

GW-199

HOBBS

REPORT

DATE:

10.11.2007



4600 South Ulster Street, Suite 930 • Denver, Colorado 80237 • (303) 850-9200 • Fax (303) 850-9214

GW-199, Hobbs

October 11, 2007

Mr. Wayne Price
Environmental Bureau Chief
New Mexico Oil Conservation Division
1220 South St Francis Drive
Santa Fe, NM 87505

Re: Chromium Data Compared with Modeling Results, Champion Technologies, Inc., Site (AP-14), 4001 South Highway 18, Hobbs, New Mexico

Dear Mr. Price:

As stated in our letter summarizing the chromium modeling results, dated January 29, 2007, for the Champion Technologies, Inc., site located at 4001 South Highway 18 in Hobbs, New Mexico, WSP Environmental Strategies LLC has prepared this comparison of semiannual sampling results to the model results. That model simulated offsite transport and attenuation of chromium as it relates to the entire saturated thickness of the Ogallala Aquifer. Based on the conditional approval of the July 12, 2006 site investigation report, the New Mexico Oil Conservation Division (NMOCD) concurred that chromium in groundwater is the one remaining environmental problem at the site. This letter recapitulates a description of the modeling effort and presents our interpretation of site data in relation to the model.

Model Simulation

The purpose of the modeling was to estimate future behavior of chromium in groundwater using the site-specific data. The site data suggest that a finite release occurred, and that, on the site, there is not a continuing source of chromium to the groundwater. The primary attenuation mechanism in groundwater is likely dispersion and, to a lesser degree, sorption and diffusion.

The groundwater modeling software used for this analysis is AT123D, originally developed at Oak Ridge National Laboratory, Oak Ridge, Tennessee, by Gour-Tsyh Yeh, Ph.D. AT123D is based on an analytical solution for transient one-, two-, or three-dimensional transport of a dissolved chemical in a homogeneous aquifer with uniform, stationary regional flow. This model allows for an instantaneous, or continuous, release of organic or inorganic compounds to groundwater. It calculates the distribution of chemicals of concern (COCs) in groundwater over time taking into account dispersion, diffusion, sorption, and biodegradation, as warranted. The program predicts the concentration distribution in space and time in milligrams per liter (mg/l or ppm). The aquifer can be bounded (finite extent) or of infinite extent in the Y- and/or Z-direction; it is defined as an infinite extent in the positive X-direction. The X-direction is west to east, in the direction of groundwater flow; the Y-direction is north to south, perpendicular to groundwater flow; and the Z-direction is the vertical depth into the water table, in other words,

the top of the water table is $Z=0$, and 30 meters below the water table is $Z=30$. The simulated source is centered at $X=0$, $Y=0$, and $Z=0$ to 3 meters.

Model Inputs

Based on information from previous site investigations, the subsurface geologic deposits at the site are characterized as a poorly-graded fine sand with trace silt. Perennial groundwater is encountered in the unconfined sand unit at a depth of approximately 17 meters below ground surface with a saturated thickness of at least 24 meters. A saturated thickness of 30 meters was defined for the modeling effort. Overall, the water level data from recent site investigations indicate a hydraulic gradient of 0.003 feet per foot to the east-southeast. There are no known groundwater recharge areas or sinks in the immediate area.

The release was modeled as a 50-year long, continuous release of chromium into groundwater. The results of historical soil investigations did not identify affected soils or a continuing source, suggesting that the source area currently has a low mass of chromium, within the range of background concentrations; however, in the past, the source area may have had elevated chromium concentrations that already migrated to the water table. The best-fit model input for the source was an area of approximately 10 meters by 10 meters, located at MW-13; this location and source dimensions yielded an output most closely fitting the historical groundwater data. The following table presents the primary model input values and the rationale or source of the values.

Parameter	Value	Comment
Aquifer depth	30 m (98 ft)	Based on review of NMOSE well records
Source dimensions	10 m x 10 m	Inferred from site data
Hydraulic conductivity	1 m/hr (2.8×10^{-2} cm/s)	Consistent with grain-size observed and TWDB literature
Hydraulic gradient	0.003	Based on site data 2003 to 2006
Longitudinal dispersivity, α_x	10 m	Based on length of plume observed
Lateral dispersivity, α_y	1 m	$0.1 \alpha_x$
Vertical dispersivity, α_z	0.5 m	$0.05 \alpha_x$
Partitioning/Distribution coefficient, K_d	$0.001 \text{ m}^3/\text{kg}$ (1 ml/g)	EPA literature value
Molecular diffusion	$1 \times 10^{-5} \text{ m}^2/\text{hr}$ ($2.8 \times 10^{-5} \text{ cm}^2/\text{s}$)	Tortuosity factor x FDEP literature value
Discharge duration	438,000 hr (50 years)	Based on site operation and regional oil-production history
Discharge rate	$1.1 \times 10^{-4} \text{ kg/hr}$ (0.96 kg/yr)	Inferred from model output

Table Notes:

NMOSE: New Mexico Office of the State Engineer records for available water well logs in Township 19 South Range 38 East. <http://iwaters.osc.state.nm.us:7001/iWATERS/>

TWDB: Texas Water Development Board, Report 288, *Evaluating the Ground Water Resources of the High Plains of Texas*. May 1984.

EPA: United States Environmental Protection Agency. *Understanding Variation in Partitioning Coefficient, K_d Values* (402-R-99-004B). August 1999.

FDEP: Florida Department of Environmental Protection. *Technical Report: Development of Cleanup Target Levels (CTLs), For Chapter 62-777, F.A.C.* University of Florida Center for Environmental & Toxicology. February 2005.

The historical groundwater analytical results from monitoring wells MW-13 and MW-20 were the primary calibration targets along the longitudinal axis of the model. Additionally, the analytical data from monitoring wells MW-3 and MW-5 (located approximately 25 meters north of the plume's longitudinal axis, and having chromium concentrations below 0.01 mg/l), were used to calibrate the transverse axis of the model. Figure 1 depicts the location of the monitoring wells. The analytical data used for calibration are as follows:

DATE	MW-19	MW-13	MW-4	MW-4D	MW-20
February-03	--	0.151	0.271	--	--
May-03	--	0.158	0.201	--	--
August-03	--	0.191	0.187	--	--
November-03	--	0.180	0.161	--	--
March-04	--	0.179	0.163	--	--
June-04	--	0.166	0.117	--	--
October-04	--	0.199	0.161	--	--
July-05	0.001	0.092	0.058	0.110	0.054
October-05	0.003	0.100	0.063	0.089	0.057
January-06	ND	0.110	0.047	0.060	0.047
April-06	ND	0.044	0.035	0.043	0.072
February-07	--	0.110	--	0.016	0.042
July-07	--	0.009	--	0.019	0.048

Table Notes: Dissolved chromium is presented in mg/l
 MW-4D, MW-19 and MW-20 were installed in July 2005.
 Data from MW-4D and all data collected after April 2006 were not used in the model calibration

WSP Environmental Strategies applied AT123D by first calibrating the model using traditional trial and error methods to approximate the field observations. During the calibration, various combinations of input parameters were used to simulate the observed plume behavior; and the final calibrated model represents the scenario with the most plausible combination of input parameters and the best match to the observed analytical data. The final calibrated model output shows a continuous or sustained release, steady-state dispersing plume. This can be considered to be the upper-bound envelope of chromium concentrations in groundwater (calibrated to the maximum historical concentrations).

Simulated Plume Behavior

The series of model outputs simulating a steady-state plume were developed in the January 2007 letter summarizing the modeling effort. The model output indicated that the plume reaches a steady state after 10 years, in other words, the output for a 10-year release duration would attain the same plume dimensions as a release of 50 years or more, as long as it had a steady contaminant flux from the soil to groundwater. The maximum pre-2007 concentrations are represented as the "Baseline" curve, on Figure 2.

Figure 2 depicts the longitudinal profile along the centerline, at a depth of 1.5 meters below the water table, for steady-state sources of varying magnitudes ranging from 1/2 to 1/8 times the

Baseline curve. These curves simulate the concentrations along the plume's centerline, caused by an attenuating source, reducing in half, then quarter, then eighth. Because there are infinite gradations between these points, these intervals were selected only for reference. The general shape of the infinite number of curves would be similar, though. Because it takes approximately ten years for each profile to attain steady state, a source that has a half-life of less than ten years would exhibit slightly different profiles, but would not exceed the upper-bound envelope represented by the Baseline curve.

Data Comparison

Figures 3 and 4 show the data from MW-13, MW-4 and MW-20 from July and October 2005. They correspond very well to the $\frac{1}{2}$ Baseline curve. The error bars shown are $\pm 20\%$, which is the acceptable tolerance, referred to as relative percent difference (RPD), for two measurements of the same sample using EPA Method 6010, which was the analytical method used in this project.

