STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
1250 W Alder St • Union Gap, WA 98903-0009 • (509) 575-2490

December 27, 2021

Bill Preston
Yakima City Engineer
City of Yakima
129 N 2nd St
Yakima, WA 98901

**Re: Updated Agreed Order Scope of Work and Schedule:**

- **Site Name:** Tiger Oil N 1st St Fmr 6013
- **Site Address:** 1808 N. 1st Street, Yakima
- **Cleanup Site ID:** 4922
- **Facility/Site ID:** 477
- **Agreed Order No:** DE 19882

Dear Bill Preston:

Please find the enclosed revised Exhibit B, Scope of Work and Schedule for Agreed Order DE 19882. As we have previously discussed, the revised Scope of Work and Schedule pertain to technical details of the proposed Interim Remedial Action to be performed at the Site as well as an update to the project schedule. The revised scope of work is based on new information from the completion of Task 2, Monitoring Well Replacements, as well as technical feedback from the City of Yakima and Landau Associates. As presented in the revised schedule, Landau will begin implementing the proposed Interim Remedial Action in the spring of 2022.

The Department of Ecology appreciates the ongoing efforts of the City team to clean up this Site.

If you have any questions or concerns please contact me by phone at (509) 454-7835 or e-mail at Frank.Winslow@ecy.wa.gov.

Sincerely,

Frank P. Winslow, LHG
Site Manager
Toxics Cleanup Program
Central Regional Office

Enclosure: Exhibit B-Scope of Work and Schedule

cc: Jeffrey Menken, Landau Associates

# Enclosure

# Exhibit B-Scope of Work and Schedule

# EXHIBIT B –SCOPE OF WORK (SOW) AND SCHEDULE

# SCOPE OF WORK

## PURPOSE

The work required under this Agreed Order (AO) is to address remaining gasoline-related contamination in soil and groundwater at 1808 N 1st Street. A release of gasoline from an underground storage tank (UST) system was first identified in 1982. Since that time, various investigations and remedial actions have taken place including pumping to remove free product in 1982 sand 1983. An assessment of the extent of groundwater contamination was performed by the U.S. Geological Survey (U.S.G.S.) in 1991. The USTs were removed in 2005. The extent of soil and groundwater contamination was reassessed in 2017. The 2017 study showed that while soil and groundwater contamination concentrations remain above MTCA Method A cleanup levels, the extent of contamination is much smaller than the extent of contamination delineated in 1991.

Gasoline contamination in the subsurface tends to naturally degrade provided electron acceptors (e.g. oxygen) are present to support natural biodegradation. The reduction in the extent of contamination between 1991 and 2017 is believed to be due to natural attenuation. The 2017 investigations demonstrated that the groundwater system is aerobic at a distance from the area of contamination. Gasoline in the subsurface typically degrades in the presence of free oxygen. In the core area of the remaining contamination, free oxygen has been depleted and the groundwater system is anaerobic. Therefore, the proposed interim action involves the injection of oxidants or oxidant/oxygen release compound (ORC) combination (oxidant/ORC) into the subsurface to destroy remaining hydrocarbons through oxidation and enhance degradation of the remaining gasoline in soil and groundwater. Later stages of treatment may also include application of ORC only to enhance long-term in-situ bioremediation.

The property is under a Lease-to-Own agreement between the City and a Lessee. The work described herein will be done on behalf of the City, but will need to be done in consultation with the Lessee. This includes coordinating locations and periods of work with the Lessee to minimize adverse impacts to the Lessee's operations.

Three tasks have been developed under this Agreed Order Scope of Work:

- Task 1 – UST & Contaminated Soil Removals
- Task 2 – Monitoring Well Replacements
- Task 3 – Interim Action

## Task 1 – UST & Contaminated Soil Removals

Two underground storage tanks (USTs) were found during site preparation work; a waste oil UST and a heating oil UST. Four fueling USTs had previously been removed in 2005. The two USTs were removed on October 14, 2019 and soil samples were collected from the floor and sidewalls of the excavations. Heavy oil was found above cleanup levels in one soil sample collected adjacent to the waste oil tank, and diesel was found above cleanup levels in one soil sample collected adjacent to the heating oil tank. The contaminated soil will need to be excavated and properly disposed of prior to Ecology issuing a No Further Action (NFA) determination for the site. Costs for the UST removals and contaminated soil excavation and offsite disposal shall be considered reimbursable to the City under this Agreed Order. These costs may include costs incurred prior to finalization of this Agreed Order.

## Task 2 – Monitoring Well Replacements

Subsequent to the Remedial Investigation Report dated May 22, 2017, several monitoring wells were evidently destroyed. In order to perform the Interim Action and associated monitoring under Task 3, several monitoring wells need to be replaced. Ecology will determine the number, locations, and completions of the replacement monitoring wells, in consultation with the property Lessee. Consistent with the existing monitoring wells, the replacement monitoring wells shall be constructed with 2-inch PVC well pipe and screen, with 0.010 slot screens from 10 to 20 feet below ground surface (ft bgs). The monitoring wells shall be completed with flush-mount vaults and locking well caps.

