Final Work Plan
Supplemental Remedial Investigation
Phase III
2301 Taylor Way
Tacoma, WA

Prepared for:

USG Corporation
550 W. Adams Street
Chicago, IL 60661

December 3, 2013

CDM Smith

A Report Prepared For:

USG Corporation
550 W. Adams Street
Chicago, IL 60661

FINAL WORK PLAN
SUPPLEMENTAL REMEDIAL INVESTIGATION
PHASE III
2301 TAYLOR WAY
TACOMA, WASHINGTON

December 3, 2013

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Table of Contents

Section 1
Introduction

1.1 General

This document presents the Work Plan for Phase III of the Supplemental Remedial Investigation (RI) being conducted at the property generally located at 2301 Taylor Way, Tacoma, Washington (Taylor Way Property or Site). This Work Plan has been prepared on behalf of USG Interiors, Inc. (USGI) by CDM Smith Inc. (CDM Smith, previously Camp Dresser and McKee Inc. [CDM]). The work described in this Work Plan is being conducted in accordance with the State of Washington Model Toxics Control Act (MTCA), Chapter 173-340 of the Washington Administrative Code (WAC) under Agreed Order No. DE3405.

This Work Plan supplements work completed under Exhibit C to the Agreed Order, which is the initial Work Plan dated June 27, 2006 (CDM, 2006), and under a Supplemental Remedial Investigation Phase II, completed under a final Work Plan dated July 21, 2008 (CDM, 2008). In a conference call on August 9, 2013, Ecology requested additional monitoring wells and groundwater sampling on the adjacent former Murray Pacific Log Sort Yard #1 property located at 3502/3510 Lincoln Avenue in order to define the extent of the contaminant plume and refine the conceptual site model.

1.2 Site Location and Description

The Site lies within the Commencement Bay Nearshore Tideflats Superfund Area (CBN/T) of Tacoma, Washington. The "Site" is defined by the extent of contamination caused by the release of hazardous substances, including areas on adjacent properties, other than the originating property, where contamination has migrated onto. The focus of this investigation has been the property at 2301 Taylor Way, Tacoma, Washington (Taylor Way Property). The Taylor Way property was formerly owned and occupied by USGI and Thermafiber, and is now owned by the Port of Tacoma. A mineral fiber insulation manufacturing facility on the property was demolished in 2002. The Taylor Way Property is an L-shaped 9.4 acre parcel on the southwest shore of the Hylebos Waterway in Tacoma, Washington (**Figure 1**). The Taylor Way Property is currently occupied by Carlile Trucking. Current structures on the property include a large dock high concrete tilt-up warehouse and an open-sided I-beam supported metal-roofed structure with a concrete slab floor where maintenance activities such as welding occur. The rest of the property is asphalt-paved. **Figure 2** shows current features on the Taylor Way Property, as well as the configuration of USGI plant buildings prior to demolition.

Taylor Way borders the southwest side of the Taylor Way Property. Bordering the southeast side of the Taylor Way Property is the property of a former chemical manufacturing plant currently owned by the Port of Tacoma. A succession of chemical manufacturing companies, including Atofina, Arkema, ELF Atochem, and Pennwalt owned and occupied this property, which is currently referred to as the Arkema Property (**Figure 2**). On the north is a gravel-surfaced yard that is also currently owned by the Port of Tacoma. This property was formerly occupied by the Murray Pacific Log Sort Yard #1 and is referred to as the Murray Pacific Property (**Figure 2**). The former Murray Pacific Property is currently used by Carlile Trucking for parking long haul trailers. The former Murray Pacific Property is hydraulically downgradient of the Taylor Way Property.

1.3 Objectives of Phase III of the Supplemental RI

The objective of the RI is to develop a comprehensive portrayal of the nature and extent of contamination in soil and groundwater throughout the Site. Investigations conducted across the Site and adjacent properties over the past 20 years have developed a large amount of information regarding the nature and extent of Site contamination. However, these efforts have been complicated by similar contamination that originates on adjacent properties.

The specific objectives of this Phase III Supplemental RI work scope pertain to the co-mingling of arsenic contamination related to Murray Pacific's and USGI's historical use of ASARCO slag and are as follows:

- Evaluate the attenuation of arsenic in groundwater that migrates from the Site onto the former Murray Pacific Property.
- Evaluate whether the source of arsenic observed in groundwater along the Murray Pacific Property tide bank are related USGI's and/or Murray Pacific's historical use of ASARCO slag.
- Evaluate USGI's contribution of arsenic in groundwater along the Murray Pacific tide bank.

Section 2
Scope of Work and Methods

2.1 Overview

This section addresses the scope of work and methods that will be used to meet the objectives outlined in Section 1.3. The new data will be used in revising the draft RI dated December 21, 2010.

A Sampling and Analysis Plan (SAP), which details specific exploration and sampling procedures, chemical analysis methods, quality assurance procedures, sample handling, and equipment decontamination and waste control is provided in Appendix A.

An updated site-specific Health and Safety Plan is included in Appendix B of this document.

2.2 Field Investigation

2.2.1 Purpose and Scope of Work

The subsurface investigation will utilize hollow-stem auger drilling (with monitoring well installation) to explore subsurface conditions. Seven wells will be completed in the surface aquifer. The approximate locations of these wells are shown on **Figure 2**. The specific purposes for the planned wells are as follows:

- One well will be installed near the edge of the Hylebos Waterway between MW31 and MW32 in order to fill what may be considered a large area between these two wells that lacks data.
- Three wells will be installed centrally within the former Murray Pacific site. The purpose of these wells will be to evaluate the attenuation of arsenic in groundwater that may be migrating through the property from the former USGI property.
- Two wells will be installed on the property line between the former Murray Pacific and USGI properties, near the Hylebos Waterway. The purpose of these wells will help to evaluate: 1) residual arsenic concentrations that may be associated with a berm formerly located over this area, 2) arsenic concentrations upgradient of MW29, and 3) the presence/absence of wood debris at depth, as was indicated at MW28 and MW29.
- One well will be installed centrally between MW29 and the new shallow well installed next to MW18. The purpose of this well is to evaluate the attenuation of arsenic originating from USG. However, if wood debris is identified at this location, it would instead further delineate residual wood debris associated with the former Murray Pacific site.

2.2.2 Monitoring Well Installation

Seven surface aquifer monitoring wells will be installed by the methods outlined in Appendix A. These wells will be numbered consecutively with those already installed, starting with MW36.

2.2.3 Soil Sampling

Soils will be screened for arsenic, lead, and iron using an X-Ray Fluorescence (XRF) meter. Soil samples will be collected at 2.5 foot intervals while drilling and at least one XRF reading will be taken at each sample interval. Additional XRF readings may be taken if there are obvious lithologic changes in any given sample core. One to two of the XRF-screened soil samples from each monitoring well boring will be submitted for analysis of total arsenic, lead, and iron in accordance with methods described in the SAP. The soil samples submitted for analysis will target depths that contain contamination, if any. If contamination is not indicated by the XRF, samples will be collected below the backfill that was installed during the remedial actions associated with the former Murray Pacific property.

2.2.4 Groundwater Sampling

Groundwater samples will be collected from: 1) all newly installed monitoring wells, and 2) existing monitoring wells: MW17, MW25, MW27, and MW29 through MW35. During purging the following parameters will be measured in the field:

- pH
- specific conductance
- temperature
- turbidity
- dissolved oxygen
- oxygen reduction potential (ORP) (to be converted to Eh)

Collected groundwater samples will be analyzed for the following:

- Dissolved arsenic
- Dissolved organic carbon
- Dissolved iron
- Chloride
- Sulfate
- Hardness
- Sulfide
- Arsenic Speciation (all newly installed monitoring wells, and MW25, MW29, MW30, and MW33)

Section 3
Documentation and Reporting

RI activities will be documented using field investigation daily reports, soil sampling records, groundwater sampling records, chain-of-custody forms, and additional forms as appropriate. Examples of these forms are included in the Sampling and Analysis Plan (SAP), Attachment A.

The data collected during this investigation will be used in preparing the revised draft RI Report. However, prior to submittal of the draft RI, CDM Smith will submit the analytical reports, data validation reports, drafted boring logs, and analytical summary tables from the most recent field investigation to Ecology. The data collected from this investigation will also be uploaded to Ecology's Electronic Information Management (EIM) system database.

Section 4
Schedule

The estimated schedule to complete the Phase III Supplemental RI field investigation is summarized as follows:

- The field work will begin within three weeks of Ecology's final approval of this Work Plan, or as subcontractor availability and weather dictate. The approximate number of field days that each phase of the investigation will require is summarized below.
  - Monitoring well installation, 2 days
  - Monitoring well development, 1 day
  - Groundwater sampling, 3 days
  - Water level monitoring, low tide – 1 day
  - Survey, 1 day
  - The field investigation is estimated to be complete within 3 to 4 weeks upon commencement.
- The analytical reports, data validation reports, boring logs, figures showing exploration locations, and summary tables will be transmitted to Ecology within 3 weeks after receiving the final analytical reports.
- The analytical data will be uploaded to the EIM database within approximately 6 weeks after receiving the final analytical reports.