Figures 5 and 6 show the data from January and April 2006. They correspond well with the $\frac{1}{2}$ and $\frac{1}{4}$ Baseline curves, with the upgradient part of the plume corresponding better with the $\frac{1}{4}$ Baseline curve, and the downgradient part still corresponding with the $\frac{1}{2}$ Baseline curve.

Figures 7 and 8 show data from February and July 2007. The upgradient data correspond well with the $\frac{1}{8}$ Baseline curve, the middle of the plume corresponds with the $\frac{1}{4}$ Baseline, and the downgradient data still corresponds with the $\frac{1}{2}$ Baseline.

As predicted in the January modeling letter, there appears to be a lag in response between decreases in the concentrations near the source area compared with concentrations at distal wells. These comparisons indicate that the source is attenuating faster than the downgradient plume can equilibrate with.

WSP Environmental Strategies tabulated data points for MW-13, MW-4, MW-4D and MW-20, using the Mann Kendall statistical method to evaluate trends in the dissolved chromium data. The method is valid for up to ten data points, in chronological order and includes an estimate of the percent confidence level that a data set is decreasing or increasing. As shown on Table 1, the overall concentrations trends are declining or stable. There is at least 90 percent confidence that MW-13, MW-4 and MW-4D are decreasing and MW-20 is stable. Furthermore, the concentrations have attenuated to less than the New Mexico Water Quality Control Commission standard for groundwater protection 0.05 mg/l in all of the wells monitored.

Conclusions

The site data correspond reasonably well with the model simulation of a declining source, including some lag time between changes in groundwater concentrations in the source area compared with those at distal wells. The chromium concentrations in soil suggest the source has depleted itself.

Recommendations

Because dissolved chromium concentrations at MW-13 and MW-4D statistically decreasing (with more than 90% confidence) and are currently less than 0.05 mg/l, and concentrations at MW-20 are stable and less than 0.05 mg/l, Champion Technologies and WSP Environmental Strategies recommend that abatement activities at the site be terminated.

If you have any questions regarding this matter, please contact us at (303) 850-9200 or manley.tom@wspgroup.com.

Sincerely yours,

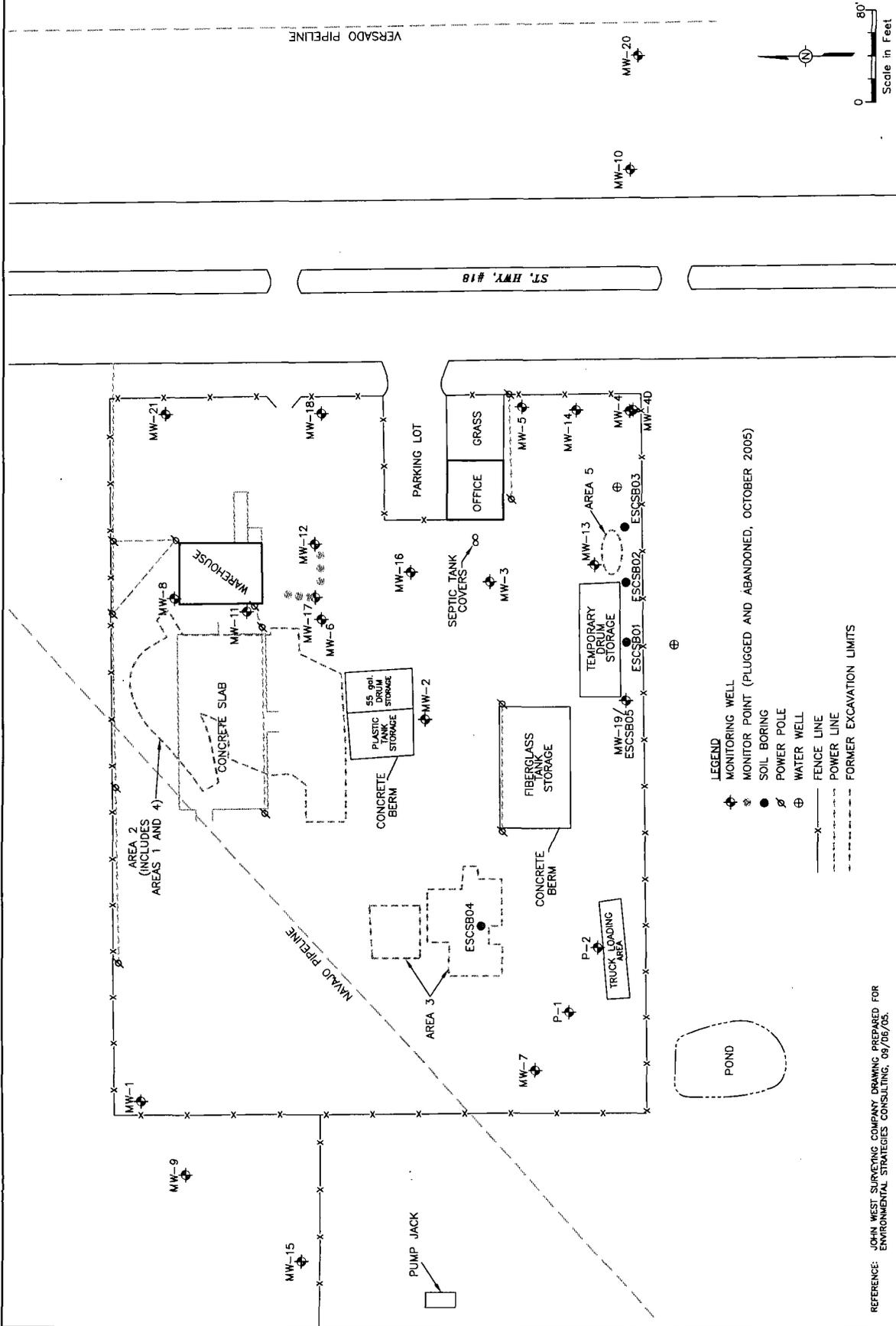


Manley Tom, P.E.
Technical Manager

Enclosure

cc/encl: Mr. Chris Williams, New Mexico Oil Conservation Division
Mr. Marty Brown, Champion Technologies Inc.
Mr. Dwight Vorpahl, Champion Technologies Inc.
Mr. Brian Friedman, Champion Technologies Inc.
Mr. Juan Alvarado, Champion Technologies Inc.
Mr. John Simon, WSP Environmental Strategies LLC

Figures



REFERENCE: JOHN WEST SURVEYING COMPANY DRAWING PREPARED FOR ENVIRONMENTAL STRATEGIES CONSULTING, 09/06/05.

Figure 2

Theoretical Curves for Declining Sources: Longitudinal Profile at the Centerline
Champion Technologies, Inc. Site
Hobbs, New Mexico

