SEMI-ANNUAL
OPERATION & MAINTENANCE REPORT
January through June – 2016

APPLETON WIRE
FORMER ALBANY INTERNATIONAL
Chrome Plant
Groundwater Treatment System

908 North Lawe Street
Appleton, Wisconsin
WDNR ERP# 02-45-000015

Prepared for the
WISCONSIN DEPARTMENT OF NATURAL RESOURCES

August 25, 2016

Ms. Jennifer Borski
Wisconsin Department of Natural Resources
625 East County Road Y, Suite No. 700
Oshkosh, WI 54901-9731

Re: Appleton Wire, Former Albany International Chrome Plant – Appleton, WI
Semi-Annual Operation & Maintenance Report
January through June, 2016
WDNR ERP# 02-45-000015

Dear Ms. Borski:

Enclosed, please find Badger Laboratories and Engineering Co., Inc.'s "Semi-Annual Operation and Maintenance Report" for the Appleton Wire, Former Albany International Chrome Plant, 908 North Lawe Street Street, Appleton, Wisconsin, (WDNR ERP# 02-45-000015). Our report covers the time period from January 1, 2016 through June 30, 2016.

This report includes a site history, a summary of treatment system performance and monitoring, results of any compliance sampling, operation and maintenance activities over the last six months, historical analytical data and conclusions and recommendations for the site.

If you have any questions or require additional information, feel free to contact me.

Very truly yours,

Badger Laboratories and Engineering Co., Inc.

David J. Casper John M. Stoeger

David J. Casper . John M. Stoeger
Project Manager Stoeger and Associates, LLC

Enclosure: "Semi-Annual Operation & Maintenance Report"
cc: JP Hammerton, Albany International
Amy Monk, Albany International
Joe Gaug, Albany International
Sam Edwards, Luvata
Brian Kreski, City of Appleton Wastewater Division

SEMI-ANNUAL
OPERATION & MAINTENANCE REPORT
Year
January through June - 2016

APPLETON WIRE
FORMER ALBANY INTERNATIONAL
CHROME PLANT
GOUNDWATER TREATMENT SYSTEM
908 North Lawe Street
Appleton, Wisconsin
Appleton, Wisconsin
WDNR ERP# 02-45-000015

Prepared for the
WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Prepared by
Badger Laboratories & Engineering Co., Inc.
Neenah, Wisconsin

And

Stoeger & Associates, LLC
Appleton, Wisconsin

August 25, 2016

Table of Contents

List of Tables

List of Figures

List of Appendices

HYDROGEOLOGIST CERTIFICATION

"I, Mark Love, hereby certify I am a Hydrogeologist as that term is defined in s NR 712.03 (1) Wisconsin Administrative Code; and that to the best of my knowledge, all of the information contained in this document is correct and the document was prepared in compliance with all applicable requirements of chs. NR 700 to 726, Wisconsin Administrative Code."

Mark Love

Mark Love, PSS

August 24, 2016

Date

Document Reference: Semi-annual Operation and Maintenance Report –
January through June 2016
Albany International Former Chrome Site, Appleton, WI

Former Albany International
Chrome Plant
Groundwater Treatment System
908 North Lawe Street
Appleton, Wisconsin
WDNR ERP# 02-45-000015

Prepared for the
WISCONSIN DEPARTMENT OF NATURAL RESOURCES

I. SITE BACKGROUND

The Appleton Wire, Former Albany International, Chrome Plant, located at 908 North Lawe, Appleton, Wisconsin, was utilized as a chrome plating facility from 1963 to 1982. The chrome plant building and a parking lot north of the building were sold to Valley Cast in 1984. The address of the Valley Cast portion of the site is 908 North Lawe Street. The loading dock area near the chrome plating area was referred to as 831 North Meade Street. An office building and parking lot south of the former chrome plant were sold to Appleton Papers (now Appvion) between 1985 and 1990. The address of the office building is 714 East Hancock Street. Reporting related to the release of chromium on the site has been referenced under the Meade Street, Hancock Street and Lawe Street addresses. As of June, 2009, the physical address (for reporting purposes) of the former chrome plant site was changed to 908 North Lawe Street. An aerial photograph of the site delineating current property ownership is shown in Figure #5.

Valley Cast became a fully owned subsidiary of Outokumpu in 1985. The facility name was changed to Outokumpu in 2001. In 2006, the company was sold and currently operates under the name Luvata Appleton.

In 1985, Valley Cast employees noted groundwater collecting in the basement of the building. Subsequent tests indicated concentrations of chromium in the collected groundwater.

STS Consultants, Inc. conducted an investigation of the former chrome plant site on January 19, 1987. The purpose of the investigation was to determine the horizontal and vertical extent of the chromium contamination and to evaluate the effectiveness of the facility's basement sump to collect contaminated groundwater from the north and south sides of the building.

The results of the investigation indicated that the chromium contamination appeared limited to areas along the northeast and southeast ends of the building and to a depth of approximately 15-feet below grade. The existing basement sump was found to be adequate for collection of groundwater along the south end of the building. The consultant proposed installation of a collection system along the north side of the building to improve groundwater collection.

In 1988, a chemical precipitation process was installed to treat the groundwater collecting in the facility basement sump. The system was operated until 1998, when it was replaced by an ion exchange treatment system.

In 1992, a groundwater collection system was installed along the north side of the building. The system consists of approximately 110 feet of perforated piping, placed

14 feet below grade. The piping empties into a manhole, located at the northeast corner of the facility. Collected groundwater is pumped from the manhole to two storage tanks, located in the basement of the facility. Groundwater flowing to the basement sump is also pumped to the storage tanks.

In 2003, eleven geoprobe monitoring wells were installed in and around the two source areas in an attempt to better define the vertical and horizontal extent of the chromium contamination. Periodic sampling was conducted from the geoprobe monitoring wells until their abandonment in April, 2008. The results of the sampling are contained in Figure 8.

On June 30, 2009, groundwater monitoring wells MW-19 and MW-19A were placed in the warehouse portion of the Luvata facility, west of the basement area. MW-19 was placed to a depth of 20 feet below the facility floor. MW-19A was placed to a depth of approximately 40 feet below the facility floor. The resultant groundwater sampling data indicated that chromium contaminated groundwater is present to the west of the former plating area and under the current Luvata Appleton warehouse building.

Between May 12, 2014 and May 14, 2014, eleven Geoprobe borings were placed in the interior of the former chrome plant building and in the current Luvata Appleton production area to further delineate the extent of subsurface Chromium contamination. As part of the investigation, Monitoring Well MW-20 and Piezometer MW-20A were installed in the Luvata warehouse area. Monitoring well MW-21 and Piezometer MW-21A were installed in the Luvata production area. The Geoprobe™ and monitoring well locations have been added to Figure #1.

The results of the May, 2014 investigation indicated that subsurface chromium contamination was present in the northeastern portion of the Luvata Appleton warehouse area. Several former employees were interviewed regarding these findings and it was discovered that there had been a second plating operation to the north of the main chrome plating line. Groundwater samples collected from monitoring wells MW-20 and MW-20A, in the area of the second plating line, recorded high levels of total chromium. Groundwater sampling from the Luvata production area at monitoring wells MW-21 and MW-21A, recorded little to no total chromium. With the data provided by the addition of the 4 monitoring wells in 2014, the extent of the chromium concentration has been confirmed to lie under the warehouse building.

A total of 16 groundwater monitoring wells exist on the former chrome plant property to monitor the subsurface chromium contamination. Additionally, the groundwater collection system (French Drain) and basement sump are monitored to track the effectiveness of the treatment system

The monitoring well and soil boring locations are shown on Figure #1. Historical investigation data in regard to soil borings and abandoned monitoring wells is contained in Appendix D. The current property and adjacent property ownership information, monitoring well locations and soil boring locations are shown on Figure #1.

II. BATCH TREATMENT PROCESS

A. Groundwater Treatment System

The impacted groundwater on the site is collected in a basement sump and a groundwater collection system (French Drain). The collected water is pumped to two-2000 gallon storage tanks, located in the basement of the facility. The groundwater is treated in batches at the operator’s discretion. Prior to initiation of the treatment process, the pH in the basement storage tanks is adjusted down to a pH of around 4.00 to maximize the efficiency of the ion exchange resin. The water is pumped at a flow rate of 8-12 gallons per minute through a series of filters and two (2) ion exchange canisters. The water then flows to another tank where the pH is adjusted back up to a pH between 6.0 and 7.0. The treated water then decants to the City of Appleton Sanitary Sewer System.

B. Permit Monitoring and Reporting

The discharge from the groundwater treatment system is tested for Hexavalent Chromium during each batch discharge using a Hach Hexavalent Chromium test kit. The effluent is tested monthly for Total Chromium and annually for the parameters listed in Table #1. The parameters are a requirement of the City of Appleton Industrial Use Permit Number 04-17, issued for the site in May, 2014 and are valid through May 31, 2017.

The reporting requirements for compliance with the City of Appleton Industrial User Permit and the Wisconsin DNR are summarized below.

1. Quarterly Reporting

a. City of Appleton Quarterly Discharge Reports

Quarterly reports are submitted to the City of Appleton Wastewater Division covering the time periods of January through March, April through June, July through September, and October through December. The City Reports include batch process discharge volumes; discharge pHs, Hexavalent chromium as measured with the Hach test kit and the monthly laboratory analytical results.

b. Wisconsin DNR Quarterly Groundwater Sampling Reports

As of April, 2009, quarterly groundwater sampling reports are no longer required by the Wisconsin DNR.

2. Semi-Annual Operation and Maintenance Summary

With the elimination of quarterly groundwater monitoring reports to the Wisconsin DNR, semi annual reports are prepared. The semi-annual operation and maintenance summary consists of a review of the treatment process, an overview of operation and maintenance activities, a summary of the treatment system analytical results and a summary of the analytical results from the groundwater monitoring wells.

C. Compliance Sampling

Compliance sampling of the treatment system effluent is conducted twice per year by the City of Appleton. The effluent is analyzed for all the parameters listed in Table #1, except hexavalent chromium. During the first quarter of each year, Stoeger & Associates, LLC collects one sample at the system outfall and tests for the parameters listed in Table #1. The compliance sampling laboratory results are summarized on Table #2. Table #3 summarizes the monthly batch discharge volumes by month and totaled by quarter.

D. Routine Operation and Maintenance Activities

The groundwater treatment system is operated in batches, at the operator's discretion. Site visits are conducted 1-2 times per week to check on the water levels in the storage tanks. When sufficient water is collected to run a batch, the system is operated. Each batch discharge is tested for Hexavalent Chromium using a Hach test kit. The monthly and quarterly volumes of treated groundwater are shown on Table #3.

Additionally a walk through of the building is conducted to check the equipment or look for any obvious problems. Site activities are documented on log sheets. The log sheets are kept on-site.

The pH probes are cleaned and calibrated monthly. The in-line filters are changed when an increase in system pressure is noted. The ion exchange canisters are changed out when the total chromium concentration in the outfall exceeds 2 mg/l.

E. Significant Operation and Maintenance Activities

Between January 1, 2016 and June 30, 2016, Ron Buck (Albany International) and Ron Moddes (Luvata Appleton) retired from their respective oversite positions and were replaced by JP Hammerton and Sam Edwards, respectively.

F. Emergency Shut Downs

There were no emergency shut downs of the system during the reporting period.

III. GROUNDWATER SAMPLING

G. Groundwater Sampling Procedures

A total of 16 groundwater monitoring wells are associated with the groundwater treatment system. Monitoring Wells MW-20, MW-20A, MW-21 and MW-21A were installed between May 12 and 14, 2014 and were first sampled on, June 2, 2014. Monitoring wells, MW-19 and MW-19A were installed on June 30, 2009 and were first sampled on July 13, 2009. Sampling of MW-20, MW-20A, MW-21, MW-21A, MW-19 and MW-19A is conducted quarterly along with the two source area wells, MW-05 and MW-05A. The remainder of the monitoring wells are sampled annually.

Groundwater levels are measured in the monitoring wells and piezometers relative to the north side of the top of the well casing. The groundwater elevations are collected from each monitoring well prior to sampling. A dedicated 12-volt submersible pump is installed in each well. Each well is slowly pumped dry, allowed to recharge and sampled. Purge water is collected and treated in the treatment system.

The laboratory analytical data is contained in Tables #4, and #5. The analytical data sheets are contained in Appendix E.

Graphs of the chromium contaminant concentrations for each monitoring well, the building sump and French Drain are contained in Appendix A.

Table #6 summarizes the historical groundwater elevation data collected from each monitoring well during the quarterly sampling. Groundwater elevation contours are calculated based upon the observed elevations of the monitoring wells, basement sump and French Drain. The groundwater elevation contour maps from the January and April sampling events are presented in Figures #3 and #4. Groundwater elevation versus time graphs is presented in Appendix B.

H. <u>Groundwater Sampling Results</u>

The collected groundwater samples are analyzed for Total and Hexavalent chromium.

A total of two sampling events took place during the reporting period. On January 21, 2016, monitoring wells MW-05, MW5A, MW19, MW-19A, MW-20, MW-20A, MW-21 and MW-21A were sampled as part of the regularly schedule quarterly sampling. Monitoring wells MW-05 (444 ug/l), MW-19 (15,295 ug/l), MW-19A (121 ug/l) and MW-20 (212,000 ug/l) had exceedances of the NR 140.10 Enforcement Standard (ES) of 100 ug/l for Total Chromium. None of the remaining sampled wells had an exceedance of the ES or NR140.10 Preventative Action limit (PAL) of 10 ug/l for total chromium.

On April 14, 2016, all 16 monitoring wells associated with the site were sampled. Exceedences of the ES for total chromium were detected in monitoring wells MW-05 (562 ug/l), MW-19 (18,420 ug/l), MW-19A (233 ug/l) and MW-20 (412750 ug/l). MW-20A had an exceedence of the PAL with a concentration of 66 ug/l. None of the remaining sampled wells had an exceedance of the ES or (PAL) for total chromium.

A chromium isoconcentration map is developed once per year with the results from the April sampling. The April sampling is the only event where all the wells attributed to the property are sampled and therefore is the most accurate representation of the data as a whole. The chromium isoconcentration map from the April 14, 2016 sampling is shown on Figure #2.

Samples are collected monthly from the Manhole (French Drain) and basement Collection Sump. All samples collected from the Manhole and basement Collection Sump during the period from January 1, 2016 through June 30, 2016 had exceedances of the ES for Total Chromium. The laboratory analytical results for the Manhole and Collection Sump are shown in Table #5. Current and historical groundwater elevation data is contained in Table #6.

A review of the historical analytical data shows decreasing concentrations of chromium in monitoring wells MW-05 and MW-05A. Historical data from the French Drain and Building Sump also show stable or decreasing chromium concentrations. Historical data collected for MW-19 shows a stable or increasing chromium concentrations and data from MW-19A is too inconsistent to develop a trend line. There are only nine data points on MW-20 and MW-20A. While the chromium concentrations in MW-20A are decreasing, concentrations in MW-20 do not present a consistent pattern.

The groundwater treatment system is effectively removing chromium from the groundwater on the site. With the information gathered from sampling the four new groundwater wells, a study of remediation options to speed up the chromium removal process in the areas of MW-19 and MW-20 has been presented to Albany International and is currently under review.

The yearly chromium removal quantities were calculated utilizing the monthly analytical data and flow quantities from the building sump and French Drain. From January 1, 2016 through June 30, 2016, 4.46 pounds of chromium was removed from the building sump and 0.76 pounds of chromium removed from the French Drain. The pounds of chromium removed from the sump and French Drain is calculated using the chromium concentrations (in mg/L) from the sump and French Drain from each months sampling; times the total volume (in millions of gallons) of groundwater treated during each month from the two extraction points; times 8.34 pounds per gallon of water treated. The historical chromium removal quantities are summarized in Table #7. The Wisconsin DNR Operation and Maintenance form 4400-194 is included in Appendix C.

IV. GROUNDWATER COLLECTION SYSTEM

The groundwater collection system (French Drain) was installed in 1992 to collect contaminated groundwater from the north side of the property. The collection system consists of approximately 110-feet of perforated piping, placed 14-feet below grade. The collected groundwater flows by gravity to a collection sump, where it is pumped to the storage tanks in the basement of the facility. The collection trench creates a capture zone for contaminated groundwater along the north end of the building.

The building sump creates a capture zone for contaminants along the south side and under the building. The building sump is located at the northeast corner of the building basement.

V. CONCLUSIONS AND RECOMMENDATIONS

On January 21, 2016, groundwater samples were collected from the monitoring wells that have been identified as requiring quarterly monitoring. On April 14, 2016, all 16 wells associated with the site were sampled. Samples collected from source area wells, MW-05 and MW-20 as well as MW-19 and MW-19A, the nearest monitoring wells west of the two source areas, recorded detections for total chromium in excess of the NR 140.10 Enforcement Standard (ES). MW- 20A had an exceedance of the PAL (66 ug/l) during the April 14, 2016 sampling and no exceedances of the PAL during the January 21, 2016 sampling. The remaining sampled monitoring wells had no exceedances of the ES or PAL during either sampling event.

All monthly samples collected during the monitoring period from the French Drain and collection sump had exceedances of the NR 140.10 ES for Total Chromium.

Data collected to date from the groundwater wells on the exterior of the building, the collection sump and French drain show stable, if not decreasing, concentrations of chromium. Monitoring well MW-19A has shown stable, if not increasing concentrations of total chromium. MW-19 has recorded analytical results for which the linear trend of detected concentrations is upward. Monitoring well MW-20 wasn sampled 9 times to the end of this report period. The latest analysis yielded the highest detected concentration so far and the linear trend line of the data is slightly upward in concentration. MW-20A has shown a significant decrease in total chromium over the 9 sampling times.

A Remedial Actions Options Report was developed on behalf of Albany International to identify and evaluate potential options to more efficiently remove the chromium contamination under the warehouse floor. The report concluded that the chromium contamination is within the capture zone of the collection sump and French Drain. It further concluded that there is at present no cost effective method to improve the present collection/treatment to speed up the chromium removal.

Prior to issuance of the current three year wastewater discharge permit, the City of Appleton was petitioned to allow the direct discharge of flows from the French Drain (Manhole). Total chromium concentrations in the Manhole have remained close to an average of 7 mg/l, which is the current upper limit for direct discharge to the City of Appleton Wastewater Treatment Facility. The City of Appleton determined that there was not enough historical data to allow the direct discharge and will again reevaluate the option when the current permit expires in 2017.

Based upon the historical analytical results from the groundwater monitoring wells and treatment systems, Badger Laboratories and Engineering Co., Inc., recommends continued operation of the groundwater treatment system at the Appleton Wire, Former Albany International Chrome Plant.

Data Tables

Table #1

CITY OF APPLETON EFFLUENT COMPLIANCE LIMITS

Permit #11-17 Effluent Point 001

Appleton Wire Former Albany International Chrome Plant

Aluminum (mg/l)	Arsenic (mg/l)	Cadmium (mg/l)	Chromium Total (mg/l)	Copper (mg/l)	Cyanide (mg/l)	Lead (mg/l)	Mercury (mg/l)	Nickel (mg/l)	Zinc (mg/l)	Hexavalent Chromium (mg/L)
70	1.0	0.3	7.0	3.5	0.3	2.0	0.002	2.0	10.0	4.5

mg/l = milligram / liter
ug/l = microgram / liter

Table #2

LABORATORY ANALYTICAL RESULTS
Effluent Point 001
Appleton Wire Former Albany International Chrome Plant

Date	Cyanide (mg/l)	Aluminum (mg/l)	Arsenic (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Hexavalent Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Nickel (mg/l)	Zinc (mg/l)
2/26/03 ***	<0.0014	<0.027	<0.0082	<0.00053	1.0	NA	0.011	0.0075	<0.000028	0.0045	0.0057
4/24/03 **	<0.0015	<0.027	<0.0081	<0.0053	0.049	N/A	0.1	0.0017	<0.00003	<0.0021	<0.0072
10/23/03 ***	<2.7	0.0500	<0.0012	<0.0001	1.588	NA	0.034	0.0033	<0.0002	0.0046	<0.010
03/18/04 **	<.005	0.001	<.0012	<.0001	0.399	NA	0.019	0.0053	<.0002	0.0034	0.02
04/19/04 ***	<.005	<.01	<.0012	<.01	0.32	<.002	0.02	<.05	<.0002	<.03	0.01
01/13/05 ***	<0.005	0.012	0.009	<0.0001	1.651	NA	0.024	0.0051	<0.0002	0.0035	<0.010
04/11/05**	<0.005	<0.07	<0.0012	<0.01	0.0027	<0.002	0.02	<0.05	<0.0002	<0.03	0.03
10/12/05 ***	0.014	0.132	<0.006	<0.0005	0.0032	NA	0.0087	0.0089	<0.0002	0.0046	0.05
01/31/06 ***	<0.005	0.068	<0.0012	0.0002	1.887	NA	0.038	0.051	<0.0002	0.0071	0.03
04/11/06 **	<0.005	<0.07	<0.0011	<0.01	1.3	0.004	0.06	<0.05	0.0006	<0.03	0.05
9/26/06 ***	0.004	0.152	0.0016	<0.0001	5.59	NA	0.156	0.019	<0.0002	0.0086	0.03
02/28/07 ***	0.010	0.096	<0.001	<0.0001	1.222	NA	0.019	0.0042	<.0002	0.0077	0.050
04/29/07 **	0.005	<0.07	<0.001	<.01	0.12	<0.002	0.12	<0.03	<0.0002	<0.04	0.03
10/30/07 ***	<0.004	<0.07	<1.0	<0.01	0.04	NA	<0.01	<0.03	<0.0002	<0.04	0.03
2/17/08 ***	<.004	<.07	<.001	<.01	2.4	NA	0.25	<.03	<.0002	<.04	0.98
4/23/08 **	<.008	<.08	<.001	<.01	0.36	<.002	0.05	<.03	<.0002	<.02	0.81
11/20/08 ***	<.008	<.08	<.08	<.01	0.72	NA	0.03	<.03	<.0002	0.02	0.07
2/24/09 ***	<0.008	<0.09	<0.09	<0.01	3.9	NA	0.04	0.05	<0.0002	<0.02	0.07
4/07/09 **	<0.008	<0.09	<0.0012	<0.01	0.07	<0.001	<0.01	<0.05	<0.0002	<0.02	0.15
10/08/09 ***	<0.008	<0.08	<0.012	<0.01	0.03	NA	<0.01	<0.05	<0.0002	<0.02	0.01
2/24/10 ***	<0.008	<0.06	<0.0002	<0.01	0.11	NA	<0.01	<0.03	<0.0002	<0.01	0.06
4/13/10 **	<0.008	<0.06	<0.0019	<0.01	0.2	0.047	0.05	<0.03	<0.0002	<0.01	0.06
2/17/11 ***	<0.008	<0.08	<0.001	<0.001	0.15	NA	0.05	<0.04	<0.0002	0.02	0.08
4/27/11**	<0.008	0.33	<0.01	<0.01	0.47	0.008	0.84	<0.04	<0.0002	<0.02	0.27
11/15/11***	<0.007	<0.008	<0.005	<0.01	0.27	NA	0.05	<0.04	<0.0002	<0.02	0.05
3/19/12***	<0.007	<0.11	<0.001	<0.01	0.1	NA	0.02	<0.02	<0.0002	<0.02	0.05
Appleton Permit Limits	0.30	70	1.0	0.30	7.0	4.5	3.5	2.0	0.002	2.0	10.0

Table #2

LABORATORY ANALYTICAL RESULTS
Effluent Point 001
Appleton Wire Former Albany International Chrome Plant

Date	Cyanide (mg/l)	Aluminum (mg/l)	Arsenic (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Hexavalent Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Nickel (mg/l)	Zinc (mg/l)
04/10/12**	<0.007	<0.08	<0.001	<0.01	0.07	0.023	<0.01	<0.04	<0.0002	<0.02	0.08
08/07/12***	0.0046	3.38	0.044	0.0012	0.336	NA	0.462	<0.0014	<0.0001	0.171	0.0699
4/15/13**	<.006	<0.1	<0.001	0.01	0.16	0.073	<0.01	<0.02	<0.0002	<0.02	0.01
5/22/13***	0.0039	<0.714	<0.0042	<0.00048	0.389	NA	0.01	<0.0027	<0.0001	0.006	0.0188
11/18/13***	<0.0038	<0.714	<0.0042	<0.00048	0.0185	NA	0.0156	<0.0027	<0.0001	0.0054	0.0192
04/09/14**	<0.006	<0.05	<0.0015	<0.01	0.1	0.04	<0.01	<0.03	<0.0002	<0.02	0.04
5/12/2014***	<0.020	0.102*	<0.0068	<0.001	0.0724	NA	0.017	<0.0016	<0.0001	0.0033	0.025*
9/25/14***	<0.01	<0.0655	<0.0068	<0.001	0.0075*	NA	0.0075*	0.0023*	<0.001	0.0058*	0.0141*
4/2/15***	<0.01	<0.112*	0.0148*	0.0014*	0.24	NA	0.0079*	0.0043*	<.0001	0.0069*	0.0319*
04/21/2015	<0.007	<0.1	<0.0015	<0.01	0.24	0.162	0.03	<0.03	<0.0002	<0.03	0.03
7/22/2015***	<0.010	0.155*	<0.0068	<0.0010	0.0587	NA	0.0474	0.0021*	<0.0001	0.0043*	0.0477
4/14/16**	<0.007	<0.09	<0.001	<0.01	0.09	0.053	0.04	<0.03	<0.0002	<0.02	0.03
Appleton Permit Limits	0.30	70	1.0	0.30	7.0	4.5	3.5	2.0	0.002	2.0	10.0

mg/l = milligram / liter (ppm)

NA = Not Analyzed

* = Analyte detected between Limit of Detection and Limit of Quantitation

** = Sampled by Operator

*** = Sampled by the City of Appleton

Table #3

BATCH DISCHARGES

January 1, through June 30, 2016
Appleton Wire Former Albany International Chrome Plant

Month	Monthly (gallons)	Quarterly Flow (gallons)
January	3,590	
February	11,910	29,790
March	14,290	
April	11,190	
May	9,820	28,010
June	7,000	
TOTAL	**57,800**	

Table #4

Groundwater Analytical Results
Appleton Wire Former Albany International Chrome Plant

Well Name	Sample Date	Adjusted Chromium Value	Total Chromium (ug/l)	Hexavalent Chromium (ug/l)
	02/09/87	*50*	*50*	
MW-1	07/29/87	*20*	<40	
	09/25/87	*50*	<100	
	12/11/87	*50*	<100	
	03/21/88	1.6	1.6	
	06/13/88	3.0	3.0	
	09/08/88	9	9	
	12/15/88	2.5	2.5	
	03/26/92	*20*	<40	
	06/16/92	4.9	4.9	
	09/04/92	*50*	*50*	
	03/25/93	40	<80	
	09/16/93	40	<80	
	03/15/94	*35*	<70	
	09/20/94	*13*	*13*	
	03/31/95	*39*	*39*	
	09/07/95	7.2	7.2	
	03/15/96	*15*	*15*	
	09/05/96	6.4	6.4	
	04/26/97	*11*	*11*	
	04/30/98	*60*	*60*	
	10/22/98	7	7	
	04/16/99	*12*	*12*	
	10/19/99	9.3	9.3	
	04/17/00	*11*	*22***	
	04/06/01	5.5	<11	
	04/18/02	5.5	<11	
	04/16/03	2.9	2.9	
	04/19/04	2.8	2.8	<2.0
	04/11/05	*82*	*82*	16
	07/18/05	*15*	*<30*	<2
	04/11/06	1.7	1.7	<2.0
	04/29/07	4	4	<2.0
	04/23/08	4.4	4.4	<2.0
	04/07/2009	4.6	4.6	<0.1
	04/13/2010	26	*26*	<3.0
	04/27/2011	*3*	3	<3
	04/10/2012	1.7	1.7	<3
	04/15/2013	2.6	2.6	<2.6
	04/09/2014	4.2	4.2	<3.0
	04/21/2015	0.5	0.5	<0.5
	04/14/2016	0.35	0.35	<2

Table #4

Groundwater Analytical Results
Appleton Wire Former Albany International Chrome Plant

Well Name	**Sample Date**	**Adjusted Chromium Value**	**Total Chromium (ug/l)**	**Hexavalent Chromium (ug/l)**
MW-2	02/09/87	*70*	*70*	
	07/29/87	*20*	<40	
	09/25/87	**100**	**100**	
	12/11/87	**100**	**100**	
	03/21/88	*85*	*85*	
	06/13/88	**140**	**140**	
	09/08/88	*70*	*71*	
	12/15/88	**130**	**130**	
	03/26/92	*20*	<40	
	06/16/92	*17*	*17*	
	09/04/92	*20*	<40	
	03/25/93	*40*	<80	
	09/16/93	*40*	<80	
	03/15/94	*35*	<70	
	09/20/94	*19*	*19*	
	03/31/95	*19*	*19*	
	09/07/95	*14*	*14*	
	03/15/96	*11*	*11*	
	09/05/96	*29*	*29*	
	04/26/97	9.2	9.2	
	10/29/97	*10*	*10*	
	04/30/98	*11*	*11*	
	10/22/98	9.3	9.3	
	04/16/99	7.7	7.7	
	10/19/99	6.8	6.8	
	04/17/00	*11*	*22***	
	04/06/01	5.5	<11	
	04/18/02	5.5	<11	
	04/16/03	0.55	<1.1	
	04/19/04	1.0	1.0	<2.0
	04/11/05	1.3	1.3	<2.0
	04/11/06	0.4	0.4	<2.0
	04/29/07	1.5	1.5	<2.0
	04/23/08	2.4	2.4	<2.0
	04/07/2009	8.3	8.3	<.1
	04/13/2010	5	5	<3.0
	04/27/2011	3	3	<3.0
	04/10/2012	0.7	0.7	<3.0
	04/15/2013	0.4	0.4	<.4
	04/09/2014	0.6	0.6	<0.6
	04/21/2015	0.94	0.94	<0.94
	04/14/2016	4.9	4.9	<2

Table #4

Groundwater Analytical Results
Appleton Wire Former Albany International Chrome Plant

Well Name	Sample Date	Adjusted Chromium Value	Total Chromium (ug/l)	Hexavalent Chromium (ug/l)
MW-2A	03/26/92	*20*	<40	
	06/16/92	1.5	1.5	
	09/04/92	*20*	<40	
	03/25/93	*40*	<80	
	09/16/93	*40*	<80	
	03/15/94	*35*	<70	
	09/20/94	*14*	*14*	
	03/31/95	*17*	*17*	
	09/07/95	3.9	3.9	
	03/15/96	3.6	3.6	
	09/05/96	1.2	1.2	
	04/26/97	0.3	0.3	
	04/30/98	2.5	2.5	
	04/16/99	2.4	2.4	
	04/17/00	*11.5*	*23***	
	04/06/01	5.5	<11	
	04/18/02	5.5	<11	
	04/16/03	0.55	<1.1	
	04/19/04	0.6	0.6	<2.0
	04/11/05	0.4	0.4	<2.0
	04/11/06	0.1	0.1	<2.0
	04/29/07	0.7	0.7	<2.0
	04/23/08	0.2	<0.4	<2.0
	04/07/2009	1.5	1.5	<0.1
	04/13/2010	5	5	<3.0
	04/27/2011	2	2	<3.0
	04/10/2012	0.5	0.5	<3.0
	04/15/2013	0.1	<0.2	<0.2
	04/09/2014	0.4	0.4	<0.4
	04/21/2015	0.11	0.11	<0.11
	04/14/2016	0.56	0.56	<2
MW-5	03/26/92	**33,000**	**33,000**	
	06/16/92	**27,000**	**27,000**	
	09/04/92	**33,000**	**33,000**	
	12/17/92	**28,000**	**28,000**	
	03/25/93	**29,000**	**29,000**	
	06/22/93	**24,000**	**24,000**	
	09/16/93	**25,000**	**25,000**	
	12/03/93	**26,000**	**26,000**	
	03/15/94	**26,000**	**26,000**	
	06/16/94	**2,013**	**2,013**	
	09/20/94	**29,000**	**29,000**	
	12/13/94	**19,000**	**19,000**	
	03/31/95	**19,960**	**19,960**	

Table #4

Groundwater Analytical Results
Appleton Wire Former Albany International Chrome Plant

Well Name	Sample Date	Adjusted Chromium Value	Total Chromium (ug/l)	Hexavalent Chromium (ug/l)
	06/15/95	**21,190**	**21,190**	
MW-5	09/07/95	**25,400**	**25,400**	
Cont.	12/11/95	**18,000**	**18,000**	
	03/15/96	**15,830**	**15,830**	
	06/27/96	**18,000**	**18,000**	
	09/05/96	**14,000**	**14,000**	
	12/03/96	**24,000**	**24,000**	
	01/23/97	**22,000**	**22,000**	
	04/26/97	**17,000**	**17,000**	
	07/16/97	**20,000**	**20,000**	
	10/29/97	**1,600**	**1,600**	
	01/20/98	**18,000**	**18,000**	
	04/30/98	**15,000**	**15,000**	
	07/10/98	**18,000**	**18,000**	
	10/22/98	**21,000**	**21,000**	
	01/19/99	**14,000**	**14,000**	
	04/16/99	**15,000**	**15,000**	
	07/23/99	**14,000**	**14,000**	
	10/19/99	**18,175**	**18,175**	
	01/10/00	**12,000**	**12,000**	
	04/17/00	**8,500**	**8,500**	
	07/20/00	**11,000**	**11,000**	
	10/25/00	**8,500**	**8,500**	
	01/17/01	**14,000**	**14,000**	
	04/06/01	**7,900**	**7,900**	
	07/20/01	**10,000**	**10,000**	
	10/16/01	**12,000**	**12,000**	
	01/14/02	**11,000**	**11,000**	
	04/18/02	**5,500**	**5,500**	
	07/23/02	**788**	**788**	
	10/30/02	**1,500**	**1,500**	
	01/20/03	**19,000**	**19,000**	
	04/16/03	**7,000**	**7,000**	
	07/10/03	*33*	*33*	
	10/07/03	**3,300**	**3,300**	
	01/30/04	**1,200**	**1,200**	
	04/19/04	**7,900**	**7,900**	**10000**
	07/26/04	**6,700**	**6,700**	**6300**
	10/11/04	**6,500**	**6,500**	**6500**
	01/12/05	**6,460**	**6,460**	**6300**
	04/11/05	**5,085**	**5,085**	**4500**
	07/18/05	**4,900**	**4,900**	**4900**
	10/11/05	**5,100**	**5,100**	**4900**

Table #4

Groundwater Analytical Results
Appleton Wire Former Albany International Chrome Plant

Well Name	**Sample Date**	**Adjusted Chromium Value**	**Total Chromium (ug/l)**	**Hexavalent Chromium (ug/l)**
	01/10/06	**10,880**	**10,880**	**10000**
MW-5	04/11/06	**4,455**	**4,455**	**3880**
Cont.	07/27/06	**3,190**	**3,190**	**3400**
	10/18/06	**5,100**	**5,100**	**4500**
	01/09/07	**2,900**	**2,900**	**2800**
	04/29/07	**2,895**	**2,895**	**2500**
	07/24/07	**2,465**	**2,465**	**2465**
	10/24/07	**3,205**	**3,205**	**2700**
	01/16/08	**2,335**	**2,335**	**2300**
	04/23/08	**2,067**	**2,067**	**1700**
	07/15/08	**2,425**	**2,425**	**1700**
	10/23/08	**2,400**	**2,400**	**1800**
	1/22/09	**2,024**	**2,024**	**1900**
	4/7/09	**2,116**	**2,116**	**1700**
	7/7/09	**2,200**	**2,200**	**2000**
	10/11/09	**2,500**	**2,500**	**2300**
	1/19/10	**2,015**	**2,015**	**1900**
	4/13/10	**1,600**	**1,600**	**1400**
	7/29/10	**1,800**	**1,800**	**1300**
	10/19/10	**1,700**	**1,700**	**1400**
	1/13/11	**1,500**	**1,500**	**1400**
	4/27/11	**1,200**	**1,200**	**1200**
	7/19/11	**1,100**	**1,100**	**1000**
	10/11/11	**1,100**	**1,100**	**1000**
	1/10/12	**1,140**	**1,140**	**950**
	4/10/12	**1,200**	**1,200**	**1100**
	8/8/12	**1,200**	**1,200**	**49**
	10/9/12	**1,139**	**1,139**	**1100**
	1/8/13	**1,500**	**1,500**	**1310**
	4/15/13	**1,166**	**1,166**	**1166**
	7/10/13	**1,300**	**1,300**	**1300**
	10/14/13	**1,338**	**1,338**	**1300**
	1/15/14	**1,594**	**1,594**	**1730**
	4/9/14	**1,430**	**1,430**	**1280**
	7/8/14	**1,300**	**1,300**	**1180**
	10/14/14	**960**	**960**	**960**
	1/13/15	**784**	**784**	**670**
	4/21/15	**576**	**576**	**514**
	7/15/15	**605**	**605**	**591**
	10/20/15	**604**	**604**	**512**
	1/21/16	**444**	**444**	**408**
	4/14/16	**462**	**462**	**430**

Table #4

Groundwater Analytical Results
Appleton Wire Former Albany International Chrome Plant

Well Name	**Sample Date**	**Adjusted Chromium Value**	**Total Chromium (ug/l)**	**Hexavalent Chromium (ug/l)**
	02/09/87	*80*	*80*	
MW-5A*	07/29/87	**8,000**	**8,000**	
	09/25/87	**2,100**	**2,100**	
	12/11/87	**14,400**	**14,400**	
	03/21/88	**26,000**	**26,000**	
	06/13/88	**7,800**	**7,800**	
	09/08/88	**3,000**	**3,000**	
	12/15/88	**7,100**	**7,100**	
	03/26/92	**5,600**	**5,600**	
	06/16/92	**7,600**	**7,600**	
	09/04/92	**13,000**	**13,000**	
	12/17/92	**1,500**	**1,500**	
	03/25/93	**2,200**	**2,200**	
	06/22/93	**1,400**	**1,400**	
	09/16/93	**3,800**	**3,800**	
	12/03/93	**10,000**	**10,000**	
	03/15/94	**900**	**900**	
	06/16/94	**312**	**312**	
	09/20/94	**350**	**350**	
	12/13/94	**580**	**580**	
	03/31/95	**568**	**568**	
	06/15/95	**228**	**228**	
	09/07/95	**1,928**	**1,928**	
	12/11/95	*24*	*24*	
	03/15/96	**552**	**552**	
	06/27/96	**490**	**490**	
	09/05/96	**2,200**	**2,200**	
	12/03/96	**1,600**	**1,600**	
	01/23/97	**170**	**170**	
	04/26/97	*68*	*68*	
	07/16/97	*40*	*40*	
	10/29/97	**140**	**140**	
	01/20/98	**1,500**	**1,500**	
	04/30/98	**130**	**130**	
	07/10/98	**150**	**150**	
	10/22/98	**160**	**160**	
	01/19/99	**900**	**900**	
	04/16/99	*99*	*99*	
	07/23/99	*76*	*76*	
	10/19/99	**104**	**104**	

Table #4

Groundwater Analytical Results
Appleton Wire Former Albany International Chrome Plant

Well Name	**Sample Date**	**Adjusted Chromium Value**	**Total Chromium (ug/l)**	**Hexavalent Chromium (ug/l)**
	01/10/00	**1,200**	**1,200**	
MW-5A*	04/17/00	**880**	**880**	
Cont.	07/20/00	**400**	**400**	
	10/25/00	**1,100**	**1,100**	
	01/17/01	**280**	**280**	
	04/06/01	*65*	*65*	
	07/20/01	*11*	*11*	
	10/16/01	8	*16***	
	01/14/02	*78*	*78*	
	04/18/02	**380**	**380**	
	07/23/02	**207**	**207**	
	10/30/02	*45*	*45*	
	01/20/03	**1,200**	**1,200**	
	04/16/03	**270**	**270**	
	07/10/03	**1,200**	**1,200**	
	10/07/03	*16*	*16*	
	01/30/04	*23*	*23*	
	04/19/04	**480**	**480**	*82*
	07/26/04	*40*	*40*	<4
	10/11/04	*12*	*12*	12
	01/12/05	*30*	*30*	<2
	04/11/05	*13*	*13*	10
	07/18/05	*15*	*<30*	<2
	10/11/05	*26*	*26*	<2
	01/10/06	1	*<2*	
	04/11/06	1	*<2*	
	07/27/06	**720**	**720**	
	10/18/06	5.2	*5.2*	
	01/09/07	2.3	2.3	<2.0
	04/29/07	*12*	*12*	10
	07/24/07	2.4	2.4	<2.0
	10/24/07	2.7	2.7	<2.0
	01/16/08	*10*	*10*	<2.0
	04/23/08	**167**	**167**	20
	07/15/08	6.4	6.4	<1.0
	10/23/08	*18*	*18*	10
	01/22/09	*248*	*248*	210
	4/7/09	*630*	*630*	590
	7/7/09	*7*	*7*	<4.0
	10/11/09	*33*	*33*	<3.0

Table #4

Groundwater Analytical Results
Appleton Wire Former Albany International Chrome Plant

Well Name	**Sample Date**	**Adjusted Chromium Value**	**Total Chromium (ug/l)**	**Hexavalent Chromium (ug/l)**
	1/19/10	*24*	*24*	<3.0
MW-5A*	4/13/10	7	*7*	7
Cont.	7/29/10	6	*6*	<3.0
	10/19/10	5	*5*	5
	1/13/11	5	*5*	5
	4/27/11	27	*27*	14
	7/19/11	1.5	<3	<3
	10/11/11	11	*11*	7
	1/10/12	*94*	*94*	60
	4/10/12	4.2	*4.2*	<3.0
	8/8/12	49	*49*	<3.0
	10/9/12	39	*39*	26
	1/8/13	7.9	7.9	<3.0
	4/15/13	3.7	3.7	<3.0
	7/10/13	**1300**	**1300**	<3.0
	10/14/13	*65*	*65*	*67*
	1/15/14	*23*	*23*	*21*
	4/9/14	*12*	*12*	*7*
	7/8/14	4	4	<3
	10/14/14	5	5	<3
	1/13/15	3.1	3.1	<3
	4/21/15	1.2	1.2	<1.2
	7/15/15	4.6	4.6	<0.1
	10/20/15	*16*	*16*	<2.0
	1/21/16	7.8	7.8	<2.0
	4/14/16	1.2	1.2	9
	01/19/99	3.7	3.7	
MW-10R	04/16/99	4.4	4.4	
	07/23/99	8.3	8.3	
	10/19/99	1	1	
	01/10/00	5.5	<11	
	04/17/00	*6.5*	_13**_	
	07/20/00	*8*	_16**_	
	10/25/00	5.5	<11	
	01/17/01	5.5	<11	
	04/06/01	5.5	<11	
	04/18/02	5.5	<11	
	04/30/03	1.1	1.1	
	04/19/04	1.2	1.2	<2.0
	04/11/05	1.2	1.2	<2.0
	07/18/05	*15*	<30	<2.0
	04/11/06	1	1	<2.0
	04/29/07	1.5	1.5	1.5
	04/23/08	3.5	3.5	3.5

