NS	0.265	NS	NS
Nov-04	NS	NS	0.0172	0.0033	NS	NS	NS	NS	0.184	0.0132	0.576	0.342	0.0249	NS	NS	0.392	NS	NS
Dec-04	NS	0.0029	0.0132	0.0036	NS	NS	NS	NS	0.182	0.00610	0.326	0.386	0.0229	NS	NS	0.230	NS	NS
Jan-05	NS	NS	0.0462	0.0026	NS	NS	NS	NS	0.143	0.0371	0.300	0.305	0.0160	NS	NS	2.550	NS	NS
Feb-05	NS	0.0042	0.291	0.0039	NS	NS	NS	NS	0.122	0.0312	0.325	0.307	0.0258	NS	NS	3.51	NS	NS
Mar-05	NS	NS	0.454	0.0048	NS	NS	NS	NS	0.12	0.0354	0.292	0.314	0.0214	NS	NS	3.08	NS	NS
Jun-05	NS	0.0036	0.140	0.0049	NS	NS	NS	NS	0.255	0.0244	0.919	0.191	0.0208	NS	NS	0.173	NS	NS
Jul-05	NS	0.0040	0.0602	0.0038	NS	NS	NS	NS	0.0522	0.0360	0.603	0.312	0.0238	NS	NS	12.500	NS	NS
Aug-05	NS	0.030	0.0558	0.0040	NS	NS	NS	NS	0.0794	0.0216	0.230	0.268	0.0207	NS	NS	1.040	NS	NS
Jan-06	NS	NS	0.0432	NS	NS	NS	NS	NS	0.0538	NS	0.0636	0.328	NS	NS	NS	5.150	NS	NS
Feb-06	NS	NS	0.0541	NS	NS	NS	NS	NS	0.0589	NS	0.0596	0.338	NS	NS	NS	4.460	NS	NS
Mar-06	NS	NS	0.0564	NS	NS	NS	NS	NS	0.0279	NS	0.0591	0.395	NS	NS	NS	4.710	NS	NS
Jun-06	NS	NS	0.0490	NS	NS	NS	NS	NS	0.0257	NS	0.0444	0.121	NS	NS	NS	5.470	NS	NS
Jul-06	NS	NS	0.0980	NS	NS	NS	NS	NS	0.0197	NS	0.0466	0.088	NS	NS	NS	199.0	NS	NS