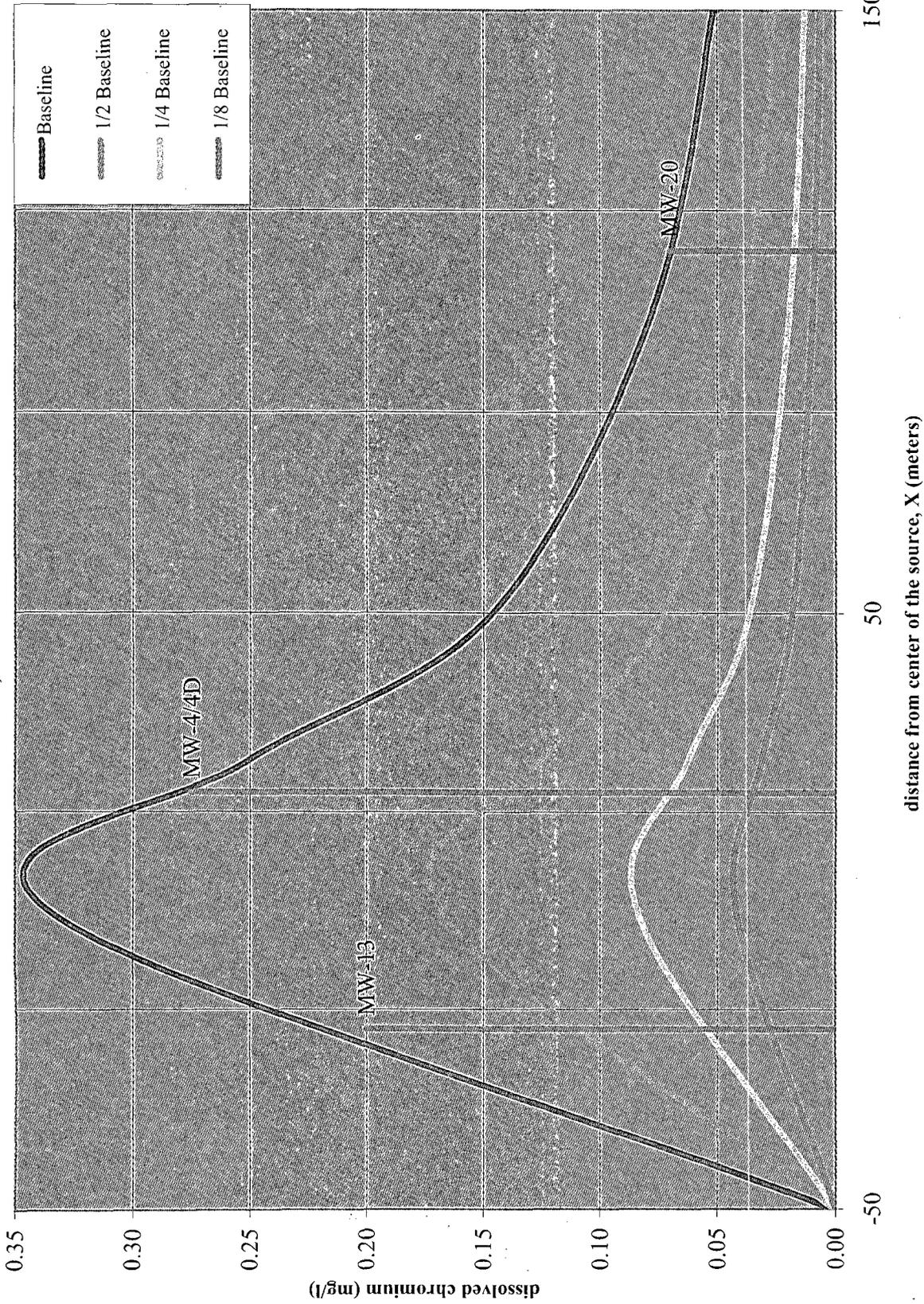


Figure 3

July 2005 Data Compared with Theoretical Curves
Champion Technologies, Inc. Site
Hobbs, New Mexico

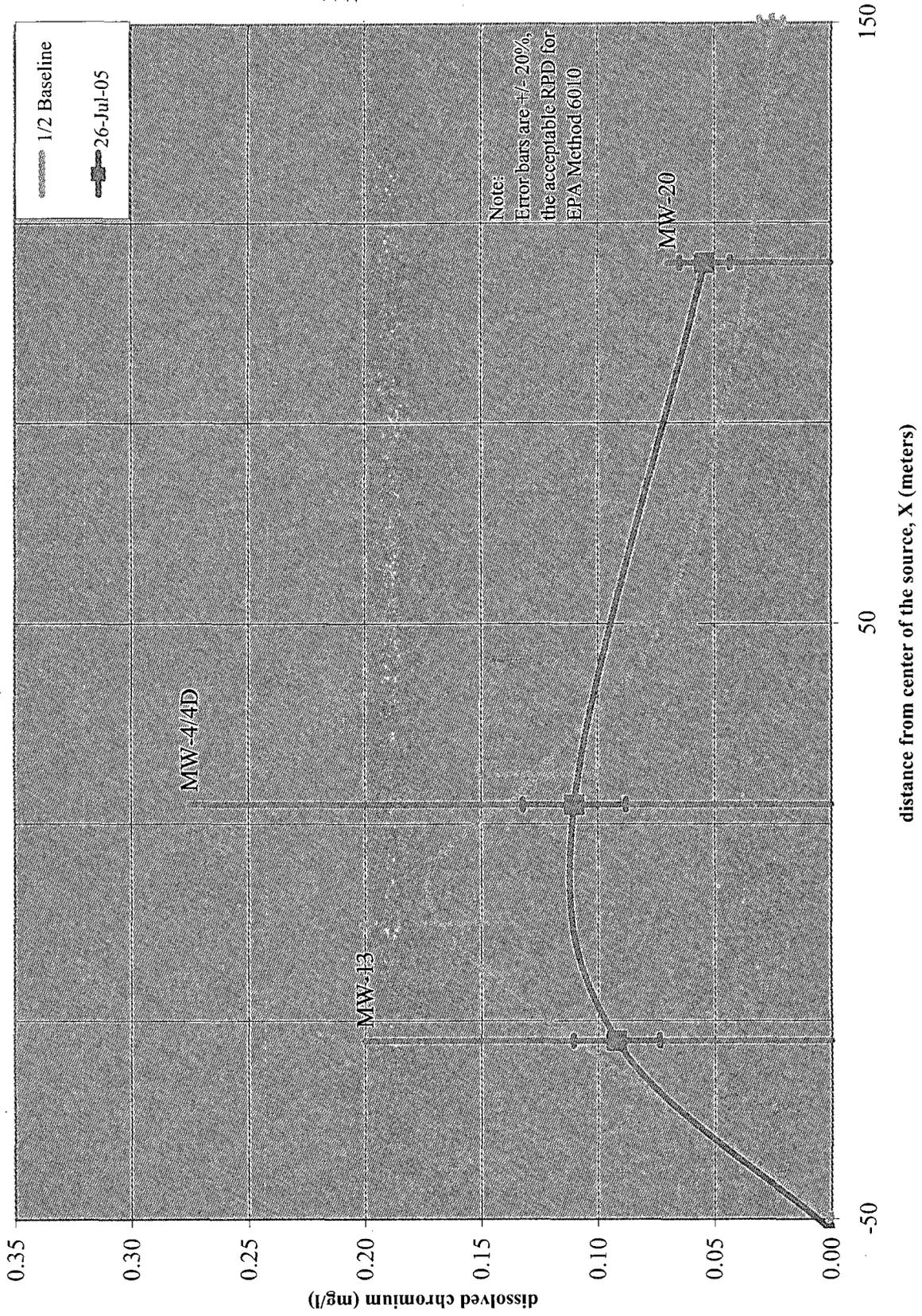


Figure 4

October 2005 Data Compared with Theoretical Curves
Champion Technologies, Inc. Site
Hobbs, New Mexico