All wastes, including drill cuttings and well development water, shall be property disposed of. The wells will be installed by licensed well driller, and the wells registered with Ecology.

## Task 3 – Interim Action

### Interim Action Approach

Oxidizing agent or oxidant/ORC will be delivered to the subsurface through the installation of temporary injection points. The injection points will be spaced approximately 20 feet apart. A total of up to 24 injection points are anticipated. The location, spacing, and number of injection points will be proposed to Ecology prior to installation.

The injection points are anticipated to be installed via hollow stem auger or other drilling methods. The following discussion provides the anticipated construction methods for the injection points.

Each borings will be completed to a depth of approximately 20 feet bgs. Wells will be constructed using a ten-foot nominal 2-inch diameter, Schedule 40 PVC well casing with ten feet of 0.020-inch slotted PVC well screen with end cap. The well slotted interval will

be placed a minimum of three to six feet below the seasonal low water level, estimated to be 14 ft bgs. Wells will be completed using appropriate sand pack and seals per Washington's Minimum Standards for Construction and Maintenance of Wells (Washington Administrative Code 173-160).

A temporary vault will be installed to protect the wellhead at the surface.

After all of the injection points have been installed, developed and sampled, injection of a fluid or slurry oxidant/ORC will take place.

The rate of injection should be designed to optimize oxidant delivery to the saturated zone. The added oxidant/ORC is expected to substantially reduce hydrocarbon mass within the vicinity of the injection point, as well as providing for some oxygen residual to enhance biodegradation as groundwater migrates downgradient of the injection point.

There is some uncertainty regarding whether or not the initial injection will result in achievement of targeted cleanup levels. If the injected oxidant/ORC does not result in achieving targeted cleanup levels within the desired time span, then additional injection of oxidant and/or ORC will follow. The steps of the remedial approach and schedule constraints are summarized in Table 1.

**Table 1: Remedial Approach Steps**

| Step | Activity | Schedule |
|---|---|---|
| Step 1 | Install and develop additional monitoring wells for performance and compliance monitoring. | Completed |
| Step 2 | Sample all monitoring wells to characterize baseline conditions. | Completed |
| Step 3 | Install, develop, and sample up to 24 injection points. | Spring 2022. |
| Step 4 | Injection of oxidant into injection points. | Within one month of completion of Step 3. |
| Step 5 | Monitor groundwater quality, one sampling event. | Within two months after Step 4. |
| Step 6* | Assess groundwater conditions. If additional treatment needed, return to Step 4. If not needed, proceed to Step 7. | Immediately following completion of Step 5. |
| Step 7* | Complete additional three quarters of quarterly groundwater monitoring in case or rebound. If rebound concern, return to Step 4. If no rebound concern, proceed to Step 8. | Following completion of Step 6. |
| Step 8 | Prepare Interim Action Completion Report. | Following completion of Step 7. |

*Note that Steps 6 and 7 will include decisions by Ecology as to whether or not additional oxidant/ORC injection or monitoring is needed. Ecology may identify specific injection points to target for additional oxidant/ORC injection, based on groundwater sampling results. A minimum of four post-injection quarterly monitoring rounds are anticipated prior to proceeding to Step 8.

The City shall coordinate with Ecology throughout the development of the Interim Action and shall keep Ecology informed of changes to any Work Plan or other project plans, and of any issues or problems as they develop.
The SOW is divided into four tasks as follows:

| | |
|---|---|
| Task 3a. | Interim Action Work Preparation |
| Task 3b. | Interim Action Field Execution |
| Task 3c. | Interim Action Contingency Work |
| Task 3d. | Interim Action Report |

## TASK 3a. INTERIM ACTION WORK PREPARATION

During Task1, the City's consultant shall make preparations including:

- Prepare and engineering cost estimate for the project. This estimate to include options for contingency injection rounds.
- Identification and contracting of drilling and probing subcontractor(s).
- Identification and contracting of analytical laboratory subcontractor.
- Identification and contracting of licensed surveyor.
- Sourcing of oxidant/ORC and rental of appurtenances and suitable storage for the chemicals and appurtenances during the course of the interim action.
- Submittal of proposed locations and construction details of injection and monitoring wells to Ecology for approval.
- Preparation of detailed map of proposed injection locations for approval by Ecology.
- Submittal to Ecology of calculated oxidant injection amounts, including estimated volume, pressure, and radius of influence.
- Preparation a Health & Safety Plan for all Interim Action activities.
- Coordination with the lessor of the property at 1808 N 1st Street and owner of the property at 1904 N 1st Street.
- Satisfying all requirements of Ecology's Underground Injection Control (UIC) program.