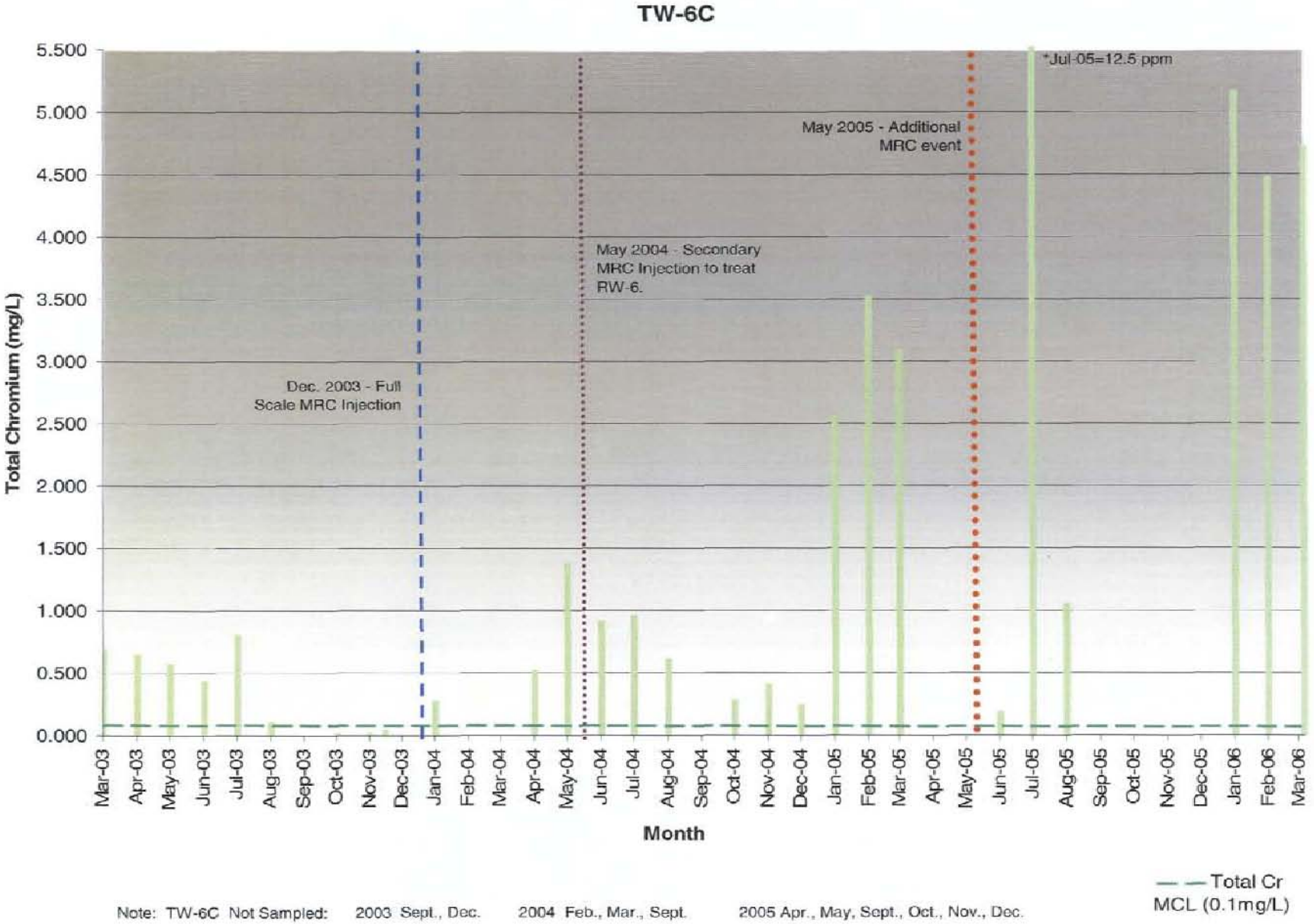
NS = Not Sampled

Total Cr is reported in ppm (parts per million)