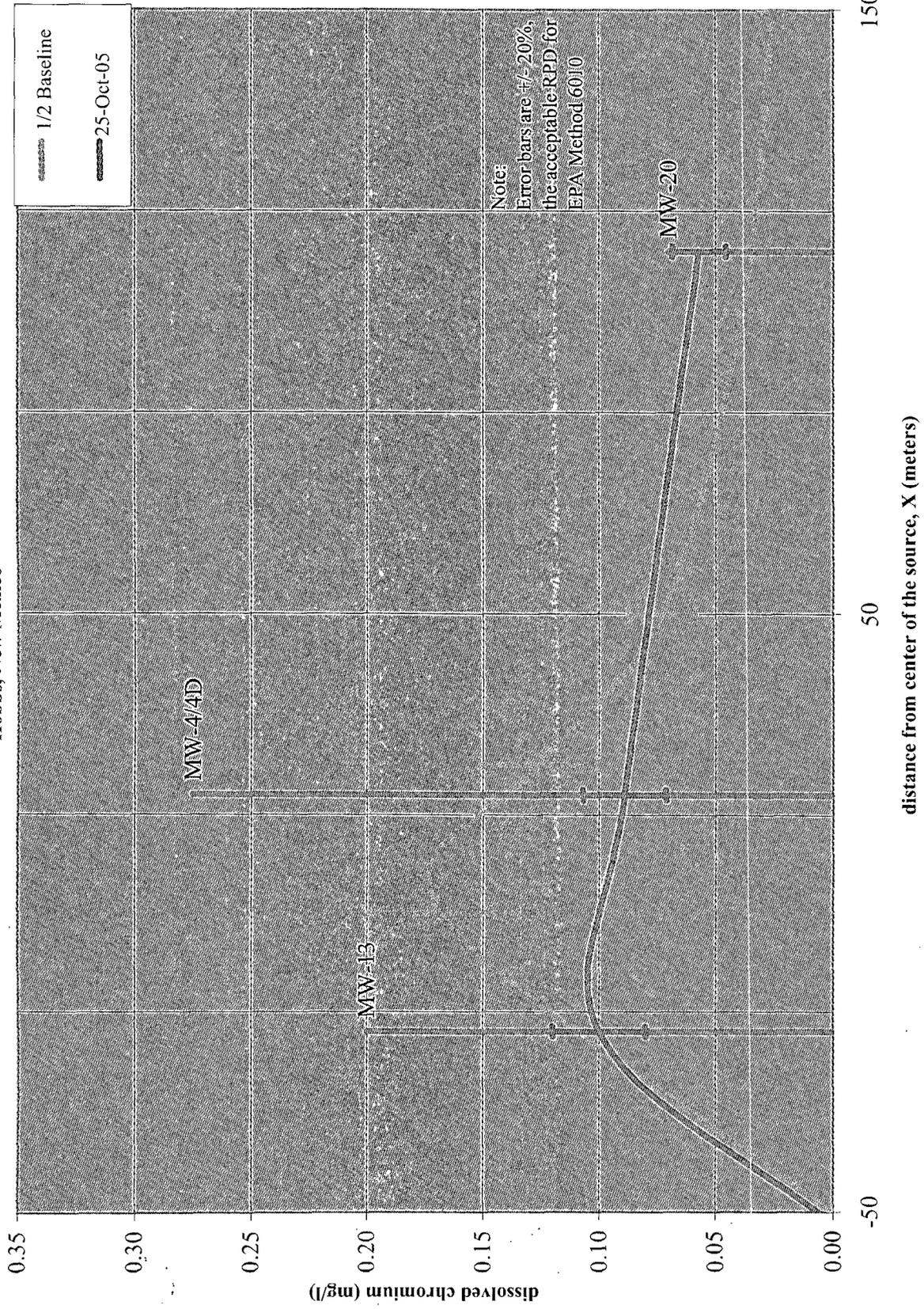


Figure 5

January 2006 Data Compared with Theoretical Curves
Champion Technologies, Inc. Site
Hobbs, New Mexico

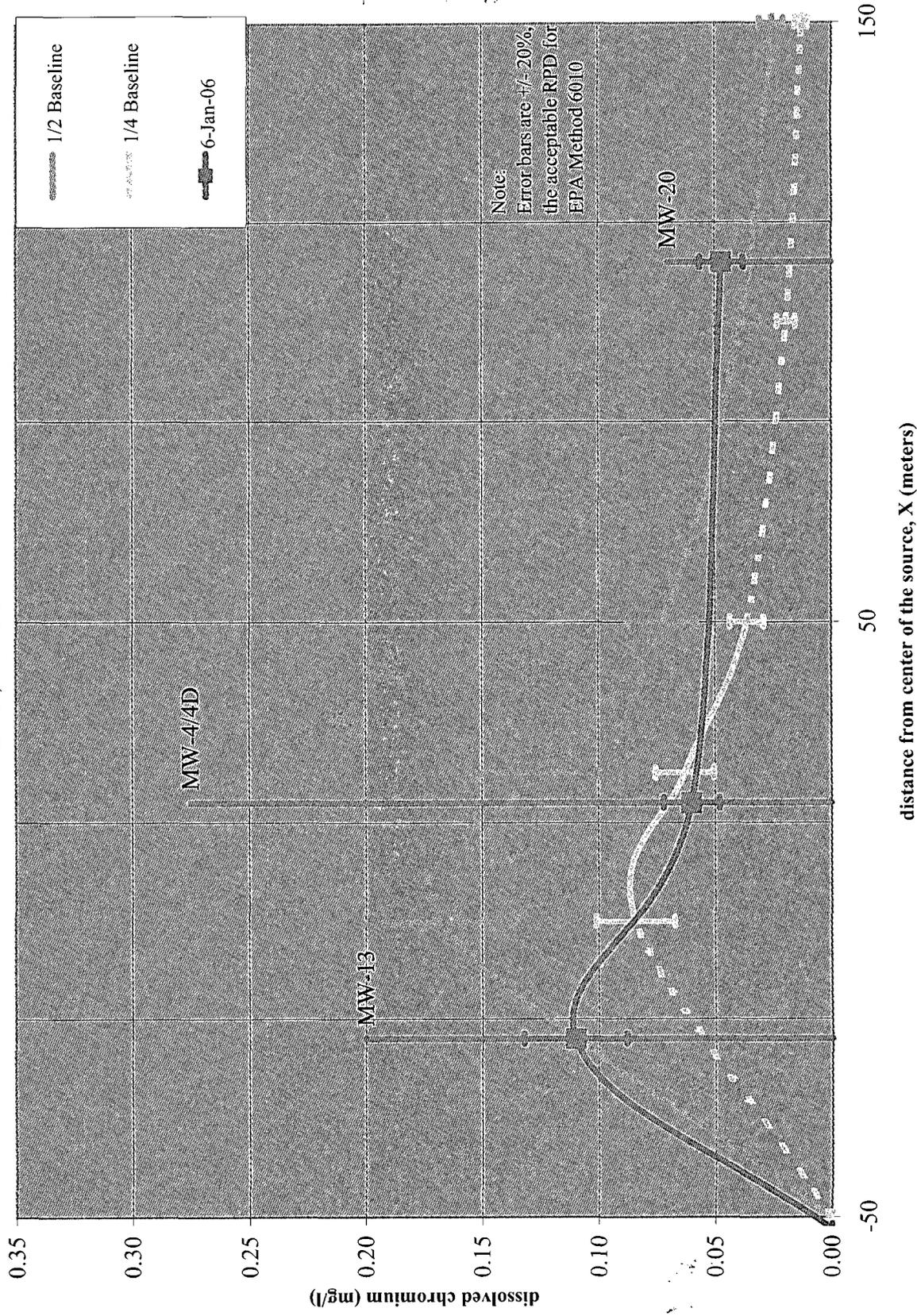


Figure 6

April 2006 Data Compared with Theoretical Curves
Champion Technologies, Inc. Site
Hobbs, New Mexico

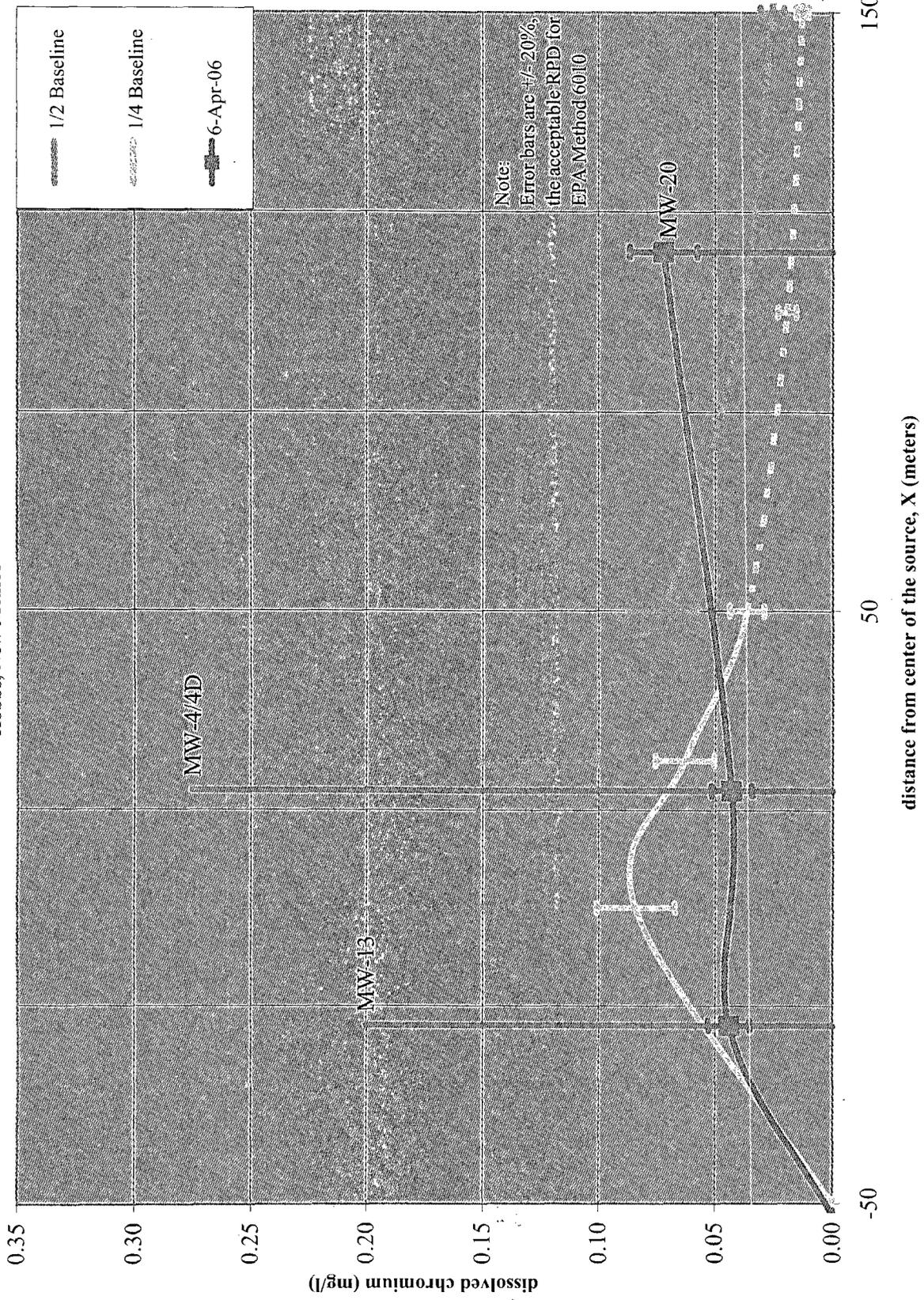


Figure 7

February 2007 Data Compared with Theoretical Curves
Champion Technologies, Inc. Site
Hobbs, New Mexico

