

**From:** [Philip Cordell](#)  
**To:** [Winslow, Frank \(ECY\)](#)  
**Cc:** [Peter Kingston](#)  
**Subject:** Preliminary Spring 2023 Groundwater Evaluation - Ross-Simmons Hardwood (VCP Project No. XS0013)  
**Date:** Thursday, May 11, 2023 8:53:33 AM  
**Attachments:** [image001.png](#)  
[Charts 1-4\\_NA Eval.pdf](#)  
[Figure-06\\_SECorner\\_GW-Analytical.pdf](#)

Good morning Frank,

This email provides a summary of the recent groundwater monitoring event conducted at the Ross-Simmons Lumber Co. Site (VCP Project No. XS0013) on March 21, 2023. A summary of the analytical data including the NWTPH-Dx results (with and without silica gel cleanup) and monitored natural attenuation parameters is provided below. A figure showing well locations and several charts showing NWTPH-Dx concentrations and various groundwater parameters are attached. A summary table of the parameters discussed in this email is presented below. Based on the data summarized below, Farallon has concluded that the dissolved-phase NWTPH-Dx plume is stable and naturally attenuating. As such, a NWTPH-Dx concentration of 25,212 milligrams per kilogram (mg/kg), which was proposed in the Remedial Investigation Report, is recommended as the remediation level for soil in the upcoming Cleanup Action Plan.

As shown in the table below and discussed in the Remedial Investigation Report, diesel-range organics and oil-range organics (DRO and ORO, respectively) results have consistently demonstrated that polar metabolites are predominant in groundwater. DRO are consistently detected during laboratory analysis with Northwest Method NWTPH-Dx and, following a silica gel cleanup preparation, reported non-detect at the laboratory practical quantitation limit. The lack of DRO detections using silica gel cleanup has been consistent during all groundwater monitoring events where silica gel cleanup was used. Furthermore, a review of chromatograms performed by Apex Laboratories showed a consistent polar metabolite signature. Apex Laboratories is currently working on a "grouping letter" that will provide a detailed analysis of the chromatograms and quantify the polar metabolites and diesel-range petroleum hydrocarbons detected in the groundwater samples, but the letter will not be available until mid-May 2023. The available analytical data and abundant wood debris observed in the subsurface supports the conclusion that organics are contributing to the elevated NWTPH-Dx results due to the abundance of polar metabolites. Furthermore, the above evidence suggests that if DRO sourced from a petroleum release is present in groundwater, it is heavily weathered/degraded.

Natural attenuation of the dissolved-phase NWTPH-Dx plume is evident by the decrease of dissolved oxygen in the source area (i.e., MW-2 and MW-9) indicating that aerobic respiration and therefore biodegradation is occurring. Groundwater in monitoring well MW-11, while downgradient of the source area, contains concentrations of DRO and exhibits low dissolved oxygen, suggesting biodegradation throughout and downgradient of the source area.

Elevated methane concentrations in the source area at wells MW-2 and MW-9, and downgradient wells MW-11, provide additional evidence that biodegradation of NWTPH-Dx and wood debris is occurring through methanogenesis. Elevated methane concentrations in groundwater at MW-18, located near the former log pond, suggest that methanogenesis is also occurring in areas where only wood debris is present. Other metabolic byproducts including iron and manganese are also elevated in the source area, suggesting anaerobic biodegradation is occurring when oxygen is depleted. The groundwater data at the Site supports the use of the Polar Metabolite (PM) Screening Levels presented in the Draft Guidance for Silica Gel Cleanup in Washington State, dated September 2022. Further rationale for use of the PM Screening Levels will be presented with the transmittal of the forthcoming hydrocarbon and polar metabolite grouping letter.

Farallon requests feedback on the proposed remediation level and use of the PM Screening Levels based on the results presented herein. The remediation level and PM Screening Levels will be used to develop the forthcoming Cleanup Action Plan. Graymont hopes to implement the selected remedy in late summer or early fall of 2023.

Please contact me or Pete with any questions.

Thanks,

Phil

Sample Location	Analytical Results (micrograms per liter)						Dissolved Oxygen (mg/l)	Methane (µg/l)	Dissolved Ferrous Iron (mg/l)	Total Manganese (µg/l)
	NWTPH-Dx			NWTPH-Dx with Silica Gel Cleanup						
	DRO	ORO	DRO + ORO	DRO	ORO	DRO + ORO				
<b>Upgradient Wells</b>										
MW-5	291	< 162	291	< 80.8	< 162	< 242.8	1.34	< 1.0	0.015	436
MW-7	90.0	< 165	90.0	< 82.5	< 165	< 247.5	0.76	35	0.039	1,900
<b>Plume Area Wells</b>										
MW-2	<b>1,080</b>	< 160	<b>1,080</b>	< 80.0	< 160	< 240	0.38	120	0.054	3,290
MW-9	<b>1,030</b>	< 165	<b>1,030</b>	< 82.5	< 165	< 247.5	0.70	31	0.028	2,250
<b>Downgradient Wells</b>										
MW-11	<b>590</b>	< 168	<b>590</b>	< 84.2	< 168	< 252.2	0.64	4,400	0.315	6,360
MW-18	122	< 157	122	< 78.4	< 157	< 235.4	2.34	470	0.0	146

*Phil Cordell, RG (OR), LG (WA) Senior Geologist*

Farallon Consulting | 4380 S Macadam Ave, Suite 500 | Portland, OR 97239

C: **206-730-5016** | [Bio](#) | [LinkedIn](#)



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