Quality Control Summary Report,
Former F.E. Warren Air Force Base,
Atlas “E” Missile Site No. 12,
Windsor, Colorado

Prepared for:
Department of the Army
USA Engineer District, Omaha

Prepared by:
North Wind, Inc.

September 2010
Quality Control Summary Report
Former F.E. Warren Air Force Base,
Atlas “E” Missile Site No. 12,
Windsor, Colorado

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Attachment 2—Electronic Data Deliverable Compliance Screening Reports
Attachment 3—Laboratory Quality Control Outlier Reports
Attachment 4—Sample Qualification Reports
Attachment 5—Automated Data Review Library
ACRONYMS

°C degrees Celsius
ADR Automated Data Review
BTEX benzene, toluene, ethylbenzene, xylenes
CDPHE Colorado Department of Public Health and Environment
COC chain-of-custody
DO dissolved oxygen
DOD Department of Defense
DQO data quality objective
DRO diesel range organic
EPA Environmental Protection Agency
FD field duplicate
GC/MS gas chromatography/mass spectrometry
ISU Idaho State University
LCS laboratory control sample
LCSD laboratory control sample duplicate
MS/MSD matrix spike/matrix spike duplicate
NELAC National Environmental Laboratory Accreditation Conference
ORP oxidation reduction potential
PID photoionization detector
QA quality assurance
QA/QC quality assurance/quality control
QAPP Quality Assurance Project Plan
QC quality control
QCSR Quality Control Summary Report
QSM Quality Systems Manual
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPD</td>
<td>relative percent difference</td>
</tr>
<tr>
<td>SAP</td>
<td>Sampling and Analysis Plan</td>
</tr>
<tr>
<td>SDG</td>
<td>sample delivery group</td>
</tr>
<tr>
<td>TCE</td>
<td>trichloroethene</td>
</tr>
<tr>
<td>TOC</td>
<td>total organic carbon</td>
</tr>
<tr>
<td>USACE</td>
<td>United States Army Corps of Engineers</td>
</tr>
<tr>
<td>USU</td>
<td>Utah State University</td>
</tr>
<tr>
<td>UWRL</td>
<td>Utah Water Research Laboratory</td>
</tr>
<tr>
<td>VOC</td>
<td>volatile organic compound</td>
</tr>
</tbody>
</table>
Quality Control Summary Report
Former F.E. Warren Air Force Base.
Atlas “E” Missile Site No. 12,
Windsor, Colorado

1. PROJECT QUALITY REQUIREMENTS

This Quality Control Summary Report (QCSR) is prepared for the U.S. Army Corps of Engineers (USACE) Omaha District under Contract Number W9128F-04-D-0017 as part of the ongoing activities at the Former F.E. Warren Air Force Base, Atlas “E” Missile Site No. 12 (Atlas 12 site) in Windsor, Colorado. Data reviewed in this QCSR were collected from April 2009 to February 2010, as stated in the Atlas 12 Pilot Test Work Plan (North Wind 2009). All definitive samples were analyzed by Test America Laboratories-Denver. Field data and screening level data were also evaluated for quality.

The quality assurance/quality control (QA/QC) practices employed during the field activities are outlined in this QCSR. A summary of the project quality requirements outlined in the Work Plan are presented, including the data quality objectives (DQOs) (Section 1.1), QC requirements for screening level data (Section 1.2), and analytical laboratory services and methods for definitive data (Section 1.3). An assessment of the screening data quality is discussed in Section 2, an assessment of the definitive data quality is presented in Section 3, and a summary of the data verification results is provided in Section 4. References are provided in Section 5.

1.1 Data Quality Objectives

DQOs are qualitative and quantitative statements that specify the data needed to support specific decisions or regulatory actions. The Atlas 12 DQOs specific to the Pilot Test include the following:

- Quantify the contaminants and identify the presence of trichloroethene (TCE) degradation products (cis-DCE, vinyl chloride, and ethene) to determine the effectiveness and timeframe of contaminant degradation processes.
- Determine the longevity and utilization of the EHC-G amendment in the bedrock subsurface through analysis of total organic carbon (TOC).
- Monitor groundwater geochemical conditions and microbial populations to determine if conditions remain optimal for contaminant degradation pathways.

Table 1 identifies the types of data, the data quality level assigned to each type, and a summary of the analyses (when applicable) for the data evaluated in this QCSR. Data users include the contractor, USACE Omaha District, Environmental Protection Agency (EPA) Region 8, and the Colorado Department of Public Health and Environment (CDPHE).
Table 1. Data types and data quality levels for Pilot Test data.

<table>
<thead>
<tr>
<th>Data Inputs</th>
<th>Data Quality Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subsurface Soil Sampling</td>
<td>Screening Data:</td>
</tr>
<tr>
<td></td>
<td>• PID screening</td>
</tr>
<tr>
<td>Groundwater Monitoring</td>
<td>Screening Data:</td>
</tr>
<tr>
<td></td>
<td>• Groundwater purge parameters</td>
</tr>
<tr>
<td></td>
<td>• Remediation parameters</td>
</tr>
<tr>
<td></td>
<td>• Natural attenuation parameters</td>
</tr>
<tr>
<td></td>
<td>• DHC</td>
</tr>
<tr>
<td></td>
<td>Definitive Data:</td>
</tr>
<tr>
<td></td>
<td>• VOCs (including BTEX)</td>
</tr>
<tr>
<td></td>
<td>• DROs</td>
</tr>
<tr>
<td>Geospatial Data</td>
<td>Screening Data:</td>
</tr>
<tr>
<td></td>
<td>• Well survey data</td>
</tr>
</tbody>
</table>

**Note:** Detailed descriptions of the data inputs and information for data collection are provided in Sections 4 and 5 of the Pilot Test Work Plan (North Wind 2009), the Sampling and Analysis Plan (Appendix A), and Update to the Quality Assurance Project Plan (Appendix B).

BTEX = benzene, toluene, ethylbenzene, xylenes  
DRO = diesel range organics  
PID = photoionization detector  
VOC = volatile organic compound  
DHC = *Dehalococcoides* spp.

