TECHNICAL PROGRESS REPORT

on

GROUNDWATER MONITORING

conducted

September 19, 2007

for the

DES MOINES NORTH PLUME SITE

Prepared by
the Iowa Department of Natural Resources
Contaminated Sites Section
October 2007
TECHNICAL PROGRESS REPORT
SEPTEMBER 19, 2007 GROUNDWATER SAMPLING
DES MOINES TCE OPERABLE UNIT No. 3 (NORTH PLUME) SITE

1. INTRODUCTION

Sampling of groundwater was conducted on September 19, 2007 in general accordance with the February 17, 1993, Field Sampling Plan, Des Moines TCE OU No. 3, Des Moines, Iowa, prepared by CH2M Hill and the Superfund State Contract between the Iowa Department of Natural Resources (DNR) and the U.S. Environmental Protection Agency (EPA) for the Des Moines TCE Site, Operable Unit 3. Seven monitoring wells were sampled on September 19, 2007. Samples were analyzed for the following volatile organic compounds (VOCs): tetrachloroethene (PCE), trichloroethene (TCE), cis 1,2-dichloroethene (DCE), and vinyl chloride (VC). Sampling locations are shown on the attached map.

2. PROCEDURES

The depth to water in each well was measured to the nearest 0.01 ft. with a water level indicator. Based on the depth to water and recorded well depth and diameter, the volume of water in each well was calculated. This value was considered to represent one purge volume. The volume in the filter pack around the well screen was not included in the purge volume as recommended in the Field Sampling Plan.

A 12-volt submersible pump was utilized to purge all of the monitoring wells. Water was pumped into a 5-gallon bucket and dumped on the ground away from the well. Three well volumes were purged from each well prior to sampling, except NW-36 which was pumped dry twice and only 2.3 well volumes were purged. Temperature, pH, and conductivity were recorded after 2 well volumes were purged and again after 3 well volumes were purged. These parameters stabilized within 10% for all but NW-34 in which an additional 0.5 well volume was purged before stabilization.

Samples were collected immediately after purging. Samples were collected in three 40-ml vials at each monitoring well. The vials contained hydrochloric acid for sample preservation. Samples were collected directly from the pump used for purging. No headspace was allowed in the samples. Sample location and time were recorded on the sample containers, field book, and laboratory sample sheets. All samples were placed in an ice chest after collection. Samples were submitted to the University of Iowa Hygienic Laboratory with chain-of-custody documentation the day after completion of sampling.

A blind duplicate sample was collected as a quality control sample from NW-35 and was labeled NW-41.
3. RESULTS

Table 1 summarizes water-level information since the DNR initiated the sampling program in April 1996. Groundwater levels were among the highest in the last 11 years. All wells, except NW-36 yielded a constant flow of water during purging.

Table 2 is a cumulative summary of contaminant detections in the 8 (currently 7) monitoring wells which are part of the ongoing monitoring program. The September 2007 sampling revealed quantifiable levels of contaminants in three monitoring wells (NW-34, NW-35 and NW-36) and detection below the quantification levels in one other monitoring well (NW-40). These results are consistent with past monitoring results with the exception of the 0.7 µg/l of PCE detected in NW-34. A quantifiable level of PCE had not been recorded from NW-34 since the 1.7 µg/l found in September of 1991. PCE in NW-34 was detected below the quantification limit of 0.5 µg/l during the November 2004 sampling event. Monitoring well NW-35 still contains the highest levels of contaminants. Contaminant levels in NW-35 appear to have stabilized at levels above MCLs, but not by a large margin.

The duplicate sample showed very similar levels of contaminants to the primary sample. All laboratory results are attached in the appendix.

4. CONCLUSIONS AND RECOMMENDATIONS

The September 2007 sampling of Des Moines TCE OU3 monitoring wells yielded results generally comparable to previous sampling events. The reappearance of contaminants in NW-34 does not represent a major concern since the levels were very low, lower than levels originally found and well below MCLs. Sampling of NW-34 in one year is recommended to determine if increasing contaminant levels are occurring in this well.

Overall there continues to be no evidence of significant changes. If anything, a general decrease in contaminant levels has been observed. Most importantly, there is again no evidence of contamination from the North Plume migrating to the south/southwest towards the Des Moines Water Works' gallery system.