Table #4

Groundwater Analytical Results
Appleton Wire Former Albany International Chrome Plant

Well Name	Sample Date	Adjusted Chromium Value	Total Chromium (ug/l)	Hexavalent Chromium (ug/l)
	4/7/09	4.4	4.4	<0.1
MW-10R Cont.	4/13/10	*11*	11	<3.0
	4/27/11	*5*	5	<3.0
	4/10/12	5.5	5.5	<3.0
	4/15/13	0.5	0.5	<0.5
	4/9/14	0.5	0.5	<0.5
	4/21/15	0.41	0.41	<0.41
	4/14/16	0.31	0.31	<2
	03/26/92	*20*	<40	
MW-17	06/16/92	1.3	1.3	
	09/04/92	*20*	<40	
	03/25/93	*40*	<80	
	09/16/93	*40*	<80	
	03/15/94	*35*	<70	
	09/20/94	15	*15*	
	03/31/95	9.8	9.8	
	09/07/95	8.1	8.1	
	03/15/96	3.6	3.6	
	09/05/96	2.4	2.4	
	04/26/97	0.5	0.5	
	04/30/98	1.7	1.7	
	04/16/99	2.9	2.9	
	04/17/00	5.5	<11	
	04/06/01	5.5	<11	
	04/18/02	5.5	<11	
	04/16/03	0.55	<1.1	
	04/19/04	1.7	1.7	<2.0
	04/11/05	0.3	0.3	<2.0
	04/11/06	1.5	1.5	<2.0
	04/29/07	0.8	0.8	<2.0
	04/23/08	0.2	<0.4	<2.0
	04/07/2009	1.7	1.7	<0.1
	04/13/2010	12	*12*	<3.0
	04/27/2011	2	2	<3.0
	04/10/2012	0.4	0.4	<3.0
	04/15/2013	0.1	<0.2	<0.2
	04/09/2014	0.8	0.8	<0.8
	04/21/2015	0.39	0.39	<0.39
	04/14/2016	0.68	0.68	<2

Table #4

Groundwater Analytical Results
Appleton Wire Former Albany International Chrome Plant

Well Name	Sample Date	Adjusted Chromium Value	Total Chromium (ug/l)	Hexavalent Chromium (ug/l)
	03/26/92	*20*	<40	
MW-17A	06/16/92	*26*	*26*	
	09/04/92	*20*	<40	
	03/25/93	*40*	<80	
	09/16/93	*40*	<80	
	03/15/94	*35*	<70	
	09/20/94	*22*	*22*	
	03/31/95	*14*	*14*	
	09/07/95	6.4	6.4	
	03/15/96	3.4	3.4	
	09/05/96	0.7	0.7	
	04/26/97	0.1	<.2	
	04/30/98	1.5	1.5	
	04/16/99	0.9	0.9	
MW-17A	04/17/00	5.5	<11	
Cont.	04/06/01	5.5	<11	
	04/18/02	5.5	<11	
	04/16/03	0.55	<1.1	
	04/19/04	0.2	0.2	<2.0
	04/11/05	0.3	0.3	<2.0
	04/11/06	0.05	<0.1	<2.0
	04/29/07	0.2	0.2	<2.0
	04/23/08	0.2	<0.4	<2.0
	04/07/09	0.3	0.3	<0.1
	04/13/10	0.9	0.9	<3.0
	04/27/11	3	3	<3.0
	04/10/12	0.5	0.5	<3.0
	04/15/13	0.1	0.2	0.2
	04/09/14	0.2	0.2	<0.2
	04/21/15	0.17	0.17	<0.17
	04/14/16	0.1	<0.2	<2

Table #4

Groundwater Analytical Results
Appleton Wire Former Albany International Chrome Plant

Well Name	Sample Date	Adjusted Chromium Value	Total Chromium (ug/l)	Hexavalent Chromium (ug/l)
MW-18	08/13/02	6	<12	
	04/16/03	0.55	<1.1	
	04/19/04	0.1	<0.2	<2.0
	04/11/05	0.1	<0.2	<2.0
	04/11/06	0.55	<0.1	<2.0
	04/29/07	0.55	0.1	2
	04/23/08	0.2	<0.4	<2.0
	04/07/09	0.3	0.3	<0.1
	04/13/10	8.1	8.1	<3.0
	04/27/11	0.3	0.3	<3.0
	04/10/12	0.2	0.2	<3.0
	04/15/13	0.1	<0.2	<0.2
	04/09/14	0.4	0.4	<0.4
	04/21/15	0.05	<0.1	<0.1
	04/14/16	1.6	1.6	<2
	08/13/02	6	<12	
MW-18A	04/16/03	0.55	<1.1	
	04/19/04	0.1	<0.2	<2.0
	04/11/05	0.4	0.4	<2.0
	04/11/06	1.5	1.5	<2.0
	04/29/07	0.3	0.3	<2.0
	04/23/08	1.1	1.1	<4.0
	04/07/09	3.8	3.8	<2.0
	04/13/10	6.9	6.9	<3.0
	04/27/11	0.4	0.4	<3.0
	04/10/12	0.2	0.2	<3.0
	04/15/13	0.1	<0.2	<0.2
	04/09/14	3.3	3.3	<3.0
	04/21/15	*15*	*15*	<3.0
	04/14/16	*0.1*	*<0.2*	2

Table #4

Groundwater Analytical Results
Appleton Wire Former Albany International Chrome Plant

Well Name	**Sample Date**	**Adjusted Chromium Value**	**Total Chromium (ug/l)**	**Hexavalent Chromium (ug/l)**
	07/13/09	**13000**	**13000**	**15000**
MW-19	07/28/09	**22000**	**22000**	**20000**
	10/11/09	**5300**	**5300**	**4000**
	01/19/10	**3030**	**3030**	**2600**
	04/13/10	**5270**	**5270**	**5270**
	07/29/10	**6400**	**6400**	**3900**
	10/19/10	**7100**	**7100**	**4800**
	01/13/11	**7100**	**7100**	**7100**
	04/27/11	**15000**	**15000**	**15000**
	07/19/11	**9400**	**9400**	**8700**
	10/11/11	**21000**	**21000**	**17000**
	01/10/12	**41100**	**41100**	**40000**
	04/10/12	**21672**	**21672**	**23000**
	08/08/12	**26000**	**26000**	**26000**
	10/09/12	**14187**	**14187**	**13000**
	01/08/13	**12575**	**12575**	**11000**
	04/15/13	**16300**	**16300**	**16300**
	07/10/13	**19000**	**19000**	**19000**
	10/14/13	**15440**	**15440**	**16000**
	04/09/14	**20005**	**20005**	**20005**
	07/08/14	**18000**	**18000**	**17000**
	10/14/14	**21600**	**21600**	**21300**
	01/13/15	**18050**	**18050**	**15000**
	04/21/15	**18587**	**18587**	**18000**
	07/15/15	**17200**	**17200**	**16000**
	10/20/15	**18000**	**18000**	**18000**
	01/21/16	**15295**	**15295**	**17000**
	04/14/16	**18420**	**18420**	**18100**

Table #4

Groundwater Analytical Results
Appleton Wire Former Albany International Chrome Plant

Well Name	Sample Date	Adjusted Chromium Value	Total Chromium (ug/l)	Hexavalent Chromium (ug/l)
	07/13/09	*30*	*30*	*50*
MW-19A	07/28/09	*40*	*40*	*40*
	10/11/09	3	3	<3.0
	01/19/10	4.3	4.3	<3.0
	04/13/10	8.2	8.2	<3.0
	07/29/10	3	3	<3.0
	10/19/10	1	1	<3.0
	01/13/11	1	1	1
	04/27/11	3	3	3
	07/19/11	**143**	**143**	<3
	10/11/11	4	4	4
	01/10/12	4	4	<3.0
	04/10/12	1.8	1.8	<3.0
	08/08/12	**6100**	**6100**	5400
	10/09/12	22	*22*	40
	01/08/13	8.1	8.1	<3.0
	04/15/13	**500**	**500**	<3.0
	04/09/14	1.8	1.8	<1.8
	07/08/14	3.8	3.8	<3
	10/14/14	4	4	<3
	01/13/15	**321**	**321**	<3
	04/21/15	1.5	1.5	<1.5
	07/15/15	**97**	**97**	<2.0
	10/20/15	1.7	1.7	<2.0
	01/21/16	**121**	**121**	<2.0
	04/14/16	**233**	**233**	<2.0
	06/02/14	**338000**	**338000**	**338000**
MW-20	07/08/14	**283000**	**283000**	**89000**
	10/14/14	**330000**	**330000**	**297000**
	01/13/15	**199000**	**199000**	**155000**
	04/21/15	**248900**	**248900**	**248900**
	07/15/15	**248150**	**248150**	**247000**
	10/20/15	**385000**	**385000**	**385000**
	01/21/16	**212000**	**212000**	**234000**
	04/14/16	**412750**	**412750**	**279000**

Table #4

Groundwater Analytical Results
Appleton Wire Former Albany International Chrome Plant

Well Name	Sample Date	Adjusted Chromium Value	Total Chromium (ug/l)	Hexavalent Chromium (ug/l)
MW-20A	06/02/14	**1200**	**1200**	1060
	07/08/14	**230**	**230**	15
	10/14/14	**117**	**117**	<3
	01/13/15	*11*	*11*	<3
	04/21/15	1.1	1.1	<1.1
	07/15/15	**192**	**192**	<2.0
	10/20/15	***23***	***23***	<2.0
	01/21/16	5.4	5.4	<2.0
	04/14/16	**66**	**66**	8
MW-21	06/02/14	2.6	2.6	<30
	07/08/14	**210**	**210**	<3
	10/14/14	0.05	<0.1	<3
	01/13/15	0.63	0.63	<3
	04/21/15	5.9	5.9	<3.0
	07/15/15	2.6	2.6	<2.0
	10/20/15	1.7	1.7	<2.0
	01/21/16	0.89	0.89	<2.0
	04/14/16	2.2	2.2	<2.0
MW-21A	06/02/14	1.8	1.8	<30
	07/08/14	1.1	1.1	<3
	10/14/14	0.05	<0.1	<3
	01/13/15	0.05	<0.1	<3
	04/21/15	0.54	0.054	<0.54
	07/15/15	<0.2	0.1	<2.0
	10/20/15	0.51	0.51	<2.0
	01/21/16	0.21	0.21	<2
	04/14/16	0.6	0.6	<2.0
NR 140 Total Chromium Enforcement Standard (ES)			100 ug/l	
NR 140 Total Chromium Preventive Action Limit (PAL)			10 ug/l	

Table #5

Groundwater Analytical Results
Total and Hexavalent Chromium- Manhole and Sump

Date	Manhole (French Drain) Total Chromium ug/l	Manhole (French Drain) Hexavalent Chromium ug/l	Sump Total Chromium ug/l	Sump Hexavalent Chromium ug/l
1989*			9,700	
1990*			129,000	
1991*			94,000	
1992*	125,000		101,000	
1993*	71,000		72,000	
1994*	58,000		76,000	
1995*	36,000		88,000	
1996*	44,000		35,000	
1997*	32,000		41,000	
1998*	37,000		61,000	
12/09/1999	21,000		76,000	
03/08/2000	13,000		33,000	
01/17/2001	20,000		6,000	
02/15/2001	11,000		35,000	
03/15/2001	19,000		38,000	
04/06/2001	8,300		21,000	
05/18/2001	15,000		48,000	
06/18/2001	15,000		51,000	
07/20/2001	31,000		74,000	
08/14/2001	17,000		70,000	
09/18/2001	16,000		55,000	
10/16/2001	13,000		38,000	
11/12/2001	17,000		53,000	
12/25/2001	15,000		39,000	
01/11/2002	15,000		54,000	
02/12/2002	16,000		43,000	
03/13/2002	11,000		27,000	
04/18/2002	11,000		17,000	
05/20/2002	17,000		49,000	
06/20/2002	14,000		35,000	
07/15/2002	16,000		61,000	
08/15/2002	19,000		63,000	
09/18/2002	13,000		61,000	
10/30/2002	18,000		12,000	
11/20/2002	13,000		38,000	
12/12/2002	13,000		44,000	
01/20/2003	16,000		47,000	
02/19/2003	22,000		37,000	
03/17/2003	9000		30,000	
04/16/2003	8,800		5,300	
05/28/2003	11,000		32,000	
06/10/2003	10,000		66,000	
07/10/2003	9,600		27,000	
08/20/2003	13,000		55,000	
09/12/2003	16,000		64,000	

Table #5

Groundwater Analytical Results
Total and Hexavalent Chromium- Manhole and Sump

Date	Manhole (French Drain) Total Chromium ug/l	Manhole (French Drain) Hexavalent Chromium ug/l	Sump Total Chromium ug/l	Sump Hexavalent Chromium ug/l
10/07/2003	**9,800**		**32,000**	
11/18/2003	**8,100**		**29,000**	
12/08/2003	**8,700**		**31,000**	
01/30/2004	**9,700**		**44,000**	
02/12/2004	**11,260**		**42,175**	
03/25/2004	**9,200**		**55,000**	
04/19/2004	**13,000**	**14,000**	**41,000**	**41,000**
05/10/2004	**10,000**		**17,000**	
06/14/2004	**5,400**	**5,000**	**16,000**	**15,000**
07/19/2004	**8,700**	**8,700**	**52,000**	**52,000**
08/17/2004	**11,000**	**10,000**	**79,000**	**66,000**
09/14/2004	**12,000**	**12,000**	**76,000**	**43,000**
10/11/2004	**9,900**	**8,900**	**80,000**	**73,000**
11/16/2004	**11,000**	**10,500**	**55,000**	**53,000**
12/08/2004	**15,000**		**7,700**	
01/12/2005	**8,900**	**7,200**	**33,000**	**13,100**
02/16/2005	**6,200**	**5,600**	**25,000**	**22,000**
03/07/2005	**9,900**	**8,500**	**9,800**	**7,600**
04/11/2005	**5,700**	**5,800**	**33,000**	**31,000**
05/18/2005	**12,000**	**9,200**	**33,000**	**33,000**
06/13/2005	**11,000**	**8,000**	**42,000**	**42,000**
07/18/2005	**10,000**	**10,000**	**82,000**	**40,000**
08/19/2005	**10,000**	**9,500**	**76,000**	**80,000**
09/15/2005	**8,900**	**7,600**	**64,000**	**60,000**
10/11/2005	**8,100**	**7,400**	**46,000**	**46,000**
11/16/2005	**8,200**	**6,500**	**14,000**	**13,000**
12/15/2005	**7,900**	**7,000**	**43,000**	**40,000**
01/10/2006	**5,600**	**5,100**	**17,000**	**15,000**
02/01/06	**7,000**	**5,800**	**15,000**	**14,000**
03/13/06	**3,800**	**3,400**	**9,000**	**7,200**
04/11/06	**8,000**	**8,000**	**25,000**	**23,900**
05/17/06	**6,800**	**6,800**	**23,000**	**23,000**
06/21/06	**6,900**	**6,800**	**66,000**	**67,000**
07/27/06	**7,400**	**7,200**	**67,000**	**67,000**
08/11/06	**11,000**	**9,800**	**80,000**	**59,000**
09/12/06	**6,800**	**6,000**	**19,000**	**17,000**
10/18/06	**8,200**	**6,500**	**9,100**	**6,900**
11/14/06	**7,800**	**4,200**	**47,000**	**22,900**
12/13/06	**7,800**	**7,000**	**32,000**	**26,000**
01/09/07	**6,900**	**6,900**	**32,000**	**32,000**
02/14/07	**7,100**	**6,900**	**48,000**	**48,000**
03/06/07	**5,100**	**4,500**	**29,000**	**29,000**
04/29/07	**7,500**	**7,400**	**31,000**	**16,200**
05/14/07	**8,400**	**6,600**	**45,000**	**17,800**
06/17/07	**7,600**	**3,900**	**18,000**	**9,800**

Table #5

Groundwater Analytical Results
Total and Hexavalent Chromium- Manhole and Sump

Date	**Manhole (French Drain) Total Chromium ug/l**	**Manhole (French Drain) Hexavalent Chromium ug/l**	**Sump Total Chromium ug/l**	**Sump Hexavalent Chromium ug/l**
07/24/07	**8,000**	**7,300**	**103,000**	**103,000**
08/09/07	**11,000**	**8,200**	**95,000**	**95,000**
09/20/07	**7,100**	**6,200**	**58,000**	**50,000**
10/24/07	**5,800**	**5,600**	**22,000**	**18,700**
11/27/007	**6,400**	**4,000**	**65,000**	**26,500**
12/12/07	**5,500**	**4,700**	**60,000**	**60,000**
01/16/08	**4,700**	**3,700**	**25,000**	**27,000**
02/07/08	**6,000**	**4,300**	**45,000**	**9,600**
03/05/08	**6,100**	**5,600**	**15,000**	**9,600**
04/23/08	**5,900**	**5,100**	**48,000**	**48,000**
05/21/08	**5,900**	**1,500**	**49,000**	**25,000**
06/16/08	**4,900**	**3,900**	**34,000**	**23,000**
07/15/08	**6,600**	**3,900**	**68,000**	**52,000**
08/21/08	**7,500**	**6,200**	**94,000**	**69,000**
09/09/08	**5,565**	**4,600**	**94,800**	**64,000**
10/23/08	**5,900**	**4,700**	**89,000**	**88,000**
11/20/08	**6,400**	**3,600**	**48,000**	**21,000**
12/16/08	**4,900**	**3,700**	**21,000**	**8,900**
01/22/09	**5,200**	**3,200**	**40,000**	**18,000**
02/10/09	**5,200**	**3,600**	**5,800**	**4,000**
03/16/09	**3,100**	**1,700**	**8,900**	**3,800**
04/07/09	**3,900**	**2,800**	**33,000**	**15,000**
05/12/09	**3,400**	**1,600**	**41,000**	**19,000**
06/17/09	**3,200**	**2,300**	**47,000**	**39,000**
07/07/09	**6,000**	**4,000**	**91,000**	**49,000**
08/11/09	**4,900**	**3,500**	**95,000**	**94,000**
09/08/09	**7,200**	**2,900**	**99,000**	**61,000**
10/08/09	**7,800**	**3,100**	**38,000**	**15,000**
11/10/09	**4,900**	**4,400**	**49,000**	**42,000**
12/15/09	**5,000**	**3,600**	**47,000**	**17,000**
01/19/10	**5,300**	**5,300**	**43,000**	**44,000**
02/09/10	**4,400**	**4,100**	**36,000**	**31,000**
03/15/10	**2,000**	**1,800**	**19,000**	**16,000**
04/13/10	**3,900**	**2,800**	**31,000**	**20,000**
05/11/10	**5,000**	**4,200**	**23,000**	**20,000**
06/08/10	**5,500**	**5,100**	**52,000**	**42,000**
07/14/10	**5,800**	**3,800**	**66,000**	**27,000**
08/24/10	**7,700**	**2,700**	**66,000**	**26,000**
09/15/10	**5,700**	**2,900**	**85,000**	**39,000**
10/19/10	**5,800**	**2,300**	**81,000**	**62,000**
11/04/10	**5,000**	**3,500**	**53,000**	**53,000**
12/14/10	**4,800**	**3,000**	**49,000**	**65,000**
01/13/11	**320**	**3,200**	**39,000**	**36,000**
02/08/11	**5,700**	**4,000**	**46,000**	**43,000**
03/15/11	**3,500**	**3,300**	**9,500**	**7,100**

Table #5

Groundwater Analytical Results
Total and Hexavalent Chromium- Manhole and Sump

Date	Manhole (French Drain) Total Chromium ug/l	Manhole (French Drain) Hexavalent Chromium ug/l	Sump Total Chromium ug/l	Sump Hexavalent Chromium ug/l
04/27/11	2,400	2,400	20,000	20,000
05/16/11	5,500	5,300	25,000	25,000
06/07/11	5,500	5,200	56,000	62,000
07/19/11	4,200	3,600	105,000	51,000
08/23/11	4,900	4,100	98,000	89,000
09/13/11	5,300	3,900	100,000	61,000
10/11/11	31,000	26,000	88,000	72,000
11/08/11	4,300	2,800	54,000	39,000
12/13/11	3,600	3,400	57,000	52,000
01/10/12	5,400	3,800	60,000	49,000
02/14/12	420	360	41,000	39,000
03/13/12	2,000	1,500	20,000	18,000
04/10/12	4,800	4,200	44,000	32,000
05/22/12	5,300	5,100	84,000	37,000
06/18/12	5,000	4,400	111,000	88,000
07/18/12	4,800	4,200	122,000	90,000
08/08/12	6,100	5,500	63,000	18,000
09/11/12	4,100	4,100	101,000	92,000
10/09/12	620	505	89,000	92,000
11/20/12	3,500	3,400	43,000	44,000
12/18/12	3,600	3,200	30,000	30,000
01/08/13	*<30*	*<3*	41,000	33,000
02/11/13	3,300	3,000	13,000	14,000
03/12/13	2,600	2,200	12,000	7,500
04/15/13	3,900	3,490	25,000	25,000
05/07/13	3,900	3,900	38,000	35,000
06/20/13	3,900	3,900	48,000	50,000
07/10/13	4,300	4,300	9,000	41,506
08/20/13	5,100	5,000	84,000	80,000
09/19/13	6,000	6,000	76,000	76,000
10/14/13	3,800	3,800	75,000	85,000
11/12/13	3,900	3,700	27,000	29,000
12/17/13	3,700	3,500	46,000	48,000
01/15/14	*170*	*126*	27,000	27,600
02/18/14	12,000	2,900	39,000	38,000
03/11/14	2,300	2,400	7,300	6,100
04/09/14	1,900	1,570	19,000	17,000
05/12/14	2,200	2,200	4,400	4,400
06/02/14	1,500	1,500	7,000	6,800
07/08/14	3,800	3,200	27,000	27,000
08/05/14	4,200	3,300	64,000	41,000
09/09/14	4,700	4,000	67,000	61,000
10/16/14	3,300	3,300	8,000	6,800
11/4/14	2,600	2,600	37,000	37,000
12/16/14	3000	2700	15000	12000

Table #5

Groundwater Analytical Results
Total and Hexavalent Chromium- Manhole and Sump

Date	Manhole (French Drain) Total Chromium ug/l	Manhole (French Drain) Hexavalent Chromium ug/l	Sump Total Chromium ug/l	Sump Hexavalent Chromium ug/l
1/13/15	**2400**	**2100**	**36000**	**31000**
2/10/15	**3200**	**2500**	**39000**	**33000**
3/10/15	**2700**	**2400**	**25000**	**18000**
4/21/15	**1800**	**1600**	**16000**	**4400**
5/18/15	**2700**	**1800**	**1900**	**8600**
6/9/15	**1900**	**1700**	**56000**	**9100**
7/15/15	**3441**	**3300**	**10627**	**10000**
8/11/15	**3700**	**3200**	**45000**	**32000**
9/8/15	**5900**	**3400**	**42000**	**24000**
10/20/15	**3700**	**3200**	**50000**	**42000**
11/10/15	**3700**	**3000**	**24000**	**19000**
12/8/15	**3300**	**2700**	**25000**	**7900**
1/21/16	**2800**	**2640**	**22000**	**22400**
2/8/16	**3200**	**3150**	**6700**	**6130**
3/14/16	**2600**	**2490**	**17000**	**16500**
4/14/16	**3200**	**3150**	**19000**	**18200**
5/17/16	**3100**	**2880**	**26000**	**0**
6/9/16	**2700**	**2210**	**35000**	**24400**

** Estimated result based on Enchem Laboratory Report
* Number are average over 1-year.

Max. Contaminant Level	100		100	
NR 140.10 ES	100		100	
NR 140.10 PAL	10		10	

102 Indicates exceedance of NR 140.10 ES & PAL
14 Indicates exceedance of NR 140.10 PAL

Table #6

Groundwater Elevations
Appleton Wire Former Albany International Chrome Plant

Well Name	Date Measured	Depth Water (feet)	Reference Elevation (to top PVC)	Groundwater Elevation (feet)	Elevation Top of Screen
	1/19/10	9.48	770.01	760.53	757.96
MW-1	4/13/10	8.21		761.80	
	7/29/10	9.28		760.73	
	10/19/10	7.31		762.70	
	1/13/11	7.94		762.07	
	4/27/11	6.86		763.15	
	7/19/11	5.51		764.50	
	10/11/11	7.41		762.60	
	1/10/12	9.32		760.69	
	4/10/12	8.45		761.56	
	8/8/12	9.88		760.13	
	10/9/12	9.83		760.18	
	1/18/13	9.17		760.84	
	4/15/13	7.30		762.71	
	7/10/13	8.22		761.79	
	11/14/13	9.32		760.69	
	1/15/14	10.32		759.69	
	4/9/14	7.42		762.59	
	6/2/14	8.16		761.85	
	7/8/14	7.80		762.21	
	10/14/14	8.18		761.83	
	1/13/15	9.22		760.79	
	4/21/15	8.68		761.33	
	7/15/15	8.90		761.11	
	10/20/15	8.72		761.29	
	1/21/16	8.90		761.11	
	4/14/16	8.61		761.40	

Table #6

Groundwater Elevations
Appleton Wire Former Albany International Chrome Plant

Well Name	Date Measured	Depth Water (feet)	Reference Elevation (to top PVC)	Groundwater Elevation (feet)	Elevation Top of Screen
	1/19/10	8.42	770.76	762.34	759.04
MW-2	4/13/10	8.31		762.45	
	7/29/10	9.00		761.76	
	10/19/10	7.03		763.73	
	1/13/11	8.81		761.95	
	4/27/11	7.51		763.25	
	7/19/11	4.41		766.35	
	10/11/11	7.20		763.56	
	1/10/12	8.70		762.06	
	4/10/12	7.54		763.22	
	8/8/12	8.57		762.19	
	10/9/12	9.21		761.55	
	1/8/13	8.20		762.56	
	4/15/13	5.30		765.46	
	7/10/13	7.42		763.34	
	10/14/13	8.71		762.05	
	1/15/14	8.98		761.78	
	4/9/14	6.53		764.23	
	6/2/14	7.10		763.66	
	7/8/14	7.48		763.28	
	10/14/14	7.82		762.94	
	1/13/15	8.52		762.24	
	4/21/15	6.63		764.13	
	7/15/15	8.31		762.45	
	10/20/15	8.38		762.38	
	1/21/16	7.38		763.38	
	4/14/16	6.42		764.34	

Table #6

Groundwater Elevations
Appleton Wire Former Albany International Chrome Plant

Well Name	Date Measured	Depth Water (feet)	Reference Elevation (to top PVC)	Groundwater Elevation (feet)	Elevation Top of Screen
MW-2A	1/19/10	15.39	770.64	755.25	733.72
	4/13/10	15.55		755.09	
	7/29/10	15.55		755.09	
	10/19/10	13.62		757.02	
	1/13/11	17.13		753.51	
	4/27/11	16.22		754.42	
	7/19/11	15.21		755.43	
	10/11/11	14.16		756.48	
	1/10/12	15.03		755.61	
	4/10/12	15.32		755.32	
	8/8/12	16.54		754.10	
	10/9/12	15.41		755.23	
	1/8/13	14.84		755.80	
	4/15/13	14.57		756.07	
	7/10/13	15.20		755.44	
	10/14/13	15.20		755.44	
	1/15/14	15.22		755.42	
	4/9/14	15.12		755.52	
	6/2/14	15.18		755.46	
	7/8/14	15.11		755.53	
	10/14/14	14.63		756.01	
	1/13/15	14.63		756.01	
	4/21/15	15.23		755.41	
	7/15/15	15.38		755.26	
	10/20/15	14.58		756.06	
	1/21/16	13.32		757.32	
	4/14/16	14.22		756.42	

Table #6

Groundwater Elevations
Appleton Wire Former Albany International Chrome Plant

Well Name	Date Measured	Depth Water (feet)	Reference Elevation (to top PVC)	Groundwater Elevation (feet)	Elevation Top of Screen
	1/19/10	11.25	771.16	759.91	756.73
MW-5	4/13/10	5.50		765.66	
	7/29/10	10.13		761.03	
	10/19/10	8.44		762.72	
	1/13/11	7.17		763.99	
	4/27/11	6.20		764.96	
	7/19/11	4.16		767.00	
	10/11/11	8.50		762.66	
	1/10/12	8.79		762.37	
	4/10/12	8.82		762.34	
	8/8/12	11.72		759.44	
	10/9/12	12.52		758.64	
	1/8/13	8.36		762.80	
	4/15/13	5.39		765.77	
	7/10/13	7.04		764.12	
	10/14/13	11.67		759.49	
	1/15/14	9.74		761.42	
	4/9/14	6.08		765.08	
	6/2/14	5.96		765.20	
	7/8/14	7.69		763.47	
	10/14/14	6.48		764.68	
	1/13/15	8.28		762.88	
	4/21/15	5.48		765.68	
	7/15/15	7.18		763.98	
	10/20/15	11.84		759.32	
	1/21/16	6.61		764.55	
	4/14/16	5.65		765.51	

Table #6

Groundwater Elevations
Appleton Wire Former Albany International Chrome Plant

Well Name	Date Measured	Depth Water (feet)	Reference Elevation (to top PVC)	Groundwater Elevation (feet)	Elevation Top of Screen
	1/19/2010	8.90	769.94	761.04	732.83
MW-5A	4/13/2010	5.81		764.13	
	07/29/10	8.31		761.63	
	10/19/10	10.24		759.70	
	01/13/11	14.98		754.96	
	04/27/11	3.72		766.22	
	07/19/11	8.12		761.82	
	10/11/11	9.95		759.99	
	01/10/12	13.08		756.86	
	04/10/12	6.70		763.24	
	08/08/12	14.15		755.79	
	10/09/12	14.04		755.90	
	01/08/13	11.24		758.70	
	04/15/13	4.32		765.62	
	07/10/13	6.77		763.17	
	10/14/13	16.42		753.52	
	01/15/14	13.80		756.14	
	04/09/14	4.40		765.54	
	06/02/14	5.48		764.46	
	07/08/14	6.72		763.22	
	10/14/14	13.73		756.21	
	01/13/15	7.61		762.33	
	04/21/15	4.04		765.90	
	07/15/15	8.44		761.50	
	10/20/15	7.44		762.50	
	01/21/16	7.50		762.44	
	04/14/16	5.34		764.60	

Table #6

Groundwater Elevations
Appleton Wire Former Albany International Chrome Plant

Well Name	Date Measured	Depth Water (feet)	Reference Elevation (to top PVC)	Groundwater Elevation (feet)	Elevation Top of Screen
	1/19/10	7.88	767.13	759.25	757.51
MW-10R	4/13/10	4.84		762.29	
	7/29/10	6.98		760.15	
	10/19/10	5.59		761.54	
	1/13/11	4.80		762.33	
	4/27/11	4.81		762.32	
	7/19/11	3.36		763.77	
	10/11/11	5.68		761.45	
	1/10/12	5.41		761.72	
	4/10/12	5.37		761.76	
	8/8/12	6.01		761.12	
	10/9/12	8.14		758.99	
	1/8/13	8.03		759.10	
	4/15/13	2.32		764.81	
	7/10/13	4.38		762.75	
	10/14/13	5.86		761.27	
	1/15/14	7.92		759.21	
	4/9/14	4.53		762.60	
	6/2/14	4.51		762.62	
	7/8/14	5.54		761.59	
	10/14/14	5.08		762.05	
	1/13/15	6.35		760.78	
	4/21/15	5.02		762.11	
	7/15/15	5.61		761.52	
	10/20/15	5.83		761.30	
	1/21/16	5.68		761.45	
	4/14/16	5.08		762.05	

Table #6

Groundwater Elevations
Appleton Wire Former Albany International Chrome Plant

Well Name	Date Measured	Depth Water (feet)	Reference Elevation (to top PVC)	Groundwater Elevation (feet)	Elevation Top of Screen
	01/19/10	9.58	771.97	762.39	759.39
MW-17	04/13/10	6.36		765.61	
	07/29/10	8.61		763.36	
	10/29/10	7.11		764.86	
	01/13/11	8.06		763.91	
	04/27/11	7.92		764.05	
	07/19/11	6.30		765.67	
	10/11/11	7.20		764.77	
	01/10/12	9.25		762.72	
	04/10/12	8.24		763.73	
	08/08/12	8.23		763.74	
	10/09/12	9.46		762.51	
	01/08/13	9.76		762.21	
	04/15/13	7.78		764.19	
	07/10/13	8.18		763.79	
	10/14/13	8.38		763.59	
	01/15/14	9.71		762.26	
	04/09/14	7.90		764.07	
	06/02/14	7.82		764.15	
	07/08/14	7.96		764.01	
	10/14/14	7.96		764.01	
	01/13/15	6.14		765.83	
	04/21/15	6.68		765.29	
	07/15/15	7.71		764.26	
	10/20/15	9.18		762.79	
	01/21/16	9.61		762.36	
	04/14/16	8.20		763.77	

Table #6

Groundwater Elevations
Appleton Wire Former Albany International Chrome Plant

Well Name	**Date Measured**	**Depth Water (feet)**	**Reference Elevation (to top PVC)**	**Groundwater Elevation (feet)**	**Elevation Top of Screen**
	01/19/10	16.32	771.26	754.94	733.85
MW-17A	04/13/10	16.58		754.68	
	07/29/10	14.28		756.98	
	10/19/10	16.97		754.29	
	01/13/11	17.20		754.06	
	04/27/11	18.02		753.24	
	07/19/11	17.21		754.05	
	10/11/11	16.82		754.44	
	01/10/12	15.50		755.76	
	04/10/12	16.16		755.10	
	08/08/12	16.00		755.26	
	10/09/12	15.56		755.70	
	01/08/13	15.60		755.66	
	04/15/13	16.29		754.97	
	07/10/13	15.32		755.94	
	10/14/13	15.32		755.94	
	01/15/14	15.91		755.35	
	04/09/14	16.32		754.94	
	06/02/14	15.48		755.78	
	07/08/14	15.21		756.05	
	10/14/14	6.60		764.66	
	01/13/15	15.02		756.24	
	04/21/15	16.08		755.18	
	07/15/15	15.72		755.54	
	10/10/15	15.09		756.17	
	01/21/16	14.98		756.28	
	04/14/16	15.22		756.04	

Table #6

Groundwater Elevations
Appleton Wire Former Albany International Chrome Plant

Well Name	Date Measured	Depth Water (feet)	Reference Elevation (to top PVC)	Groundwater Elevation (feet)	Elevation Top of Screen
MW-18	01/19/10	9.60	770.03	760.43	757.23
	04/13/10	7.80		762.23	
	07/29/10	9.57		760.46	
	10/19/10	8.63		761.40	
	1/13/11	8.35		761.68	
	4/27/11	8.82		761.21	
	7/19/11	6.42		763.61	
	10/11/11	8.60		761.43	
	1/10/12	9.27		760.76	
	4/10/12	8.80		761.23	
	8/8/12	9.31		760.72	
	10/9/12	9.85		760.18	
	1/8/13	9.22		760.81	
	4/15/13	7.06		762.97	
	7/10/13	8.78		761.25	
	10/14/13	9.04		760.99	
	1/15/14	10.35		759.68	
	4/9/14	8.20		761.83	
	6/2/14	8.75		761.28	
	7/8/14	8.62		761.41	
	10/14/14	8.71		761.32	
	1/13/15	9.32		760.71	
	4/21/15	8.00		762.03	
	7/15/15	8.94		761.09	
	10/20/15	8.85		761.18	
	1/21/16	8.61		761.42	
	4/14/16	8.04		761.99	

Table #6

Groundwater Elevations
Appleton Wire Former Albany International Chrome Plant

Well Name	Date Measured	Depth Water (feet)	Reference Elevation (to top PVC)	Groundwater Elevation (feet)	Elevation Top of Screen
MW-18A	1/19/10	27.48	770.67	743.19	732.37
	4/13/10	27.72		742.95	
	7/29/10	27.93		742.74	
	10/19/10	27.72		742.95	
	1/13/11	29.44		741.23	
	4/27/11	29.44		741.23	
	7/19/11	28.87		741.80	
	10/11/11	28.33		742.34	
	1/10/12	26.43		744.24	
	4/10/12	26.80		743.87	
	8/8/12	27.45		743.22	
	10/9/12	27.97		742.70	
	1/8/13	26.11		744.56	
	4/15/13	26.48		744.19	
	7/10/13	27.18		743.49	
	10/14/13	27.32		743.35	
	1/15/14	26.32		744.35	
	4/9/14	27.03		743.64	
	6/2/14	29.62		741.05	
	7/8/14	28.14		742.53	
	10/14/14	26.88		743.79	
	1/13/15	9.32		761.35	
	4/21/15	26.92		743.75	
	7/15/15	27.13		743.54	
	10/20/15	26.31		744.36	
	1/21/16	25.18		745.49	
	4/14/16	25.56		745.11	

Table #6

Groundwater Elevations
Appleton Wire Former Albany International Chrome Plant

Well Name	Date Measured	Depth Water (feet)	Reference Elevation (to top PVC)	Groundwater Elevation (feet)	Elevation Top of Screen
	01/19/10	5.20	768.19	762.99	758.27
MW-19	04/13/10	5.33		762.86	
	07/29/10	6.57		761.62	
	10/19/10	5.50		762.69	
	01/13/11	7.29		760.90	
	04/27/11	5.60		762.59	
	07/19/11	6.63		761.56	
	10/11/11	5.55		762.64	
	01/10/12	5.97		762.22	
	04/10/12	4.78		763.41	
	08/08/12	6.38		761.81	
	10/09/12	6.70		761.49	
	01/08/13	5.74		762.45	
	04/15/13	2.40		765.79	
	07/10/13	4.25		763.94	
	10/14/13	6.30		761.89	
	01/15/14	6.22		761.97	
	04/09/14	4.47		763.72	
	06/02/14	4.11		764.08	
	07/08/14	4.40		763.79	
	10/14/14	4.70		763.49	
	01/13/15	5.78		762.41	
	04/21/15	4.20		763.99	
	07/15/15	5.17		763.02	
	10/20/15	5.70		762.49	
	01/21/16	4.44		763.75	
	04/14/16	3.48		764.71	

Table #6

Groundwater Elevations
Appleton Wire Former Albany International Chrome Plant

Well Name	Date Measured	Depth Water (feet)	Reference Elevation (to top PVC)	Groundwater Elevation (feet)	Elevation Top of Screen
	01/19/10	18.36	768.04	749.68	731.1
MW-19A	04/13/10	18.33		749.71	
	07/29/10	18.22		749.82	
	10/19/10	18.40		749.64	
	01/13/11	20.47		747.57	
	04/27/11	18.40		749.64	
	07/19/11	18.44		749.60	
	10/11/11	18.42		749.62	
	01/10/12	16.58		751.46	
	04/10/12	16.98		751.06	
	08/08/12	20.13		747.91	
	10/09/12	16.56		751.48	
	01/08/13	15.40		752.64	
	04/15/13	16.22		751.82	
	07/10/13	16.37		751.67	
	10/14/13	16.83		751.21	
	01/15/14	18.73		749.31	
	04/09/14	17.24		750.80	
	06/02/14	16.80		751.24	
	07/08/14	16.84		751.20	
	10/14/14	16.24		751.80	
	01/13/15	16.23		751.81	
	04/21/15	18.21		749.83	
	07/15/15	18.42		749.62	
	10/20/15	18.03		750.01	
	01/21/16	15.68		752.36	
	04/14/16	16.02		752.02	

Table #6

Groundwater Elevations
Appleton Wire Former Albany International Chrome Plant

Well Name	Date Measured	Depth Water (feet)	Reference Elevation (to top PVC)	Groundwater Elevation (feet)	Elevation Top of Screen
MW-20	06/02/14	7.36	768.29	760.93	764.29
	07/08/14	5.63		762.66	
	10/14/14	5.57		762.72	
	01/13/15	7.91		760.38	
	04/21/15	5.68		762.61	
	07/15/15	6.48		761.81	
	10/20/15	7.48		760.81	
	01/21/16	7.19		761.10	
	04/14/16	5.81		762.48	
MW-20A	06/02/14	32.73	768.36	735.63	739.02
	07/08/14	20.88		747.48	
	10/14/14	12.61		755.75	
	01/13/15	17.04		751.32	
	04/21/15	18.06		750.30	
	07/15/15	18.53		749.83	
	10/20/15	16.78		751.58	
	01/21/16	16.07		752.29	
	04/14/16	17.25		751.11	
MW-21	06/02/14	4.96	768.85	763.89	764.8
	07/08/14	5.02		763.83	
	10/14/14	6.82		762.03	
	01/13/15	6.18		762.67	
	04/21/15	5.34		763.51	
	07/15/15	5.74		763.11	
	10/20/15	6.00		762.85	
	01/21/16	5.22		763.63	
	04/14/16	4.48		764.37	
MW-21A	06/02/14	32.18	768.85	736.67	739.85
	07/08/14	16.27		752.58	
	10/14/14	15.98		752.87	
	01/13/15	14.80		754.05	
	04/21/15	15.52		753.33	
	07/15/15	13.03		755.82	
	10/20/15	14.73		754.12	
	01/21/16	14.49		754.36	
	04/14/16	12.35		756.50	

Table #7

Appleton Wire Former Albany international Chrome Plant
Total Pounds Chromium Removed

Year	Sump	Manhole	Yearly Total	Historic Total
1988-1998*				550.00
1998**	10.68	13.26	23.94	573.94
1999	21.81	8.4	30.21	604.15
2000	NA	NA	22.00	626.15
2001	18.75	8.69	27.64	653.79
2002	13.1	9.98	23.08	676.87
2003	12.94	4.95	17.89	694.76
2004	12.83	5.29	18.12	712.88
2005	8.07	4.57	12.64	725.52
2006	7.36	4.27	11.63	736.88
2007	11.72	2.87	14.59	751.47
2008	16.40	3.40	19.80	771.27
2009	13.79	2.66	16.45	796.03
2010	17.09	3.36	20.45	816.48
2011	16.26	2.60	18.86	835.34
2012	11.66	2.39	14.05	849.39
2013	8.24	1.78	10.02	859.37
2014	8.10	1.30	9.4	868.77
2015	8.59	1.30	9.89	878.66
2016***	4.46	0.76	5.22	883.88

*Chemical Precipitation process was utilized from June 29, 1988 to April 20, 1998. During that period 550# of chromium was removed in the form of chromium sulfate**.**

** Partial Year - Ion exchange System on-line April 20, 1998

*** Partial Year

NA - Data not available

Table #8
Geoprobe Monitoring Wells
GROUNDWATER ANALYTICAL RESULTS
Total Chromium and Hexavalent Chromium
Appleton Wire Former Albany International Chrome Plant
Appleton, Wisconsin

Well Name	Sample Date	Total Chromium	Hexavalent Chromium (ug/l)
GMW-01	06/30/04	**5300**	5100
	08/01/07	**8490**	N/A
	10/24/07	**3085**	1900
	01/16/08	**3020**	2260
	04/23/08	**2001**	2000
GMW-02	06/30/04	**5700**	4700
	08/01/04	**6355**	N/A
	10/24/07	**6115**	6115
	01/16/08	**7040**	6800
	04/23/08	**6600**	4900
GMW-03	06/30/04	**5000**	4700
	08/01/04	**4790**	N/A
	10/24/07	**3545**	2300
	01/16/08	**4550**	3100
	04/23/08	**3320**	1400
GMW-04	06/30/04	*52*	52
	08/01/04	*56*	N/A
	10/24/07	*14*	<2.0
	01/16/08	*31*	<.002
	04/23/08	3.7	<2.0
GMW-05	06/30/04	*40*	34
	08/01/04	*55*	N/A
	10/24/07	5.6	<2.0
	01/16/08	8.5	<.002
	04/23/08	*31.0*	<2.0
GMW-06	06/30/04	3.3	<2
	08/01/04	4.2	N/A
	10/24/07	3.5	<2.0
	01/16/08	3.3	<.002
	04/23/08	5.2	<2.0
GMW-07	06/30/04	0.8	<2
	08/01/04	1.7	N/A
	10/24/07	2.3	<2.0
	01/16/08	*13.0*	<.002
	04/23/08	3.1	<2.0
GMW-08	06/30/04	0.4	<2
	08/01/04	1.4	N/A
	10/24/07	**489.0**	270
	01/16/08	8.6	<.002
	04/23/08	**101.0**	20
GMW-09	06/30/04	1.3	<2
	08/01/04	1.5	N/A
	10/24/07	2.8	<2.0
	01/16/08	9.3	<.002
	04/23/08	4.2	<2.0
GMW-10	06/30/04	0.5	<2

Table #8
Geoprobe Monitoring Wells
GROUNDWATER ANALYTICAL RESULTS
Total Chromium and Hexavalent Chromium
Appleton Wire Former Albany International Chrome Plant
Appleton, Wisconsin

	08/01/04	0.6	N/A
	10/24/07	*11.0*	<2.0
	01/16/08	0.5	<.002
	04/23/08	2.6	<2.0
GMW-11	06/30/04	1.1	<2
	08/01/04	1.9	N/A
	10/24/07	3.6	<2.0
	01/16/08	5.6	<.002
	04/23/08	4.1	<2.0
Enforcement Standard, Chapter NR140		100.0	****
Preventive Action Limit, Chpater NR 140		10.0	****

EXPLANATION:

**** = Hexavalent Chromi not have a State G Groundwater Quality Standard.
However, Hexavalent Chromium is part of total chromium, which has a
State Groundwater Quality Standard.