### 1.2 Quality Control Requirements for Screening Level Data

Screening level data collected as part of the Pilot Test activities at Atlas 12 were generated from the following sources:

- Collection of photoionization detector (PID) screenings during soil boring activities;
- Determination of remediation parameters and natural attenuation parameters (performed by the Utah Water Research Laboratory [UWRL] at Utah State University [USU] and Zymax Forensics);
- Collection of temperature, pH, conductivity, dissolved oxygen (DO), and oxidation-reduction potential (ORP) using water quality instruments;
- Analysis of ferrous iron using a Hach field kit; and
- Geospatial data.
Continual reviews of the screening data quality were conducted and reported in Daily QC Reports (Attachment 1) and include summary information of quality assessments. As outlined in the Quality Assurance Project Plan (QAPP), which is included as an attachment to the Site Characterization Work Plan (North Wind 2008) with updates attached to the Pilot Test Work Plan (North Wind 2009), field data were validated using the criteria described below.

- **Completeness of field records.** A check of field record completeness will ensure that all requirements for field activities in the Sampling and Analysis Plan (SAP), which is included as an addendum to the Work Plan (North Wind 2009), have been fulfilled, complete records exist for each field activity, and that the procedures specified in the SAP (or approved as field change requests) were implemented. Field documentation will ensure sample integrity and provide sufficient technical information to recreate each field event. The results of the completeness check will be documented and environmental data affected by incomplete records will be identified in the technical report.

- **Identification of valid samples.** The identification of valid samples involves interpretation and evaluation of the field records to detect problems affecting the representativeness of environmental samples. For example, field records can indicate whether a well is properly constructed or if unanticipated environmental conditions were encountered during construction. The lithologic and geophysical logs may be consulted to determine if a well is screened only in the water-bearing zone of concern. Records should also note sample properties such as clarity, color, odor, etc. Photographs may show the presence or absence of obvious sources of potential contamination, such as operating combustion engines near a well during sampling. Judgments of sample validity will be documented in the technical report, and environmental data associated with poor or incorrect fieldwork will be identified.

- **Correlation of data.** The results of field tests obtained from similar areas will be correlated. For example, PID headspace screening and volatile organic compound (VOC) analysis results may be correlated. The findings of these correlations will be documented, and the significance of anomalous data will be discussed in the technical report.

- **Identification of anomalous field test data.** Anomalous field data will be identified and explained (to the extent possible). For example, water temperature for one well that is significantly higher than any other well temperature in the same aquifer will be explained in the technical report.

- **Accuracy and precision of field data and measurements.** The assessment of the quality of field measurements will be based on instrument calibration records and a review of any field corrective actions. The accuracy and precision of field measurements will be discussed. Field record review is an ongoing process. The Site Contractor QC Systems Manager will be responsible for ensuring that proper documentation is recorded during sampling activities.

### 1.3 Analytical Laboratory Services and Methods for Definitive Data

Test America-Denver provided the analytical laboratory services for this investigation. Test America-Denver holds current certification under the National Environmental Laboratory Accreditation Conference (NELAC) and has completed the self-declaration form showing compliance with the Department of Defense (DOD) Quality Systems Manual (QSM; DOD 2006). The aqueous analytical methods used by Test America-Denver, in accordance with the Work Plan (North Wind 2009), are stated in Table 2.
Table 2. Aqueous analytical methods.

<table>
<thead>
<tr>
<th>Matrix</th>
<th>Analytical Suite</th>
<th>Preparation Method</th>
<th>Analysis Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groundwater</td>
<td>Extractable Petroleum Hydrocarbons</td>
<td>3510</td>
<td>8015B</td>
</tr>
<tr>
<td></td>
<td>Volatile Petroleum Hydrocarbons</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Volatile Organics by GC/MS</td>
<td>5030B</td>
<td>8260B</td>
</tr>
</tbody>
</table>

References
GC/MS = gas chromatography/mass spectrometry

Analyses were performed in accordance with the QAPP and the updates to the QAPP (North Wind 2008 and 2009) and the DOD QSM (DOD 2006). Analyses were performed using established analytical and QC procedures to produce definitive level quantitative data. Analytical results produced were analyte-specific, with confirmation of analyte identity and concentration. Applicable SW-846 Test Methods (EPA 2006) and Methods for Chemical Analyses of Water and Wastes (EPA 1986) were used to analyze, document, verify, and assess the data. The data that meet quality criteria are suitable for:

- Site assessments,
- Risk assessments,
- Remedial design, and
- Remediation efforts.

Definitive data are not restricted in their use unless QC parameters are not met. QC parameters for the definitive data are provided in the QAPP, and an assessment of the definitive analytical data quality is detailed in Section 3 of this QCSR.

2. ASSESSMENT OF SCREENING LEVEL DATA QUALITY

A field record completeness check was conducted to ensure that all requirements for field activities in the SAP were fulfilled, complete records exist for each field activity, and the procedures specified in the SAP (or approved as field change requests) were implemented. Field documentation was found to provide sufficient technical information to recreate each field event. During field operations, one inconsistency was noted and corrected in the field. As a result of a technician inconsistency in operation of the field instrumentation during one sampling event, ferrous iron results from three locations were incorrectly noted as not detected. Corrective actions included review of the field operations procedure for the instrument. Affected ferrous iron field test results were flagged to denote that they were estimated. Upon review of field documentation, the results of other field tests obtained from similar areas indicate no significant anomalous data. Field instrument calibrations were noted daily in the field log books and no other field corrective actions were noted.

Table 3 indicates specific data quality assessment conclusions for each type of screening data collected during the site characterization.
Table 3. Screening level data assessment.

