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December 17, 2024

Vasiliy Kravtsov
Tree Top, Inc.
P.O. Box 248
Selah, WA 98942-0248

**SUBJECT: Statement of Work for Groundwater Quality Evaluation
Tree Top, Inc. – Selah, Washington**

Dear Vasiliy:

Valley Science and Engineering (Valley) has prepared this Statement of Work (SOW) for completing a Groundwater Quality Evaluation for the Tree Top, Inc. (Tree Top) operations in Selah, Washington.

Background

Tree Top operates a 305-acre land treatment system (Site) on 420 acres in the Selah Valley on the north side of Selah. The land treatment system is used to manage fruit processing wastewater from March through November. The Yakima River flows south along the east edge of the Site and supplies the Taylor Ditch that flows along the west edge of the Site. Taylor Ditch supplies a 12-acre pond on the Site which serves as an irrigation pumping reservoir. Prior to land application, wastewater is treated at the plant by using screens to remove solids. The screened wastewater is conveyed to a 17-acre, 3-cell extended aeration lagoon system at the Site for biochemical oxygen demand removal. Land treatment provides final treatment in the soil-plant ecosystem by final filtration and stabilization, with nutrient removal through volatile pathways and uptake by hay crop production.

The Site was assigned Outfall 002 in National Pollutant Discharge Elimination System Permit WA0002437 (Permit).¹ The Permit was renewed by the State of Washington Department of Ecology (Ecology) on July 1, 2024. The Permit requires quarterly (previously monthly) groundwater monitoring in 8 groundwater monitoring wells, including 4 positioned around the perimeter of the Site with “MW” prefixes and 4 positioned on the Site with “WW” prefixes. The Permit also contains limits for nitrate as nitrogen (nitrate-N) and total dissolved solids (TDS), based upon a statistical analysis of monitoring data from the upgradient monitoring well (MW-1). The Permit fact sheet references a hydrogeologic study report issued in 1990 that has been lost.² The

¹ Ecology, W. D. (2024). National Pollutant Discharge Elimination System Waste Discharge Permit No. WA0002437. Issued to Tree Top Facilities, Selah. Union Gap: author.

² EMCOM Northwest Inc. and Adolfson Associates. (1990). Environmental Impact Statement for Tree Top Process Wastewater Disposal. Appendix A. Hydrogeologic Assessment of the Congdon Orchard Site in Selah. Bothell: author.

1990 report includes the original information from the 8 groundwater monitoring wells at the Site (2 wells have been replaced since then – MW-2R and WW-4R).

Special Condition S10 of the Permit requires completion of a Groundwater Quality Evaluation by July 1, 2028, starting with submittal of a SOW by January 1, 2025. The study must evaluate the impacts of wastewater land application on the Site. The SOW must conform to Ecology guidelines.^{3,4} If the SOW recommends installation of additional groundwater monitoring wells and/or conducting additional groundwater monitoring, a Work Plan must also be submitted to Ecology by July 1, 2025. The Work Plan must be implemented within 60 days after it is approved by Ecology.

Scope of Work

This SOW has been prepared to complete a Groundwater Quality Evaluation to evaluate the impacts of wastewater land application on the Site. The following topics will be addressed, as recommended by Ecology guidelines.

Geology

The geology of the Site will be characterized to include descriptions and maps of surface geologic map units, geologic structures, soil map units, topography, and subsurface formations to depths of water wells within one mile of the Site. Geologic information will be compiled from published geologic maps, soil maps, topographic maps, and well logs.

Well logs will be retrieved from Ecology's online database for a one-mile buffer around the Site. Well locations will be plotted on a map. The following well information will be tabulated in a well inventory: map identifier, Ecology well report number, owner, completion date, location, use, well depth, water depth, aquifer or water-bearing lithology, specific capacity (if reported). Cross sections or fence diagrams may be prepared from water well logs, if they would help describe subsurface conditions.

Hydrogeology

The hydrogeology of the Site will be characterized from available information.

Hydrostratigraphic Units

One or more saturated geologic units (hydrostratigraphic units) will be identified from literature and refined at the Site based upon well logs as having a distinct lithologic composition on a Site-wide and/or regional scale that imparts hydraulic properties for storage and transmission of groundwater (aquifers, aquicludes, aquitards, etc.) boundaries. The lithologic compositions, depths, thicknesses and lateral extents of hydrostratigraphic units will be summarized.

³ Ecology, W. D. (1993). Guidelines for Preparation of Engineering Reports for Industrial Wastewater Land Application Systems. Olympia: author.

⁴ Ecology, W. D. (2005). Implementation Guidance for the Ground Water Quality Standards. Olympia: author.

The hydraulic properties of each hydrostratigraphic units will be described based upon observations or inferences from well log observations and/or previous studies, including hydraulic conductivity, transmissivity, porosity and storativity.

Groundwater Flow and Water Balance

Hydrographs will be prepared by plotting groundwater elevations over at least one year on a quarterly frequency for all Site groundwater monitoring wells. Groundwater elevations will be calculated by subtracting static water level measurements surveyed tops of well casings.

Seasonal groundwater flow directions and gradients beneath the Site will be determined by construction of seasonal groundwater elevation contour maps. Contours will be constructed using software with professional judgement with respect to well construction, flow boundaries, and recharge and discharge areas.