N/A = Not Analyzed

ug/l = Microgram / Liter (ppb)

100 = Exceeds Enforcement Standards (ES), Chapter NR 140of the Wis. Admin. C

121 = Exceeds Preventive Action Limit (PAL), Chapter NR 140 of the Wis. Admin.

Figures

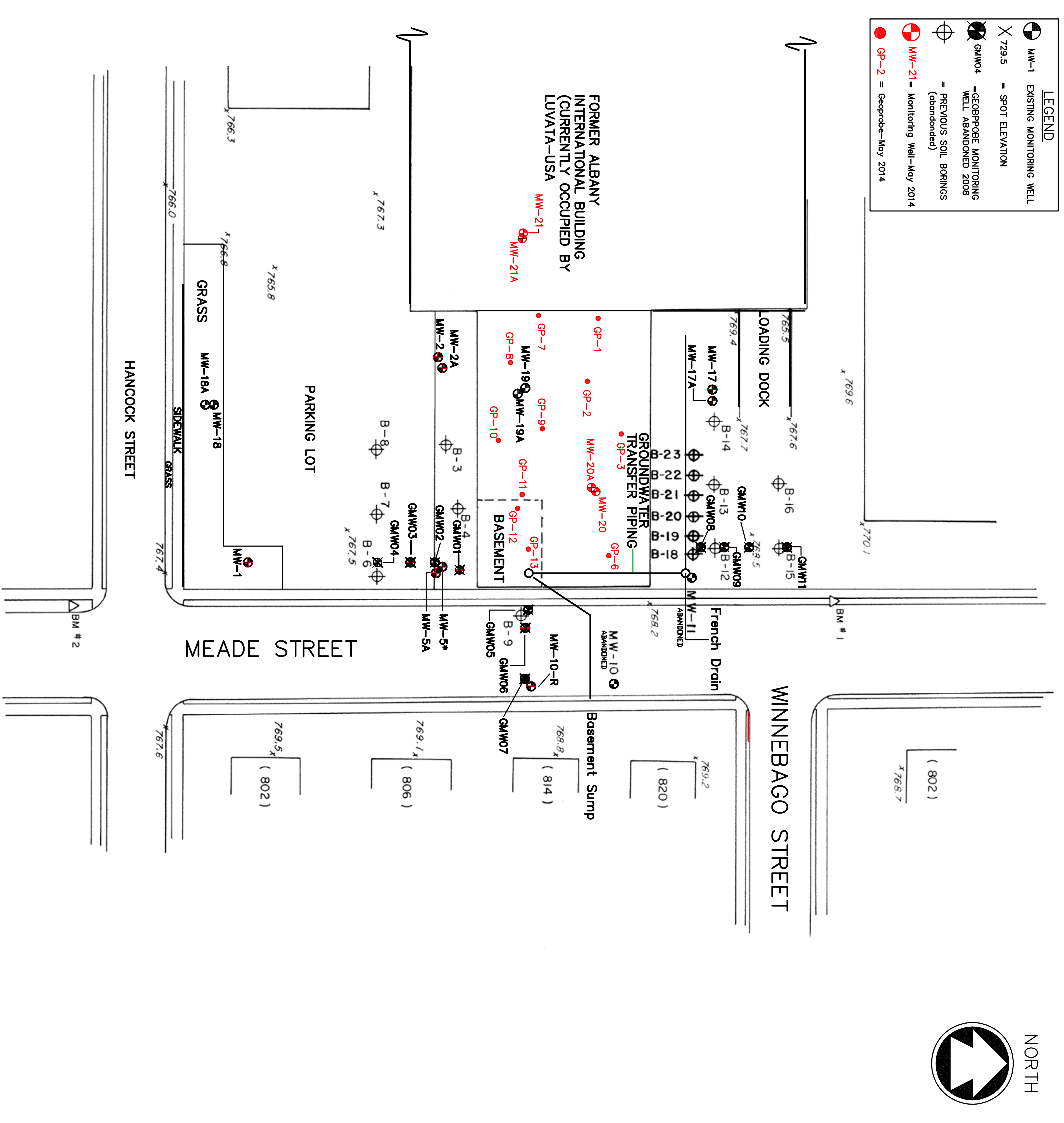


FIG. NO. 1

SCALE 1" = 60'
DATE 8/18/09
PROJECT NO. Appleton Wire Former Albany International Chrome Plant

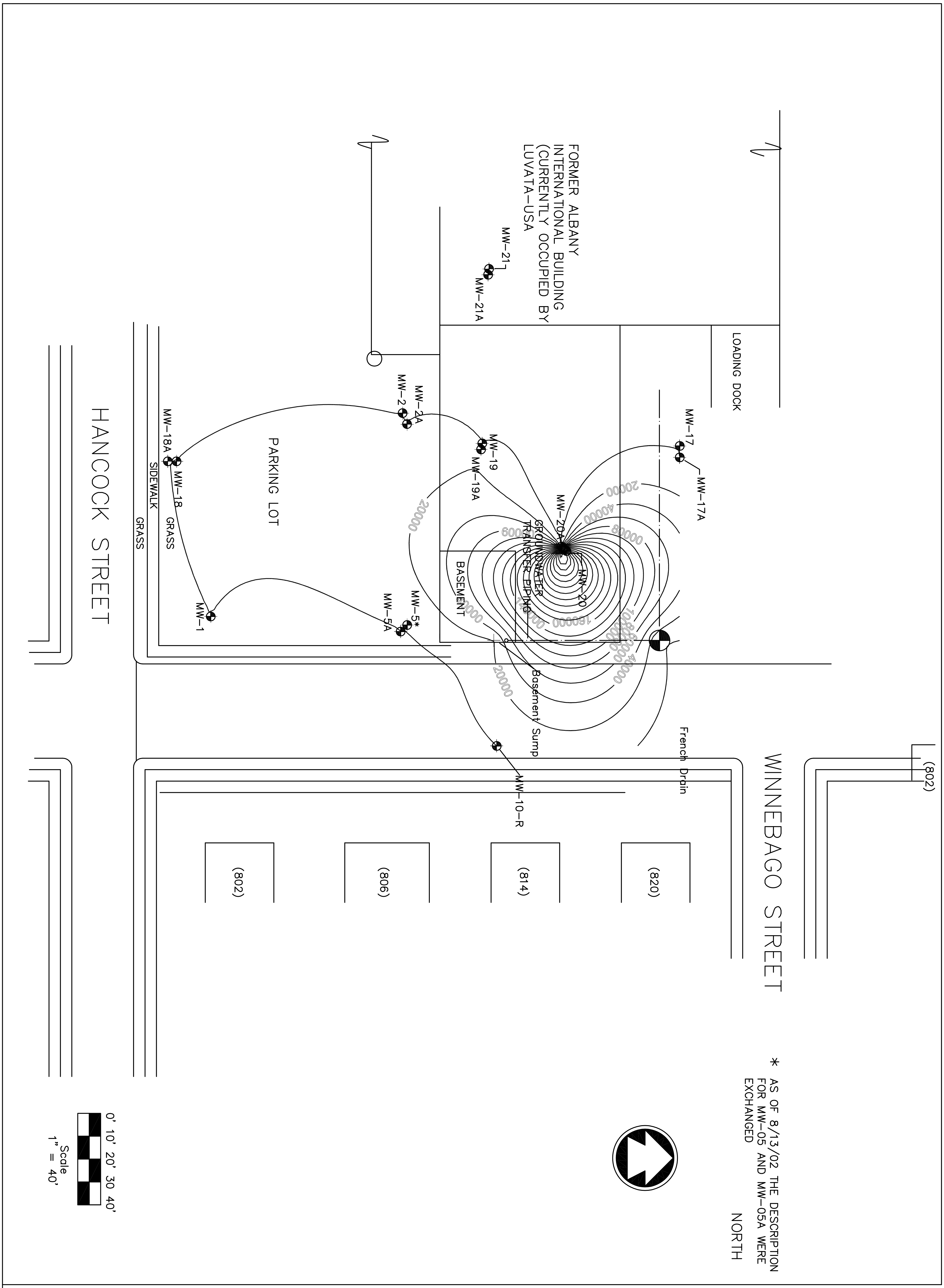
Appleton Wire Former Albany International Chrome Plant
Site Map with Monitoring Wells Locations

DESIGNED BY
DRAWN BY DJC
CHECKED BY DJC

This drawing developed from base drawing provided by AECOM/STS by Badger Laboratories and Engineering Co. Inc.

Badger Laboratories & Engineering Co. Inc.
501 W. Bell St., Neenah WI 54956
TEL: (920) 729-1100 FAX: (920) 729-4945

NO.	DATE	REVISION
		OVERLY 2005 AERIAL

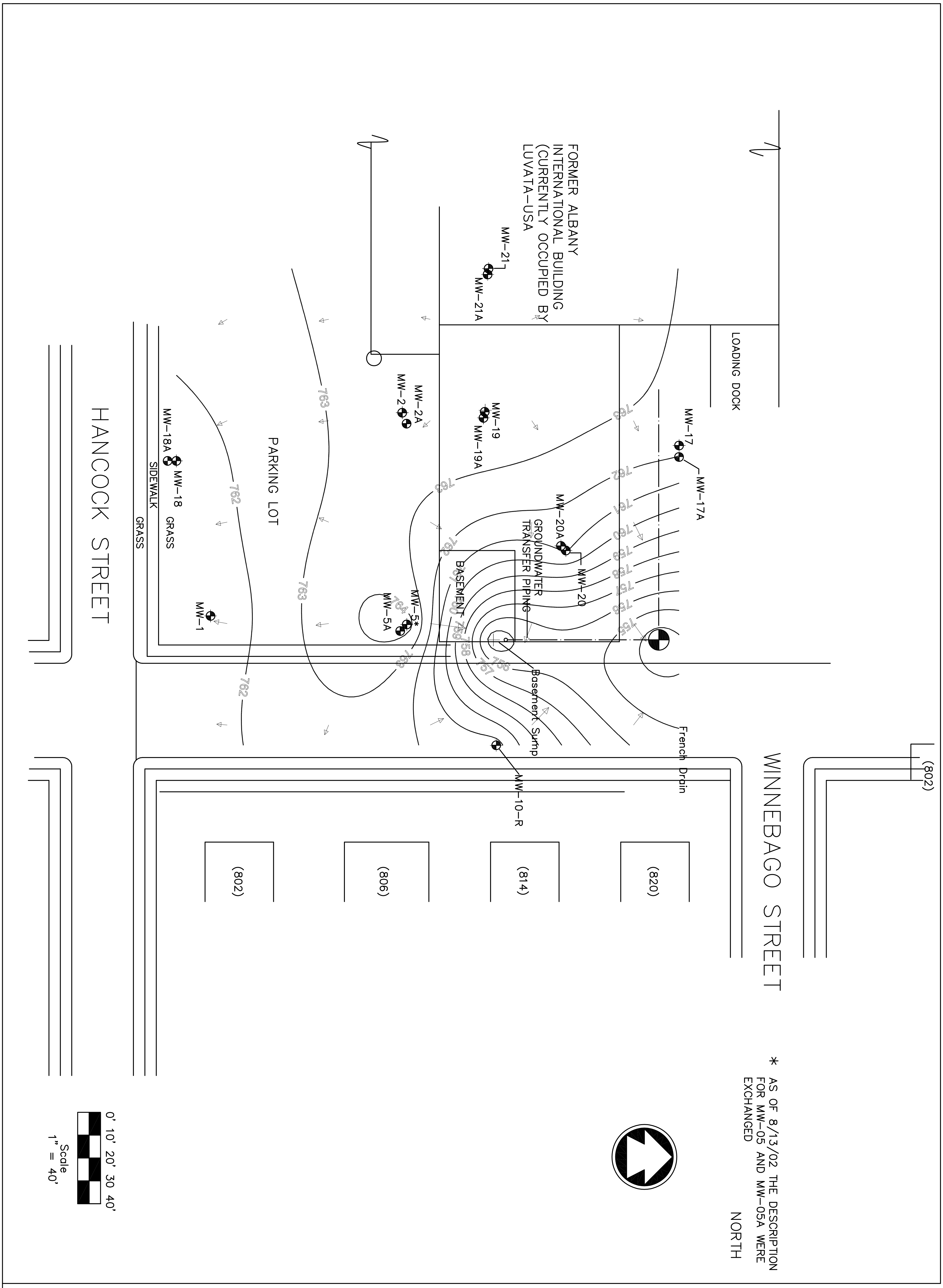


FILE NO.	FIGURE NO. 2	SCALE NO SCALE DATE 4/27/09 PROJECT NO. Albany Int. CrO2	Appleton Wire Former Albany International Chrome Plant April 14, 2016 Groundwater Total Chromium Isoconcentration Map (ug/l)	DESIGNED BY DRAWN BY DJC CHECKED BY KDC

This drawing developed from base drawing provided by McMahon Associates Inc. by Badger Laboratories and Engineering Co. Inc.

Badger Laboratories & Engineering Co. Inc.
501 W. Bell St., Neenah WI 54956
TEL: (920) 729-1100 FAX: (920) 729-4945

NO.	DATE	REVISION
	8/20/09	Overlay 2005 Arerial Photo



* AS OF 8/13/02 THE DESCRIPTION FOR MW-05 AND MW-05A WERE EXCHANGED

FILE NO.	FIGURE NO.
	3

SCALE
NO SCALE
DATE
4/27/09
PROJECT NO.
Albany Int. CrO2

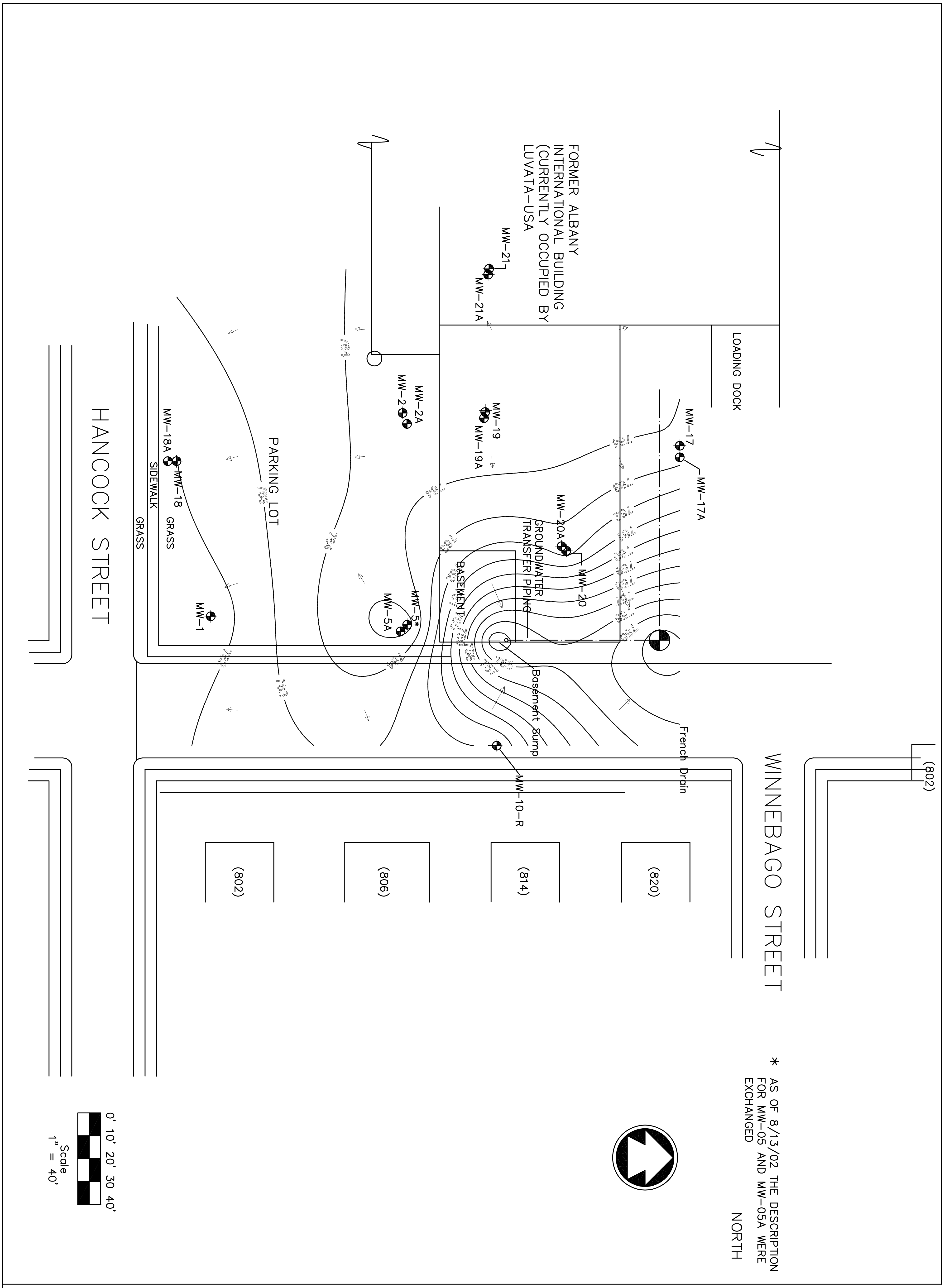
Appleton Wire
Former Albany International Chrome Plant
Groundwater Elevation Contours 1/21/2016

DESIGNED BY
DRAWN BY
DJC
CHECKED BY
KDC

This drawing developed from base drawing provided by McMahon Associates Inc. by Badger Laboratories and Engineering Co. Inc.

Badger Laboratories &
Engineering Co. Inc.
501 W. Bell St., Neenah WI 54956
TEL: (920) 729-1100 FAX: (920) 729-4945

NO.	DATE	REVISION
	8/20/09	Overlay 2005 Arerial Photo



FILE NO.	FIGURE NO. 4	SCALE NO SCALE DATE 4/27/09 PROJECT NO. Albany Int. Cr02	Appleton Wire Former Albany International Chrome Plant Groundwater Elevation Contours 4/14/16

DESIGNED BY	
DRAWN BY	DJC
CHECKED BY	KDC

This drawing developed from base drawing provided by McMahon Associates Inc. by Badger Laboratories and Engineering Co. Inc.

Badger Laboratories & Engineering Co. Inc.
501 W. Bell St., Neenah WI 54956
TEL: (920) 729-1100 FAX: (920) 729-4945

NO.	DATE	REVISION
	8/20/09	Overlay 2005 Arerial Photo

Disclaimer: This map is not guaranteed to be accurate, correct, current, or complete and conclusions drawn are the responsibility of the user.

NO.	DATE	REVISION
	5/28/08	Overlay 2005 Aerial Photo

Badger Laboratories &
Engineering Co. Inc.
501 W. Bell St., Neenah WI 54956
TEL: (920) 729-1100 FAX: (920) 729-4946

This drawing developed from base drawing provided by McMahon Associates Inc. by Badger Laboratories and Engineering Co. Inc.

DESIGNED BY
DRAWN BY DJG
CHECKED BY MDG

Appleton Wire
Former Albany International Chrome Plant
Site Layout on 2005 Aerial Photo

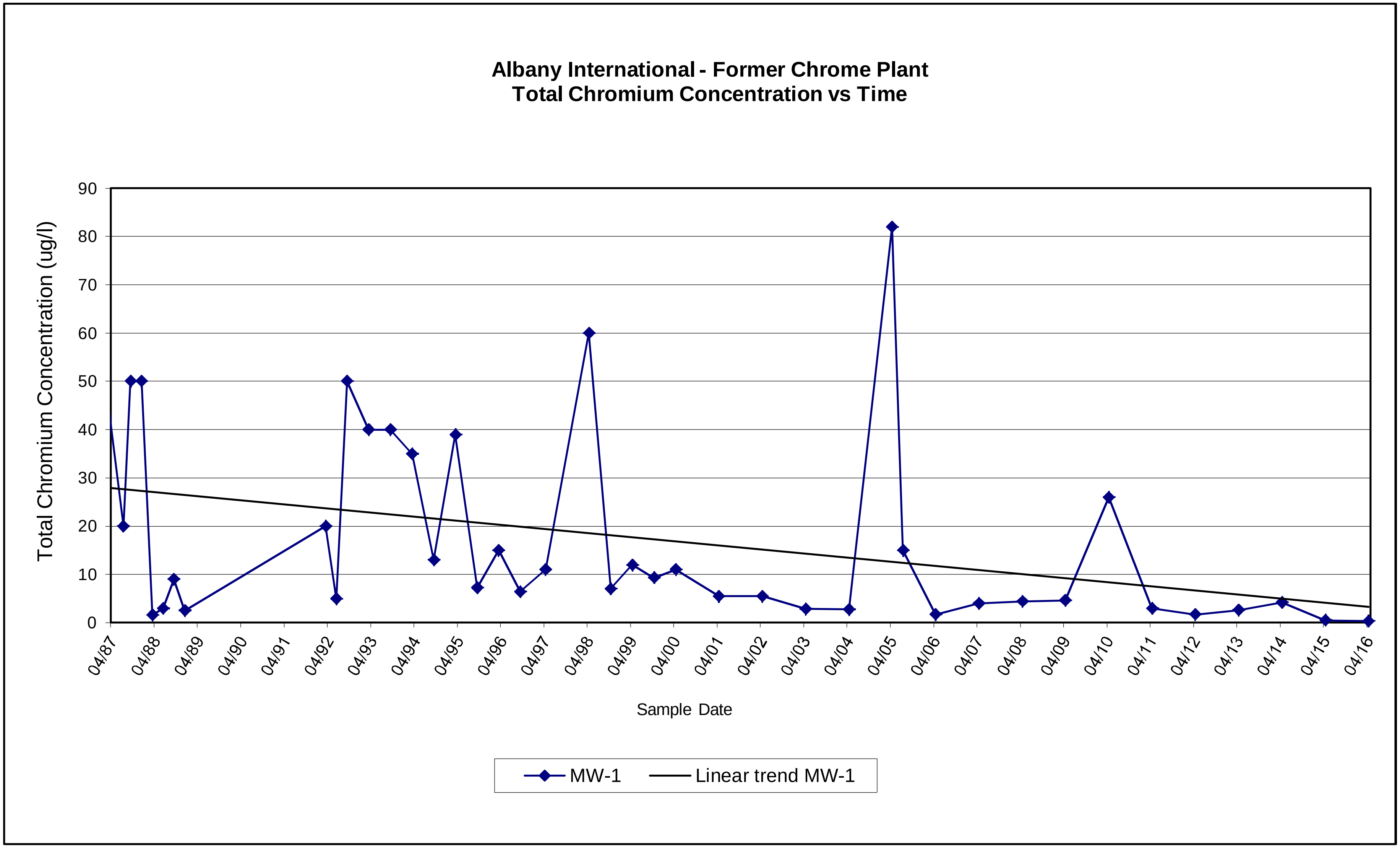
SCALE 1" = 40'
DATE 4/27/08
PROJECT NO. Albany Int. ChOR

FIGURE NO.
5

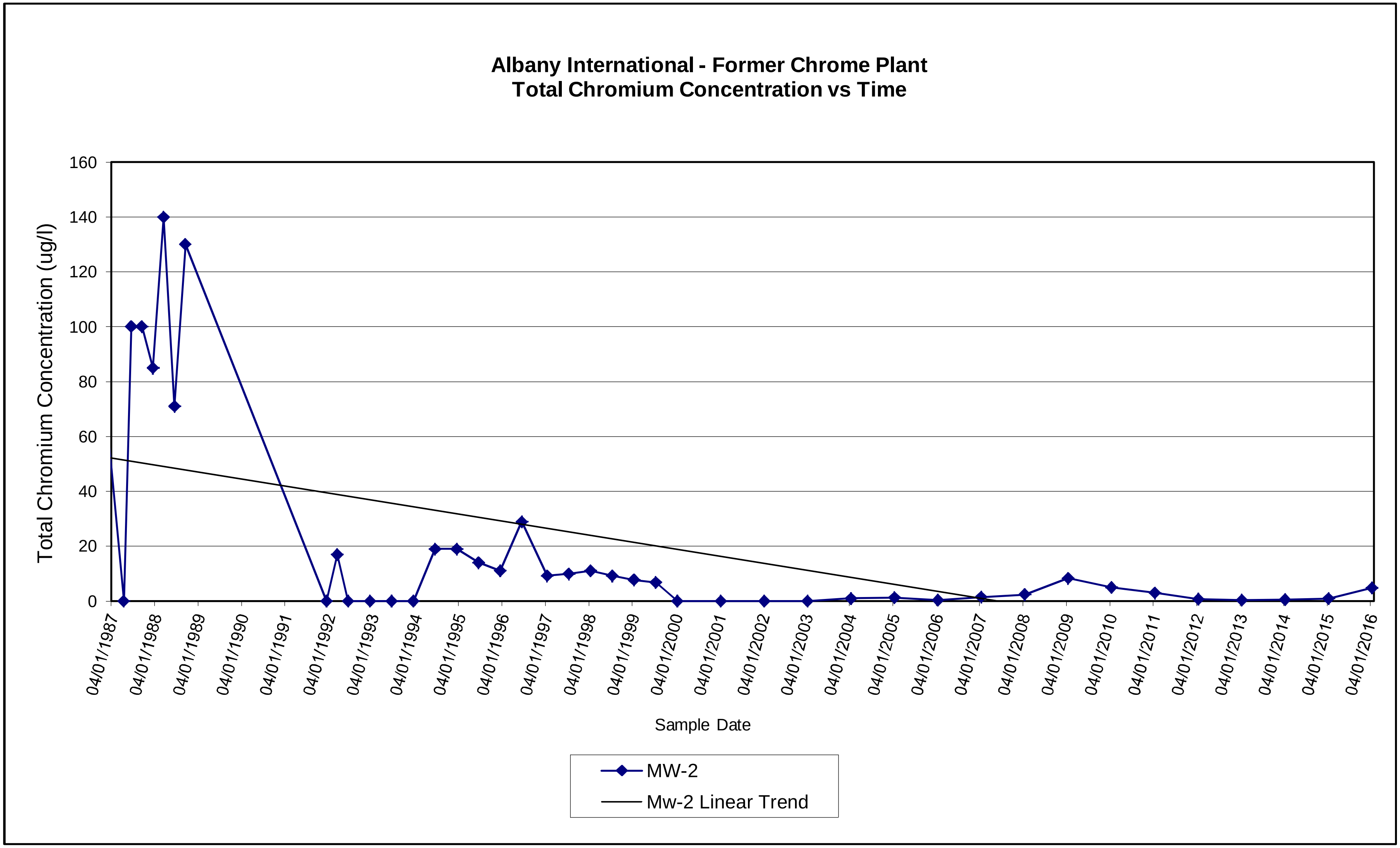
FILE NO.

APPENDIX A

Concentration Versus Time Graphs – All Wells, Sump and French Drain

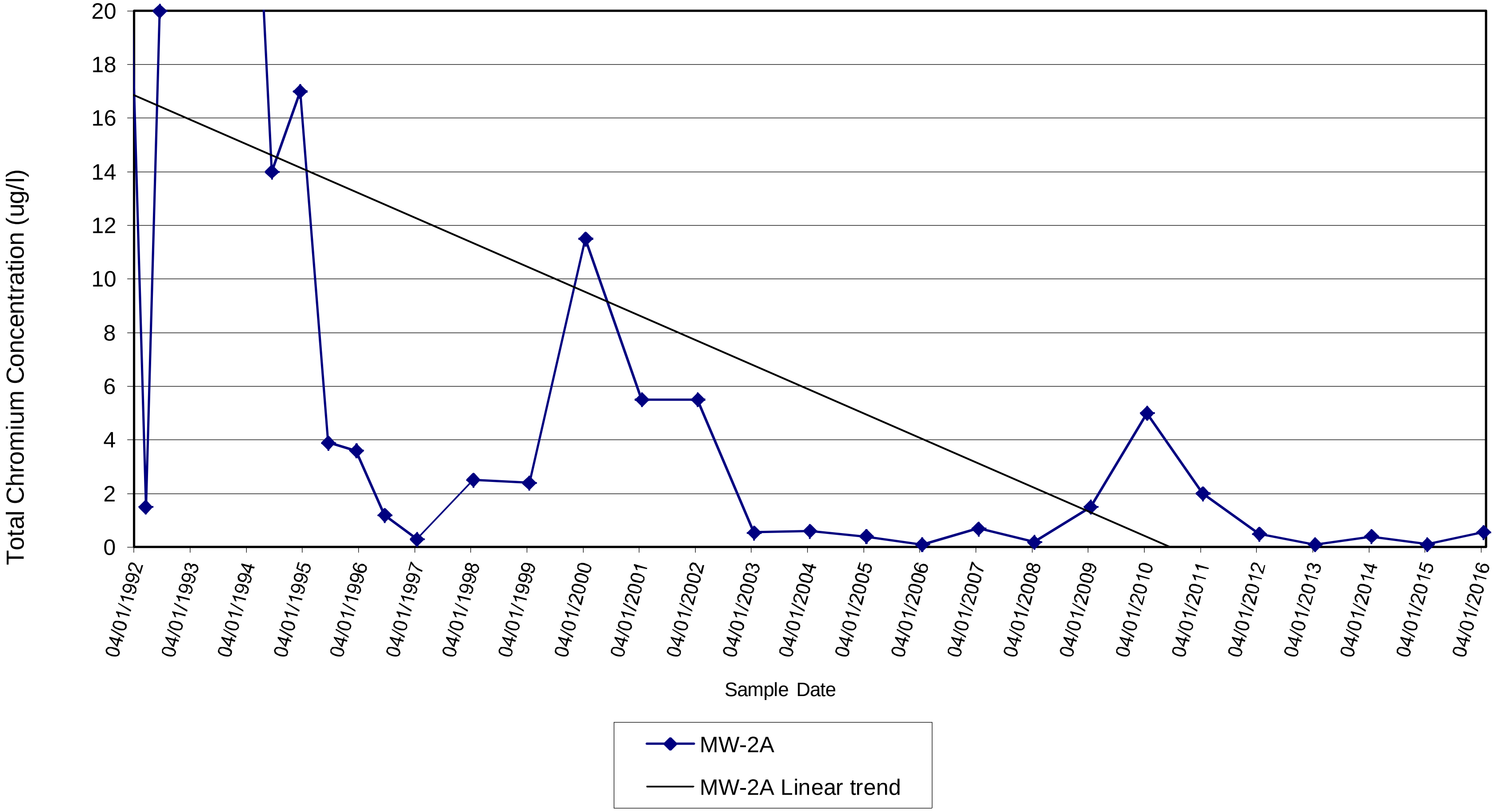


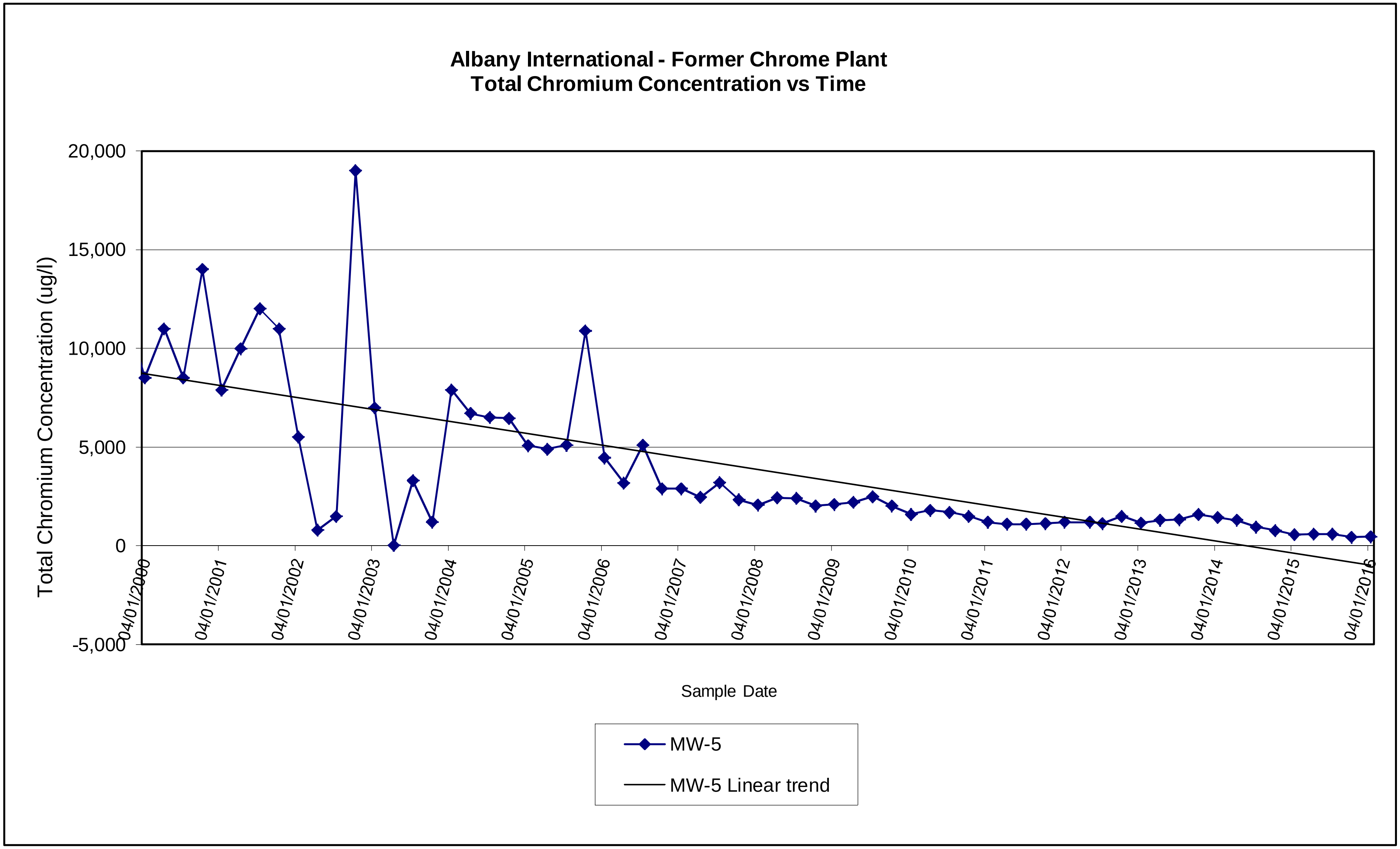
Albany International - Former Chrome Plant
Total Chromium Concentration vs Time

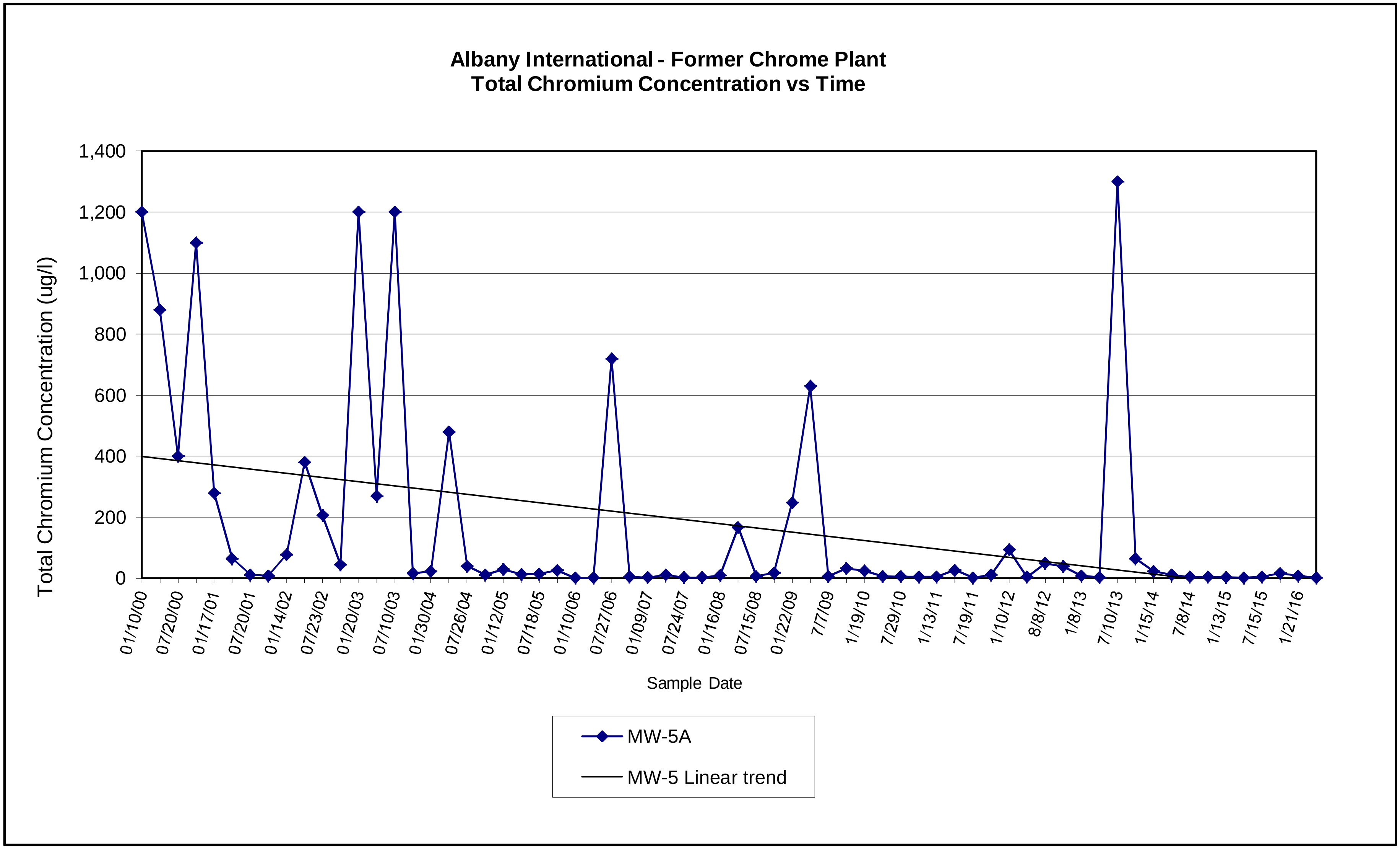


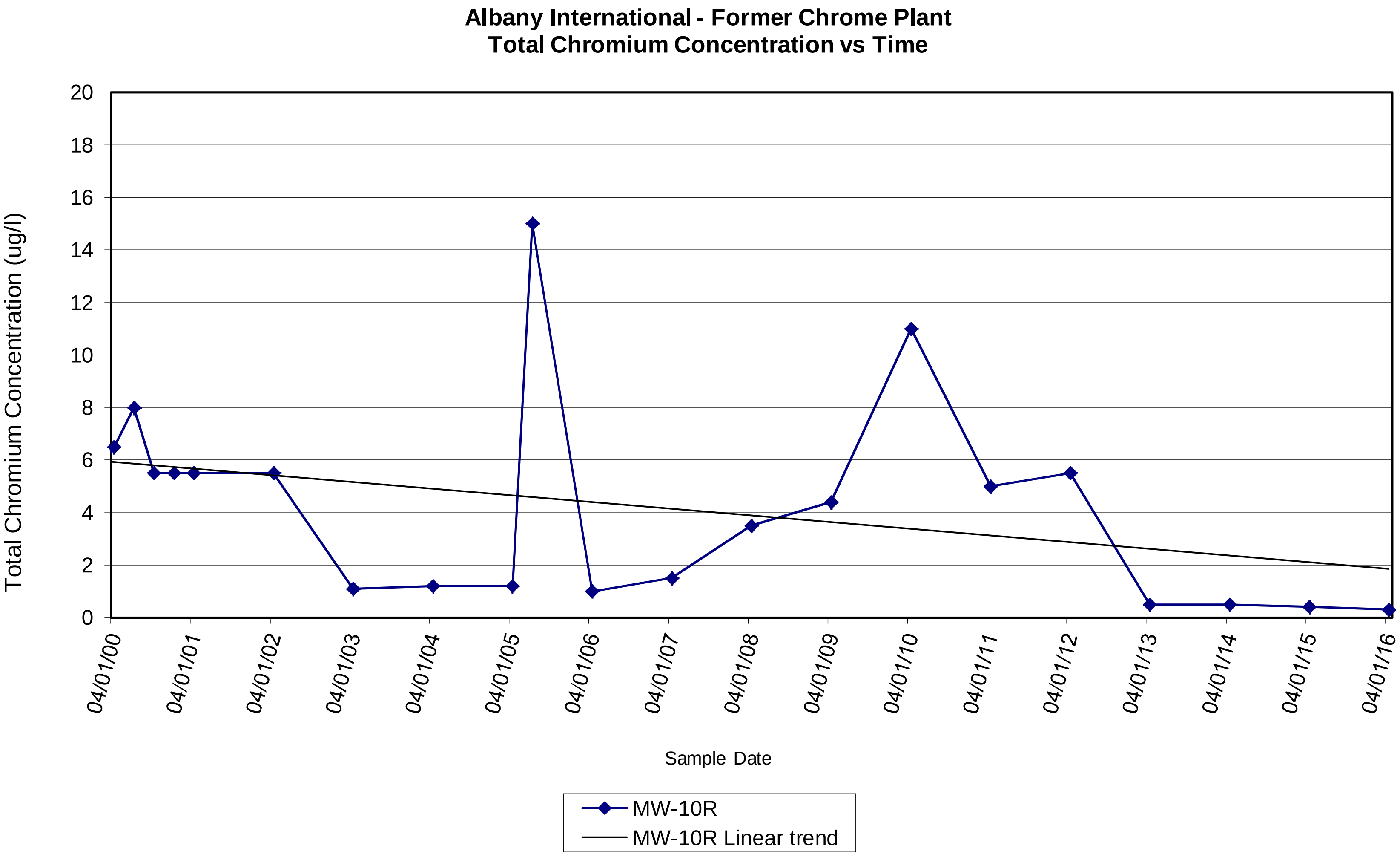
Albany International - Former Chrome Plant
Total Chromium Concentration vs Time