<table>
<thead>
<tr>
<th>Type of Data</th>
<th>Source</th>
<th>Parameter Tested</th>
<th>Data Quality Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groundwater – Remediation Parameters and Natural Attenuation Parameters</td>
<td>USU UWRL</td>
<td>Anions (chloride, sulfate, phosphate, nitrate)</td>
<td>Duplicate samples were taken of groundwater to assess the RPD; the UWRL laboratory required a field blank and a trip blank for separate analysis to assess cross contamination. Laboratory replicates were analyzed to assess laboratory error. Samples were collected under COC using North Wind standard operating procedures for collection of groundwater samples.</td>
</tr>
<tr>
<td>Groundwater – Natural Attenuation Parameters</td>
<td>Zymax Forensics</td>
<td>CSIA</td>
<td>Groundwater samples were collected, transported and processed under COC using North Wind standard operating procedures for collection of groundwater samples. Analyses for CSIA were conducted using laboratory established procedures for quality.</td>
</tr>
<tr>
<td>Groundwater – Microbial Analyses</td>
<td>ISU (North Wind, Inc.)</td>
<td>DHC</td>
<td>Groundwater samples were collected, transported and processed under COC using North Wind standard operating procedures for collection of groundwater samples. Analyses for DHC were conducted using laboratory established procedures for quality.</td>
</tr>
<tr>
<td>Groundwater – Field Test</td>
<td>North Wind, Inc.</td>
<td>Ferrous Iron</td>
<td>Samples were collected using North Wind standard operating procedures for collection of groundwater samples. Majority of field analyses were conducted per manufacturer specifications. Duplicate samples were analyzed to ensure precision.</td>
</tr>
<tr>
<td>Groundwater Field Data Collection</td>
<td>North Wind, Inc.</td>
<td>Temperature pH Conductivity DO ORP</td>
<td>Field data instruments are calibrated daily using manufacturer instructions. Calibration solutions were purchased for the Atlas 12 project only. The instruments used were in good repair and are serviced regularly by the supplier.</td>
</tr>
</tbody>
</table>
Table 3. (continued).

<table>
<thead>
<tr>
<th>Type of Data</th>
<th>Source</th>
<th>Parameter Tested</th>
<th>Data Quality Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil Field Data Collection</td>
<td>North Wind, Inc.</td>
<td>PID testing</td>
<td>Field data instruments are calibrated daily using manufacturer instructions, and appropriate calibration gases were purchased.</td>
</tr>
<tr>
<td>GeoSpatial Data</td>
<td>Intermill Land Surveying</td>
<td>Well elevation and horizontal location</td>
<td>A well survey was conducted by a registered surveyor from the State of Colorado.</td>
</tr>
</tbody>
</table>

COC = chain-of-custody  
CSIA = carbon stable isotope analysis  
DHC = *Dehalococcoides* spp.  
DO = dissolved oxygen  
ISU = Idaho State University  
ORP = oxidation reduction potential  
PID = photoionization detector  
RPD = relative percent difference  
TOC = total organic carbon  
TSS = total suspended solids  
USU = Utah State University  
UWRL = Utah Water Research Laboratory
3. ASSESSMENT OF DEFINITIVE ANALYTICAL DATA QUALITY

Data quality is assessed through a series of review and verification processes in accordance with the Work Plan (North Wind 2009), QAPP (North Wind 2008), and updates to the QAPP (North Wind 2009). First, Test America-Denver performed a data assessment to evaluate compliance with approved analytical methods and with laboratory standard operating procedures. Test America-Denver laboratory review procedures used to assess adherence to the analytical method specifications are detailed in Section 3.1. Second, a North Wind project chemist performed data verification to determine if data were collected, as required by the Work Plan, and performed data verification using the Automated Data Review (ADR) software (Section 3.2). A detailed overview of the quality procedures and analyses for the analytical data is presented in Section 3.3. A summary of the data verification results is presented in Section 4.

3.1 Laboratory Data Assessment

The laboratory data quality assessment includes an analytical data review to ensure accurate and complete reporting and compliance with the analytical method specifications. The laboratory performed analytical procedures requested in accordance with the DOD QSM, Version 3 (DOD 2006). Test America-Denver maintains a rigorous QA/QC program that follows the criteria established by NELAC, USACE, and the DOD QSM that includes EPA approved analytical procedures and sample handling and preservation techniques. Test America-Denver used the QSM QC limits for organic analytes. The electronic data deliverable compliance screening reports, with the laboratory comments, are included as Attachment 2 (included on CD).

3.1.1 Sample Receipt

QC procedures followed by the laboratory include sample container inspection and chain-of-custody (COC) documentation review. The laboratory inspected the shipping containers upon receipt and compared the contents with the COC form associated with each cooler. Information from the sample check-in procedure was recorded on the COC forms, “Sample Confirmation Report,” and “Sample Receiving Checklist.” These forms are used by the laboratory to document that sample identifications listed on the COC forms agree with the samples contained in the coolers. The laboratories ensured that COC forms were filled out properly, sample containers were not broken, headspace was not present in VOC containers, custody seals were intact, and cooler temperatures were maintained at 4 degrees Celsius (ºC) +/- 2ºC.

3.1.2 Laboratory Qualification of Data

The laboratory flags analytical results with data qualifiers, when necessary, to indicate potential impacts to data usability and to alert the user to special analytical conditions. More than one qualifier may be used to indicate multiple conditions or situations that apply to an individual result. Test America-Denver applied the qualifiers identified in Table 4 to the Atlas 12 analytical data. The laboratory QC outlier reports, which are ADR generated, are included as Attachment 3.
Table 4. Test America-Denver Laboratory qualifiers for analytical data.

<table>
<thead>
<tr>
<th>Qualifier</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>U</td>
<td>Undetected at the limit of detection. The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.</td>
</tr>
<tr>
<td>J</td>
<td>Estimated: The analyte was positively identified; the quantitation is an estimation (e.g., matrix interference or outside the calibration range).</td>
</tr>
<tr>
<td>B</td>
<td>Blank contamination: The analyte was detected above the method detection limit in an associated blank.</td>
</tr>
<tr>
<td>K</td>
<td>Benzo(b&amp;k)fluoranthene unresolved–matrix. Total reported as Benzo(b)fluoranthene.</td>
</tr>
<tr>
<td>Q</td>
<td>One or more QC criteria (e.g., LCS recovery or surrogate recovery) failed. Data usability should be carefully assessed by the project team.</td>
</tr>
<tr>
<td>a</td>
<td>Spiked analyte recovery is outside control limit.</td>
</tr>
<tr>
<td>H</td>
<td>Sample was prepped or analyzed beyond the specified holding time.</td>
</tr>
<tr>
<td>MSB</td>
<td>The recovery and RPD were not calculated because the sample amount was greater than four times the spike amount.</td>
</tr>
<tr>
<td>N</td>
<td>Inorganics: Spiked analyte recovery is outside stated control limits.</td>
</tr>
<tr>
<td>*</td>
<td>Surrogate or LCS is outside control limits.</td>
</tr>
</tbody>
</table>

LCS = laboratory control sample  
QC = quality control  
RPD = relative percent difference

3.2 Data Verification

The following sections describe the procedures followed by the North Wind project chemist to assess the quality and usability of definitive data. Data assessment is completed when 100% of the information is collected. Based on the results of the verification processes, data are categorized as fully usable, usable as qualified, or rejected.