The previous groundwater monitoring report dated January 2006 indicated that sampling frequency will be limited to every five years, concurrent with the Superfund Five-Year Reviews, if no significant changes were found from the recent monitoring results. As indicated above, the reappearance of contaminants in NW-34 is the only potentially significant change that was identified from the recent monitoring results. Sampling of NW-34 will be conducted in 2008 and, if results indicate continued increases, comprehensive bi-annual monitoring will continue with the next monitoring event in 2009. If the 2008 sample from NW-34 does not reveal evidence of increasing contaminant levels, the next comprehensive groundwater monitoring event will be conducted in 2012 for the use in the 2012 Superfund Five-Year Review.
FORMER MTA BUS BARN LOCATION

LEGEND

• 1989 MONITORING WELL LOCATIONS (SINGLE WELL)
■ 1989 MONITORING WELL LOCATION (2 WELLS)
X 1989 PIEZOMETER LOCATION
• 1991 MONITORING WELL LOCATIONS (SINGLE WELL)
NOTE: MONITORING WELL & PIEZOMETER LOCATIONS ARE APPROXIMATE

MONITORING WELL AND PIEZOMETER LOCATIONS
DES MOINES TCE
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<tr>
<td></td>
<td>TCE</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>36 (40)</td>
<td>1</td>
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</tr>
<tr>
<td></td>
<td>DCE</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>20 (21)</td>
<td>2</td>
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</tr>
<tr>
<td></td>
<td>VC</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND(ND)</td>
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<td>ND</td>
<td>ND</td>
<td>ND</td>
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<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>42</td>
<td>ND</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>DCE*</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>18</td>
<td>ND</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>VC*</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
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<td>July 2001</td>
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<td>ND</td>
<td>ND</td>
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<td>170 (120)</td>
<td>ND</td>
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<tr>
<td></td>
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<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>65 (63)</td>
<td>3</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>DCE</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>28 (25)</td>
<td>5</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>VC</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND(ND)</td>
<td>ND</td>
<td>ND</td>
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<tr>
<td>Sept. 2002</td>
<td>PCE</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>130 (130)</td>
<td>ND</td>
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<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>40 (41)</td>
<td>4</td>
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<tr>
<td></td>
<td>DCE</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>18 (18)</td>
<td>10</td>
<td>--</td>
</tr>
</tbody>
</table>

NOTES: ND = Not detected at detection limit.  
* Detection limit = 5 ug/l 
J = The associated value is an estimate 
--- = Indicates no sample was collected.
### TABLE 2 (Cont.): CUMULATIVE SUMMARY OF CONTAMINANT LEVELS (µg/l) IN DES MOINES TCE OU3 MONITORING WELLS

<table>
<thead>
<tr>
<th>Sample Date</th>
<th>Parameter</th>
<th>NW-30</th>
<th>NW-31</th>
<th>NW-32</th>
<th>NW-34</th>
<th>NW-35</th>
<th>NW-36</th>
<th>NW-39</th>
<th>NW-40</th>
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<tr>
<td>Nov. 2004</td>
<td>PCE</td>
<td>--</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
<td>&lt;0.5 (J)</td>
<td>21 (22)</td>
<td>1.5</td>
<td>--</td>
<td>&lt;0.5 (J)</td>
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<tr>
<td></td>
<td>TCE</td>
<td>--</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
<td>&lt;0.5 (J)</td>
<td>9.9 (11)</td>
<td>18</td>
<td>--</td>
<td>&lt;0.5 (J)</td>
</tr>
<tr>
<td></td>
<td>DCE</td>
<td>--</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
<td>3.0 (3.3)</td>
<td>20</td>
<td>--</td>
<td>&lt;0.5 (J)</td>
</tr>
<tr>
<td></td>
<td>VC</td>
<td>--</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
<td>--</td>
<td>--</td>
<td>&lt;0.5</td>
</tr>
<tr>
<td>Oct. 2005</td>
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<td>&lt;5</td>
<td>&lt;5</td>
<td>&lt;5</td>
<td>22 (20)</td>
<td>&lt;5</td>
<td>--</td>
<td>&lt;5</td>
</tr>
<tr>
<td></td>
<td>TCE*</td>
<td>&lt;5</td>
<td>&lt;5</td>
<td>&lt;5</td>
<td>&lt;5</td>
<td>13 (10)</td>
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<td>&lt;5</td>
</tr>
<tr>
<td></td>
<td>DCE*</td>
<td>&lt;5</td>
<td>&lt;5</td>
<td>&lt;5</td>
<td>&lt;5</td>
<td>&lt;5 (&lt;5)</td>
<td>&lt;5</td>
<td>--</td>
<td>&lt;5</td>
</tr>
<tr>
<td></td>
<td>VC*</td>
<td>&lt;5</td>
<td>&lt;5</td>
<td>&lt;5</td>
<td>&lt;5</td>
<td>&lt;5 (&lt;5)</td>
<td>&lt;5</td>
<td>--</td>
<td>&lt;5</td>
</tr>
<tr>
<td>Sept. 2007</td>
<td>PCE</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
<td>0.7</td>
<td>25 (23)</td>
<td>&lt;0.5</td>
<td>--</td>
<td>&lt;0.5 (J)</td>
</tr>
<tr>
<td></td>
<td>TCE</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
<td>&lt;0.5 (J)</td>
<td>7.3 (7.4)</td>
<td>1.9</td>
<td>--</td>
<td>&lt;0.5</td>
</tr>
<tr>
<td></td>
<td>DCE</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
<td>2.1 (2.1)</td>
<td>4.2</td>
<td>--</td>
<td>&lt;0.5</td>
</tr>
<tr>
<td></td>
<td>VC</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
<td>&lt;0.5 (&lt;5)</td>
<td>&lt;0.5 (J)</td>
<td>--</td>
<td>&lt;0.5</td>
</tr>
</tbody>
</table>