Albany International - Former Chrome Plant
Total Chromium Concentration vs Time

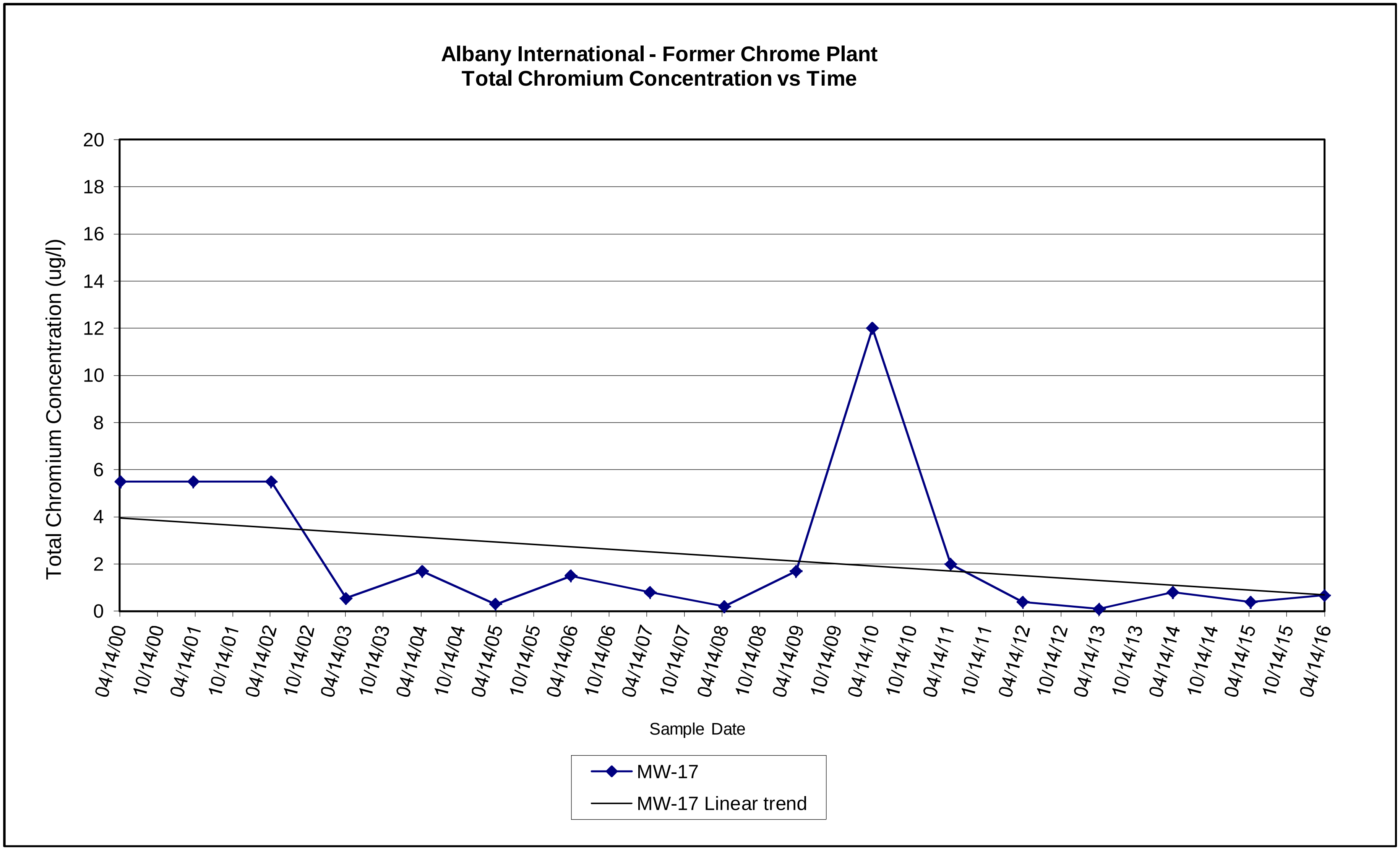


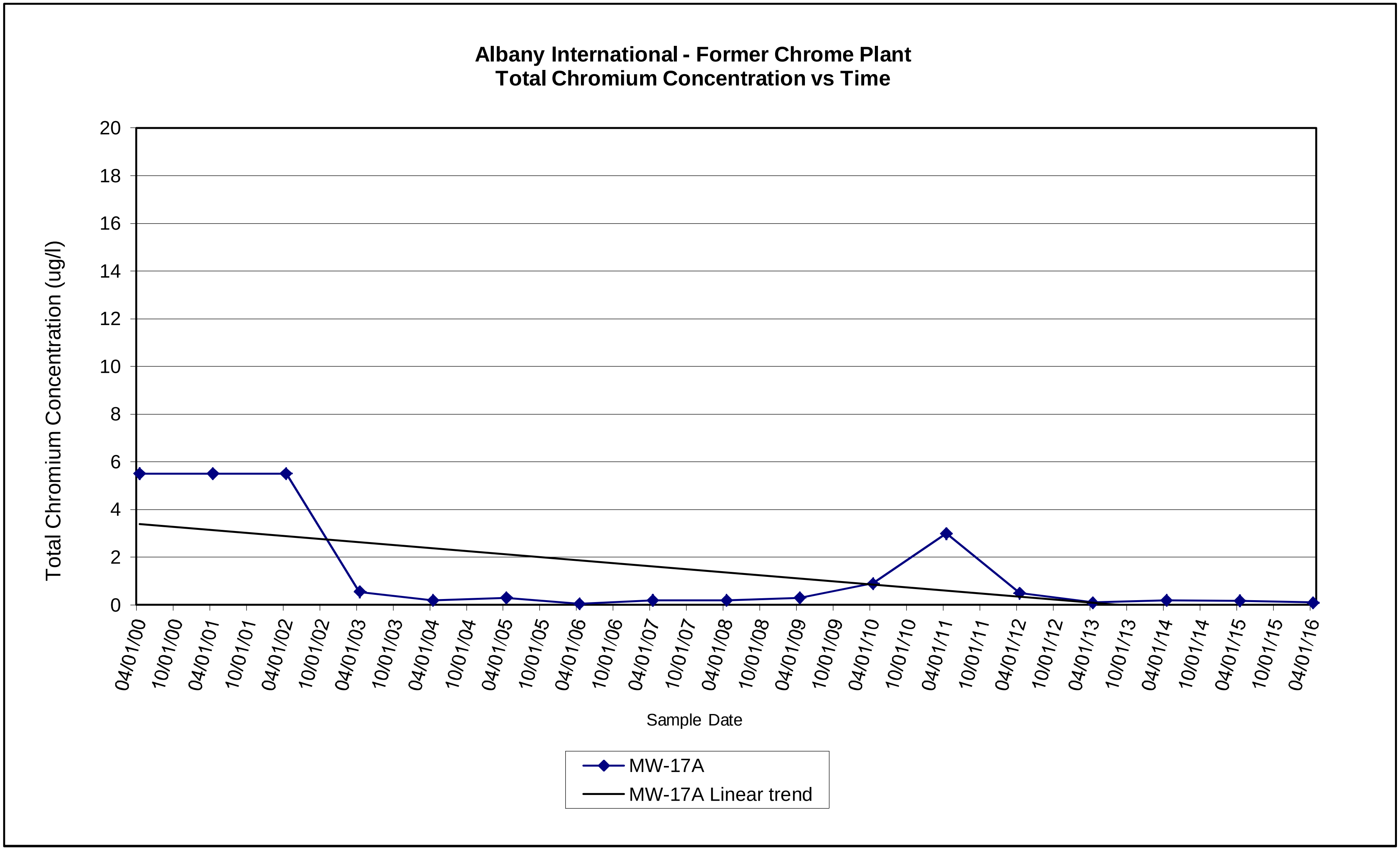

Albany International - Former Chrome Plant
Total Chromium Concentration vs Time
Total Chromium Concentration (ug/l)
20,000
15,000
10,000
5,000
0
-5,000
04/01/2000
04/01/2001
04/01/2002
04/01/2003
04/01/2004
04/01/2005
04/01/2006
04/01/2007
04/01/2008
04/01/2009
04/01/2010
04/01/2011
04/01/2012
04/01/2013
04/01/2014
04/01/2015
04/01/2016
Sample Date
MW-5
MW-5 Linear trend


Albany International - Former Chrome Plant
Total Chromium Concentration vs Time
Total Chromium Concentration (ug/l)
1,400
1,200
1,000
800
600
400
200
0
01/10/00
07/20/00
01/17/01
07/20/01
01/14/02
07/23/02
01/20/03
07/10/03
01/30/04
07/26/04
01/12/05
07/18/05
01/10/06
07/27/06
01/09/07
07/24/07
01/16/08
07/15/08
01/22/09
7/7/09
1/19/10
7/29/10
1/13/11
7/19/11
1/10/12
8/8/12
1/8/13
7/10/13
1/15/14
7/8/14
1/13/15
7/15/15
1/21/16
Sample Date
MW-5A
MW-5 Linear trend

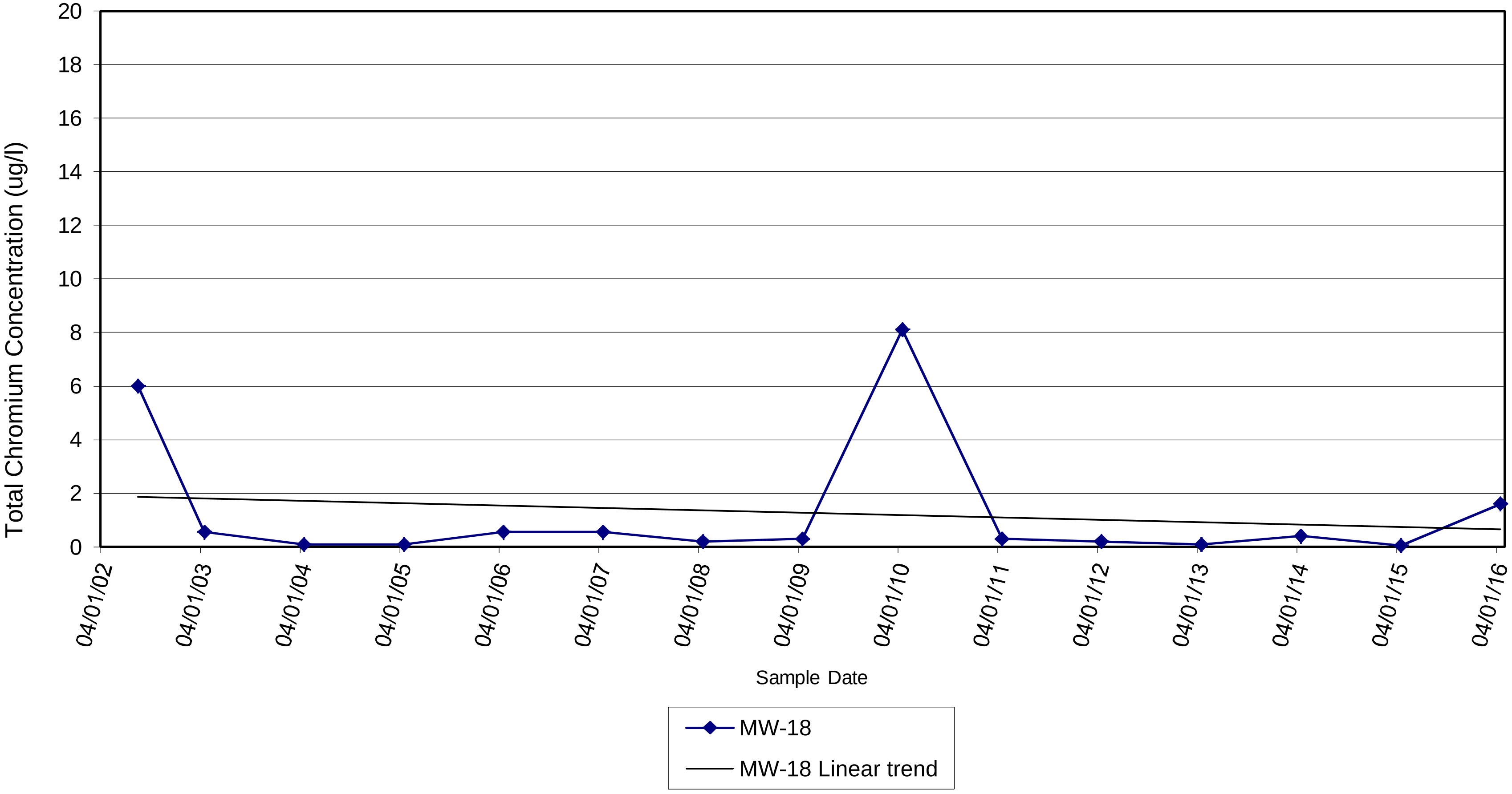


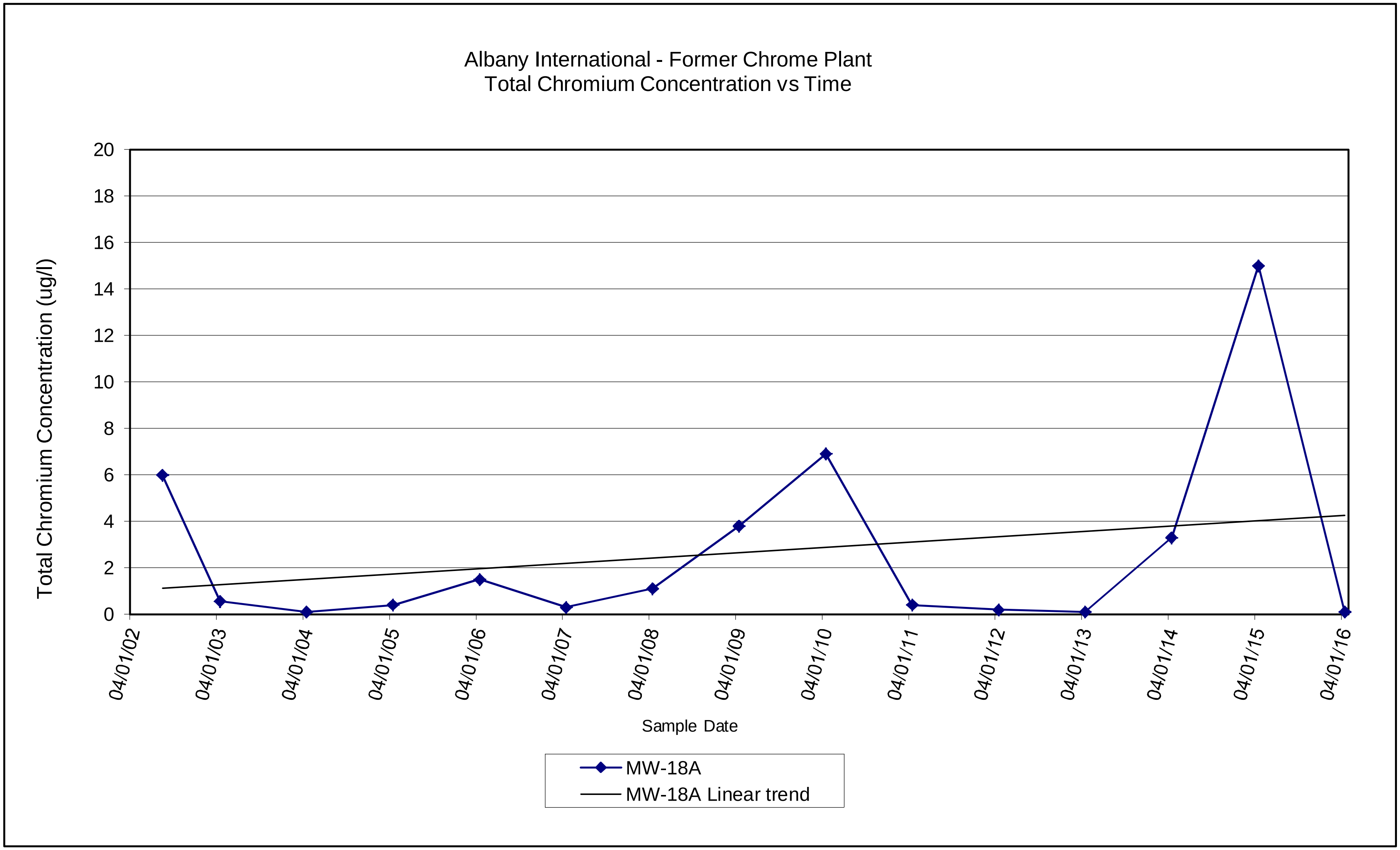
Albany International - Former Chrome Plant
Total Chromium Concentration vs Time
Total Chromium Concentration (ug/l)
20
18
16
14
12
10
8
6
4
2
0
04/01/00
04/01/01
04/01/02
04/01/03
04/01/04
04/01/05
04/01/06
04/01/07
04/01/08
04/01/09
04/01/10
04/01/11
04/01/12
04/01/13
04/01/14
04/01/15
04/01/16
Sample Date
MW-10R
MW-10R Linear trend

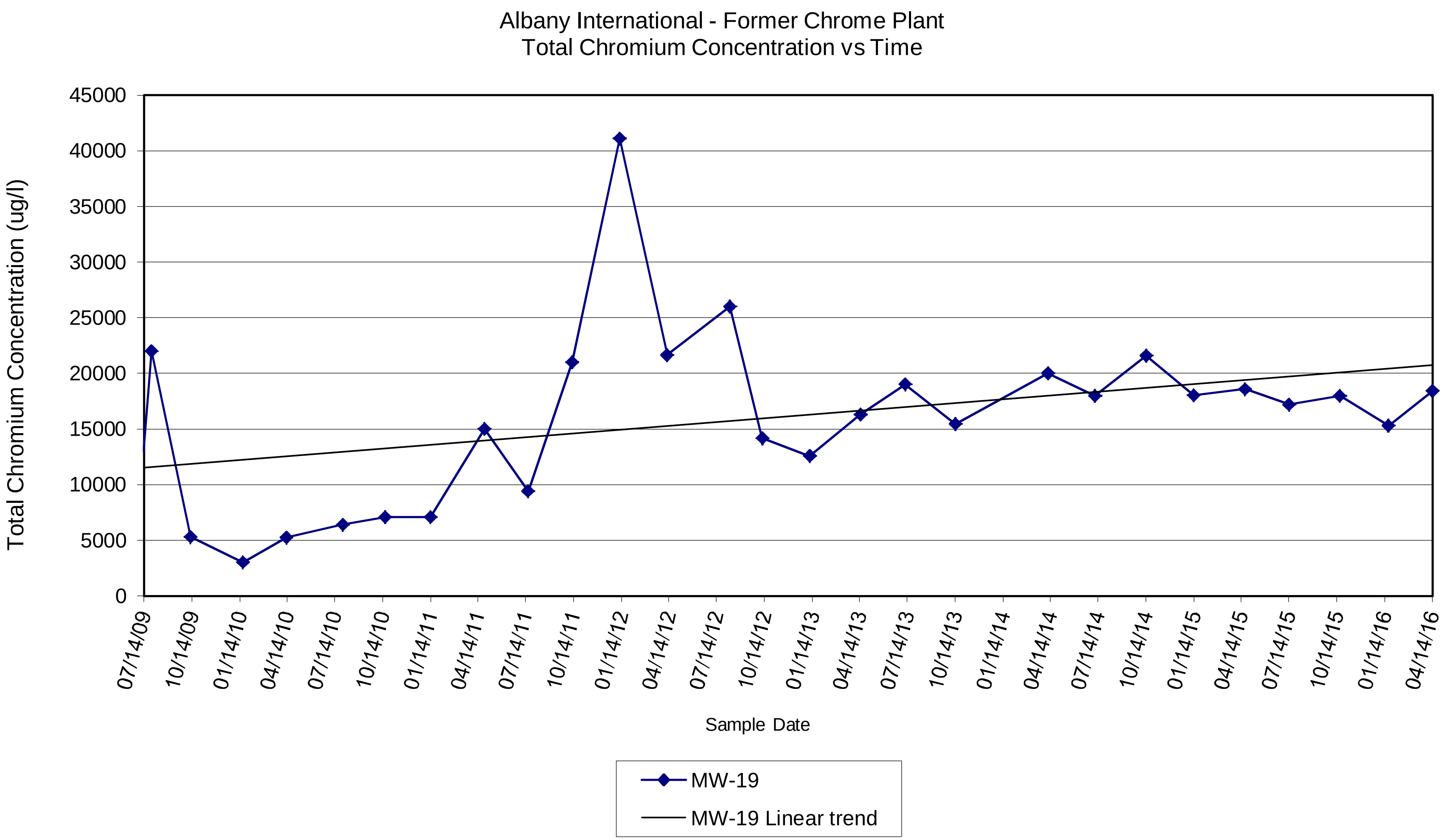

Albany International - Former Chrome Plant
Total Chromium Concentration vs Time
Total Chromium Concentration (ug/l)
20
18
16
14
12
10
8
6
4
2
0
04/14/00
10/14/00
04/14/01
10/14/01
04/14/02
10/14/02
04/14/03
10/14/03
04/14/04
10/14/04
04/14/05
10/14/05
04/14/06
10/14/06
04/14/07
10/14/07
04/14/08
10/14/08
04/14/09
10/14/09
04/14/10
10/14/10
04/14/11
10/14/11
04/14/12
10/14/12
04/14/13
10/14/13
04/14/14
10/14/14
04/14/15
10/14/15
04/14/16
Sample Date
MW-17
MW-17 Linear trend

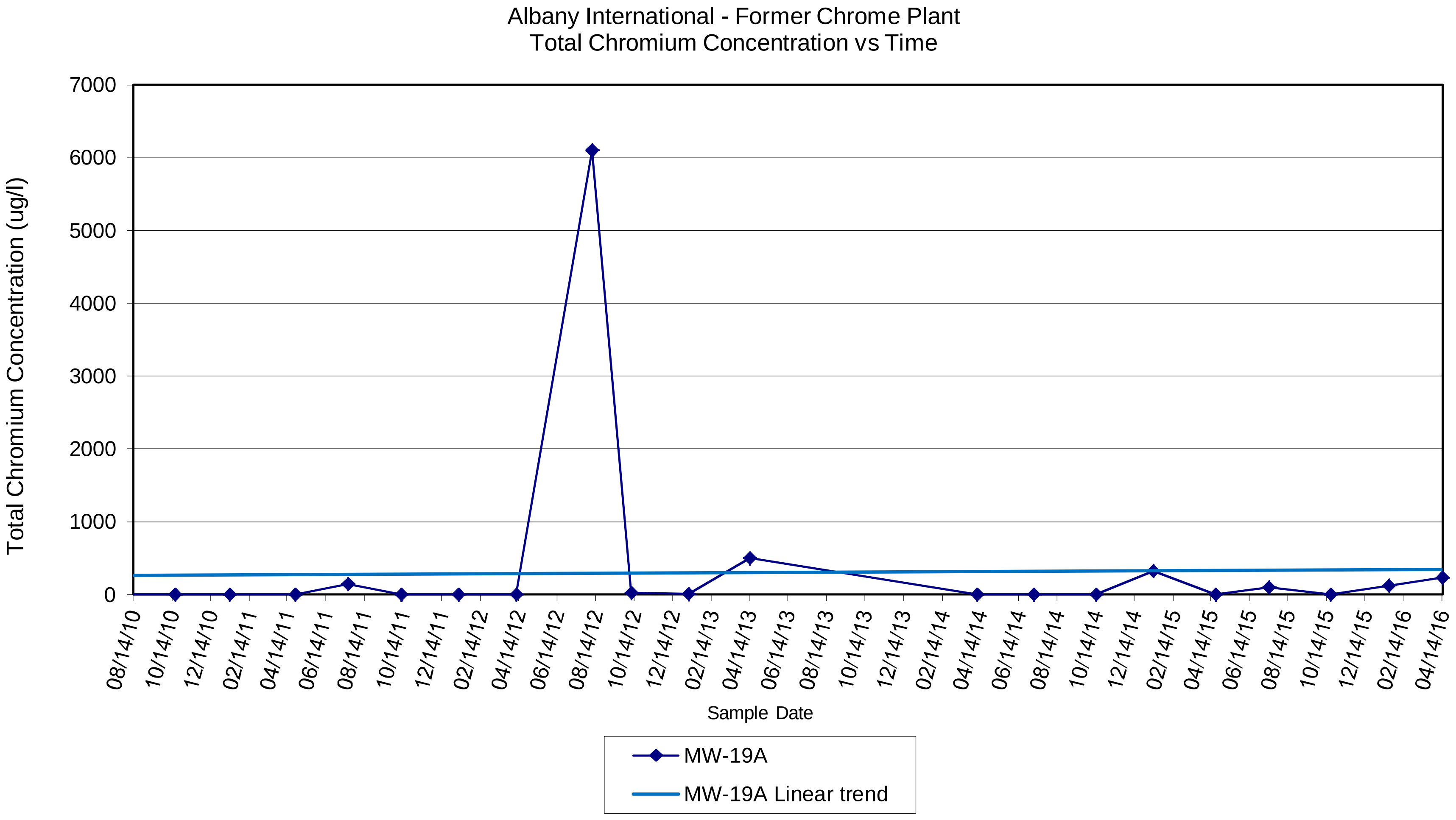


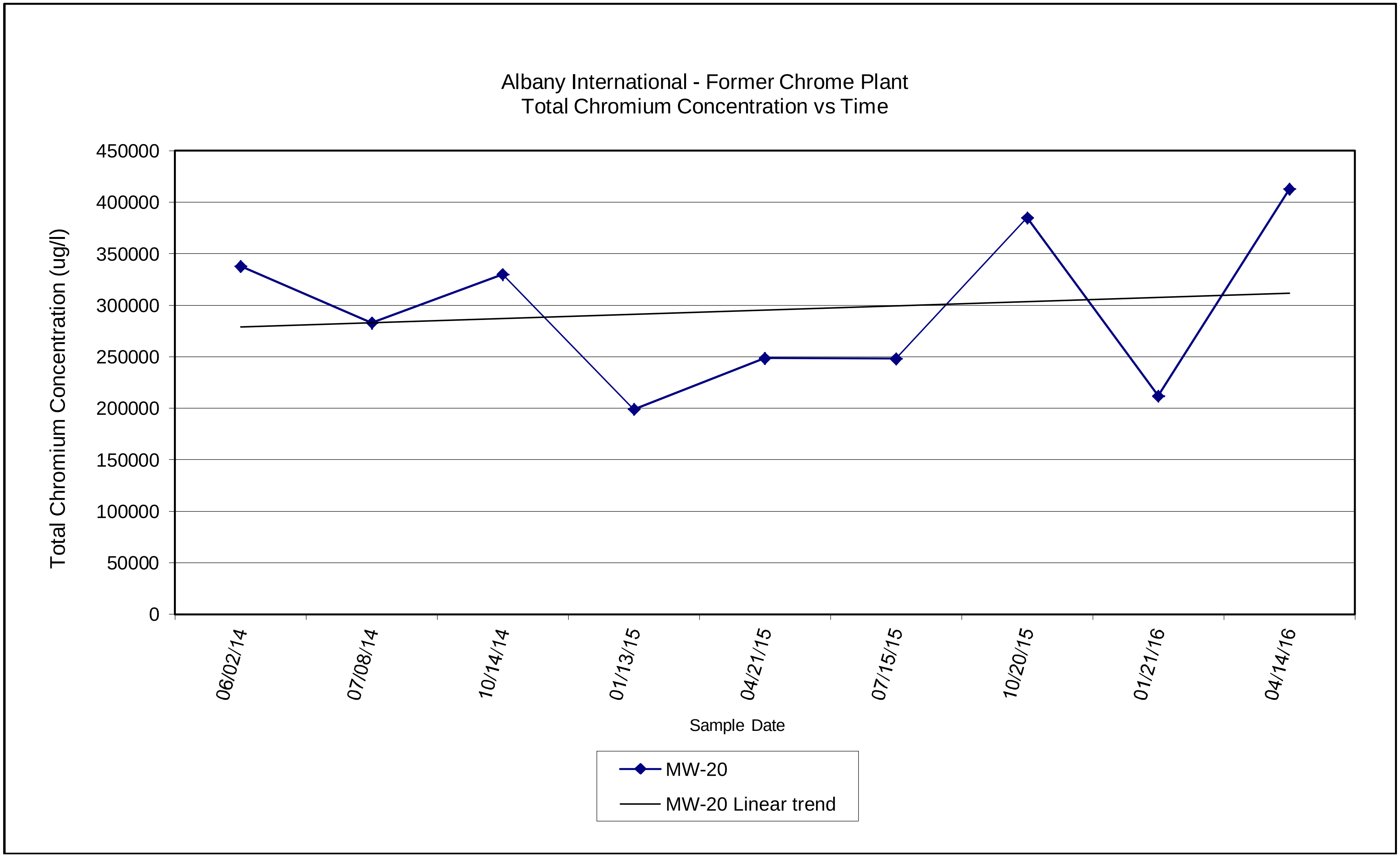
Albany International - Former Chrome Plant
Total Chromium Concentration vs Time

Albany International - Former Chrome Plant
Total Chromium Concentration vs Time
Total Chromium Concentration (ug/l)
20
18
16
14
12
10
8
6
4
2
0
04/01/02
04/01/03
04/01/04
04/01/05
04/01/06
04/01/07
04/01/08
04/01/09
04/01/10
04/01/11
04/01/12
04/01/13
04/01/14
04/01/15
04/01/16
Sample Date
MW-18
MW-18 Linear trend

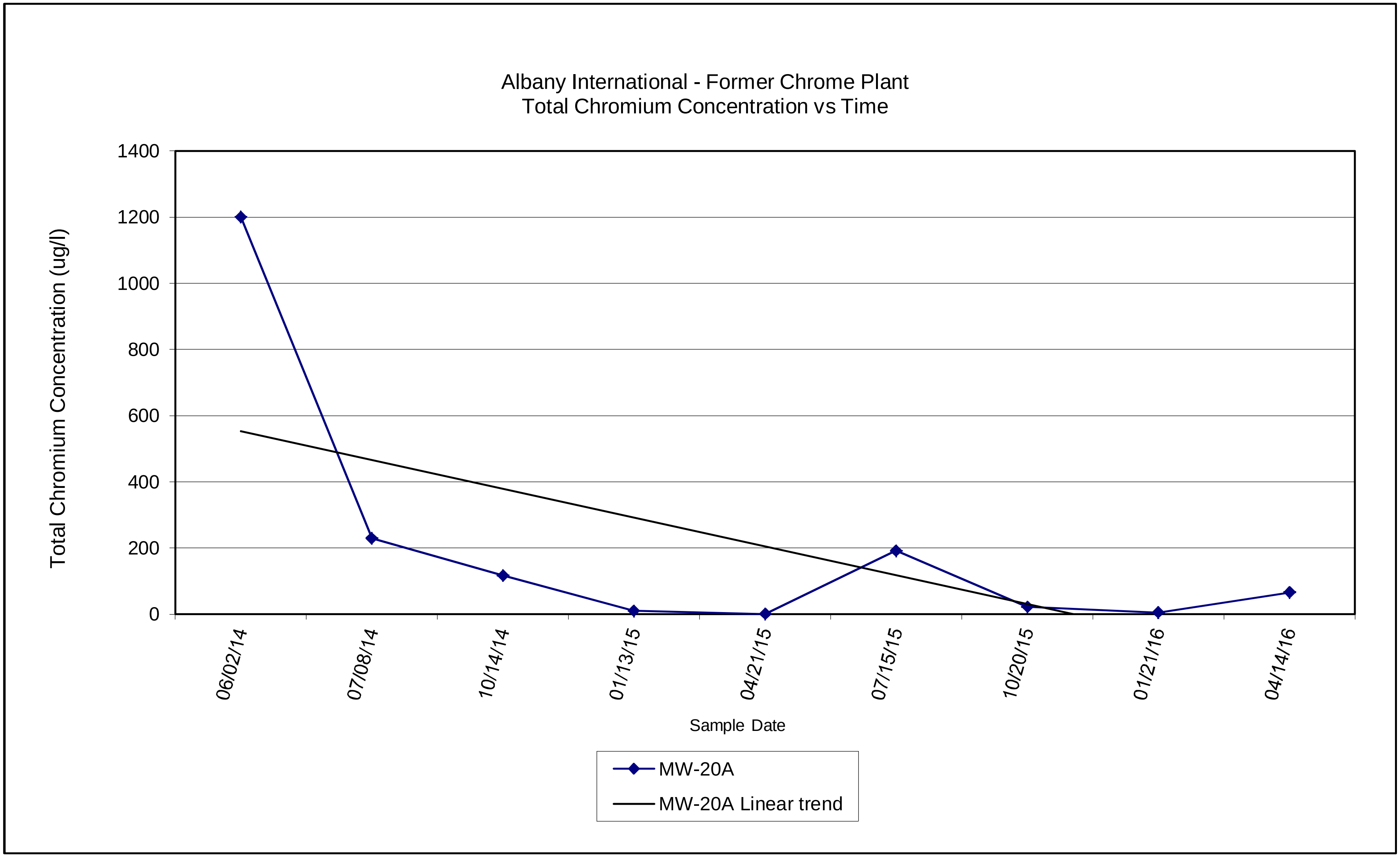

Albany International - Former Chrome Plant
Total Chromium Concentration vs Time
Total Chromium Concentration (ug/l)
20
18
16
14
12
10
8
6
4
2
0
04/01/02
04/01/03
04/01/04
04/01/05
04/01/06
04/01/07
04/01/08
04/01/09
04/01/10
04/01/11
04/01/12
04/01/13
04/01/14
04/01/15
04/01/16
Sample Date
MW-18A
MW-18A Linear trend

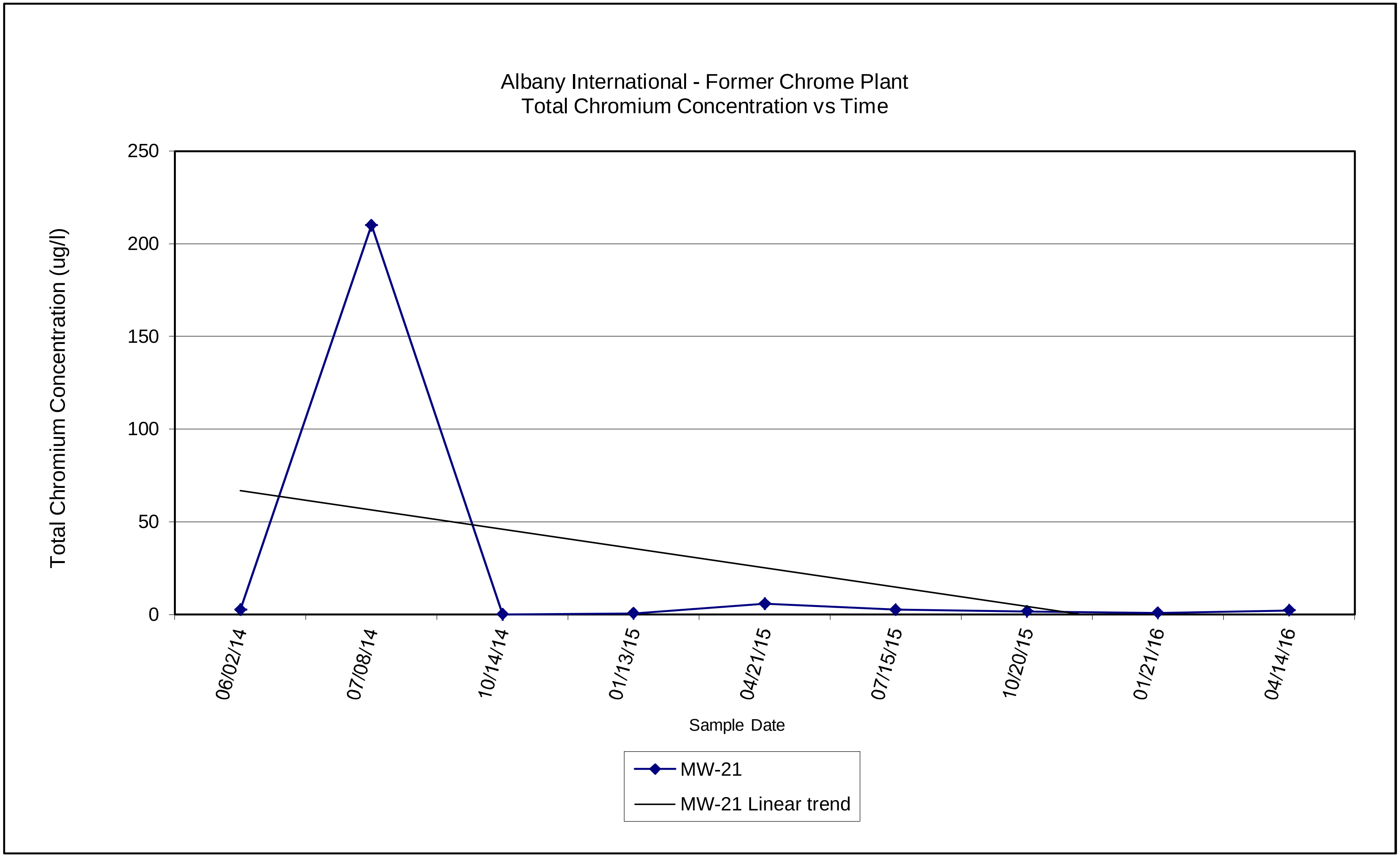

Albany International - Former Chrome Plant
Total Chromium Concentration vs Time
Total Chromium Concentration (ug/l)
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
07/14/09
10/14/09
01/14/10
04/14/10
07/14/10
10/14/10
01/14/11
04/14/11
07/14/11
10/14/11
01/14/12
04/14/12
07/14/12
10/14/12
01/14/13
04/14/13
07/14/13
10/14/13
01/14/14
04/14/14
07/14/14
10/14/14
01/14/15
04/14/15
07/14/15
10/14/15
01/14/16
04/14/16
Sample Date
MW-19
MW-19 Linear trend