3.2.1 Data Verification

Data verification is the process of determining whether data have been collected or generated as required by project documents. Data verification consists of:

- Verifying that field activities were performed in compliance with the Work Plan (North Wind 2009);
- Verifying that the data collection plans and protocols were followed, as outlined in the Work Plan (North Wind 2009), the QAPP (North Wind 2008), and updates to the QAPP (North Wind 2009);
- Verifying the completeness to establish that sufficient data necessary to meet project objectives have been collected; and
- Ensuring that each sample delivery group (SDG) conforms and complies with analytical methods and procedural and contractual requirements.
3.2.2 Automated Data Review Data

A method-specific assessment that substantiates, independently of the data verification assessment, that analytical requirements have been met and that data qualifiers have been applied appropriately and consistently was conducted using ADR software. This data verification was performed using the ADR software developed by Laboratory Data Consultants. The data receive qualifier flags per the method requirements and following the decision logic established within the ADR software.

Reporting errors resulting from reporting limits that fail to meet project objectives, or have inconsistencies, unexpected results (possible anomalies), matrix effects, poor recoveries, and potentially rejected data (i.e., identifying data gaps), were targeted for further review by the North Wind project chemist. The results of the evaluation of the chemical data obtained during this investigation are included in Attachment 4.

Final flag codes were applied to the data (based on the definitions in Table 5) to indicate data usability. None of the QC issues resulted in rejection of data; therefore, data are considered usable (as qualified during verification). The results of the ADR qualification are included in Attachment 4.

Table 5. Verification qualifications for analytical data.

<table>
<thead>
<tr>
<th>Qualifier</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>U</td>
<td>The analyte was analyzed for, but was not detected up to, the method detection limit and was not quantifiable to the reporting limit.</td>
</tr>
<tr>
<td>J</td>
<td>The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.</td>
</tr>
<tr>
<td>R</td>
<td>The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.</td>
</tr>
<tr>
<td>UJ</td>
<td>The analyte was not detected above the adjusted limit of detection. However, the reported adjusted limit of detection is approximate.</td>
</tr>
</tbody>
</table>

Note: No project data were rejected as a result of data verification.

3.3 Quality Procedures and Analyses

This section presents the procedures and analyses conducted to assess the quality of the analytical data. Two types of QC results were used to evaluate data quality: (1) field QC samples were collected and analyzed to evaluate field sampling activities (Section 3.3.1), and (2) laboratory QC samples were analyzed to evaluate laboratory analytical procedures and maintain control of the analytical methods (Section 3.3.2). The results from the ADR evaluation of the laboratory method-specific DQOs (as listed in the QAPP [North Wind 2008] and updates to the QAPP [North Wind 2009]) are provided in Attachment 4. The QC acceptance criteria are provided in Attachment 5.

3.3.1 Field Quality Control Procedures and Analyses

QC samples include field duplicates (FDs) and trip blank samples for VOC analyses. The Work Plan (North Wind 2009), QAPP (North Wind 2008), and updates to the QAPP (North Wind 2009) were used as guidance documents to identify the adequate number of QC samples, procedures for their collection and analyses, and evaluation of results required for this investigation. Evaluation procedures for QA and QC sample analyses are summarized below.
3.3.1.1 Field Duplicate Samples

FD samples are secondary samples collected at the same time and from the same source as the primary samples and submitted to one laboratory as separate samples. FDs were collected at a frequency of one for every 10 samples.

Comparison of FD samples with associated field investigative samples provides precision information for the overall sample collection and analytical process, including possible variability related to sample collection, handling, shipping, storage, preparation, and analysis. Evaluating the calculated relative percent differences (RPDs) for the FD and associated field investigative samples assesses this variability. The ADR software assesses the RPDs using the criteria outlined in the QAPP (North Wind 2008 and 2009). FD sample evaluation results are presented in Attachment 3.

3.3.1.2 Trip Blank Samples

Trip blanks provide an indication of contamination attributable to sample collection, handling, and shipment. Trip blanks were kept with the field samples for VOC analysis and shipped together to the lab for analysis. One laboratory prepared trip blank was included with each cooler containing VOC samples per QAPP requirements. Trip blanks were analyzed for all VOC analytes of concern. Trip blanks were used to assess the potential for VOC contamination of samples due to contaminant migration during sample collection and handling, shipment, and storage.

3.3.1.3 Field Blank Samples

Field blanks are used to determine if contaminants present at the site are affecting sample quality. These samples are collected by exposing commercially purified water to ambient conditions to quantify the error associated with field handling. Field blanks are not required by the Work Plan (North Wind 2009), but unexpected detections of toluene in groundwater prompted collection of field blanks during the sampling event in February 2010 to assess the possibility of fuels combustion from generators onsite and from the oil burner located to the south of the site as possible contribution sources to the detections. While toluene was detected in the field blanks, concentrations were not sufficient to account for the concentrations found in groundwater sampled.

3.3.2 Laboratory Quality Control Procedures and Analyses

Laboratory QC checks represent internal system checks and QC samples used to monitor the possible effect of laboratory activities on sample results. In order to ensure a consistent and appropriate selection of analytical QC samples and their associated performance criteria, it is required that all analytical measurement systems follow the guidance, standards, and analytical QC acceptance criteria listed in the QAPP, unless project-specific, test method, or regulatory requirements are more stringent than those listed in the QAPP.

Analytical QC procedures followed by the laboratory include sample holding time review, laboratory control sample (LCS) analyses, method blank analyses, and surrogate spike sample evaluation. The laboratory followed standard procedures in dealing with the laboratory non-conformances. Laboratory flags were applied, as required by the DOD QSM (DOD 2006) for laboratory flagging. Some of the laboratory flags were removed as per independent requirements of the DOD QSM. The laboratory non-conformance reports are included in Attachment 2; the laboratory QC outlier reports are included in Attachment 3.

