



Mr. Matthew Morris
Washington State Department of Ecology
Southwest Regional Office Toxics Cleanup Program
PO Box 47775
Olympia, Washington 98504-7775

Subject: Tidal Influence Study Work Plan
Former Standard Oil Bulk Terminal/Chevron Facility No. 1001348
1656 East J Street
Tacoma, Washington

Dear Mr. Morris:

On behalf of Chevron Environmental Management Company (Chevron EMC), Leidos Inc. (Leidos) prepared this work plan to perform a tidal influence study at the Former Standard Oil Bulk Terminal/Chevron Facility No. 1001348 located at 1656 East J Street in Tacoma, Washington, herein referred to as the "site." The former bulk terminal is under an Agreed Order (No. DE 7111) with the Washington State Department of Ecology (Ecology). This work plan is an addendum to the *Remedial Investigation Work Plan* dated June 4, 2010 and is a response to comments provided by Ecology on July 21, 2016.

The overall objective of this work plan is to further evaluate groundwater flow patterns at the site, in order to determine future placement of groundwater monitoring wells off the former bulk terminal property. Specific objectives of this work plan include:

- Evaluation of tidal influence in both the upper and lower aquifers; and
- Survey all monitoring wells by a licensed survey company to ensure the accuracy of groundwater flow direction patterns.

The investigation activities proposed by this work plan will be performed per the requirements of Agreed Order No. DE 7111, and are consistent with the *Remedial Investigation Work Plan* dated June 4, 2010 as well as the *Remedial Investigation Sampling and Analysis Plan* dated May 25, 2010 and the *Remedial Investigation Quality Assurance Project Plan* dated May 25, 2010.

SITE DESCRIPTION

The fenced 3.5-acre former Standard Oil bulk terminal is located in an industrial area in Tacoma, Washington. The former bulk terminal was in operation from 1905 to 1988. A summary of the regional geology, hydrogeology, and a complete summary of the site

background, including investigative history were presented in SAIC's *Remedial Investigation Work Plan* dated June 4, 2010 as well as the *Draft Remedial Investigation* dated December 15, 2014. The property is currently used for transportation offices, parking for transportation vehicles, and employee parking for the adjacent Northwest Detention Center.

PROPOSED REMEDIAL INVESTIGATION ACTIVITIES

In order to address data gaps regarding the potential tidal influence of the Wheeler-Osgood Waterway or the Puyallup River on the groundwater flow direction in both the upper and lower aquifers, Leidos proposes to perform a tidal influence study as well as survey both the horizontal and vertical locations of the groundwater monitoring wells at the site.

TIDAL INFLUENCE STUDY

A tidal study will be performed in order to identify the relationship of the groundwater gradient and seawater intrusion at the site to the tidal cycle in Commencement Bay. This relationship will be used to determine the placement of downgradient monitoring wells to fully delineate groundwater impacts at the site. The study involves obtaining groundwater elevation measurements from monitoring wells during at least one complete tidal cycle.

Water level measurements will be taken in representative monitoring wells at least every ten minutes for a period of not less than two weeks and up to four weeks. At a minimum, the following wells will be monitored: MW-10, MW-14, MW-18, MW-19, MW-21, MW-22, D-1, D-2A, D-3, D-6, and D-7.

Measurements will be taken automatically using pressure transducers and electronic data loggers but will be calibrated manually by an electric water-level meter. A water level meter will collect depth to water level measurements, total depth of monitoring wells, and deployment depth of data logger immediately after installation of the data logger. In addition depth to water measurements will manually be collected prior to removal of the data logger to calibrate the instrument. Tidal height information will be obtained from NOAA using predictions corrected for Tacoma, Washington. The data loggers will be set up to record measurements at the same time for all eleven data loggers prior to installation.

In order to ensure that measurements encompass a complete range of conditions, the study will be conducted during a tidal cycle where the lower low tide reaches a level of 0.0 ft MLLW or less and the higher high tide reaches a level of 12.0 ft MLLW or more. According to the National Oceanic and Atmospheric Association (NOAA) website, these tide cycles occur during the months of August, September, and October, with the time of day for lowest low tides and highest high tides varying every day.

MONITORING WELL SURVEY

In order to comply with current Ecology guidelines for groundwater elevation data as well as ensure the accuracy of groundwater flow direction at the site, Leidos will subcontract a Washington State licensed land-surveying firm to perform a location and elevation survey of all the existing monitoring wells. Monitoring well elevation measurements will be

made to the nearest 0.01 foot at the ground surface (top of well-box lid) and at the top of the well casing, relative to the North American Vertical Datum of 1988 (NAVD88). In addition, all monitoring wells will be surveyed laterally to the 1983 North American Datum. Missing monitoring wells MW-11 and MW-12 will be located prior to survey activities.

Following the completion of the tidal influence study and well survey, the data will be evaluated to determine placement of additional groundwater monitoring wells downgradient of the site. The placement of the monitoring wells will fully delineate the dissolved-phase hydrocarbons observed at the site.

SCHEDULE

The project team is prepared to initiate the field activities on September 1, 2016. Data collected from this investigation will be used to complete a Supplemental Remedial Investigation Work Plan detailing the placement of additional groundwater monitoring wells and borings at the site. The Supplemental Remedial Investigation Work Plan will be submitted to Ecology on November 15, 2016, approximately 45 days following completion of these proposed tasks.

Thank you for reviewing this work plan. Please direct any questions or comments to Don Wyll (Leidos Principal Project Manager) at 425-482-3315 or wylld@leidos.com.

Sincerely,

Leidos Inc.



Don Wyll
Principal Project Manager