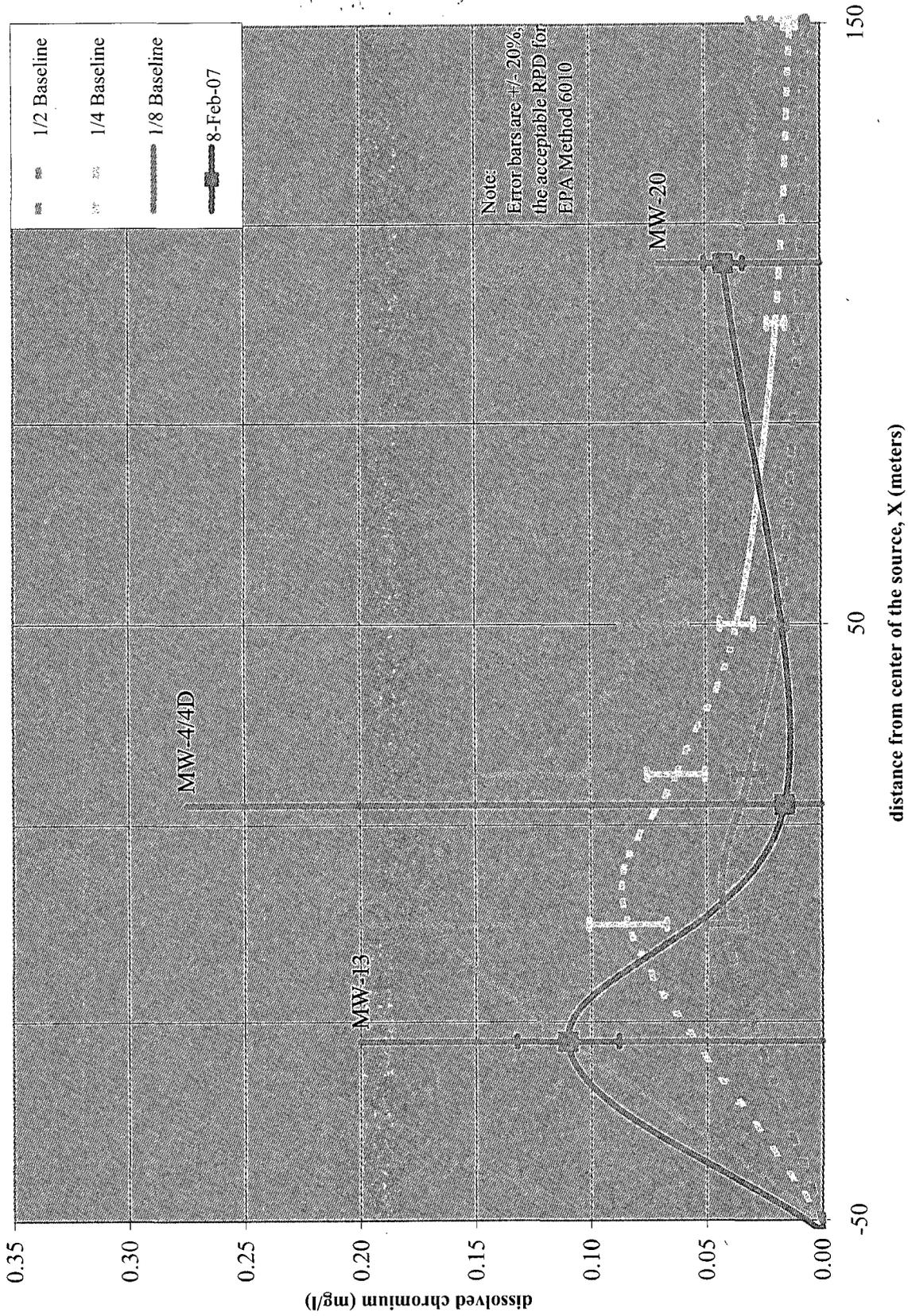
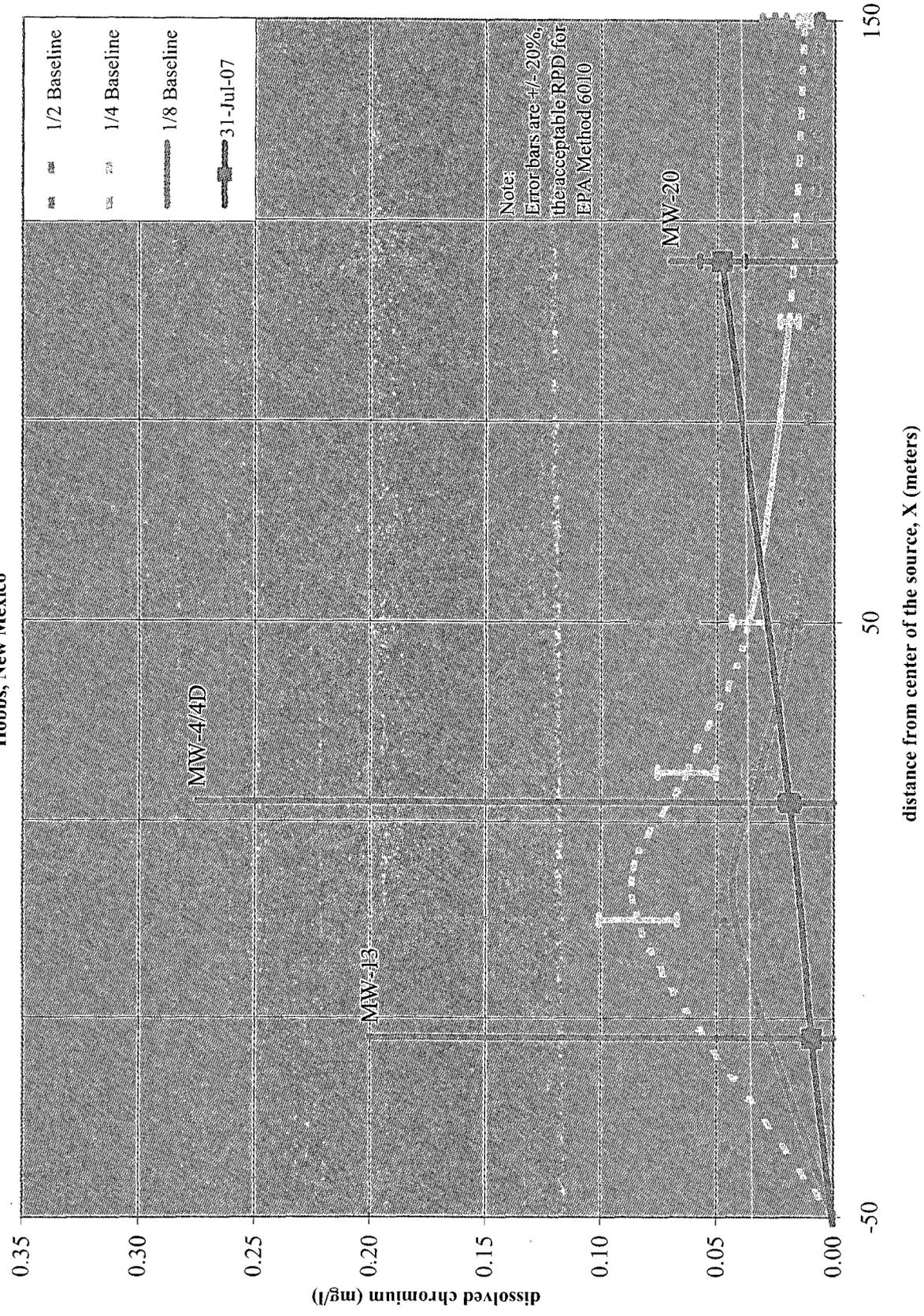


Figure 8

July 2007 Data Compared with Theoretical Curves
Champion Technologies, Inc. Site
Hobbs, New Mexico



Tables

February 2007 Laboratory Report



STL

STL Denver
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Arvada, CO 80002

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ANALYTICAL REPORT

Champion, Hobbs NM
Project # 131042/1

Lot #: D7B090307

Manley Tom
WSP Environmental Strategies, LLC
4600 South Ulster Street
Suite 930
Denver, CO 80237

Severn Trent Laboratories, Inc./STL Denver

Gail DeRuzzo
for Gail DeRuzzo
Project Manager

February 20, 2007

Table Of Contents

Standard Deliverables

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Total Number of Pages

Standard Deliverables

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- **Executive Summary – Detection Highlights**
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- **QC Evaluation and/or Data Reports**
- **Chain-of-Custody**

Case Narrative

Enclosed is the report for three samples that arrived at STL's Denver laboratory on February 9, 2007. The results included in this report have been reviewed for compliance with STL's Laboratory Quality Manual (LQM). The test results shown in this report meet all requirements of NELAC and any exceptions are noted below.