The overall data qualification, as a result of the individual laboratory QC outliers, is presented in Attachment 4.
### 3.3.2.1 Holding Times

Samples were delivered from the Atlas 12 Site to Test America-Denver regularly throughout the sampling events in coordination with the analytical laboratory to ensure analyses were conducted within the required holding times. The time elapsed between sample collection and sample extraction/analysis was calculated as part of the review process to identify holding time violations. All samples were analyzed within the appropriate hold times except for the following:

- **Job Number 280-742-1** – Due to a laboratory error, sample 12-MW19-04-00 was analyzed 1 day outside of the recommended 7-day holding time for unpreserved samples. Associated results are flagged "H" for holding time violations and ADR verification designated “J” qualifiers as appropriate (Attachments 3 and 4).

- **Job Number 280-630-1** – All of the samples in this batch were analyzed outside of the State of Colorado recommended holding time for volatile organic analysis (with no preservatives). These data were assigned data flags by the laboratory for holding time violations, and ADR verification designated “J” qualifiers as appropriate (Attachments 3 and 4).

### 3.3.2.2 Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate (MS/MSD) samples are separate aliquots (portions) taken from a single field sample and spiked in the laboratory with known concentrations of target analytes prior to sample preparation and analysis. The MS and MSD are spiked at a level less than or equal to the mid-point of the calibration curve for each analyte. These samples are used to document the bias attributed to the sample matrix encountered during sample preparation and analysis. Analytical results from MS samples are used to evaluate method accuracy and applicability to a given matrix. However, these results also yield information on precision when used with results from MSD samples. MS and MSD sample results that do not compare well may be an indication of sample heterogeneity. Calculating the percent recovery of the target analytes added to the investigative sample-assessed accuracy. Precision was assessed by calculating the RPD for the MS/MSD sample pairs.

MS/MSD samples were collected at a frequency of at least one per 20 environmental samples. In cases where a target analyte was not detected in either sample or in only one of the samples, an RPD would not be valid and is therefore not calculated. The following data and associated flags were identified by the laboratory:

- **Lot D9H130367** – Sample 12-MW22-02-00 was logged for 8260 VOCs and diesel range organic (DRO) analyses, per the containers received. The MS/MSDs for DRO requested on the COC cannot be performed due to insufficient volume submitted. Sufficient volume was received for the 8260 MS/MSD. The MS/MSD analyses associated with QC batches 9231040 and 9232508 were performed on samples D9H130367-002 and -008, respectively, and were in control.

- **Lot D9H110297** – MS/MSD analyses were not requested in this batch of samples.

- **Lot D9F040359** – MS/MSD analyses, associated with QC batch 9161133, were performed on sample D9F040359-001. The MS/MSD exhibited RPD values outside of QC limits for acetone. The acceptable LCS analysis data indicated that the analytical system was operating within control. No flags were applied to the parent sample.
MS/MSD analyses associated with QC batch 9169046 were performed on a sample from another client and/or lot and were not in control. The acceptable LCS analyses data indicated that the analytical system was operating within control. No flags are applied to the parent sample. MS/MSD analyses performed on sample D9F040359-001 were in control (DRO).

- **Lot D9K120587** – MS/MSD analyses were performed on sample D9K120587-014. The MS and MSD exhibited a spike compound recovery outside the QC limits for 2-butanone and toluene due to obvious matrix interference. The associated results in the parent sample are flagged “J”. In addition, the MS for method 8015B exhibited a surrogate recovery outside of QC limits for o-terphenyl. Acceptable LCS analysis data indicated that the analytical system was operating and within control.

Method 6020B MS/MSD analyses were performed on sample D9K120587-006. The MS and MSD exhibited a spike compound recovery outside the QC limits due to obvious matrix interference. The associated results in the parent sample are flagged “J”. Acceptable LCS analysis data indicated that the analytical system was operating and within control.

- **Lot D9K130607** – MS/MSD analyses were performed on sample D9K130607-005. The MS and MSD exhibited a spike compound recovery outside the QC limits for chloroethane. The associated results in the parent sample are flagged “J”. Method 6020B MS/MSD analyses were performed on a sample from another client and/or lot and were not in control. The acceptable LCS analysis data indicated that the analytical system was operating and within control.

- **Job Number 280-742-1** – MS/MSD analyses were performed on the 5x dilution of sample 12-MW4-04-00. The MS and/or MSD exhibited recoveries outside of QC limits for p-isopropyltoluene, n-butylbenzene, n-propylbenzene, and sec-butylbenzene. TCE is present in the parent sample at a concentration four times greater than the matrix spike concentration; therefore, control limits are not applicable. The associated LCS recovery met acceptance criteria.

- **Job Number 280-630-1** – MS/MSD analyses were performed on the 50x dilution of sample 12-MW5-04-00 and were in control for TCE. 2-Butanone was present in the parent sample at a concentration four times greater than the matrix spike concentration; therefore, control limits are not applicable. The associated LCS recovery met acceptance criteria.

### 3.3.2.3 Laboratory Control Samples/Laboratory Control Sample Duplicates

LCS/laboratory control sample duplicate (LCSD) pairs were analyzed to assess analytical precision and accuracy. LCSs and LCSDs consist of analyte-free water spiked with select target constituents of known concentration. The laboratories calculated percent recoveries and RPDs for these constituents to indicate laboratory accuracy and precision, respectively. The results of LCS/LCSD analyses are included in the QC summary sections of the laboratory analytical reports.

The LCS/LCSD percent recoveries were used to indicate whether laboratory accuracy and precision were within the QAPP limits or laboratory historical control limits. The QAPP limits are listed in the ADR library (included as Attachment 5). Analytical results would be qualified as estimated detections (J) or estimated non-detections (UJ) if LCS/LCSD percent recoveries were outside QAPP or laboratory historical control limits. Qualifiers that were applied as a result of LCS/LCSD non-conformances are shown in Attachment 3.

Job Number 280-742-1 – 1,2-dibromoethane, 2-hexanone, 4-methyl-2-pentanone, methyl tert-butyl ether, and 1,2,3-trichloropropane failed the recovery criteria low for LCS 280-5452/4. 1,2 dibromoethane, 2-hexanone, 4-methyl-2-pentanone, and 1,2,3-trichloropropane failed the recovery criteria low for LCSD.
280-5452/5. Associated results were flagged “Q” by the laboratory. The samples associated with the batch were reanalyzed with acceptable LCS/LCSD recoveries. Since reanalysis was then performed outside of holding time, only data from the original analysis are reported.