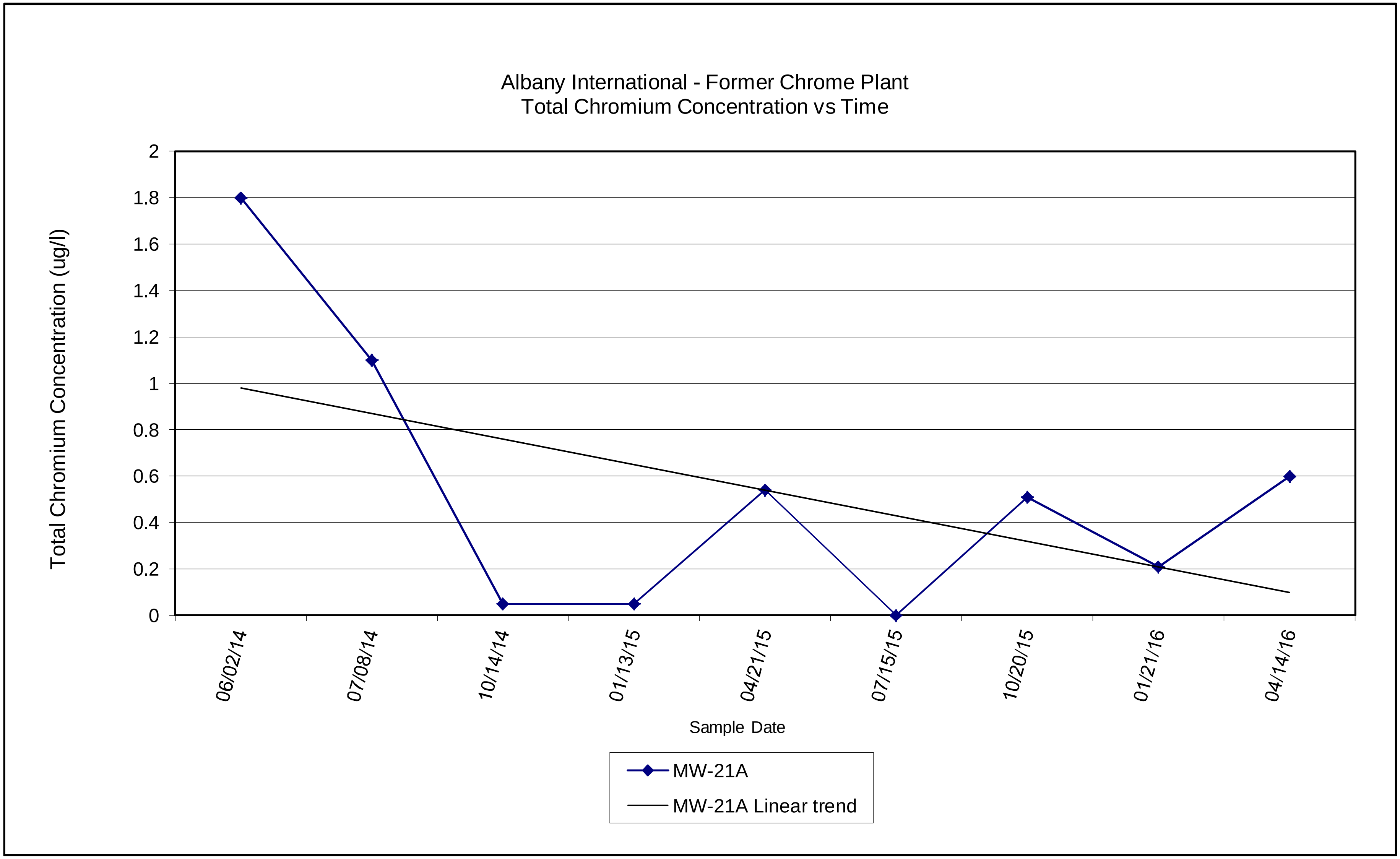

Albany International - Former Chrome Plant
Total Chromium Concentration vs Time
Total Chromium Concentration (ug/l)
7000
6000
5000
4000
3000
2000
1000
0
08/14/10
10/14/10
12/14/10
02/14/11
04/14/11
06/14/11
08/14/11
10/14/11
12/14/11
02/14/12
04/14/12
06/14/12
08/14/12
10/14/12
12/14/12
02/14/13
04/14/13
06/14/13
08/14/13
10/14/13
12/14/13
02/14/14
04/14/14
06/14/14
08/14/14
10/14/14
12/14/14
02/14/15
04/14/15
06/14/15
08/14/15
10/14/15
12/14/15
02/14/16
04/14/16
Sample Date
MW-19A
MW-19A Linear trend

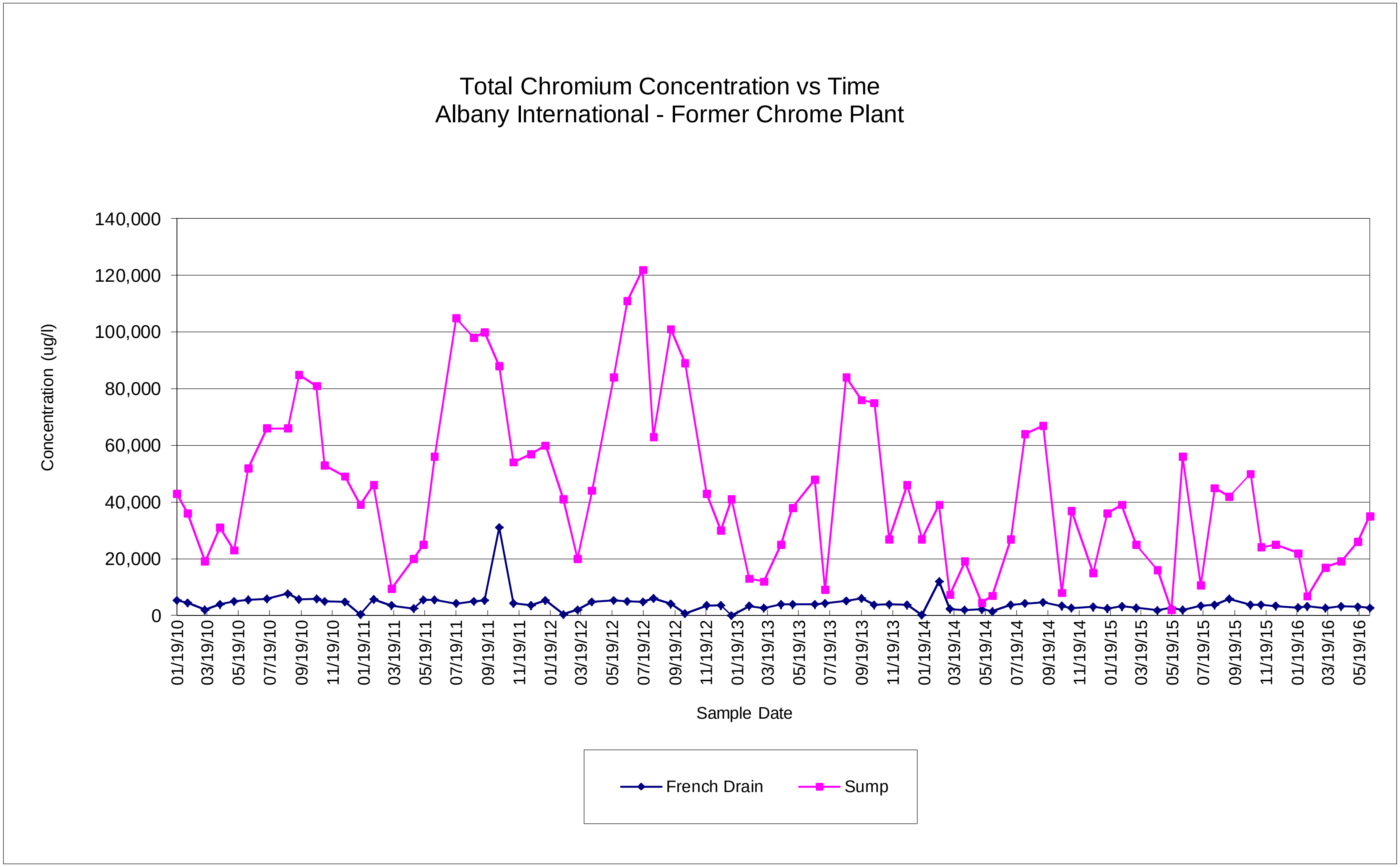


Albany International - Former Chrome Plant
Total Chromium Concentration vs Time
Total Chromium Concentration (ug/l)
450000
400000
350000
300000
250000
200000
150000
100000
50000
0
06/02/14
07/08/14
10/14/14
01/13/15
04/21/15
07/15/15
10/20/15
01/21/16
04/14/16
Sample Date
MW-20
MW-20 Linear trend


Albany International - Former Chrome Plant
Total Chromium Concentration vs Time
Total Chromium Concentration (ug/l)
1400
1200
1000
800
600
400
200
0
06/02/14
07/08/14
10/14/14
01/13/15
04/21/15
07/15/15
10/20/15
01/21/16
04/14/16
Sample Date
MW-20A
MW-20A Linear trend

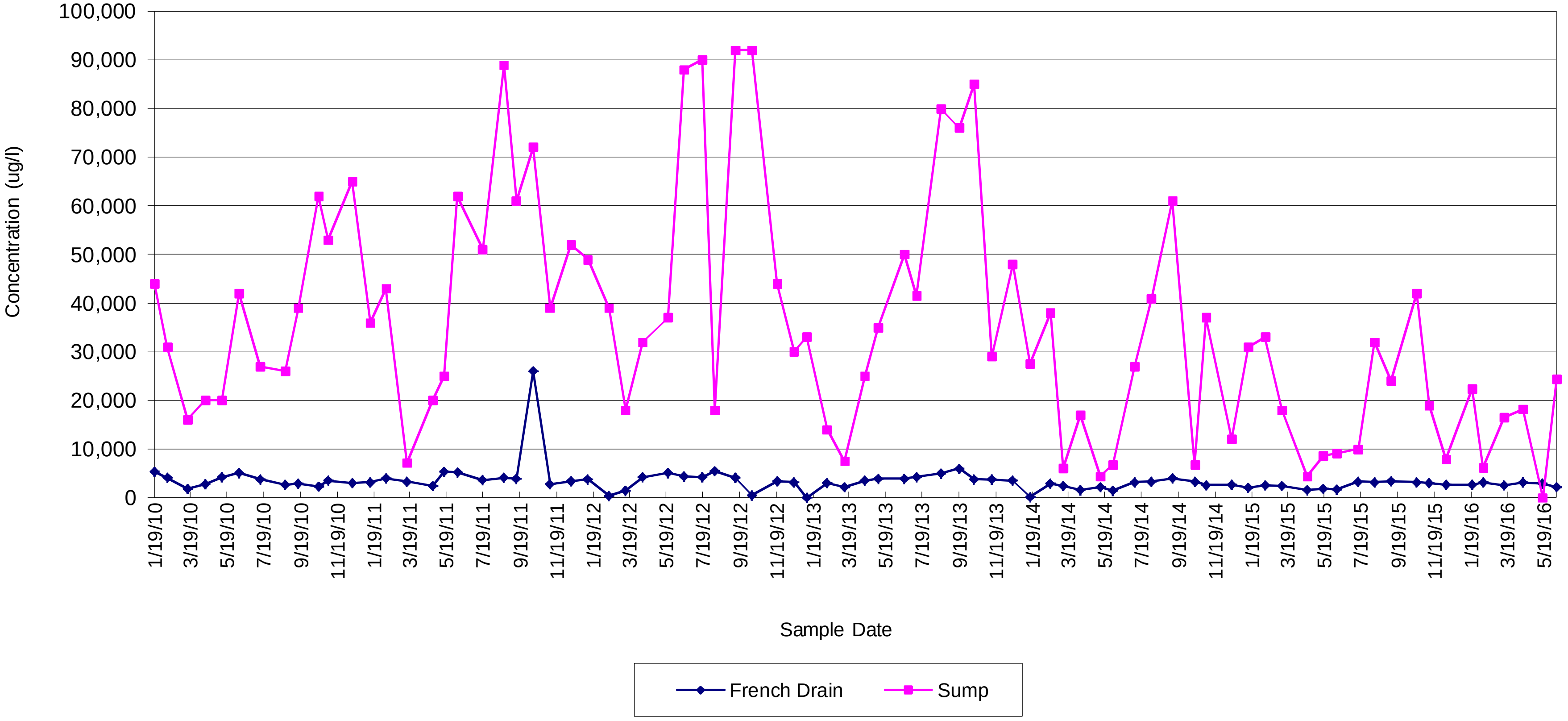

Albany International - Former Chrome Plant
Total Chromium Concentration vs Time
Total Chromium Concentration (ug/l)
250
200
150
100
50
0
06/02/14
07/08/14
10/14/14
01/13/15
04/21/15
07/15/15
10/20/15
01/21/16
04/14/16
Sample Date
MW-21
MW-21 Linear trend


Albany International - Former Chrome Plant
Total Chromium Concentration vs Time
Total Chromium Concentration (ug/l)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
06/02/14
07/08/14
10/14/14
01/13/15
04/21/15
07/15/15
10/20/15
01/21/16
04/14/16
Sample Date
MW-21A
MW-21A Linear trend



Total Chromium Concentration vs Time
Albany International - Former Chrome Plant

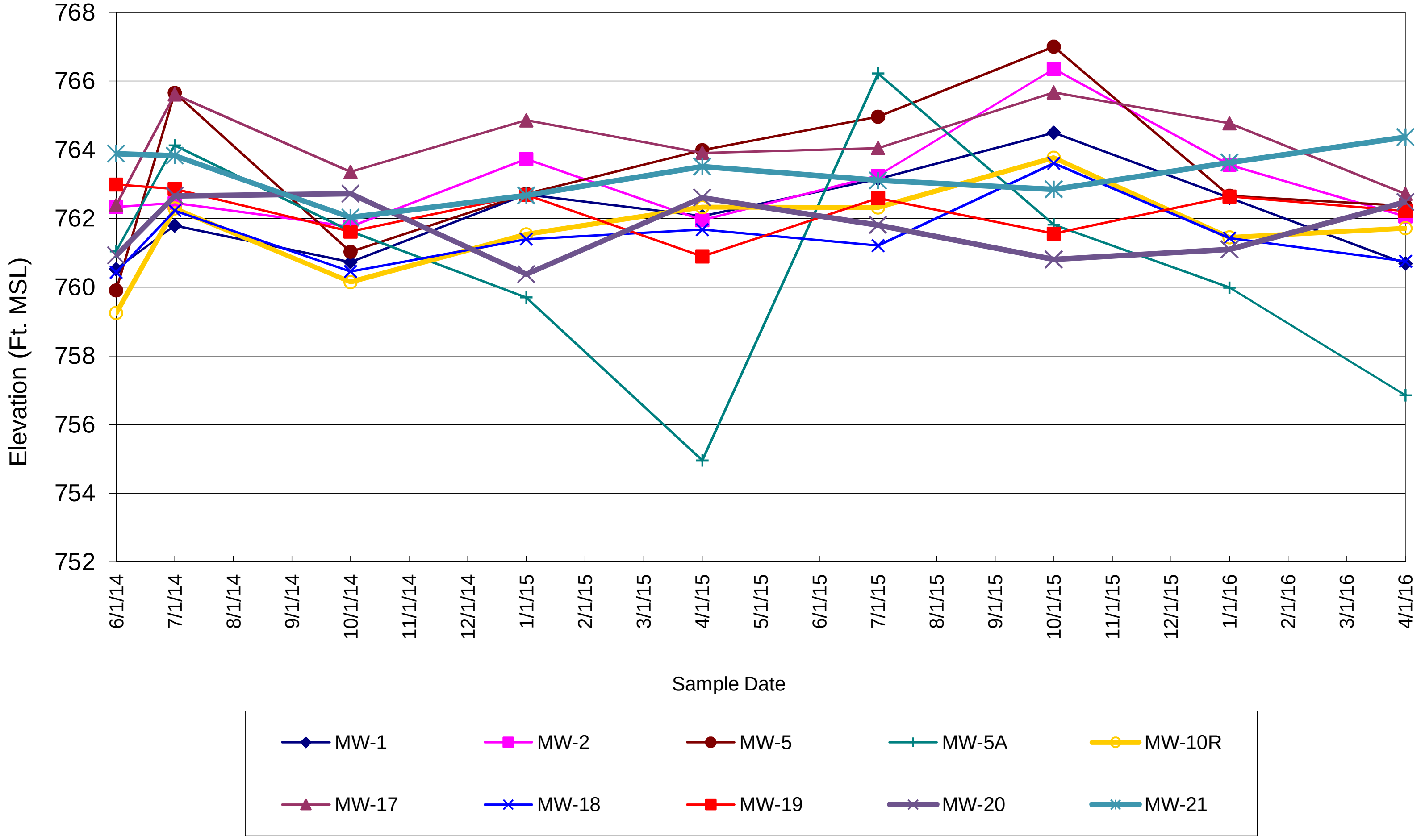
Hexavalent Chromium Concentration vs Time
Albany International - Former Chrome Plant



APPENDIX B

Groundwater Elevations Versus Time – All Wells

Groundwater Elevation vs Time
Appleton Wire - Former Albany International Chrome Plant



APPENDIX C

Operation & Maintenance
Report Form 4400-194

State of Wisconsin
Department of Natural Resources
PO Box 7921, Madison WI 53707-7921
dnr.wi.gov

Remediation Site Progress and Operation, Maintenance, Monitoring & Optimization Report

Form 4400-194 (R 1/14)

Notice: Pursuant to ss. NR 700.11(1) and 724.13(3), Wis. Adm. Code, this form is required to be completed or a narrative report or letter containing the equivalent information required in this form may be submitted in lieu of the actual form. Failure to submit this form as required is a violation and is subject to the penalties as stated in s. 292.99, Wis. Stats. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records Law (ss. 19.31-19.39, Wis. Stats.). *Unless otherwise noted, all citations refer to Wisconsin Administrative Code.*

GENERAL INSTRUCTIONS, PURPOSE AND APPLICABILITY OF THIS FORM: Completion of this form is required under s. NR 700.11(1) and s. NR 724.13(3), Wis. Adm. Code. A narrative report or letter containing the equivalent information required in this form may be submitted in lieu of the actual form. Failure to submit this form as required is a violation of s. NR 700.11(1) and s. NR 724.13(3), Wis. Adm. Code, and is subject to the penalties in s. 292.99, Wis. Stats. This form must be submitted every six months for remediation projects that are regulated under the NR 700 series of Wis. Adm. Code. Specifically, for sites meeting any of the following criteria:

- Any site where a discharge has occurred that report progress in accordance with s. NR 700.11(1), Wis. Adm. Code until site closure is granted. This includes sites where no response activities occurred during the six month reporting period. Attach, if applicable, a separate brief summary of the work completed during the reporting period and the anticipated future work.
- Soil or groundwater remediation projects that report operation and maintenance progress in accordance with s. NR 724.13(3), Wis. Adm. Code.

Note: Long-term monitoring results submitted in accordance with s. NR 724.17(3), Wis. Adm. Code are required to be submitted within 10 business days of receiving sampling results and are not required to be submitted using this form. However, portions of this form require monitoring data summary information that may be based on information previously submitted in accordance with s. NR 724.17(3), Wis. Adm. Code.

Note: Responsible parties should check with the State Project Manager assigned to the site to determine if this form is required to be submitted at sites responded to under the Federal Comprehensive Environmental Response and Compensation Act (commonly known as Superfund) or an equivalent State lead Superfund response.

Note: Responsible parties should check with the State Project Manager assigned to the site to determine if any of the information required in this form may be omitted or changed and obtain prior written approval for any omissions or changes.

Submittal of this form is not a substitute for reporting required by Department programs such as Waste Water or Air Management. Personally identifiable information on this form is not intended to be used for any other purpose than tracking progress of the remediation by the Bureau for Remediation and Redevelopment.

Only complete and submit all of page GI-1 and Section E on pages 3 and 4 for sites where a discharge has been reported but no response, monitoring or remediation has begun or occurred during the six month reporting period that are required to report only under s. NR 700.11(1), Wis. Adm. Code and attach, if applicable, a summary of the anticipated future work.

Section GI - General Site Information

A. General Information

1. Site name
Appleton Wire-Albany International Former Chrome Plant

2. Reporting period from: 01/01/2016 To: 06/30/2016 Days in period: 182

3. Regulatory agency (enter DNR, DCOM, DATCP and/or other)
WDNR

4. BRRTS ID No. (2 digit program-2 digit county-6 digit site specific)
02-45-000015

5. Site location

Region	County	Address
Northeast Region	Outagamie	908 North Lawe Street

Municipality name ● City ○ Town ○ Village	Township	Range ● E ○ W	Section	¼	¼ ¼
Appleton	21 N	17	25	NW	NW

6. Responsible party
Name
Albany International Forming Fabrics Division
Mailing address
PO Box 1939, Appleton, WI 54913-1939
Phone number
(920) 725-2600

7. Consultant
☐ Select if the following information has changed since the last submittal
Company name
Stoeger & Associates, LLC
Mailing address
527 South Story St, Appleton, WI 54914
Phone number
(920) 428-9513

8. Contaminants
Chromium

9. Soil types (USCS or USDA)
Clay/Silty Clay

10. Hydraulic conductivity(cm/sec): 1 X 10 -2	11. Average linear velocity of groundwater (ft/yr) 0.002

12. If soil is treated ex situ, is the treatment location off site? ○ Yes ○ No

If yes, give location: Region	County					
Municipality name ○ City ○ Town ○ Village	Township N	Range ○E ○W	Section	¼	¼ ¼

B. Remediation Method

Only submit sections that apply to an individual site. Check all that apply:

☒ Groundwater extraction (submit a completed Section GW-1).
☐ Free product recovery (submit a completed Section GW-1).
☐ In situ air sparging (submit a completed Section GW-2).
☐ Groundwater natural attenuation (submit a completed Section GW-3).
☒ Other groundwater remediation method (submit a completed Section GW-4).
☐ Soil venting (including soil vapor extraction building venting and bioventing submit a completed Section IS-1).
☐ Soil natural attenuation (submit a completed Section IS-2).
☐ Other in situ soil remediation method (submit a completed Section IS-3).
☐ Biopiles (submit a completed Section ES-1).
☐ Landspreading/thinspreading of petroleum contaminated soil (submit a completed Section ES-2).
☐ Other ex situ remediation method (submit a completed Section ES-3).
☐ Site is a landfill (submit a completed Section LF-1).

C. General Effectiveness Evaluation for All Active Systems

If the remediation is active (not natural attentuation), complete this subsection.

1. Is the system operating at design rates and specifications? ● Yes ○ No
If the answer is no, explain whether or not modifications are necessary to achieve the goal that was previously established in design.

2. Are modifications to the system warranted to improve effectiveness ○ Yes ● No
If yes, explain:

3. Is natural attenuation an effective low cost option at this time? ○ Yes ● No
4. Is closure sampling warranted at this time? ○ Yes ● No
5. Are there any modifications that can be made to the remediation to improve cost effectiveness? ● Yes ○ No
If yes, explain:
A remedial action plan detailing the installation of an additional groundwater collection trench system in the warehouse area is under review by the facility owner.

Site name: Appleton Wire-Albany International Former Chrome Plant

Reporting period from: 01/01/2016 To: 06/30/2016

Days in period: 182

D. Economic and Cost Data to Date

1. Total investigation cost: $45,000.00

2. Implementation costs (design, capital and installation costs, excluding investigation costs: $10,000.00

3. Total costs during the previous reporting period: $18,000.00

4. Total costs during this reporting period: $15,000.00

5. Total anticipated costs for the next reporting period: $150,000.00

6. Are any unusual or one-time costs listed in the reporting periods covered by D.3., D.4. or D.5. above? ○ Yes ● No

   If yes, explain:

7. If closure is anticipated within 12 months, estimated costs for project closeout:

E. Name(s), Signature(s) and Date of Person(s) Submitting Form

Legibly print name, date and sign. Only persons qualified to submit reports under ch. NR 712 Wis. Adm. Code are to sign this form for sites with any ongoing active remediation, monitoring or an investigation. Other persons may sign this form for sites with no response activities during the six month reporting period.

Registered Professional Engineers:

I hereby certify that I am a registered professional engineer in the State of Wisconsin, registered in accordance with the requirements of ch. A-E 4, Wis. Adm. Code; that this document has been prepared in accordance with the rules of Professional Conduct in ch. A-E 8, Wis. Adm. Code; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

Print name	Title
Signature	Date

Hydrogeologists:

I hereby certify that I am a hydrogeologist as that term is defined in s. NR 712.03(1), Wis. Adm. Code, and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

Print name Mark Love	Title Professional Soil Scientist/Project Mgr.
Signature Mark Love	Date August 24, 2016

Scientists:

I hereby certify that I am a scientist as that term is defined in s. NR 712.03(3), Wis. Adm. Code, and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

Print name	Title
Signature	Date

Other Persons:

Print name	Title
Signature	Date

Site name: Appleton Wire-Albany International Former Chrome Plant

Reporting period from: 01/01/2016 To: 06/30/2016

Days in period: 182

Remediation Site Progress and Operation, Maintenance, Monitoring & Optimization Report

Form 4400-194 (R 1/14)

Professional Seal(s), if applicable:

Site name: Appleton Wire-Albany International Former Chrome Plant
Reporting period from: 01/01/2016 To: 06/30/2016
Days in period: 182

Remediation Site Progress and Operation, Maintenance, Monitoring & Optimization Report

Form 4400-194 (R 1/14)

Section GW-1, Groundwater Pump and Treat Systems and Free Product Recovery Systems

A. Groundwater Extraction System Operation:

1. Total number of groundwater extraction wells or trenches available: 2 and the number in use during period: 2

2. Number of days of operation (only list the number of days the system actually operated, if unknown explain:
182

3. System utilization in percent (days of operation divided by reporting time period multiplied by 100). If < 80%, explain:
100

4. Quantity of groundwater extracted during this time period: 55,540 gallons

5. Average groundwater extraction rate: 0.21 gpm

6. Quantity of dissolved phase contaminants removed during this time period in pounds: 5.22 lbs

B. Free Product Recovery System Operation

1. Is free product (nonaqueous phase liquid) being recovered at this site? ○ Yes ● No
If yes, explain:

2. Quantity of free product extracted during this time period (enter none if none): 0 gallons

3. Average free product extraction rate: gpm

C. System Effectiveness Evaluation

1. Is a contaminated groundwater plume fully contained in the capture zone? ● Yes ○ No
If no, explain:

2. If free product is present, is the free product fully contained in capture zone? ○ Yes ○ No
If no, explain:

3. If free product is present in any wells at the site, but free product was not recovered during reporting period, explain:

4. If free product is not present, determine the single contaminant that requires the greatest percent reduction to achieve ch. NR 140 ES and PAL. Perform this calculation for all contaminants that were present at the site that have ch. NR 140 standards. Use the highest contaminant concentration measured in any sampling points during reporting period. If free product is present, write "FREE PRODUCT" in C.4.a.

   a. Contaminant: Chromium

   b. Percent reduction necessary to reach ch. NR 140 ES and PAL: 99.99 %

   c. Maximum contaminant concentration level in any monitoring well of that contaminant: 412,750 µg/L

   d. Maximum contaminant concentration level in any extraction well of that contaminant: 26,000 µg/L

e. If the maximum concentration in a monitoring well is more that one order of magnitude above the concentration measured in an extraction well, explain why the extracted groundwater contamination levels are significantly less than the levels at other locations within the aquifer.

The high chromium concentrations in MW-20 (412,750 ug/l) are in an area that housed a recently discovered second plating line. The area is assumed to be an isolated area of high contamination as soil borings and monitoring wells outside of the area do not show contaminant levels near those shown in MW-20. A remedial action plan to collect and treat the contaminated groundwater from the area of MW-20 is currently under review by the facility owner.

D. Additional Attachments

Attach the following to this form:

- Most recent report to the DNR Wastewater Program, if applicable.
- Groundwater contour map with capture zone indicated.
- Groundwater contaminant distribution map (may be combined with contour map).
- Graph of cumulative contaminant removal, if both free product recovery and ground water extraction are used, provide separate graphs.
- Time versus groundwater contaminant concentration graphs for the contaminant listed in C.4.a. (above), as follows:
  - Graph of contaminant concentrations versus time for each extraction well in use during the period.
  - Graph of contaminant concentrations versus time for the monitoring well with the greatest level of contamination.
- Groundwater contaminant chemistry table.
- Groundwater elevations table.
- System operational data table.

Site name: Appleton Wire-Albany International Former Chrome Plant

Reporting period from: 01/01/2016 To: 06/30/2016

Days in period: 182

Remediation Site Progress and Operation, Maintenance, Monitoring & Optimization Report

Form 4400-194 (R 1/14)

Section GW-2, In Situ Air Sparging Systems

A. In Situ Air Sparging System Operation

1. Number of air injection wells at the site and the number actually in use during the period: 0
2. Number of days of operation (only list the number of days the system actually operated, if unknown explain):
3. System utilization in percent (days of operation divided by reporting time period multiplied by 100). If < 80%, explain:

B. System Effectiveness Evaluation

1. If free product is not present, determine the single contaminant that requires the greatest percent reduction to achieve ch. NR 140 ES and PAL. Perform this calculation for all contaminants that were present at the site that have ch. NR 140 standards. Use the highest contaminant concentration measured in any sampling points during reporting period. If free product is present, write "FREE PRODUCT" in B.1.a.

   a. Contaminant:

   b. Percent reduction necessary to reach ch. NR 140 ES and PAL: %

   c. Maximum contaminant concentration level in any monitoring well: µg/L

2. Is there any evidence that air is short circuiting through natural or man-made pathways? ○ Yes ○ No

   If yes, explain:

3. Is the size of the plume: ○ Increasing ○ Stabalized ○ Decreasing ?

   If increasing, explain:

C. Additional Attachments

Attach the following to this form:

- Groundwater contour map.
- Groundwater contaminant distribution map (may be combined with contour map).
- When contaminants are aerobically biodegradable, attach a dissolved oxygen in groundwater map (dissolved oxygen may be combined with the contaminant data on a single map).
- Site map with all air injection wells and groundwater monitoring points.
- Graph of contaminant concentrations versus time for the contaminant listed in B.1.a. (above) for the monitoring point with the greatest level of contamination.
- Groundwater contaminant chemistry table.
- Groundwater elevations table.
- System operational data table.

Site name: Appleton Wire-Albany International Former Chrome Plant

Reporting period from: 01/01/2016 To: 06/30/2016

Days in period: 182

Remediation Site Progress and Operation, Maintenance, Monitoring & Optimization Report

Form 4400-194 (R 1/14)

Section GW-3, Natural Attenuation (Passive Bioremediation) in Groundwater

A. Effectiveness Evaluation

1. If free product is not present, determine the single contaminant that requires the greatest percent reduction to achieve ch. NR 140 ES and PAL. Perform this calculation for all contaminants that were present at the site that have ch. NR 140 standards. Use the highest contaminant concentration measured in any sampling points during reporting period. If free product is present, write "FREE PRODUCT" in A.1.a

   a. Contaminant: Chromium

   b. Percent reduction necessary to reach ch. NR 140 ES and PAL: 99.99 %

   c. Maximum contaminant concentration level in any monitoring well of that contaminant: 412,750 µg/L

2. Aquifer parameters:

   a. Hydraulic conductivity: 1 X 10-7 cm/sec

   b. Groundwater average linear velocity: 0.002 ft/yr

3. Is there a downgradient monitoring well that meets ch. NR 140 standards? ● Yes ○ No

4. Based on water chemistry results, is the plume: ○ Expanding ● Stabalized ○ Contracting ?

5. If the answer in 4. (above) is "expanding," is natural attenuation still the best option? ○ Yes ○ No

   If yes, explain:

6. Biodegradation parameters:

   a. Upgradient (or other site specific background) DO level: µg/L

   b. DO levels in the part of the plume that is most heavily contaminated µg/L

7. Is site closure a viable option within 12 months from the date of this form? ○ Yes ● No

8. Are there any modifications that can improve cost effectiveness? ○ Yes ● No

   If yes, explain:

9. Have groundwater table fluctuations changed the contaminant level trends over time? ○ Yes ● No

   If yes, explain:

10. Has the direction of groundwater flow changed during the reporting period? ○ Yes ● No

    If yes, approximate change in degrees:

B. Additional Attachments

Attach the following:

- Groundwater contour map.
- Groundwater contaminant distribution map (may be combined with contour map).
- When contaminants are aerobically biodegradable, attach a dissolved oxygen in groundwater map (dissolved oxygen may be combined with the contaminant data on a single map).
- Graph of contaminant concentrations versus time for the contaminant listed in A.1.a. (above) for the monitoring point with the greatest level of contamination.
- Graph of contaminant concentrations versus distance.
- Groundwater contaminant chemistry table.
- Groundwater biological parameters.
- Groundwater elevations table.

Section GW-4, Other Groundwater Remediation Methods

A. Effectiveness Evaluation

1. If free product is not present, determine the single contaminant that requires the greatest percent reduction to achieve ch. NR 140 ES and PAL. Perform this calculation for all contaminants that were present at the site that have ch. NR 140 standards. Use the highest contaminant concentration measured in any sampling points during reporting period. If free product is present, write "FREE PRODUCT" in A.1.a.

a. Contaminant: Chromium

b. Percent reduction necessary: 99.99 %

c. Maximum contaminant concentration level in any monitoring well: 412,750 µg/L

2. Is the size of the plume: ○ Increasing ● Stabalized ○ Decreasing ?

3. Describe the method used to remediate groundwater at the site:
Groundwater from underneath the former chrome plant is collected into a building sump or french drain and the chromium is removed through an ion exchange process. Wastewater from the process is discharged to the City of Appleton wastewater facility and the captured chrome within the ion exchange canisters is shipped off site to be recycled.

4. List any additional information required by the DNR for this method for this site:

B. Additional Attachments

Attach the following:

- Groundwater contour map.
- Groundwater contaminant distribution map (may be combined with contour map).
- When contaminants are aerobically biodegradable, attach a dissolved oxygen in groundwater map (dissolved oxygen may be combined with the contaminant data on a single map).
- Graph of contaminant concentrations versus time for the contaminant listed in A.1.a. (above) for the monitoring point with the greatest level of contamination.
- Groundwater contaminant chemistry table.
- Groundwater elevations table.
- Any other attachments required by the DNR for this remediation method.

Site name: Appleton Wire-Albany International Former Chrome Plant
Reporting period from: 01/01/2016 To: 06/30/2016
Days in period: 182

Remediation Site Progress and Operation, Maintenance, Monitoring & Optimization Report

Form 4400-194 (R 1/14)

Section IS-1, Soil Venting (Including Soil Vapor Extraction, Building Venting and Bioventing)

A. Soil Venting Operation

Note: This form is not required for building vapor mitigation systems that are installed proactively to protect building occupants/users and are not considered part of ongoing active soil remediation.

1. Number of air extraction wells available and number of wells actually in use during the period: __________
2. Number of days of operation (only list the number of days the system actually operated, if unknown explain):
3. System utilization in percent (days of operation divided by reporting time period multiplied by 100). If < 80%, explain:
4. Average depth to groundwater: __________ gpm

B. Building Basement/Subslab Venting System Operation

1. Number of venting points available and number of points actually in use during the period: __________
2. Number of days of operation (only list the number of days the system actually operated, if unknown explain):
3. System utilization in percent (days of operation divided by reporting time period multiplied by 100). If < 80%, explain:

If the venting system is passive, note that here and describe if any part of the system was not functioning and what was done to restore it.

C. Effectiveness Evaluation

1. Average contaminant removal rate for the entire system: __________ pounds per day
2. Average contaminant removal rate per well or venting point: __________ pounds per day
3. If the average contaminant removal rate is less than one pound per day for the entire system, or if the average contaminant removal rate per well is less than one tenth of a pound per day, evaluate the following:
   a. If contaminants are aerobically biodegradable and confirmation borings have not been drilled in the past year:
      i. Oxygen levels in extracted air: ________ percent
      ii. Methane levels in extracted air (ppm_V) If over 10 ppm_V, explain:
      iii. If methane is not present above 10 ppm_V and if oxygen is greater than 20 percent in extracted air, you should either:
         - Drill confirmation borings during the next reporting period, if the entire site should be considered for closure.
         - Or, perform an in situ respirometry test in a zone of high contamination. Do not perform the test in an air extraction well, use a gas probe or water table well. If a zero order rate of decay based on oxygen depletion is less than 2 mg/kg per day, then you should drill confirmation borings, if the entire site should be considered for closure. If the rate of decay is between 2 and 10 mg/kg, operate for one more reporting period before evaluating further. If the zero order rate of decay is greater than 10 mg/kg total hydrocarbons, continue operating the system in a manner than maximizes aerobic biodegradation.
   b. If contaminants are not aerobically biodegradable and confirmation borings have not been recently drilled during the past year, you should drill confirmation borings during the next reporting period if the entire site should be considered for closure.
   c. If soil borings were drilled during the past year and soil contamination remains above acceptable levels, explain if the system effectiveness can be increased and/or if other options need to be considered to achieve cleanup criteria.

D. Additional Attachments

Attach the following to this form:

- Well and soil sample location map indicating all air extraction wells. If forced air injection wells are also in use, identify those wells.
- If water table monitoring wells are present at the site, a map of well locations.
- Time versus vapor phase contaminant concentration graph.
- Time versus cumulative contaminant removal graph.
- Groundwater elevations table, if water table wells are present at the site; also list screen lengths and elevations.
- Table of soil contaminant chemistry data.
- Soil gas data, if gas probes are used to monitor subsurface conditions in locations other than where air is extracted.
- System operational data table.

Site name: Appleton Wire-Albany International Former Chrome Plant

Reporting period from: 01/01/2016 To: 06/30/2016

Days in period: 182

Remediation Site Progress and Operation, Maintenance, Monitoring & Optimization Report

Form 4400-194 (R 1/14)

Section IS-2, Natural Attenuation (Passive Bioremediation) in Soil

A. Effectiveness Evaluation

1. Soil gas information in the soil that is most contaminated from a permanently installed gas probe(s) or water table monitoring well(s).

   a. Hydrocarbon levels: ________ ppm, with an FID

   b. Oxygen levels: ________ percent

   c. Carbon dioxide levels(specify ppm or percent): ________

   d. Methane levels: ________ ppm

2. Soil gas information in background (uncontaminated soil) from permanently installed gas probe(s)or water table monitoring well(s):

   a. Hydrocarbon levels: ________ ppm, with an FID

   b. Oxygen levels: ________ percent

   c. Carbon dioxide levels(specify ppm or percent): ________

   d. Methane levels: ________ ppm

3. List the results of the single boring that had the highest levels of soil contamination during the last round of soil sampling, and the date those samples were collected. Since soil borings are only drilled periodically, list the most recent data even if the data is prior to this reporting period. Since this data is used to assess progress based on the most recent soil sampling event, do not list data from prior sampling events.

   a. Total hydrocarbons (Specify if GRO and/or DRO): ________ µg/kg

   b. Specific compounds (µg/kg):

      i. Benzene: ________ µg/kg

      ii. 1,2 Dichloroethane: ________ µg/kg

      iii. Ethylbenzene: ________ µg/kg

      iv. Toluene: ________ µg/kg

      v. Total xylenes: ________ µg/kg

4. Is there any evidence that contaminants are leaching into groundwater? ○ Yes ○ No

   If the answer is yes and if groundwater quality is not being monitored, explain:

5. Is site closure a viable option within 12 months from the date of this form? ○ Yes ○ No

6. Are there any modifications that can be made to the remediation to improve cost effectiveness? ○ Yes ○ No

   If yes, explain:

B. Additional Attachments

Attach the following to this form:

- Well and soil sample location map.
- Cross sections showing the water table, soil sampling locations, screened intervals for gas probes or water table wells, geologic contacts, and any former excavation boundaries.
- Graphs of contaminant concentrations, oxygen, carbon dioxide and methane levels over time.
- Groundwater elevations table, if water table wells are present at the site.
- Table of soil contaminant chemistry.
- Table of soil gas readings.

Site name: Appleton Wire-Albany International Former Chrome Plant
Reporting period from: 01/01/2016 To: 06/30/2016
Days in period: 182

Remediation Site Progress and Operation, Maintenance, Monitoring & Optimization Report
Form 4400-194 (R 1/14)

Section IS-3, Other In Situ Soil Remediation Methods

A. Effectiveness Evaluation

1. Describe the method used to remediate soil at the site:

2. List all information required by the DNR for this remediation method for this site:

B. Additional Attachments

Attach the following to this form:

- Any other attachments required by the DNR for this remediation method.

Site name: Appleton Wire-Albany International Former Chrome Plant
Reporting period from: 01/01/2016 To: 06/30/2016
Days in period: 182

Remediation Site Progress and Operation, Maintenance, Monitoring & Optimization Report

Form 4400-194 (R 1/14)

Section ES-1, Ex Situ Soil Treatment Using Biopiles

A. Effectiveness Evaluation

1. Volume of soil in the biopile (if multiple biopiles, list number of piles and total volume):

2. Monitoring used to assess progress and verify optimal conditions for biodegradation.

  a. Vapor phase measurements of gases (average of all readings from most recent sampling event):

    i. VOCs by FID: ______ ppm

    ii. Oxygen: ______ percent

    iii. Carbon dioxide: ______ percent

    iv. Methane: ______ ppm

  b. Soil temperature: ______ °F

  c. Soil moisture sensors, if used: ______ percent

3. Treatment amendments added to the soil during construction:

  a. Artificial nutrients, excluding manure.

    i. Types and total pounds added:

    ii. Nitrogen and phosphorous content of the added amendment: ______ percent

  b. Manure: ______ total pounds

  c. Natural organic materials (straw, wood chips, etc.)(type and total pounds):

4. Forced air biopiles only answer the following:

  a. Total air flow rate of the ventilation system: ______ scfm

  b. Average contaminant removal rate: ______ pounds per day

  c. Average biodegradation rate based on oxygen utilization: ______ pounds per day

5. If soil samples have been taken to monitor progress, list results. Only list the most recent results. If none collected enter NA.

  a. Total hydrocarbons. Specify if GRO and/or DRO: ______ µg/kg

  b. Specific compounds (µg/kg):

    i. Benzene: ______ µg/kg

    ii. 1,2 Dichloroethane: ______ µg/kg

    iii. Ethylbenzene: ______ µg/kg

    iv. Toluene: ______ µg/kg

    v. Total xylenes: ______ µg/kg

B. Additional Attachments

Attach the following to this form:

- Figure showing the construction details of the biopile and any sampling locations within the biopile.
- Table of soil contaminant chemistry data.
- Table of operational data.

Site name: Appleton Wire-Albany International Former Chrome Plant
Reporting period from: 01/01/2016 To: 06/30/2016
Days in period: 182

Remediation Site Progress and Operation, Maintenance, Monitoring & Optimization Report

Form 4400-194 (R 1/14) Page 14 of 29

Section ES-2, Ex Situ Soil Treatment Using Landspreading/Thinspreading

A. Effectiveness Evaluation

1. Method used: ○ landspreading ○ thinspreading

Note: For purposes of this form, "landspreading" is the placement of contaminated soil on native topsoil, incorporation of that soil into the native soil and planting crops or other plants on it. The term "thinspreading" refers to placing contaminated soil on an impervious base for aeration.

2. Was any progress monitoring using field screening on soil conducted during this reporting period? ○ Yes ○ No

3. If the answer to A.2. (above) is yes:

   i. List monitoring method: ______

   ii. List monitoring results: ______

4. Is there any evidence of soil erosion at the landspreading/thinspreading location? ○ Yes ○ No

5. Spreading thickness: ______ inches

6. Type of crop planted (if thinspreading with no crop planted, so state): ______

7. Confirmation sampling date: ______ Anticipated confirmation sampling date: ______

8. Most recent soil sample results, if soil samples for laboratory analysis have been collected to monitor progress. Only list the highest result of the most recent sampling round. If no samples have been collected, enter NA.

   a. Total hydrocarbons. Specify if GRO and/or DRO: ______ µg/kg

   b. Specific compounds (µg/kg):

      i. Benzene: ______ µg/kg

      ii. 1,2 Dichloroethane: ______ µg/kg

      iii. Ethylbenzene: ______ µg/kg

      iv. Toluene: ______ µg/kg

      v. Total xylenes: ______ µg/kg

B. Additional Attachments

Attach the following to this form:

- Map of the landspreading/thinspreading area. If soil samples have been collected, specify locations of samples and dates of sampling.
- Table of soil contaminant chemistry data.
- Table of any field screening results with dates of sample collection.