Section 5
References

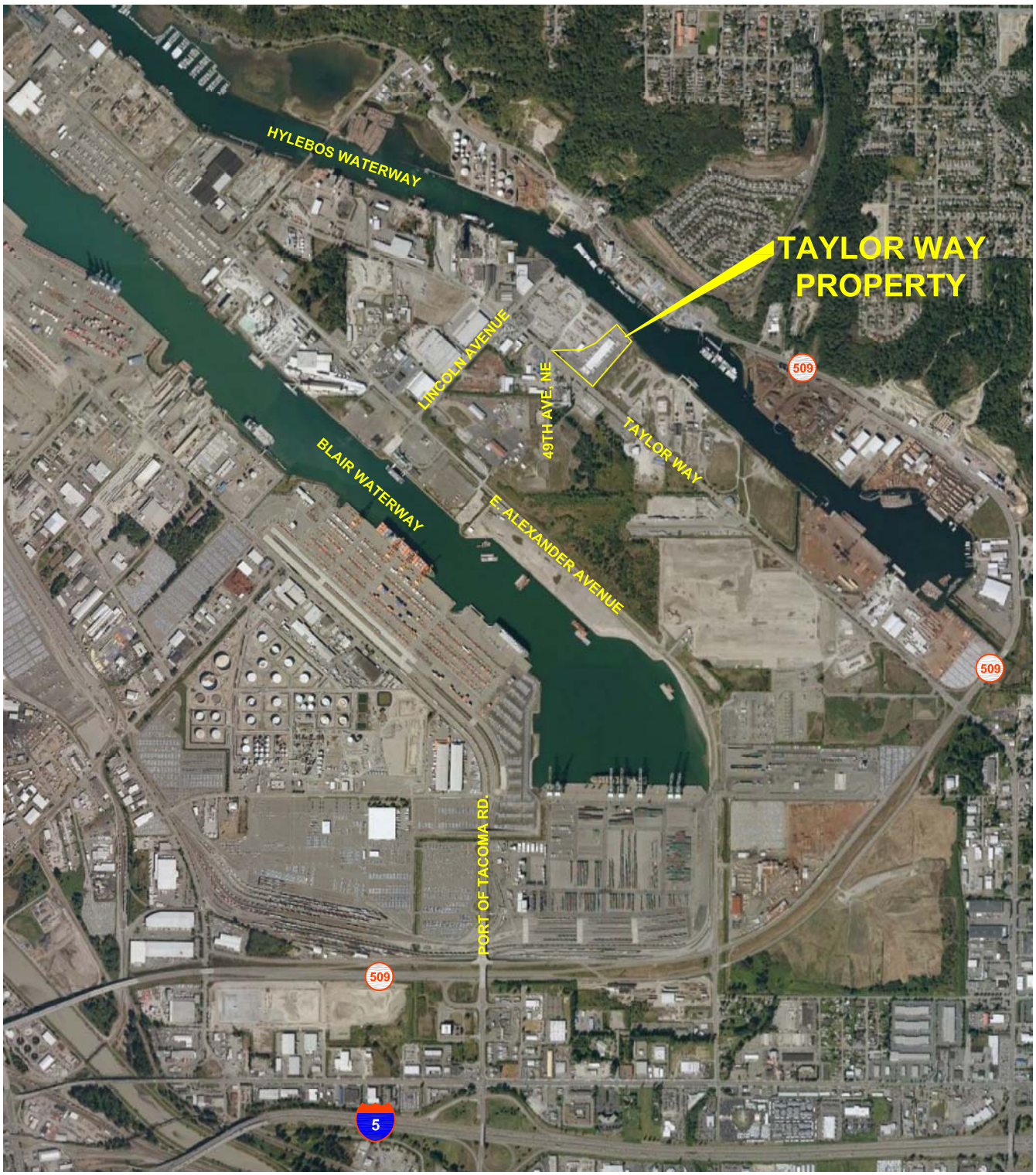
CDM. 2006. Exhibit C to Agreed Order No. DE3405, Between the Department of Ecology, USG interiors, Inc. and the Port of Tacoma. Final Work Plan, Supplemental Remedial Investigation, 2301 Taylor Way, Tacoma, Washington. CDM Project No. 19921-38072. Tacoma, RT. June 27.

CDM. 2008. Final Work Plan, Supplemental Remedial Investigation, Phase II, 2302 Taylor Way, Tacoma, Washington. July 21, 2008. CDM Project No. 19921-59455. July 21.

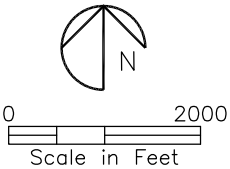
Distribution

3 Copies 1 CD	Dept. of Ecology Southwest Regional Office PO Box 47775 Olympia, Washington 98504-7775 Attention: Ms. Joyce Mercuri
1 Copy 1 CD	USG Corporation 550 West Adams Street Chicago, Illinois 60661-3676 Attention: Ms. Kim Peterson
1 Copy 2 CDs	Port of Tacoma PO Box 1837 Tacoma, Washington 98401-1837 Attention: Mr. Scott Hooton

Figures



Source: GOOGLE EARTH PRO, 2009



SUPPLEMENTAL REMEDIAL INVESTIGATION, PHASE III
2301 TAYLOR WAY
TACOMA, WASHINGTON

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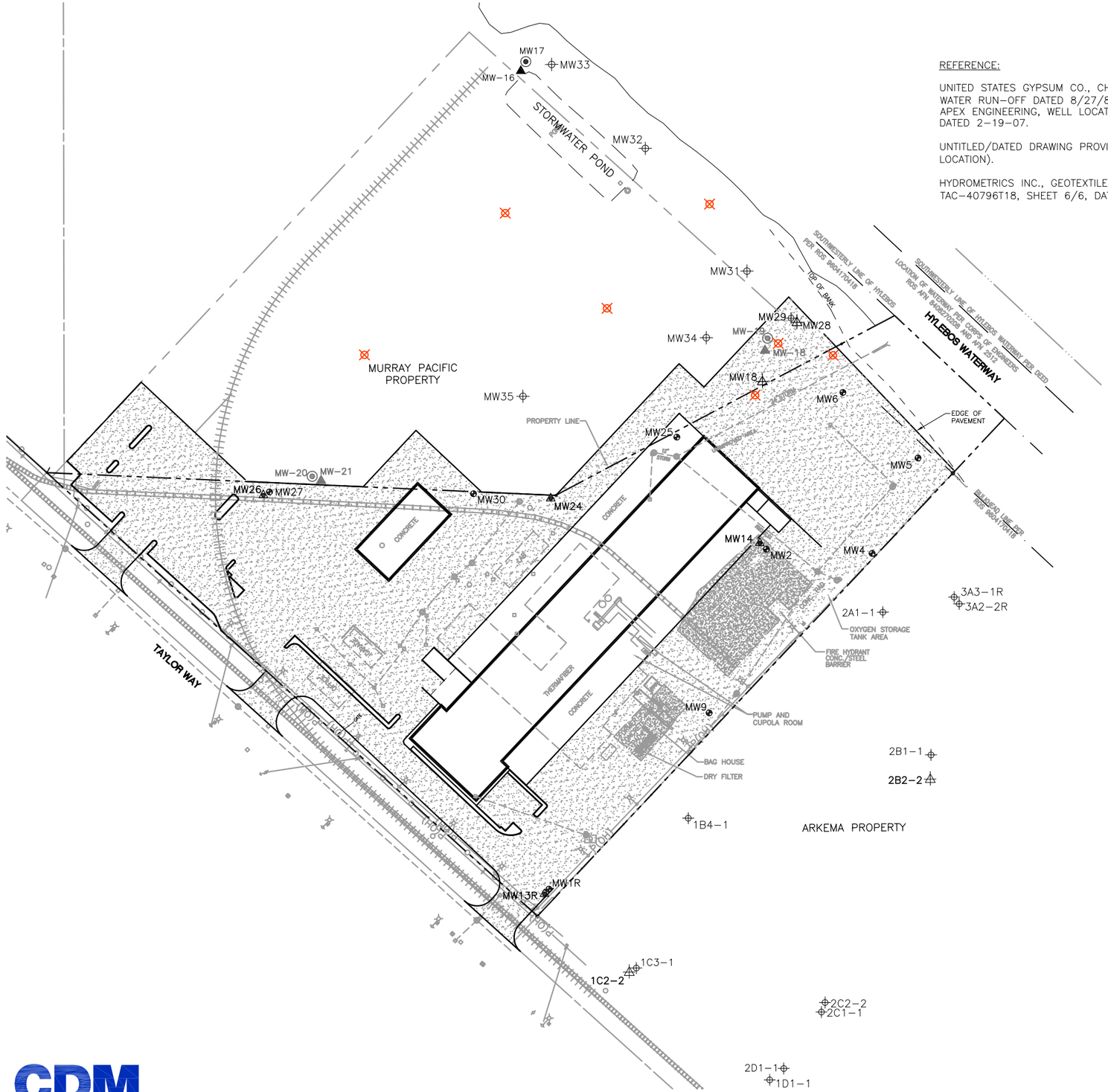
Figure No. 1
Vicinity Map



REFERENCE:

UNITED STATES GYPSUM CO., CHICAGO, ILL. PLANT PROPERTY LAYOUT, STORM WATER RUN-OFF DATED 8/27/85, DRAWING NO. C-1008-TAC, REV. 3.
APEX ENGINEERING, WELL LOCATION EXHIBIT, SHEET 1 OF 1, FILE NO. 30528, DATED 2-19-07.

UNTITLED/DATED DRAWING PROVIDED BY PORT OF TACOMA (CURRENT BLDG. LOCATION).

HYDROMETRICS INC., GEOTEXTILE PLACEMENT AND WELL LOCATIONS, DWG.# TAC-40796T18, SHEET 6/6, DATED 2/27/96.

1" = 150'

75 0 150

N

LEGEND:

- MW6 — SURFACE AQUIFER WELL AND DESIGNATION
- MW26 — SECOND AQUIFER WELL AND DESIGNATION
- 1C3-1 — OFF-SITE SURFACE AQUIFER WELL AND DESIGNATION
- 2B2-2 — OFF-SITE SECOND AQUIFER WELL AND DESIGNATION
- MW-20 — ORIGINAL MURRAY PACIFIC PROPERTY SURFACE AQUIFER WELL LOCATION AND DESIGNATION (ABANDONED WELLS SHADED BACK)
- MW-21 — ORIGINAL MURRAY PACIFIC PROPERTY SECOND AQUIFER WELL LOCATION AND DESIGNATION (ABANDONED WELLS SHADED BACK)
- TAYLOR WAY PROPERTY BOUNDARY
- EXISTING BUILDING
- NEW ASPHALT PAVED AREA
- FORMER CONCRETE PAD
- FORMER BUILDING LOCATION
- STORM DRAIN SYSTEM
- PROPOSED SURFACE AQUIFER MONITORING WELL LOCATION

NOTE:

ORIGINAL MONITORING WELL LOCATIONS ON THE MURRAY PACIFIC PROPERTY ARE SCANNED IN FROM A HARD COPY 1996 DRAWING. THE PRECISION OF THE FEATURES AS THEY RELATE TO THE USG SITE FEATURES CANNOT BE DETERMINED. BOTH MW18 WELLS SHOWN SHOULD THEORETICALLY ALIGN.