### 3.3.2.4 Method Blank Samples

Method blanks were prepared and analyzed by the laboratory to assess the level of background interferences and/or contamination present in the analytical system or to verify the analyte-free reagents. The method blank sample consists of analyte-free water containing all of the reagents used for analysis. It is prepared in the same manner as the primary sample and is processed through all of the analytical steps, including any sample preparation. One method blank sample is analyzed for every 20 samples or for each analytical batch, whichever is more frequent, for each matrix type.

The goal is to conduct sample analysis in such a manner that sample contamination is not introduced by the analytical methods, equipment, or reagents used. If such contamination occurs, it is usually identified by detection of target analytes at trace or low concentrations in the method blanks. When detectable target analytes are found in a method blank, the laboratory investigates the source, qualifies the affected data as appropriate according to the magnitude of the detections, and implements corrective measures (as appropriate).

Acetone, methylene chloride, carbon disulfide, and 2-butanone (MEK) are commonly used laboratory solvents; phthalates are associated with plastics and are also common laboratory contaminants. Analytical results were qualified as non-detections (U) when an analyte was detected in the primary sample at a concentration of less than five times (10 times for common laboratory contaminants) the analyte concentration in the associated method blank. Qualifiers that were applied due to method blank non-conformances are shown in Attachment 3. The following data and associated flags were identified by the laboratory:

- **Lot D9H130367** – Methylene chloride was present in the method blank associated with QC batch 9232508. Because the concentration in the method blank is at a level less than half the reporting limit, corrective action was deemed unnecessary.

- **Lot D9H110297** – Low levels of naphthalene and 1,2,3-trichlorobenzene are present in the method blank associated with QC batch 9226208. Because the concentration in the method blank is at a level less than one-half the reporting limit, corrective action is deemed unnecessary.

- **Lot D9F040359** – Low levels of naphthalene and acetone are present in the method blank associated with QC batch 9161133. Because the concentration in the method blank is at a level less than one-half the reporting limit, corrective action is deemed unnecessary.

- **Lot D9K120587** – Methylene chloride was present in the method blank associated with QC batch 9322041. Because the concentration in the method blank is at a level less than half the reporting limit, corrective action was deemed unnecessary.

Low levels of naphthalene are present in the method blank associated with QC batch 9169046. Because the concentration in the method blank is at a level less than one-half the reporting limit, corrective action is deemed unnecessary.

A low level of gasoline range organics was present in the method blank associated with QC batch 9163380. Because the concentration in the method blank is at a level less than half the reporting limit, corrective action was deemed unnecessary.

- **Lot D9K120587** – Methylene chloride was present in the method blank associated with QC batch 9322041. Because the concentration in the method blank is at a level less than half the reporting limit, corrective action was deemed unnecessary.
• Lot D9K130607 – No compounds were reported present in the method blank associated with this sample batch.

• Job Number 280-742-1 – No compounds were reported present in the method blank associated with this sample batch.

• Job Number 280-630-1 – No compounds were reported present in the method blank associated with this sample batch.

3.3.2.5 Surrogate Recovery

Surrogates are organic compounds that are similar to the target analyte(s) in chemical composition and behavior in the analytical process but that are not normally found in environmental samples. Surrogates are used to evaluate accuracy, method performance, and extraction efficiency. Surrogate recoveries that are outside the control limits may indicate performance problems with the analytical system and extraction procedures, or significant matrix effects when evaluated in conjunction with the MS/MSD results.

QAPP and laboratory historical control limits were used to assess percent recoveries for surrogate spike constituents. The surrogate recoveries were within the QC limits. The following data and associated flags were identified by the laboratory:

• Lot D9H130367 – Surrogate o-terphenyl recovered below QC limits in sample D9H130367-001. Matrix interference is obvious in the chromatography. Associated data are flagged “J”.

• Lot D9H110297 – Sample D9H110297-002 was analyzed at a dilution due to high concentrations of target compounds. Reporting limits have been adjusted relative to the dilution required. The surrogate recovery could not be calculated because the extract was diluted beyond the ability to quantitate a recovery.

• Lot D9F040359 – Surrogate dibromofluoromethane recovered below QC limits in samples D9F040359-009 and -010 due to matrix interference. The analyst noted that all the VOC volumes submitted for these samples were at a pH of approximately 11 and 12 respectively, which has shown to have an effect on the recovery of this surrogate.

• Lot D9K120587 – No data from this batch were flagged due to surrogate recoveries.

• Lot D9K130607 – No data from this batch were flagged due to surrogate recoveries.

• Job Number 280-742-1 – No data from this batch were flagged due to surrogate recoveries.

• Job Number 280-630-1 – No data from this batch were flagged due to surrogate recoveries.
4. DATA VERIFICATION RESULTS

Four quality control sample results were rejected due to errors associated with QC issues (Attachment 4). These included trichloroethane MS recoveries for sample 12-MW10-04-02, 12-MW1-04-02 (field blank), 12-MW23-04-04 (trip blank), and 12-SUMP-04-00 all from lab report batch 780-742-1 from the February sampling event. The associated matrix spike recovery was below the DOD QSM limits.

The remainder of the data are considered usable as qualified during the data assessment. The results of the ADR qualification are included in Attachment 4. Any deviations from the planned work are described in the main body of the Pilot Test Report. However, no deviations were identified that would render the project objective as “not satisfied.” Overall, data verification and qualification results indicate that:

- Field activities were performed in compliance with the Work Plan (North Wind 2009), and no field actions resulted in significant impacts to data quality;
- The data collection plans and protocols outlined in the Work Plan (North Wind 2009), the QAPP (North Wind 2008), and updates to the QAPP (North Wind 2009) were followed, except as noted previously, and these variations had no resulting impacts on data quality;
- Data necessary to meet project objectives were collected and verified (Attachment 4); and
- All sample analyses conform and comply with analytical methods and procedural and contract requirements, except as noted in this QCSR.