Site name: Appleton Wire-Albany International Former Chrome Plant

Reporting period from: 01/01/2016 To: 06/30/2016

Days in period: 182

Remediation Site Progress and Operation, Maintenance, Monitoring & Optimization Report

Form 4400-194 (R 1/14)

Section ES-3, Landfills

Note: Reporting forms or reporting requirements in a Department approved Operation and Maintenance Plan for a landfill may take the place of this form.

Specific Inspection Items	Potential Problem Areas	Status	Notes
Perimeter Security Fencing	Broken or missing wood slats, torn chain link fabric, barbed wire, other - list		
Entrance Gate and Locking Mechanism	Lock broken/missing, mechanism inoperative.		
Monitoring Wells and Wellhead Covers	Signs of tampering, casing damaged, lock missing.		
Final Cover Vegetation	Bare spots, stressed vegetation, deep rooted vegetation.		
Final Cover Slope (explain below)	Gullies, lack of vegetation, subsidence, ponding.		
Evidence of Burrowing Animals	Damage to final cover, evidence of waste.		
Stormwater Drainage Channels	Gullies, erosion, debris, culvert blocked.		
Passive Landfill Gas Venting System	Damaged or blocked vent risers, stressed vegetation.		
Active Landfill Gas Extraction System	Damaged or blocked piping, cleanouts, other blower flare, knockouts, etc.		
Leachate Collection System	Pumps, connection piping, collection system piping, extraction wells, collection tanks, tanker truck loading system or sanitary sewer discharge piping.		
Access Road Cover Mowing; Tall Vegetation Removal	Ponding, rutting, erosion, cracked or damaged pavement. Mowing and tall vegetation removal done to specified vegetation.		

Summary of Deficiencies and/or Corrective Actions:

Site name: Appleton Wire-Albany International Former Chrome Plant

Reporting period from: 01/01/2016 To: 06/30/2016

Days in period: 182

Remediation Site Progress and Operation, Maintenance, Monitoring & Optimization Report

Form 4400-194 (R 1/14)

B. Additional Attachments

Attach the following to this form:

- Any photographs documenting problems and maintenance activities.
- Maps, drawings showing site features requiring maintenance.
- Records for leachate pumping/discharge/hauling.
- Records for active gas extraction volumes.

Section INS- 1, Section by Section Instructions and Information

Specific Section by Section Instructions for This Form. The site name and reporting period is listed on every page. Then if the pages are inadvertently separated, that information can be used to determine which pages form the report.

General Site Information

-- A.1. List the name as it appears on the DNR tracking system. If the person filling out the form does not know what the name on the tracking system is, use the name that the DNR used in the most recent correspondence.

-- A.2. The reporting period should be either from January 1 to June 30 or July 1 to December 31 for active systems. For passive systems, use a calendar year basis. If however the report covers a newly installed system, list the actual startup date instead of January 1 or July 1. For new passive systems, use the first date that monitoring data is available as the date of startup.

-- A.3. Enter all regulatory agencies that regulate the site.

-- A.4. This form is a DNR form. For that reason, list the DNR site number. If there are other agencies regulating the site, listing identification numbers for other agencies is also recommended, but not mandatory, unless specified by those other agencies.

-- A.5. If the information listed for the site location is not sufficient information for a person to use to drive to a site (example: no street address in a rural area), also include a map that is sufficient for a person to use to drive to the site. A U.S. G.S. topographic map that shows the site location may be used.

-- A.8. List the contaminants that have at one time exceeded the PALs or Table Values in ch. NR 720. If GRO and/or DRO exceed the ch. NR 720 standards, also list GRO and/or DRO. Do not list other contaminants that have never exceeded state standards at the site. If more room is necessary, write "SEE ATTACHED SHEETS" and list all contaminants on a separate sheet.

-- A.9. List the predominant soil types that are contaminated. If there is both contaminated soil and groundwater at the site, list soil types both above and below the water table. If only some soil is contaminated, do not list the soil types that are uncontaminated. If the site soils meet soil cleanup criteria, but groundwater is contaminated, so state that. Specify if the USCS or USDA system is used for soil descriptions. This line specifies soil because the vast majority of contaminated sites do not have contaminated bedrock. If bedrock is contaminated, also list that bedrock type.

-- A.10. If the groundwater meets ch. NR 140 standards, enter "NA - NO NR 140 EXCEEDANCES". Otherwise, list the estimated hydraulic conductivity and the method used to estimate it (bail-down tests, calculations based on grain size, pumping test, etc.) If the hydraulic conductivity has not been determined, state when the tests are to be conducted. When a number of test results are available, list the range of results and the geometric mean. If however some results have a low level of accuracy and some results have a high level of accuracy, you should only list the most accurate results. See the Section on aquifer testing in the *Guidance on Design, Installation and Operation of Ground Water Extraction and Product Recovery Systems* for more information.

-- A.11. If the groundwater meets ch. NR 140 standards, enter "NA - NO NR 140 EXCEEDANCES". Otherwise, enter groundwater average linear velocity as a function of hydraulic conductivity, effective porosity and the groundwater gradient. You should use the geometric mean from A.11. (above) and the most representative value for the gradient at the site. Estimate the effective porosity based on soil types and geologic origin of the soil. If there are reasons to believe that the average liner velocity estimate is less than the actual rate at the site, so state that reason. Secondary porosity effects, flow through submerged utility trenches, widespread contaminant distribution in low permeability soils, etc., are reasons to assume that the actual migration rate is much greater than the predicted average linear velocity. In such cases, you should explain the reasoning for doubting the predicted average linear velocity.

-- A.12. If the information listed for the soil treatment location is not sufficient information for a person to use to drive to a site, also include a map that is sufficient for a person to use to drive to the site. A U.S.G.S. topographic map or a plat map that shows the site location may be used.

-- B. Check all methods used at a site. For example, if groundwater extraction, free product recovery and soil venting are used, check all three methods and submit the additional pages for those methods. If dual-phase or bioslurping are used, these methods extract both air and groundwater, check boxes for and attach additional pages for both soil venting and pump and treat.

-- C. Remediation systems that use any form of enhancement are considered "active" and sites where there are no enhancements of any kind are considered "passive" forms of remediation. For purposes of these forms, natural attenuation (also called naturally occurring bioremediation) is "passive" and all other remediation methods are "active" methods.

-- C.1. Design flow rates refers to flow rates such as gallons per minute extracted by a ground water extraction system, standard cubic feet per minute extracted by a soil venting system, standard cubic feet per minute injected by an in situ air sparging system, etc. If the actual flow rate is within 80 percent of the rate predicted in the design, consider that as meeting the design specification.

-- D. The cost data in this section is used by DNR staff to evaluate whether or not the selected remedy is the most cost effective remedy and whether or not system modifications may be warranted to improve efficiency and/or cost effectiveness. Responsible parties and consultants are encouraged to submit cost information so that DNR staff may assist responsible parties and consultants accomplish environmental cleanups in the most cost effective manner.

Total costs for past costs are all costs to date. This information is for all costs that were incurred to investigate and/ or remediate the site. These costs include but are not limited to: consulting labor and supplies, laboratory testing, transportation, equipment, etc. If the consultant does not pass all costs through the consulting firm, the consultant will need to contact their client for other non-consulting costs to determine total costs. Exceptions include costs for attorney fees, accounting, claim assistance in preparing claims to state reimbursement funds, or other indirect expenses that are not essential to remediating the site.

-- D.2. The initial implementation costs are all costs that are incurred to start implementing a remedy at a site. Costs for the investigation however are excluded because those costs are incurred prior to remedy selection. Since costs for treatability and/or pilot testing are used to procure data for remedial design and are specific to different remediation methods, these costs should be included in implementation costs and not investigation costs. Startup or shakedown costs are also considered implementation costs and should not be considered operation and maintenance costs.

-- D.3. Costs for implementation or investigation should not be repeated here or they will be double counted.

-- D.4. Costs for implementation or investigation should not be repeated here or they will be double counted.

-- D.5. Costs for implementation or investigation should not be repeated here or they will be double counted.

-- D.6. Examples of one-time or unusual costs include the following:
- Replacing a burned out motor on a pump.
- Replacement of a well that was destroyed by a snowplow.
- Confirmation sampling to determine if the site meets closeout criteria. This type of cost is considered an unusual cost because this type of sampling is not conducted during most reporting periods.

-- D.7. This estimate of costs is for all costs to close out a site minus the salvage value of any remediation equipment. Pertinent costs include items such as well abandonment, equipment removal from the site, consulting costs associated with these items, etc. Do not include any costs that will not be paid by a state reimbursement fund, such as repaving.

Section GW-1. Groundwater Extraction and Product Recovery

-- A.1. List two numbers, the total number of extraction wells at the site and the number that were in actual use during the period. If all wells were in use, state that on the form.

-- A.2. The number of days of operation are the number of days that the system was actually operated. If the system was shut down for reasons such as: repairs were necessary, piping froze, shut down to provide time for subsurface conditions to equilibrate before sampling, etc., do not list those days as being in operation.

-- A.3. System utilization is a measure of the amount of time that the system operated relative to the amount of time that it could have operated.

-- A.5. The average is for the entire site, not per well or trench. For purposes of determining the average ground water extraction rate, calculate the average based on the total volume of groundwater extracted divided by the time of the reporting period. For example, if the system operated at 10 gallons per minute for one month, the amount of water extracted would be approximately 432,000 gallons. If the reporting period was six months long, then the time period is approximately 260,000 minutes. Therefore, the average flow rate over six months is 432,000 divided by 260,000 minutes for an average flow rate of 1.67 gallons per minute (gpm).

-- A.6. Calculate the total dissolved contaminants removed in pounds. If the estimate is a sum of BTEX and not based on a total hydrocarbon test (GRO and/or DRO), so state that on the form.

-- B.3. The average should be based on the entire site over the entire reporting period. See instructions above for A.5. List the free product recovery rate as gallons per day (gpd), not gallons per minute (gpm).

-- C.1. To answer this question, a thorough evaluation of water levels and chemical analyses in all monitoring points at the site is necessary.

-- C.2. If the capture zone has not been determined mathematically, it will need to be determined to answer this question. See the *Guidance on Design, Installation and Operation of Ground Water Extraction and Product Recovery Systems* for and any recent update or errata sheets for more information on plume capture.

-- C.4. When free product is present, line C.4.a. should state "FREE PRODUCT" and lines C.4.b. through C.4.d. are left blank. Otherwise, complete the following calculations.
There typically are several compounds at most contaminated sites that exceed the standards in ch. NR 140. The purpose of this question is to focus on the single contaminant that requires the most treatment to achieve groundwater quality standards on a percent reduction basis. For example, the most recent round of sampling at an example site demonstrated the highest levels of contaminants were 1,000 µg/L benzene and 1,000 µg/L toluene in the most heavily contaminated monitoring well. The ES and PAL for benzene is 5 µg/L and 0.5 µg/L (respectively) and for toluene the ES and PAL is 343 µg/L and 68.6 µg/L (ES and PAL data as of August 1995). Therefore the percent reduction to meet the ES and PAL for benzene is 99.5 and 99.95 percent and for toluene it is 65.7 and 93.14 percent. For that reason, the single contaminant that is most critical to reaching state groundwater standards is benzene. Therefore benzene is entered on line a. In this example, 99.5 and 99.95 percent is entered on line b. In this example, 1,000 µg/L is entered on line c. In this example, benzene is the driving factor, therefore enter the maximum benzene level in the single most heavily contaminated extraction well during the most recent sampling period on line d.

-- D. See the generic discussion at the end of the instructions (below) for figures, graphs and tables, starting on page INS-2.

Section GW-2. In Situ Air Sparging

-- B.1. See instructions for Section GW-1, Item C.4.

-- C. See the generic discussion at the end of the instructions (below) for figures, graphs and tables, starting on page INS-2.

Section GW-3, Natural Attenuation in Groundwater

-- A.1. See instructions for Section GW-1, Item C.4.

-- A.2.a. List the estimated hydraulic conductivity that was listed on line A.11 in Section GI-1.

-- A.2.b. List the groundwater average linear velocity that was listed on line A.12 in Section GI-1.

-- A.3. Assess the monitoring well network to determine if there is a down gradient well that has not been impacted by the contaminants. Consider the possibility of a submerged (or diving) plume in that assessment. If all evidence indicates that the plume does not extend to the farthest "clean" downgradient well, indicate "YES" on the form. Otherwise indicate "NO" on the form. If there are not plans to install such a well, explain.

-- A.4. Based on the contaminant distribution, evaluate whether or not the plume is expanding, stabilized, or contracting. When making this determination, consider the contaminant that requires the greatest percent reduction to achieve ch. NR 140 standards.

-- A.5. If the plume is expanding and a justification is necessary, add additional sheets justifying why natural attenuation is still the appropriate remedy. If it is not, further describe in the explanation the plans to use a different remedy.

-- A.6.a. Enter the upgradient dissolved oxygen (DO) level(s). If however there are contaminants measured in the upgradient well, it is not a true background measurement. In that case enter "UNKNOWN" on the form.

-- A.6.b. Enter the range of DO values measured in wells within the plume.

-- B. See the generic discussion at the end of the instructions (below) for figures, graphs and tables, starting on page INS-2.

Section GW-4, Other Groundwater Remediation Methods

-- A.1. See instructions for Section GW-1, Item C.4.
-- A.2. Self explanatory.
-- A.3-4. Enter the information specified by the DNR for this method at this site.

Section IS-1, Soil Venting (Including both Soil Vapor Extraction and Bioventing)

-- B.3. This subsection is used as a trigger for determining if the system requires an evaluation for future activities, such as improvements, converting the site to monitoring for natural attenuation, closure, etc. If an in situ respiration test must be performed, see Hinchee, R.E. and Ong, S.K. 1992. A Rapid In Situ Respiration Test for Measuring Aerobic Biodegradation Rates of Hydrocarbons in Soil. *Journal of the Air and Waste Management Association.* Volume 42, Number 10. Pages 1305 to 1312 for general procedures. For a discussion of methane monitoring, see the instructions for Section IS-2, item A.1.d., below. If the contaminant extraction rate in B.3. is greater than the trigger levels, leave lines B.3.a.i. and B.3.a.ii. blank.

-- C. See the generic discussion at the end of the instructions (below) for figures, graphs and tables, starting on page INS-2.

Section IS-2, Natural Attenuation in Soil

-- A.1. This data is used to assess subsurface conditions based on soil gas data. Whenever possible, a permanently installed gas probe should be used. If at all possible, the gas probe should be located in the part of the site that is most heavily contaminated, since that is the part of the site that is likely to take the longest amount of time to meet ch. NR 720 standards. Water table wells that have screen exposed above the water table are also good measuring points. When installing permanent gas probes, you should install the screen deep enough that a true measure of the most heavily contaminated soil is possible, but install the screen shallow enough to assure that it is not submerged by groundwater table fluctuations. In some situations where the depth of contamination is variable, consideration should be given to using nested gas probes instead of only using probes at a single depth. Measuring points that should not be used include temporary gas probes because these points are less repeatable from one monitoring event to the next. Also, if there has been an active soil venting system in use at the site, the air extraction wells should not be used because these wells are in locations that have had much more aggressive treatment than the rest of the site.

-- A.1.a. A flame ionization detector (FID) is specified instead of a photo ionization detector (PID) because PIDs often read inaccurately in moist oxygen deficient/carbon dioxide rich atmospheres. Also, PIDs do not detect some petroleum compounds.

-- A.1.d. Methane readings are used to measure for anaerobic conditions. When the original product that is lost is a refined petroleum product (not crude oil), there should not be any methane within the product. Methane however may be produced under very anaerobic conditions. Any method may be used for measuring methane provided that the detection limit is less than a few ppm_V. One convenient method is to use an FID that is equipped with a granular activated carbon filter to filter out non-methane components. Some instrument manufacturers make these filters available as options. In some cases an FID will flame out due to an oxygen deficiency. Some instrument manufacturers offer a dilution device as an accessory that is designed to prevent flameouts and also raises the upper limit of measurement to 10,000 ppm_V or higher. If the meter "pegs" at 10,000 ppm_V (or one percent), enter ">10,000 ppm_V."

-- A.2. The background monitoring point is predominantly used to measure natural oxygen and carbon dioxide levels in soil over time. For this reason, the background monitoring point should be reasonably close to the site, but not so close that the conditions are no longer representative. Considerable variations over time can occur, this background point should be measured during every sample event. Considerations for determining if a background point is representative include:

- If an on-site background point has minor levels of VOCs in it due to gas phase diffusion, that is acceptable, but if the levels are high, it may not be representative of true background conditions.
- Background oxygen and carbon dioxide levels vary with soil type and natural organic carbon content. For this reason, if at all possible, the soil types should be identical within the screened interval of all gas probes.
- The same depths should be used for all gas probes to allow comparison from one location to the next. If the depth to water varies greatly across the site, a certain amount of confusion in the data is likely. In this case, use professional judgement to provide the best data possible at a reasonable cost.

-- A.3. Enter this data for petroleum fuel sites. For other sites, provide the data that is most appropriate for the situation.

-- B. Cross sections are self explanatory, see the generic discussion at the end of the instructions (below) for other attachments.

Section IS-3, Other In Situ Soil Treatment Methods

-- A.2. Enter the information specified by the DNR for this method at this site.

Section ES-1, Ex Situ Soil Treatment Using Biopiles

-- A.3.a. The term "artificial nutrients" essentially means agricultural fertilizers or any other fertilizer products.

-- A.3.a.i. The types of fertilizers that are added should be listed here by chemical names, not by vendor trade names.

-- A.3.a.ii. List nitrogen content as N, list phosphorous content as phosphoric acid (P_2O_5). Note: Fertilizer ratings are based not on actual content of N, P and K, but on nitrogen (as N), phosphorous (as P_2O_5) and potassium (as K_2O).

-- A.4.c. See example calculations at the end of this set of instructions.

-- A.5. Enter this data for petroleum fuel sites. For other sites, provide the data that is most appropriate for the situation.

-- B. The figure is self explanatory. See the generic discussion at the end of the instructions (below) for instructions for the tables.

Section ES-2, Ex Situ Soil Treatment Using Landspreading/Thinspreading

-- B. A map to scale of the landspreading location including and landmarks or benchmarks. When samples have been collected, the distances to any landmarks or benchmarks should be indicated.

Section ES-3, Other Ex Situ Soil Treatment Methods

-- A.2. Enter the information specified by the DNR for this method at this site.

Section INS- 2, Figures, Graphs and Tables

When figures and graphs are specified, they should at a minimum contain the following information, or an explanation as to why the information is not necessary.

Maps. All maps should include the applicable information specified in s. NR 724.11(6), Wis. Adm. Code. In most cases, all information can be combined into a single map. There are times that a single map will have so much data that it is essentially unreadable. The consultant should use professional judgement when determining if a single map or multiple maps best portray the information necessary.

- Groundwater Contour Map Guidelines.
  - -- List groundwater elevations for each measuring point on the map.
  - -- Use the most recent data available.
  - -- For water table maps, do not use data from deeper piezometers. If piezometer data is shown, use a different symbol for the piezometers than used for water table wells.
  - -- If any wells are dry, indicate that on the map.
  - -- If free product is present at site, shade the area where free product is estimated to be present.
  - -- If groundwater is extracted with a pump and treat system, also denote plume capture zone.
  - -- If in situ air sparging or soil venting is in use, specify on the map if the system was operating or shut down during the water level measurements. See the Subsection on water table maps in the *Guidance on Design, Installation and Operation of Ground Water Extraction and Product Recovery Systems* for more information on this topic.

- Groundwater Contaminant Distribution Map Guidelines.
  - -- Only contaminants that exceed the ch. NR 140 ES or PAL should be shown on the map. When contaminants are above the PAL or ES at some data points and below the PAL or ES at other data points, list the data for all locations to portray which areas of the site meet ch. NR 140 groundwater quality standards.
  - -- If a well is not sampled due to the presence of free product indicate "FREE PRODUCT" at those data points.
  - -- If more than five contaminants exceed ch. NR 140 ES, only the five contaminants that require the greatest percent reduction to achieve ch. NR 140 ES or PAL should be shown on the map.
  - -- Drawing isoconcentration lines is optional, unless specified for the site on a site specific basis.
  - -- If the contamination has crossed the property line, that property line should be clearly denoted on the map.
  - -- If in situ air sparging is used, water samples from ch. NR 141 type monitoring wells may not represent aquifer water quality as a whole. For that reason, groundwater data should be obtained from driven probes with no filter pack. If there are no driven probes and conventional ch. NR 141 monitoring wells are used, shut down the air injection system at least two weeks prior to collecting groundwater samples. See the *Guidance on Design, Installation and Operation of In Situ Air Sparging Systems* and the August 1995 update sheets for more information on this topic.

- Dissolved Oxygen Map Guidelines.
  - -- Dissolved oxygen data may be shown on the contaminant concentration graphs or on a separate graph.
  - -- Dissolved oxygen maps are optional for ground water extraction and product recovery systems.
  - -- When in situ air sparging is used, monitoring points may not represent aquifer water quality as a whole. For that reason, groundwater data should be obtained from driven probes with no filter pack. If there are no driven probes and conventional ch. NR 141 monitoring wells are used, shut down the air injection system at least two weeks prior to collecting groundwater samples for DO. See the *Guidance on Design, Installation and Operation of In Situ Air Sparging Systems* and the August 1995 update sheets for more information on this topic.

- Well and Soil Sample Location Map Guidelines. Well and sample location maps for all methods should clearly indicate the location(s) of the release or the area where soil contamination historically has been highest. Also, if part of the contamination has been excavated, the pit boundaries.

  The recommended documentation for each remedial method is as follows:

  - -- Groundwater Extraction and Product Recovery - separate well location maps should not be provided, instead the wells should be indicated on the groundwater contour and contaminant distribution maps.
  - -- In Situ Air Sparging - the map should indicate all air injection wells, soil venting extraction wells, and all groundwater monitoring points.

Maps (Continued).

- -- Natural Attenuation in Groundwater - separate well location maps should not be provided, instead the wells should be indicated on the groundwater contour maps.
- -- Soil Venting - indicate all air extraction wells. If any gas probes are used to assess subsurface conditions in either contaminated zones or background locations, also indicate those data points with a different symbol. If soil samples have been collected recently to track progress, indicate those locations with the date of sampling noted on the map.
- -- Natural Attenuation in Soil - show all monitoring points. Indicate which data points are background measuring points. If soil samples have been collected recently to track progress, indicate those locations with the date of sampling noted on the map. If the site was previously treated by soil venting, the locations of former air extraction wells should also be shown since these are areas where aggressive treatment has been applied. Also show area(s) of paved and unpaved ground surface. If pavement is significantly broken to allow significant water infiltration and air diffusion, map that area as broken pavement.

Graphs. All graphs that show time versus contaminant concentration or cumulative contaminant removal should be based on total time, not only operation time. All graphs that denote cumulative removal should use pounds of contaminant removed. Graphs should accurately show the time period(s) when the system was not operating. Plot time on the X axis, concentration or cumulative removal data on the Y axis.

- Time Versus Cumulative Removal. The recommended documentation for each remedial method is as follows:

  - -- Groundwater Extraction and Product Recovery - separate graphs should be used for free product recovery and dissolved phase recovery. A single graph for each phase is adequate, per well graphs are only necessary when specified by the Department on a site specific basis.
  - -- In Situ Air Sparging - no graph is necessary (removal data is shown on the graphs for the soil venting system).
  - -- Natural Attenuation in Groundwater - no graph is necessary.
  - -- Soil Venting - provide a graph of cumulative removal for total VOCs for the total system.
  - -- Natural Attenuation in Soil - no graph is necessary.
  - -- Ex Situ Soil Treatment Using Biopiles - Provide two graphs, one showing cumulative removal of total VOCs and a second graph showing total contaminant biodegradation over time.
  - -- Ex Situ Soil Treatment Using Landspreading/Thinspreading - no graphs are needed.

- Time Versus Contamination Concentration Graphs. Create graphs with contamination level on the y axis (semilog scale) and time on the x axis (linear scale). If free product is present, time versus contamination concentration graphs are not necessary.

  The recommended documentation for each remedial method is as follows:

  - -- Groundwater Extraction and Product Recovery - graph the contaminant level over time for the groundwater that is extracted by the extraction system. List all compounds that exceed ch. NR 140 ES or PAL. If over five contaminants exceed ch. NR 140 ES or PAL, only list the five contaminants that exceed ch. NR 140 standards by the greatest percent.
  - -- In Situ Air Sparging - provide a graph for the single monitoring well that is most heavily contaminated. If over five contaminants exceed ch. NR 140 ES or PAL, only list the five contaminants that exceed ch. NR 140 standards by the greatest percent.
  - -- Natural Attenuation in Groundwater - provide a graph for all monitoring wells that contain any compounds that exceed ch. NR 140 standards. If over five contaminants exceed ch. NR 140 ES or PAL, only list the five contaminants that exceed ch. NR 140 standards by the greatest percent.
  - -- Soil Venting - provide a graph of contaminant concentration over time for the entire system for total VOCs. If any gas probes are used to assess subsurface conditions in either contaminated zones, also provide a graph with the data from the most heavily contaminated gas probe.
  - -- Natural Attenuation in Soil - provide a graph of contaminant concentration over time for total vapor phase VOCs as measured with an FID, oxygen, carbon dioxide and methane in an gas probe.
  - -- Ex Situ Soil Treatment Using Biopiles - no graph is necessary.
  - -- Ex Situ Soil Treatment Using Landspreading/Thinspreading - no graphs are needed.

Graphs (Continued).

- Graph of Contaminant Concentrations Versus Distance. If free product is present, a graph of contaminant concentrations versus distance is not necessary.

  The recommended documentation for each remedial method is as follows:

  -- Groundwater Extraction and Product Recovery - no graph is necessary.
  -- In Situ Air Sparging and Natural Attenuation in Groundwater - plot a graph with distance (on the x axis, linear scale) and contaminant concentrations (y axis, log scale) from the upgradient measurement point to the farthest downgradient data point along the centerline of the plume. List the same contaminants as shown on the Time Versus Contaminant Concentration Graphs. Clearly show the source area on the graph. If free product has been present, label the data points that previously contained free product. For in situ air sparging, see comments above about samples collected from conventional monitoring wells with filter packs versus driven probes.

Tables. Whenever possible, data over the life of the project should be listed.

The recommended documentation for each type of table is as follows:

- Groundwater Contaminant Chemistry Data.

  List:
  -- Contamination levels for all contaminants that exceed ch. NR 140 standards.
  -- Dissolved oxygen levels if applicable.
  -- Other biological parameters, if applicable (nitrogen, phosphorous, manganese, sulphate, iron, dissolved methane, redox potential, pH, microbial population size, etc.). See instructions for page GW-3 for more information on these parameters. Also, list the dates the samples were collected and the standard methods used to analyze the samples.

- Groundwater Biological Parameters.

  For natural attenuation in groundwater only, these measurements should be listed (if known) to provide information on biodegradation. This table is not necessary for free product extraction, groundwater extraction or in situ air sparging.

  Provide a table that includes any results of tests conducted for dissolved oxygen, nitrate, manganese, iron, sulphate, methane, redox potential, heterotrophic and/or hydrocarbon degrading microorganism populations. Identify on the table if the monitoring locations are upgradient, side gradient, downgradient, or within the plume, dates of sampling, and the analytical methods used for those parameters. Include all data for the life of the project. Since some of these tests are only conducted once, or periodically - enter "NS" in the table for not sampled for any parameters that were not sampled during a particular round of sampling.

  When asked to list the standard methods, list the method if a standard method exists. There are however some tests (for example dissolved methane) where there are no official standard laboratory or field methods. In this case the laboratory will have to create their own standard procedures. In these cases list the name of the laboratory and that laboratory's name for that test.

  Specific considerations for each parameter are as follows:

  -- Dissolved oxygen (mg/L). The most efficient mechanism for natural or enhanced biodegradation of petroleum compounds is aerobic biodegradation.
  -- Nitrate (mg/L as N). Nitrate ($NO3^{-1}$) is a potential electron acceptor for denitrification and also serves as a nutrient for heterotrophic microbial populations to enhance aerobic biodegradation. Decreasing nitrate levels from background wells to wells within the plume are an indication of either aerobic or anaerobic biodegradation.
  -- Manganese as Mn^{+2} (mg/L). Manganese as Mn^{+4} is converted to soluble manganese as Mn^{+2} under anaerobic biodegradation. For this reason, total manganese analysis is not appropriate, only soluble manganese as Mn^{+2}. When the levels of soluble manganese are higher in wells within the plume than in background wells, that is an indication of anaerobic biodegradation.
  -- Iron as Fe^{+2} (mg/L). Iron as Fe^{+3} is converted to soluble iron as Fe^{+2} under anaerobic biodegradation. For this reason, total iron analysis is not appropriate, only soluble iron as Fe^{+2}. When the levels of soluble iron are higher in wells within the plume than in background wells, that is an indication of anaerobic biodegradation.

Tables (Continued).

-- Dissolved sulphate ($SO4^{-2}$, mg/L). Sulphate ($SO4^{-2}$) is a potential electron acceptor. Decreasing sulphate levels from background wells to wells within the plume are an indication of anaerobic biodegradation.

-- Dissolved methane (mg/L). Methane is produced under anaerobic conditions. Since background methane levels can usually be assumed to be zero, in most cases only measurements within the plume are used. Exceptions are when the natural soils have very high levels of TOC (for example peat), background methane levels are also warranted. When the contaminant is crude oil instead of a refined petroleum product, methane measurements may however cause erratic results. Significant amounts of methane may be created when other electron acceptors ($NO3^{-1}$, Mn^{+4}, Fe^{+3} and $SO4^{-2}$) are exhausted. For this reason, significant levels of methane are indicative of very very anaerobic conditions.

-- Redox potential (millivolts, include + or - sign). Redox potential is another measure of the level of aerobic/anaerobic conditions, however it is a much more sensitive measurement than DO at very low levels of DO.

-- Heterotrophic and hydrocarbon degrading microorganism populations (CFU/mL). Heterotrophic and specific hydrocarbon degrader population sizes should be listed for both background locations and locations within the plume, if there is information available. There is disagreement by many of the experts within the field as to the merits of sampling for this parameter. Refer to other DNR guidance documents on natural attenuation (or passive bioremediation) for more information on this topic.

- Soil Gas Data.

The recommended documentation for each remedial method is as follows:

-- When natural attenuation in soil is used, provide a graph of all soil gas readings over time for every data point.

-- When soil venting is used, if a gas probe is used to assess subsurface conditions over time in a location where air is not extracted, provide that data in a table.

- System Operational Data.

The recommended documentation for each remedial method is as follows:

-- Groundwater Extraction and Product Recovery:

- Well by well flow rates in gpm for each extraction well. If a well is off line, list flow rate as "ZERO." Clearly denote on the table periods of system shutdown.

-- In Situ Air Sparging:

- Air pressure and injection flow rates in scfm for each well. If a well is off line, list flow rate as "ZERO." Clearly denote on the table periods of system shutdown.

-- Natural Attenuation in Groundwater - no table needed.

-- Soil Venting:

- Vacuum readings and extraction rates in scfm for each well. If a well is off line, list flow rate as "ZERO." Clearly denote on the table periods of system shutdown.
- Air concentrations in ppm_v or in mg/L for total VOCs.
- Total system contaminants removed in pounds and the pounds per day removal rate.

-- Natural Attenuation in Soil - no table needed.

Tables (Continued).

- Ex Situ Soil Treatment Using Biopiles:
  - If forced air ventilation is used:
    - System extraction rates in scfm.
    - Air concentrations in ppm$_v$ for total VOCs.
    - Total system contaminants removed in pounds and the pounds per day removal rate.
    - Temperature.
  - If passive ventilation is used, a table of temperatures.
- Ex Situ Soil Treatment Using Landspreading/Thinspreading - no table is needed.

<u>Acronyms and Abbreviations:</u>

CFU/mL	colony forming units per milliliter
cm/sec	centimeters per second
DATCP	Department of Agriculture, Trade and Consumer Protection
DCOM	Department of Commerce
DNR	Department of Natural Resources
DO	Dissolved Oxygen
DRO	Diesel Range Organics
ES	Enforcement Standards in NR 140
FID	Flame Ionization Detector
ft/yr	feet per year
gpd	gallons per day
gpm	gallons per minute
GRO	Gasoline Rage Organics
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
NR	prefix for rules established by the DNR
P.E.	Registered Professional Engineer
P.G.	Registered Professional Geologist
PAL	Preventative Action Limit in NR 140
PECFA	the state sponsored cleanup fund for certain petroleum contaminated sites
ppm$_v$	parts per million by volume (vapor phase only)
scfm	standard cubic feet per minute
TOC	Total Organic Carbon
USCS	Unified Soil Classification System
USDA	United States Department of Agriculture
µg/kg	micrograms per kilogram
µg/mL	micrograms per milliliter
VOC	Volatile Organic Compounds
Y/N	Yes or No

Section INS-3, Example Calculations for Determining the Biodegradation Rate on Forced Air Biopiles

Important Note: This page uses a nonproportional font and characters that are unique to WordPerfect. If the user received this document electronically, this page may need to be converted to a different font for the formulas to print correctly. The original font used for this page was prestige elite with 16.67 characters per inch.

Assumptions:

- The measurements at the stack are as follows:
  - -- Average flow rate is 20 scfm.
  - -- Average oxygen level extracted from biopile is 14.0 percent by volume.
  - -- Average carbon dioxide level extracted from biopile is 3.5 percent by volume or 35,000 ppm_v.
- Atmospheric air contains 21 percent oxygen by volume and 400 ppm_v (or 0.04 percent) carbon dioxide. (Note: On each site visit, the consultant should check atmospheric air to assure that the instrument is spanned correctly.)
- Atmospheric air weight 0.0763 pounds per cubic foot at standard temperature and pressure (Gibbs, 1971).
- Average molecular weight of air is 28.97 (Gibbs, 1971) which is rounded off to 29, molecular weight of O_2 is 32, molecular weight of CO_2 is 44.
- For every pound of contaminants biodegraded, 3.3 pounds of oxygen is utilized and up to 3.2 pounds of carbon dioxide is generated.

  -- The stoichiometry of aerobic benzene biodegradation can be described as follows:

  $$C_6H_6 + 7.5\ O_2 \text{ -- -- --> } 6\ CO_2 + 3\ H_2O$$

  Based on this, benzene biodegradation requires that 3.07 pounds of oxygen are utilized to fully oxidize one pound of benzene, assuming no electron acceptors other than oxygen are used. Assuming no biomass is produced and no geochemical reactions consume carbon dioxide, 3.38 pounds of carbon dioxide is generated from one pound of benzene.

  -- The stoichiometry of aerobic hexane biodegradation can be described as follows:

  $$C_6H_{14} + 9.5\ O_2 \text{ -- -- --> } 6\ CO_2 + 7\ H_2O$$

  Based on the above assumptions, hexane biodegradation requires 3.52 pounds of oxygen and generates up to 3.06 pounds of carbon dioxide.

  Other hydrocarbons also require a similar ratio of oxygen for aerobic biodegradation. For purposes of this guidance it is assumed that a pound of petroleum contamination requires 3.3 pounds of oxygen and generates up to 3.2 pounds of carbon dioxide and 1.1 pounds of water in the biodegradation reaction.

Calculations:

Oxygen utilization rate:

$$(0.21 - 0.14) * \frac{32}{29} * 0.0763 \frac{\text{pounds}}{\text{ft}^3} * 20 \frac{\text{ft}^3}{\text{min}} * 60 \frac{\text{min}}{\text{hour}} = 7.07 \frac{\text{pounds}}{\text{hour}}$$

Carbon dioxide production rate:

$$(0.035 - 0.0004) * \frac{44}{29} * 0.0763 \frac{\text{pounds}}{\text{ft}^3} * 20 \frac{\text{ft}^3}{\text{min}} * 60 \frac{\text{min}}{\text{hour}} = 4.81 \frac{\text{pounds}}{\text{hour}} \text{ -- -- -- -- -- -- -- --}$$

Calculations (Continued):

Biodegradation rate based on oxygen:

7.07 / 3.3 = 2.1 pounds per hour

Biodegradation rate based on carbon dioxide:

4.81 / 3.2 = 1.5 pounds per hour

Since the biodegradation rate is based on oxygen utilization and/or carbon dioxide generation, it is a measure of the overall biodegradation rate of all carbon sources, including natural organic carbon and any organic materials that were added. For this reason, the biodegradation rate is not specific to hydrocarbons and it is likely that the measured biodegradation rate will overestimate the rate of contaminant reduction.

Commonly the measured biodegradation rate based on carbon dioxide generation is less than the rate estimated with oxygen. Because of geochemical interferences and biomass formation, estimates based on carbon dioxide measurements are often low. If however the biodegradation rate estimate based on carbon dioxide is significantly greater than the estimate based on oxygen, it is likely that there is a measurement or calculation error. In this way, the carbon dioxide measurements can be used to double check the oxygen measurements and calculations.

Appendix D

Historical Soil Boring and Groundwater Monitoring Well Data
Abandoned Borings and Wells

STS Consultants Ltd.

OWNER Albany International

LOG OF BORING NUMBER MW-1

PROJECT NAME Chromium Contamination Assessment

ENGINEER

SITE LOCATION N. Meade Street, Appleton, Wisconsin

WELL INSTALLATION
TOP STANDPIPE EL. + 769.98

SURFACE ELEVATION 767.89 (USGS)

DEPTH	ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, N (B/FT)	UNCONFINED COMPRESSIVE STRENGTH, Qp (TONS/FT²)	WATER CONTENT, %	UNIT DRY WEIGHT (LBS/FT³)	LIQUID/PLASTIC LIMIT LL/PL	PERCENT PASSING #200 SIEVE	PERMEABILITY, K (CM/SEC)
		1	SS			Dark brown sandy silt (ML) - little roots and grass - medium dense - topsoil	12						
		1A	SS										
		2	SS			Fill: Brown silty clay (CL) - trace of sand and gravel - medium dense	21/6"						
		3	SS			Brown silty clay (CL) - trace of gravel - medium dense to dense - glacial till - saturated at 13.0 feet	15						
		4	SS				36						
		5	SS				37						
		6	SS				29						
		7	SS				15						
15		8	SS				8						
		9	SS				6						
		10	SS				6						
						End of Boring Boring advanced from 0.0 to 20.0 feet by power auger 2 inch diameter PVC observation well installed at 20.0 feet with protector pipe							

The stratification lines represent the approximate boundary between soil types. In situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally.

WL		BCR			ACR
WL-T PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME
Dry	1-21-87		15.3	2-9-87	
Dry	1-22-87		9.0	3-26-87	
16.1	2-4-87				

BORING STARTED 1-19-87

BORING COMPLETED 1-19-87

RIG Joy 15

FOREMAN RER

STS OFFICE 540 Lambeau Street
Green Bay, WI. 54303

DRAWN BY JJT

SHEET 1 OF 1

APP'D. BY JWK

STS JOB NO. 13685

L: 5-983

STS Consultants Ltd.

OWNER
Albany International

LOG OF BORING NUMBER
MW-2

PROJECT NAME
Chromium Contamination Assessment

ENGINEER

SITE LOCATION
N. Meade Street, Appleton, Wisconsin

WELL INSTALLATION
TOP STANDPIPE EL. + 770.63

SURFACE ELEVATION 768.53 (USGS)

DEPTH	ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, N (B/FT)	UNCONFINED COMPRESSIVE STRENGTH, Qp (TONS/FT²)	WATER CONTENT, %	UNIT DRY WEIGHT (LBS/FT³)	LIQUID/PLASTIC LIMIT LL/PL	PERCENT PASSING #200 SIEVE	PERMEABILITY, K (CM/SEC)
		1	SS			Dark brown sandy silt (ML) - trace of gravel, little roots - loose - topsoil	9						
		2	SS			Brown silty clay (CL) - trace of sand and gravel - trace of roots - medium dense - possible fill	10						
		3	SS				25						
		4	SS			Brown silty clay (CL) - trace of gravel - medium dense - glacial till - saturated at 14.0 feet	26						
		5	SS				29						
		6	SS				23						
		7	SS				23						
		8	SS				7						
		9	SS				6						
		10	SS				7						
						End of Boring Boring advanced from 0.0 to 20.0 feet by power auger 2 inch diameter PVC observation well installed at 20.0 feet with protector pipe							

The stratification lines represent the approximate boundary between soil types. In situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally.

WL		BCR			ACR
WL-T. PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME
14.3	1-21-87		8.1	2-9-87	
11.4	1-22-87		6.1	3-26-87	
7.7	2-4-87				

BORING STARTED 1-19-87
BORING COMPLETED 1-19-87
RIG Joy 15
FOREMAN RER

STS OFFICE 540 Lambeau Street
Green Bay, WI. 54303

DRAWN BY JJT
SHEET 1 OF 1
APP'D. BY JWK
STS JOB NO. 13685

5-983

STS Consultants Ltd.

OWNER Albany International	**LOG OF BORING NUMBER** MW-2A
PROJECT NAME Site Remediation	**ENGINEER** STS Consultants, Ltd.

ITE LOCATION Former Albany International Chromium Facility
Appleton, Wisconsin

WELL INSTALLATION
TOP STANDPIPE EL. +764.74

SURFACE ELEVATION +762.80

H	ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, N (B/FT)	UNCONFINED COMPRESSIVE STRENGTH, Qp (TONS/FT²)	WATER CONTENT, %	UNIT DRY WEIGHT (LBS/FT³)	LIQUID/PLASTIC LIMIT LL/PL	PERCENT PASSING #200 SIEVE	PERMEABILITY, K (CM/SEC)
			HS										
5													
						No samples collected - see boring log of Boring 2							
10													
			RB										
15													
20													
		1	ST					1.5					
25													
		2	ST			Brown silty clay (CL) - trace of gravel - firm - wet - till		1.0					
30													
		3	ST					1.0					
35													
		4	ST					.75					
40													
42		5	ST					.75					

End of Boring
Boring advanced to 7.0 feet with power auger and from 7.0 to 42.0 feet with rock bit - 8.0 feet of 6 inch diameter temporary casing installed while drilling - 2 inch diameter monitoring well installed at 40.0 feet

The stratification lines represent the approximate boundary between soil types. In situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally.

/L		BCR			ACR		
VL-T. PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME		
8.96'	2-5-90						

BORING STARTED 1-29-90
BORING COMPLETED 1-29-90
RIG CME 75
FOREMAN BZ

STS OFFICE 540 Lambeau Street
Green Bay, WI 54303

DRAWN BY RLS
SHEET 1 OF 1
APP'D. BY MAB
STS JOB NO. 16898XH

: 5-983

STS Consultants Ltd.