Dilution factors and footnotes have been provided to assist in the interpretation of the results. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at concentrations above the linear calibration curve, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

STL utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the analytical methods summary page in accordance with the methods indicated. A summary of quality control parameters is provided below.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Quality Control Summary for Lot D7B090307

Sample Receiving

The cooler temperature upon receipt at the Denver laboratory was 4.3°C.

The dissolved metals were filtered and preserved at the laboratory.

No anomalies were observed.

Dissolved Metals – Method 6010B

Laboratory generated matrix spike analysis data have been provided. The MS/MSD associated with batch 7041064 exhibited spike compound recoveries outside the QC limits. The acceptable LCS analysis data indicated that the analytical system was operating within control; therefore, corrective action is deemed unnecessary.

No other anomalies were observed.

EXECUTIVE SUMMARY - Detection Highlights

D7B090307

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>ANALYTICAL METHOD</u>
MW-13 02/08/07 11:15 001				
Chromium - DISSOLVED	110	10	ug/L	SW846 6010B
MW-4D 02/08/07 12:45 002				
Chromium - DISSOLVED	16	10	ug/L	SW846 6010B
MW-20 02/08/07 13:30 003				
Chromium - DISSOLVED	42	10	ug/L	SW846 6010B

METHODS SUMMARY

D7B090307

<u>PARAMETER</u>	<u>ANALYTICAL METHOD</u>	<u>PREPARATION METHOD</u>
Inductively Coupled Plasma (ICP) Metals	SW846 6010B	SW846 3005A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

METHOD / ANALYST SUMMARY

D7B090307

<u>ANALYTICAL METHOD</u>	<u>ANALYST</u>	<u>ANALYST ID</u>
SW846 6010B	Janel Motichka	2862

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

D7B090307

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
JN8FD	001	MW-13	02/08/07	11:15
JN8FF	002	MW-4D	02/08/07	12:45
JN8FG	003	MW-20	02/08/07	13:30

NOTE (S) :

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

WSP Environmental Strategies LLC

Client Sample ID: MW-13

DISSOLVED Metals

Lot-Sample #...: D7B090307-001

Matrix.....: WATER

Date Sampled...: 02/08/07 11:15 Date Received...: 02/09/07

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>

Prep Batch #...: 7041064

Chromium	110	10	ug/L	SW846 6010B	02/13/07	JN8FD1AA
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Dilution Factor: 1

Analysis Time...: 17:39

MDL.....: 2.6

WSP Environmental Strategies LLC

Client Sample ID: MW-4D

DISSOLVED Metals

Lot-Sample #...: D7B090307-002

Matrix.....: WATER

Date Sampled...: 02/08/07 12:45 Date Received...: 02/09/07

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Prep Batch #...: 7041064						
Chromium	16	10	ug/L	SW846 6010B	02/13/07	JN8FF1AA
		Dilution Factor: 1		Analysis Time...: 17:43	MDL.....: 2.6	

WSP Environmental Strategies LLC

Client Sample ID: MW-20

DISSOLVED Metals

Lot-Sample #...: D7B090307-003

Matrix.....: WATER

Date Sampled...: 02/08/07 13:30 Date Received...: 02/09/07

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION-</u> <u>ANALYSIS DATE</u>	<u>WORK</u> <u>ORDER #</u>
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Prep Batch #...: 7041064

Chromium	42	10	ug/L	SW846 6010B	02/13/07	JN8FG1AA
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Dilution Factor: 1

Analysis Time...: 17:48

MDL.....: 2.6

QC DATA ASSOCIATION SUMMARY

D7B090307

Sample Preparation and Analysis Control Numbers

<u>SAMPLE#</u>	<u>MATRIX</u>	<u>ANALYTICAL METHOD</u>	<u>LEACH BATCH #</u>	<u>PREP BATCH #</u>	<u>MS RUN#</u>
001	WATER	SW846 6010B		7041064	7041045
002	WATER	SW846 6010B		7041064	7041045
003	WATER	SW846 6010B		7041064	7041045

METHOD BLANK REPORT

DISSOLVED Metals

Client Lot #...: D7B090307

Matrix.....: WATER

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
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MB Lot-Sample #: D7B100000-064		Prep Batch #... : 7041064				
Chromium	ND	10	ug/L	SW846 6010B	02/13/07	JN8TP1AF
		Dilution Factor: 1				
		Analysis Time...: 16:35				

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

DISSOLVED Metals

Client Lot #...: D7B090307

Matrix.....: WATER

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
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LCS Lot-Sample#: D7B100000-064 Prep Batch #...: 7041064

Chromium	103	(90 - 113)	SW846 6010B	02/13/07	JN8TP1AU
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Dilution Factor: 1 Analysis Time...: 16:40

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE DATA REPORT

DISSOLVED Metals

Client Lot #...: D7B090307

Matrix.....: WATER

<u>PARAMETER</u>	<u>SPIKE</u> <u>AMOUNT</u>	<u>MEASURED</u> <u>AMOUNT</u>	<u>UNITS</u>	<u>PERCNT</u> <u>RECVRY</u>	<u>METHOD</u>	<u>PREPARATION-</u> <u>ANALYSIS DATE</u>	<u>WORK</u> <u>ORDER #</u>
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LCS Lot-Sample#:	D7B100000-064		Prep Batch #...	7041064			
Chromium	200	206	ug/L	103	SW846 6010B	02/13/07	JN8TP1AU
			Dilution Factor: 1		Analysis Time...: 16:40		

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE EVALUATION REPORT

DISSOLVED Metals

Client Lot #...: D7B090307

Matrix.....: WATER

Date Sampled...: 02/06/07 14:00 Date Received...: 02/08/07

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>RPD</u>	<u>RPD LIMITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
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MS Lot-Sample #: D7B080160-001 Prep Batch #...: 7041064

Chromium	70 N	(73 - 135)			SW846 6010B	02/13/07	JN4191CD
	74	(73 - 135)	3.5	(0-25)	SW846 6010B	02/13/07	JN4191CE

Dilution Factor: 1

Analysis Time...: 16:54

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

N Spiked analyte recovery is outside stated control limits.

MATRIX SPIKE SAMPLE DATA REPORT

DISSOLVED Metals

Client Lot #...: D7B090307

Matrix.....: WATER

Date Sampled...: 02/06/07 14:00 Date Received...: 02/08/07

<u>PARAMETER</u>	<u>SAMPLE AMOUNT</u>	<u>SPIKE AMT</u>	<u>MEASRD AMOUNT</u>	<u>UNITS</u>	<u>PERCNT RECVRY</u>	<u>RPD</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
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MS Lot-Sample #: D7B080160-001 Prep Batch #...: 7041064

Chromium

52	200	193 N	ug/L	70			SW846 6010B	02/13/07	JN4191CI
52	200	200	ug/L	74	3.5		SW846 6010B	02/13/07	JN4191CI

Dilution Factor: 1

Analysis Time...: 16:54

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

N Spiked analyte recovery is outside stated control limits.