Data assessment and verification for the Atlas 12 data were completed for 100% of the data collected. Method specific DQOs presented in the QAPP were evaluated and data flags were applied to indicate not detected values (“U” flag) due to method blank contamination and MS/MSD or LCS/LCSD spike recoveries or RPDs outside the limits (“J/UJ” flags for detects/non-detects). No data were rejected as a result of not meeting the applicable QC data objectives. The project data completeness is 100%. Data qualified as a result of the data assessment are summarized in Table 6. Approximately 26% of the data results were assigned qualifiers as a result of the data assessment.

Table 6. Data qualification statistics for the characterization data.

<table>
<thead>
<tr>
<th>Sample Type</th>
<th>Number of Samples</th>
<th>Number of Measurements</th>
<th>Number of Method Blank Qualifiers</th>
<th>Number of MS/MSD Qualifiers</th>
<th>Number of Surrogate Qualifiers</th>
<th>Number of LCS/LCSD Qualifiers</th>
<th>Number of Holding Time Qualifiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground water</td>
<td>68</td>
<td>4,488</td>
<td>14</td>
<td>151</td>
<td>23</td>
<td>13</td>
<td>726</td>
</tr>
</tbody>
</table>

Note: The number of measurements includes the field original and duplicate analyses results from samples collected from April 2009 to February 2010.
5. REFERENCES


Attachments 1 through 5
(Included on CD)
Appendix E

Investigation Derived Waste Management for the Pilot Test Report, Former F.E. Warren Air Force Base, Atlas “E” Missile Site No. 12, Windsor, Colorado

1. INTRODUCTION

All waste was containerized in Department of Transportation (DOT) approved containers that included bulk soils in roll-offs and bulk fluids in polytanks. Investigation derived waste (IDW) from separate media, and/or unlike past characterization (nonhazardous versus hazardous), was not mixed. The containers were appropriately labeled using indelible markings and were staged in a secure and easily accessible area. All waste generated as a result of the Pilot Test field activities was managed in accordance with the IDW Management Plan presented in the Site Characterization Work Plan and Current Conceptual Site Model, Former FE Warren Air Force Base (North Wind 2008).

2. WASTE DISPOSITION

IDW Material: A log was kept to include the locations from which the waste was generated. The IDW logs are included in this Appendix. The following waste was generated:

- **Liquid:** Wastewater generated at the site included decontamination water, well development water, and purge water from site wells. Wastewater was containerized in two poly tanks and labeled PTW and PTE to indicate the contents.

- **Soil:** Soil generated at the site included soil cuttings generated during the drilling of fracture boreholes and monitoring wells. Soils were containerized in roll-offs labeled RON and ROS and the information was entered into the log to indicate the contents of the container.

Waste Sampling: A sample was collected from each liquid and soil bulk waste container on May 20 and 21, 2009. These samples were delivered under chain of custody to Test America Laboratories and analyzed for volatile organic compounds (VOCs).

Waste Characterization Results: VOC analyses indicated that no constituents of concern were above regulatory levels.

Disposal:

- **Liquid:** Wastewater in the poly tanks was determined to be nonhazardous and was pumped to a grassy area onsite.

- **Soil:** Soil drums previously reported in the Site Characterization Report (North Wind 2009) were determined to be non-hazardous and were disposed of off-site as non-hazardous on August 11, 2009. One drum, sampled on August 12, 2009, has been determined to be non-hazardous and currently awaits disposal as non-hazardous. Bulk soils in the roll-off containers were determined to be non-hazardous and were disposed of off-site as non-hazardous on June 6, 2009.
3.  **ONGOING WASTE COLLECTIONS**

Liquid wastes routinely generated from purge and decontamination during the quarterly groundwater monitoring events have been containerized in a bulk tote within the fenced area at the Atlas 12 site since November 2009 (log attached). Once the 350-gallon poly tote reaches 75% full, it will be characterized and disposed of properly.

A 55-gallon drum containing spent absorbents saturated with product removed from MW-19 is also stored in the waste accumulation area. The hydrocarbon absorbents will be recycled or disposed of once the drum capacity is reached.
### IDW DRUM INVENTORY LOG

<table>
<thead>
<tr>
<th>Drum Number</th>
<th>Well/Boring # Contained in Drum</th>
<th>Contents of Drum (Water/Soil/Sediment)</th>
<th>Date of IDW Generation</th>
<th>Size/Type of Drum</th>
<th>Drum Location at Site</th>
<th>Depth Interval of IDW</th>
<th>Volume of Material (% Full)</th>
<th>IDW Generating Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Roll-Off</td>
<td>Soil/Sediments</td>
<td>4/15 to 5/1/09</td>
<td>18x8x4 rolloff</td>
<td>Upper launch area</td>
<td>95</td>
<td>Drilling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Roll-Off</td>
<td>Soil/Sediments</td>
<td>5/1 to 5/21/09</td>
<td>18x8x4 rolloff</td>
<td>Upper launch area</td>
<td>75</td>
<td>Drilling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>East Poly</td>
<td>Water</td>
<td>4/15 to 5/5/09</td>
<td>1000 gal Poly</td>
<td>West of Driveway</td>
<td>95</td>
<td>Drilling/Development</td>
<td></td>
<td></td>
</tr>
<tr>
<td>East Poly</td>
<td>Water</td>
<td>5/5 to 5/21/09</td>
<td>1000 gal Poly</td>
<td>West of Driveway</td>
<td>95</td>
<td>Drilling/Development</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:** Depth interval of waste includes depth of soil or screen interval for groundwater water. Activity generating the waste includes MW installation, soil boring, well development, well sampling.