A preliminary groundwater balance for the Site will be constructed from available inputs and professional judgement. A forthcoming analysis of all known, available and reasonable methods of prevention, control and treatment (AKART) in an Engineering Report will refine this water balance (as described in the next Section of this SOW). Groundwater recharge rates from the Site land treatment fields will be derived from irrigation records, and local weather station records precipitation and evapotranspiration rates for grass hay crops. Groundwater recharge from wastewater lagoons, which have double liners with leak detection, will be assumed to be nil.⁵ Groundwater continuity (recharge and/or discharge) with the unlined irrigation pond, irrigation canals and streams will be characterized based upon hydrographs of monitoring wells and water table elevations with respect to topographic positions of these surface water features. Groundwater discharge rates from hydrostratigraphic units along the downgradient boundaries of the Site will be determined from groundwater potentiometric gradients and transmissivity(ies) of hydrostratigraphic units. There are no high capacity groundwater pumping wells on the Site that would have a measurable influence on the water balance.

Area of Concern, Ambient Groundwater Quality, and Beneficial Uses

The area of concern for groundwater pollutant migration is the Site, with respect to groundwater enforcement limits at Tree Top's monitoring wells.

Ambient groundwater quality has been characterized by Ecology to develop groundwater enforcement limits for nitrate-N and TDS in the Permit.⁶ Enforcement limits were derived with consideration of numeric and narrative criteria of the groundwater quality standards; the antidegradation policy of the groundwater standards; and wastewater treatment by AKART. The hydrogeologic analysis will be used to examine whether additional monitoring wells should be installed to refine the characterization of ambient groundwater quality.

⁵ Lier, J. W. (2016, September 22). Email to Ecology Staff RE: Tree Top Lagoon Liner Installation. Union Gap.

⁶ Ecology, W. D. (2023). Fact Sheet for NPDES Permit WA0002437. Union Gap: author.

Within the area of concern, groundwater will be reviewed from all Site monitoring wells for at least one year on a quarterly basis. Groundwater monitoring data for nitrate-N and TDS from all monitoring wells will be tabulated and displayed as graphs. Isoconcentration maps may also be prepared to display spatial patterns in groundwater quality, which can also be compared to groundwater flow maps.

All potential beneficial uses of groundwater shall be assumed to require protection, which include but are not limited to; domestic, stock watering, industrial, commercial, agricultural, irrigation, mining, fish and wildlife maintenance and enhancement, recreation, generation of electric power, preservation of environmental and aesthetic values, and all other uses compatible with the enjoyment of the public waters of the state.

Groundwater Protection Measures

Groundwater protection measures will address pretreatment and management of land treatment to protect groundwater.

Waste Characterization

Wastewater characteristics were characterized by Ecology in Table 11 of the Permit Fact Sheet, in consultation with Tree Top, using monitoring data of wastewater effluent discharged to the Site submitted in discharge monitoring reports (DMRs) from 2015 to 2019. If the sludge removed from the wastewater lagoon system is land applied on the Site, it will also be characterized as required by the Permit. Potential groundwater impacts from wastewater impoundments will not be considered because they have a double liner system with interstitial leak detection.

All Known, Available and Reasonable Methods of Prevention, Control and Treatment

Groundwater quality impacts will be evaluated in context of a forthcoming AKART analysis that will be submitted to Ecology in an Engineering Report by July 1, 2026, as well as Site management practices that will be described in an Operations and Maintenance Manual that will be submitted to Ecology by July 1, 2027.

Groundwater Monitoring Program Evaluation

The existing groundwater monitoring program will be evaluated to address data gaps for monitoring groundwater quality impacts from land treatment operations at the Site.

Well Construction

The construction and integrity of existing monitoring wells will be evaluated for obtaining representative groundwater samples. Construction will be evaluated based upon well logs, static water level records, well inspection with a downhole camera (if necessary), and inspecting surface completions. The wellhead location and elevation data will be reviewed for accuracy with respect to documentation of benchmarks, georeferencing to datums and measurement accuracy.

Well Siting

Well siting will be reviewed with respect to objectives of characterizing ambient groundwater quality and detecting site impacts on groundwater with confidence. Sufficient groundwater monitoring wells will provide a clearly understood spatial pattern in groundwater flow and groundwater quality variations that characterizes effects of Site operations on groundwater quality. Existing well locations will be reviewed with respect to boundaries of the Site, topography, locations of surface water features, existing interpretations of groundwater flow patterns, geologic heterogeneities that can create preferential flow paths, and spatial variations in groundwater quality between existing monitoring wells. Additional groundwater monitoring well locations will be proposed to address data gaps.

Review of Groundwater Monitoring Protocols

Existing groundwater monitoring methods will be reviewed for collecting representative samples. Protocols include measuring static water levels, equipment suitability, equipment decontamination or use of dedicated equipment, purging procedures or low flow sampling procedures including field parameter measurement, field meter calibration, quality assurance samples, sample handling and transportation to the laboratory, and documentation. Recommendations will be provided to improve groundwater monitoring procedures for obtaining representative samples, as necessary.

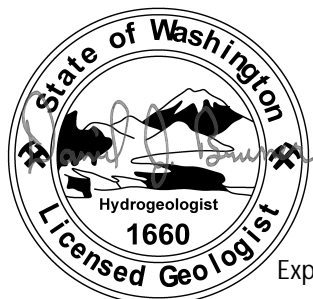
Please contact me at (208) 776-4092 if you have any questions or comments.

Sincerely,

VALLEY SCIENCE AND ENGINEERING

Dan Bruner, LHG
Managing Geologist II

DJB/fec



Exp. 12/7/2025

Daniel J. Bruner