STL Denver
Sample Receiving Checklist

Lot #: D7B090302 Date/Time Received: 2.9.02 1600

Company Name & Sampling Site: WSP - Champion HOABS

PM to Complete This Section: Yes No
Residual chlorine check required: Quarantined:

Quote #: 65831-E

Special Instructions:

Time Zone:

• EDT/EST • CDT/CST • MDT/MST • PDT/PST • OTHER

Unpacking Checks:

Cooler #(s): 1

Temperatures (°C): 4.3

N/A Yes No

Initials

1. Cooler seals intact? (N/A if hand delivered) If no, document on CUR. 4P
2. Chain of custody present? If no, document on CUR.
3. Bottles broken and/or are leaking? If yes, document on CUR.
4. Multiphasic samples obvious? If yes, document on CUR.
5. Proper container & preservatives used? (ref. Attachment D of SOP# DEN-QA-0003) If no, document on CUR.
6. pH of all samples checked and meet requirements? If no, document on CUR.
7. Sufficient volume provided for all analysis requested? (ref. Attachment D of SOP# DEN-QA-0003) If no, document on CUR, and contact PM before proceeding.
8. Did chain of custody agree with labels ID and samples received? If no, document on CUR.
9. Were VOA samples without headspace? If no, document on CUR.
10. Were VOA vials preserved? Preservative HCl 4±2°C Sodium Thiosulfate Ascorbic Acid
11. Did samples require preservation with sodium thiosulfate?
12. If yes to #11, did the samples contain residual chlorine? If yes, document on CUR.
13. Sediment present in dissolved/filtered bottles? If yes, document on CUR.
14. Is sufficient volume provided for client requested MS, MSD or matrix duplicates? If no, document on CUR, and contact PM before proceeding.
15. Receipt date(s) > 48 hours past the collection date(s)? If yes, notify PA/PM.
16. Are analyses with short holding times requested?
17. Was a quick Turn Around (TAT) requested?

STL Denver
Sample Receiving Checklist

Lot # D73090307

Login Checks:

Initials

N/A Yes No

MS

- 18. Sufficient volume provided for all analysis requested? (ref. Attachment D of SOP# DEN-QA-0003) If no, document on CUR, and contact PM before proceeding.
- 19. Is sufficient volume provided for client requested MS, MSD or matrix duplicates? If no, document on CUR, and contact PM before proceeding.
- 20. Did the chain of custody includes "received by" and "relinquished" by signatures, dates, and times?
- 21. Were special log in instructions read and followed?
- 22. Were AFCEE metals logged for refrigerated storage?
- 23. Were tests logged checked against the COC? Which samples were confirmed? 1
- 24. Was a Rush form completed for quick TAT?
- 25. Was a Short Hold form completed for any short holds?
- 26. Is "Strict ICOC" required?
- 27. Were special archiving instructions indicated in the General Comments? If so, what were they?

Labeling and Storage Checks:

Initials

PS

- 28. Was the subcontract COC signed and sent with samples to bottle prep?
- 29. Were sample labels double-checked by a second person?
- 30. Were sample bottles and COC double checked for dissolved/filtered metals by a second person?
- 31. Did the sample ID, Date, and Time from label match what was logged?
- 32. Were stickers for special archiving instructions affixed to each box and to the ICOC? See #27
- 33. Were AFCEE metals stored refrigerated?
- 34. Were "Strict ICOC" copies given to satellite storage areas?

Document any problems or discrepancies and the actions taken to resolve them on a Condition Upon Receipt Anomaly Report (CUR).

August 2007 Laboratory Report

STL

STL Denver
4955 Yarrow Street
Arvada, CO 80002

Tel: 303 736 0100 Fax: 303 431 7171
www.stl-inc.com

ANALYTICAL REPORT

Champion, Hobbs NM
Project # 131042/1

Lot #: D7H010218

Manley Tom
WSP Environmental Strategies, LLC
4600 South Ulster Street
Suite 930
Denver, CO 80237

TestAmerica Denver



Gail DeRuzzo
Project Manager

August 14, 2007

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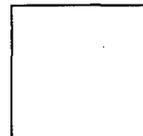
Standard Deliverables

Report Contents

Total Number of Pages

Standard Deliverables

The Cover Letter and the Report Cover page are considered integral parts of this Standard Deliverable package. This report is incomplete unless all pages indicated in this Table of Contents are included.



- **Table of Contents**
- **Case Narrative**
- **Executive Summary – Detection Highlights**
- **Methods Summary**
- **Method/Analyst Summary**
- **Lot Sample Summary**
- **Analytical Results**
- **QC Data Association Summary**
- **Chain-of-Custody**

Case Narrative

Enclosed is the report for four samples that arrived at TestAmerica's Denver laboratory on August 1, 2007. The results included in this report have been reviewed for compliance with TestAmerica's Laboratory Quality Manual (LQM). The test results shown in this report meet all requirements of NELAC and any exceptions are noted below.

Dilution factors and footnotes have been provided to assist in the interpretation of the results. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at concentrations above the linear calibration curve, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the analytical methods summary page in accordance with the methods indicated. A summary of quality control parameters is provided below.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Quality Control Summary for Lot D7H010218

Sample Receiving

The cooler temperature upon receipt at the Denver laboratory was 3.4°C.

The dissolved metals were filtered and preserved at the laboratory.

No anomalies were observed.

Dissolved Metals – Method 6010B

No anomalies were observed.

EXECUTIVE SUMMARY - Detection Highlights

D7H010218

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>ANALYTICAL METHOD</u>
MW-13 07/31/07 09:45 001 Chromium - DISSOLVED	9.3 B	10	ug/L	SW846 6010B
MW-99 07/31/07 09:30 002 Chromium - DISSOLVED	11	10	ug/L	SW846 6010B
MW-4D 07/31/07 10:45 003 Chromium - DISSOLVED	19	10	ug/L	SW846 6010B
MW-20 07/31/07 11:30 004 Chromium - DISSOLVED	48	10	ug/L	SW846 6010B

METHODS SUMMARY

D7H010218

<u>PARAMETER</u>	<u>ANALYTICAL METHOD</u>	<u>PREPARATION METHOD</u>
Inductively Coupled Plasma (ICP) Metals	SW846 6010B	SW846 3005A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

METHOD / ANALYST SUMMARY

D7H010218

<u>ANALYTICAL</u> <u>METHOD</u>	<u>ANALYST</u>	<u>ANALYST</u> <u>ID</u>
SW846 6010B	Lynn-Anne Trudell	6645

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

D7H010218

<u>WO #</u>	<u>SAMPLE#</u>	<u>CLIENT SAMPLE ID</u>	<u>SAMPLED DATE</u>	<u>SAMP TIME</u>
J3099	001	MW-13	07/31/07	09:45
J31AA	002	MW-99	07/31/07	09:30
J31AC	003	MW-4D	07/31/07	10:45
J31AD	004	MW-20	07/31/07	11:30

NOTE (S) :

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

WSP Environmental Strategies LLC

Client Sample ID: MW-13

DISSOLVED Metals

Lot-Sample #...: D7H010218-001

Matrix.....: WATER

Date Sampled...: 07/31/07 09:45 Date Received...: 08/01/07

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
Prep Batch #...: 7218455						
Chromium	9.3 B	10	ug/L	SW846 6010B	08/09-08/10/07	J30991AA
		Dilution Factor: 1		Analysis Time...: 00:59	MDL.....: 2.6	

NOTE(S) :

B Estimated result. Result is less than RL.

WSP Environmental Strategies LLC

Client Sample ID: MW-99

DISSOLVED Metals

Lot-Sample #...: D7H010218-002

Matrix.....: WATER

Date Sampled...: 07/31/07 09:30 Date Received...: 08/01/07

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
------------------	---------------	----------------------------	--------------	---------------	---------------------------------------	-------------------------

Prep Batch #...: 7218455

Chromium	11	10	ug/L	SW846 6010B	08/09-08/10/07	J31AA1AA
		Dilution Factor: 1		Analysis Time...: 01:04	MDL.....: 2.6	

WSP Environmental Strategies LLC

Client Sample ID: MW-4D

DISSOLVED Metals

Lot-Sample #...: D7H010218-003

Matrix.....: WATER

Date Sampled...: 07/31/07 10:45 Date Received...: 08/01/07

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>	<u>PREPARATION-</u>	<u>WORK</u>
		<u>LIMIT</u>	<u>UNITS</u>		<u>ANALYSIS DATE</u>	<u>ORDER #</u>
Prep Batch #...: 7218455						
Chromium	19	10	ug/L	SW846 6010B	08/09-08/10/07	J31AC1AA
		Dilution Factor: 1		Analysis Time...: 01:09	MDL.....: 2.6	

WSP Environmental Strategies LLC

Client Sample ID: MW-20

DISSOLVED Metals

Lot-Sample #...: D7H010218-004

Matrix.....: WATER

Date Sampled...: 07/31/07 11:30 Date Received...: 08/01/07

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION-</u> <u>ANALYSIS DATE</u>	<u>WORK</u> <u>ORDER #</u>
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Prep Batch #...: 7218455

Chromium	48	10	ug/L	SW846 6010B	08/09-08/10/07	J31AD1AA
		Dilution Factor: 1		Analysis Time...: 01:14	MDL.....: 2.6	