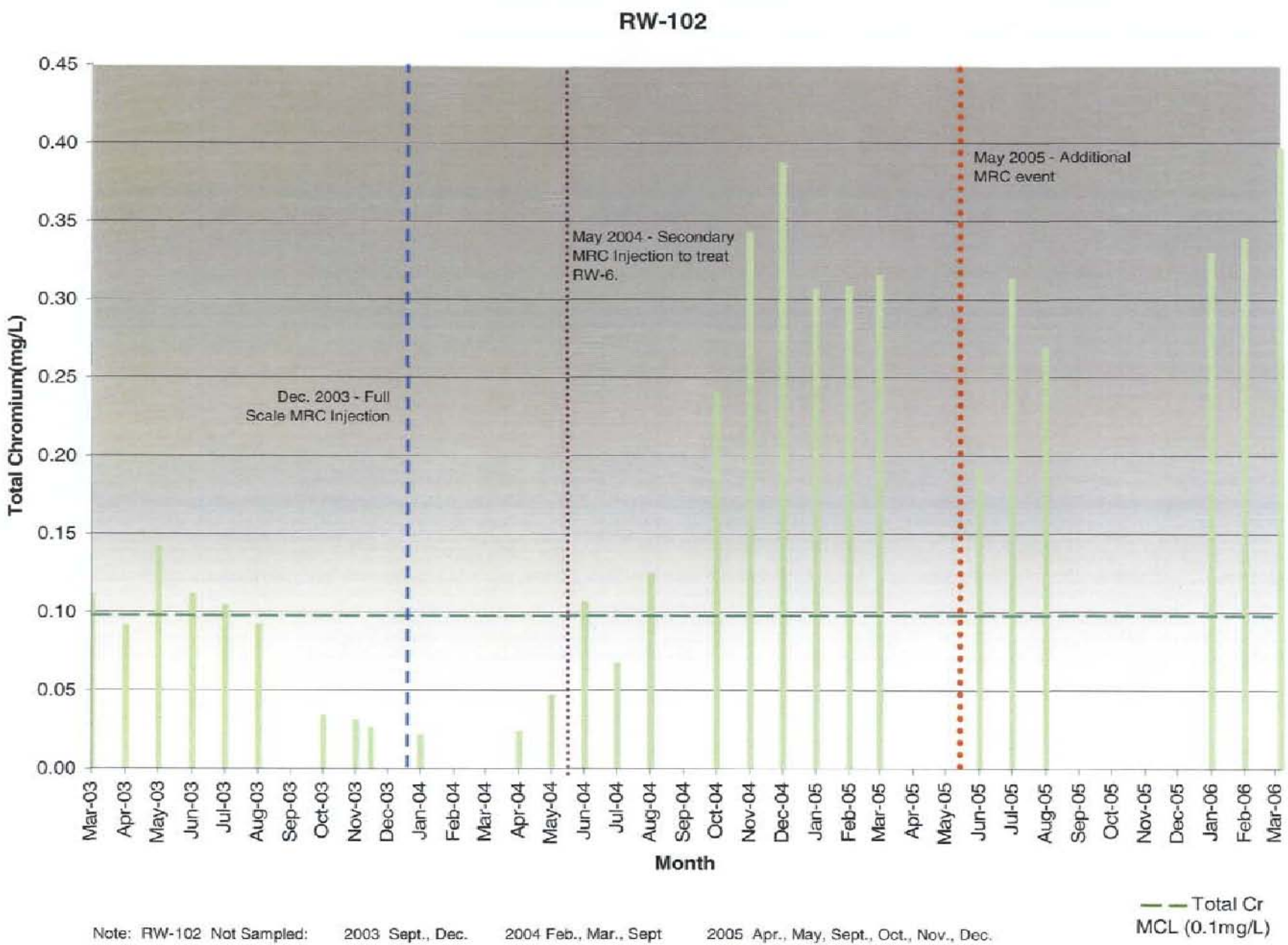
Attachment 8

Chromium Concentration Trend Graphs

(Source: Shaw Environmental & Infrastructure, Inc. "Site Data for EPA Five-Year Review July 2001 August 2006, 4318 Brazos Odessa, TX." June 15, 2006.)