NOTES: ND = Not detected at detection limit. J = Compound detected below quantification limit.

* Detection limit = 5 µg/l

-- = Indicates no sample was collected.
Hygienic Laboratory
The University of Iowa

Date of report: 09-27-2007

Sample Number: 2007037362
Date Received: 09-20-2007
Project: WMSF
Date Collected: 09-19-2007 11:25
Collection Site: nwl-31
Collection Town: water
Description: DSM TCE NORTH PLUME
Reference: Collector: DRUSTRUP ROBERT
Phone: (515) 281-8900
Purchase Order: }

Comments: Upon arrival, sample met container and preservation requirements for the analysis requested. Please review carefully your sample results for additional analyte comments or method exceptions.

Results of Analyses

GC/MS 524.2 Volatiles

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Concentration ug/L</th>
<th>Quantitation Limit ug/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetrachloroethylene</td>
<td>&lt;0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Trichloroethylene</td>
<td>&lt;0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>cis-1,2-Dichloroethene</td>
<td>&lt;0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Vinyl chloride</td>
<td>&lt;0.5</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Date Analyzed: 09-25-2007
Method: EPA 524.2

Description of units used within this report

 ug/L - Micrograms per Liter

Quant Limit - Lowest concentration reliably measured

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Iowa Environmental Laboratory ID #027.

If you have any questions please call Client Services at 800/421-IOWA (4692) or 319/335-4500. Thank you.

Page 1 - End of Report
Date of report: 09-27-2007

<table>
<thead>
<tr>
<th>Sample Number</th>
<th>Date Received</th>
<th>Project</th>
<th>Date Collected</th>
<th>Collection Site</th>
<th>Collection Town</th>
<th>Description</th>
<th>Reference</th>
<th>Collector</th>
<th>Phone</th>
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<td>09-20-2007</td>
<td>WMSF</td>
<td>09-19-2007</td>
<td>nw-30</td>
<td>water</td>
<td>DSM TCE NORTH PLUME</td>
<td>DRUSTRUP ROBERT</td>
<td>(515) 281-8900</td>
<td></td>
</tr>
</tbody>
</table>

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Results of Analyses

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Concentration ug/L</th>
<th>Quantitation Limit ug/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetrachloroethylene</td>
<td>&lt;0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Trichloroethylene</td>
<td>&lt;0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>cis-1,2-Dichloroethene</td>
<td>&lt;0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Vinyl chloride</td>
<td>&lt;0.5</td>
<td>0.5</td>
</tr>
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**GC/MS 524.2 Volatiles**

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<thead>
<tr>
<th>Analyte</th>
<th>Concentration ug/L</th>
<th>Quantitation Limit ug/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetrachloroethylene</td>
<td>0.7</td>
<td>0.5</td>
</tr>
<tr>
<td>Trichloroethylene</td>
<td>&lt;0.5 J</td>
<td>0.5</td>
</tr>
<tr>
<td>cis-1,2-Dichloroethene</td>
<td>&lt;0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Vinyl chloride</td>
<td>&lt;0.5</td>
<td>0.5</td>
</tr>
</tbody>
</table>

**Comments**

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Date Analyzed: 09-25-2007
Method: EPA 524.2

Analyst: LL
Verified: CR

Description of units used within this report

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- Quant Limit - Lowest concentration reliably measured

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<tbody>
<tr>
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<td>&lt;0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Trichloroethylene</td>
<td>&lt;0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>cis-1,2-Dichloroethylene</td>
<td>&lt;0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Vinyl chloride</td>
<td>&lt;0.5</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Date Analyzed: 09-25-2007
Method: EPA 524.2

Description of units used within this report

ug/L - Micrograms per Liter
Quant Limit - Lowest concentration reliably measured

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Iowa Environmental Laboratory ID #027.