**COMMENTS:**

______________________________

**SIGNATURE**  Erik Whitmore
# IDW DRUM INVENTORY LOG

<table>
<thead>
<tr>
<th>Drum Number</th>
<th>Well/Boring # Contained in Drum</th>
<th>Contents of Drum (Water/Soil/Sediment)</th>
<th>Date of IDW Generation</th>
<th>Size/Type of Drum</th>
<th>Drum Location at Site</th>
<th>Depth Interval of IDW</th>
<th>Volume of Material (% Full)</th>
<th>IDW Generating Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1186</td>
<td>MW-36, 37, 38, 39, 40, 41, 26</td>
<td>Purge water</td>
<td>6/2/09 – 6/3/09</td>
<td>55 gal</td>
<td>Concrete pad</td>
<td>30%</td>
<td>Sampling</td>
<td></td>
</tr>
<tr>
<td>1200</td>
<td>MW-5, 7, 8, 12, 13, 21, 22, and contents of drum 1186</td>
<td>Purge water</td>
<td>8/11/09 – 8/12/09</td>
<td>55 gal with vented bung</td>
<td>Concrete pad</td>
<td>90%</td>
<td>Sampling</td>
<td></td>
</tr>
<tr>
<td>275 gallon TOTE</td>
<td>Contents of above drums were pumped into this tote; all wells sampled</td>
<td>Purge water and decon water</td>
<td>11/09</td>
<td>275 gallon TOTE</td>
<td>Concrete pad</td>
<td>50%</td>
<td>Sampling</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Purge water and decon water</td>
<td>2/10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: Depth interval of waste includes depth of soil or screen interval for groundwater water. Activity generating the waste includes MW installation, soil boring, well development, well sampling.

**COMMENTS:** 55-gallon drum 1186 was redrummed and labeled 1200 in Aug 09 to allow for a vented bung. 55-gallon drum 1200 was pumped into the 275-gallon tote in Nov 09. The 275-gallon tote is currently the only waste container for liquids onsite.

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**SIGNATURE** Ann O'Hagan

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*Final Pilot Test Report*  
*Atlas “E” Missile Site No. 12*  
*North Wind, Inc.*  
*December 2010*
4. REFERENCES


### General Comments

<table>
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<th>Comment Resolution</th>
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<tr>
<td>CDPHE 1</td>
<td>Section 4.0</td>
<td>Section 4 focuses almost entirely on how the Interim Action is going to reduce TCE concentrations in the locations with pre-pilot test TCE concentrations of 400μg/L or higher, as defined by the 2008 site characterization activities. However, there is little mention of how the distal plume will be addressed. (Section 4.1.3 briefly discusses the distal plume in bullet 3, but even this text is unclear about how the Interim Action will address the TCE concentrations within the distal plume.) Please revise Section 4 to clarify that the ultimate objective of this project is to reduce TCE concentrations to MCLs within the entire on-site portion of the plume, and further supplement the report with a discussion regarding how the Interim Action will be designed to address the distal plume.</td>
<td>Clarified RAO is to reduce TCE concentrations to MCLs in all portions of the on site plume and identified the technical approach to be applied to the source area (&gt;400 μg/L) and distal plume (5 μg/L to 400 μg/L).</td>
</tr>
<tr>
<td>CDPHE 2</td>
<td>Environmental Covenants</td>
<td>The report frequently references the use of an environmental covenant to address contaminant exposure pathways. However, given that this site is a FUDS, the landowner must agree to place an environmental covenant on the property. Has the landowner, Weld County, agreed to this? If so, the process to put an environmental covenant in place should be started as soon as possible. In some instances, this can be a relatively long effort. If the landowner does not wish to place an environmental covenant on the property, then the path-forward for the Interim Action may require modification.</td>
<td>We agree and understand that the Landowner will need to agree to any environmental covenant proposed for this site. We have spoken with Troy Swain and Toby Taylor about possible covenants at the site. They have indicated that there will be a approval process with Weld County that we will have to go through. We are prepared to enter the approval process for EC once we have agreement from the CDPHE and EPA on our proposed ECs for the site.</td>
</tr>
<tr>
<td>Item No.</td>
<td>Page No./Section</td>
<td>Review Comment</td>
<td>Comment Resolution</td>
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<tr>
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<tr>
<td>EPA 1</td>
<td>Section 4.0</td>
<td>Recommendation to Implement an Interim Action</td>
<td>The goal of the clean-up is to achieve the MCL concentration of 5.0 ug/L. To the regulators, the percent decrease is not a relevant issue. In addition, the MCL needs to be met throughout the plume not just in the greater than 400 ug/L &quot;source area&quot;. Effort needs to be made to treat the entire plume area having concentrations in excess of 5.0 ug/L. The document is not clear that this is being proposed.</td>
</tr>
<tr>
<td>EPA 2</td>
<td>Section 4.2.1</td>
<td>Performance Goals</td>
<td>It is possible that the MCL is not achievable. In that case, a Technical Impracticability Waiver may be appropriate or the application of the Colorado Policy on No Further Action (when finalized) concerning ground water contamination. I recommend this issue be discussed before we reach what may be considered an end point.</td>
</tr>
<tr>
<td>EPA 3</td>
<td>Last sentence in Section 4.2</td>
<td></td>
<td>Sentence states &quot;(unless contingent actions are triggered by exceedance of criteria specified in the exit strategy as defined in the IACR)&quot;, please explain.</td>
</tr>
</tbody>
</table>

**Specific Comments**

<p>| CDPHE 3 | Section 2.5.2, Page 10, Last Paragraph | This paragraph references Figure 1 for the locations of monitoring wells. However, the monitoring wells are not illustrated on Figure 1. Please either add the monitoring well locations to Figure 1, or change the reference to a figure in the report which illustrates all of the monitoring well locations, such as Figure 7. | This reference will be changed to: Locations of monitoring wells are shown in Figure 7. |</p>
<table>
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<th>Item No.</th>
<th>Page No./Section</th>
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<th>Comment Resolution</th>
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<tr>
<td>CDPHE</td>
<td>Section 2.6.2,</td>
<td>This paragraph references Section 6.4 for additional information regarding environmental covenants. There is no Section 6.4 in this report; please revise this reference.</td>
<td>The following sentence will be deleted: Additional information about environmental covenants is included in Section 6.4.</td>
</tr>
<tr>
<td>4</td>
<td>Page 20, Paragraph 3</td>
<td></td>
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<tr>
<td>CDPHE</td>
<td>Section 4.2.2,</td>
<td>This section focuses on a TCE mass reduction of greater than 90%. While greater than 90% reduction is certainly an accomplishment, if a &gt;90% reduction does not achieve MCLs, this percentage appears to be irrelevant. Please describe the relevance of a &gt;90% TCE mass reduction.</td>
<td>The bullets under #3 will be deleted. The performance objective will be revised as: 3. Assess the magnitude of TCE concentration reduction within the &gt;400 μg/L (as determined in 2008) area.</td>
</tr>
<tr>
<td>5</td>
<td>Page 28</td>
<td></td>
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