QC DATA ASSOCIATION SUMMARY

D7H010218

Sample Preparation and Analysis Control Numbers

<u>SAMPLE#</u>	<u>MATRIX</u>	<u>ANALYTICAL METHOD</u>	<u>LEACH BATCH #</u>	<u>PREP BATCH #</u>	<u>MS RUN#</u>
001	WATER	SW846 6010B		7218455	7218258
002	WATER	SW846 6010B		7218455	7218258
003	WATER	SW846 6010B		7218455	7218258
004	WATER	SW846 6010B		7218455	7218258

METHOD BLANK REPORT

DISSOLVED Metals

Client Lot #...: D7H010218

Matrix.....: WATER

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
------------------	---------------	----------------------------	--------------	---------------	---------------------------------------	-------------------------

MB Lot-Sample #: D7H060000-455 Prep Batch #... : 7218455						
Chromium	ND	10	ug/L	SW846 6010B	08/09-08/10/07	J39491AD
		Dilution Factor: 1				
		Analysis Time...: 00:48				

NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

DISSOLVED Metals

Client Lot #...: D7H010218

Matrix.....: WATER

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
------------------	-----------------------------	----------------------------	---------------	---------------------------------------	---------------------

LCS Lot-Sample#: D7H060000-455 Prep Batch #...: 7218455

Chromium 101 (90 - 113) SW846 6010B 08/09-08/10/07 J39491AE

Dilution Factor: 1 Analysis Time...: 00:54

NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE DATA REPORT

DISSOLVED Metals

Client Lot #...: D7H010218

Matrix.....: WATER

<u>PARAMETER</u>	<u>SPIKE</u> <u>AMOUNT</u>	<u>MEASURED</u> <u>AMOUNT</u>	<u>UNITS</u>	<u>PERCNT</u> <u>RECVRY</u>	<u>METHOD</u>	<u>PREPARATION-</u> <u>ANALYSIS DATE</u>	<u>WORK</u> <u>ORDER #</u>
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LCS Lot-Sample#: D7H060000-455 Prep Batch #...: 7218455
Chromium 200 202 ug/L 101 SW846 6010B 08/09-08/10/07 J39491AE
Dilution Factor: 1 Analysis Time...: 00:54

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE EVALUATION REPORT

DISSOLVED Metals

Client Lot #...: D7H010218

Matrix.....: WATER

Date Sampled...: 07/30/07 12:40 Date Received...: 08/01/07

<u>PARAMETER</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>RECOVERY</u> <u>LIMITS</u>	<u>RPD</u> <u>RPD</u>	<u>LIMITS</u>	<u>METHOD</u>	<u>PREPARATION-</u> <u>ANALYSIS DATE</u>	<u>WORK</u> <u>ORDER #</u>
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MS Lot-Sample #: D7H010212-001 Prep Batch #...: 7218455

Chromium	100	(73 - 135)			SW846 6010B	08/09-08/10/07	J309H1A3
	100	(73 - 135)	0.05	(0-25)	SW846 6010B	08/09-08/10/07	J309H1A4

Dilution Factor: 1

Analysis Time...: 01:45

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE DATA REPORT

DISSOLVED Metals

Client Lot #...: D7H010218

Matrix.....: WATER

Date Sampled...: 07/30/07 12:40 Date Received...: 08/01/07

<u>PARAMETER</u>	<u>AMOUNT</u>	<u>SAMPLE SPIKE AMT</u>	<u>MEASRD AMOUNT</u>	<u>UNITS</u>	<u>PERCNT RECVRY</u>	<u>RPD</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>WORK ORDER #</u>
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MS Lot-Sample #: D7H010212-001 Prep Batch #...: 7218455

Chromium

ND	200	201	ug/L	100			SW846 6010B	08/09-08/10/07	J309H1A3
ND	200	201	ug/L	100	0.05		SW846 6010B	08/09-08/10/07	J309H1A4

Dilution Factor: 1
Analysis Time...: 01:45

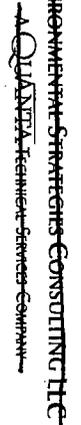
NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

CHAIN OF CUSTODY RECORD

2.4.00
8107-1R

Project Number: 131042/1		Site and Location: CHAMPION - HOBBS NH		Matrices: S = Soil; Aq = Water A = Air; Bu = Bulk; W = Wipe Bi = Biot; OW = Oily Waste; O = Other		Requested Analyses		No. 036765
Sampler's Name(s): DAVID CARSTENS		Sampler's Signature(s):		Number of Containers		Dissolved Chromium EPA Method 6010		
Sample Identification:		Date	Time	Matrix	Remarks			
MW-13		7/31/01	0945	AQ	STL SHALL FILTER			
MW-09			0930	AQ	SAMPLER PRIOR TO			
MW-4D			1045	AQ	ACIDIFYING			
MW-20			1130	AQ				
Relinquished by (Signature):		Date: 8/1/01	Time: 1135	Received by (Signature):		Laboratory Name: STL		WSP
Relinquished by (Signature):		Date: 10/2/01	Time: 1135	Received by (Signature):		Laboratory Location: CO		
Turn-Around Time: STANDARD		Tracking Number:		Method of Shipment: HAND		<input checked="" type="checkbox"/> Denver Office: 4600 South Ulster, # 930, Denver, CO 80237 Tel: (303) 850-9200, Fax: (303) 850-9214 <input type="checkbox"/> Minneapolis Office: 123 North 3rd St, #706, Minneapolis, MN 55401 Tel: (612) 343-0510, Fax: (612) 343-0506		



Sample Receiving Checklist

Lot #: D7H010218 Date/Time Received: 8/1/07 1135

Company Name & Sampling Site: WSP - Champion Hobbs

PM to Complete This Section: Yes No Residual chlorine check required: Quarantined: Yes No

Quote #:

Special Instructions:

Time Zone:

• EDT/EST • CDT/CST • MDT/MST • PDT/PST • OTHER

Unpacking Checks:

Cooler #(s): 1

Temperatures (°C): 3.4

N/A Yes No

Initials

PS

- 1. Cooler seals intact? (N/A if hand delivered) If no, document on CUR.
- 2. Chain of custody present? If no, document on CUR.
- 3. Bottles broken and/or are leaking? If yes, document on CUR.
- 4. Multiphasic samples obvious? If yes, document on CUR.
- 5. Proper container & preservatives used? (ref. Attachment D of SOP# DEN-QA-0003) If no, document on CUR.
- 6. pH of all samples checked and meet requirements? If no, document on CUR.
- 7. Sufficient volume provided for all analysis requested? (ref. Attachment D of SOP# DEN-QA-0003) If no, document on CUR, and contact PM before proceeding.
- 8. Did chain of custody agree with labels ID and samples received? If no, document on CUR.
- 9. Were VOA samples without headspace? If no, document on CUR.
- 10. Were VOA vials preserved? Preservative HCl 4±2°C Sodium Thiosulfate Ascorbic Acid
- 11. Did samples require preservation with sodium thiosulfate?
- 12. If yes to #11, did the samples contain residual chlorine? If yes, document on CUR.
- 13. Sediment present in dissolved/filtered bottles? If yes, document on CUR.
- 14. Is sufficient volume provided for client requested MS, MSD or matrix duplicates? If no, document on CUR, and contact PM before proceeding.
- 15. Receipt date(s) > 48 hours past the collection date(s)? If yes, notify PA/PM.
- 16. Are analyses with short holding times requested?
- 17. Was a quick Turn Around (TAT) requested?

STL Denver
Sample Receiving Checklist

Lot # D7H010218

Login Checks:

Initials
OB

N/A Yes No

- 18. Sufficient volume provided for all analysis requested? (ref. Attachment D of SOP# DEN-QA-0003) If no, document on CUR, and contact PM before proceeding.
- 19. Is sufficient volume provided for client requested MS, MSD or matrix duplicates? If no, document on CUR, and contact PM before proceeding.
- 20. Did the chain of custody includes "received by" and "relinquished" by signatures, dates, and times?
- 21. Were special log in instructions read and followed?
- 22. Were AFCEE metals logged for refrigerated storage?
- 23. Were tests logged checked against the COC? Which samples were confirmed? 1
- 24. Was a Rush form completed for quick TAT?
- 25. Was a Short Hold form completed for any short holds?
- 26. Were special archiving instructions indicated in the General Comments? If so, what were they?

Labeling and Storage Checks:

Initials
PS

- 28. Was the subcontract COC signed and sent with samples to bottle prep?
- 29. Were sample labels double-checked by a second person?
- 30. Were sample bottles and COC double checked for dissolved/filtered metals by a second person?
- 31. Did the sample ID, Date, and Time from label match what was logged?
- 32. Were stickers for special archiving instructions affixed to each box and to the ICOC? See #27
- 33. Were AFCEE metals stored refrigerated?

Document any problems or discrepancies and the actions taken to resolve them on a Condition Upon Receipt Anomaly Report (CUR).