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SUPPLEMENTAL REMEDIAL INVESTIGATION, PHASE III
2301 TAYLOR WAY
TACOMA, WASHINGTON

Figure No. 2
Proposed Monitoring Well Locations

Appendix A
Sampling and Analysis Plan

Section 1
Introduction

This sampling and analysis plan (SAP) has been prepared to describe the methods that will be used to conduct Phase III supplemental remedial investigation (RI) activities at the Site. The Port of Tacoma and USG Interiors (USGI) are working with the Ecology to supplement data previously collected at the Site to complete the remedial investigation, which will then be used in developing recommendations for any required remediation.

The objective of this SAP is to ensure that sample collection, handling, and analysis will result in data of known and acceptable quality.

1.1 Project Personnel and their Responsibilities

Supplemental remedial investigation activities will be conducted by CDM Smith Inc. (CDM Smith) on behalf of the potential liable parties (PLPs). Mr. Martin Carlson is CDM Smith's technical lead on the project. Ms. Pam Morrill is the project manager and has responsibility for the day to day management and coordination of the project. Ms. Kim Peterson is USGI's (PLP) designated representative. Mr. Scott Hooton is the Port of Tacoma's (current property owner and PLP) designated representative. Analytical Resources Incorporated (ARI) of Seattle, Washington is the analytical laboratory for this project. Ms. Cheronne Oreiro is ARI's project manager and will serve as the laboratory's primary contact person and will ensure that the project requirements are met by the laboratory.

Section 2
Field Exploration and Sampling Procedures

2.1 Monitoring Well Installation

2.1.1 Drilling

Drilling and monitoring well installation will be accomplished using a truck-mounted drill rig equipped with 6-inch-diameter hollow-stem augers. Borings and monitoring wells to be completed in the surface aquifer will be terminated upon reaching the top of the native tideflat aquitard, which occurs at approximately 10 feet below ground surface (ft bgs).

2.1.2 Soil Sampling

During drilling, soil will be logged and sampled at 2-1/2-foot intervals by driving a split-barrel sampler 18 inches into undisturbed soil ahead of the borehole bottom. Driving will be terminated when the full 18-inch drive is completed. Each sampled interval will be logged according to the Unified Soil Classification System.

The following procedures will be used to collect subsurface soil samples:

1. Driller retrieves split-barrel sampler from borehole.

2. The split-barrel sampler is opened and sample recovery is measured. The contents of the sampler will be described on the field log.

3. Field screening for arsenic and lead will occur by placing a piece of plastic sheeting over the surface of the soil in the core and placing the window of the XRF directly onto the plastic sheeting over the soil core. A 90 second screening interval will be used. The data will be directly read from the machine and transcribed onto the field boring log in order to assist with selection of samples for laboratory analysis (the data in the machine will be downloaded to an electronic file later in the office).

   A soil sample is collected into a 4-ounce laboratory-grade sample jar for possible analysis and/or archiving at the analytical laboratory. Sample containers will be labeled, secured with a chain-of-custody seal, placed in a chilled cooler.

4. The split-barrel sampler will be decontaminated by the procedures described in Section 6 of this appendix.

2.1.3 Well Installation

A two-inch-diameter monitoring well will be installed in each boring. Wells will be constructed in accordance with Chapter 173-160 Washington Administrative Code (WAC) Part Two, General Requirements for Resource Protection Wells and Geotechnical Soil Borings (updated December 19, 2008).

The monitoring wells will be constructed of 2-inch-diameter Schedule 40, flush-threaded PVC pipe with 0.010-inch milled lot screen surrounded by a silica sand filter pack. The top of the screen in

surface aquifer wells will end approximately 1 to 2 feet over the top of the water table to account for seasonal variation. Bentonite chips will be installed above the top of the filter pack to form a hydraulic seal. A tamper-resistant, flush-mount, protective casing will be set in concrete over the upper end of the PVC riser.

2.2 Well Development and Sampling

2.2.1 Development

New monitoring wells will be developed by a combination of bailing and surging. Equipment used during well development will be decontaminated in accordance with the procedures outlined in Section 6. Typical well developing sequence is as follows:

1. Measure and record depth to water. Collect a bailer of groundwater and measure pH, conductivity, and temperature.

2. Surge well to loosen sediment within sand pack. Surging is performed with a bailer or surge block that has a slightly smaller diameter than the PVC well casing.

3. Bail well to remove sediment and groundwater. Measure pH, conductivity, and temperature at 5-gallon intervals.

4. Terminate well development after the water is essentially sediment free and pH, conductivity, and temperature are stable. Purging will be considered complete when field measured parameters have stabilized (pH to within 0.1 standard unit, conductivity and temperature to within 3 percent).

5. Typical water volume bailed from a 2-inch monitoring well during development is 10 to 20 gallons. Measure water level after development is complete.

2.2.2 Groundwater Sampling

The wells will be allowed to stabilize at least 72 hours between development and sampling. Prior to collecting groundwater samples, monitoring wells will be purged using "low flow" purging and sampling techniques. Low-flow sampling techniques minimize disturbance to the aquifer during purging and thereby provide a more representative groundwater sample.

Monitoring wells will be purged using a peristaltic pump. Purge water will be directed through a flow cell containing parameter measurement equipment. Groundwater purging and parameter measurement techniques to be used for this project are described below:

1. Measure water depth to the nearest 0.01 foot using a SINCO water-level sounder. Record depth to water measurement on the groundwater sampling form.

2. Calibrate parameter measurement equipment per manufacturer's instructions as described below:

   - The electrical conductivity meter will be checked against factory supplied calibrator solutions prior to bringing the meter onsite.

   - The pH meter will be calibrated daily prior to beginning sampling using two manufacturer supplied buffer solutions (pH 4.0 and 7.0).

- The temperature probe will be checked against a mercury thermometer prior to bringing the meter onsite.
- Dissolved Oxygen: The meter will be calibrated according to the procedures described in the factory manual.

3. Lower the tubing into the well and connect to the pump and flow cell.
4. Begin purging at a rate of no more than 0.5 milliliters per minute, directing purge water through the flow cell.
5. Monitor pH, temperature, specific conductance, oxidation reduction potential, and dissolved oxygen and record readings at 2-liter purge intervals. Record parameter measurements on the groundwater sampling form.
6. Purging will be considered complete when turbidity is less than 10 NTU and the remaining parameters have stabilized (pH to within 0.1 standard unit, conductivity and temperature to within 3 percent, oxidation reduction potential to within 10 millivolts, dissolved oxygen to within 10 percent over three consecutive readings).

Groundwater sampling will be conducted immediately after parameters have stabilized. Groundwater samples to be analyzed for dissolved metals will be field filtered before placement into the sample bottle. Field filtering will be accomplished by placing the tubing discharge over the inflow end of a 0.45 micron filter and discharging the filtered water directly into the sample bottle. The samples to be analyzed for arsenic speciation will be collected in accordance with the laboratory protocols provided in **Attachment A** to this appendix.

2.3 Survey

The locations of the wells will be predetermined from a geo-referenced aerial photograph and the locations identified in the field using a GPS. The locations and elevations of new monitoring wells will be surveyed by a licensed surveyor in accordance with ASTM D5092 (10). Each well location will be measured horizontally to the nearest 0.1 foot. Well casing elevations will be measured to the nearest 0.01 foot using an established Port of Tacoma datum (Port of Tacoma MLLW Tide BM22=19.39') to be consistent with prior survey data. These data can be converted to NAVD88 when uploaded to the EIM database.

2.4 Groundwater Level Monitoring

A complete round of water levels in the surface aquifer wells will be measured at low tide. This will include all of the newly installed monitoring wells, and existing surface aquifer monitoring wells shown on **Figure 2** in the body of the work plan. Predicted tidal information for the Tacoma Tideflats area will be obtained from the NOAA website to determine the times of water level measurements.

Wells will be uncapped and allowed to equilibrate with atmospheric pressure. The water levels will be measured using an electronic sounder. Measurements will begin one hour before the low tide. The measurements will start at MW17 and progress along the waterway towards MW5 then back across towards the Murray Pacific Site and working inland towards Taylor Way. The water levels in wells on the Arkema site will then be measured, beginning with well 2A1-1, and working toward Taylor Way.

Section 3
Chemical Analysis

Soil and groundwater samples will be submitted to Analytical Resources Inc. (ARI) in Seattle, Washington for analysis.

Groundwater samples will be analyzed for dissolved arsenic, dissolved organic carbon, dissolved iron, sulfide, sulfate, hardness and chloride. Arsenic will be speciated (As^{+3}, As^{+5}) in selected wells. The samples to be analyzed for arsenic speciation will be subcontracted to Applied Speciation and Consulting, LLC in Bothell, Washington.

Collected soil samples will be analyzed for total arsenic, lead, and iron.

Table A1 summarizes the analytical methods, target reporting limits, and holding times for each media and analyte.

Section 4
Quality Assurance Procedures

The overall quality assurance (QA) objective for this project is to develop and implement procedures for field sampling, chain-of-custody, laboratory analysis, and reporting that will provide technically and legally defensible results. This section discusses QA objectives and procedures for this project.

4.1 Precision

Precision is a measure of reproducibility of measurements of the same characteristic, usually under a given set of conditions.

4.1.1 Field Precision Objectives

Field precision will be assessed by the collection and analysis of field duplicates and will be expressed as relative percent difference (RPD). Duplicate samples are analyzed to check for matrix variability and analytical method reproducibility. One duplicate groundwater sample and one duplicate soil sample will be collected. Duplicate soil and groundwater samples will be analyzed for the same parameters.

4.1.2 Laboratory Precision Objectives

The control limits for accuracy automatically identify the precision of a method. In the analysis of samples in a batch, if the recoveries of the analytes of interest are within control limits, then the precision also is within control. Precision also may be calculated in terms RPD. Precision control limits are outlined in **Table A1**.

Precision will be assessed by comparing the analytical results between laboratory duplicates. The RPD will be calculated for each pair of duplicate analyses using the following equation:

$$RPD = \frac{X_1 - X_2}{(X_1 + X_2)/2} (100\%)$$

Where:

RPD = relative percent different.