OWNER Albany International

LOG OF BORING NUMBER B-3

PROJECT NAME Chromium Contamination Assessment

ENGINEER

SITE LOCATION N. Meade Street, Appleton, Wisconsin

WELL INSTALLATION
TOP STANDPIPE EL. +

SURFACE ELEVATION

TH	ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, N (B/FT)	UNCONFINED COMPRESSIVE STRENGTH, Qp (TONS/FT²)	WATER CONTENT, %	UNIT DRY WEIGHT (LBS/FT³)	LIQUID/PLASTIC LIMIT LL/PL	PERCENT PASSING #200 SIEVE	PERMEABILITY, K (CM/SEC)
		1	SS			Dark brown clayey sandy silt (ML) - trace of gravel, little roots and gravel - loose - topsoil	5						
		1A	SS										
		2	SS			Brown silty clay (CL) - trace of gravel - loose - possible fill	6						
5		3	SS			Brown silty clay (CL) - trace of gravel - medium dense - glacial till - saturated at 16.0 feet	30						
		4	SS				26						
		5	SS				24						
10		6	SS				20						
		7	SS				18						
15		8	SS				11						
		9	SS				6						
9.5		10	SS				9						
						End of Boring Boring advanced from 0.0 to 19.5 feet by power auger Boring backfilled with bentonite							

The stratification lines represent the approximate boundary between soil types. In situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally.

WL		BCR			ACR
WL-T. PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME

BORING STARTED 1-14-87

BORING COMPLETED 1-14-87

RIG Joy 15

FOREMAN RER

STS OFFICE 540 Lambeau Street
Green Bay, WI. 54303

DRAWN BY JJT

APP'D. BY JWK

SHEET 1 OF 1

STS JOB NO. 13685

5-983

STS Consultants Ltd.

OWNER Albany International

LOG OF BORING NUMBER B-4

PROJECT NAME Chromium Contamination Assessment

ENGINEER

SITE LOCATION N. Meade Street, Appleton, Wisconsin

WELL INSTALLATION
TOP STANDPIPE EL. +

TH	ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION	STANDARD PENETRATION TEST, N (B/FT)	UNCONFINED COMPRESSIVE STRENGTH, Qp (TONS/FT²)	WATER CONTENT, %	UNIT DRY WEIGHT (LBS/FT³)	LIQUID/PLASTIC LIMIT LL/PL	PERCENT PASSING #200 SIEVE	PERMEABILITY, K (CM/SEC)
		1	SS			Dark brown clayey sandy silt (ML) - trace of gravel, little grass, roots - loose - topsoil	7						
		2	SS			Brown silty clay (CL) - trace of gravel - loose to medium dense - possible fill	9						
5		3	SS				25						
		4	SS				24						
10		5	SS			Brown silty clay (CL) - trace of gravel - loose to medium dense - glacial till - saturated at 10.0 feet	6						
		6	SS				17						
		7	SS				9						
15		8	SS				9						
		9	SS				7						
19.5		10	SS				7						

End of Boring
Boring advanced from 0.0 to 19.5 feet by power auger
Boring backfilled with bentonite

The stratification lines represent the approximate boundary between soil types. In situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally.

WL		BCR			ACR
WL-T PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME

BORING STARTED 1-19-87
BORING COMPLETED 1-19-87
RIG Joy 15
FOREMAN RER

STS OFFICE 540 Lambeau Street
Green Bay, WI. 54303

DRAWN BY JJT
SHEET 1 OF 1
APP'D. BY JWK
STS JOB NO. 13685

5-983

STS Consultants Ltd.

OWNER Albany International

LOG OF BORING NUMBER MW-5

PROJECT NAME Chromium Contamination Assessment

ENGINEER

SITE LOCATION N. Meade Street, Appleton, Wisconsin

WELL INSTALLATION
TOP STANDPIPE EL. + 769.88

SURFACE ELEVATION 768.08 (USGS)

DEPTH	ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, N (B/FT)	UNCONFINED COMPRESSIVE STRENGTH, Qp (TONS/FT²)	WATER CONTENT, %	UNIT DRY WEIGHT (LBS/FT³)	LIQUID/PLASTIC LIMIT LL/PL	PERCENT PASSING #200 SIEVE	PERMEABILITY, K (CM/SEC)
						Concrete							
						Fill: Crushed stone							
		1	SS			Brown silty clay (CL) - trace of gravel - medium dense - possible fill	12						
5													
		2	SS				15						
		3	SS			Brown silty clay (CL) - trace of gravel - loose to medium dense - glacial till - saturated at 18.0 feet	26						
10													
		4	SS				12						
		5	SS				14						
15													
		6	SS				5						
		7	SS				6						
20													
		8	SS				6						
25													
		9	SS				5						
30													
		10	SS				6						
35													
		11	SS				6						
40													
41.5		12	SS				9						
						End of Boring Boring advanced from 0.0 to 17.5 feet by power auger - Boring advanced from 17.5 to 41.5 feet by roller bit and water 2 inch diameter PVC piezometer installed at 40 ft. with protector pipe - 7.0 feet of HW casing used							

The stratification lines represent the approximate boundary between soil types. In situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally.

WL		BCR			ACR
WL-T. PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME
5.2	1-21-87		25.3	2-9-87	
15.4	1-22-87		16.8	3-26-87	
26.6	2-4-87				

BORING STARTED 1-20-87
BORING COMPLETED 1-29-87
RIG Joy 15
FOREMAN RER

STS OFFICE 540 Lambeau Street
Green Bay, WI. 54303

DRAWN BY JJT
SHEET 1 OF 1
APP'D. BY JWK
STS JOB NO. 13685

5-983

STS Consultants Ltd.

OWNER
Albany International

LOG OF BORING NUMBER
MW-5A

PROJECT NAME
Site Remediation

ENGINEER
STS Consultants, Ltd.

ITE LOCATION
Former Albany International Chromium Facility
Appleton, Wisconsin

TH	ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +762.41	WELL INSTALLATION TOP STANDPIPE EL. + 765.29	STANDARD PENETRATION TEST, N (B/FT)	UNCONFINED COMPRESSIVE STRENGTH, Qp (TONS/FT²)	WATER CONTENT, %	UNIT DRY WEIGHT (LBS/FT³)	LIQUID/PLASTIC LIMIT LL/PL	PERCENT PASSING #200 SIEVE	PERMEABILITY, K (CM/SEC)
5														
10			HS			No samples collected - see log of boring log MW-5								
15														
20						End of Boring Boring advanced to 20.0 feet with power auger 2 inch diameter monitoring well installed at 20.0 feet								

The stratification lines represent the approximate boundary between soil types. In situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally.

Dry WD		BCR			ACR
-T. PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME

BORING STARTED 1-29-90
BORING COMPLETED 1-29-90
RIG CME 75
FOREMAN BZ

STS OFFICE 540 Lambeau Street
Green Bay, WI 54303

DRAWN BY RLS
SHEET 1 OF 1
APP'D. BY MAB
STS JOB NO. 16898XH

-983

STS Consultants Ltd.

OWNER
Albany International

LOG OF BORING NUMBER
B-6

PROJECT NAME
Chromium Contamination Assessment

ENGINEER

SITE LOCATION
N. Meade Street, Appleton, Wisconsin

DEPTH ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION	WELL INSTALLATION TOP STANDPIPE EL. +	STANDARD PENETRATION TEST, N (B/FT)	UNCONFINED COMPRESSIVE STRENGTH, Qp (TONS/FT²)	WATER CONTENT, %	UNIT DRY WEIGHT (LBS/FT³)	LIQUID/PLASTIC LIMIT LL/PL	PERCENT PASSING #200 SIEVE	PERMEABILITY, K (CM/SEC)
					Blacktop and crushed stone								
	1	SS					18						
5	2	SS					20						
	3	SS					23						
10	4	SS			Brown silty clay (CL) - trace of gravel - loose to medium dense - glacial till - saturated at 15.0 feet		15						
	5	SS					9						
15	6	SS					4						
	7	SS					5						
20	8	SS					5						
21.5					End of Boring Boring advanced from 0.0 to 21.5 feet by power auger Boring backfilled with bentonite								

The stratification lines represent the approximate boundary between soil types. In situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally.

WL		BCR			ACR
WL-T. PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME

BORING STARTED 1-20-87
BORING COMPLETED 1-20-87
RIG Joy 15
FOREMAN RER

STS OFFICE 540 Lambeau Street
Green Bay, WI. 54303

DRAWN BY JJT
APP'D. BY JWK
SHEET 1 OF 1
STS JOB NO. 13685

5-983

STS Consultants Ltd.

OWNER
Albany International

LOG OF BORING NUMBER
B-7

PROJECT NAME
Chromium Contamination Assessment

ENGINEER

ITE LOCATION
N. Meade Street, Appleton, Wisconsin

WELL INSTALLATION
TOP STANDPIPE EL. +

TH	ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION	STANDARD PENETRATION TEST, N (B/FT)	UNCONFINED COMPRESSIVE STRENGTH, Qp (TONS/FT²)	WATER CONTENT, %	UNIT DRY WEIGHT (LBS/FT³)	LIQUID/PLASTIC LIMIT LL/PL	PERCENT PASSING #200 SIEVE	PERMEABILITY, K (CM/SEC)
						Blacktop and crushed stone							
		1	SS			Brown silty clay (CL) - trace of gravel - loose to medium dense - glacial till - saturated at 15.0 feet	30						
		2	SS				14						
		3	SS				20						
10		4	SS				15						
		5	SS				9						
15		6	SS				9						
		7	SS				6						
20 21.5		8	SS				5						

End of Boring
Boring advanced from 0.0 to 21.5 feet by power auger
Boring backfilled with bentonite

The stratification lines represent the approximate boundary between soil types. In situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally.

WL		BCR			ACR
L-T. PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME

BORING STARTED 1-20-87
BORING COMPLETED 1-20-87
RIG Joy 15
FOREMAN RER

STS OFFICE 540 Lambeau Street
Green Bay, WI. 54303

DRAWN BY JJT
SHEET 1 OF 1
APP'D. BY JWK
STS JOB NO. 13685

E 5-983

STS Consultants Ltd.

OWNER Albany International

LOG OF BORING NUMBER B-8

PROJECT NAME Chromium Contamination Assessment

ENGINEER

SITE LOCATION N. Meade Street, Appleton, Wisconsin

WELL INSTALLATION
TOP STANDPIPE EL. + ______

TH	ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, N (B/FT)	UNCONFINED COMPRESSIVE STRENGTH, Qp (TONS/FT²)	WATER CONTENT, %	UNIT DRY WEIGHT (LBS/FT³)	LIQUID/PLASTIC LIMIT LL/PL	PERCENT PASSING #200 SIEVE	PERMEABILITY, K (CM/SEC)
						SURFACE ELEVATION							
						Fill: Blacktop, stone and clay							
		1	SS			Brown to yellowish brown slightly clayey silt (ML) trace of fine to coarse sand - moist at 5.0 feet - medium dense	19						
5		2	SS				16						
		3	SS				28						
10		4	SS			Brown silty clay (CL) - trace of fine to medium sand - trace of organics at 12.5 feet - loose to medium dense - moist	17						
		5	SS				8						
15		6	SS				7						
		7	SS				7						
20		8	SS			Brown to pale olive silty clay (CL) - trace of fine sand and wood - pale olive by wood - moist	5						
21.5						End of Boring Boring advanced from 0.0 to 21.5 feet by power auger Boring bacfilled with bentonite							

The stratification lines represent the approximate boundary between soil types. In situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally.

WL		BCR			ACR
WL-T. PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME

BORING STARTED 1-20-87

BORING COMPLETED 1-20-87

RIG Joy 15

FOREMAN RER

STS OFFICE 540 Lambeau Street
Green Bay, WI. 54303

DRAWN BY JJT

SHEET 1 OF 1

APP'D. BY JWK

STS JOB NO. 13685

: 5-983

STS Consultants Ltd.

OWNER Albany International

LOG OF BORING NUMBER B-9

PROJECT NAME Chromium Contamination Assessment

ENGINEER

SITE LOCATION N. Meade Street, Appleton, Wisconsin

WELL INSTALLATION TOP STANDPIPE EL. +

SURFACE ELEVATION

DEPTH ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, N (B/FT)	UNCONFINED COMPRESSIVE STRENGTH, Qp (TONS/FT²)	WATER CONTENT, %	UNIT DRY WEIGHT (LBS/FT³)	LIQUID/PLASTIC LIMIT LL/PL	PERCENT PASSING #200 SIEVE	PERMEABILITY, K (CM/SEC)
	1	SS			Fill: Yellowish brown silty gravelly fine sand (SM) - little fine gravel - little silt - loose to medium dense	5						
5												
	2	SS				18						
	3	SS			Brown silty clay (CL) - trace of fine sand - trace of coarse sand - thin streaks of gray clay 12.5 to 14.0 feet - streaks of fine to medium sand at 15.0 to 16.5 feet - moist at 19.0 feet - loose to medium dense	27						
10												
	4	SS				16						
	5	SS				9						
15												
	6	SS				6						
	7	SS				6						
20												
21.5	8	SS				5						
					End of Boring Boring advanced from 0.0 to 215. feet by power auger Boring backfilled with bentonite							

The stratification lines represent the approximate boundary between soil types. In situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally.

WL		BCR			ACR
WL-T. PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME

BORING STARTED 1-21-87

BORING COMPLETED 1-21-87

RIG Joy 15

FOREMAN RER

STS OFFICE 540 Lambeau Street
Green Bay, WI. 54303

DRAWN BY JJT

SHEET 1 OF 1

APP'D. BY JWK

STS JOB NO. 13685

BL 5-983

STS Consultants Ltd.

OWNER Albany International

LOG OF BORING NUMBER MW-10

PROJECT NAME Chromium Contamination Assessment

ENGINEER

SITE LOCATION N. Meade Street, Appleton, Wisconsin

WELL INSTALLATION
TOP STANDPIPE EL. + 767.46

SURFACE ELEVATION 767.80 (USGS)

DEPTH	ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, N (B/FT)	UNCONFINED COMPRESSIVE STRENGTH, Qp (TONS/FT²)	WATER CONTENT, %	UNIT DRY WEIGHT (LBS/FT³)	LIQUID/PLASTIC LIMIT LL/PL	PERCENT PASSING #200 SIEVE	PERMEABILITY, K (CM/SEC)
		1	SS			Brown clayey sandy silt (ML) - trace of fine gravel - medium dense	23						
5		2	SS				22						
		3	SS			Brown silty clay (CL) - trace of sand - fractured at 10.0 feet - moist at 20.0 feet - loose to medium dense	18						
10		4	SS				11						
		5	SS				11						
15		6	SS				11						
		7	SS				6						
20		8	SS				5						
21.5						End of Boring Boring advanced from 0.0 to 21.5 feet by power auger 2 inch diameter PVC observation well installed at 20.0 feet with protector pipe							

The stratification lines represent the approximate boundary between soil types. In situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally.

WL		BCR			ACR
WL-T. PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME
Dry	1-21-87		6.1	3-26-87	
7.5	1-22-87				
6.5	2-9-87				

BORING STARTED 1-21-87

BORING COMPLETED 1-21-87

RIG Joy 12

FOREMAN RER

STS OFFICE 540 Lambeau Street
Green Bay, WI. 54303

DRAWN BY JJT

SHEET 1 OF 1

APP'D. BY JWK

STS JOB NO. 13685

5-983

STS Consultants Ltd.

OWNER Albany International	LOG OF BORING NUMBER MW-11
PROJECT NAME Chromium Contamination Assessment	ENGINEER

SITE LOCATION
N. Meade Street, Appleton, Wisconsin

WELL INSTALLATION
TOP STANDPIPE EL. + 768.65

SURFACE ELEVATION 768.90 (USGS)

...TH	ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, N (B/FT)	UNCONFINED COMPRESSIVE STRENGTH, Qp (TONS/FT²)	WATER CONTENT, %	UNIT DRY WEIGHT (LBS/FT³)	LIQUID/PLASTIC LIMIT LL/PL	PERCENT PASSING #200 SIEVE	PERMEABILITY, K (CM/SEC)
		1	SS				20						
5		2	SS			Brown silty clay (CL) - 2" topsoil - medium dense	24						
		3	SS				24						
10		4	SS				17						
		5	SS				8						
15		6	SS			Brown silty clay (CL) - trace of sand and gravel - moist at 15.0 feet - loose	5						
		7	SS				6						
20													
21.5		8	SS				6						
						End of Boring Boring advanced from 0.0 to 21.5 feet by power auger 2 inch diameter PVC observation well installed at 20.0 feet with protector pipe							

The stratification lines represent the approximate boundary between soil types. In situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally.

WL		BCR			ACR	BORING STARTED	1-21-87	STS OFFICE	540 Lambeau Street Green Bay, WI. 54303
WL-T. PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME	BORING COMPLETED	1-21-87	DRAWN BY JJT	SHEET 1 OF 1
Dry	1-21-87		3.1	3-26-87		RIG	Joy 12	APP'D. BY JWK	STS JOB NO. 13685
Dry	1-22-87					FOREMAN	RER		
6.3	2-9-87								

5-983

STS Consultants Ltd.

OWNER Albany International

LOG OF BORING NUMBER B-12

PROJECT NAME Chromium Contamination Assessment

ENGINEER

SITE LOCATION N. Meade Street, Appleton, Wisconsin

WELL INSTALLATION TOP STANDPIPE EL. +

DEPTH	ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION	STANDARD PENETRATION TEST, N (B/FT)	UNCONFINED COMPRESSIVE STRENGTH, Qp (TONS/FT²)	WATER CONTENT, %	UNIT DRY WEIGHT (LBS/FT³)	LIQUID/PLASTIC LIMIT LL/PL	PERCENT PASSING #200 SIEVE	PERMEABILITY, K (CM/SEC)
		1	SS			Dark brown silty clay (CL) - medium dense	12						
5		2	SS			Brown silty clay (CL) - trace of sand and gravel - fractured - moist at 15.0 feet - loose to medium dense	23						
		3	SS				23						
10		4	SS				16						
		5	SS				12						
15		6	SS				6						
		7	SS				5						
20		8	SS				5						
21.5						End of Boring Boring advanced from 0.0 to 21.5 feet by power auger Boring backfilled with bentonite							

The stratification lines represent the approximate boundary between soil types. In situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally.

WL			BCR		ACR
WL-T PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME

BORING STARTED 1-21-87

BORING COMPLETED 1-21-87

RIG Joy 12

FOREMAN RER

STS OFFICE 540 Lambeau Street
Green Bay, WI. 54303

DRAWN BY JJT

SHEET 1 OF 1

APP'D. BY JWK

STS JOB NO. 13685

L: 5-983

STS Consultants Ltd.

OWNER
Albany International

LOG OF BORING NUMBER
B-13

PROJECT NAME
Chromium Contamination Assessment

ENGINEER

SITE LOCATION
N. Meade Street, Appleton, Wisconsin

DEPTH	ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL WELL INSTALLATION TOP STANDPIPE EL. + SURFACE ELEVATION	STANDARD PENETRATION TEST, N (B/FT)	UNCONFINED COMPRESSIVE STRENGTH, Qp (TONS/FT²)	WATER CONTENT, %	UNIT DRY WEIGHT (LBS/FT³)	LIQUID/PLASTIC LIMIT LL/PL	PERCENT PASSING #200 SIEVE	PERMEABILITY, K (CM/SEC)
		1	SS			Fill: Dark brown to brown silty clay (CL) - trace of gravel - medium dense	10						
5		2	SS			Brown silty clay (CL) - trace of sand and gravel - moist at 15.0 feet - medium dense	27						
		3	SS				26						
10		4	SS				20						
		5	SS				13						
15		6	SS				17						
		7	SS			Gray to brown silty clay (CL) - trace of sand - some wood - loose	4						
20 21.5		8	SS			Brown silty clay (CL) - trace of coarse sand - loose	6						
						End of Boring Boring advanced from 0.0 to 21.5 feet by power auger Boring backfilled with bentonite							

The stratification lines represent the approximate boundary between soil types. In situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally.

WL		BCR			ACR
WL-T. PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME

BORING STARTED 1-21-87
BORING COMPLETED 1-21-87
RIG Joy 12
FOREMAN RER

STS OFFICE 540 Lambeau Street
Green Bay, WI. 54303
DRAWN BY JJT
APP'D. BY JWK
SHEET 1 OF 1
STS JOB NO. 13685

5-983

STS Consultants Ltd.

OWNER
Albany International

LOG OF BORING NUMBER
B-14

PROJECT NAME
Chromium Contamination Assessment

ENGINEER

TE LOCATION
N. Meade Street, Appleton, Wisconsin

WELL INSTALLATION
TOP STANDPIPE EL. +

SURFACE ELEVATION

ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, N (B/FT)	UNCONFINED COMPRESSIVE STRENGTH, Qp (TONS/FT²)	WATER CONTENT, %	UNIT DRY WEIGHT (LBS/FT³)	LIQUID/PLASTIC LIMIT LL/PL	PERCENT PASSING #200 SIEVE	PERMEABILITY, K (CM/SEC)
	1	SS			Fill: Brown silty clay (CL) - some sand - trace of gravel - slight yellow stain on gravel - medium dense	11						
	2	SS			Brown silty clay (CL) - trace to a little sand - trace of gravel - fractured to 14.0 feet - moist at 15.0 feet - loose to medium dense	27						
	3	SS				20						
	4	SS				20						
	5	SS				12						
	6	SS				6						
	7	SS				6						
	8	SS				13						

End of Boring
Boring advanced from 0.0 to 21.5 feet by power auger
Boring backfilled with bentonite

The stratification lines represent the approximate boundary between soil types. In situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally.

BCR			ACR		
L-T PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME

BORING STARTED 1-21-87
BORING COMPLETED 1-21-87
RIG Joy 12
FOREMAN RER

STS OFFICE 540 Lambeau Street
Green Bay, WI. 54303
DRAWN BY JJT
SHEET 1 OF 1
APP'D. BY JWK
STS JOB NO. 13685

5-983

STS Consultants Ltd.

OWNER Albany International

LOG OF BORING NUMBER B-15

PROJECT NAME Chromium Contamination Assessment

ENGINEER

SITE LOCATION N. Meade Street, Appleton, Wisconsin

WELL INSTALLATION
TOP STANDPIPE EL. +

SURFACE ELEVATION

DEPTH	ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, N (B/FT)	UNCONFINED COMPRESSIVE STRENGTH, Qp (TONS/FT²)	WATER CONTENT, %	UNIT DRY WEIGHT (LBS/FT³)	LIQUID/PLASTIC LIMIT LL/PL	PERCENT PASSING #200 SIEVE	PERMEABILITY, K (CM/SEC)
		1	SS			Brown silty clay (CL) - little sand - trace of gravel - medium dense	16						
5		2	SS		LS		26						
		3	SS				26						
10		4	SS			Brown silty clay (CL) - trace of sand and gravel - moist at 15.0 to 16.5 feet - loose to medium dense	17						
		5	SS				9						
15		6	SS				6						
		7	SS				6						
20		8	SS				5						
21.5						End of Boring Boring advanced from 0.0 to 21.5 feet by power auger Boring backfilled with bentonite							

The stratification lines represent the approximate boundary between soil types. In situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally.

WL		BCR			ACR
WL-T PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME

BORING STARTED 2-4-87

BORING COMPLETED 2-4-87

RIG #12

FOREMAN RER

STS OFFICE 540 Lambeau Street
Green Bay, WI. 54303

DRAWN BY JJT

SHEET 1 OF 1

APP'D. BY JWK

STS JOB NO. 13685

5-983

STS Consultants Ltd.

OWNER
Albany International

LOG OF BORING NUMBER
B-16

PROJECT NAME
Chromium Contamination Assessment

ENGINEER

ITE LOCATION
N. Meade Street, Appleton, Wisconsin

TH	ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION	WELL INSTALLATION TOP STANDPIPE EL. +	STANDARD PENETRATION TEST, N (B/FT)	UNCONFINED COMPRESSIVE STRENGTH, Qp (TONS/FT²)	WATER CONTENT, %	UNIT DRY WEIGHT (LBS/FT³)	LIQUID/PLASTIC LIMIT LL/PL	PERCENT PASSING #200 SIEVE	PERMEABILITY, K (CM/SEC)
		1	SS			Fill: Brown silty clay (CL) - trace of sand - some gravel - loose		5						
5		2	SS			Brown silty clay (CL) - trace of sand and gravel - fractured - moist at 12.0 to 15.5 feet - loose to medium dense		24						
		3	SS					28						
10		4	SS					13						
		5	SS					9						
15		6	SS					7						
		7	SS					6						
20 21.5		8	SS					6						
						End of Boring Boring advanced from 0.0 to 21.5 feet by power auger Boring backfilled with bentonite								

The stratification lines represent the approximate boundary between soil types. In situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally.

VL		BCR			ACR
WL-T. PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME

BORING STARTED 2-4-87
BORING COMPLETED 2-4-87
RIG #12
FOREMAN RER

STS OFFICE 540 Lambeau Street
Green Bay, WI. 54303

DRAWN BY JJT
APP'D. BY JWK
SHEET 1 OF 1
STS JOB NO. 13685

: 5-983

STS Consultants Ltd.

OWNER
Albany International

LOG OF BORING NUMBER
MW-17

PROJECT NAME
Site Remediation

ENGINEER
STS Consultants, Ltd.

SITE LOCATION
Former Albany International Chromium Facility
Appleton, Wisconsin

WELL INSTALLATION
TOP STANDPIPE EL. + 771.84

SURFACE ELEVATION +769.07

TH	ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, N (B/FT)	UNCONFINED COMPRESSIVE STRENGTH, Qp (TONS/FT²)	WATER CONTENT, %	UNIT DRY WEIGHT (LBS/FT³)	LIQUID/PLASTIC LIMIT LL/PL	PERCENT PASSING #200 SIEVE	PERMEABILITY, K (CM/SEC)
5													
						No samples collected - see boring log of MW-17A							
10			HS										
15													
20													
						End of Boring Boring advanced to 20.0 feet with power auger 2 inch diameter Schedule 40 PVC monitoring well installed at 20.0 feet							

The stratification lines represent the approximate boundary between soil types. In situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally.

VL		BCR			ACR
VL-T. PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME

BORING STARTED 1-31-90
BORING COMPLETED 1-31-90
RIG CME 45
FOREMAN BZ

STS OFFICE 540 Lambeau Street
Green Bay, WI 54303

DRAWN BY RLS
SHEET 1 OF 1
APP'D. BY MAB
STS JOB NO. 16898XH

5-983

STS Consultants Ltd.

OWNER Albany International	**LOG OF BORING NUMBER** MW-17A
PROJECT NAME Site Remediation	**ENGINEER** STS Consultants, Ltd.

SITE LOCATION Former Albany International Chromium Facility
Appleton, Wisconsin

WELL INSTALLATION
TOP STANDPIPE EL. + 771.07

SURFACE ELEVATION +769.02

DEPTH	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, N (B/FT)	UNCONFINED COMPRESSIVE STRENGTH, Qp (TONS/FT²)	WATER CONTENT, %	UNIT DRY WEIGHT (LBS/FT³)	LIQUID/PLASTIC LIMIT LL/PL	PERCENT PASSING #200 SIEVE	PERMEABILITY, K (CM/SEC)
	1	PA	Brown sand and gravel - fill							
	2	ST	Red silty clay - fill							
5			Black peat - trace of roots - trace of cinders - dry - topsoil							
	3	ST	Reddish brown silty clay (CL) - trace of gravel - trace of cobbles - very stiff to very hard - damp - till		4.5+					
	4	ST			3.75					
10										
	5	ST			3.5					
	6	ST	Reddish brown silty clay (CL) - stiff - damp - till		1.0					
15										
	7	ST	Brown silty clay (CL) - trace of gravel - trace of silt and very fine sand layers-moist-firm-till							
	8	ST	Brown silty clay (CL) - trace of gravel - very soft to soft - wet - till		1.0					
20										
	9	ST			.5					
25										
	10	ST			.25					
30										
	11	ST			.5					
35										
	12	ST			.75					
40										
	13	ST			1.5					
42										

End of Boring
Boring advanced to 20.0 feet with power auger and from 20.0 to 42.0 feet with rock bit
10.0 feet of 6 inch diameter temporary casing installed while drilling
2 inch diameter Schedule 40 PVC monitoring well installed at 40.0 feet

The stratification lines represent the approximate boundary between soil types. In situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally.

WL		BCR			ACR
WL-T. PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME

BORING STARTED 1-30-90	STS OFFICE 540 Lambeau Street Green Bay, WI 54303		
BORING COMPLETED 1-30-90	DRAWN BY RLS	SHEET 1 OF 1	
RIG CME 75			
FOREMAN BZ	APP'D. BY MAB	STS JOB NO. 16898XH	

5-983

STS Consultants Ltd.

OWNER
Albany International

LOG OF BORING NUMBER
B-18

PROJECT NAME
Site Remediation

ENGINEER
STS Consultants, Ltd.

SITE LOCATION
Former Albany International Chromium Facility
Appleton, Wisconsin

WELL INSTALLATION
TOP STANDPIPE EL. +

SURFACE ELEVATION +768.94

DEPTH	ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, N (B/FT)	UNCONFINED COMPRESSIVE STRENGTH, Qp (TONS/FT²)	WATER CONTENT, %	UNIT DRY WEIGHT (LBS/FT³)	LIQUID/PLASTIC LIMIT LL/PL	PERCENT PASSING #200 SIEVE	PERMEABILITY, K (CM/SEC)
		1	PA			Fill: Brown sand and gravel							
5		2	ST			Reddish brown silty clay (CL) - trace of gravel - yellowish brown silt laminations - very stiff to very hard - damp - fractured - till		4.5+					
		3	ST					3.75					
10		4	ST					3.75					
		5	ST					1.75					
15		6	ST					3.50					
		7	ST			Reddish brown to brown silty clay (CL) - stiff - moist - till		.75					
20		8	ST			Brown silty clay (CL) - firm - wet - till		.50					
22		9	ST					1.75					

End of Boring
Boring advanced to 22.0 feet with power auger
Boring backfilled with granular bentonite

The stratification lines represent the approximate boundary between soil types. In situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally.

WL		BCR	ACR		
WL-T. PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME

BORING STARTED 2-1-90
BORING COMPLETED 2-1-90
RIG CME 75
FOREMAN BZ

STS OFFICE 540 Lambeau Street
Green Bay, WI 54303
DRAWN BY RLS
SHEET 1 OF 1
APP'D. BY MAB
STS JOB NO. 16898XH

5-983

STS Consultants Ltd.

OWNER
Albany International

LOG OF BORING NUMBER
B-19

PROJECT NAME
Site Remediation

ENGINEER
STS Consultants, Ltd.

SITE LOCATION
Former Albany International Chromium Facility
Appleton, Wisconsin

WELL INSTALLATION
TOP STANDPIPE EL. + ____

TH	ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, N (B/FT)	UNCONFINED COMPRESSIVE STRENGTH, Qp (TONS/FT²)	WATER CONTENT, %	UNIT DRY WEIGHT (LBS/FT³)	LIQUID/PLASTIC LIMIT LL/PL	PERCENT PASSING #200 SIEVE	PERMEABILITY, K (CM/SEC)
						SURFACE ELEVATION +768.98							
		1	AS			Fill: Brown sand and gravel							
5		2	ST			Reddish brown silty clay (CL) - trace of gravel - trace of medium sand from 10.0 to 12.0 feet - very hard - damp - fractured - till		4.5+					
		3	ST					4.5+					
10		4	ST					4.5+					
		5	ST					4.5+					
15		6	ST					4.5+					
		7	ST			Brown silty clay (CL) - firm - wet - till		.75					
20		8	ST					.75					
22		9	ST					.75					
						End of Boring Boring advanced to 22.0 feet with power auger Boring backfilled with granular bentonite							

The stratification lines represent the approximate boundary between soil types. In situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally.

WL		BCR			ACR
WL-T PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME

BORING STARTED 1-31-90
BORING COMPLETED 1-31-90
RIG CME 75
FOREMAN BZ

STS OFFICE 540 Lambeau Street
Green Bay, WI 54303

DRAWN BY RLS
SHEET 1 OF 1
APP'D. BY MAB
STS JOB NO. 16898XH

STS Consultants Ltd.

OWNER	**LOG OF BORING NUMBER**
Albany International	B-20
PROJECT NAME	**ENGINEER**
Site Remediation	STS Consultants, Ltd.

SITE LOCATION Former Albany International Chromium Facility
Appleton, Wisconsin

WELL INSTALLATION
TOP STANDPIPE EL. +

SURFACE ELEVATION +769.01

TH	ELEVATION	SAMPLE NO.	SAMPLE TYPE	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, N (B/FT)	UNCONFINED COMPRESSIVE STRENGTH, Qp (TONS/FT²)	WATER CONTENT, %	UNIT DRY WEIGHT (LBS/FT³)	LIQUID/PLASTIC LIMIT LL/PL	PERCENT PASSING #200 SIEVE	PERMEABILITY, K (CM/SEC)
		1	PA	Fill: Brown sand and gravel							
5		2	ST	Reddish brown silty clay (CL) - trace of gravel - yellowish brown fine sand laminations from 3.0 to 3.5 feet - trace of coarse sand from 5.0 to 7.0 feet - 1/4 inch thick yellowish brown fine sand lense at 8.0 feet - very hard - damp - fractured-till		4.5+					
		3	ST			4.5+					
10		4	ST			4.5+					
		5	ST	Reddish brown silty clay (CL) - very stiff - moist - fractured - till		3.5					
15		6	ST	Reddish brown silty clay (CL) - trace of gravel - very stiff - moist - till		2.25					
		7	ST	Brown silty clay (CL) - trace of gravel from 15.0 to 17.0 feet - firm - wet - till		.75					
20		8	ST			.5					
22		9	ST			.5					

End of Boring
Boring advanced to 22.0 feet with power auger
Boring backfilled with bentonite

The stratification lines represent the approximate boundary between soil types. In situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally.

WL		BCR			ACR
WL-T. PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME

BORING STARTED 2-1-90
BORING COMPLETED 2-1-90
RIG CME 75
FOREMAN BZ

STS OFFICE 540 Lambeau Street
Green Bay, WI 54303

DRAWN BY RLS
SHEET 1 OF 1
APP'D. BY MAB
STS JOB NO. 16898XH

5-983

STS Consultants Ltd.

OWNER
Albany International

LOG OF BORING NUMBER
B-21

PROJECT NAME
Site Remediation

ENGINEER
STS Consultants, Ltd.

SITE LOCATION
Former Albany International Chromium Facility
Appleton, Wisconsin

WELL INSTALLATION
TOP STANDPIPE EL. +

SURFACE ELEVATION +769.04

DEPTH	ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, N (B/FT)	UNCONFINED COMPRESSIVE STRENGTH, Qp (TONS/FT²)	WATER CONTENT, %	UNIT DRY WEIGHT (LBS/FT³)	LIQUID/PLASTIC LIMIT LL/PL	PERCENT PASSING #200 SIEVE	PERMEABILITY, K (CM/SEC)
		1	PA			Fill: Brown sand and gravel							
		2	ST			Reddish brown silty clay (CL) - trace of gravel - very hard - damp - fractured from 5.0 to 10.0 feet - till		4.5+					
5		3	ST					4.5+					
10		4	ST					4.5+					
		5	ST					4.5+					
15		6	ST			Reddish brown silty clay (CL) - trace of coarse sand - trace of gravel - stiff - moist - till		1.75					
		7	ST					1.0					
20		8	ST			Brown silty clay (CL) - trace of gravel - firm - wet - till		.5					
22		9	ST					.5					
						End of Boring Boring advanced to 22.0 feet with power auger Boring backfilled with bentonite							

The stratification lines represent the approximate boundary between soil types. In situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally.

WL		BCR			ACR
WL-T. PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME

BORING STARTED 2-1-90
BORING COMPLETED 2-1-90
RIG CME 75
FOREMAN BZ

STS OFFICE 540 Lambeau Street
Green Bay, WI 54303
DRAWN BY RLS
SHEET 1 OF 1
APP'D. BY MAB
STS JOB NO. 16898XH

5-983

STS Consultants Ltd.

OWNER
Albany International

LOG OF BORING NUMBER
B-22

PROJECT NAME
Site Remediation

ENGINEER
STS Consultants, Ltd.

SITE LOCATION
Former Albany International Chromium Facility
Appleton, Wisconsin

WELL INSTALLATION
TOP STANDPIPE EL. +

SURFACE ELEVATION +769.07

TH	ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, N (B/FT)	UNCONFINED COMPRESSIVE STRENGTH, Qp (TONS/FT²)	WATER CONTENT, %	UNIT DRY WEIGHT (LBS/FT³)	LIQUID/PLASTIC LIMIT LL/PL	PERCENT PASSING #200 SIEVE	PERMEABILITY, K (CM/SEC)
		1	PA			Fill: Brown sand and gravel							
		2	ST			Reddish brown silty clay (CL) - trace of gravel - trace of coarse sand from 7.0 to 9.0 feet - very hard - damp - fractured from 5.0 to 7.0 feet - till		4.5+					
5		3	ST					4.5+					
		4	ST					4.5+					
10		5	ST					4.5+					
		6	ST			Reddish brown silty clay (CL) - trace of gravel - very stiff - moist - till		2.75					
15		7	ST			Brown silty clay (CL) - trace of gravel from 20.0 to 22.0 feet - firm to stiff - wet - till		.50					
		8	ST					.75					
20		9	ST					.50					
22						End of Boring Boring advanced to 22.0 feet with power auger Boring backfilled with bentonite							

The stratification lines represent the approximate boundary between soil types. In situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally.

WL		BCR			ACR
WL-T. PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME

BORING STARTED 2-1-90
BORING COMPLETED 2-1-90
RIG CME 75
FOREMAN BZ

STS OFFICE 540 Lambeau Street
Green Bay, WI 54303
DRAWN BY RLS
SHEET 1 OF 1
APP'D. BY MAB
STS JOB NO. 16898XH

5-983

STS Consultants Ltd.

OWNER Albany International

LOG OF BORING NUMBER B-23

PROJECT NAME Site Remediation

ENGINEER STS Consultants, Ltd.

SITE LOCATION Former Albany International Chromium Facility
Appleton, Wisconsin

DEPTH	ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	WELL INSTALLATION TOP STANDPIPE EL. +	STANDARD PENETRATION TEST, N (B/FT)	UNCONFINED COMPRESSIVE STRENGTH, Qp (TONS/FT²)	WATER CONTENT, %	UNIT DRY WEIGHT (LBS/FT³)	LIQUID/PLASTIC LIMIT LL/PL	PERCENT PASSING #200 SIEVE	PERMEABILITY, K (CM/SEC)
						SURFACE ELEVATION +769.12								
		1	PA			Fill: Brown sand and gravel								
		2	ST						4.5+					
5		3	ST			Reddish brown silty clay (CL) - trace of gravel - trace of coarse sand from 3.0 to 4.0 feet - very hard - damp - fractured from 5.0 to 7.0 feet - till			4.5+					
		4	ST						4.5+					
10		5	ST						4.5+					
		6	ST			Reddish brown silty clay (CL) - trace of gravel - very stiff - moist - till			2.0					
14.5						End of Boring Boring advanced to 14.5 feet with power auger Boring backfilled with bentonite								

The stratification lines represent the approximate boundary between soil types. In situ, the transition may be gradual. Water levels were measured at the times indicated. Water levels may vary seasonally.

WL		BCR			ACR
WL-T. PIPE	DATE	TIME	WL-T. PIPE	DATE	TIME

BORING STARTED 2-1-90

BORING COMPLETED 2-1-90

RIG CME 75

FOREMAN BZ

STS OFFICE 540 Lambeau Street
Green Bay, WI 54303

DRAWN BY RLS

SHEET 1 OF 1

APP'D. BY MAB

STS JOB NO. 16898XH

5-983

CHEMISTS
ENGINEERS
BADGER LABORATORIES & ENGINEERING CO. INC.
1110 S. ONEIDA STREET • APPLETON, WISCONSIN 54915 • (414) 739-9213
FAX (414) 739-5399 • TOLL FREE PHONE IN WISCONSIN 1-800-242-3556

STS Project No. 16898XH
Forty-Five (45) Soil Samples
Received February 5, 1990
Sampled By: Client

Our Report No. 200856
Issued February 26, 1990

STS CONSULTANTS, LTD.
540 Lambeau Street
Green Bay, WI 54303

Att'n: Mr. Mark Bergeron

Request: Total and EP Toxicity Chromium determination as listed below.

Results:

	Chromium, Total ppm. Wet Weight Basis	Chromium, EP Toxicity mg/l.
18-2	26.1	NR
18-3	46.7	NR
18-4	38.7	NR
18-5	40.0	NR
18-6	26.6	NR
18-7	23.9	NR
18-8	20.9	NR
18-9	20.2	NR
19-2	164	<0.04
19-3	105	0.40
19-4	138	1.7
19-5	103	2.8
19-6	42.8	NR
19-7	24.7	NR
19-8	23.6	NR
19-9	22.6	NR
20-2	96.2	NR
20-3	111	0.97
20-4	138	4.0
20-5	340	10.1
20-6	167	4.5
20-7	20.5	NR
20-8	22.2	NR
20-9	22.2	NR
21-2	138	<0.04
21-3	148	0.24
21-4	170	4.3
21-5	439	10.9

WI Reg. Engineers (Corp.) #CE00601
WI DNR Certified Lab #445023150
WI Div. Health Cert. Lab #205, Bacteria water/milk
USDA Certified Lab #5585, Various tests for (Meat & Poultry) foods

Members
WI Environmental Labs; Am. Chemical Soc.;
Water Pollution Control Fed.; T.A.P.P.I.;
WI Food Processors Assn.; Wisc. Paper Council

	Chromium, Total ppm. Wet Weight Basis	Chromium, EP Toxicity mg/l.
21-6	596	21.5
21-7	280	1.8
21-8	20.4	NR
21-9	19.6	NR
22-2	472	<0.04
22-3	150	<0.04
22-4	121	1.2
22-5	184	5.0
22-6	510	15.0
22-7	21.0	NR
22-8	20.9	NR
22-9	21.8	NR
23-2	20.4	NR
23-3	108	0.83
23-4	142	3.4
23-5	203	7.0
23-6	140	4.1

Method: Test Methods for Evaluating Solid Waste, EPA, 1982, SW-846.

BADGER LABORATORIES & ENGINEERING
WDNR Certified Lab #445023150

Carla M Brown

Carla M. Brown
Lab Analyst

CMB:mw

Chain of Custody Enclosed.