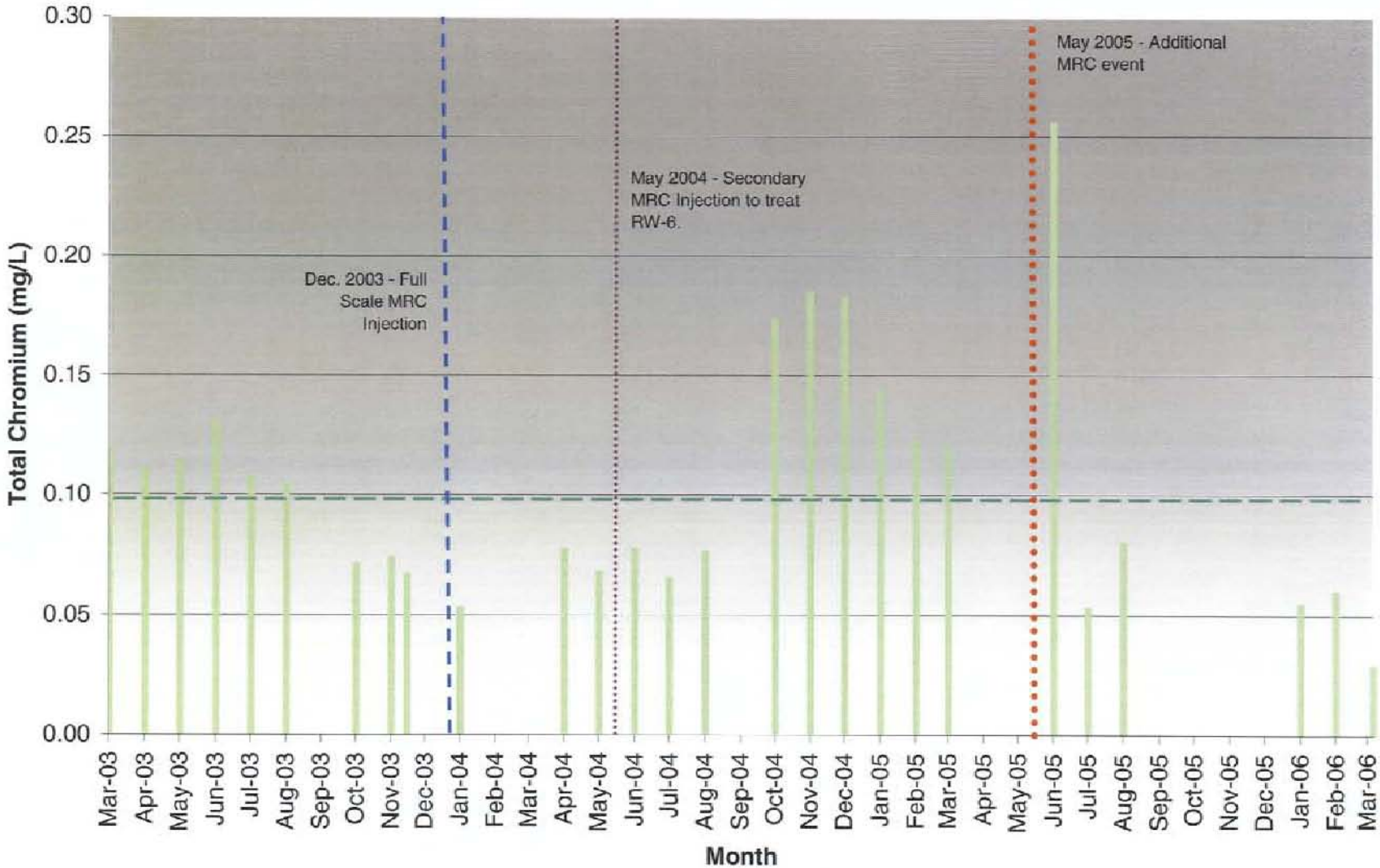


Note: TW-6C Not Sampled: 2003 Sept., Dec. 2004 Feb., Mar., Sept. 2005 Apr., May, Sept., Oct., Nov., Dec.



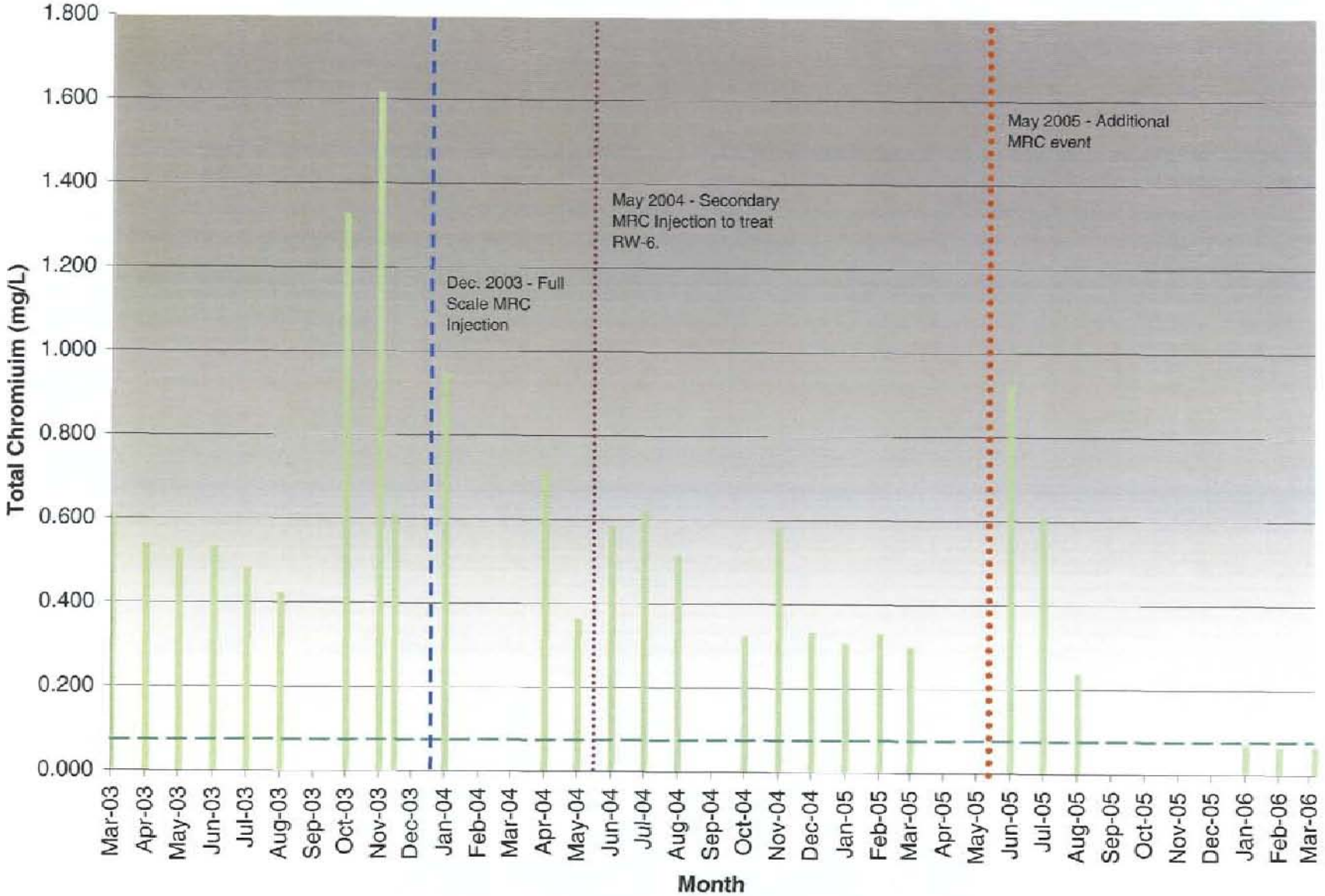
Note: RW-102 Not Sampled: 2003 Sept., Dec. 2004 Feb., Mar., Sept 2005 Apr., May, Sept., Oct., Nov., Dec.