X1, X2 = value of sample 1 and sample 2.

RPDs may be compared to the laboratory-established RPD control limits for the analysis. Precision of duplicates depends on sample homogeneity.

4.2 Accuracy

Accuracy is the degree of agreement of a measurement or average of measurements with an accepted reference or "true" value and is a measure of bias in the system. The accuracy of a measurement system is impacted by errors introduced through the sampling process, field contamination, preservation, handling, sample matrix, sample preparation, and analytical techniques.

4.2.1 Field Accuracy Objectives

The achievement of accurate data in the field will be addressed through the adherence to all sample handling, preservation, and holding times.

4.2.2 Laboratory Accuracy Objectives

Results for method blank and laboratory control samples will be the primary indicators of accuracy. These results will be used to control accuracy by requiring that they meet specific criteria. As spiked samples are analyzed, spike recoveries will be calculated and compared to acceptance limits.

The calculation formula for percent recovery is:

$$R\% = \frac{(C_1 - C_2)(100\%)}{C_3}$$

Where:

R% = Spike amount recovered.

C1 = Concentration of analyte in spiked sample.

C2 = Concentration of analyte in unspiked sample.

C3 = Concentration of spike added.

Acceptance limits as listed in **Table A1** will be based on previously established laboratory performance for similar samples. In this approach, the control limits reflect the minimum and maximum recoveries expected for individual measurements for an in-control system. Recoveries outside the established limits indicate some assignable cause, other than normal measurement error, and possible need for corrective action. Corrective actions may include recalibration of the instrument, reanalysis of the QC sample, reanalysis of the samples in the batch, re-preparation of samples in the batch, or flagging the data as suspect if the problems cannot be resolved. For contaminated samples, recovery of matrix spikes may depend on sample homogeneity, matrix interference, and dilution requirements for quantitation.

4.3 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount expected under normal conditions.

4.3.1 Field Completeness Objectives

Field completeness is a measure of the amount of valid measurements obtained from all the measurements taken in the project. Field completeness for this project will be greater than 90 percent.

4.3.2 Laboratory Completeness Objectives

The project laboratory will provide data meeting QC acceptance criteria for a minimum of 90 percent of the samples tested using the SW-846 and other standard methods. At the completion of sample analysis testing, the percent completeness will be calculated by the following equation:

$$C\% = \frac{S}{R}(100\%)$$

Where:

C = completeness.

S = number of successful analyses.

R = number of requested analyses.

Successful laboratory analyses can only be accomplished if both the field and laboratory portions of the project are successful. Factors that adversely affect completeness include:

- Receipt of samples in broken containers.
- Receipt of samples in which chain-of-custody or sample integrity is compromised in some way.
- Samples received with insufficient volume to perform initial analyses or repeat analyses, if initial efforts do not meet QC acceptance criteria.
- Improperly preserved samples.
- Samples held in the field or laboratory longer than expected, thereby jeopardizing holding time requirements.
- Samples that have unclear analyses requests.

4.4 Representativeness

Representativeness qualitatively expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition.

Representativeness expresses the degree to which a sample represents a source material, an environmental media, or a geochemical process. Representativeness is a qualitative parameter, dependent on the proper design of the sampling program and proper choice of extraction and analytical methods.

The characteristic of representativeness cannot be quantified. Subjective factors to be taken into account are as follows:

- Degree of homogeneity of a site.
- Degree of homogeneity of a sample taken from one point in a site.
- Available information on which a sampling plan is based.

4.4.1 Measures to Ensure Representativeness of Field Data

Field duplication and field replication, as defined under precision, also are used to assess representativeness. Two samples that are collected at the same location and at the same time are considered equally representative of this condition, at a given point in space and time.

4.4.2 Measures to Ensure Representativeness of Laboratory Data

Representativeness in the laboratory is ensured by using the proper analytical procedures, meeting sample holding times, and analyzing and assessing field duplicate samples. Precautions are taken to extract from the sample container an aliquot representative of the whole sample. This includes premixing the sample and discarding foreign material (i.e., stones, twigs, pebbles, etc) from soil samples.

4.5 Comparability

Comparability expresses the confidence with which one data set can be compared with another. The extent to which existing and new analytical data will be comparable depends on the similarity of sampling and analytical methods.

4.5.1 Measures to Ensure Comparability of Field Data

Comparability for the supplemental RI will be optimized for this work by utilizing similar well drilling and installation procedures, similar groundwater sampling techniques, and similar surface soil sampling techniques as were previously used during prior Site investigations by CDM Smith.

4.5.2 Measures to Ensure Comparability of Laboratory Data

Planned analytical data will be comparable when similar sampling and analytical methods are used as documented in this SAP. Comparability is also dependent on similar QA objectives.

4.6 Quality Control Samples

4.6.1 Field Duplicates

Duplicate samples are analyzed to check for matrix variability and analytical method reproducibility. One duplicate soil sample and one duplicate groundwater sample will be collected.

4.7 Data Validation Documentation

The analytical data will be verified and validated to the Stage 2A Level[1] which includes verification of analysis of samples as requested by the chain-of-custodies, performance of analyses within the USEPA specified holding times, data qualifiers and reporting units, sampling dates and times, requested methods and method dates, and sample-related QC and acceptance criteria such as method blanks, surrogate recoveries, surrogates, laboratory control samples, duplicate samples, matrix spike and matrix spike duplicate recoveries as described above. A data validation report will be completed for each analytical report. Data qualifiers as determined from the data validation, if any, will be added to the specific qualified data in the data summary tables.

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[1] USEPA. 2009. *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use*. EPA Publication 540-R—08-005. January.

Section 5

Sample Containers, Custody Procedures, Shipping, Documentation and Sample Identification

5.1 Sample Containers

Sample bottles will be provided by the analytical laboratory ARI. **Table A1** summarizes the containers and preservatives required for each of the analytes. The containers will be kept closed and in their shipping boxes until used. After sampling, the containers will be labeled, secured with chain-of-custody seals, placed in coolers, chilled to 4ºC, and shipped to the laboratory.

5.2 Custody Procedures

A chain-of-custody protocol will be followed to maintain and document sample possession. Each sample will be labeled immediately after collection. Each label will include, at a minimum, the following information:

- Project name and number.
- Initials of the collector.
- Date and time of collection.
- Number that uniquely identifies the sample and its collection location (the sample numbering sequence will not indicate to the laboratory which samples are duplicates).
- Preservative (if any).

Samples will be kept in the sampler's custody until the end of each day, when they will be shipped to the laboratory, if possible.

Samples will be shipped to the analytical laboratory with chain-of-custody records, establishing the documentation necessary to trace sample possession from the time of collection. The chain-of-custody records will contain, at a minimum, the following information:

- Sample number.
- Signature of collector.
- Date and time of collection.
- Place of collection.
- Sample matrix.
- Signatures of persons involved in the chain of possession.
- Inclusive dates of possession.
- Condition of samples.

The chain-of-custody record also will be used to indicate what analyses are required by checking the appropriate box(es) on the form. Following proper sealing and labeling, sample containers will be placed in a chilled cooler. The cooler will be closed and sealed with a custody seal.

5.3 Shipping

As described above, samples will be accompanied by a properly completed chain-of-custody form. The original and yellow copies will accompany the shipment, and the pink copy will be retained by the sampler for CDM Smith's project files. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents transfer of custody of samples from the sampler to another person, to the project laboratory, or to/from a secure storage area.

Samples will be properly packaged for shipment and dispatched to the laboratory for analysis, with a separate, signed custody record enclosed in each sample cooler. Shipping containers will be secured with strapping tape and custody seals will be attached for shipment to the laboratory. The preferred procedure includes use of a custody seal attached to the front right and back left of the cooler. The custody seals are covered with clear plastic tape. The cooler is strapped shut with strapping tape in at least two locations. Samples will either be delivered directly to the analytical laboratory by the sampler, or brought back to CDM Smith's Bellevue office where it will be picked up by a laboratory representative or courier for delivery to the laboratory.

5.4 Documentation and Sample Identification

The Daily Field Investigation Form is the basis of CDM Smith's documentation. Entries on it describe the day's activities. Field measurements and sample data will be recorded on appropriate forms and included as attachments to the Daily Field Investigation Form. If an incorrect entry is made, the information will be crossed out with a single line and initialed and dated by the field representative.

Whenever a sample is collected or a measurement is made, a detailed description of the sample location will be recorded. The type of sampling equipment will be noted, along with sample time, sample description, sample depth, and volume and number of containers. Samples will be labeled uniquely and sequentially. Examples for each media are as follows:

Soil

Soil samples will be prefixed by monitoring well (MW) which they were collected. The sample depth will also be identified. For example, a sample collected at two feet below ground surface from the borehole at MW36 would be identified as MW36-2'.

Groundwater

Groundwater samples collected from monitoring wells will be labeled with the well ID, month, and year. For example, a sample collected from MW36 in November 2013 would be identified as: MW36-11/13.

Field duplicates will receive a blind and unique sample designation, such as MWD1-11/13. The sample ID's will not be named with a succeeding well ID, such as MW43 (where the number of monitoring wells end at MW42).

Section 6
Equipment Decontamination and Waste Control

Equipment decontamination and waste control during sampling activities is important to prevent the spread of contaminants, to ensure that no cross contamination occurs during sampling, and to ensure integrity of the work. Specifically, the main objectives are to:

- Contain contaminated soil and water on the Taylor Way Property so that work performed does not cause the spread of hazardous constituents within or off the Taylor Way Property.
- Decontaminate drilling and sampling equipment so that hazardous constituents are not introduced into the subsurface or samples through cross contamination.

All waste will be designated and disposed of properly in accordance with Washington State Dangerous Waste regulations, 173-303 WAC and in a manner that is protective of human health and the environment, per 173-340-820(3)(c)(vi).

6.1 Drilling Equipment

Drilling equipment, including the auger flights and sampling tools, will be decontaminated with a high-pressure steam cleaner/pressure wash prior to each use.

6.2 Soil Sampling Equipment

The following decontamination procedures will be used to decontaminate the soil sampling equipment.