WELL DATA SUMMARY SHEET

June 11, 1991

Total Chromium*

(parts per million)

Well No.	3-31-89	6-30-89	9-28-89	12-14-89	3-30-90	6-21-90	9-27-90	12-12-90	3-26-91	6-11-91
MW-1	<.001	.0037	<.10	<.04	.06	<0.04	<0.04	<0.04	0.07	<0.04
MW-2	.083	.073	.13	.05	.07	0.09	0.05	0.05	<0.04	0.04
MW-2A					<.04	<0.04	0.05	0.06	0.05	<0.04
MW-5	18.80	1.55	3.4	4.4	14.1	1.8	0.75	1.32	2.69	1.8
MW-5A					34.4	39.3	57.1	47.8	43.3	41
MW-10	**	<.10	<.10	<.04	.07	0.05	<0.04	<0.04	<0.04	<0.04
MW-11	14.30	40.90	24.5	9.2	18.0	31.3	28.1	19.1	11.2	14
MW-17					<.04	0.09	<0.04	<0.04	<0.04	<0.04
MW-17A					.04	<0.04	<0.04	<0.04	<0.04	<0.04

* Analyses were run by Badger Laboratories
** Flush mounted well cap jammed

Appendix E

Laboratory Analytical Data

Sample Number: 46003827
Description: MW-19A
Sample Date: 1/21/2016
Date Received: 1/21/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	121	ug/l	30	100	1	SM3113B	01/25/16	
HEX CHROME	<0.002	mg/l	0.002	0.006	1	SM3500CrB	01/21/16	

Sample Number: 46003828
Description: MW-20
Sample Date: 1/21/2016
Date Received: 1/21/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	**212000**	ug/l	6210	20679	207	SM3113B	01/25/16	
HEX CHROME	234	mg/l	0.020	0.067	1000	SM3500CrB	01/21/16	

Sample Number: 46003829
Description: MW-20A
Sample Date: 1/21/2016
Date Received: 1/21/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	5.4	ug/l	0.20	0.66	1	SM3113B	01/29/16	
HEX CHROME	<0.002	mg/l	0.002	0.006	1	SM3500CrB	01/21/16	

Sample Number: 46003830
Description: MW-20B
Sample Date: 1/21/2016
Date Received: 1/21/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	216000	ug/l	6143	20456	205	SM3113B	01/25/16	
HEX CHROME	156	mg/l	0.020	0.067	1000	SM3500CrB	01/21/16	

Sample Number: 46003831
Description: MW-21
Sample Date: 1/21/2016
Date Received: 1/21/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	0.89	ug/l	0.20	0.66	1	SM3113B	01/29/16	
HEX CHROME	<0.002	mg/l	0.002	0.006	1	SM3500CrB	01/21/16	

Sample Number: 46003832
Description: MW-21A
Sample Date: 1/21/2016
Date Received: 1/21/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	0.21	ug/l	0.20	0.66	1	SM3113B	01/29/16	
HEX CHROME	<0.002	mg/l	0.002	0.006	1	SM3500CrB	01/21/16	

Sample Number: 46003833
Description: MANHOLE
Sample Date: 1/21/2016
Date Received: 1/21/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,TOTAL REC	2.8	mg/l	0.08	0.27	2.7	SM3111D	01/25/16	
HEX CHROME	2.64	mg/l	0.040	0.133	20	SM3500CrB	01/21/16	
TURBIDITY-LAB	0.20	NTU	0	0		EPA180.1	01/22/16	

Sample Number: 46003834
Description: SUMP
Sample Date: 1/21/2016
Date Received: 1/21/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,TOTAL REC	22	mg/l	0.67	2.2	22	SM3111D	01/25/16	
HEX CHROME	22.4	mg/l	0.400	1.33	200	SM3500CrB	01/21/16	
METALS DIGESTION	DONE		0	0		SM3030E	01/22/16	

Sample Number: 46003835
Description: CANISTER A
Sample Date: 1/21/2016
Date Received: 1/21/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,TOTAL REC	4.0	mg/l	0.12	0.40	4	SM3111D	01/25/16	
TURBIDITY-LAB	0.45	NTU	0	0		EPA180.1	01/22/16	

Sample Number: 46003836
Description: OUTFALL 001
Sample Date: 1/21/2016
Date Received: 1/21/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,TOTAL REC	0.20	mg/l	0.03	0.10	1	SM3111D	01/25/16	
TURBIDITY-LAB	0.80	NTU	0	0		EPA180.1	01/22/16	

BADGER LABS & ENGINEERING
WDNR Certified Lab #445023150
Approved By:

Jeffrey M. Wagner

JMW:rt

REISSUED-Cr CORRECTION

Report Number:	16001668
Report Date:	2/3/2016
Sampled By:	Client
Emailed:	2/4/2016
PO#:	4500 208835
# Samples:	13 GROUNDWATERS /WASTEWATERS

ALBANY INTERNATIONAL-APPLETON
253 TROY RD
RENSSLEAER, NY 12144-

Sample Number: 46003824
Description: MW-05
Sample Date: 1/21/2016
Date Received: 1/21/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	444	ug/l	30	100	1	SM3113B	01/25/16	
HEX CHROME	0.408	mg/l	0.008	0.027	4	SM3500CrB	01/21/16	

Sample Number: 46003825
Description: MW-05A
Sample Date: 1/21/2016
Date Received: 1/21/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	7.8	ug/l	0.20	0.66	1	SM3113B	01/29/16	
HEX CHROME	<0.002	mg/l	0.002	0.006	1	SM3500CrB	01/21/16	

Sample Number: 46003826
Description: MW-19
Sample Date: 1/21/2016
Date Received: 1/21/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	15295	ug/l	452	1505	15	SM3113B	01/25/16	
HEX CHROME	17.0	mg/l	0.200	0.666	100	SM3500CrB	01/21/16	

BADGER LABORATORIES & ENGINEERING CO., INC.

SAMPLE RECEIPT FORM

16001668

CLIENT INFORMATION

COMPANY: Albany International
NAME:
ADDRESS: 253 Troy Road
Rensslear, NY 12144
PHONE/ FAX:
P.O. #: 4500 208835
PROJECT/SITE: Appleton Chrome Site
REPORT & BILL TO: Monthly Billing No Report To Albany
ADDITIONAL REPORTS TO: John Stoeger & DJC

TURN AROUND TIME:

☒ Normal
☐ Rush (Approval ________)

SAMPLE TYPE:

☑ Groundwater
☑ Wastewater
☐ WPDES
☐ Cooling Water
☐ Drinking Water
☐ Solid Waste
☐ Oil
☐ Other________

☐ Lab Filtered
☑ Field Filtered
☐ Grab
☐ Composite
☐ Flow Proportional
☐ Time Proportional

1 of 2

								DELIVERY METHOD				PRESERVATION									
CUSTOMER SAMPLE ID	SAMPLE DATE/TIME	DATE REC'D	BL & E REPORT #	BL & E SAMPLE #	TEMP *	# OF CONTAINERS	Ice Y/N	BLAE	CLIENT	UPS	OTHER	PIF	PIL	NON-PRES	H2SO4	HNO3	NAOH	OTHER	ANALYTICAL REQUESTS	pH ok	EP
MW-05	1/21/16 9:40 Am	1/21	1668	3824	7	2	Y		X			Y		X		X			Total Hex Chrom		
MU-05A				3825					X					X		X					
MW-19				3826					X					X		X					
MW-19A				3827					X					X		X					
MW-20				3828					X					X		X					
MW-20A				3829					X					X		X					
MW-20B				3830					X					X		X					
MW-21				3831					X					X		X					
MW-21A				3832					X					X		X					

CHAIN OF CUSTODY RECORD

FILLED IN BY CUSTOMER
SAMPLED BY: John Stoeger
DATE/TIME SAMPLED: 1/21/16 9:40 Am
RELINQUISHED BY:

FILLED IN BY BADGER LABS & ENG
RECEIVED BY: 10:40
DATE/TIME RECEIVED: JAN 21 2016
LOGGED IN:

* Temperature over 4°C are above EPA/DNR Protocol unless received on ice.
* EP= If pH was not correct, extra preservation was added until correct pH was achieved.
* PIF= Preserved in field.
* PIL= Preserved in lab.

BADGER LABORATORIES & ENGINEERING CO., INC.

SAMPLE RECEIPT FORM

2 of 2

CLIENT INFORMATION

COMPANY: Albany International
NAME:
ADDRESS: 253 Troy Road
Rensslealer, NY 12144
PHONE/ FAX:
P.O. #: 4500 208835
PROJECT/SITE: Appleton Chrome Site
REPORT & BILL TO: " Monthly Billing No Report To Albany
ADDITIONAL REPORTS TO: John Sturgeon & DJC.

TURN AROUND TIME:

☒ Normal
☐ Rush (Approval ________)

SAMPLE TYPE:

☑ Groundwater
☑ Wastewater
☐ WPDES
☐ Cooling Water
☐ Drinking Water
☐ Solid Waste
☐ Oil
☐ Other ________
☐ Lab Filtered
☑ Field Filtered
☐ Grab
☐ Composite
☐ Flow Proportional
☐ Time Proportional

CUSTOMER SAMPLE ID	SAMPLE DATE/TIME	DATE REC'D	BL & E REPORT #	BL & E SAMPLE #	TEMP *	# OF CONTAINERS	Ice Y/N	DELIVERY METHOD				PRESERVATION							ANALYTICAL REQUESTS	pH ok	EP
								BLAE	CLIENT	UPS	OTHER	PIF	PIL	NON-PRES	H2SO4	HNO3	NAOH	OTHER			
Manhole	1/21/16 9:00 Am	1/22	16608	3833	1	2	y		X					X		X			Total Hex Chrome		
Sump				3834		2			X					X		X			↓ ↓		
Canister A				3835		1			X							X			Total Chromium		
Outfall 001	↓			3836		1			X							X			↓ ↓		

CHAIN OF CUSTODY RECORD

FILLED IN BY CUSTOMER
SAMPLED BY: John Sturgeon
DATE/TIME SAMPLED: 1/21/16 9:00 Am
RELINQUISHED BY:

FILLED IN BY BADGER LABS & ENG
RECEIVED BY: at 10:40
DATE/TIME RECEIVED: JAN 21 2016
LOGGED IN: BSD

* Temperature over 4°C are above EPA/DNR Protocol unless received on ice.
* EP= If pH was not correct, extra preservation was added until correct pH was achieved.
* PIF= Preserved in field.
* PIL= Preserved in lab.

samppcrt2.xls
11-26-08

ALBANY INTERNATIONAL-APPLETON
253 TROY RD
RENSSLEAER, NY 12144-

Report Number: 16002246
Report Date: 2/12/2016
Sampled By: Client
Emailed: 2/12/2016

PO#: 4500 208835
Samples: 4 WASTEWATERS /GROUNDWATERS

Sample Number: 46005030
Description: MANHOLE
Sample Date: 2/8/2016
Date Received: 2/8/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,TOTAL REC	3.2	mg/l	0.10	0.33	3.3	SM3111D	02/10/16	
HEX CHROME	3.15	mg/l	0.038	0.127	20	SM3500CrB	02/08/16	
TURBIDITY-LAB	0.15	NTU	0	0		EPA180.1	02/05/16	

Sample Number: 46005031
Description: SUMP
Sample Date: 2/8/2016
Date Received: 2/8/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,TOTAL REC	6.7	mg/l	0.21	0.70	7	SM3111D	02/10/16	
HEX CHROME	6.13	mg/l	0.380	1.27	200	SM3500CrB	02/08/16	
METALS DIGESTION	DONE		0	0		SM3030E	02/09/16	

Sample Number: 46005032
Description: CANISTER A
Sample Date: 2/8/2016
Date Received: 2/8/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,TOTAL REC	2.0	mg/l	0.06	0.20	2	SM3111D	02/10/16	
TURBIDITY-LAB	0.15	NTU	0	0		EPA180.1	02/05/16	

Sample Number:	46005033
Description:	OUTFALL 001
Sample Date:	2/8/2016
Date Received:	2/8/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,TOTAL REC	0.22	mg/l	0.03	0.10	1	SM3111D	02/10/16	
TURBIDITY-LAB	0.15	NTU	0	0		EPA180.1	02/05/16	

BADGER LABS & ENGINEERING
WDNR Certified Lab #445023150
Approved By:

Jeffrey M. Wagner

JMW:rt

1600224b

BADGER LABORATORIES & ENGINEERING CO., INC.

SAMPLE RECEIPT FORM

CLIENT INFORMATION

COMPANY: Albany International
NAME:
ADDRESS: 253 Troy Road
Rensslealer, NY 12144
PHONE/ FAX:
P.O. #: 4500 208835
PROJECT/SITE: Appleton Chrome Site
REPORT & BILL TO: " Monthly Billing No Report To Albany
ADDITIONAL REPORTS TO: John Stoeger & OTC

TURN AROUND TIME:

☒ Normal
☐ Rush (Approval ________)

SAMPLE TYPE:

☒ Groundwater
☒ Wastewater
☒ WPDES
☐ Cooling Water
☐ Drinking Water
☐ Solid Waste
☐ Oil
☐ Other ________
☐ Lab Filtered
☐ Field Filtered
☐ Grab
☐ Composite
☐ Flow Proportional
☐ Time Proportional

CUSTOMER SAMPLE ID	SAMPLE DATE/TIME	DATE REC'D	BL & E REPORT #	BL & E SAMPLE #	TEMP *	# OF CONTAINERS	Ice Y/N	DELIVERY METHOD				PRESERVATION							ANALYTICAL REQUESTS	pH ok	EP
								BL&E	CLIENT	UPS	OTHER	PIF	PIL	NON-PRES	H2SO4	HNO3	NAOH	OTHER			
Manhole	2-8-16 8:30A	2/8/16	2246	S030		2			X					X		X			Tot & Hex Chrome		
Sump	↓			S031		2			X					X		X			↓ ↓		
Canister A	↓			S032		1			X							X			Total Chromium		
Outfall 001	↓			S033		1			X							X			↓ ↓		

CHAIN OF CUSTODY RECORD

FILLED IN BY CUSTOMER

SAMPLED BY: John Stoeger
DATE/TIME SAMPLED: 2-8-16 8:30A
RELINQUISHED BY:

FILLED IN BY BADGER LABS & ENG

RECEIVED BY: st
DATE/TIME RECEIVED: FEB 0 8 2016 9:10
LOGGED IN:

- * Temperature over 4°C are above EPA/DNR Protocol unless received on ice.
- * EP= If pH was not correct, extra preservation was added until correct pH was achieved.
- * PIF= Preserved in field.
- * PIL= Preserved in lab.

sampprct2.xls
11-26-08

ALBANY INTERNATIONAL-APPLETON
253 TROY RD
RENSSLEAER, NY 12144

Report Number:	16003508
Report Date:	3/21/2016
Sampled By:	Client
Emailed:	3/21/16
PO#:	4700001444
# Samples:	4

Sample Number:	46007747
Description:	MANHOLE
Sample Date:	3/14/2016
Date Received:	3/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,TOTAL REC	2.6	mg/l	0.05	0.17	2.5	SM3111D	03/18/16	
HEX CHROME	2.49	mg/l	0.038	0.127	20	SM3500CrB	03/14/16	
TURBIDITY-LAB	0.20	NTU	0	0		EPA180.1	03/15/16	

Sample Number:	46007748
Description:	SUMP
Sample Date:	3/14/2016
Date Received:	3/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,TOTAL REC	17	mg/l	0.31	1.03	16	SM3111D	03/18/16	
HEX CHROME	16.5	mg/l	0.38	1.27	200	SM3500CrB	03/14/16	
METALS DIGESTION	DONE		0	0		SM3030E	03/14/16	

Sample Number:	46007749
Description:	CANISTER A
Sample Date:	3/14/2016
Date Received:	3/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,TOTAL REC	0.50	mg/l	0.02	0.07	1	SM3111D	03/18/16	
TURBIDITY-LAB	0.25	NTU	0	0		EPA180.1	03/15/16	

Sample Number:	46007750
Description:	001 OUTFALL
Sample Date:	3/14/2016
Date Received:	3/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,TOTAL REC	0.04	mg/l	0.02	0.07	1	SM3111D	03/18/16	
TURBIDITY-LAB	0.20	NTU	0	0		EPA180.1	03/15/16	

BADGER LABS & ENGINEERING
WDNR Certified Lab #445023150
Approved By:

Jeffrey M. Wagner

JMW:jc

BADGER LABORATORIES & ENGINEERING CO., INC.

SAMPLE RECEIPT FORM

16003508

CLIENT INFORMATION

COMPANY: Albany International
NAME:
ADDRESS: 253 Troy Road
Rensslealer, NY 12144
PHONE/ FAX:
P.O. #: 4500 208835
PROJECT/SITE: Appleton Chrome Site
REPORT & BILL TO: " Monthly Billing No Report To Albany
ADDITIONAL REPORTS TO: John Stoeger & DJC.

TURN AROUND TIME:

☒ Normal
☐ Rush (Approval ________)

SAMPLE TYPE:

☑ Groundwater
☑ Wastewater
☐ WPDES
☐ Cooling Water
☐ Drinking Water
☐ Solid Waste
☐ Oil
☐ Other ________
☐ Lab Filtered
☐ Field Filtered
☐ Grab
☐ Composite
☐ Flow Proportional
☐ Time Proportional

CUSTOMER SAMPLE ID	SAMPLE DATE/TIME	DATE REC'D	BL & E REPORT #	BL & E SAMPLE #	TEMP *	# OF CONTAINERS	Ice Y/N	DELIVERY METHOD BL&E	CLIENT	UPS	OTHER	PRESERVATION PIF	PIL	NON-PRES	H2SO4	HNO3	NAOH	OTHER	ANALYTICAL REQUESTS	pH ok	EP
Manhole	3-14-16 9:30Am	3/14	3508	7747	↓	2	Y		X			↓		X		X			Tot & Hex Chrom	X	
Sump	↓			7748	↓	2	↓		X			↓		X		X			+ +	X	
Canister A	↓			7749	↓	1	↓		X			↓				X			Total Chromium	X	
Outfall 001	↓			7750	↓	1	↓		X			↓				X				X	

CHAIN OF CUSTODY RECORD

FILLED IN BY CUSTOMER

SAMPLED BY: John Stoeger
DATE/TIME SAMPLED: 3-14-16 9:30 am
RELINQUISHED BY:

FILLED IN BY BADGER LABS & ENG

RECEIVED BY:
DATE/TIME RECEIVED: MAR 14 2016 11:35
LOGGED IN: BSh

- * Temperature over 4°C are above EPA/DNR Protocol unless received on ice.
- * EP= If pH was not correct, extra preservation was added until correct pH was achieved.
- * PIF= Preserved in field.
- * PIL= Preserved in lab.

REISSUE – UNIT CHANGE

Report Number:	16004710
Report Date:	4/26/2016
Sampled By:	Client
Emailed:	5/2/16
PO#:	4500 208835
# Samples:	23 GROUNDWATER /WASTEWATER

ALBANY INTERNATIONAL-APPLETON
253 TROY RD
RENSSLEAER, NY 12144-

Attn: JOHN STOEGER

Sample Number: 46010515
Description: MW-01
Sample Date: 4/14/2016
Date Received: 4/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	0.35	ug/l	0.20	0.66	1	SM3113B	04/22/16	
HEX CHROME	<2	ug/l	2	6	1	SM3500CrB	04/15/16	

Sample Number: 46010516
Description: MW-02
Sample Date: 4/14/2016
Date Received: 4/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	4.9	ug/l	0.20	0.66	1	SM3113B	04/22/16	
HEX CHROME	<2	ug/l	2	6	1	SM3500CrB	04/15/16	

Sample Number: 46010517
Description: MW-02A
Sample Date: 4/14/2016
Date Received: 4/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	0.56	ug/l	0.20	0.66	1	SM3113B	04/22/16	
HEX CHROME	<2	ug/l	2	6	1	SM3500CrB	04/15/16	

Sample Number: 46010518
Description: MW-05
Sample Date: 4/14/2016
Date Received: 4/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	462	ug/l	20	67	1	SM3111D	04/15/16	
HEX CHROME	430	ug/l	19	63	10	SM3500CrB	04/15/16	

Sample Number: 46010519
Description: MW-05A
Sample Date: 4/14/2016
Date Received: 4/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	1.2	ug/l	0.20	0.66	1	SM3113B	04/22/16	
HEX CHROME	9	ug/l	2	6	1	SM3500CrB	04/15/16	

Sample Number: 46010520
Description: MW-05B
Sample Date: 4/14/2016
Date Received: 4/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	458	ug/l	20	67	1	SM3111D	04/15/16	
HEX CHROME	467	ug/l	2	6	1	SM3500CrB	04/15/16	

Sample Number: 46010521
Description: MW-10R
Sample Date: 4/14/2016
Date Received: 4/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	0.31	ug/l	0.20	0.66	1	SM3113B	04/22/16	
HEX CHROME	<2	ug/l	2	6	1	SM3500CrB	04/15/16	

Sample Number: 46010522
Description: MW-17
Sample Date: 4/14/2016
Date Received: 4/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	0.68	ug/l	0.20	0.66	1	SM3113B	04/22/16	
HEX CHROME	<2	ug/l	2	6	1	SM3500CrB	04/15/16	

Sample Number: 46010523
Description: MW-17A
Sample Date: 4/14/2016
Date Received: 4/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	<0.20	ug/l	0.20	0.66	1	SM3113B	04/22/16	
HEX CHROME	<2	ug/l	2	6	1	SM3500CrB	04/15/16	

Sample Number: 46010524
Description: MW-18
Sample Date: 4/14/2016
Date Received: 4/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	1.6	ug/l	0.20	0.66	1	SM3113B	04/22/16	
HEX CHROME	<2	ug/l	2	6	1	SM3500CrB	04/15/16	

Sample Number: 46010525
Description: MW-18A
Sample Date: 4/14/2016
Date Received: 4/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	<0.20	ug/l	0.20	0.66	1	SM3113B	04/22/16	
HEX CHROME	<2	ug/l	2	6	1	SM3500CrB	04/15/16	

Sample Number: 46010526
Description: MW-19
Sample Date: 4/14/2016
Date Received: 4/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	18420	ug/l	328	1092	16	SM3111D	04/15/16	
HEX CHROME	18100	ug/l	190	633	100	SM3500CrB	04/15/16	

Sample Number: 46010527
Description: MW-19A
Sample Date: 4/14/2016
Date Received: 4/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	233	ug/l	20	67	1	SM3111D	04/15/16	
HEX CHROME	<2	ug/l	2	6	1	SM3500CrB	04/15/16	

Sample Number: 46010528
Description: MW-20
Sample Date: 4/14/2016
Date Received: 4/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	412750	ug/l	6945	23127	347	SM3111D	04/15/16	
HEX CHROME	279000	ug/l	1900	6330	1000	SM3500CrB	04/15/16	

Sample Number: 46010529
Description: MW-20A
Sample Date: 4/14/2016
Date Received: 4/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	66	ug/l	2.0	6.7	10	SM3113B	04/22/16	
HEX CHROME	8	ug/l	2	6	1	SM3500CrB	04/15/16	

Sample Number:	46010530
Description:	MW-20B
Sample Date:	4/14/2016
Date Received:	4/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	406500	ug/l	6670	22211	334	SM3111D	04/15/16	
HEX CHROME	581000	ug/l	1900	6330	1000	SM3500CrB	04/15/16	

Sample Number:	46010531
Description:	MW-21
Sample Date:	4/14/2016
Date Received:	4/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	2.2	ug/l	0.20	0.66	1	SM3113B	04/22/16	
HEX CHROME	<2	ug/l	2	6	1	SM3500CrB	04/15/16	

Sample Number:	46010532
Description:	MW-21A
Sample Date:	4/14/2016
Date Received:	4/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,DISSOLVED	0.60	ug/l	0.20	0.66	1	SM3113B	04/22/16	
HEX CHROME	<2	ug/l	2	6	1	SM3500CrB	04/15/16	

Sample Number:	46010533
Description:	MANHOLE
Sample Date:	4/14/2016
Date Received:	4/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,TOTAL REC	3200	ug/l	60	200	3	SM3111D	04/15/16	
HEX CHROME	3150	ug/l	38	127	20	SM3500CrB	04/15/16	
TURBIDITY-LAB	0.20	NTU	0	0		EPA180.1	04/15/16	

Sample Number: 46010534
Description: SUMP
Sample Date: 4/14/2016
Date Received: 4/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,TOTAL REC	19000	ug/l	500	1700	25	SM3111D	04/21/16	
HEX CHROME	18200	ug/l	380	1270	200	SM3500CrB	04/15/16	
METALS DIGESTION	DONE		0	0		SM3030E	04/18/16	

Sample Number: 46010535
Description: CANISTER A
Sample Date: 4/14/2016
Date Received: 4/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,TOTAL REC	450	ug/l	20	60	1	SM3111D	04/15/16	
TURBIDITY-LAB	0.20	NTU	0	0		EPA180.1	04/15/16	

Sample Number: 46010536
Description: 001 OUTFALL
Sample Date: 4/14/2016
Date Received: 4/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CYANIDE, TOTAL	<0.007	mg/l	0.007	0.023	1	EPA335.4	04/15/16	

Sample Number: 46010537
Description: 001 OUTFALL
Sample Date: 4/14/2016
Date Received: 4/14/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
ALUMINUM, TOTAL	<0.09	mg/l	0.09	0.31	1	SM3111D	04/21/16	
ARSENIC,TOTAL REC.	<0.001	mg/l	0.001	0.0034	1	SM3113B	04/15/16	
CADMIUM,TOTAL REC	<0.01	mg/l	0.01	0.03	1	SM3111B	04/15/16	
CHROMIUM,TOTAL REC	90	ug/l	20	60	1	SM3111D	04/15/16	
COPPER,TOTAL REC	0.04	mg/l	0.01	0.03	1	SM3111B	04/15/16	
HEX CHROME	53	ug/l	2	6	1	SM3500CrB	04/15/16	
LEAD,TOTAL REC	<0.03	mg/l	0.03	0.10	1	SM3111B	04/15/16	
MERCURY,TOTAL REC	<0.0002	mg/l	0.0002	0.0008	1	EPA245.1	04/15/16	
NICKEL,TOTAL REC	<0.02	mg/l	0.02	0.04	1	SM3111B	04/18/16	
TURBIDITY-LAB	0.20	NTU	0	0		EPA180.1	04/15/16	
ZINC,TOTAL REC	0.03	mg/l	0.01	0.03		SM3111B		

BADGER LABS & ENGINEERING
WDNR Certified Lab #445023150
Approved By:

Jeffrey M. Wagner

JMW:rt

BADGER LABORATORIES & ENGINEERING CO., INC.

SAMPLE RECEIPT FORM

1 -of 3

CLIENT INFORMATION

COMPANY: Albany International
NAME:
ADDRESS: 253 Troy Road
Rensslealer, NY 12144
PHONE/ FAX:
P.O. #: 4500 208835
PROJECT/SITE: Appleton Chrome Site
REPORT & BILL TO: " Monthly Billing No Report To Albany
ADDITIONAL REPORTS TO: John Stocgen & DJC.

TURN AROUND TIME:

☒ Normal
☐ Rush (Approval ________)

SAMPLE TYPE:

☑ Groundwater
☑ Wastewater
☐ WPDES
☐ Cooling Water
☐ Drinking Water
☐ Solid Waste
☐ Oil
☐ Other ________
☐ Lab Filtered
☐ Field Filtered
☐ Grab
☐ Composite
☐ Flow Proportional
☐ Time Proportional

CUSTOMER SAMPLE ID	SAMPLE DATE/TIME	DATE REC'D	BL & E REPORT #	BL & E SAMPLE #	TEMP *	# OF CONTAINERS	Ice Y/N	DELIVERY METHOD				PRESERVATION							ANALYTICAL REQUESTS	pH ok	EP
								BL&E	CLIENT	UPS	OTHER	PIF	PIL	NON-PRES	H2SO4	HNO3	NAOH	OTHER			
MW-01	4/14/16	4/14	4710	10515		2	Y		✓		✓		✓		✓			Total & Hex Chrome		
MW-02	1:00 pm			10516		2			✓					✓		✓					
MW-02A				10517		2			✓					✓		✓					
MW-05				10518		2			✓					✓		✓					
MW-05A				10519		2			✓					✓		✓					
MW-05B				10520		2			✓					✓		✓					
MW-10R				10521		2			✓					✓		✓					
MW-17				10522		2			✓					✓		✓					
MW-17A				10523		2			✓					✓		✓					
MW-18				10524		2			✓					✓		✓					

CHAIN OF CUSTODY RECORD

FILLED IN BY CUSTOMER
SAMPLED BY: John Stocgen
DATE/TIME SAMPLED: 4/14/16 1:00 pm
RELINQUISHED BY:

FILLED IN BY BADGER LABS & ENG
RECEIVED BY: BSS
DATE/TIME RECEIVED: 4-14-16
LOGGED IN: 14:15 pm

* Temperature over 4°C are above EPA/DNR Protocol unless received on ice.
* EP= If pH was not correct, extra preservation was added until correct pH was achieved.
* PIF= Preserved in field.
* PIL= Preserved in lab.

samppret2.xls
11-26-08

2 of 3
16004710

BADGER LABORATORIES & ENGINEERING CO., INC.

SAMPLE RECEIPT FORM

CLIENT INFORMATION

COMPANY: Albany International
NAME:
ADDRESS: 253 Troy Road
Rensslealer, NY 12144
PHONE/ FAX:
P.O. #: 4500 208835
PROJECT/SITE: Appleton Chrome Site
REPORT & BILL TO: " Monthly Billing No Report To Albany
ADDITIONAL REPORTS TO: John Stoeger & DJC.

TURN AROUND TIME:

☒ Normal
☐ Rush (Approval ________)

SAMPLE TYPE:

☑ Groundwater
☑ Wastewater
☐ WPDES
☐ Cooling Water
☐ Drinking Water
☐ Solid Waste
☐ Oil
☐ Other ________
☐ Lab Filtered
☐ Field Filtered
☐ Grab
☐ Composite
☐ Flow Proportional
☐ Time Proportional

CUSTOMER SAMPLE ID	SAMPLE DATE/TIME	DATE REC'D	BL & E REPORT #	BL & E SAMPLE #	TEMP *	# OF CONTAINERS	Ice Y/N	DELIVERY METHOD				PRESERVATION							ANALYTICAL REQUESTS	pH ok	EP
								BL&E	CLIENT	UPS	OTHER	PIF	PIL	NON-PRES	H2SO4	HNO3	NAOH	OTHER			
MW-18A	4/14/14	4/14	4710	10525		2	Y		X					X		X			Total Hex Chrome		
MW-19	1:00pm			10526		2			X					X		X					
MW-19A				10527		2			X					X		X					
MW-20				10528		2			X					X		X					
MW-20A				10529		2			X					X		X					
MW-20B				10530		2			X					X		X					
MW-21				10531		2			X					X		X					
MW-21A				10532		2			X					X		X					
Manhole				10533		2			X					X		X					
Sump				10534		2			X					X		X					

CHAIN OF CUSTODY RECORD

FILLED IN BY CUSTOMER
SAMPLED BY: John Stoeger
DATE/TIME SAMPLED: 4-14-14 1:00pm
RELINQUISHED BY:

FILLED IN BY BADGER LABS & ENG
RECEIVED BY: OSD
DATE/TIME RECEIVED: 4-14-14
LOGGED IN: 14:15

* Temperature over 4°C are above EPA/DNR Protocol unless received on ice.
* EP= If pH was not correct, extra preservation was added until correct pH was achieved.
* PIF= Preserved in field.
* PIL= Preserved in lab.

sampprct2.xls
11-26-08

BADGER LABORATORIES & ENGINEERING CO., INC.

SAMPLE RECEIPT FORM

3 of 3

CLIENT INFORMATION

COMPANY: Albany International
NAME:
ADDRESS: 253 Troy Road
Rensselaer, NY 12144
PHONE/ FAX:
P.O. #: 4500 208835
PROJECT/SITE: Appleton Chrome Site
REPORT & BILL TO: " Monthly Billing No Report To Albany
ADDITIONAL REPORTS TO: John Stoeger & OJC

TURN AROUND TIME:

☒ Normal
☐ Rush (Approval ________)

SAMPLE TYPE:

☐ Groundwater
☑ Wastewater
☐ WPDES
☐ Cooling Water
☐ Drinking Water
☐ Solid Waste
☐ Oil
☐ Other ________
☐ Lab Filtered
☐ Field Filtered
☐ Grab
☐ Composite
☐ Flow Proportional
☐ Time Proportional

								DELIVERY METHOD				PRESERVATION									
CUSTOMER SAMPLE ID	SAMPLE DATE/TIME	DATE REC'D	BL & E REPORT #	BL & E SAMPLE #	TEMP *	# OF CONTAINERS	Ice Y/N	BL&E	CLIENT	UPS	OTHER	PIF	PIL	NON-PRES	H2SO4	HNO3	NAOH	OTHER	ANALYTICAL REQUESTS	pH ok	EP
Canister A	4/14/16	4/14	4710	10135		1	Y		X			Y				1			Total Chromium		
Outfall 001	1:00 pm			10136		3			X			X					1		See Below: A		
				10132								Y		1		1					

CHAIN OF CUSTODY RECORD

FILLED IN BY CUSTOMER
SAMPLED BY: John Stoeger
DATE/TIME SAMPLED: 4/14/16 1:00 pm
RELINQUISHED BY:

FILLED IN BY BADGER LABS & ENG
RECEIVED BY: DD
DATE/TIME RECEIVED: 4-14-16
LOGGED IN: 14:15

A Aluminum, Arsenic, Cadmium
Total Chromium, Hexavalent Chromium
Copper, Cyanide, Lead, Mercury
Nickel, Zinc

* Temperature over 4°C are above EPA/DNR Protocol unless received on ice.
* EP= If pH was not correct, extra preservation was added until correct pH was achieved.
* PIF= Preserved in field.
* PIL= Preserved in lab.

CHEMISTS
ENGINEERS

BADGER LABORATORIES & ENGINEERING INC.
501 WEST BELL STREET • NEENAH, WISCONSIN 54956-4868 • EST. 1966
(920) 729-1100 • FAX (920) 729-4945 • 1-800-776-7196

ALBANY INTERNATIONAL-APPLETON
253 TROY RD
RENSSLEAER, NY 12144-

Report Number: 16005870
Report Date: 5/25/2016
Sampled By: Client
Emailed: 5/25/16

PO#: 4500208835
Samples: 4 GROUNDWATER /WASTEWATER

Sample Number: 46013115
Description: MANHOLE
Sample Date: 5/17/2016
Date Received: 5/17/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,TOTAL REC	3100	ug/l	20	60	1	SM3111D	05/20/16	
HEX CHROME	2880	ug/l	38	127	20	SM3500CrB	05/17/16	
TURBIDITY-LAB	0.20	NTU	0	0		EPA180.1	05/19/16	

Sample Number: 46013116
Description: SUMP
Sample Date: 5/17/2016
Date Received: 5/17/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,TOTAL REC	26000	ug/l	480	1600	24	SM3111D	05/20/16	
HEX CHROME	25300	ug/l	380	1270	200	SM3500CrB	05/17/16	
METALS DIGESTION	DONE		0	0		SM3030E	05/19/16	

Sample Number: 46013117
Description: CANISTER A
Sample Date: 5/17/2016
Date Received: 5/17/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,TOTAL REC	880	ug/l	20	60	1	SM3111D	05/20/16	
TURBIDITY-LAB	0.30	NTU	0	0		EPA180.1	05/19/16	

Sample Number:	46013118
Description:	001 OUTFALL
Sample Date:	5/17/2016
Date Received:	5/17/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,TOTAL REC	170	ug/l	20	60	1	SM3111D	05/20/16	
TURBIDITY-LAB	0.40	NTU	0	0		EPA180.1	05/19/16	

All LOD/LOQs adjusted for dilution and/or solids content.

BADGER LABS & ENGINEERING
WDNR Certified Lab #445023150
Approved By:
Jeffrey M. Wagner

JMW:rt

16005870

BADGER LABORATORIES & ENGINEERING CO., INC.

SAMPLE RECEIPT FORM

CLIENT INFORMATION

COMPANY: Albany International
NAME:
ADDRESS: 253 Troy Road
Rensslealer, NY 12144
PHONE/ FAX:
P.O. #: 4500 208835
PROJECT/SITE: Appleton Chrome Site
REPORT & BILL TO: " Monthly Billing No Report To Albany
ADDITIONAL REPORTS TO: John Stoeger & DJC.

TURN AROUND TIME:

☒ Normal
☐ Rush (Approval ________)

SAMPLE TYPE:

☒ Groundwater
☑ Wastewater
☐ WPDES
☐ Cooling Water
☐ Drinking Water
☐ Solid Waste
☐ Oil
☐ Other ________
☐ Lab Filtered
☐ Field Filtered
☐ Grab
☐ Composite
☐ Flow Proportional
☐ Time Proportional

CUSTOMER SAMPLE ID	SAMPLE DATE/TIME	DATE REC'D	BL & E REPORT #	BL & E SAMPLE #	TEMP *	# OF CONTAINERS	Ice Y/N	DELIVERY METHOD				PRESERVATION							ANALYTICAL REQUESTS	pH ok	EP
								BLAE	CLIENT	UPS	OTHER	PIF	PIL	NON-PRES	H2SO4	HNO3	NAOH	OTHER			
MANHOLE	5/17/16 10:30A	5/17	5870	13115	|	2	Y		X			|		X		X			Tot & Hex Chrom	|	
Sump	↓			13116	|	2	|		X			|		X		X			↓ ↓	|	
Canister A	↓			13117	|	1	|		X			|				X			Total Chromium	|	
Outfall 001	↓			13118	|	1	|		X			|				X			↓ ↓	|	

CHAIN OF CUSTODY RECORD

FILLED IN BY CUSTOMER

SAMPLED BY: John Stoeger
DATE/TIME SAMPLED: 5/17/16 @10:30 Am
RELINQUISHED BY:

FILLED IN BY BADGER LABS & ENG

RECEIVED BY: 12:50
DATE/TIME RECEIVED: MAY 17 2016
LOGGED IN:

* Temperature over 4°C are above EPA/DNR Protocol unless received on ice.
* EP= If pH was not correct, extra preservation was added until correct pH was achieved.
* PIF= Preserved in field.
* PIL= Preserved in lab.

sampprct2.xls
11-26-08

ALBANY INTERNATIONAL-APPLETON
253 TROY RD
RENSSLEAER, NY 12144-

Report Number: 16006720
Report Date: 6/21/2016
Sampled By: Client

PO#: 470000144
Samples: 4 WASTEWATER/ GROUNDWATER

Sample Number: 46015021
Description: MANHOLE
Sample Date: 6/9/2016
Date Received: 6/9/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,TOTAL REC	2.7	mg/l	0.05	0.17	2.5	SM3111D	06/09/16	
HEX CHROME	2.21	mg/l	0.038	0.127	19	SM3500CrB	06/09/16	
TURBIDITY-LAB	0.35	NTU	0	0		EPA180.1	06/10/16	

Sample Number: 46015022
Description: SUMP
Sample Date: 6/9/2016
Date Received: 6/9/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,TOTAL REC	35	mg/l	0.65	2.2	33	SM3111D	06/15/16	
HEX CHROME	24.4	mg/l	0.380	1.265	190	SM3500CrB	06/09/16	
METALS DIGESTION	DONE		0	0		SM3030E	06/10/16	

Sample Number: 46015023
Description: CANISTER A
Sample Date: 6/9/2016
Date Received: 6/9/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,TOTAL REC	0.09	mg/l	0.02	0.06	1	SM3111D	06/09/16	
TURBIDITY-LAB	0.30	NTU	0	0		EPA180.1	06/10/16	

Sample Number: 46015024
Description: OUTFALL 001
Sample Date: 6/9/2016
Date Received: 6/9/2016

Parameter	Results	Units	LOD	LOQ	Dil.	Method	Analyzed	Codes
CHROMIUM,TOTAL REC	0.26	mg/l	0.02	0.06	1	SM3111D	06/09/16	
TURBIDITY-LAB	0.20	NTU	0	0		EPA180.1	06/10/16	

All LOD/LOQs adjusted for dilution and/or solids content.

BADGER LABS & ENGINEERING
WDNR Certified Lab #445023150
Approved By:

Jeffrey M. Wagner

JMW:rt

BADGER LABORATORIES & ENGINEERING CO., INC.

SAMPLE RECEIPT FORM

16006720

CLIENT INFORMATION

COMPANY: Albany International
NAME:
ADDRESS: 253 Troy Road
Rensselaer, NY 12144
PHONE/ FAX:
P.O. #: 4500 208835
PROJECT/SITE: Appleton Chrome Site
REPORT & BILL TO: " Monthly Billing No Report To Albany
ADDITIONAL REPORTS TO: John Stoeger of OTC

TURN AROUND TIME:

☒ Normal
☐ Rush (Approval ________)

SAMPLE TYPE:

☒ Groundwater
☒ Wastewater
☐ WPDES
☐ Cooling Water
☐ Drinking Water
☐ Solid Waste
☐ Oil
☐ Other ________
☐ Lab Filtered
☐ Field Filtered
☐ Grab
☐ Composite
☐ Flow Proportional
☐ Time Proportional

CUSTOMER SAMPLE ID	SAMPLE DATE/TIME	DATE REC'D	BL & E REPORT #	BL & E SAMPLE #	TEMP *	# OF CONTAINERS	Ice Y/N	DELIVERY METHOD				PRESERVATION							ANALYTICAL REQUESTS	pH ok	EP
								BLAE	CLIENT	UPS	OTHER	PIF	PIL	NON-PRES	H2SO4	HNO3	NAOH	OTHER			
Manhole	6-9-16 10am	6/9	6720	15021		2			X					X		X			Total Hex Chrome		
Sump	↓			15022		2			X					X		X			↓ ↓		
Canister A	↓			15023		1			X					X					Diss Chrome		
Outfall 001	↓			15024		1			X					X					↓ ↓		

CHAIN OF CUSTODY RECORD

FILLED IN BY CUSTOMER
SAMPLED BY: John Stoeger
DATE/TIME SAMPLED: 6-9-16 10am
RELINQUISHED BY:

FILLED IN BY BADGER LABS & ENG
RECEIVED BY:
DATE/TIME RECEIVED: JUN 09 2016 11:09
LOGGED IN: BSB

* Temperature over 4°C are above EPA/DNR Protocol unless received on ice.
* EP= If pH was not correct, extra preservation was added until correct pH was achieved.
* PIF= Preserved in field.
* PIL= Preserved in lab.

samppract2.xls
11-26-08