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Results of Analyses

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Concentration (ug/L)</th>
<th>Quantitation Limit (ug/L)</th>
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</thead>
<tbody>
<tr>
<td>Tetrachloroethylene</td>
<td>&lt;0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Trichloroethylene</td>
<td>1.9</td>
<td>0.5</td>
</tr>
<tr>
<td>cis-1,2-Dichloroethene</td>
<td>4.2</td>
<td>0.5</td>
</tr>
<tr>
<td>Vinyl chloride</td>
<td>&lt;0.5 J</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Comments: J - Please note that this compound was observed below the quantitation limit in the analysis of this sample.

Date Analyzed: 09-25-2007
Method: EPA 524.2

Analyst: LL
Verified: CR

Summary: The results of this report relate only to the items analyzed. This report shall not be reproduced except in full without the written approval of the laboratory.

Iowa Environmental Laboratory ID #027.

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Comments
Upon arrival, sample met container and preservation requirements for the analysis requested. Please review carefully your sample results for additional analyte comments or method exceptions.

Results of Analyses

GC/MS 524.2 Volatiles

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<thead>
<tr>
<th>Analyte</th>
<th>Concentration ug/L</th>
<th>Quantitation Limit ug/L</th>
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</thead>
<tbody>
<tr>
<td>Tetrachloroethylene</td>
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<td>0.5</td>
</tr>
<tr>
<td>Trichloroethylene</td>
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</tr>
<tr>
<td>cis-1,2-Dichloroethene</td>
<td>2.1</td>
<td>0.5</td>
</tr>
<tr>
<td>Vinyl chloride</td>
<td>&lt;0.5</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Comments
Please note that one or more target compounds which were not requested were observed below the quantitation limit in the analysis of this sample.

Date Analyzed: 09-25-2007
Method: EPA 524.2

Analyst: LL
Verified: CR

Description of units used within this report
ug/L - Micrograms per Liter
Quant Limit - Lowest concentration reliably measured

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Iowa Environmental Laboratory ID #027.

If you have any questions please call Client Services at 800/421-IOWA (4692) or 319/335-4500. Thank you.
Date of report: 09-27-2007

ROBERT DRUSTRUP
IDNR CONTAMINATED SITES
WALLACE STATE OFFICE BLDG
502 EAST NINTH STREET
DES MOINES IA 50319-0034

Comments

Upon arrival, sample met container and preservation requirements for the analysis requested. Please review carefully your sample results for additional analyte comments or method exceptions.

Results of Analyses

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Concentration ug/L</th>
<th>Quantitation Limit ug/L</th>
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<tr>
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<tr>
<td>cis-1,2-Dichloroethene</td>
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<td>0.5</td>
</tr>
<tr>
<td>Vinyl chloride</td>
<td>&lt;0.5</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Comments

Please note that one or more target compounds which were not requested were observed below the quantitation limit in the analysis of this sample.

Date Analyzed: 09-25-2007
Method: EPA 524.2

Analyst: LL
Verified: CR

Description of units used within this report

ug/L - Micrograms per Liter
Quant Limit - Lowest concentration reliably measured

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GC/MS 524.2 Volatiles

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<th>Analyte</th>
<th>Concentration ug/L</th>
<th>Quantitation Limit ug/L</th>
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<tbody>
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<td>0.5</td>
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<tr>
<td>Trichloroethylene</td>
<td>&lt;0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>cis-1,2-Dichloroethene</td>
<td>&lt;0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Vinyl chloride</td>
<td>&lt;0.5</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Comments: 
- Please note that this compound was observed below the quantitation limit in the analysis of this sample.

Date Analyzer: 09-25-2007
Method: EPA 524.2

Description of units used within this report

- ug/L - Micrograms per Liter
- Quant Limit - Lowest concentration reliably measured

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Iowa Environmental Laboratory ID #027.

If you have any questions please call Client Services at 800/421-IOWA (4692) or 319/335-4500 Thank you.
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<thead>
<tr>
<th>Sample ID/Description</th>
<th>Date</th>
<th>Time</th>
<th>Sample Matrix</th>
<th>W</th>
<th>S</th>
<th>Other</th>
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<td>NW-30</td>
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<td>11:25a</td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>NW-34</td>
<td>1:15p</td>
<td></td>
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</tr>
<tr>
<td>NW-35</td>
<td>3:10p</td>
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<td></td>
</tr>
<tr>
<td>NW-36</td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>NW-40</td>
<td>3:50p</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>NW-41</td>
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<th>Time</th>
<th>Comments</th>
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<td>Robert Drusen</td>
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<td>3:55p</td>
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<th>Time</th>
<th>Comments</th>
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<tr>
<td>Rene</td>
<td>9/20</td>
<td>15:55</td>
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<table>
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<tr>
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<th>Phone</th>
</tr>
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<tbody>
<tr>
<td>(515) 281-8900</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Collector's Signature</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robert Drusen</td>
<td>Signature</td>
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<th>Description</th>
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Please use method yielding lowest quantification limits.