1. Rinse and pre-clean in potable water.
2. Wash and scrub with nonphosphate-based detergent and potable water.
3. Rinse with potable tap water.
4. Rinse with deionized water.
5. Rinse in deionized water.

Solutions will be renewed as needed. Sponges and nylon scrubbers will be used during Steps 1 through 3. Equipment will be air dried, if possible, and held in clean plastic bags between uses.

6.3 Groundwater Sampling Equipment

Bailers and surge blocks used for well development will be decontaminated as described in Section 6.2. Twine used on the bailers will be discarded between each use. Tubing used for groundwater sampling will be discarded between each use.

6.4 Waste Control

All investigation derived waste will be drummed and labeled pending appropriate disposal. Drummed soil, groundwater, and decontamination water will be designated and disposed of through a contractor that specializes in waste and dangerous waste disposal.

Specifically, soil generated during drilling and water generated during groundwater development and purging will be placed in Department of Transportation (DOT)-certified 55-gallon drums. The drums will be sealed and labeled to identify the contents, volume, and date. CDM Smith will arrange for appropriate disposal of the drummed materials in accordance with 173-303 WAC and 173-340-820 WAC.

Other waste generated during soil sampling (rubber gloves, paper towels, etc.) will be placed in plastic garbage bags and sealed shut. The garbage bags will be placed in a commercial waste collection container at CDM Smith's office for ultimate disposal in a sanitary landfill.

Attachment A

APPLIED SPECIATION
AND CONSULTING, LLC

18804 Northcreek Parkway Bothell, WA, 98011
Tel: (425) 483-3300 Fax: (425) 483-9818
www.appliedspeciation.com

SUMMARY OF SAMPLING METHOD FOR ARSENIC SPECIATION ANALYSIS USING VACUETTES

Note: This method has not been approved by any regulatory authority.

Sample collection

Samples should be collected using standard clean-sampling procedures (the "clean–hands – dirty–hands" technique described in EPA Method 1669).

1) One 15mL syringe, one 0.45µm luer-lock filter, one luer-lock needle, and one 6mL vacuette container are removed from the supplied packaging. Do **not** remove the cap from the vacuette container at any time.
2) Attach the luer-lock 0.45µm filter to the end of the syringe.
3) Attach the luer-lock needle to the end of the filter, ensuring that the needle remains sheathed.
4) Remove the plunger from the syringe.
5) Fill the syringe with approximately 10-12mL of the sample to be evaluated for arsenic speciation, then replace the plunger in the syringe top.
6) Remove the sheath from the needle, then expel *and discard* 2-3mL of sample from the syringe apparatus.
7) Carefully insert the tip of the needle through the septum in the vacuette's cap. The vacuette should fill itself, but the sampler may also gently depress the plunger to fill the container. Leaving a small amount of headspace (~1mL) in the vial is acceptable.
8) Remove the needle from vacuette, then gently invert the container several times to fully solubilize the EDTA preservative within the vacuette.
9) Label the vacuette with the sample ID, then place the container into the supplied plastic bag. Seal the bag and place into a cooler containing ice (blue or crushed). Log each sample on the supplied chain of custody (COC) form.
10) Dispose of each used needle into an appropriate sharps disposal container.

The samples should then be sent to the laboratory via overnight courier. It cannot be stressed enough that speciation ratios can change over time. It is highly recommended that samples be collected on Monday through Wednesday to account for possible shipping problems. If samples are sent on Thursday or Friday, the shipment must be scheduled for Saturday delivery and the relevant ASC project manager must be notified. While the regulated temperature (maintained at 4°C) is known to inhibit chemical interactions, it is still recommended for the samples to be analyzed as soon as possible after the sampling event.

Arsenate and arsenite typically do not occur abundantly enough to readily contaminate the samples; however, it should be standard practice to eliminate the possibility of such contamination from occurring during sampling.

If any questions arise during the sampling event, please contact your project manager at (425) 483-3300.

Table A1

Table A1

Analytical Methods, Sample Holding Times, Containers, and Quality Assurance Goals

Taylor Way Property/Supplemental Remedial Investigation, Phase III
2301 Taylor Way
Tacoma, Washington

Parameter	Analytical Method	Holding Time	Sample Bottles	Practical Quantitation Limit	Accuracy (Percent Recovery)	Precision RPD	Completeness
WATER				µg/L			
Dissolved Arsenic	EPA 200.8	6 months	500 ml HDPE, Preserved with HNO3 (pH <2) after filtration	0.2-0.5 (1-5)[a]	80 - 120%	20%	90%
Dissolved Iron	EPA 6010C			50 (250-1250)	80 - 120%	20%	90%
Dissolved Organic Carbon	SM5310 or EPA 9060	28 days	250 ml amber glass Preserved with H2SO4 (pH <2)	1500	80 - 120%	20%	90%
Hardness	SM 2340/6010C	6 months	500 ml HDPE Preserved with HNO3 (pH <2)	Calculation Ca - 50, Mg - 50	80 - 120%	20%	90%
Sulfide	EPA 376.2	7 days	500 ml HDPE Preserved with Zinc Acetate	50	80 - 120%	20%	90%
Chloride	EPA 300.0	28 days	500 ml HDPE	100	80 - 120%	20%	90%
Sulfate				100	80 - 120%	20%	90%
Arsenic Speciation							
Arsenic^{+3}	IC-ICP-CRC-MS	ASAP[b]	6 mL PET vacuette EDTA preservative	0.5[c]	80 - 120%	35%	90%
Arsenic^{+5}				0.5	80 - 120%	35%	90%
SOIL				(mg/kg)			
Arsenic				5	80 - 120%	20%	90%
Lead	EPA 6010C	6 months	4 or 8 oz WMG	2	80 - 120%	20%	90%
Iron				5	80 - 120%	20%	90%

Notes:

a) numbers in parantheses are reporting limit ranges for samples that require dilution due to high salts/dissolved solids.

b) Samples to be collected on a Monday - Wednesday and overnighted to the laboratory. The laboratory to analyze as soon as possible after receipt.

c) depends in part on dilution

µg/L - micrograms per liter

mg/kg - milligrams per kilogram

Appendix B

Site-Specific Health and Safety Plan

HEALTH AND SAFETY PLAN FORM

CDM Health and Safety Program

This document is for the exclusive use of CDM and its subcontractors

PROJECT NAME	Taylor Way Property	**PROJECT#**	19921-96914	**REGION**	WST
SITE ADDRESS	2301 Taylor Way Tacoma, Washington	**CLIENT ORGANIZATION** **CLIENT CONTACT** **CLIENT CONTACT PHONE #**		USG Interiors Kim Peterson 708-834-8832	

(x) AMENDMENT TO EXISTING APPROVED H&SP?
( ) H&SP AMENDMENT NUMBER? ____ **(X) DATE OF APPROVED H&SP** June 2012

OBJECTIVES OF FIELD WORK:
(e.g. collect surface soil samples):

Drill and install 7 shallow (i.e., 10 ft deep) monitoring wells. Use XRF to screen arsenic and lead in soil. Develop installed monitoring wells. Purge and sample newly installed and existing montoring wells. Measure water levels.

SITE TYPE: *Check as many as applicable*

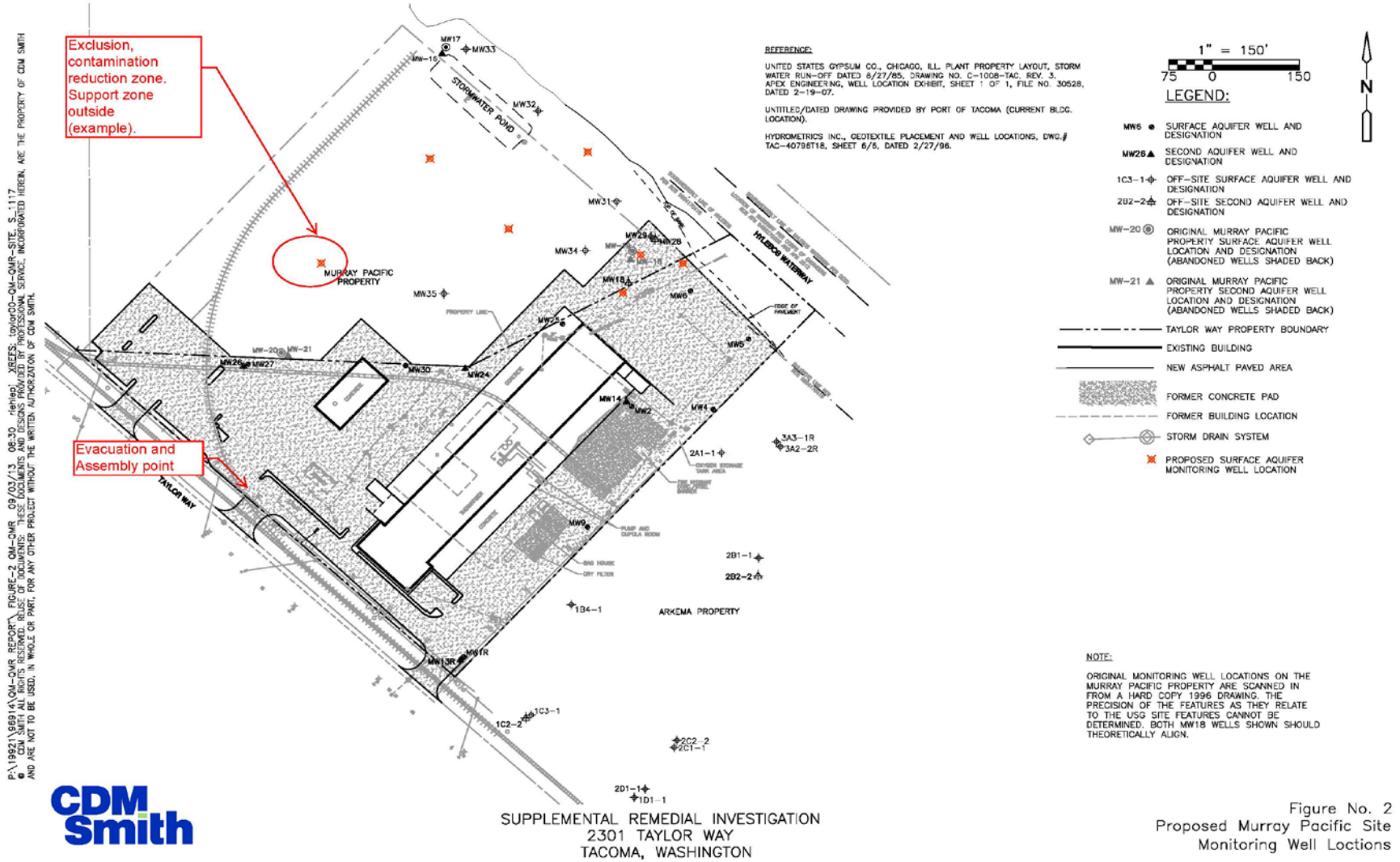
Active	(X)	Landfill	( )	Unknown	( )
Inactive	( )	Uncontrolled	( )	Military	( )
Secure	(X)	Industrial	(X)	Other (specify)	
Unsecure	( )	Recovery	( )		
Enclosed space	( )	Well Field	( )		

All requirements described in the **CDM Health and Safety Manual** are incorporated in this health and safety plan by reference.