## TASK 3b. INTERIM ACTION FIELD EXECUTION

After completion of the preparation activities detailed under Task 1, Steps 1 through 8 shall be executed. Specifications for these steps are included as follows:

- All purge and development water and investigation-derived wastes to be appropriately disposed of.
- Monitoring wells shall be completed with a permanent water-tight flush mount vault, including locking j-plug.
- Monitoring well top of casing elevation and horizontal coordinates to be surveyed by a licensed surveyor to a minimum accuracy of 0.01 feet and 0.1 feet, respectively.
- All monitoring well sampling to follow low flow purge methods using a flow-through cell and including monitoring of pH, temperature, conductivity, turbidity, dissolved oxygen (DO), and oxidation-reduction potential (ORP).
- All laboratory analysis of groundwater samples to include gasoline range organics (NWTPH-Gx), diesel and heavy oil range organics (NWTPH-Dx with no silica gel cleanup), and benzene, toluene, ethylbenzene, and xylenes (BTEX, by EPA Method 8260C).
- Injection points shall be completed with a water-tight flush mount vault. At the end of the project, these injection points shall be plugged and abandoned by a licensed well driller.

The City's consultant shall provide interim data reports and updates to Ecology as new site data and information become available. Laboratory analysis data shall also be provided in electronic format when it has been validated. Raw laboratory data will be provided to Ecology upon request.

## TASK 3c. INTERIM ACTION CONTINGENCY WORK

The need for additional oxidant/ORC injection and/or monitoring will be at the sole discretion of Ecology. The City's consultant shall be prepared to perform additional injection rounds within two weeks of Ecology's decision. Contingency injection of oxidizing agent should be included in the initial underground injection control notification under Task 1in order to not delay implementation of this contingency option. In addition to contingency injection, contingency rehabilitation of the injection points could be needed in case rapid biofouling is encountered.

## TASK 3d. INTERIM ACTION COMPLETION REPORT

The Interim Action Completion Report shall be prepared by the City's consultant after groundwater monitoring has been completed to Ecology's satisfaction. This report shall include:

- Laboratory analytical reports.
- Tables presenting analytical data.
- Evaluation and discussion of data quality.
- Drilling logs and monitoring well completion diagrams for new monitoring wells.
- Site plan showing all injection and monitoring locations.
- Table detailing oxidant/ORC injection periods, amounts injected by injection point, and slotted interval depths for injection points.
- Time trend plots for key contaminants in groundwater and showing injection events.
- Groundwater monitoring purge field forms.
- Table summary of final field parameter measurements, for each monitoring round.
- Brief discussion of Interim Action methods and results.
- Water level measurement data table, and potentiometric surface map for each monitoring round.

The City's consultant shall compile the above information into an Interim Action Completion Report. Two hard copies and one electronic copy in Adobe (.pdf) format, to Ecology for review and comment.

# SCHEDULE OF DELIVERABLES

The schedule for deliverables described in the Agreed Order and the Scope of Work is presented below in Table 2. If the date for submission of any item or notification required by this Schedule of Deliverables occurs on a weekend, state or federal holiday, the date for submission of that item or notification is extended to the next business day following the weekend or holiday. Where a deliverable due date is triggered by Ecology notification, comments or approval, the starting date for the period shown is the date the City received such notification, comments or approval by certified mail, return receipt requested, unless otherwise noted below. Where triggered by Ecology receipt of a deliverable, the starting date for the period shown is the date Ecology receives the deliverable by certified mail, return receipt requested, or the date of Ecology signature on a hand-delivery form.

**Table 2: Schedule of Deliverables**

| Task | Responsible Party | Deliverable description | Completion Times |
|---|---|---|---|
| | City | Selection and contracting with City's Consultant complete. | Within 30 calendar days following the effective date of the Agreed Order |
| 1 – Contaminated Soil Removal | City (work can be done by City's or Lessee's Consultant) | UST closure report. | To Be Determined (prior to Ecology issuing a NFA for the site) |
| | Ecology | Comments on or approval of submittal. | Within 20 days after report receipt |
| 2 – Replacement Monitoring Wells | City's Consultant | Replacement monitoring well completion diagrams and registration forms. | By December 31, 2021 |
| 3a – Interim Action Preparation | City's Consultant | Project cost estimate, proposed monitoring and injection well locations and construction, and injection. | By February 28, 2021 |
| | Ecology | Comments on or approval of submittal. | Within 14 calendar days of submittal receipt. |

| Task | Responsible Party | Deliverable description | Completion Times |
|---|---|---|---|
| 3b – Interim Action Field Execution | City's Consultant | Beginning of interim action field work | By April 30, 2022 |
| | City's Consultant | Completion of interim action field work | Depends on Ecology decisions regarding injection and monitoring. Minimum of 4 quarters of groundwater monitoring following completion of injection(s). |
| 3c – Interim Action Contingency Work | City's Consultant | Completion of interim action contingency field work | Depends on Ecology decisions regarding potential additional injection and monitoring. |
| 3d – Interim Action Completion Report | City's Consultant | Submittal of Report to Ecology. | Within 60 calendar days following completion of Interim Actions |
| | Ecology | Ecology comments on draft report to City. | Within 30 calendar days following receipt of draft document |
| | City's Consultant | Revised report Ecology[1] | Within 30 calendar days of receipt of Ecology comments |

1 – Ecology reserves the right, at the sole discretion of Ecology, to require one additional comment and document revision round, if needed. All Ecology comments must be addressed to Ecology's satisfaction prior to document finalization.