RW-4



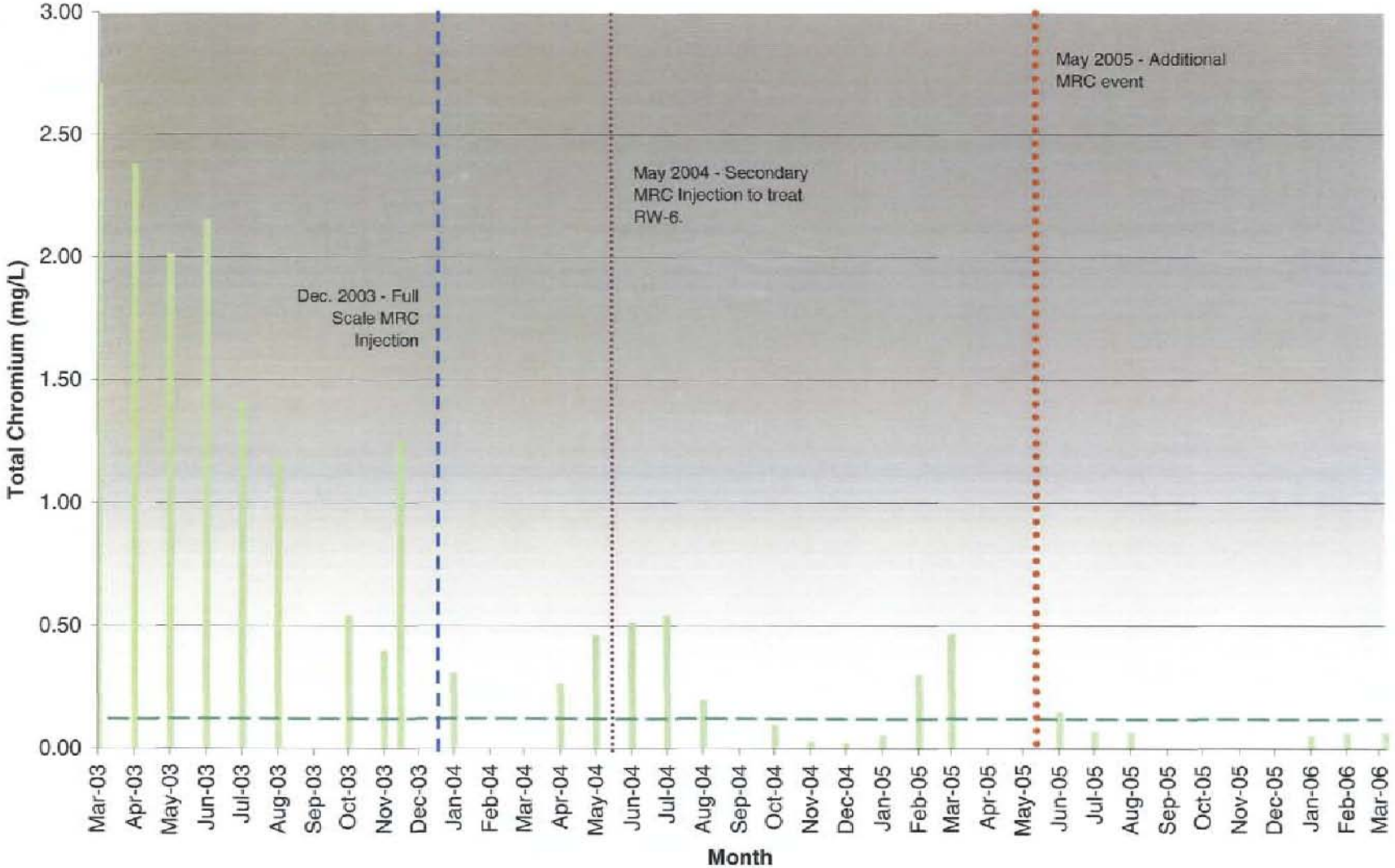
Note: RW-4 Not Sampled 2003 Sept., Dec. 2004 Feb., Mar., Sept. 2005 Apr., May, Sept., Oct., Nov., Dec.

RW-6



Note: RW-6 Not Sampled: 2003 Sept., Dec. 2004 Feb., Mar., Sept. 2005 Apr., May, Sept., Oct., Nov., Dec.

MW-111



Note: MW-111 Not Sampled 2003 Sept., Dec. 2004 Feb., Mar., Sept. 2005 Apr., May, Sept., Oct., Nov., Dec.