	PERSONNEL AND RESPONSIBILITIES NAMES OF WORK CREW MEMBERS	COMPANY or DIVISION	CDM HEALTH CLEARANCE	PROJECT OR SITE RESPONSIBILITIES	Tasks On Site?
	Pam Morrill	CED	Yes	Work Assignment Manager	**1-2-3-4**
	Pam Morrill	CED	Yes	Site Health & Safety Coordinator	**1-2-3-4**
	August Welch	CED	Yes	Geologist	**1-2-3-4**
	Mark Jusayan	CED	Yes	Geologist	**1-2-3-4**
					1-2-3-4-5-6
					1-2-3-4-5-6
					1-2-3-4-5-6

BACKGROUND REVIEW: (X) Complete ( ) Incomplete

SITE MAP: *Show Exclusion, Contamination Reduction, and Support Zones. Indicate Evacuation and Reassembly Points*



HEALTH AND SAFETY PLAN FORM

CDM Health and Safety Program

This document is for the exclusive use of CDM and its subcontractors

HISTORY: *Summarize conditions that relate to hazard. Include citizen complaints, spills, previous investigations or agency actions, known injuries, etc.*

Mineral fiber insulation products were produced on the former USG Property from 1946 to 2002. Slag was used in the manufacturing process. From 1959 to 1973, ASARCO slag was used to produce the mineral fiber insulation. ASARCO slag typically contains high concentrations of arsenic, copper, lead, zinc, antimony, and silver. Arsenic and lead are determined to be contaminants of concern at the site in soil and arsenic in groundwater. Remedial actions completed throughout much of the proposed exploration area on the former USG site have removed a large quantity of the arsenic and lead contaminated source soils. Similarly, on the former Murray Pacific site, ASARCO slag was used as ballast for the former log yard operations. The wood debris and slag were almost entirely removed in the 1990s, and only residual contaminated materials exist.

WASTE TYPES: ( ) Liquid (X) Solid ( ) Sludge ( ) Gas ( ) Unknown ( ) Other, specify:

WASTE CHARACTERISTICS: *Check as many as applicable.*

( ) Corrosive	( ) Flammable	( ) Radioactive
(X) Toxic	( ) Volatile	( ) Reactive
( ) Inert Gas	( ) Unknown	
( ) Other: _____		

WORK ZONES: *Describe the Exclusion, Contamination Reduction, and Support Zones in terms on-site personnel will recognize*

Exclusion: Within 25 feet of boring locations, and at least 1.5 times the drill rig mast height in any direction (where possible).

Contamination Reduction: Immediately outside of the exclusion zone where equipment will be decontaminated

Support Zone: All other areas outside of the Exclusion and Contamination

HAZARDS OF CONCERN: *Check as many as applicable.*

( ) Heat Stress	CDM Guideline	(X) Noise	CDM Guideline
(X) Cold Stress	CDM Guideline	(X) Inorganic Chemicals	
( ) Explosive/Flammable		( ) Organic Chemicals	
( ) Oxygen Deficient		(X) Motorized Traffic	
( ) Radiological		(X) Heavy Machinery	
( ) Biological		(X) Slips & Falls	CDM Guideline
( ) Other: _____			
( ) Other: _____			

FACILITY'S PAST AND PRESENT DISPOSAL METHODS AND PRACTICES:

Mineral Fiber facility is no longer operating at the site and the site is currently redeveloped with a trucking facility. In the past, waste materials (shot, cupola bottoms, baghouse dust) was stockpiled in the northern portion of the site pending offsite disposal. In the past ASARCO slag was used as ballast across the log yard. The former log yard area is now used for parking truck trailers. Nearly all of these materials have been removed during prior remedial actions and prior to redevelopment.

This plan incorporates CDM's procedure for: *(Click on the relevant topics to download the hazard guideline. Delete irrelevant topics.)*

Housekeeping
Manual Material Handling
Tools and Power Equipment
Working Around Heavy Equipment
Hazardous Waste Site Controls
Working Safely Around Drill Rigs
Working Safety with Direct Hydraulic Push Technology
Hazardous Waste Site Decontamination

HEALTH AND SAFETY PLAN FORM CDM Health and Safety Program	*This document is for the exclusive use of CDM and its subcontractors*	CAMP DRESSER & McKEE INC. PROJECT DOCUMENT #:

DESCRIPTION AND FEATURES: *Include principal operations and unusual features (containers, buildings, dikes, power lines, hillslopes, rivers, etc.*

The former USG and Murray Pacific sites combined are an approximately square property located on the southwest shore of the Hylebos Waterway. The onsite buildings were demolished in 2002 after the property was purchased by the Port of Tacoma. The site has since been redeveloped by the Port of Tacoma as a trucking facility (Carlile Trucking). The site is fairly flat. The area where drilling will occur is gravel surfaced. The remainder is aspalt paved. The facility is a fairly active trucking facilty with trucks entering and exiting on a regular basis. The entrance to the area where drilling will occur is secured by facility personnel who check the credentials of anyone entering. There are unlikely to be any underground utilities at the locations where drilling will occur. There are no overhead utilities. The Hylebos water is located immediately adjacent to several of the existing monitoring wells, and a location where one well will be drilled. The work will not occur on the bank of the waterway.

SURROUNDING POPULATION: ( ) Residential (X) Industrial ( ) Commercial ( ) Rural ( ) Urban OTHER:

HAZARDOUS MATERIAL SUMMARY: ***Highlight or bold waste types and estimate amounts by category.***

CHEMICALS: *Amount/Units:*	SOLIDS: *Amount/Units:*	SLUDGES: *Amount/Units:*	SOLVENTS: *Amount/Units:*	OILS: *Amount/Units:*	OTHER: *Amount/Units:*
Acids	Flyash	Paints	Ketones	Oily Wastes	Laboratory
Pickling Liquors	Mill or Mine Tailings	Pigments	Aromatics	Gasoline	Pharmaceutical
Caustics	Asbestos	Metals Sludges	Hydrocarbons	Diesel Oil	Hospital
Pesticides	Ferrous Smelter	POTW Sludge	Alcohols	Lubricants	Radiological
Dyes or Inks	Non-Ferrous Smelter	Distillation Bottoms	Halogenated (chloro, bromo)	Polynuclear Aromatics	Municipal
Cyanides	**Metals**	Aluminum	Esters	PCBs	Construction
Phenols	Dioxins		Ethers	Heating Oil	Munitions
Halogens					
Other - *specify*	Other - *specify*	Other - *specify*	Other - *specify*	Other - *specify* Bunker C Oil	Other - *specify*

KNOWN CONTAMINANTS	HIGHEST OBSERVED CONCENTRATION [a]	PEL/TLV *ppm or mg/m3 (specify)*	IDLH *ppm or mg/m3 (specify)*	Warning Concentration *(in ppm)*	SYMPTOMS & EFFECTS OF ACUTE EXPOSURE	PHOTO IONIZATION POTENTIAL
Arsenic	1.8 mg/L (GW) 20,700 mg/kg (S)	10 µg/m3	5 mg/m3	Dust	Nasal ulcers, fever, bronchitis, melanosis, peripheral neuropathy	Dust
Cadmium	<0.001 mg/L (GW) 3.09 mg/kg (S)	5 µg/m3	9 mg/m3	Dust	Pulmonary edema, tight chest, chills	Dust
Chromium	0.018 mg/L (GW) 543 mg/Kg (S)	500 µg/m3	250 mg/m3	Dust	Lung damage, skin sensitization	Dust
Copper	0.004 mg/L (GW) 380 mg/Kg (S)	1 mg/m3	NE	Dust	Nasal perforation, metal taste	Dust
Lead	<0.001 mg/L (GW) 3,900 mg/kg (S)	50 µg/m3	100 mg/m3	Dust	Fatigue, pallor, colic, insomnia	Dust
Antimony	0.055mg/L (GW) 165 mg/Kg (S)	500 µg/m3	50 mg/m3	Dust	Irritated nose, cough, headache, diarrhea	Dust
Zinc	<0.004 mg/L (GW) 1,500 mg/Kg (S)	5 mg/m3	NE	Dust	Sweet metal taste, dry throat, cough, tight chest, chills	Dust

a) Current site soil arsenic and lead data. Highest groundwater data during 2008/2009.

NA = Not Available **NE = None Established** **U = Unknown**

Verify your access to an MSDS for each chemical you will use at the site.

S = Soil SW = Surface Water T = Tailings W = Waste TK = Tanks SD = Sediment
A = Air GW = Ground Water SL = Sludge D = Drums L = Lagoons OFF = Off-Site

HEALTH AND SAFETY PLAN FORM CDM Health and Safety Program	*This document is for the exclusive use of CDM and its subcontractors*		CDM Smith
SPECIFIC TASK DESCRIPTIONS	**Disturbing the Waste?**	**TASK - SPECIFIC HAZARDS**	**HAZARD & SCHEDULE**
1 Install 7 2-inch diameter monitoring wells	Intrusive	Moving parts on drill rig, parts breaking on rig, heavy equipment, exposure to contaminants, trucks moving around yard,slip, trip. XRF radiation.	Medium Hazard Nov-Dec 2013
2 Develop installed monitoring wells	Intrusive	Exposure to contaminants, trucks moving around yard, slip trip.	Medium Hazard Nov-Dec 2013
3 Purge and sample monitoring wells	Intrusive	Exposure to contaminants, trucks moving around yard, slip trip.	Medium Hazard Nov-Dec 2013
4 Measure water levels.	Intrusive	Exposure to contaminants, trucks moving around yard, slip trip.	Medium Hazard Nov-Dec 2013
5			
6			
SPECIALIZED TRAINING REQUIRED: Training on use of XRF.		**SPECIAL MEDICAL SURVEILLANCE REQUIREMENTS:** None	
OVERALL HAZARD EVALUATION: ( ) High (X) Medium ( ) Low ( ) Unknow *(Where tasks have different hazards, evaluate each.)* **JUSTIFICATION:** Easy exit from area, open, no confined spaces, personnel trained to work safely around investigation equipment (drill rig). Most of the source material (i.e., soil with highest contaminant conc.) has been removed.			
FIRE/EXPLOSION POTENTIAL: ( ) High ( ) Medium (X) Low ( ) Unknown			

HEALTH AND SAFETY PLAN FORM

CDM Health and Safety Program

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CDM Smith

PROTECTIVE EQUIPMENT: *Specify by task. Indicate type and/or material, as necessary. Group tasks if possible. Use copies of this sheet if needed.*

BLOCK A

TASKS: **1 - 2 - 3 - 4** - 5 - 6 - 7 - 8 - 9 - 10
LEVEL: A - B - C - **D** - Modified
( ) Primary ( ) Contingency

Respiratory: (X) Not needed
( ) SCBA, Airline:
( ) APR:
( ) Cartridge:
( ) Escape Mask:
( ) Other:

Head and Eye: ( ) Not needed
(X) Safety Glasses:
( ) Face Shield:
( ) Goggles:
(X) Hard Hat:
( ) Other:

Boots: ( ) Not needed
(X) Steel-Toe ( ) Steel Shank
( ) Rubber (X) Leather
( ) Overboots:

Prot. Clothing: ( ) Not needed
( ) Encapsulated Suit:
( ) Splash Suit
( ) Apron:
( ) Tyvek Coverall or
( ) Saranex Coverall
( ) Cloth Coverall:
(X) Other: work clothes, safety vest

Gloves: ( ) Not needed
( ) Undergloves:
(X) Gloves: latex
(X) Gloves: cut-resistant when necessary
Other: specify below
( ) Tick Spray
( ) Flotation Device If Over Water
(X) Heating Protection: during drilling
( ) Sun Screen

BLOCK B

TASKS: **1 - 2 - 3 - 4** - 5 - 6 - 7 - 8 - 9 - 10
LEVEL: A - B - C - D - Modified
( ) Primary (x) Contingency

Respiratory: ( ) Not needed
( ) SCBA, Airline:
( ) Full Face
( ) Cartridge: GMC
( ) Escape Mask:
( ) Other:

Head and Eye: ( ) Not needed
( ) Safety Glasses:
( ) Face Shield:
( ) Goggles:
( ) Hard Hat:
( ) Other:

Boots: ( ) Not needed
( ) Steel Shank
( ) Rubber ( ) Leather
( ) Overboots: Latex

Prot. Clothing: ( ) Not needed
( ) Encapsulated Suit:
( ) Splash Suit
( ) Apron:
( ) Tyvek Coverall or
( ) Saranex Coverall
( ) Cloth Coverall:
( ) Other:

Gloves: ( ) Not needed
( ) Undergloves: PVC
( ) Gloves:
( ) Overgloves: Nitrile

Other: specify below
( ) Tick Spray
( ) Flotation Device If Over Water
( ) Heating Protection
( ) Sun Screen

BLOCK C

TASKS: 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10
LEVEL: A - B - C - D - Modified
( ) Primary ( ) Contingency

Respiratory: ( ) Not needed
( ) SCBA, Airline:
( ) APR:
( ) Cartridge:
( ) Escape Mask:
( ) Other:

Head and Eye: ( ) Not needed
( ) Safety Glasses:
( ) Face Shield:
( ) Goggles:
( ) Hard Hat:
( ) Other:

Boots: ( ) Not needed
( ) Steel-Toe ( ) Steel Shank
( ) Rubber ( ) Leather
( ) Overboots:

Prot. Clothing: ( ) Not needed
( ) Encapsulated Suit:
( ) Splash Suit
( ) Apron:
( ) Tyvek Coverall
( ) Saranex Coverall
( ) Cloth Coverall:
( ) Other:

Gloves: ( ) Not needed
( ) Undergloves:
( ) Gloves:
( ) Overgloves:

Other: specify below
( ) Tick Spray
( ) Flotation Device
( ) Heating Protection
( ) Sun Screen

BLOCK D

TASKS: 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10
LEVEL: A - B - C - D - Modified
( ) Primary ( ) Contingency

Respiratory: ( ) Not needed
( ) SCBA, Airline:
( ) APR:
( ) Cartridge:
( ) Escape Mask:
( ) Other:

Head and Eye: ( ) Not needed
( ) Safety Glasses:
( ) Face Shield:
( ) Goggles:
( ) Hard Hat:
( ) Other:

Boots: ( ) Not needed
( ) Steel-Toe ( ) Steel Shank
( ) Rubber ( ) Leather
( ) Overboots:

Prot. Clothing: ( ) Not needed
( ) Encapsulated Suit:
( ) Splash Suit
( ) Apron:
( ) Tyvek Coverall
( ) Saranex Coverall
( ) Cloth Coverall:
( ) Other:

Gloves: ( ) Not needed
( ) Undergloves:
( ) Gloves:
( ) Overgloves:

Other: specify below
( ) Tick Spray
( ) Flotation Device
( ) Heating Protection
( ) Sun Screen

This health and safety plan form constitutes hazard analysis per 29 CFR 1910.132

HEALTH AND SAFETY PLAN FORM CDM Health and Safety Program		*This document is for the exclusive use of CDM and its subcontractors*		CDM Smith
MONITORING EQUIPMENT:		*Specify by task. Indicate type as necessary. Attach additional sheets if needed.*		
INSTRUMENT	**TASK**	**ACTION GUIDELINES**		**COMMENTS**
Combustible Gas Indicator	1-2-3-4-5-6-7-8	0-10% LEL 10-25% LEL >25% LEL 21.0% O2 <21.0% O2 <19.5% O2	*No explosion hazard* *Potential explosion hazard; notify SHSC* *Explosion hazard; interrupt task/evacuate* *Oxygen normal* *Oxygen deficient; notify SHSC* *Interrupt task/evacuate*	(X) Not Needed Contaminants are not explosive
Radiation Survey Meter	1-2-3-4-5-6-7-8	3 x Background: >2mR/hr:	*Notify HSM* *Establish REZ*	(X) Not Needed
Photoionization Detector _____eV Lamp Type____	1-2-3-4-5-6-7-8	*Specify:*		(X) Not Needed Metals are not volatile. No soil excavation planned.
Flame Ionization Detector Type_____	1-2-3-4-5-6-7-8	*Specify:*		(X) Not Needed Contaminants are not volatile
Single Gas Type_____ Type_____	1-2-3-4-5-6-7-8	*Specify:*		(X) Not Needed Contaminants are not volatile
Respirable Dust Monitor Type____DataRAM_____ Type_____	1	*Specify:*	0-.1 mg/m3 sustained over 5 min. avg: Level D >.1 mg/m3 ove 5 min. avg: Stop activities, assess work practices, control dust. A 0-.1 mg/m3 reading must be sustained in order to continue drilling activities. Control visible dust. A no dust policy will be in place; dust to be controlled via water hoses/sprayers/etc. and through work practices. If dust cannot be controlled work will be stopped and practices assessed.	( ) Not Needed Part of Site is paved the other part is has gravel surfacing
Other *Specify:* Type_____ Type_____	1-2-3-4-5-6-7-8	*Specify:*	If team notices unusual odors or irritation of the eyes or throat, they will leave the area.	( ) Not Needed
Other *Specify:* Type_____XRF____ Type_____	1-2-3-4-5-6-7-8	*Specify:*	None	( ) Not Needed The XRF is a screening tool to be used to determine arsenic concentrations in the field

HEALTH AND SAFETY PLAN FORM CDM Health and Safety Program	*This document is for the exclusive use of CDM and its subcontractors*	CDM Smith

DECONTAMINATION PROCEDURES

ATTACH SITE MAP INDICATING EXCLUSION, DECONTAMINATION, AND SUPPORT ZONES AS PAGE TWO

Personnel Decontamination *Summarize below or attach diagram;*	**Sampling Equipment Decontamination** *Summarize below or attach diagram;*	**Heavy Equipment Decontamination** *Summarize below or attach diagram;*
Personal decontamination station will move from location to location as the exploration equipment is moved. Wash hands and face with soap and water after taking PPE on and off. Workers will remove protective equipment in this order: 1.) equipment drop 2.) hard hat 3.) gloves 4.) face and hand wash. WASH HANDS AND FACE BEFORE EATING OR DRINKING. ( ) Not Needed	All sampling equipment will be thoroughly decontaminated between samples with soap, water, and rinsing with distilled water. The four steps of tool and equipment decontamination are: 1. Scrub with mild solution of Alconox until all visual soil is removed 2. rinse with potable water 3. spray rinse with deionized water 4. air dry. ( ) Not Needed	All down-hole equipment and tool parts that contact excavated soil are constructed of heavy gauge steel and have no natural or synthetic components that could absorb and retain most soil-borne organic contaminants. The drill rig, augers, and any other large equipment in the exclusion zone shall be steam cleaned prior to movement from the site. ( ) Not Needed
Containment and Disposal Method PPE waste generated during soil sampling (rubber gloves, paper towels, etc.) will be placed in plastic garbage bags and sealed shut. The garbage bags will be placed in a commercial waste collection container at CDM Smith's office for ultimate disposal in accordance with 173-303 WAC and 173-340-820 WAC.	**Containment and Disposal Method** Water generated from decontamination procedures will be disposed of with sampling purge water.	**Containment and Disposal Method** Investigation derived waste will be drummed, profiled and disposed of appropriately following completion of field activities and receipt of analytical data.

HAZARDOUS MATERIALS TO BE BROUGHT ONSITE

Preservatives		*Decontamination*		*Calibration*	
( ) Hydrochloric Acid	( ) Zinc Acetate	(X) Alconox ™	( ) Hexane	( ) 100 ppm isobutylene	( ) Hydrogen Sulfide
(x) Nitric Acid	( ) Ascorbic Acid	( ) Liquinox ™	( ) Isopropanol	( ) Methane	( ) Carbon Monoxide
( ) Sulfuric Acid	( ) Acetic Acid	( ) Acetone	( ) Nitric Acid	( ) Pentane	( ) pH Standards
( ) Sodium Hydroxide	( ) Other:	( ) Methanol	( ) Other:	( ) Hyrogen	( ) Conductivity Std
		( ) Mineral Spirits		( ) Propane	( ) Other:

HEALTH AND SAFETY PLAN FORM

This document is for the exclusive use of CDM and its subcontractors

CDM Health and Safety Program

EMERGENCY CONTACTS

Water Supply	
Site Telephone	
EPA Release Report #:	800 / 424 - 8802
CDM 24-Hour Emergency #:	732 / 539 - 8128
Facility Management	
Other (specify)	
CHEMTREC Emergency #:	800 / 424 - 9300

CONTINGENCY PLANS: *Summarize below*

Evacuate site if any unexpected hazardous conditions are encountered. The "buddy system" will be employed for all work being done. Upon site evacuation, staff will meet at the west entrance to the site on Taylor Way.

If a work team observes hazards for which they have not been prepared, they will withdraw from the area and call CDM Smith Health and Safety. Without regard to monitoring instrument reading, CDM Smith personnel will leave site if they experience nausea or dizziness.
Although underground utilities are unlikely, team will ensure utility locates are performed/marked prior to activities.
XRFs to be used in accordance with manufacturer's instructions, and in manner preventing any possible employee exposure to radiation. Potential exposure to radiation requires additional controls and training.

HEALTH AND SAFETY PLAN APPROVALS (H&S Mgr must sign each plan)

Prepared by	Pam Morrill	Date	9/12/2013
DHSC Signature		Date	9/13/2013
HSM Signature		Date	9/13/2013

EMERGENCY CONTACTS

EMERGENCY CONTACTS	NAME	PHONE
Health and Safety Manager	Paul Opem	(505) 780-0381
Project Manager	Pam Morrill	(425) 248-0215
Site Safety Coordinator	Pam Morrill	(425) 519-8300
Client Contact	Kim Peterson	708-834-8832
Other *(specify)*	Scott Hooton	(253) 383-5841
Environmental Agency	Ecology	(425) 407-6000
State Spill Number	Washington	(800) 258-5990
Fire Department		911
Police Department		911
State Police		911
Health Department		
Poison Control Center	Nationwide	800 / 222 - 1222
Occupational Physician	Kenneth Chase	800 / 777 - WOHA

MEDICAL EMERGENCY

MEDICAL EMERGENCY		PHONE
Hospital Name:	St. Joseph Medical Center	(253) 426-4101
Hospital Address	1717 South J Street, Tacoma, WA 98405	
Name of Contact at Hospital:		
Name of 24-Hour Ambulance:		
Route to Hospital:		

See Attached Map

Distance to Hospital 6 miles

HEALTH AND SAFETY PLAN SIGNATURE FORM

CDM Health and Safety Plan

All site personnel must sign this form indicating receipt of the H&SP. Keep this original on site. It becomes part of the permanent project files. Send a copy to the Health and Safety Manager (HSM).

SITE NAME/NUMBER: Former USG Mineral Fiber Plant

DIVISION/LOCATION: 2301 Taylor Way, Tacoma, Washington

CERTIFICATION:

I understand, and agree to comply with, the provisions of the above referenced H&SP for work activities on this project. I agree to report any injuries, illnesses or exposure incidents to the site Health and Safety Coordinator (SHSC). I agree to inform the SHSC about any drugs (legal and illegal) that I take within three days of site work.

PRINTED NAME	SIGNATURE	DATE

MAPQUEST.

Send To Printer Back To Directions

Start: 2301 Taylor Way
Tacoma, WA
98421-4304 US

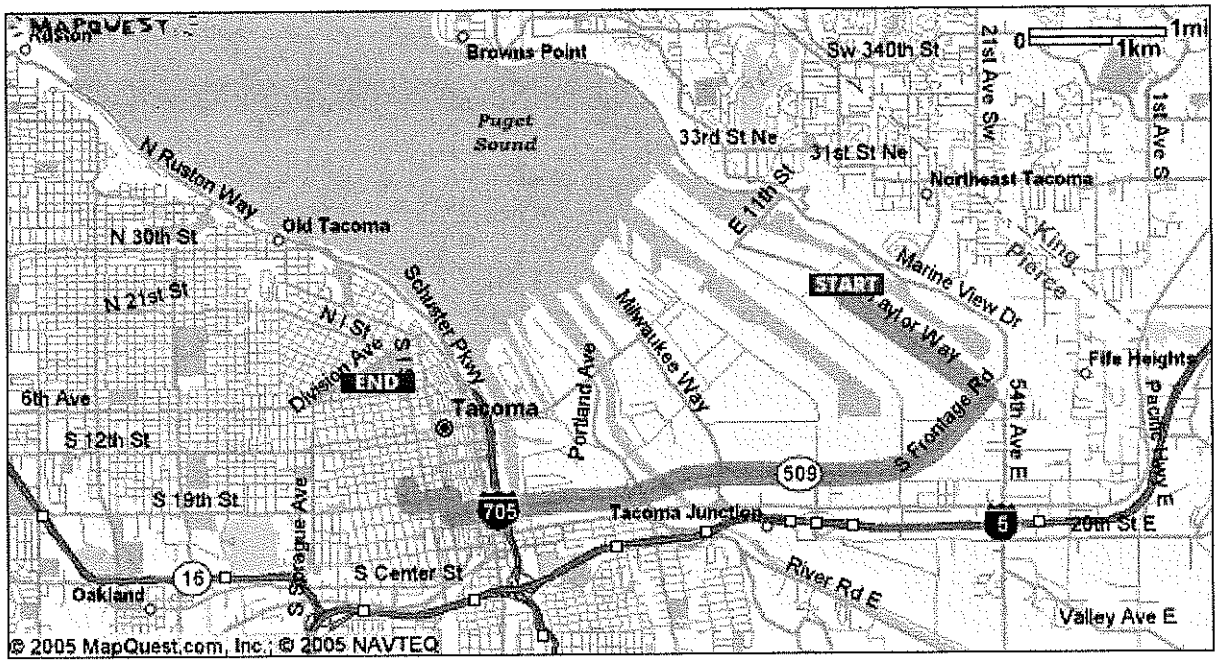
St. Joseph Medical Center

End: 1717 S J St
Tacoma, WA
98405-4933 US

Distance: 6.07 miles

Total Estimated Time: 12 minutes

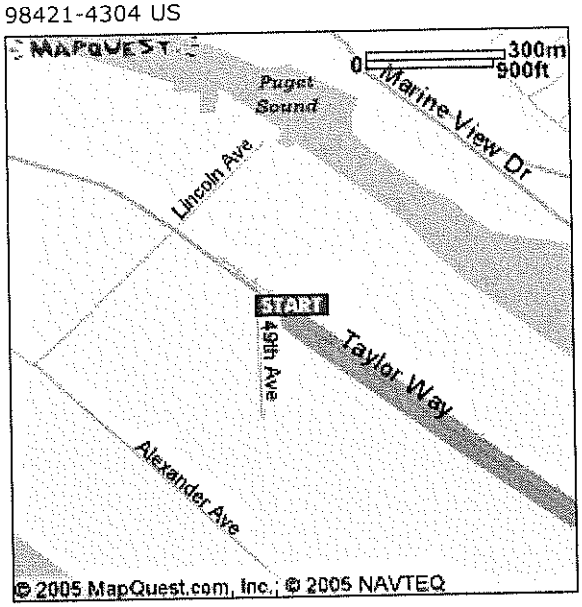
Directions		Distance
START	**1.** Start out going SOUTHEAST on TAYLOR WAY E toward MARINE VIEW DR/WA-509.	1.3 miles
SOUTH 509	**2.** Turn RIGHT onto WA-509 S/N FRONTAGE RD. Continue to follow WA-509 S.	3.9 miles
	3. Stay STRAIGHT to go onto S 21ST ST.	0.2 miles
	4. Turn RIGHT onto TACOMA AVE S.	0.1 miles
	5. Turn LEFT onto S 19TH ST.	0.2 miles
	6. Turn RIGHT onto S J ST.	0.1 miles
END	**7.** End at 1717 S J St, Tacoma, WA 98405-4933 US	



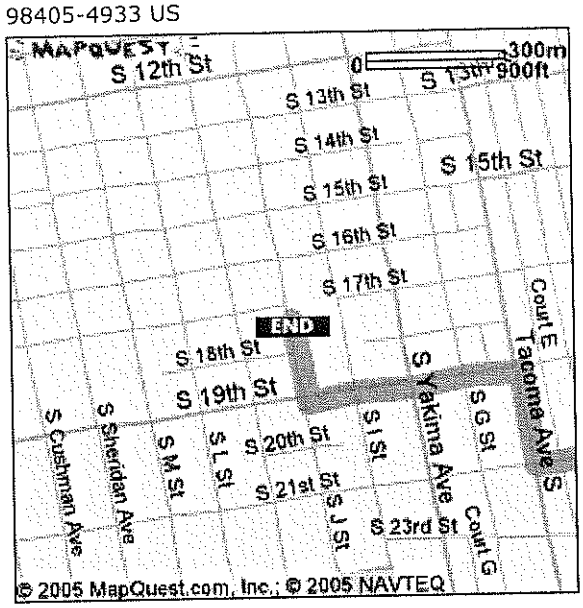
Start:
2301 Taylor Way

End:
1717 S J St

Tacoma, WA
98421-4304 US



Tacoma, WA
98405-4933 US



NAVTEQ ON BOARD

Notes: