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From: [Rory Isbell](#)
To: [BJORK Mary F * WRD](#)
Subject: Comments on Application # LL-2023
Date: Tuesday, April 7, 2026 4:35:46 PM
Attachments: [Final COLW Application # LL-2023 4.7.26.pdf](#)

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Hello Ms. Bjork,

Please find attached comments from Central Oregon LandWatch on Application # LL-2023. I'll follow up in separate emails with the attachments listed at the end of our comments. This is email 1/3.

Regards,

Rory Isbell

Rory Isbell (he/him)
Staff Attorney & Rural Lands Program Director
Central Oregon LandWatch
2843 NW Lolo Drive, Suite 200
Bend, Oregon 97703
541-647-2930 x804

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and Tana'nma (Warm Springs) people*

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April 7, 2026

Filed via email: Mary.f.bjork@water.oregon.gov

Oregon Water Resources Department
% Mary Bjork, Senior Water Right Technician
725 Summer St NE, Suite A
Salem, OR 97301

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Re: Application # LL-2023 (Knife River Corporation – Northwest)

To Whom It Concerns:

Thank you for the opportunity to provide comment on the above-referenced limited license application. Central Oregon LandWatch (LandWatch) opposes the issuance of the requested limited license and respectfully requests the Department deny the application.

LandWatch is a land use and conservation advocacy organization with over 900 members that has proudly protected Central Oregon's forests, farmland, high deserts, rivers, wildlife, and vibrant communities for 40 years. LandWatch works on water resource issues throughout the Upper Deschutes River Basin, including the Crooked River Basin. We continue to be interested in both restoring instream flows and supporting an efficient irrigation-based farming community throughout Central Oregon.

LandWatch's members and the public have an interest in the scenic, recreational, and fish and wildlife habitat values of the Crooked River Basin and the Deschutes Basin, and in maintaining the health and safety of public groundwater resources by preventing groundwater depletion and contamination. Additional groundwater withdrawals threaten the public's interest in the Deschutes and Crooked Rivers and are likely to exacerbate existing groundwater quality problems. The proposed limited license directly conflicts with the interests of LandWatch and its members, as outlined below.

1. LandWatch's opposition to this limited license application arises in the context of existing groundwater quality concerns in the area surrounding the well sites proposed for additional pumping. The subject property appears to be at the epicenter of a slow-moving public health and environmental quality crisis. For several years now dozens of residential and agricultural wells in the area have been contaminated by dangerously



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high levels of manganese, arsenic, and other heavy metals. Residents have experienced serious health problems, children have broken out in hives, livestock have been stillborn, property values have been destroyed, and tens of thousands of dollars have been spent on retrofitting existing wells. To be clear, at this time, the exact cause of the contamination is undetermined, and LandWatch expresses no opinion on whether the industrial activities on the subject property are related to the contaminated well water.¹

Nevertheless, it is imperative that OWRD take the well-documented environmental conditions surrounding the subject property into account. The fact that the cause of contamination is undetermined is not a reason to proceed with business-as-usual in the area. Any additional appropriation of groundwater, temporary or otherwise, is wholly inappropriate and reckless until the nature and cause of the contamination has been determined by the State of Oregon. We offer several Oregon Department of Environment Quality documents as exhibits in support. See Exhibit A (2022 DEQ fine showing the applicant pumped wastewater into a creek/irrigation canal), Exhibit B (2026 DEQ letter informing DOGAMI/Knife River that Knife River violated testing protocols), Exhibit C (2026 DEQ Groundwater special studies showing contamination), Exhibit D (DEQ website landing page with sampling results showing increases in levels of arsenic and manganese), Exhibit E (DEQ/Oregon Health Authority Summary Memo). News outlets have also reported extensively on this situation. Exhibit I (OPB article (August 26, 2025), Exhibit J (Central Oregon Daily article (March 18, 2025)).

2. In addition to concerns about water quality, issues of water quantity exist as well. The source of this well-documented groundwater contamination does not affect the impact that increased groundwater withdrawals will have on the groundwater resource. OWRD data from area wells show that groundwater levels are steadily declining. Exhibit F (OWRD Hydrographs for well tag 461554). This hydrograph shows groundwater decline especially during the past five years, beginning around 2021 when OWRD issued the existing limited license request for the same applicant on the same property under LL 1876. In 2021 the well level was 11.19 feet, and in 2026 the level is 43.19 feet, indicating that groundwater levels have dropped by 32 feet over the last five years. The local groundwater resource is not stable and increased groundwater withdrawals are likely

¹ At least one report by a certified geologist and engineer, Jim Newton, has found that "elevated levels of manganese are probably occurring as a result of the Site mine." See Exhibit H, page 1 (Memorandum from Cascade Geoengineering (March 20, 2023)).





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not within the capacity of the resource. Further, decreasing groundwater levels are likely to exacerbate groundwater quality concerns, as a lowering water table is likely to lead to increased leaching or release of contaminants into the groundwater resource.²

In other words, whether the applicant, Knife River, is responsible for the well-documented groundwater contamination is immaterial to whether the proposed limited license will exacerbate both the existing groundwater quantity and groundwater quality conditions.

3. It appears that this limited license application is not permitted under the Deschutes Basin Plan. That plan mandates that water used for industrial or mining purposes in the Lower Crooked River basin must not interfere with other beneficial uses of water. OAR 690-505-0040(4). Unless and until it is determined that the applicant's mining activities have no causal relationship with the well-documented groundwater contamination in the area surrounding the subject property, the Department should not issue a new limited license for increased water use. The Department cannot ensure that issuing the requested limited license will not result in interference with other beneficial uses of water.
4. The application appears to seek water to serve uses disallowed under Crook County land use regulations. According to the local watermaster's statement included in the application packet, "aggregate washing" appears to be a use for which the limited license is sought. This use, however, is disallowed under the 2015 Crook County conditional use permit (file no. 217-15-000115-PLNG) under which the applicant conducts its mining activities. That permit, also included in the application packet, states at condition of approval number 28, that "[t]he existing water well on the mill site must not be used for aggregate washing operations[.]" The Land Use Information Form completed by Crook County planning staff references this condition as well. Any use of groundwater for aggregate washing activities is not authorized by local land use regulations and would require a new conditional use permit approval.

² Melissa A. Lombard, Johnni Daniel, Zuha Jeddy, Lauren E. Hay, and Joseph D. Ayotte. 2021. Assessing the Impact of Drought on Arsenic Exposure from Private Domestic Wells in the Conterminous United States. *Environmental Science & Technology* 2021 55 (3), 1822-1831. DOI: 10.1021/acs.est.9b05835





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DOGAMI has confirmed that the applicant has already violated the conditions of its 2015 conditional use permit issued by Crook County, writing that the applicant's "current use of the 'settling ponds' on tax lot 703 for the settling of process water is inconsistent with both the state and county approvals." Exhibit G (DOGAMI Memo to Crook County (October 2025)). While the cause of the significant groundwater contamination in the area of the subject property has not been definitively determined, it has been determined by DOGAMI that the applicant is in violation of state and county approvals by way of its use of settling ponds to discharge used mining process water.

5. Statute prevents the issuance of limited licenses for more than 5 consecutive years to serve the same use. ORS 537.143(8). As noted above, the Department approved limited license application LL 1876, also for industrial and commercial uses, in 2021. Approval of a second consecutive LL on this property would not be a temporary use and doing so runs counter to the purpose and definition of a limited license.
6. The application proposes storing pumped water in reservoirs, but such reservoirs are not allowed without a permit under ORS 537.400.
7. The applicant seeks a limited license that exceeds 120 days for groundwater use that is hydraulically connected to surface waters. As such, this application must undergo a Division 33 review pursuant to OAR 690-033-0310(1)(A).
8. The Deschutes Basin Groundwater Mitigation program requires that the applicant obtain mitigation water in order to offset the proposed consumptive use. OAR 690-505. The applicant's prior limited license application, LL 1876, required provision of mitigation water, but the current application proposes none.
9. The proposed limited license will be detrimental to the public interest, and the Department should deny the application under OAR 690-310-0130(1)-(2). As evidenced by the hydrograph for Well Tag 461554 (Exhibit F), there does not appear to be water available within the capacity of the resource to support the proposed use, running afoul of OAR 690-310-0130(1)(b). We further incorporate our above comments under numbers 1 through 3 concerning groundwater quality concerns and the likely potential for exacerbating groundwater quality in the area of the subject property should the proposed limited license be granted. Many neighbors of the subject property are unable to drink or bathe using water from their domestic wells, and the Department should not risk worsening that dire situation by allowing increased groundwater pumping under the



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proposed limited license. Other neighbors have ceased certain farm practices due to heavy metal contamination of the groundwater. When it comes to the public's interest in the water resources of the Crooked River Basin, the Crook County Circuit Court has recently underscored the public's right to transparency when the public interest is concerned: "In a time when transparency is vital for trust in public agencies and for issues involving water rights in particular, the public has the right to be heard when they raise public interest issues." Exhibit K (Amended Opinion Letter, Crook Co. Circuit Court Case No. 23CV46779). The Department should not approve the proposed limited license unless it is absolutely certain that doing so would not further threaten groundwater quality at the subject property.

Thank you for your consideration of these comments and please notify us of any further decisions or opportunities for public comment on this application.

Regards,

Rory Isbell
Staff Attorney & Rural Lands Program Manager
Central Oregon LandWatch
2843 NW Lolo Drive, Ste. 200
Bend, Oregon 97703

Attachments

- Exhibit A DEQ Notice of Civil Penalty Assessment and Order, Case No. WQ/SW-ER-2021-548 (July 19, 2022)
- Exhibit B DEQ Letter to DOGAMI (February 23, 2026)
- Exhibit C DEQ Groundwater Special Studies, Woodward Min and Knife River GW Split 2025 (February 20, 2026)
- Exhibit D DEQ Website Crook County Groundwater Investigation Landing Page (accessed April 2, 2026)
- Exhibit E DEQ/OHA Crook County Groundwater Summary memo (August 19, 2025)
- Exhibit F OWRD Hydrograph for Well Tag 461554 (accessed April 2, 2026)
- Exhibit G DOGAMI letter to Crook County (October 31, 2024)



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- Exhibit H Memorandum from Cascade Geoengineering (March 20, 2023)
- Exhibit I Oregon Public Broadcasting article "In search of source for Crook County well pollution, Oregon presses mining company to investigate itself" (August 26, 2025)
- Exhibit J Central Oregon Daily article "New tests reveal more toxins, including arsenic, in Crook County well water crisis" (March 18, 2025)
- Exhibit K Amended Opinion Letter, Crook Co. Circuit Court Case No. 23CV46779 (February 11, 2025)



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Date: Tuesday, April 7, 2026 4:37:51 PM
Attachments: [ExECrookCountySummaryMemo2025.pdf](#)
[ExD Department of Environmental Quality Crook County Groundwater Investigation Water Quality Programs State of Oregon.pdf](#)
[ExB DEQ Memo KR Testing Protocols 2 2026.pdf](#)
[ExF OWRD GW Hydrographs.pdf](#)
[ExA 2022 DEQ Fine KnifeRiverCorp \(1\).pdf](#)
[ExC KnifeRiverSplitDataDec2025 \(1\).pdf](#)
[ExG 07-0159 20241031 CrookCountyQuestionsResponse Final.pdf](#)

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Email 2/3. Exhibits A though G.

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Crook County Groundwater Summary

Date: August 19, 2025

Subject: Crook County Groundwater Summary

Groundwater Sampling and Data Collection

In response to concerns in Crook County over groundwater quality and sediment observed in drinking water from domestic wells, state agencies began coordinating with the governor's office in 2023 to better understand local conditions. Agencies recognized the need for more data to understand health risks and opted to fund a domestic well sampling effort. In November 2024, the Oregon Department of Environmental Quality (DEQ) hired an environmental consultant, Maul Foster and Alongi (MFA), to sample private drinking water wells in Crook County. Results from the study were mailed to landowners and residents in January and February of 2025. DEQ's consultants conducted a follow-up sampling event of many of the same wells and several new wells in April and May of 2025. In total, DEQ tested water samples for 43 analytes. The attached report includes data from both sampling events.

These two sampling events were designed to provide homeowners with drinking water quality information and to provide the Oregon Health Authority (OHA) with initial data to begin a health consultation. A health consultation is a written document comparing data about contaminant levels in water against levels known to cause harm to health. Neither sampling event was intended to identify the source of any contaminants found.

In the Fall of 2024, MFA collected samples from 55 private wells over a two-week period. In the Spring of 2025, MFA collected samples from 58 private wells, 52 of which were also sampled in the Fall of 2024. After each round of sampling, OHA notified individual households of results via email. Based on OHA's analysis, the sampling results showed the following and individualized support has been given to residents to address issues:

- 32 (55%) wells had manganese levels at or above EPA's secondary drinking water standards of 50 micrograms per liter ($\mu\text{g/L}$) in the Spring of 2025, with a high of 464 $\mu\text{g/L}$. There were 28 (51%) wells with manganese at or above 50 $\mu\text{g/L}$, with a high of 414 $\mu\text{g/L}$, in the Fall of 2024. EPA's secondary drinking water standards provide guidelines for aesthetic considerations, such as taste, color, and odor. They are not indicative of a risk to human health.
- In both rounds of sampling, several wells had high levels of arsenic, and a few had concerning levels of vanadium.
- Nitrate concentrations were detected in nine wells in the Spring 2025 sampling event and 10 wells in the Fall 2024 event at levels slightly above the primary Maximum Contaminant Level, or MCL, of 10 milligrams per liter (mg/L), with a high of 20.73 mg/L .



- Lead was detected in samples from two households in Fall 2024, and from two different households in Spring 2025. There is no safe level of lead exposure. One household had copper at a level of health concern. However, the source both lead and copper in drinking water is typically from plumbing fixtures, and not from groundwater.
- In the Fall of 2024, 13 wells tested positive for total coliform bacteria. Of these households, only 4 still had coliform detections in the Spring of 2025. No new households tested positive in the second round, indicating that many households took action to address the sources of bacteria.
- The remaining analytes such as aluminum, fluoride and iron were detected, but not at levels posing a risk of harm to health.

Public Health Consultation

OHA communicated individual domestic well water sampling results to landowners and residents, and whether contaminants were present at levels known to harm health, after receiving each round of sampling results. OHA offered individual consultations with a toxicologist to every household; there were seven such requests after the first round of testing, and none after the second round. In Fall of 2025, OHA will use these water test results to complete a health consultation that assesses community-wide health risks based on the levels of various contaminants in domestic well water, including manganese, and provide recommendations to well users and other agencies to reduce exposure to contaminants. For additional information about the health consultation, please visit OHA's webpage www.oregon.gov/crookcowells.

Contact

Water Quality Program
700 NE Multnomah Street, Suite 600, Portland, OR 97232
503-229-5263, Toll-free in Oregon: 800-452-4011

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Crook County Groundwater Investigation

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Overview

Since late summer of 2023, DEQ has been coordinating with Governor Kotek's office, Department of Geological and Mining Industry, Oregon Health Authority and Oregon Water Resources Department to address groundwater issues in Crook County.

Private well owners north of the city of Prineville have submitted concerns to multiple state agencies about their well water quality, including concerns for potential impacts on human health. The reports include concerns about drinking water quality and its impact on their health, household pipes, appliances and suitability for use by livestock and animals.

DEQ's Top Priorities

To adequately investigate groundwater issues in Crook County, DEQ's priorities are to oversee Knife River's groundwater investigation in partnership with DOGAMI. Additionally, DEQ will continue to support OHA as they complete their public health consultation.

Domestic Well Sampling

Sampling domestic drinking water wells is an important first step in addressing water quality issues. DEQ hired an environmental consultant, Maul Foster and Alongi, to sample private drinking water wells in Crook County. The purpose of the domestic well water sampling was not to identify the source of any contaminants found, but to

provide homeowners with drinking water quality information, and to provide the OHA with initial data to develop an area-wide public health consultation. (http://www.oregon.gov)

Fall 2024 and Spring 2025 Domestic Well Sampling



In the Fall of 2024, MFA collected samples from 55 private wells over a two-week period. In the Spring of 2025, MFA collected samples from 58 private wells, 52 of which were also sampled in the Fall of 2024. After each round of sampling, OHA notified individual households of results via email.

Knife River Sampling and Analysis Plan

State and federal agencies worked with Knife River to complete a Sampling and Analysis Plan. Sampling per that SAP will continue through 2026.

- [Q4 2025 DEQ Split Sample Field Report \(/deq/wq/Documents/KnifeRiverSplitDataDec2025.pdf\)](/deq/wq/Documents/KnifeRiverSplitDataDec2025.pdf)
- [Field Sampling Protocol memo from DEQ \(/deq/wq/Documents/KnifeRiverDEQResponse20260223.pdf\)](/deq/wq/Documents/KnifeRiverDEQResponse20260223.pdf)

While EPA has established maximum contaminant levels (<https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations>) to protect the public against contaminants that present a risk to human health and secondary maximum contaminant levels (<https://www.epa.gov/sdwa/secondary-drinking-water-standards-guidance-nuisance-chemicals>) for aesthetic considerations, such as scaling, taste and odor, that are not considered to present a risk to human health, these enforceable standards are for public water systems only. **The quality and safety of drinking water from private domestic wells are not regulated by the Federal or State Government.**

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The combined results from the domestic well sampling showed the following:

Contaminant	Screening Level	Spring 2025 sampling results – 58 private wells	Fall 2024 sampling
Manganese	EPA's secondary maximum contaminant level: 50 µg/L	32 (55%) wells had manganese at or above the secondary drinking water standard, with a high of 464 µg/L.	28 (51%) wells had secondary drinking of 414 µg/L.
Arsenic	EPA's maximum contaminant level: 10 µg/L	Approximately 40% of wells exceeded the drinking water standard for arsenic.	Approximately 35% drinking water stan
Vanadium	Agency for Toxic Substances and Disease Registry risk level: 63 ug/L	Two wells had levels of vanadium slightly higher than the risk level, with a high of 69.9 ug/L.	Three wells had lev higher than the risk 73.2 ug/L.
Nitrate	EPA's maximum contaminant level: 10 mg/L	Nine wells with nitrate at or above maximum contaminant level, with a high of 20.73 mg/L.	10 wells with nitrate contaminant level, v

Contaminant	Screening Level	Spring 2025 sampling results – 58 private wells	Fall 2024 sampling
Lead (http://www.oregon.gov)	EPA has set the maximum contaminant level for lead in drinking water at zero because it is harmful even at low exposure levels.	Two household wells had lead. Only one of these elevated concentrations was confirmed.	Two different house levels of lead above level.
Total Coliform Bacteria	Detection	Four of the Fall 2024 tested wells still had coliform detections, with no new households tested positive.	13 wells tested pos bacteria.
Remaining analytes listed in the full report.	Detection	Detects, but not at levels posing a risk of harm to health.	Detects, but not at to health.

Read a [summary memo \(/deq/wq/Documents/CrookCountyMemo2025.pdf\)](/deq/wq/Documents/CrookCountyMemo2025.pdf)

Read the full [results and report \(/deq/wq/Documents/GWP-DomesticWellSampling.pdf\)](/deq/wq/Documents/GWP-DomesticWellSampling.pdf)

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Regional Sampling and Analysis Plan

DEQ requires more data to understand what is causing elevated manganese concentrations in groundwater in the region. In collaboration with EPA, DOGAMI, OHA, and OWRD, DEQ has developed a larger comprehensive Sampling and Analysis Plan. If funded, this plan would provide further information about manganese distribution and groundwater flow patterns in the area, while also gathering information to evaluate potential sources of any contamination found in the groundwater.

Knife River Woodward Mine

DEQ and DOGAMI worked collaboratively to [request that Knife River Corporation conduct a Groundwater Investigation at the Knife River Woodward Mine \(/deq/wq/Documents/DOGAMICrookCoGWInvest.pdf\)](/deq/wq/Documents/DOGAMICrookCoGWInvest.pdf). This work, which led to a sampling and analysis plan development, began in October 2024 and was in response to potential water quality impacts in nearby domestic wells. The agencies directed Knife River to conduct a groundwater assessment to evaluate whether mining operations are causing or contributing to groundwater contamination leaving the site. The sampling and analysis plan was conditionally approved by the agencies on July 30, 2025 and

the installation of new monitoring wells and the collection of groundwater quality data in the third quarter of 2025 to continue to assess groundwater conditions at the site.

Read the [approved Knife River Groundwater Investigation Sampling and Analysis Plan \(/deq/wq/Documents/DOGAMICrookCoGWInvest.pdf\)](/deq/wq/Documents/DOGAMICrookCoGWInvest.pdf).



(http://www.oregon.gov)



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Tina Kotek, Governor

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TTY 711

February 23, 2026

Attn: Vaughn Balzer - DOGAMI

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Hello Vaughn,

DEQ lab staff have provided a split field report dated February 5, 2026 for the Knife River/DEQ sampling that occurred on December 8-10, 2025. Forthcoming will be another report, upon sharing and review of the analytical data, providing comparison of those data.

In the split field report, DEQ has identified concerns with the December 2025 sampling event field procedures that must be rectified for future sampling events to ensure quality of the analytical results provided for the ongoing groundwater investigation at the permitted facility. A copy of the DEQ lab field split report is attached.

Please provide a copy of the split field report for Knife River to review with their consultant, Hudspeth Land & Water LLC. Some of the issues noted document failure for the sampling procedures to follow those described in the approved Sampling and Analysis Plan (SAP), and some outline improvements that should be made to the SAP in the forthcoming update.

We've placed each of DEQ's comments into the table below and ask that KRC respond in the document how each comment is being addressed and provide written response back to DOGAMI and DEQ as soon as possible but no later than 3/2/2026. **It will be essential for the facility to address concerns noted in the comments and for these concerns to be rectified to the maximum extent possible prior to the next sampling event.**

Regarding the low flow sampling, DEQ understands that site conditions create a turbid water column in wells not designed for low-flow sampling. The proposed sampling protocol allows at least one casing volume of water to be purged with a submersible pump at a rate higher than typical low flow purge rates as described in [EPA \(1996\)](#) prior to sampling the well using low-flow techniques. Based on those site conditions, DEQ approved the SAP proposing the modified low-flow sampling approach and a sampling event designed to compare results of the modified low-flow sampling approach with the traditional approach of purging at least three well volumes prior to sample collection.

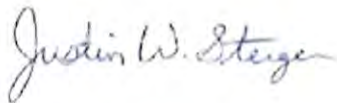
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Also, if we can attain the dates of Q1, 2026 and Q2, 2026 sampling, DEQ may also send a representative out to observe field sampling collection procedures to ensure these concerns have been addressed.

Thank you.

A handwritten signature in blue ink that reads "Justin W. Sterger". The signature is written in a cursive style with a large, looping 'J' and a trailing flourish.

Justin W. Sterger
Senior WQ Permit Writer

Table 1 – DEQ Split Event Comments

DEQ Comment/Observation	Required (Y/N)	Additional DEQ Notes	KRC Response
Fresh gloves should be worn at all times when handling any equipment that will make contact with sample water, including pumps, tubing, and sounders.	Y	This should be included in the SAP update and for all field sampling going forward.	
The sounder was not washed or rinsed and was instead wiped down with the same dry cloth between wells	Y	The Woodward SAP calls for several things that were not sufficiently completed during the observed sampling event. "Decontamination of all multi-use equipment between wells will be performed using an Alconox and distilled water mixture to clean equipment and be rinsed with distilled water"	
The submersible pump was not washed with Liquinox or rinsed with DI on the first two days of sampling. On day three, Liquinox and tap water were used to wash and rinse the pump, but not DI water.	Y	The Woodward SAP calls for several things that were not sufficiently completed during the observed sampling event. "Decontamination of all multi-use equipment between wells will be performed using an Alconox and distilled water mixture to clean equipment and be rinsed with distilled water"	
When using non-dedicated submersible pumps for low level sampling, significant effort should be used to decontaminate equipment between wells. Liquinox and high quality DI water should be used to wash the pump (both inside and out) and several lab-grade DI	Y	The Woodward SAP calls for several things that were not sufficiently completed during the observed sampling event. "Decontamination of all multi-use equipment between wells will be	

rinses should be performed afterwards. If the same "bulk" rinse water is used between wells, then at minimum the last rinse should be a fresh lab-grade DI rinse.		performed using an Alconox and distilled water mixture to clean equipment and be rinsed with distilled water"	
No blank sample was collected by the contractor. The SAP should be amended to include specific language elaborating on the type of blank expected and with what equipment it should be collected with.	Y	The SAP states: "Knife River plans to collect one duplicate sample and one blank per sampling event."	
No rinseate or equipment blank was collected, and the contractor did not note one having been collected in the past. The SAP should be amended to further explain which of these blank types is required, rinseate or equipment blank, and what the monitoring period is referring to.	Y	The SAP states: "In addition, one rinseate or equipment blank sample will be collected during the monitoring period."	
Regardless of the decontamination procedures utilized, efforts should be made to keep the non-dedicated pump and its line clean and free from contamination. Storing the pump and line in the same plastic tote between wells will not keep them free from outside or well-to-well contamination.	Y	This should be included in the SAP update and for all field sampling going forward.	
Not storing the pH probe submerged in DI water and instead using a rubber cap with pH probe storage solution (or pH 4 standard).	Y	Samplers should familiarize themselves with proper storage and handling of water quality meters.	
Ensuring dissolved oxygen is in the local DO setting to properly incorporate local barometric pressure readings.	Y	Samplers should familiarize themselves with proper storage and handling of water quality meters.	
Implementing a lab-based calibration routine with daily or twice daily calibration verifications in the field. These field checks provide confidence in daily data but	Y	Samplers should familiarize themselves with proper storage and handling of water quality meters.	

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prevent poor field conditions from contributing to a bad calibration. This also allows meter performance to be documented over time without frequently calibrating over a bad or failing probe.			
Table 3 of the SAP identifies wells MW-2, WW-2A, MW-5, MW-6, and MW-7 as low flow wells. While not explicitly prohibited in the SAP, it is industry practice to limit purge rates to relative low levels, such as <0.5 liters per minute as recommended by EPA. The incredibly high purge rates of the 4" submersible pump (~5-8 gallons per minute) may have adverse effects on sample quality.	Y	If high flow "bulk" purges are determined to be required to clear the highly-turbid water columns before sampling, then the impact on sample quality of high volume pumping and potential drawdown should be considered. Clarify in Section 2.2 of the SAP that (1) Knife River will conduct the evaluation of potential differences between samples collected using the two different purge and sampling techniques during the first sampling event following SAP approval and (2) samples will be collected at each well first using the modified low-flow techniques followed on a different day within the same quarterly sampling event by the traditional three well casing volume approach. Table 3 of the SAP should be modified to indicate that wells MW-8, MW-9, and MW-10 will be sampled using the modified low-flow procedure as is the case	

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		for the other monitoring wells at the site.	
DEQ and the contractor discussed many potential adjustments and improvements to the current sampling plan, including: a. Purchasing dedicated pumps and tubing for each well to eliminate the need for decontamination, or b. Purchasing a single pump to be used with dedicated well tubing for each well, thus limiting decontamination to only the pump and line but not the tubing. c. The inclusion of rinseate and equipment blanks to document the efficacy of any decontamination, or lack thereof, on existing or future equipment. d. Further defining language in the SAP around purge rates (traditional 3x casing volume versus low flow), equipment types, and blank types and frequencies. e. Permanently swap to using disposable cartridge-style 0.45 micron filters for immediate filtering in the field instead of transportation of raw water back to the office which can cause possible sample degradation and introduce more points of contamination.	Y	KRC should review and provide respond on selection of item a or b from these comments. If item b is selected, it is essential that all proper decontamination procedures are followed as per the SAP and the comments provided in this document. Items c-e are required to be addressed prior to the next sampling event. Section 2.4 of the SAP should be modified to be consistent with the recommendation in EPA (1996) to filter groundwater samples in the field using an in-line filter. Specifically, sections titled “Field Parameter Stabilization”, “Final Field Parameter Measurement”, and “Surface Water Sampling” should be modified so that it clarifies that samples collected for dissolved constituents will be filtered in the field using in-line 0.45µm filters. Section 2.4 of the SAP (describing well purging procedures) should be modified to clarify that (1) drawdown will be	

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		minimized to the extent practical during the purging of wells to be sampled using the modified low-flow sampling technique and (2) purging will be stopped once the well produces low turbidity water (i.e., less than 15 NTU). Section 2.4 of the SAP should be modified to be consistent with the stabilization recommendations described in EPA (2006). Specifically, the section titled "Field Parameter Stabilization" (the last paragraph on page 8) should be modified to indicate for low-flow sampling three successive readings taken three to five minutes apart should be within ± 0.1 for pH, ± 10 mv for redox potential, $\pm 10\%$ for turbidity, and $\pm 10\%$ for DO. The stabilization requirements of $\pm 3\%$ for conductivity, $\pm 0.2^\circ\text{C}$ for temperature, and 0.3 ft for water level are appropriate. In lieu of measuring all five water quality parameters, a minimum subset would include pH, conductivity, and turbidity or DO.	
It is suggested to upgrade the down well tubing used by peristaltic pumps to 3/8" or larger to reduce the coiling effect that was observed in the 4" wells on the site.	N	Recommended improvement to the SAP.	

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Regardless of whether volatile organics are being sampled, care should be taken to orient generators or other sources of wind-transported contamination such that they are down-wind of the sample collection point. If that is not possible, then they should be located as far away from the sample point as possible, or the samplers should consider battery powered equipment.	N	Recommended improvement to the SAP.	
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State of Oregon
Department of Environmental Quality Memorandum

To: Justin Sterger
From: Shane Bennett
Subject: Knife River Woodward Mine Split Field Report
DEQ Laboratory Work Order 2512080

Date: 5 February 2026

Sampling Date:

8th-10th December 2025

DEQ Representatives:

Shane Bennett

Contractor Representatives:

Amber Hudspeth of Hudspeth Land & Water LLC

Contractor Lab:

Neilson Research Corporation based in Medford, Oregon

Introduction:

Amber Hudspeth conducts the environmental sampling at Knife River's Woodward Mine in Prineville, Oregon. The purposes of this split sampling event were to:

- Observe and evaluate the groundwater sampling procedures used at the mine.
- Compare field parameter measurements with the contractors.
- Collect split samples for a comparison of laboratory analytical results.

Seven monitoring wells were sampled over the course of three days.

Chronology of Events

Shane Bennett (ODEQ) met Amber (contractor) on December 8th, 2025 at the Woodward Mine in Prineville, Oregon. After a safety briefing from Knife River representatives, the sampling took place over three days as follows:

- 12/8 – MW-2
- 12/9 – WW-2A, MW-9, MW-10
- 12/10 – MW-6, MW-5, MW-7

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Field Evaluation:Monitoring Well Construction, Identification, and Security

Table 1. Observations of well construction, identification, and security.

Well Number	Casing	Identification	Security	Concrete Pad/Protection
MW-2	8" metal outer, 4" PVC well casing	Only a WRD tag on the outer casing body: L149468	Locking outer cap.	Yes, good condition. 4 STD posts.
WW-2A	8" metal outer, 4" PVC well casing	Only a WRD tag on the outer casing body: L134386	Locking outer cap.	Yes, good condition. 3 STD posts.
MW-9	8" metal outer, 4" PVC well casing	Only a WRD tag on the outer casing body: L158339	Locking outer cap and bolts.	New well. No pad or posts yet.
MW-10	8" metal outer, 4" PVC well casing	Only a WRD tag on the outer casing body: L158338	Locking outer cap and bolts.	New well. No pad or posts yet.
MW-6	8" metal outer, 4" PVC well casing	Only a WRD tag on the outer casing body: L155659	Locking outer cap.	Yes, good condition. 4 STD posts.
MW-5	8" metal outer, 4" PVC well casing	Only a WRD tag on the outer casing body: L154810	Locking outer cap.	Yes, good condition. 4 STD posts.
MW-7	8" metal outer, 4" PVC well casing	Only a WRD tag on the outer casing body: L155661	Locking outer cap.	Yes, good condition. 4 STD posts.

Water Level and Well Depth Measurements

The contractor measured depth to water using an electronic sounder with 0.01 ft. accuracy. Depth to bottom measurements were taken from historical records. The sounder was wiped with a microfiber cloth between wells.

Purging and Sampling Techniques

Purging and sampling was conducted using a combination of methods: A non-dedicated 4" single-speed submersible pump powered by twin generators and/or a peristaltic pump with new 1/4" poly well tubing and new silicone pump tubing. At some wells, the submersible pump was used to complete a "bulk" purge of 3 or more casing volumes in order to clear turbidity from the water column before switching to the peristaltic pump for stability readings, field parameters, and sampling. However, at MW-5, MW-6, and MW-7, the submersible was used to both purge and sample the wells. The submersible pump was single speed and had a very high flow rate at ~5-8 gallons per minute. The purge line was a garden hose and both the line and pump had significant tape on the outside of them.

The contractor's plan was to take samples back to the office to filter at the end of the day. DEQ suggested using in-line cartridge filters so that samples were immediately filtered in the field without

delay. The contractor agreed and samples were filtered with in-line 0.45 micron disposable cartridge filters provided by DEQ.

The contractor measured field parameters with a YSI ProDSS in a flow through cell. The cell's discharge fed into DEQ's flow through cell with a YSI ProDSS. Both the contractor and DEQ measured temperature, pH, specific conductance, dissolved oxygen concentration (DO), turbidity, and oxidation-reduction potential (ORP). After the first site of the sampling event (MW-2), the contractor used their HACH 2100Q turbidimeter due to the unreliable readings from their ProDSS.

Relevant purge and sample details are summarized below:

- **MW-2:** Submersible bulk purge (~90 gallons). Peristaltic pump for stability readings and sampling (~100 gal total). New p-pump and down-well tubing. Purge and sampling depth at ~26 ft. Troubles sending dedicated ¼" down-well tubing into the 4" PVC well so the contractor swapped to new ¼" tubing that was stiffer and easier to use. Contractor's ProDSS turbidity sensor was very unreliable and subject to large changes in readings due to wind or other vibrations from the pump. Used penultimate turbidity readings for this comparison because the last stabilization reading changed rapidly after being bumped. DEQ duplicate site.
- **WW-2A:** Submersible bulk purge (~15 gal). Peristaltic pump for stability readings and sampling (~23 gal total). New p-pump and down-well tubing. More troubles with dedicated down-well tubing so new tubing was used again. Some bubbles in the line, slightly turbid, no aroma. Generators were running close to the sampling point and the fumes were consistently present.
- **MW-9:** Submersible bulk purge (~30 gal). Peristaltic pump for stability readings and sampling (~33 gal total). Target purge and sample depth of 30 ft. New p-pump and down-well tubing. Bubbles in the line, no aroma. Generators were running close to the sampling point and the fumes were consistently present.
- **MW-10:** Submersible bulk purge (~20 gal). Peristaltic pump for stability readings and sampling (~26 gal total). Target purge and sample depth of 25 ft. New p-pump and down-well tubing. Parameters met stability criteria but were still changing slightly as purging continued. The bulk purge rate was ~50% slower than past purges with the same pump for an inexplicable reason. Two possible explanations were a kink in the line, the pump wasn't fully submerged, etc.
- **MW-6:** Submersible bulk purge (~30 gallons) followed by stabilization readings (135 gallons total). Due to the high flow rate, parameters were taken out of a clean bottom-filling 5-gallon bucket per DEQ's suggestion. Sample water to be filtered was collected in clean poly sample bottles and filtered using the p-pump with fresh tubing. Very fast recharge observed after the pump was turned off.
- **MW-5:** Submersible bulk purge (~20 gallons) followed by stabilization readings (180 gallons total). Due to the high flow rate, parameters were taken out of a clean bottom-filling 5-gallon bucket per DEQ's suggestion. Sample water to be filtered was collected in clean poly sample bottles and filtered using the p-pump with fresh tubing. The Woodward Mine SAP designates this well as a low flow well, but the 4" single-speed pump being used could only pump at high flows that resulted in ~7 ft. of drawdown during the purging process. Very fast recharge observed after the pump was turned off.
- **MW-7:** Submersible bulk purge (~20 gallons) followed by stabilization readings (200 gallons total). Target sample depth of 39 ft. Due to the high flow rate, parameters were taken out of a clean bottom-filling 5-gallon bucket per DEQ's suggestion. Sample water to be filtered was collected in clean poly sample bottles and filtered using the p-pump with fresh tubing. Very turbid at the start of purging, but this cleared up. There was initially a large DTW drawdown that slowed significantly by the end of purging. Contractor duplicate site.

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The following EPA criteria for field parameter stabilization are referenced in the 2025 Revised SAP. However, the exact language for stabilization in the SAP points to the sampler's professional judgement in determination of representative conditions.

- pH: +/- 0.5 standard units (SU)
- Temperature: +/- 0.2 C
- Specific conductivity: +/- 3%
- Dissolved oxygen: no standard
- Redox potential: no standard
- Water level: 0.3 feet

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All monitoring wells met the stabilization criteria during the last three readings for all parameters except for the following:

- MW-6: Depth to water
- MW-5: Depth to water

The depth to water changes are listed below in Table 2 and show changes over time during purging. For low flow technique there should be minimal change in DTW over the last 3 stabilization readings.

Table 2. Depth to Water readings and changes while purging and sampling.

Sample Point	DTB (ft)	Static DTW (ft)	DTW at 1st stabilization reading (ft)	DTW at final stabilization reading (ft)	Change in DTW over last 3 stabilization readings (ft)	Total Drawdown before sampling (ft)
MW-2	36	11.72	NR	11.74	NA	0.02
WW-2A	25	20.96	20.98	20.98	0	0.02
MW-9	40	24.74	24.74	24.74	0	0
MW-10	30	22.45	22.5	22.49	-0.01	0.04
MW-6	62	32.6	36.5	36.19	-0.31	3.59
MW-5	71	20.11	26.89	27.29	0.4	7.18
MW-7	55	21.85	25.63	25.69	0.06	3.84

Quality Assurance and Preservation

The contractors stated that they collect one field duplicate per event for all parameters and no equipment blanks. For this event, the contractor collected a duplicate at MW-7. DEQ collected a field duplicate at MW-2 for all parameters and a full field blank using lab DI water.

The contractors wore gloves during purging and sampling, however they did not use gloves for handling the sounder. Samples were placed in coolers with icepacks in the field, transferred to sample refrigerators at the office for overnight storage, and picked up by a lab courier with block ice the following morning. Bottles from Neilson Research Corporation came pre-acidified and there was no pH check in the field.

Field Decontamination

DEQ did not observe any significant decontamination of the sounder between wells besides the same dry microfiber cloth that was used for all wells.

When used, the peristaltic pump had new pump tubing and down-well tubing and therefore did not warrant any decontamination.

The submersible 4" pump had varying amounts of decontamination. On days one and two, the contractor stated that they dunked the pump and ~1-2 ft of line in a rinse barrel of tap water after each well. On day 3, DEQ observed the contractor dunk the fully coiled line in a wash barrel of Liquinox and tap water, then dunk the line in a rinse barrel of tap water only. The pump was then placed in the Liquinox barrel and turned on to circulate the soap through the system. The same process was repeated in the tap water rinse barrel. There was no DI rinse of any sampling equipment and no equipment or rinseate blanks were collected.

Sample Documentation and Delivery

The samples were picked up by a lab courier the following morning after sampling. The laboratory supplied bottles and labels. Acid preservative was already added in the bottles where applicable. Field notes and chains of custody were present and filled out on site.

Table 3. Analyte and container list.

Analytes	Volume	Container	Preservative	Filtered
Total metals	500 mL	Poly	HNO3	N
Dissolved metals	500 mL	Poly	HNO3	Y
TOC	40 mL	Glass	Not recorded	N
Nitrate/Nitrite, TDS, Alk., SO4, Cl2, Fluoride	1000 mL	Poly	None	N
Bacteria	100	Poly (IDEXX)	None	N

Field Parameter Measurement

Table 4 shows the instruments used by the contractors during the sampling event.

Table 4. Meter and calibration information.

Parameter	Meter	Calibration
Water Level	electronic sounder	Manufacturer calibration.
Temperature	YSI ProDSS	Contractor stated that they calibrate their meters once before each event. However, documentation and details were not present in the field and were not provided to DEQ afterwards despite multiple requests.
pH		
Conductivity		
Oxidation-reduction potential		
Dissolved Oxygen		
Turbidity	MW-2: YSI ProDSS. All other wells: Hach 2100Q	NA
Purging	- 4" single-speed high-flow submersible pump - Geotech Geopump Peristaltic Pump with silicone pump tubing	

Discussion:

DEQ and contractor field data results are reported in Table 6 at the end of this report. Table 5 summarizes differences in the field parameter readings between the contractor and DEQ, the number of contractor readings that exceed the comparison limit, and the total number of readings taken. There are no comparison limits for ORP or turbidity readings. However, a discussion of those results is still included in the next section.

Table 5. Field Parameter Comparison Summary.

Parameter	Comparison Limit	Readings exceeding limit	Total Readings
Temperature	$\pm 1.0^{\circ}\text{C}$.	0	7
Specific Conductance	$\pm 10.0\%$	0	7
pH	± 0.3 pH units	0	7
Dissolved Oxygen	± 0.6 mg/L	0	7

Individual Parameter Comparisons

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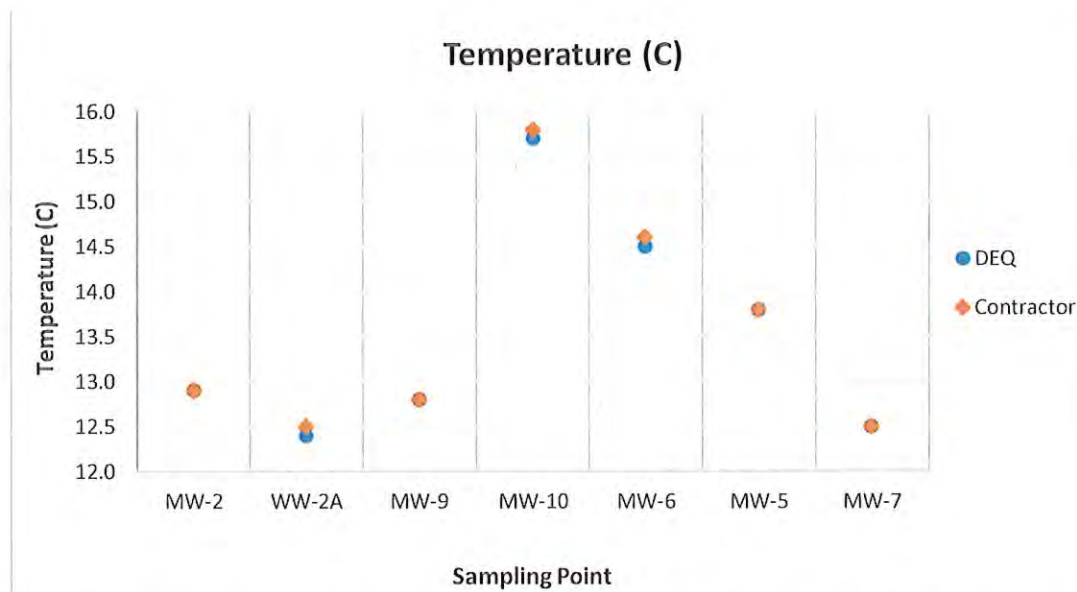


Figure 1. Temperature comparison between DEQ and the Contractor.

Temperature readings had good agreement, with an average different of ± 0.1 C occurring at WW-2A, MW-10, and MW-6. Three of the seven measurements were biased high.

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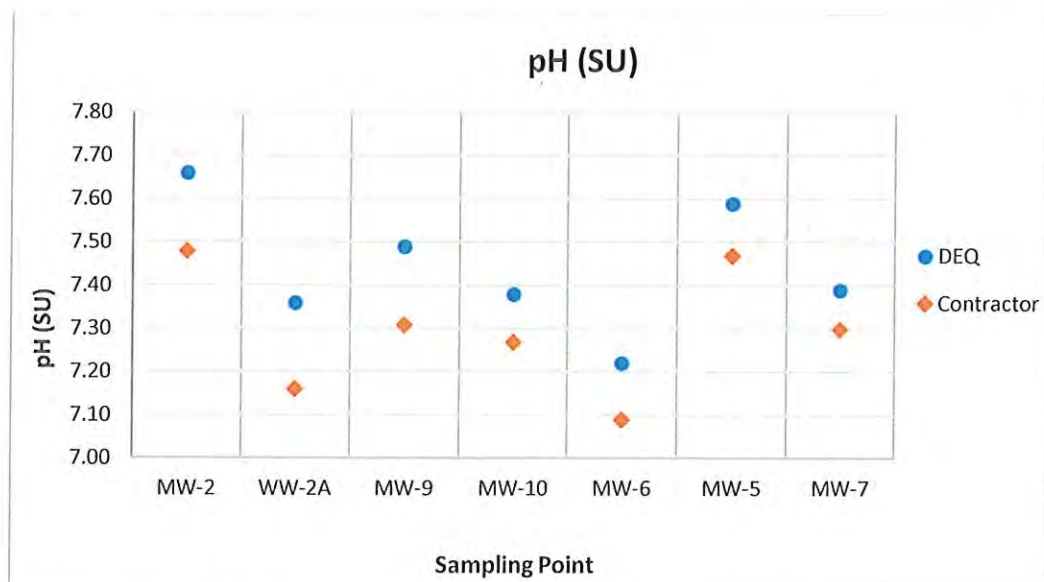


Figure 2. pH comparison between DEQ and the Contractor.

The pH readings generally had good agreement, with an average difference of 0.14 SU and the largest difference of 0.2 SU occurring at WW-2A. All seven readings were biased low.

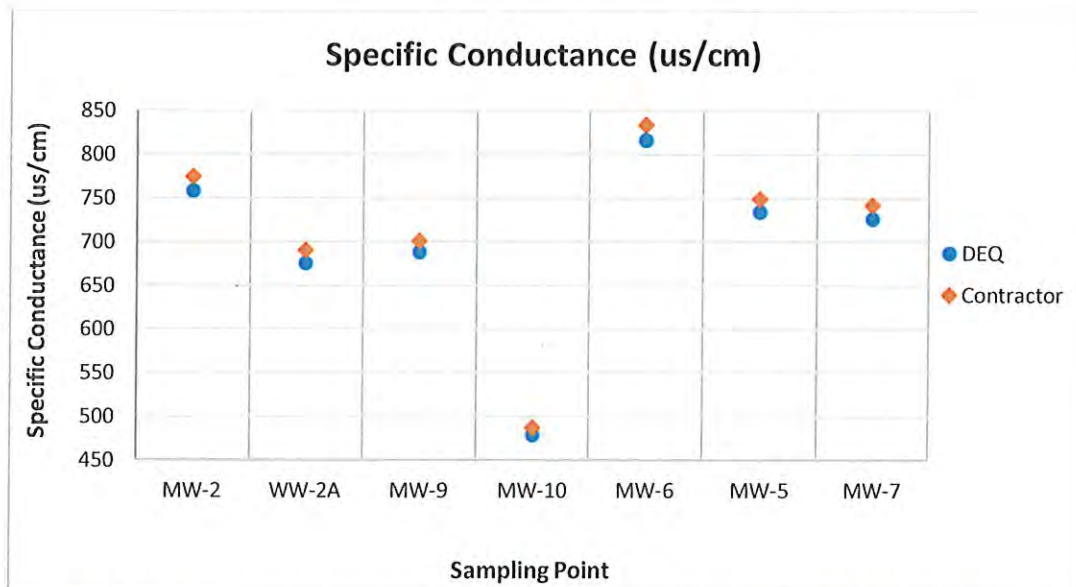


Figure 3. Specific conductance comparison between DEQ and the Contractor.

The specific conductance readings had good agreement, with an average difference of 2.0%. All seven readings were biased high.

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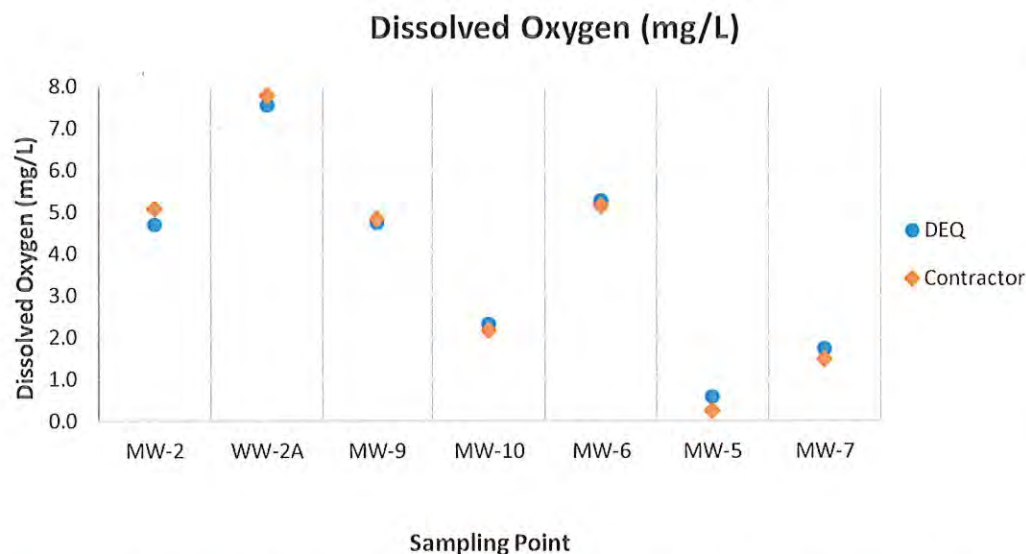


Figure 4. Dissolved oxygen comparison between DEQ and the Contractor.

Dissolved oxygen readings generally had good agreement. The average difference was 0.22 mg/L and the largest difference was 0.38 mg/L at MW-2. Four of the seven readings were biased low.

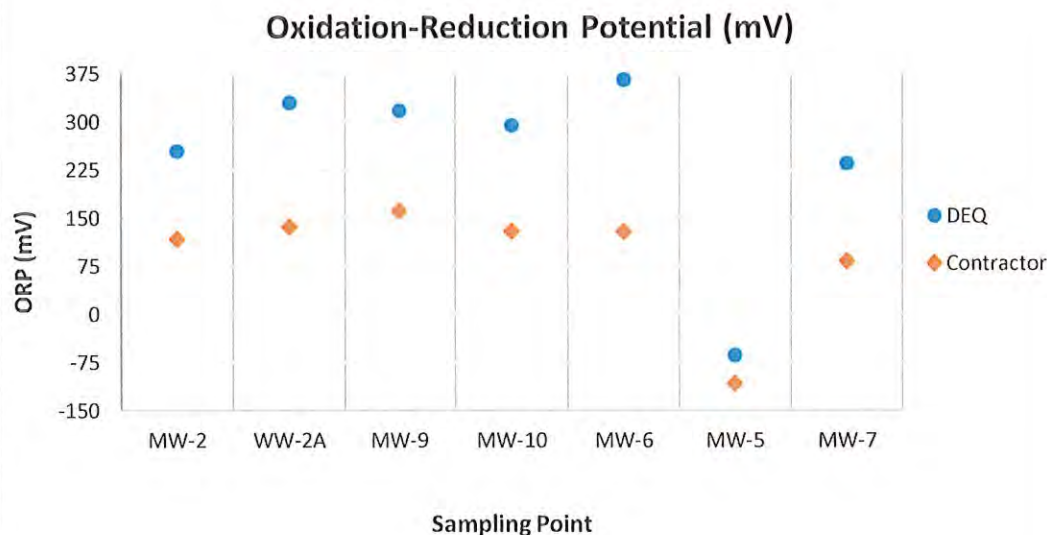
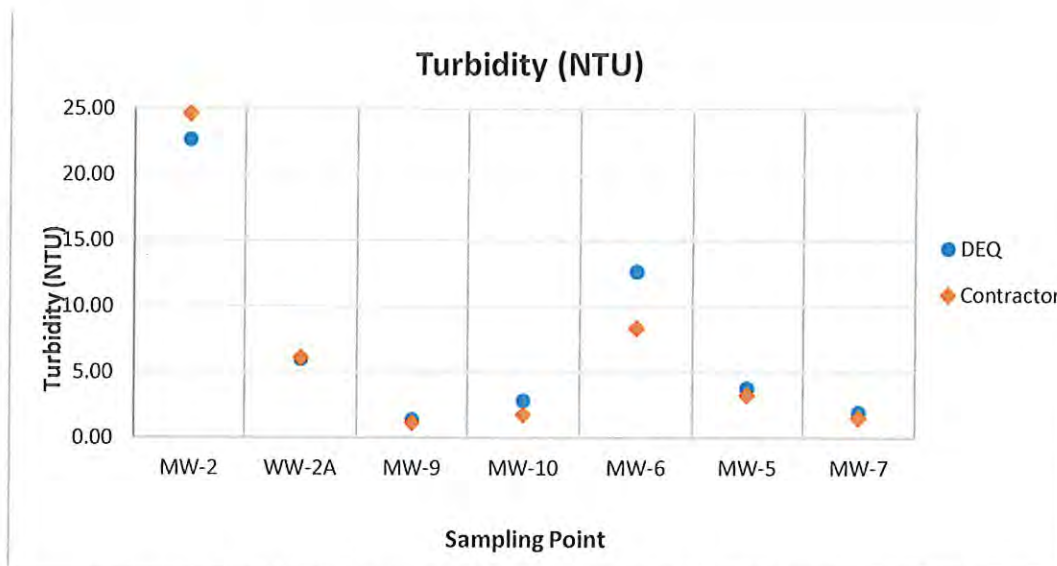


Figure 5. Oxidation-reduction potential comparison between DEQ and the Contractor.

ORP readings had poor agreement with an average difference of ~155 mV and a maximum difference of 236 mV at MW-6. ORP is generally a qualitative field measurement and subject to interpretation based on the electrode types and environmental water chemistries. Large differences are not unusual. The data trended similarly to DEQ's meters and the differences grew smaller as readings approached 0 mV. The contractor's meter was tested in DEQ's calibration standard of 220 mV and was found to read 179 mV, well below the acceptable levels. All seven readings were biased low.



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Figure 6. Turbidity comparison between DEQ and the Contractor.

Turbidity readings had moderate agreement with an average difference of 1.24 NTU and a maximum difference of 4.34 at MW-6. The contractor's reading at MW-2 was taken by a ProDSS that did not stabilize reliably and would drastically change values at the slightest disturbance. Subsequent readings were taken by the Hach 2100Q turbidimeter.

Comments:

1. Fresh gloves should be worn at all times when handling any equipment that will make contact with sample water, including pumps, tubing, and sounders.
2. The Woodward SAP calls for several things that were not sufficiently completed during the observed sampling event. Exact wording is in quotations, below.
 - a. "Decontamination of all multi-use equipment between wells will be performed using an Alconox and distilled water mixture to clean equipment and be rinsed with distilled water"
 - i. The sounder was not washed or rinsed and was instead wiped down with the same dry cloth between wells
 - ii. The submersible pump was not washed with Liquinox or rinsed with DI on the first two days of sampling. On day three, Liquinox and tap water were used to wash and rinse the pump, but not DI water.
 - iii. When using non-dedicated submersible pumps for low level sampling, significant effort should be used to decontaminate equipment between wells. Liquinox and high quality DI water should be used to wash the pump (both inside and out) and several lab-grade DI rinses should be performed afterwards. If the same "bulk" rinse water is used between wells, then at minimum the last rinse should be a fresh lab-grade DI rinse.
 - b. "Knife River plans to collect one duplicate sample and one blank per sampling event."
 - i. No blank sample was collected by the contractor.
 - ii. The SAP should be amended to include specific language elaborating on the type of blank expected and with what equipment it should be collected with.
 - c. "In addition, one rinseate or equipment blank sample will be collected during the monitoring period."

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- i. Again, no rinseate or equipment blank was collected, and the contractor did not note one having been collected in the past.
 - ii. The SAP should be amended to further explain which of these blank types is required, rinseate or equipment blank, and what the monitoring period is referring to.
3. Given the use of non-dedicated equipment to sample low level metals with largely inadequate or nonexistent decontamination procedures and a lack of equipment blanks, then all analytical data from this event and any other similar event should be considered suspect.
4. Regardless of the decontamination procedures utilized, efforts should be made to keep the non-dedicated pump and its line clean and free from contamination. Storing the pump and line in the same plastic tote between wells will not keep them free from outside or well-to-well contamination.
5. Samplers should familiarize themselves with proper storage and handling of water quality meters. Some examples discussed on site were:
 - a. Not storing the pH probe submerged in DI water and instead using a rubber cap with pH probe storage solution (or pH 4 standard).
 - b. Ensuring dissolved oxygen is in the local DO setting to properly incorporate local barometric pressure readings.
 - c. Implementing a lab-based calibration routine with daily or twice daily calibration verifications in the field. These field checks provide confidence in daily data but prevent poor field conditions from contributing to a bad calibration. This also allows meter performance to be documented over time without frequently calibrating over a bad or failing probe.
6. Table 3 of the SAP identifies wells MW-2, WW-2A, MW-5, MW-6, and MW-7 as low flow wells. While not explicitly prohibited in the SAP, it is industry practice to limit purge rates to relative low levels, such as <0.5 liters per minute as recommended by EPA. The incredibly high purge rates of the 4" submersible pump (~5-8 gallons per minute) may have adverse effects on sample quality.
7. DEQ and the contractor discussed many potential adjustments and improvements to the current sampling plan, including:
 - a. Purchasing dedicated pumps and tubing for each well to eliminate the need for decontamination, or
 - b. Purchasing a single pump to be used with dedicated well tubing for each well, thus limiting decontamination to only the pump and line but not the tubing.
 - c. The inclusion of rinseate and equipment blanks to document the efficacy of any decontamination, or lack thereof, on existing or future equipment.
 - d. Further defining language in the SAP around purge rates (traditional 3x casing volume versus low flow), equipment types, and blank types and frequencies.
 - e. Permanently swap to using disposable cartridge-style 0.45 micron filters for immediate filtering in the field instead of transportation of raw water back to the office which can cause possible sample degradation and introduce more points of contamination.
8. It is suggested to upgrade the down well tubing used by peristaltic pumps to 3/8" or larger to reduce the coiling effect that was observed in the 4" wells on the site.
9. Regardless of whether volatile organics are being sampled, care should be taken to orient generators or other sources of wind-transported contamination such that they are down-wind of the sample collection point. If that is not possible, then they should be located as far away from the sample point as possible, or the samplers should consider battery powered equipment.
10. If high flow "bulk" purges are determined to be required to clear the highly-turbid water columns before sampling, then the impact on sample quality of high volume pumping and potential drawdown should be considered.

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Table 6. DEQ and Contractor field data results.

Temperature (c)				
Sample Point	DEQ	Contractor	Δ	$\Delta > 1.0$
MW-2	12.9	12.9	0.00	
WW-2A	12.4	12.5	-0.10	
MW-9	12.8	12.8	0.00	
MW-10	15.7	15.8	-0.10	
MW-6	14.5	14.6	-0.10	
MW-5	13.8	13.8	0.00	
MW-7	12.5	12.5	0.00	
Specific Conductance (us/cm)				
Sample Point	DEQ	Contractor	RPD	RPD > 10%
MW-2	758.00	774.00	2.1%	
WW-2A	675.00	690.00	2.2%	
MW-9	688.00	701.00	1.9%	
MW-10	478.60	487.20	1.8%	
MW-6	816.00	834.00	2.2%	
MW-5	734.00	749.00	2.0%	
MW-7	726.00	742.00	2.2%	
pH				
Sample Point	DEQ	Contractor	Δ	$\Delta > 0.3$
MW-2	7.66	7.48	0.18	
WW-2A	7.36	7.16	0.20	
MW-9	7.49	7.31	0.18	
MW-10	7.38	7.27	0.11	
MW-6	7.22	7.09	0.13	
MW-5	7.59	7.47	0.12	
MW-7	7.39	7.30	0.09	
DO (mg/L)				
Sample Point	DEQ	Contractor	Δ	$\Delta > 0.6$
MW-2	4.70	5.08	-0.38	
WW-2A	7.55	7.78	-0.23	
MW-9	4.74	4.83	-0.09	
MW-10	2.32	2.17	0.15	
MW-6	5.28	5.14	0.14	
MW-5	0.59	0.26	0.33	
MW-7	1.73	1.49	0.24	
ORP (mV)				
Sample Point	DEQ	Contractor	Δ (mV)	ABS Δ (mV)
MW-2	254.10	116.90	137.20	137.2
WW-2A	330.10	136.80	193.30	193.3
MW-9	317.30	161.80	155.50	155.5
MW-10	294.30	129.30	165.00	165
MW-6	365.00	128.90	236.10	236.1
MW-5	-64.00	-107.60	43.60	43.6
MW-7	235.40	82.40	153.00	153
Turbidity (NTU)				
Sample Point	DEQ	Contractor	Δ (NTU)	Note
MW-2	22.70	24.64	1.94	A, B
WW-2A	6.00	6.10	0.10	
MW-9	1.41	1.18	-0.23	C
MW-10	2.87	1.79	-1.08	C
MW-6	12.7	8.36	-4.34	
MW-5	3.83	3.27	-0.56	
MW-7	1.99	1.55	-0.44	

A. Contractor used the ProDSS turbidity probe for this reading. All others were the Hach 2100Q

B. Used penultimate turbidity readings because the meter was bumped and not stable for the final.

C. Used penultimate turbidity readings because the contractor did not record a final turbidity.

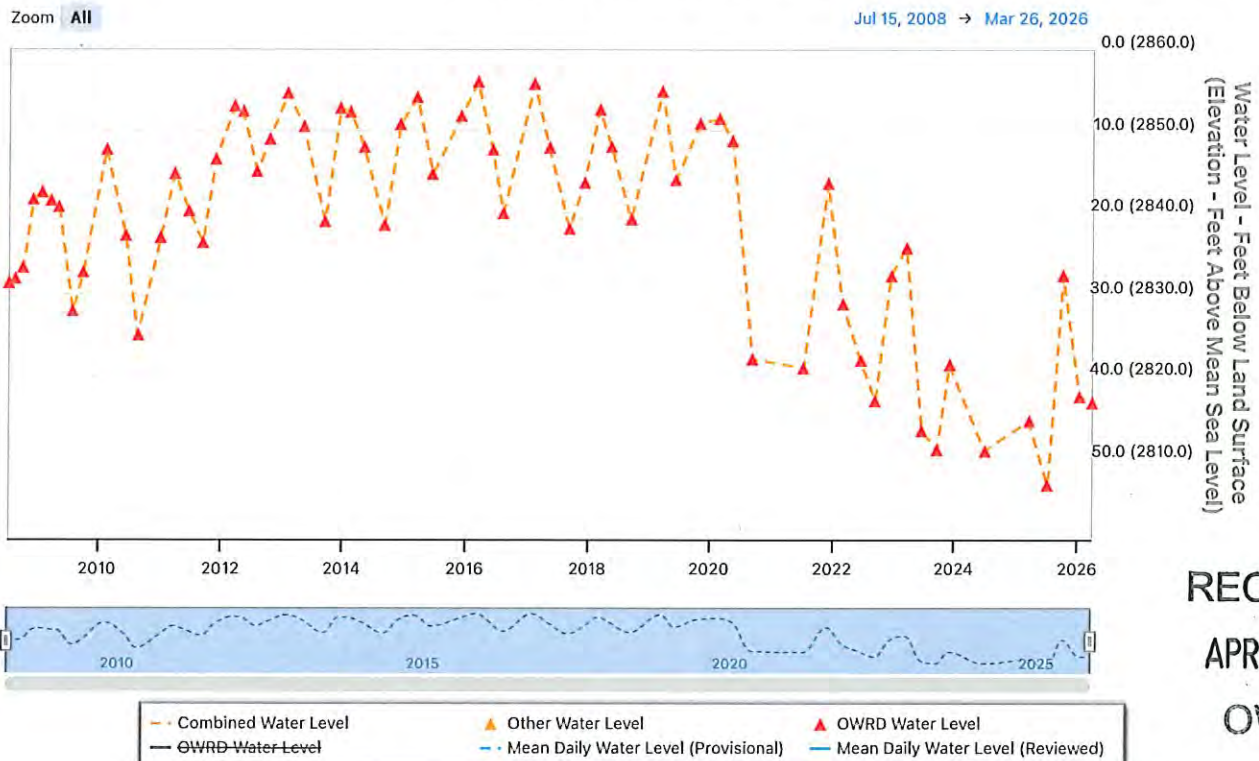
Oregon Water Resources Department
OWRD Groundwater Hydrographs[Main](#) [Help](#)
[Return](#) [Contact Us](#)

Search Records

Well Log Id: or GW Logid: [Chart](#) [Clear](#)

Well Location:	14.00S/15.00E-25BBB	Total Depth (bls):	240 ft	Water Level Count:	64
Log ID:	CROO 51607 Well Log	Land Surface Elevation:	2860 ft	Wtr Lvl Date Range:	7/15/2008 - 3/26/2026
Well Tag:	461554	Vertical Reference Datum:	NGVD1929	Wtr Lvl Depth Min-Max:	3.94 - 53.28 ft
State Observation:	1447	Primary Use of Well:	DOMESTIC	Recorder Wtr Lvl Count:	0
USGS Site:		Primary Aquifer System:	Deschutes Formation	Recorder Wtr Lvl Date Range:	---
More information:	GWS	Groundwater Mapping Tool		Recorder Wtr Lvl Depth Min-Max:	---

Groundwater Levels for CROO 51607



Source: Oregon Water Resources

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Measured Water Levels for CROO 51607										
All Fields Search...										
	Well	Date	Time	Water Level (BL...	Water Level Elev. (FT AMSL)	Organization	OWRD	Method	Status	Meas. Pt
1	CROO0051607	03/26/2026	15:41:00	43.19	2,816.81	OWRD	BEND	ETAPE	STATIC	
2	CROO0051607	01/14/2026	15:37:00	42.46	2,817.54	OWRD	BEND	ETAPE	STATIC	
3	CROO0051607	10/07/2025	15:00:00	27.61	2,832.39	OWRD	BEND	ETAPE	STATIC	
4	CROO0051607	07/09/2025	14:44:00	53.28	2,806.72	OWRD	BEND	ETAPE	STATIC	
5	CROO0051607	03/18/2025	15:19:00	45.45	2,814.55	OWRD	BEND	ETAPE	STATIC	
6	CROO0051607	01/16/2025	14:09:00	49.53	2,810.47	OWRD	BEND	ETAPE	RISING	
7	CROO0051607	09/26/2024	14:51:00	49.46	2,810.54	OWRD	BEND	ETAPE	RISING	
8	CROO0051607	07/02/2024	15:23:00	49.08	2,810.92	OWRD	BEND	ETAPE	STATIC	
9	CROO0051607	03/21/2024	15:50:00	39.51	2,820.49	OWRD	BEND	ETAPE	RISING	
10	CROO0051607	12/04/2023	15:28:00	38.55	2,821.45	OWRD	BEND	ETAPE	STATIC	
11	CROO0051607	09/20/2023	14:43:00	48.95	2,811.05	OWRD	BEND	ETAPE	STATIC	
12	CROO0051607	06/22/2023	15:10:00	46.62	2,813.38	OWRD	BEND	ETAPE	STATIC	
13	CROO0051607	03/21/2023	14:22:00	24.28	2,835.72	OWRD	BEND	ETAPE	STATIC	

4/2/26, 11:56 AM

OWRD GW Hydrographs

14	CROO0051607	12/16/2022	13:38:00	27.64	2,832.36	OWRD	BEND	ETAPE	STATIC
15	CROO0051607	09/15/2022	14:56:00	42.96	2,817.04	OWRD	BEND	ETAPE	STATIC
16	CROO0051607	06/16/2022	14:50:00	38.02	2,821.98	OWRD	BEND	ETAPE	STATIC
17	CROO0051607	03/02/2022	13:07:00	31.13	2,828.87	OWRD	BEND	ETAPE	STATIC
18	CROO0051607	12/01/2021	13:49:00	16.38	2,843.62	OWRD	BEND	ETAPE	STATIC
19	CROO0051607	07/13/2021	15:07:00	38.93	2,821.07	OWRD	BEND	ETAPE	STATIC
20	CROO0051607	03/04/2021	14:43:00	27.31	2,832.69	OWRD	BEND	ETAPE	RISING
21	CROO0051607	09/10/2020	15:42:00	37.9	2,822.10	OWRD	BEND	ETAPE	STATIC
22	CROO0051607	05/14/2020	14:07:00	11.19	2,848.81	OWRD	BEND	ETAPE	STATIC

Search took 0.001 sec

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Oregon

Kate Brown, Governor

Department of Environmental Quality
Office of Compliance and Enforcement
700 NE Multnomah Street, Suite 600
Portland, OR 97232-4100
(503) 229-5696
FAX (503) 229-5100
TTY 711

July 19, 2022

CERTIFIED MAIL: 7018 1830 0001 5906 3657

Knife River Corporation – Northwest
c/o C.T. Corporation System, Registered Agent
780 Commercial St., Suite 100
Salem, OR 97301

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Re: Notice of Civil Penalty Assessment and Order
Case No. WQ/SW-ER-2021-548

This letter is to inform you that the Oregon Department of Environmental Quality (DEQ) has issued you a civil penalty of \$20,822 for discharging comingled washwater, stormwater and excavation dewatering water from the Woodward Site mine and quarry, located at 4547 NW Stahancyk Lane, in Prineville, Oregon to the Rye Grass Irrigation Canal.

DEQ issued this penalty because unpermitted discharges can be harmful to beneficial uses of the waters of the state, including agricultural uses and aquatic life and habitat. Discharge permits require registrants to develop plans and implement and maintain best management practices to minimize and mitigate pollutants in the discharge. DEQ appreciates the Noncompliance Notice (dated December 7, 2021) that you submitted and has considered this reporting in preparing this formal enforcement action.

You may pay the civil penalty as follows:

Pay online with e-check (ACH) or Credit Card. Go to Your DEQ Online here:

<https://ydo.oregon.gov>. Select Register Account or Login, then select Pay Invoices/Fees on your account dashboard. Enter the Invoice number and Account ID included on the attached payment slip. Note: US Bank charges a 2.3% convenience charge for credit card transactions. ACH payments have no additional charges.

Pay by check or money order: Make checks payable to "Department of Environmental Quality" and mail to the address on the enclosed payment slip. Please make sure to include the payment slip with your check or money order.

If you wish to appeal this matter, DEQ must receive a request for a hearing within 20 calendar days from your receipt of this letter. The hearing request must be in writing. Send your request to DEQ Office of Compliance and Enforcement:

Via mail – 700 NE Multnomah Street, Suite 600, Portland, Oregon 97232

Via email – DEQappeals@deq.oregon.gov

Via fax – 503-229-6762

Knife River Corporation - Northwest
Case No. WQ/SW-ER-2021-548
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Once DEQ receives your request, we will arrange to meet with you to discuss this matter. If DEQ does not receive a timely written hearing request, the penalty will become due.

The attached Notice further details DEQ's reasons for issuing the penalty and provides further instructions for appealing the penalty. Please review and refer to it when discussing this case with DEQ.

DEQ may allow you to resolve part of your penalty through the completion of a Supplemental Environmental Project (SEP). SEPs are environmental improvement projects that you sponsor instead of paying a penalty. Further information is available by calling the number below or at <http://www.oregon.gov/deq/Regulations/Pages/SEP.aspx>.

DEQ's rules are available at <http://www.oregon.gov/deq/Regulations/Pages/Statutes.aspx> or by calling the number below.

If you have any questions, please contact Courtney Brown at 503-229-6839 or toll free in Oregon at 800-452-4011, extension 6839.

Sincerely,



Kieran O'Donnell, Manager
Office of Compliance and Enforcement

Enclosures

cc: Lisa Reinhart, DOGAMI
Jeff Steyaert, Knife River Corporation – Northwest, Environmental, Permitting & Property
Manager, 32260 Old Hwy 34, Tangent, OR 97389-9770
Accounting, DEQ

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BEFORE THE ENVIRONMENTAL QUALITY COMMISSION

OF THE STATE OF OREGON

IN THE MATTER OF:	)	
KNIFE RIVER CORPORATION -	)	NOTICE OF CIVIL PENALTY
NORTHWEST,	)	ASSESSMENT AND ORDER
an Oregon corporation,	)	
	)	CASE NO. WQ/SW-ER-2021-548
Respondent.	)	

I. AUTHORITY

The Department of Environmental Quality (DEQ) issues this Notice of Civil Penalty Assessment and Order (Notice) pursuant to Oregon Revised Statutes (ORS) 468.100 and 468.126 through 468.140, ORS Chapter 183, ORS Chapter 468B, and Oregon Administrative Rules (OAR) Chapter 340, Divisions 011, 012, and 045.

II. FINDINGS OF FACT

1. Respondent owns or operates the Woodward Site located at 4547 NW Stahancyk Lane in Prineville, Oregon (the Facility).

2. The Facility conducts mining and quarry activities and has a Standard Industrial Classification (SIC) code 1442.

3. On or about May 2020 through August 2020, for 3 days each month, Respondent discharged sand and gravel washwater comingled with excavation dewatering water and stormwater that had been exposed to mining and quarrying activities from the Facility to the Rye Grass Irrigation Canal.

4. The Rye Grass Irrigation Canal conveys water from Ochoco Creek and the Crooked River and ultimately joins with Lytle Creek, which flows to the Crooked River.

5. The Facility is not permitted to discharge to the Rye Grass Irrigation Canal.

III. CONCLUSIONS

Respondent has violated ORS 468B.050(1)(a) by discharging wastes into waters of the state without a permit. Specifically, the Facility discharged comingled washwater, industrial stormwater, and excavation dewatering water to the Rye Grass Irrigation Canal, as alleged in Section II, paragraph 3. Washwater, industrial stormwater and excavation dewatering water are considered "wastes" pursuant to

1 ORS 468B.005(9) as they will or may cause pollution to waters of the state. The Rye Grass Irrigation
2 Canal is a "waters of the state" pursuant to ORS 468B.005(10) because it is a canal and it effects a
3 junction with natural surface waters. This is a Class I violation, according to OAR 340-012-0055(1)(c).
4 DEQ asses a \$20,822 civil penalty for this violation.

5 IV. ORDER TO PAY CIVIL PENALTY

6 Based upon the foregoing FINDINGS OF FACTS AND CONCLUSIONS, Respondent is
7 hereby ORDERED TO: Pay a total civil penalty of \$20,822. The determinations of the civil penalties are
8 attached as Exhibit No.1 and are incorporated as part of this Notice.

9 If you do not file a request for hearing as set forth in Section V below, please pay the penalty as
10 follows:

11 Pay online with e-check (ACH) or Credit Card. Go to Your DEQ Online here:
12 <https://ydo.oregon.gov>. Select Register Account or Login, then select Pay Invoices/Fees on your account
13 dashboard. Enter the Invoice number and Account ID included on the attached payment slip. Note: US
14 Bank charges a 2.3% convenience charge for credit card transactions. ACH payments have no additional
15 charges.

16 Pay by check or money order: Make checks payable to "Department of Environmental
17 Quality" and mail to the address on the enclosed payment slip. Please make sure to include the payment
18 slip with your check or money order.

19 V. NOTICE OF RIGHT TO REQUEST A CONTESTED CASE HEARING

20 You have a right to a contested case hearing on this Notice, if you request one in writing. DEQ
21 must receive your request for hearing **within 20 calendar days** from the date you receive this Notice. If
22 you have any affirmative defenses or wish to dispute any allegations of fact in this Notice or attached
23 exhibit, you must do so in your request for hearing, as factual matters not denied will be considered
24 admitted, and failure to raise a defense will be a waiver of the defense. (See OAR 340-011-0530 for
25 further information about requests for hearing.) You must send your request to: **DEQ, Office of**
26 **Compliance and Enforcement, 700 NE Multnomah Street, Suite 600, Portland, Oregon 97232**, fax
27 it to **503-229-6762** or email it to DEQappeals@deq.oregon.gov. An administrative law judge

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1 employed by the Office of Administrative Hearings will conduct the hearing, according to ORS
2 Chapter 183, OAR Chapter 340, Division 011 and OAR 137-003-0501 to 0700. You have a right to be
3 represented by an attorney at the hearing, however you are not required to be. If you are an individual,
4 you may represent yourself. If you are a corporation, partnership, limited liability company,
5 unincorporated association, trust or government body, you must be represented by an attorney or a duly
6 authorized representative, as set forth in OAR 137-003-0555.

7 Active duty Service members have a right to stay proceedings under the federal Service
8 Members Civil Relief Act. For more information contact the Oregon State Bar at 1-800-
9 452-8260, the Oregon Military Department at 503-584-3571, or the nearest United States Armed
10 Forces Legal Assistance Office through <http://legalassistance.law.af.mil>. The Oregon Military
11 Department does not have a toll free telephone number.

12 If you fail to file a timely request for hearing, the Notice will become a final order by default
13 without further action by DEQ, as per OAR 340-011-0535(1). If you do request a hearing but later
14 withdraw your request, fail to attend the hearing or notify DEQ that you will not be attending the
15 hearing, DEQ will issue a final order by default pursuant to OAR 340-011-0535(3). DEQ designates
16 the relevant portions of its files, including information submitted by you, as the record for purposes of
17 proving a prima facie case.

18
19
20
21 7 / 19 / 2022

22 Date

21 

22 Kieran O'Donnell, Manager
23 Office of Compliance and Enforcement
24
25
26
27

EXHIBIT No.1

FINDINGS AND DETERMINATION OF RESPONDENT'S CIVIL PENALTY
PURSUANT TO OREGON ADMINISTRATIVE RULE (OAR) 340-012-0045

VIOLATION: Discharging wastes into the waters of the state from an industrial establishment without a permit, in violation of ORS 468B.050(1)(a).

CLASSIFICATION: This is a Class I violation pursuant to OAR 340-012-0055(1)(c).

MAGNITUDE: The magnitude of the violation is moderate pursuant to OAR 340-012-0130(1), as there is no selected magnitude specified in OAR 340-012-0135 applicable to this violation, and the information reasonably available to DEQ does not indicate a minor or major magnitude.

CIVIL PENALTY FORMULA: The formula for determining the amount of penalty of each violation is: $BP + [(0.1 \times BP) \times (P + H + O + M + C)] + EB$

"BP" is the base penalty, which is \$6,000 for a Class I, moderate magnitude violation in the matrix listed in OAR 340-012-0140 (2)(b)(A)(ii) and applicable pursuant to OAR 340-012-0140(2)(a)(D) because Respondent does not have an NPDES permit.

"P" is whether Respondent has any prior significant actions, as defined in OAR 340-012-0030(19), in the same media as the violation at issue that occurred at a facility owned or operated by the same Respondent and receives a value of 10 according to OAR 340-012-0145(2)(b), which provides that the value of "P" will not exceed 10. Respondent has hundreds of Class I and Class I equivalent violations as described in Case No. WQ/SW-NWR-2017-204 issued on January 23, 2018, and over one hundred Class I and Class I Equivalent violations as described in Case No. WQ/SW-NWR-2017-080 issued on July 24, 2017, and 30 class I violations as described in Case No.: WQ/SW-WR-2018-142, and 3 class II violation in Case No.: WQ/SW-NWR-2019-009 in the same media as the violations that are the subject of the current formal enforcement action.

"H" is Respondent's history of correcting prior significant actions and receives a value of 0 according to OAR 340-012-0145(3)(c) because there is insufficient information on which to base a finding under paragraphs (3)(a) or (b).

"O" is whether the violation was repeated or ongoing and receives a value of 3 according to OAR 340-012-0145(4)(c), because there were from seven to 28 occurrences of the violation. Respondent discharged for three days per month during the months of May 2020, June 2020, July 2020, and August 2020 for a total of 12 occurrences. Each day of violation constitutes a separate occurrence.

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- "M" is the mental state of the Respondent and receives a value of 8 according to OAR 340-012-0145(5)(d), because Respondent's conduct was reckless. Respondent is a holder of various discharge permits throughout the state and has been issued multiple enforcement actions for permit and discharge violations. Respondent is, therefore, aware of the requirement to obtain a permit prior to discharging to waters of the state. By discharging wastes from the Facility without permit coverage, Respondent consciously disregarded a substantial and unjustifiable risk that it would violate Oregon law requiring a permit for discharges from industrial activities.
- "C" is Respondent's efforts to correct or mitigate the violation and receives a value of 0 according to OAR 340-012-0145(6)(f), because there is insufficient information to make a finding under paragraphs (6)(a) through (6)(e), or (6)(g).
- "EB" is the approximate dollar value of the benefit gained and the costs avoided or delayed as a result of the Respondent's noncompliance. It is designed to "level the playing field" by taking away any economic advantage the entity gained and to deter potential violators from deciding it is cheaper to violate and pay the penalty than to pay the costs of compliance. In this case, "EB" receives a value of \$2,222. This is the amount Respondent gained by avoiding spending \$2,734 on the NPDES 1200-A permit fee and annual fee. This "EB" was calculated pursuant to OAR 340-012-0150(1) using the U.S. Environmental Protection Agency's BEN computer model.

PENALTY CALCULATION: $\text{Penalty} = \text{BP} + [(0.1 \times \text{BP}) \times (\text{P} + \text{H} + \text{O} + \text{M} + \text{C})] + \text{EB}$

$$\begin{aligned} &= \$6,000 + [(0.1 \times \$6,000) \times (10 + 0 + 3 + 8 + 0)] + \$2,222 \\ &= \$6,000 + [\$600 \times 21] + \$2,222 \\ &= \$6,000 + \$12,600 + \$2,222 \\ &= \$20,822 \end{aligned}$$

Oregon Department of Environmental Quality
700 NE Multnomah Street, Suite 600
Portland, OR 97232-4100



State of Oregon
Department of Environmental Quality

Phone: 503-229-5437
Fax: 503-229-5850

CIVIL PENALTY - ORS 468.135(2)

DATE:	July 19, 2022
RESPONSE DATE :	September 27, 2022
TOTAL PENALTY:	\$20,822.00

Account Name:	KNIFE RIVER CORP. NW		
Account Type:	Vendor/Organization/Company	Reference Number:	CPGFD2300007
SubSystem ID:	207062	FIMS Acct. ID:	8399

Penalty Summary

Penalty Amount	Interest	Adjustment	Amount Paid	Total Penalty
\$ 20,822.00	\$ 0.00	\$ 0.00	\$ 0.00	\$ 20,822.00

Payment of this penalty is subject to the exercise of your options or right to appeal as described in the enclosed enforcement documents.

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To Pay Online with ACH or Credit Card Visit <https://ydo.oregon.gov> and select 'Register Account'



PLEASE RETURN THIS PORTION WITH YOUR PAYMENT



REFERENCE NO.	CPGFD2300007		
PAYCODE:	00401 7400 10040 74001 0500 000000 00		
FEE PROGRAM ID:	950	RESPONSE DATE:	September 27,
FIMS ACCT. ID:	8399	TOTAL PENALTY DUE:	\$20822.00

AMOUNT ENCLOSED:

MAKE CHECK PAYABLE TO: Department of Environmental Quality

☐

Check this box if updated address information has been provided on the back of the form.

DEQ FINANCIAL SERVICES - LBX4244
PO BOX 4244
PORTLAND OR 97208-4244

00401 7400 10040 74001 0500 000000 0095000083992CPGFD230000700020822003



State of Oregon
Department of
Environmental
Quality

State of Oregon Department of Environmental Quality

CIVIL PENALTY - ORS 468.135(2)

700 NE Multnomah Street, Suite 600
Portland, OR 97232-4100
Phone: 503-229-5437
Fax: 503-229-5850

Penalty Detail

Transaction Date	Description	Amount
7/15/2022	2021-548 WQ-SW-ER-2021-548	\$20,822.00

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SFMS Agencies Use:

Trans Code	Treasury Fund	SFMS	Index	PCA (5)	Agency Object	Project #	Phase
723	00401	7400	10040	74001	0500	00000	00

Address Changes

Please visit <https://ydo.oregon.gov> to update your mailing address online or provide the following information:

Name _____
Address _____
City, State, Zip _____

Groundwater Special Studies

Woodward Mine and Knife River GW Split 2025

Survey: 2025

Sampling Event: 2512080

Date: Feb. 20, 2026



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Document information

This analytical report was prepared by Oregon Department of Environmental Quality

Laboratory and Environmental Assessment Division

7202 NE Evergreen Parkway, Suite 150

Hillsboro, OR 97124

Contact: Shane Bennett

Phone: 503-693-5700

[Visit our website for additional information.](#)

Non-discrimination statement

DEQ does not discriminate on the basis of race, color, national origin, disability, age, sex, religion, sexual orientation, gender identity, or marital status in the administration of its programs and activities.

Visit DEQ's [Civil Rights and Environmental Justice page](#).

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Narrative

The document information page of the report bears the name of the primary document recipient. Questions as to the integrity of the data contained in this report should be

directed first to the report's primary recipient and second to the laboratory. The laboratory maintains all raw data and records from which this report has been generated for a period of no less than five years.

The DEQ Laboratory employs in its operations standard analytical methods that have been adopted by governing agencies for their specific application to sample matrices and regulatory programs of interest. In cases where standard analytical methods have not been promulgated, the laboratory has developed "in-house" methods which are consistent with best laboratory operating practices that will result in data of a quality appropriate for the intended use of information. Furthermore, all data has been scrutinized for adherence to established Quality Assurance/Quality Control (QA/QC) guidelines.

Unless otherwise noted, the information contained in this report meets all the aforementioned requirements as documented in the laboratory's Quality Assurance Manual and Standard Operating Procedures. Specific deviations from these requirements are noted, as appropriate, in this report. Questions or concerns regarding the contents of this report can be addressed by contacting the DEQ laboratory.

General Considerations

The analytical data contained in this report was generated to satisfy specific data quality objectives for the programs and projects under which they were generated. Users of the data must be able to understand potential limitations of the information and its suitability for their intended use. In cases where a portion of the sample analyses were analyzed by organizations other than DEQ, the review of this data was limited to information supplied by the non-DEQ organization.

Data Qualification

All laboratory batch quality control (QC) sample results associated with the samples are contained in this report. Any QC sample that does not meet the specified criteria will be flagged with a "QC" qualifier. Specific sample results associated with a QC parameter that did not meet criteria with a data quality level (DQL) other than "A" have been qualified in the laboratory report to assist in the evaluating the limitations of the data. Certain QC exceedances do not necessarily warrant a change to the DQL as the reported value is not adversely impacted. In these cases, the sample results associated with the QC receive no further qualification.

Some examples of this are:

- 1) Non-detected results with QC exceedances that indicate a high bias.
- 2) Blank results indicate slight contamination from field or laboratory activities however the target analyte in the sample is present in significantly high concentrations relative to the blank.

- 3) Blank results indicate slight contamination from field or laboratory activities however the target analyte is not detected in the sample.
- 4) Duplicate sample results where the sample concentrations are sufficiently low ($< 5\times$ the LOQ) to affect the applicability of the RPD limits.
- 5) Matrix spike results where the source sample concentration is sufficiently higher than the spike amount to affect the applicability of the spike recovery calculation.

Field Quality Control

Where applicable, field quality control (blanks and duplicate) samples should be reviewed for their potential impact on the samples in a sampling event, or multiple sampling events, involved for a project. See DEQ09-LAB-0006-QAG for more information.

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DEQ Laboratory and Environmental Assessment Division

Analytical Report

Sampling Event: 2512080 Woodward Mine + Knife River GW Split 2025

Sampling Event Summary

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Client: Groundwater Special Studies

Project: Woodward Mine + Knife River GW Split 2025

Qtime #: 37224

Sampled by: DEQ

ID #	Type:	Station #:	Description:	Matrix:	Sample Date Time
2512080-01	FP	42163	Woodward Mine MW-2	Groundwater	08-Dec-2025 14:07
2512080-02	FD	42163	Woodward Mine MW-2	Groundwater	08-Dec-2025 14:08
2512080-03	EB	10000	Blank - Equipment	Reagent Water	08-Dec-2025 15:40
<u>Sample comments:</u> DEQ filters and tubing					
2512080-04	GS	42168	Woodward Mine MW-9	Groundwater	09-Dec-2025 15:00
2512080-05	GS	42169	Woodward Mine MW-10	Groundwater	09-Dec-2025 17:50
2512080-06	GS	42170	Woodward Land & Timber LLC WW-2A	Groundwater	09-Dec-2025 12:30
2512080-07	GS	42164	Woodward Mine MW-5	Groundwater	10-Dec-2025 14:05
2512080-08	GS	42165	Woodward Mine MW-6	Groundwater	10-Dec-2025 11:35
2512080-09	GS	42166	Woodward Mine MW-7	Groundwater	10-Dec-2025 16:00

Key to Sample Type

EB = Blank - Equipment

FD = Field Duplicate

FP = Field Primary

GS = Grab Sample

DEQ Laboratory and Environmental Assessment Division

Analytical Report

Sampling Event: 2512080 Woodward Mine + Knife River GW Split 2025

Sample Data

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OWRD

2512080-01 (Groundwater) Station: 42163

Description: Woodward Mine MW-2

Analyte	Result	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Method	Qualifiers
General Field Parameters									
Conductivity at 25°C	758	1	µmhos/cm	1	B25L117	08-Dec-25 14:07	08-Dec-25 14:07	SM 2510 B	
Depth to Bottom	36.00		Feet	1	B25L117	08-Dec-25 14:07	08-Dec-25 14:07	MOMs	
Depth to Water	11.72		Feet	1	B25L117	08-Dec-25 14:07	08-Dec-25 14:07	MOMs	
Dissolved Oxygen	4.7	0.2	mg/L	1	B25L117	08-Dec-25 14:07	08-Dec-25 14:07	Hach 10360	
Oxidation Reduction Potential	254	-500	mV	1	B25L117	08-Dec-25 14:07	08-Dec-25 14:07	SM 2580 B	
pH	7.7	0.1	pH Units	1	B25L117	08-Dec-25 14:07	08-Dec-25 14:07	SM 4500-H+ B	
Temperature	12.9	-10.0	°C	1	B25L117	08-Dec-25 14:07	08-Dec-25 14:07	EPA 170.1	
Turbidity	20	1	NTU	1	B25L117	08-Dec-25 14:07	08-Dec-25 14:07	SM 2130 B	
General Chemistry									
Alkalinity, Total as CaCO3	370	1	mg/L	1	B25L119	15-Dec-25 16:45	15-Dec-25 16:45	SM 2320 B	
Chloride	5.93	2.50	mg/L	5	B25L235	29-Dec-25 20:24	29-Dec-25 20:24	EPA 300.0	
Fluoride	0.25	0.05	mg/L	1	B26A006	05-Jan-26 19:00	05-Jan-26 19:00	EPA 300.0	
Total Dissolved Solids	481	20.0	mg/L	1	B25L105	12-Dec-25 11:28	12-Dec-25 11:28	SM 2540 C	
Sulfate	21.2	1.00	mg/L	5	B25L235	29-Dec-25 20:24	29-Dec-25 20:24	EPA 300.0	
Total Organic Carbon	3.27	0.500	mg/L	1	B25L231	26-Dec-25 23:12	26-Dec-25 23:12	SM 5310 B	
Nutrients									
Nitrate/Nitrite as N	7.61	0.0050	mg/L	1	B25L109	15-Dec-25 12:26	15-Dec-25 12:26	SM 4500-NO3 ⁻ F	
Microbiology									
Coliform, Total	ND	1	MPN/100 mL	1	B26B046	08-Dec-25 20:33	09-Dec-25 20:33	SM 9223B	
Total Metals by Inductively Coupled Plasma Mass Spectrometry									
							EPA 200.8		
Aluminum, Total recoverable	241	20.0	µg/L	1	B25L159	18-Dec-25	30-Dec-25		FDU3::B
Arsenic, Total recoverable	2.49	0.25	µg/L	1	B25L159	18-Dec-25	30-Dec-25		
Copper, Total recoverable	ND	1.50	µg/L	1	B25L159	18-Dec-25	30-Dec-25		
Iron, Total recoverable	220	50.0	µg/L	1	B25L159	18-Dec-25	30-Dec-25		
Manganese, Total recoverable	4.80	2.00	µg/L	1	B25L159	18-Dec-25	30-Dec-25		
Calcium, Total recoverable	71.8	0.20	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Hardness as CaCO3, Total recoverable	322	0.75	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Magnesium, Total recoverable	34.6	0.05	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Potassium, Total recoverable	2.86	0.20	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Sodium, Total recoverable	44.2	0.15	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Dissolved Metals by Inductively Coupled Plasma Mass Spectrometry									
							EPA 200.8		
Aluminum, Dissolved	ND	20.0	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Arsenic, Dissolved	2.48	0.25	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Copper, Dissolved	1.52	1.50	µg/L	1	B25L158	18-Dec-25	30-Dec-25		SA4::A
Iron, Dissolved	ND	50.0	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Manganese, Dissolved	ND	2.00	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Calcium, Dissolved	71.2	0.20	mg/L	1	B25L158	18-Dec-25	30-Dec-25		
Hardness as CaCO3, Dissolved	321	0.75	mg/L	1	B25L158	18-Dec-25	30-Dec-25		
Magnesium, Dissolved	34.7	0.05	mg/L	1	B25L158	18-Dec-25	30-Dec-25		SA4::A
Potassium, Dissolved	2.83	0.20	mg/L	1	B25L158	18-Dec-25	30-Dec-25		
Sodium, Dissolved	43.7	0.15	mg/L	1	B25L158	18-Dec-25	30-Dec-25		

DEQ Laboratory and Environmental Assessment Division

Analytical Report

Sampling Event: 2512080 Woodward Mine + Knife River GW Split 2025

Sample Data

2512080-02 (Groundwater) Station: 42163

Description: Woodward Mine MW-2

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OWRD

Analyte	Result	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Method	Qualifiers
General Field Parameters									
Conductivity at 25°C	759	1	µmhos/cm	1	B25L117	08-Dec-25 14:08	08-Dec-25 14:08	SM 2510 B	
Dissolved Oxygen	4.7	0.2	mg/L	1	B25L117	08-Dec-25 14:08	08-Dec-25 14:08	Hach 10360	
Oxidation Reduction Potential	256	-500	mV	1	B25L117	08-Dec-25 14:08	08-Dec-25 14:08	SM 2580 B	
pH	7.7	0.1	pH Units	1	B25L117	08-Dec-25 14:08	08-Dec-25 14:08	SM 4500-H+ B	
Temperature	12.9	-10.0	°C	1	B25L117	08-Dec-25 14:08	08-Dec-25 14:08	EPA 170.1	
Turbidity	23	1	NTU	1	B25L117	08-Dec-25 14:08	08-Dec-25 14:08	SM 2130 B	
General Chemistry									
Alkalinity, Total as CaCO3	369	1	mg/L	1	B25L119	15-Dec-25 16:45	15-Dec-25 16:45	SM 2320 B	
Chloride	5.91	2.50	mg/L	5	B25L235	29-Dec-25 20:44	29-Dec-25 20:44	EPA 300.0	
Fluoride	0.25	0.05	mg/L	1	B26A006	05-Jan-26 19:21	05-Jan-26 19:21	EPA 300.0	
Total Dissolved Solids	485	20.0	mg/L	1	B25L105	12-Dec-25 11:28	12-Dec-25 11:28	SM 2540 C	
Sulfate	21.3	1.00	mg/L	5	B25L235	29-Dec-25 20:44	29-Dec-25 20:44	EPA 300.0	
Total Organic Carbon	3.34	0.500	mg/L	1	B25L231	26-Dec-25 23:28	26-Dec-25 23:28	SM 5310 B	
Nutrients									
Nitrate/Nitrite as N	7.62	0.0050	mg/L	1	B25L109	15-Dec-25 12:27	15-Dec-25 12:27	SM 4500-NO3 ⁻ F	
Microbiology									
Coliform, Total	ND	1	MPN/100 mL	1	B26B046	08-Dec-25 20:33	09-Dec-25 20:33	SM 9223B	

Analyte	Result	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Qualifiers	
Total Metals by Inductively Coupled Plasma Mass Spectrometry							EPA 200.8		
Aluminum, Total recoverable	130	20.0	µg/L	1	B25L159	18-Dec-25	30-Dec-25	FDU3::B	
Arsenic, Total recoverable	2.54	0.25	µg/L	1	B25L159	18-Dec-25	30-Dec-25		
Copper, Total recoverable	ND	1.50	µg/L	1	B25L159	18-Dec-25	30-Dec-25		
Iron, Total recoverable	123	50.0	µg/L	1	B25L159	18-Dec-25	30-Dec-25		
Manganese, Total recoverable	2.71	2.00	µg/L	1	B25L159	18-Dec-25	30-Dec-25		
Calcium, Total recoverable	71.0	0.20	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Hardness as CaCO3, Total recoverable	320	0.75	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Magnesium, Total recoverable	34.7	0.05	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Potassium, Total recoverable	2.88	0.20	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Sodium, Total recoverable	44.4	0.15	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Dissolved Metals by Inductively Coupled Plasma Mass Spectrometry							EPA 200.8		
Aluminum, Dissolved	ND	20.0	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Arsenic, Dissolved	2.45	0.25	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Copper, Dissolved	ND	1.50	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Iron, Dissolved	ND	50.0	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Manganese, Dissolved	ND	2.00	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Calcium, Dissolved	71.6	0.20	mg/L	1	B25L158	18-Dec-25	30-Dec-25	SA4::A	
Hardness as CaCO3, Dissolved	316	0.75	mg/L	1	B25L158	18-Dec-25	30-Dec-25		
Magnesium, Dissolved	33.4	0.05	mg/L	1	B25L158	18-Dec-25	30-Dec-25		
Potassium, Dissolved	2.77	0.20	mg/L	1	B25L158	18-Dec-25	30-Dec-25		
Sodium, Dissolved	42.3	0.15	mg/L	1	B25L158	18-Dec-25	30-Dec-25		

DEQ Laboratory and Environmental Assessment Division

Analytical Report

Sampling Event: 2512080 Woodward Mine + Knife River GW Split 2025

Sample Data

2512080-03 (Reagent Water) Station: 10000

Description: Blank - Equipment::EB

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Analyte	Result	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Method	Qualifiers
General Field Parameters									
Conductivity at 25°C	1	1	µmhos/cm	1	B25L117	08-Dec-25 15:40	08-Dec-25 15:40	SM 2510 B	
Dissolved Oxygen	9.4	0.2	mg/L	1	B25L117	08-Dec-25 15:40	08-Dec-25 15:40	Hach 10360	
Oxidation Reduction Potential	263	-500	mV	1	B25L117	08-Dec-25 15:40	08-Dec-25 15:40	SM 2580 B	
Dissolved Oxygen, Saturation	98	1	%	1	B25L117	08-Dec-25 15:40	08-Dec-25 15:40	SM 4500-O G	
pH	5.9	0.1	pH Units	1	B25L117	08-Dec-25 15:40	08-Dec-25 15:40	SM 4500-H+ B	
Temperature	12.9	-10.0	°C	1	B25L117	08-Dec-25 15:40	08-Dec-25 15:40	EPA 170.1	
Turbidity	ND	1	NTU	1	B25L117	08-Dec-25 15:40	08-Dec-25 15:40	SM 2130 B	

General Chemistry

Alkalinity, Total as CaCO ₃	ND	1	mg/L	1	B25L119	15-Dec-25 16:45	15-Dec-25 16:45	SM 2320 B	
Chloride	ND	0.50	mg/L	1	B25L235	29-Dec-25 21:04	29-Dec-25 21:04	EPA 300.0	
Fluoride	ND	0.05	mg/L	1	B26A006	05-Jan-26 19:41	05-Jan-26 19:41	EPA 300.0	
Total Dissolved Solids	ND	20.0	mg/L	1	B25L105	12-Dec-25 11:28	12-Dec-25 11:28	SM 2540 C	
Sulfate	ND	0.20	mg/L	1	B25L235	29-Dec-25 21:04	29-Dec-25 21:04	EPA 300.0	
Total Organic Carbon	ND	0.500	mg/L	1	B25L231	26-Dec-25 23:43	26-Dec-25 23:43	SM 5310 B	

Nutrients

Nitrate/Nitrite as N	ND	0.0050	mg/L	1	B25L109	15-Dec-25 14:40	15-Dec-25 14:40	SM 4500-NO ₃ ⁻ F	
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Microbiology

Coliform, Total	ND	1	MPN/100 mL	1	B26B046	08-Dec-25 20:33	09-Dec-25 20:33	SM 9223B	
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Analyte	Result	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Qualifiers
Total Metals by Inductively Coupled Plasma Mass Spectrometry							EPA 200.8	
Aluminum, Total recoverable	ND	20.0	µg/L	1	B25L159	18-Dec-25	30-Dec-25	
Arsenic, Total recoverable	ND	0.25	µg/L	1	B25L159	18-Dec-25	30-Dec-25	
Copper, Total recoverable	ND	1.50	µg/L	1	B25L159	18-Dec-25	30-Dec-25	
Iron, Total recoverable	ND	50.0	µg/L	1	B25L159	18-Dec-25	30-Dec-25	
Manganese, Total recoverable	ND	2.00	µg/L	1	B25L159	18-Dec-25	30-Dec-25	
Calcium, Total recoverable	ND	0.20	mg/L	1	B25L159	18-Dec-25	30-Dec-25	
Hardness as CaCO ₃ , Total recoverable	ND	0.75	mg/L	1	B25L159	18-Dec-25	30-Dec-25	
Magnesium, Total recoverable	ND	0.05	mg/L	1	B25L159	18-Dec-25	30-Dec-25	
Potassium, Total recoverable	ND	0.20	mg/L	1	B25L159	18-Dec-25	30-Dec-25	
Sodium, Total recoverable	ND	0.15	mg/L	1	B25L159	18-Dec-25	30-Dec-25	

Dissolved Metals by Inductively Coupled Plasma Mass Spectrometry

							EPA 200.8	
Aluminum, Dissolved	ND	20.0	µg/L	1	B25L158	18-Dec-25	30-Dec-25	
Arsenic, Dissolved	ND	0.25	µg/L	1	B25L158	18-Dec-25	30-Dec-25	
Copper, Dissolved	ND	1.50	µg/L	1	B25L158	18-Dec-25	30-Dec-25	
Iron, Dissolved	ND	50.0	µg/L	1	B25L158	18-Dec-25	30-Dec-25	
Manganese, Dissolved	ND	2.00	µg/L	1	B25L158	18-Dec-25	30-Dec-25	
Calcium, Dissolved	ND	0.20	mg/L	1	B25L158	18-Dec-25	30-Dec-25	
Hardness as CaCO ₃ , Dissolved	ND	0.75	mg/L	1	B25L158	18-Dec-25	30-Dec-25	
Magnesium, Dissolved	ND	0.05	mg/L	1	B25L158	18-Dec-25	30-Dec-25	
Potassium, Dissolved	ND	0.20	mg/L	1	B25L158	18-Dec-25	30-Dec-25	
Sodium, Dissolved	ND	0.15	mg/L	1	B25L158	18-Dec-25	30-Dec-25	

DEQ Laboratory and Environmental Assessment Division

Analytical Report

Sampling Event: 2512080 Woodward Mine + Knife River GW Split 2025

Sample Data

2512080-04 (Groundwater) Station: 42168

Description: Woodward Mine MW-9

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Analyte	Result	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Method	Qualifiers
General Field Parameters									
Conductivity at 25°C	688	1	µmhos/cm	1	B25L117	09-Dec-25 15:00	09-Dec-25 15:00	SM 2510 B	
Depth to Bottom	40.00		Feet	1	B25L117	09-Dec-25 15:00	09-Dec-25 15:00	MOMs	
Depth to Water	24.74		Feet	1	B25L117	09-Dec-25 15:00	09-Dec-25 15:00	MOMs	
Dissolved Oxygen	4.7	0.2	mg/L	1	B25L117	09-Dec-25 15:00	09-Dec-25 15:00	Hach 10360	
Oxidation Reduction Potential	317	-500	mV	1	B25L117	09-Dec-25 15:00	09-Dec-25 15:00	SM 2580 B	
pH	7.5	0.1	pH Units	1	B25L117	09-Dec-25 15:00	09-Dec-25 15:00	SM 4500-H+ B	
Temperature	12.8	-10.0	°C	1	B25L117	09-Dec-25 15:00	09-Dec-25 15:00	EPA 170.1	
Turbidity	2	1	NTU	1	B25L117	09-Dec-25 15:00	09-Dec-25 15:00	SM 2130 B	
General Chemistry									
Alkalinity, Total as CaCO3	331	1	mg/L	1	B25L119	15-Dec-25 16:45	15-Dec-25 16:45	SM 2320 B	
Chloride	5.96	2.50	mg/L	5	B25L235	29-Dec-25 21:24	29-Dec-25 21:24	EPA 300.0	
Fluoride	0.31	0.05	mg/L	1	B26A006	05-Jan-26 20:01	05-Jan-26 20:01	EPA 300.0	
Total Dissolved Solids	444	20.0	mg/L	1	B25L105	12-Dec-25 11:28	12-Dec-25 11:28	SM 2540 C	
Sulfate	16.4	1.00	mg/L	5	B25L235	29-Dec-25 21:24	29-Dec-25 21:24	EPA 300.0	
Total Organic Carbon	2.22	0.500	mg/L	1	B25L231	26-Dec-25 23:58	26-Dec-25 23:58	SM 5310 B	
Nutrients									
Nitrate/Nitrite as N	6.84	0.0050	mg/L	1	B25L109	15-Dec-25 12:28	15-Dec-25 12:28	SM 4500-NO3 ⁻ F	
Microbiology									
Coliform, Total	ND	1	MPN/100 mL	1	B26B046	09-Dec-25 20:17	10-Dec-25 20:39	SM 9223B	

Analyte	Result	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Qualifiers			
Total Metals by Inductively Coupled Plasma Mass Spectrometry							EPA 200.8				
Aluminum, Total recoverable	36.6	20.0	µg/L	1	B25L159	18-Dec-25	30-Dec-25	FDU1::B			
Arsenic, Total recoverable	3.37	0.25	µg/L	1	B25L159	18-Dec-25	30-Dec-25				
Copper, Total recoverable	ND	1.50	µg/L	1	B25L159	18-Dec-25	30-Dec-25				
Iron, Total recoverable	ND	50.0	µg/L	1	B25L159	18-Dec-25	30-Dec-25				
Manganese, Total recoverable	4.76	2.00	µg/L	1	B25L159	18-Dec-25	30-Dec-25				
Calcium, Total recoverable	65.4	0.20	mg/L	1	B25L159	18-Dec-25	30-Dec-25				
Hardness as CaCO3, Total recoverable	283	0.75	mg/L	1	B25L159	18-Dec-25	30-Dec-25				
Magnesium, Total recoverable	29.0	0.05	mg/L	1	B25L159	18-Dec-25	30-Dec-25	SA4::A			
Potassium, Total recoverable	3.21	0.20	mg/L	1	B25L159	18-Dec-25	30-Dec-25				
Sodium, Total recoverable	41.6	0.15	mg/L	1	B25L159	18-Dec-25	30-Dec-25				
Dissolved Metals by Inductively Coupled Plasma Mass Spectrometry							EPA 200.8				
Aluminum, Dissolved	ND	20.0	µg/L	1	B25L158	18-Dec-25	30-Dec-25				
Arsenic, Dissolved	3.30	0.25	µg/L	1	B25L158	18-Dec-25	30-Dec-25				
Copper, Dissolved	ND	1.50	µg/L	1	B25L158	18-Dec-25	30-Dec-25				
Iron, Dissolved	ND	50.0	µg/L	1	B25L158	18-Dec-25	30-Dec-25				
Manganese, Dissolved	4.54	2.00	µg/L	1	B25L158	18-Dec-25	30-Dec-25				
Calcium, Dissolved	65.5	0.20	mg/L	1	B25L158	18-Dec-25	30-Dec-25				
Hardness as CaCO3, Dissolved	278	0.75	mg/L	1	B25L158	18-Dec-25	30-Dec-25				
Magnesium, Dissolved	27.8	0.05	mg/L	1	B25L158	18-Dec-25	30-Dec-25				
Potassium, Dissolved	3.13	0.20	mg/L	1	B25L158	18-Dec-25	30-Dec-25				
Sodium, Dissolved	40.4	0.15	mg/L	1	B25L158	18-Dec-25	30-Dec-25				

DEQ Laboratory and Environmental Assessment Division

Analytical Report

Sampling Event: 2512080 Woodward Mine + Knife River GW Split 2025

Sample Data

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OWRD

2512080-05 (Groundwater) Station: 42169

Description: Woodward Mine MW-10

Analyte	Result	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Method	Qualifiers
General Field Parameters									
Conductivity at 25°C	479	1	µmhos/cm	1	B25L117	09-Dec-25 17:50	09-Dec-25 17:50	SM 2510 B	
Depth to Bottom	30.00		Feet	1	B25L117	09-Dec-25 17:50	09-Dec-25 17:50	MOMs	
Depth to Water	22.45		Feet	1	B25L117	09-Dec-25 17:50	09-Dec-25 17:50	MOMs	
Dissolved Oxygen	2.3	0.2	mg/L	1	B25L117	09-Dec-25 17:50	09-Dec-25 17:50	Hach 10360	
Oxidation Reduction Potential	294	-500	mV	1	B25L117	09-Dec-25 17:50	09-Dec-25 17:50	SM 2580 B	
pH	7.4	0.1	pH Units	1	B25L117	09-Dec-25 17:50	09-Dec-25 17:50	SM 4500-H+ B	
Temperature	15.7	-10.0	°C	1	B25L117	09-Dec-25 17:50	09-Dec-25 17:50	EPA 170.1	
Turbidity	3	1	NTU	1	B25L117	09-Dec-25 17:50	09-Dec-25 17:50	SM 2130 B	
General Chemistry									
Alkalinity, Total as CaCO3	225	1	mg/L	1	B25L119	15-Dec-25 16:45	15-Dec-25 16:45	SM 2320 B	
Chloride	6.95	2.50	mg/L	5	B25L235	29-Dec-25 22:04	29-Dec-25 22:04	EPA 300.0	
Fluoride	0.49	0.05	mg/L	1	B26A006	05-Jan-26 20:21	05-Jan-26 20:21	EPA 300.0	
Total Dissolved Solids	356	20.0	mg/L	1	B25L105	12-Dec-25 11:28	12-Dec-25 11:28	SM 2540 C	
Sulfate	17.8	1.00	mg/L	5	B25L235	29-Dec-25 22:04	29-Dec-25 22:04	EPA 300.0	
Total Organic Carbon	2.84	0.500	mg/L	1	B25L231	27-Dec-25 00:13	27-Dec-25 00:13	SM 5310 B	
Nutrients									
Nitrate/Nitrite as N	1.04	0.0050	mg/L	1	B25L109	15-Dec-25 12:30	15-Dec-25 12:30	SM 4500-NO3 ⁻ F	
Microbiology									
Coliform, Total	ND	1	MPN/100 mL	1	B26B046	09-Dec-25 20:17	10-Dec-25 20:39	SM 9223B	

Analyte	Result	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Qualifiers	
Total Metals by Inductively Coupled Plasma Mass Spectrometry							EPA 200.8		
Aluminum, Total recoverable	86.5	20.0	µg/L	1	B25L159	18-Dec-25	30-Dec-25	FDU1::B	
Arsenic, Total recoverable	4.62	0.25	µg/L	1	B25L159	18-Dec-25	30-Dec-25		
Copper, Total recoverable	ND	1.50	µg/L	1	B25L159	18-Dec-25	30-Dec-25		
Iron, Total recoverable	87.5	50.0	µg/L	1	B25L159	18-Dec-25	30-Dec-25		
Manganese, Total recoverable	21.5	2.00	µg/L	1	B25L159	18-Dec-25	30-Dec-25		
Calcium, Total recoverable	34.0	0.20	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Hardness as CaCO3, Total recoverable	148	0.75	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Magnesium, Total recoverable	15.3	0.05	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Potassium, Total recoverable	2.56	0.20	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Sodium, Total recoverable	49.5	0.15	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Dissolved Metals by Inductively Coupled Plasma Mass Spectrometry							EPA 200.8		
Aluminum, Dissolved	ND	20.0	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Arsenic, Dissolved	4.52	0.25	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Copper, Dissolved	ND	1.50	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Iron, Dissolved	ND	50.0	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Manganese, Dissolved	20.2	2.00	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Calcium, Dissolved	34.5	0.20	mg/L	1	B25L158	18-Dec-25	30-Dec-25	SA4::A	
Hardness as CaCO3, Dissolved	149	0.75	mg/L	1	B25L158	18-Dec-25	30-Dec-25	SA4::A	
Magnesium, Dissolved	15.3	0.05	mg/L	1	B25L158	18-Dec-25	30-Dec-25		
Potassium, Dissolved	2.57	0.20	mg/L	1	B25L158	18-Dec-25	30-Dec-25	SA4::A	
Sodium, Dissolved	48.5	0.15	mg/L	1	B25L158	18-Dec-25	30-Dec-25		

DEQ Laboratory and Environmental Assessment Division

Analytical Report

Sampling Event: 2512080 Woodward Mine + Knife River GW Split 2025

Sample Data

2512080-06 (Groundwater) Station: 42170
Description: Woodward Land & Timber LLC WW-2A

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Analyte	Result	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Method	Qualifiers
General Field Parameters									
Conductivity at 25°C	675	1	µmhos/cm	1	B25L117	09-Dec-25 12:30	09-Dec-25 12:30	SM 2510 B	
Depth to Bottom	25.00		Feet	1	B25L117	09-Dec-25 12:30	09-Dec-25 12:30	MOMs	
Depth to Water	20.96		Feet	1	B25L117	09-Dec-25 12:30	09-Dec-25 12:30	MOMs	
Dissolved Oxygen	7.6	0.2	mg/L	1	B25L117	09-Dec-25 12:30	09-Dec-25 12:30	Hach 10360	
Oxidation Reduction Potential	330	-500	mV	1	B25L117	09-Dec-25 12:30	09-Dec-25 12:30	SM 2580 B	
pH	7.4	0.1	pH Units	1	B25L117	09-Dec-25 12:30	09-Dec-25 12:30	SM 4500-H+ B	
Temperature	12.4	-10.0	°C	1	B25L117	09-Dec-25 12:30	09-Dec-25 12:30	EPA 170.1	
Turbidity	6	1	NTU	1	B25L117	09-Dec-25 12:30	09-Dec-25 12:30	SM 2130 B	
General Chemistry									
Alkalinity, Total as CaCO3	308	1	mg/L	1	B25L119	15-Dec-25 16:45	15-Dec-25 16:45	SM 2320 B	
Chloride	6.90	2.50	mg/L	5	B25L235	29-Dec-25 22:45	29-Dec-25 22:45	EPA 300.0	
Fluoride	0.40	0.05	mg/L	1	B26A006	05-Jan-26 21:02	05-Jan-26 21:02	EPA 300.0	
Total Dissolved Solids	447	20.0	mg/L	1	B25L105	12-Dec-25 11:28	12-Dec-25 11:28	SM 2540 C	
Sulfate	22.5	1.00	mg/L	5	B25L235	29-Dec-25 22:45	29-Dec-25 22:45	EPA 300.0	
Total Organic Carbon	3.26	0.500	mg/L	1	B25L231	27-Dec-25 00:29	27-Dec-25 00:29	SM 5310 B	
Nutrients									
Nitrate/Nitrite as N	8.52	0.0100	mg/L	2	B25L109	15-Dec-25 12:42	15-Dec-25 12:42	SM 4500-NO3 ⁻ F	
Microbiology									
Coliform, Total	ND	1	MPN/100 mL	1	B26B046	09-Dec-25 20:17	10-Dec-25 20:39	SM 9223B	
Analyte	Result	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Qualifiers	
Total Metals by Inductively Coupled Plasma Mass Spectrometry							EPA 200.8		
Aluminum, Total recoverable	711	20.0	µg/L	1	B25L159	18-Dec-25	30-Dec-25		FDU1::B
Arsenic, Total recoverable	2.94	0.25	µg/L	1	B25L159	18-Dec-25	30-Dec-25		
Copper, Total recoverable	ND	1.50	µg/L	1	B25L159	18-Dec-25	30-Dec-25		
Iron, Total recoverable	695	50.0	µg/L	1	B25L159	18-Dec-25	30-Dec-25		
Manganese, Total recoverable	48.2	2.00	µg/L	1	B25L159	18-Dec-25	30-Dec-25		
Calcium, Total recoverable	54.0	0.20	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Hardness as CaCO3, Total recoverable	289	0.75	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Magnesium, Total recoverable	37.4	0.05	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Potassium, Total recoverable	1.86	0.20	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Sodium, Total recoverable	34.2	0.15	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Dissolved Metals by Inductively Coupled Plasma Mass Spectrometry							EPA 200.8		
Aluminum, Dissolved	ND	20.0	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Arsenic, Dissolved	2.94	0.25	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Copper, Dissolved	ND	1.50	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Iron, Dissolved	ND	50.0	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Manganese, Dissolved	8.39	2.00	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Calcium, Dissolved	54.4	0.20	mg/L	1	B25L158	18-Dec-25	30-Dec-25		SA4::A
Hardness as CaCO3, Dissolved	292	0.75	mg/L	1	B25L158	18-Dec-25	30-Dec-25		SA4::A
Magnesium, Dissolved	37.9	0.05	mg/L	1	B25L158	18-Dec-25	30-Dec-25		SA4::A
Potassium, Dissolved	1.76	0.20	mg/L	1	B25L158	18-Dec-25	30-Dec-25		
Sodium, Dissolved	33.1	0.15	mg/L	1	B25L158	18-Dec-25	30-Dec-25		

DEQ Laboratory and Environmental Assessment Division

Analytical Report

Sampling Event: 2512080 Woodward Mine + Knife River GW Split 2025

Sample Data

2512080-07 (Groundwater) Station: 42164

Description: Woodward Mine MW-5

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Analyte	Result	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Method	Qualifiers
General Field Parameters									
Conductivity at 25°C	734	1	µmhos/cm	1	B25L117	10-Dec-25 14:05	10-Dec-25 14:05	SM 2510 B	
Depth to Bottom	71.00		Feet	1	B25L117	10-Dec-25 14:05	10-Dec-25 14:05	MOMs	
Depth to Water	20.11		Feet	1	B25L117	10-Dec-25 14:05	10-Dec-25 14:05	MOMs	
Dissolved Oxygen	0.6	0.2	mg/L	1	B25L117	10-Dec-25 14:05	10-Dec-25 14:05	Hach 10360	
Oxidation Reduction Potential	-64.0	-500	mV	1	B25L117	10-Dec-25 14:05	10-Dec-25 14:05	SM 2580 B	
pH	7.6	0.1	pH Units	1	B25L117	10-Dec-25 14:05	10-Dec-25 14:05	SM 4500-H+ B	
Temperature	13.8	-10.0	°C	1	B25L117	10-Dec-25 14:05	10-Dec-25 14:05	EPA 170.1	
Turbidity	4	1	NTU	1	B25L117	10-Dec-25 14:05	10-Dec-25 14:05	SM 2130 B	
General Chemistry									
Alkalinity, Total as CaCO3	381	1	mg/L	1	B25L119	15-Dec-25 16:45	15-Dec-25 16:45	SM 2320 B	
Chloride	7.03	2.50	mg/L	5	B25L235	29-Dec-25 23:05	29-Dec-25 23:05	EPA 300.0	
Fluoride	0.32	0.05	mg/L	1	B26A006	05-Jan-26 21:22	05-Jan-26 21:22	EPA 300.0	
Total Dissolved Solids	463	20.0	mg/L	1	B25L105	12-Dec-25 11:28	12-Dec-25 11:28	SM 2540 C	
Sulfate	23.6	1.00	mg/L	5	B25L235	29-Dec-25 23:05	29-Dec-25 23:05	EPA 300.0	
Total Organic Carbon	2.23	0.500	mg/L	1	B25L231	27-Dec-25 00:44	27-Dec-25 00:44	SM 5310 B	
Nutrients									
Nitrate/Nitrite as N	0.286	0.0050	mg/L	1	B25L109	15-Dec-25 14:41	15-Dec-25 14:41	SM 4500-NO3 ⁻ F	
Microbiology									
Coliform, Total	7	1	MPN/100 mL	1	B26B046	10-Dec-25 20:39	11-Dec-25 20:40	SM 9223B	
Analyte	Result	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Qualifiers	
Total Metals by Inductively Coupled Plasma Mass Spectrometry							EPA 200.8		
Aluminum, Total recoverable	89.4	20.0	µg/L	1	B25L159	18-Dec-25	30-Dec-25		FDU1::B
Arsenic, Total recoverable	3.84	0.25	µg/L	1	B25L159	18-Dec-25	30-Dec-25		
Copper, Total recoverable	ND	1.50	µg/L	1	B25L159	18-Dec-25	30-Dec-25		
Iron, Total recoverable	384	50.0	µg/L	1	B25L159	18-Dec-25	30-Dec-25		
Manganese, Total recoverable	313	2.00	µg/L	1	B25L159	18-Dec-25	30-Dec-25		
Calcium, Total recoverable	58.1	0.20	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Hardness as CaCO3, Total recoverable	271	0.75	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Magnesium, Total recoverable	30.6	0.05	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Potassium, Total recoverable	4.16	0.20	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Sodium, Total recoverable	60.1	0.15	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Dissolved Metals by Inductively Coupled Plasma Mass Spectrometry							EPA 200.8		
Aluminum, Dissolved	ND	20.0	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Arsenic, Dissolved	3.64	0.25	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Copper, Dissolved	ND	1.50	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Iron, Dissolved	96.6	50.0	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Manganese, Dissolved	302	2.00	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Calcium, Dissolved	56.3	0.20	mg/L	1	B25L158	18-Dec-25	30-Dec-25		
Hardness as CaCO3, Dissolved	266	0.75	mg/L	1	B25L158	18-Dec-25	30-Dec-25		
Magnesium, Dissolved	30.5	0.05	mg/L	1	B25L158	18-Dec-25	30-Dec-25		
Potassium, Dissolved	4.13	0.20	mg/L	1	B25L158	18-Dec-25	30-Dec-25		
Sodium, Dissolved	59.3	0.15	mg/L	1	B25L158	18-Dec-25	30-Dec-25		

DEQ Laboratory and Environmental Assessment Division

Analytical Report

Sampling Event: 2512080 Woodward Mine + Knife River GW Split 2025

Sample Data

2512080-08 (Groundwater) Station: 42165

Description: Woodward Mine MW-6

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Analyte	Result	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Method	Qualifiers
General Field Parameters									
Conductivity at 25°C	816	1	µmhos/cm	1	B25L117	10-Dec-25 11:35	10-Dec-25 11:35	SM 2510 B	
Depth to Bottom	62.00		Feet	1	B25L117	10-Dec-25 11:35	10-Dec-25 11:35	MOMs	
Depth to Water	32.60		Feet	1	B25L117	10-Dec-25 11:35	10-Dec-25 11:35	MOMs	
Dissolved Oxygen	5.3	0.2	mg/L	1	B25L117	10-Dec-25 11:35	10-Dec-25 11:35	Hach 10360	
Oxidation Reduction Potential	365	-500	mV	1	B25L117	10-Dec-25 11:35	10-Dec-25 11:35	SM 2580 B	
pH	7.2	0.1	pH Units	1	B25L117	10-Dec-25 11:35	10-Dec-25 11:35	SM 4500-H+ B	
Temperature	14.5	-10.0	°C	1	B25L117	10-Dec-25 11:35	10-Dec-25 11:35	EPA 170.1	
Turbidity	13	1	NTU	1	B25L117	10-Dec-25 11:35	10-Dec-25 11:35	SM 2130 B	
General Chemistry									
Alkalinity, Total as CaCO3	404	1	mg/L	1	B25L119	15-Dec-25 16:45	15-Dec-25 16:45	SM 2320 B	
Chloride	7.88	2.50	mg/L	5	B25L235	29-Dec-25 23:25	29-Dec-25 23:25	EPA 300.0	
Fluoride	0.31	0.05	mg/L	1	B26A006	05-Jan-26 21:42	05-Jan-26 21:42	EPA 300.0	
Total Dissolved Solids	529	20.0	mg/L	1	B25L105	12-Dec-25 11:28	12-Dec-25 11:28	SM 2540 C	
Sulfate	25.3	1.00	mg/L	5	B25L235	29-Dec-25 23:25	29-Dec-25 23:25	EPA 300.0	
Total Organic Carbon	3.67	0.500	mg/L	1	B25L231	27-Dec-25 01:00	27-Dec-25 01:00	SM 5310 B	
Nutrients									
Nitrate/Nitrite as N	4.99	0.0050	mg/L	1	B25L109	15-Dec-25 12:35	15-Dec-25 12:35	SM 4500-NO3 ⁻ F	
Microbiology									
Coliform, Total	ND	1	MPN/100 mL	1	B26B046	10-Dec-25 20:39	11-Dec-25 20:40	SM 9223B	
Total Metals by Inductively Coupled Plasma Mass Spectrometry									
								EPA 200.8	
Aluminum, Total recoverable	920	20.0	µg/L	1	B25L159	18-Dec-25	30-Dec-25		FDU1::B
Arsenic, Total recoverable	4.40	0.25	µg/L	1	B25L159	18-Dec-25	30-Dec-25		
Copper, Total recoverable	2.21	1.50	µg/L	1	B25L159	18-Dec-25	30-Dec-25		
Iron, Total recoverable	998	50.0	µg/L	1	B25L159	18-Dec-25	30-Dec-25		
Manganese, Total recoverable	22.1	2.00	µg/L	1	B25L159	18-Dec-25	30-Dec-25		
Calcium, Total recoverable	72.7	0.20	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Hardness as CaCO3, Total recoverable	321	0.75	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Magnesium, Total recoverable	33.8	0.05	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Potassium, Total recoverable	3.70	0.20	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Sodium, Total recoverable	58.0	0.15	mg/L	1	B25L159	18-Dec-25	30-Dec-25		
Dissolved Metals by Inductively Coupled Plasma Mass Spectrometry									
								EPA 200.8	
Aluminum, Dissolved	ND	20.0	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Arsenic, Dissolved	4.44	0.25	µg/L	1	B25L158	18-Dec-25	30-Dec-25		SA4::A
Copper, Dissolved	ND	1.50	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Iron, Dissolved	ND	50.0	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Manganese, Dissolved	ND	2.00	µg/L	1	B25L158	18-Dec-25	30-Dec-25		
Calcium, Dissolved	72.6	0.20	mg/L	1	B25L158	18-Dec-25	30-Dec-25		
Hardness as CaCO3, Dissolved	320	0.75	mg/L	1	B25L158	18-Dec-25	30-Dec-25		
Magnesium, Dissolved	33.6	0.05	mg/L	1	B25L158	18-Dec-25	30-Dec-25		
Potassium, Dissolved	3.64	0.20	mg/L	1	B25L158	18-Dec-25	30-Dec-25		
Sodium, Dissolved	58.5	0.15	mg/L	1	B25L158	18-Dec-25	30-Dec-25		SA4::A

DEQ Laboratory and Environmental Assessment Division

Analytical Report

Sampling Event: 2512080 Woodward Mine + Knife River GW Split 2025

Sample Data

2512080-09 (Groundwater) Station: 42166

Description: Woodward Mine MW-7

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Analyte	Result	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Method	Qualifiers
General Field Parameters									
Conductivity at 25°C	726	1	µmhos/cm	1	B25L117	10-Dec-25 16:00	10-Dec-25 16:00	SM 2510 B	
Depth to Bottom	55.00		Feet	1	B25L117	10-Dec-25 16:00	10-Dec-25 16:00	MOMs	
Depth to Water	21.85		Feet	1	B25L117	10-Dec-25 16:00	10-Dec-25 16:00	MOMs	
Dissolved Oxygen	1.7	0.2	mg/L	1	B25L117	10-Dec-25 16:00	10-Dec-25 16:00	Hach 10360	
Oxidation Reduction Potential	235	-500	mV	1	B25L117	10-Dec-25 16:00	10-Dec-25 16:00	SM 2580 B	
pH	7.4	0.1	pH Units	1	B25L117	10-Dec-25 16:00	10-Dec-25 16:00	SM 4500-H+ B	
Temperature	12.5	-10.0	°C	1	B25L117	10-Dec-25 16:00	10-Dec-25 16:00	EPA 170.1	
Turbidity	2	1	NTU	1	B25L117	10-Dec-25 16:00	10-Dec-25 16:00	SM 2130 B	
General Chemistry									
Alkalinity, Total as CaCO3	360	1	mg/L	1	B25L119	15-Dec-25 16:45	15-Dec-25 16:45	SM 2320 B	
Chloride	6.60	2.50	mg/L	5	B25L235	29-Dec-25 23:45	29-Dec-25 23:45	EPA 300.0	
Fluoride	0.42	0.05	mg/L	1	B26A006	05-Jan-26 22:22	05-Jan-26 22:22	EPA 300.0	
Total Dissolved Solids	467	20.0	mg/L	1	B25L105	12-Dec-25 11:28	12-Dec-25 11:28	SM 2540 C	
Sulfate	21.9	1.00	mg/L	5	B25L235	29-Dec-25 23:45	29-Dec-25 23:45	EPA 300.0	
Total Organic Carbon	2.07	0.500	mg/L	1	B25L231	26-Dec-25 18:22	26-Dec-25 18:22	SM 5310 B	
Nutrients									
Nitrate/Nitrite as N	4.90	0.0050	mg/L	1	B25L109	15-Dec-25 12:40	15-Dec-25 12:40	SM 4500-NO3 ⁻ F	
Microbiology									
Coliform, Total	8	1	MPN/100 mL	1	B26B046	10-Dec-25 20:39	11-Dec-25 20:40	SM 9223B	

Analyte	Result	LOQ	Units	Dilution	Batch	Prepared	Analyzed	Qualifiers
Total Metals by Inductively Coupled Plasma Mass Spectrometry							EPA 200.8	
Aluminum, Total recoverable	99.5	20.0	µg/L	1	B25L159	18-Dec-25	30-Dec-25	FDU1::B
Arsenic, Total recoverable	4.69	0.25	µg/L	1	B25L159	18-Dec-25	30-Dec-25	
Copper, Total recoverable	ND	1.50	µg/L	1	B25L159	18-Dec-25	30-Dec-25	
Iron, Total recoverable	101	50.0	µg/L	1	B25L159	18-Dec-25	30-Dec-25	
Manganese, Total recoverable	2.50	2.00	µg/L	1	B25L159	18-Dec-25	30-Dec-25	
Calcium, Total recoverable	61.0	0.20	mg/L	1	B25L159	18-Dec-25	30-Dec-25	
Hardness as CaCO3, Total recoverable	273	0.75	mg/L	1	B25L159	18-Dec-25	30-Dec-25	
Magnesium, Total recoverable	29.4	0.05	mg/L	1	B25L159	18-Dec-25	30-Dec-25	
Potassium, Total recoverable	2.69	0.20	mg/L	1	B25L159	18-Dec-25	30-Dec-25	
Sodium, Total recoverable	58.2	0.15	mg/L	1	B25L159	18-Dec-25	30-Dec-25	
Dissolved Metals by Inductively Coupled Plasma Mass Spectrometry							EPA 200.8	
Aluminum, Dissolved	ND	20.0	µg/L	1	B25L158	18-Dec-25	30-Dec-25	
Arsenic, Dissolved	4.75	0.25	µg/L	1	B25L158	18-Dec-25	30-Dec-25	SA4::A
Copper, Dissolved	ND	1.50	µg/L	1	B25L158	18-Dec-25	30-Dec-25	
Iron, Dissolved	ND	50.0	µg/L	1	B25L158	18-Dec-25	30-Dec-25	
Manganese, Dissolved	ND	2.00	µg/L	1	B25L158	18-Dec-25	30-Dec-25	
Calcium, Dissolved	61.3	0.20	mg/L	1	B25L158	18-Dec-25	30-Dec-25	SA4::A
Hardness as CaCO3, Dissolved	273	0.75	mg/L	1	B25L158	18-Dec-25	30-Dec-25	
Magnesium, Dissolved	29.1	0.05	mg/L	1	B25L158	18-Dec-25	30-Dec-25	
Potassium, Dissolved	2.68	0.20	mg/L	1	B25L158	18-Dec-25	30-Dec-25	
Sodium, Dissolved	57.5	0.15	mg/L	1	B25L158	18-Dec-25	30-Dec-25	

DEQ Laboratory and Environmental Assessment Division

Analytical Report

Sampling Event: 2512080

Laboratory Quality Control Data

General Chemistry

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B25L119 - No Prep-Inorganic Wet Chemistry										
Blank (B25L119-BLK1)				Prepared & Analyzed: 15-Dec-25						
Alkalinity, Total as CaCO3	ND	1	mg/L							
LCS (B25L119-BS1)				Prepared & Analyzed: 15-Dec-25						
Alkalinity, Total as CaCO3	50		mg/L	50.0		99	80-120			
Duplicate (B25L119-DUP1)				Source: 2512080-05 Prepared & Analyzed: 15-Dec-25						
Alkalinity, Total as CaCO3	226	1	mg/L		225			0.4	10	
Batch B25L235 - No Prep-Non-Metals										
Blank (B25L235-BLK1)				Prepared & Analyzed: 29-Dec-25						
Chloride	ND	0.50	mg/L							
LCS (B25L235-BS1)				Prepared & Analyzed: 29-Dec-25						
Chloride	10.2	0.52	mg/L	10.0		102	90-110			
Duplicate (B25L235-DUP1)				Source: 2512080-04 Prepared & Analyzed: 29-Dec-25						
Chloride	5.95	2.50	mg/L		5.96			0.2	20	
Matrix Spike (B25L235-MS1)				Source: 2512080-05 Prepared & Analyzed: 29-Dec-25						
Chloride	109	5.15	mg/L	100	6.95	102	80-120			
Batch B26A006 - No Prep-Non-Metals										
Blank (B26A006-BLK1)				Prepared & Analyzed: 05-Jan-26						
Fluoride	ND	0.05	mg/L							
LCS (B26A006-BS1)				Prepared & Analyzed: 05-Jan-26						
Fluoride	1.02	0.05	mg/L	1.00		102	90-110			
Duplicate (B26A006-DUP1)				Source: 2512080-05 Prepared & Analyzed: 05-Jan-26						
Fluoride	0.49	0.05	mg/L		0.49			0.6	10	
Matrix Spike (B26A006-MS1)				Source: 2512080-08 Prepared & Analyzed: 05-Jan-26						
Fluoride	1.34	0.05	mg/L	1.00	0.31	102	80-120			
Batch B25L105 - Solids Prep										
Blank (B25L105-BLK1)				Prepared & Analyzed: 12-Dec-25						
Total Dissolved Solids	ND	20.0	mg/L							
Duplicate (B25L105-DUP1)				Source: 2512080-04 Prepared & Analyzed: 12-Dec-25						
Total Dissolved Solids	444	20.0	mg/L		444			0	10	
Reference (B25L105-SRM1)				Prepared & Analyzed: 12-Dec-25						
Total Dissolved Solids	101		mg/L	100		101	80-120			

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Analytical Report

Sampling Event: 2512080

Laboratory Quality Control Data

General Chemistry

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B25L235 - No Prep-Non-Metals										
Blank (B25L235-BLK1)				Prepared & Analyzed: 29-Dec-25						
Sulfate	ND	0.20	mg/L							
LCS (B25L235-BS1)				Prepared & Analyzed: 29-Dec-25						
Sulfate	20.8	0.21	mg/L	20.0		104	90-110			
Duplicate (B25L235-DUP1)				Source: 2512080-04 Prepared & Analyzed: 29-Dec-25						
Sulfate	16.4	1.00	mg/L		16.4			0.09	20	
Matrix Spike (B25L235-MS1)				Source: 2512080-05 Prepared & Analyzed: 29-Dec-25						
Sulfate	225	2.06	mg/L	200	17.8	104	80-120			
Batch B25L231 - No Prep-Wet Chemistry										
Blank (B25L231-BLK1)				Prepared & Analyzed: 26-Dec-25						
Total Organic Carbon	ND	0.500	mg/L							
LCS (B25L231-BS1)				Prepared & Analyzed: 26-Dec-25						
Total Organic Carbon	24.4	0.500	mg/L	24.9		98	90-110			
Duplicate (B25L231-DUP1)				Source: 2512031-02 Prepared & Analyzed: 26-Dec-25						
Total Organic Carbon	1.78	0.500	mg/L		1.76			1	15	
Matrix Spike (B25L231-MS1)				Source: 2512080-09 Prepared & Analyzed: 26-Dec-25						
Total Organic Carbon	12.4	0.500	mg/L	10.0	2.07	104	85-115			
Matrix Spike Dup (B25L231-MSD1)				Source: 2512080-09 Prepared & Analyzed: 26-Dec-25						
Total Organic Carbon	12.6	0.500	mg/L	10.0	2.07	105	85-115	0.9	15	

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Analytical Report

Sampling Event: 2512080

Laboratory Quality Control Data

Nutrients

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B25L109 - No Prep-Non-Metals										
Blank (B25L109-BLK1)				Prepared & Analyzed: 15-Dec-25						
Nitrate/Nitrite as N	ND	0.0050	mg/L							
LCS (B25L109-BS1)				Prepared & Analyzed: 15-Dec-25						
Nitrate/Nitrite as N	4.02		mg/L	4.00		101	90-110			
LCS (B25L109-BS2)				Prepared & Analyzed: 15-Dec-25						
Nitrate/Nitrite as N	0.198		mg/L	0.200		99	90-110			
Duplicate (B25L109-DUP1)				Source: 2512080-05 Prepared & Analyzed: 15-Dec-25						
Nitrate/Nitrite as N	1.03	0.0050	mg/L		1.04			0.9	10	
Duplicate (B25L109-DUP2)				Source: 2512085-01 Prepared & Analyzed: 15-Dec-25						
Nitrate/Nitrite as N	2.46	0.0050	mg/L		2.47			0.3	10	
Matrix Spike (B25L109-MS1)				Source: 2512080-04 Prepared & Analyzed: 15-Dec-25						
Nitrate/Nitrite as N	6.19		mg/L	2.91	3.32	99	80-120			
Matrix Spike (B25L109-MS2)				Source: 2512081-01 Prepared & Analyzed: 15-Dec-25						
Nitrate/Nitrite as N	4.33		mg/L	1.96	2.37	100	80-120			
Matrix Spike (B25L109-MS3)				Source: 2512078-05 Prepared & Analyzed: 15-Dec-25						
Nitrate/Nitrite as N	0.160		mg/L	0.0792	0.0797	101	80-120			

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Analytical Report

Sampling Event: 2512080

Laboratory Quality Control Data

Total Metals by Inductively Coupled Plasma Mass Spectrometry

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B25L159 - Digestion by 200.8										
Blank (B25L159-BLK1)				Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Aluminum, Total recoverable	ND	20.0	µg/L							
LCS (B25L159-BS1)				Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Aluminum, Total recoverable	935	20.0	µg/L	1000		93	85-115			
Matrix Spike (B25L159-MS1)				Source: 2512080-05 Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Aluminum, Total recoverable	1020	20.0	µg/L	1000	86.5	93	70-130			
Matrix Spike Dup (B25L159-MSD1)				Source: 2512080-05 Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Aluminum, Total recoverable	1010	20.0	µg/L	1000	86.5	93	70-130	0.2	20	
Batch B25L159 - Digestion by 200.8										
Blank (B25L159-BLK1)				Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Arsenic, Total recoverable	ND	0.25	µg/L							
LCS (B25L159-BS1)				Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Arsenic, Total recoverable	96.0	0.25	µg/L	100		96	85-115			
Matrix Spike (B25L159-MS1)				Source: 2512080-05 Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Arsenic, Total recoverable	101	0.25	µg/L	100	4.62	97	70-130			
Matrix Spike Dup (B25L159-MSD1)				Source: 2512080-05 Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Arsenic, Total recoverable	102	0.25	µg/L	100	4.62	97	70-130	0.5	20	
Batch B25L159 - Digestion by 200.8										
Blank (B25L159-BLK1)				Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Copper, Total recoverable	ND	1.50	µg/L							
LCS (B25L159-BS1)				Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Copper, Total recoverable	37.1	1.50	µg/L	40.0		93	85-115			
Matrix Spike (B25L159-MS1)				Source: 2512080-05 Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Copper, Total recoverable	37.6	1.50	µg/L	40.0	ND	94	70-130			
Matrix Spike Dup (B25L159-MSD1)				Source: 2512080-05 Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Copper, Total recoverable	37.9	1.50	µg/L	40.0	ND	95	70-130	0.9	20	
Batch B25L159 - Digestion by 200.8										
Blank (B25L159-BLK1)				Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Iron, Total recoverable	ND	50.0	µg/L							
LCS (B25L159-BS1)				Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Iron, Total recoverable	4960	50.0	µg/L	5000		99	85-115			

DEQ Laboratory and Environmental Assessment Division

Analytical Report

Sampling Event: 2512080

Laboratory Quality Control Data

Total Metals by Inductively Coupled Plasma Mass Spectrometry

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B25L159 - Digestion by 200.8										
Matrix Spike (B25L159-MS1)		Source: 2512080-05		Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Iron, Total recoverable	5060	50.0	µg/L	5000	87.5	99	70-130			
Matrix Spike Dup (B25L159-MSD1)		Source: 2512080-05		Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Iron, Total recoverable	4990	50.0	µg/L	5000	87.5	98	70-130	1	20	
Batch B25L159 - Digestion by 200.8										
Blank (B25L159-BLK1)		Prepared: 18-Dec-25 Analyzed: 30-Dec-25								
Manganese, Total recoverable	ND	2.00	µg/L							
LCS (B25L159-BS1)		Prepared: 18-Dec-25 Analyzed: 30-Dec-25								
Manganese, Total recoverable	99.4	2.00	µg/L	100		99	85-115			
Matrix Spike (B25L159-MS1)		Source: 2512080-05		Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Manganese, Total recoverable	119	2.00	µg/L	100	21.5	98	70-130			
Matrix Spike Dup (B25L159-MSD1)		Source: 2512080-05		Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Manganese, Total recoverable	120	2.00	µg/L	100	21.5	98	70-130	0.4	20	
Batch B25L159 - Digestion by 200.8										
Blank (B25L159-BLK1)		Prepared: 18-Dec-25 Analyzed: 30-Dec-25								
Calcium, Total recoverable	ND	0.20	mg/L							
Hardness as CaCO ₃ , Total recoverable	ND	0.75	mg/L							
Magnesium, Total recoverable	ND	0.05	mg/L							
Potassium, Total recoverable	ND	0.20	mg/L							
Sodium, Total recoverable	ND	0.15	mg/L							
LCS (B25L159-BS1)		Prepared: 18-Dec-25 Analyzed: 30-Dec-25								
Calcium, Total recoverable	4.82	0.20	mg/L	5.00		96	85-115			
Magnesium, Total recoverable	4.84	0.05	mg/L	5.00		97	85-115			
Potassium, Total recoverable	4.54	0.20	mg/L	5.00		91	85-115			
Sodium, Total recoverable	4.98	0.15	mg/L	5.00		100	85-115			
Matrix Spike (B25L159-MS1)		Source: 2512080-05		Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Calcium, Total recoverable	38.5	0.20	mg/L	5.00	34.0	90	70-130			
Magnesium, Total recoverable	20.0	0.05	mg/L	5.00	15.3	93	70-130			
Potassium, Total recoverable	7.50	0.20	mg/L	5.00	2.56	99	70-130			
Sodium, Total recoverable	54.0	0.15	mg/L	5.00	49.5	91	70-130			
Matrix Spike Dup (B25L159-MSD1)		Source: 2512080-05		Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Calcium, Total recoverable	38.8	0.20	mg/L	5.00	34.0	96	70-130	0.8	20	
Magnesium, Total recoverable	19.7	0.05	mg/L	5.00	15.3	88	70-130	1	20	
Potassium, Total recoverable	7.50	0.20	mg/L	5.00	2.56	99	70-130	0.07	20	
Sodium, Total recoverable	53.7	0.15	mg/L	5.00	49.5	84	70-130	0.6	20	

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Analytical Report

Sampling Event: 2512080

Laboratory Quality Control Data

Dissolved Metals by Inductively Coupled Plasma Mass Spectrometry

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B25L158 - Digestion by 200.8										
Blank (B25L158-BLK1)				Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Aluminum, Dissolved	ND	20.0	µg/L							
LCS (B25L158-BS1)				Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Aluminum, Dissolved	946	20.0	µg/L	1000		95	85-115			
Matrix Spike (B25L158-MS1)				Source: 2512080-05 Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Aluminum, Dissolved	935	20.0	µg/L	1000	3.32	93	70-130			
Matrix Spike Dup (B25L158-MSD1)				Source: 2512080-05 Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Aluminum, Dissolved	931	20.0	µg/L	1000	3.32	93	70-130	0.4	20	
Batch B25L158 - Digestion by 200.8										
Blank (B25L158-BLK1)				Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Arsenic, Dissolved	ND	0.25	µg/L							
LCS (B25L158-BS1)				Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Arsenic, Dissolved	97.6	0.25	µg/L	100		98	85-115			
Matrix Spike (B25L158-MS1)				Source: 2512080-05 Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Arsenic, Dissolved	101	0.25	µg/L	100	4.52	97	70-130			
Matrix Spike Dup (B25L158-MSD1)				Source: 2512080-05 Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Arsenic, Dissolved	101	0.25	µg/L	100	4.52	96	70-130	0.5	20	
Batch B25L158 - Digestion by 200.8										
Blank (B25L158-BLK1)				Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Copper, Dissolved	ND	1.50	µg/L							
LCS (B25L158-BS1)				Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Copper, Dissolved	37.8	1.50	µg/L	40.0		94	85-115			
Matrix Spike (B25L158-MS1)				Source: 2512080-05 Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Copper, Dissolved	37.3	1.50	µg/L	40.0	ND	93	70-130			
Matrix Spike Dup (B25L158-MSD1)				Source: 2512080-05 Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Copper, Dissolved	37.1	1.50	µg/L	40.0	ND	93	70-130	0.5	20	
Batch B25L158 - Digestion by 200.8										
Blank (B25L158-BLK1)				Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Iron, Dissolved	ND	50.0	µg/L							
LCS (B25L158-BS1)				Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Iron, Dissolved	4910	50.0	µg/L	5000		98	85-115			

DEQ Laboratory and Environmental Assessment Division

Analytical Report

Sampling Event: 2512080

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Laboratory Quality Control Data

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Dissolved Metals by Inductively Coupled Plasma Mass Spectrometry

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B25L158 - Digestion by 200.8										
Matrix Spike (B25L158-MS1)		Source: 2512080-05		Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Iron, Dissolved	4890	50.0	µg/L	5000	ND	98	70-130			
Matrix Spike Dup (B25L158-MSD1)		Source: 2512080-05		Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Iron, Dissolved	4970	50.0	µg/L	5000	ND	99	70-130	2	20	
Batch B25L158 - Digestion by 200.8										
Blank (B25L158-BLK1)		Prepared: 18-Dec-25 Analyzed: 30-Dec-25								
Manganese, Dissolved	ND	2.00	µg/L							
LCS (B25L158-BS1)		Prepared: 18-Dec-25 Analyzed: 30-Dec-25								
Manganese, Dissolved	99.4	2.00	µg/L	100		99	85-115			
Matrix Spike (B25L158-MS1)		Source: 2512080-05		Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Manganese, Dissolved	119	2.00	µg/L	100	20.2	98	70-130			
Matrix Spike Dup (B25L158-MSD1)		Source: 2512080-05		Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Manganese, Dissolved	119	2.00	µg/L	100	20.2	99	70-130	0.3	20	
Batch B25L158 - Digestion by 200.8										
Blank (B25L158-BLK1)		Prepared: 18-Dec-25 Analyzed: 30-Dec-25								
Calcium, Dissolved	ND	0.20	mg/L							
Hardness as CaCO ₃ , Dissolved	ND	0.75	mg/L							
Magnesium, Dissolved	ND	0.05	mg/L							
Potassium, Dissolved	ND	0.20	mg/L							
Sodium, Dissolved	ND	0.15	mg/L							
LCS (B25L158-BS1)		Prepared: 18-Dec-25 Analyzed: 30-Dec-25								
Calcium, Dissolved	4.82	0.20	mg/L	5.00		96	85-115			
Magnesium, Dissolved	4.79	0.05	mg/L	5.00		96	85-115			
Potassium, Dissolved	4.68	0.20	mg/L	5.00		94	85-115			
Sodium, Dissolved	4.89	0.15	mg/L	5.00		98	85-115			
Matrix Spike (B25L158-MS1)		Source: 2512080-05		Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Calcium, Dissolved	39.0	0.20	mg/L	5.00	34.5	90	70-130			
Magnesium, Dissolved	19.9	0.05	mg/L	5.00	15.3	91	70-130			
Potassium, Dissolved	7.53	0.20	mg/L	5.00	2.57	99	70-130			
Sodium, Dissolved	53.5	0.15	mg/L	5.00	48.5	100	70-130			
Matrix Spike Dup (B25L158-MSD1)		Source: 2512080-05		Prepared: 18-Dec-25 Analyzed: 30-Dec-25						
Calcium, Dissolved	39.2	0.20	mg/L	5.00	34.5	93	70-130	0.5	20	
Magnesium, Dissolved	19.9	0.05	mg/L	5.00	15.3	93	70-130	0.4	20	
Potassium, Dissolved	7.49	0.20	mg/L	5.00	2.57	98	70-130	0.5	20	
Sodium, Dissolved	54.2	0.15	mg/L	5.00	48.5	115	70-130	1	20	

DEQ Laboratory and Environmental Assessment Division

Analytical Report

Sampling Event: 2512080

Qualifiers and Definitions

FDU1::B	Field primary and field duplicate exceeds control limits.
FDU3::B	Field primary and field duplicate exceeds control limits and confirmed by reanalysis.
SA4::A	Dissolved analyte greater than "total" analyte. Results acceptable. The difference is within the limitations of the analytical method.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
LOD	Limit of Detection
LOQ	Limit of Quantitation
ND*	In order to provide a consistent report format, numeric results provided by outside laboratories that are below the listed LOQ have been changed to "ND" at the LOQ provided by the outside laboratory.

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Oregon Department of Environmental Quality Chain of Custody Record ¹

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Client²: Groundwater Special StudiesProject³: Woodward Mine + Knife River GW Split 2025QAPP or SAP#⁴: DEQ25-LAB-0043-SAPSurvey⁵: 2025Survey Batch⁶: Dec-2025Sample Collector (s)⁷: Shane BennettSampling Agency⁸: DEQ LaboratoryQCat Code⁹: 26370-44844LEAD Coordinator and Contact #¹¹: Shane Bennett 971-337-4512Report Recipients¹²: Shane BennettTAT or Due Date¹⁰: 90 days 37224

Sample Information						Bottle Types ²⁰									
13 Item	STATION ID # ¹⁴	Collection Date ¹⁵ : <u>12.8.25</u>				Poly 1000mL	Poly 250mL; HNO3	Poly 250mL; HNO3; Filtered	IDEXX 120 ml	Poly 250mL; Filtered	Poly 500mL; H2SO4	AG, 125mL; H2SO4			
		Station Name ¹⁶	Time ¹⁷	Sample Type ¹⁸	Report Matrix ¹⁹										
1	42163	Woodward Mine MW-2	1407	FP	GW	1	1	1	1	2	1	1			
	42164	Woodward Mine MW-5 (2)			GW										
	42165	Woodward Mine MW-6 (2)			GW										
	42166	Woodward Mine MW-7 (2)			GW										
	42168	Woodward Mine MW-9 (2)			GW										
	42169	Woodward Mine MW-10 (2)			GW										
	42170	Woodward Land & Timber LLC WW-2A (2)			GW										
2	42163	MW-2	1408	FD	GW	1	1	1	1	2	1	1			
3	10000	Equipment Blank	1540	EB	RW	1	1	1	1	2	1	1			

Event Comments:

(2) SDB 12.8.25 - Will be sampled later in the week

Preservation
Type²²

Lot#

Exp Date

A) H2SO424F0210Feb 2027B) HNO325F001510.3.26

C)

Chain of Custody²¹

Relinquished By:	Agency/Company	Date/Time	Received by:	Agency/Company	Date/Time
<u>Shane Bennett</u>	<u>ODEQ/LEAD</u>	<u>12.11.25/1430</u>	<u>[Signature]</u>	<u>OWRD</u>	<u>12/11/25 1430</u>

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Oregon Department of Environmental Quality Chain of Custody Record ¹

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Client²: Groundwater Special StudiesProject³: Woodward Mine + Knife River GW Split 2025QAPP or SAP#⁴: DEQ25-LAB-0043-SAPSurvey⁵: 2025Survey Batch⁶: Dec-2025* Office Use Only *
Affix Work Order Barcode Here

2512080

Sample Collector (s)⁷: Shane BennettSampling Agency⁸: DEQ LaboratoryQCat Code⁹: 26370LEAD Coordinator and Contact #¹¹: Shane Bennett 971-337-4512Report Recipients¹²: Shane BennettTAT or Due Date¹⁰: 90 days

Sample Information					Bottle Types ²⁰								(90) 01/04/26		
Item ¹³	STATION ID # ¹⁴	Collection Date ¹⁵ : 12.9.25			Poly 1000mL	Poly 250mL; HNO3	Poly 250mL; HNO3; Filtered	IDEX 120 ml	Poly 250mL; Filtered	Poly 500mL; H2SO4	AG, 125mL; H2SO4				
		Station Name ¹⁶	Time ¹⁷	Sample Type ¹⁸											
	42163	Woodward Mine MW-2 (1)			GW	1	1	1	1	2	1	1			
	42164	Woodward Mine MW-5 (1)			GW										
	42165	Woodward Mine MW-6 (1)			GW										
	42166	Woodward Mine MW-7 (1)			GW										
4	42168	Woodward Mine MW-9	1500	GS	GW	1	1	1	1	2	1	1			
5	42169	Woodward Mine MW-10	1750	GS	GW	1	1	1	1	2	1	1			
6	42170	Woodward Land & Timber LLC WW-2A	1230	GS	GW	1	1	1	1	2	1	1			
				FD	GW										
	10000	Equipment Blank (1)			EB	RW									

Event Comments: ① SDB 12/10/25 - Either collected on 12/8 or will be collected on 12/10

Preservation Type ²²	Lot#	Exp Date
A) H ₂ SO ₄	24 F0210	Feb 2027
B) HNO ₃	25 F0015	10.3.26
C)		

Chain of Custody²¹

Relinquished By:	Agency/Company	Date/Time	Received by:	Agency/Company	Date/Time
Shane Bennett	ODEQ/LEAD	12.11.25/1430	<i>[Signature]</i>	ODEQ	12/11/25 1430

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Oregon Department of Environmental Quality Chain of Custody Record ¹

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Client²: Groundwater Special StudiesProject³: Woodward Mine + Knife River GW Split 2025QAPP or SAP#⁴: DEQ25-LAB-0043-SAPSurvey⁵: 2025Survey Batch⁶: Dec-2025* Office Use Only *
Affix Work Order Barcode Here

2512080

Sample Collector(s)⁷: Shane BennettSampling Agency⁸: DEQ LaboratoryQCat Code⁹: 26370 44844LEAD Coordinator and Contact #¹¹: Shane Bennett 971-337-4512Report Recipients¹²: Shane BennettTAT or Due Date¹⁰: 90 days 01/04/26

Sample Information						Bottle Types ²⁰									
Item ¹³	STATION ID # ¹⁴	Collection Date ¹⁵ : <u>12.10.25</u>				Poly 1000mL	Poly 250mL; HNO3	Poly 250mL; HNO3; Filtered	IDEXX 120 ml	Poly 250mL; Filtered	Poly 500mL; H2SO4	AG, 125mL; H2SO4			
		Station Name ¹⁶	Time ¹⁷	Sample Type ¹⁸	Report Matrix ¹⁹										
	42163	Woodward Mine MW-2	(1)			1	1	1	1	2	1	1			
7	42164	Woodward Mine MW-5	1405	GS	GW	1	1	1	1	2	1	1			
8	42165	Woodward Mine MW-6	1135	GS	GW	1	1	1	1	2	1	1			
9	42166	Woodward Mine MW-7	1600	GS	GW	1	1	1	1	2	1	1			
	42168	Woodward Mine MW-9	(1)	GS	GW										
	42169	Woodward Mine MW-10	(1)		GW										
	42170	Woodward Land & Timber LLC WW-2A	(1)		GW										
				FD	GW										
	10000	Equipment Blank	(1)	EB	RW										

Event Comments: <u>(1) SOB 12.11.25 - Collected on 12/8 or 12/9</u>	Preservation Type ²²	Lot#	Exp Date
	A) <u>H2SO4</u>	<u>24F0210</u>	<u>Feb 2027</u>
	B) <u>HNO3</u>	<u>25F0015</u>	<u>10.3.26</u>
C)			

Chain of Custody²¹

Relinquished By:	Agency/Company	Date/Time	Received by:	Agency/Company	Date/Time
<u>Shane Bennett</u>	<u>ODEQ/LEAD</u>	<u>12.11.25/1430</u>	<u>(Signature)</u>	<u>ODEQ</u>	<u>12/11/25 1430</u>

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Client²: Groundwater Special StudiesProject³: Woodward Mine + Knife River GW Split 2025QAPP or SAP#⁴: DEQ25-LAB-0043-SAPSurvey⁵: 2025Survey Batch⁶: Dec-2025Sample Collector (s)⁷: Shane BennettSampling Agency⁸: DEQ LaboratoryQCat Code⁹: 26370LEAD Coordinator and Contact#¹¹: Shane Bennett 971-337-451Report Recipients¹²: Shane BennettTAT or Due Date¹⁰: 90 days

Sample Information					Field Data ^{19, 20, 21, 24}										Item Comment: ^{22, 23, 24}
Item ²³	STATION ID # ¹⁴	Collection Date ¹⁵ : <u>12.8.25</u>			DTW	DTB	Temp	Sp Cond	pH	DO (Lum)	DO Sat (Lum)	ORP	Turb		
		Station Name ¹⁶	Time ¹⁷	Sample Type ¹⁸	ft (X.XX)	ft (X.XX)	°C (X.X)	umhos /cm (X)	SU (X.X)	mg/L (X.X)	% (X)	mV (X)	NTU (X)		
1	42163	Woodward Mine MW-2	1407	FP	11.72 36.0	36.0	12.9	758	7.66	4.70	NR	254.1	19.9		
	42164	Woodward Mine MW-5 (2)													
	42165	Woodward Mine MW-6 (2)													
	42166	Woodward Mine MW-7 (2)													
	42168	Woodward Mine MW-9 (2)													
	42169	Woodward Mine MW-10 (2)													
	42170	Woodward Land & Timber LLC WW-2A (3)													
2	42163	Woodward Mine MW-2	1408	FD	NA	NA	12.9	759	7.66	4.71	NR	255.7	22.7		
3	10000	Equipment Blank	1540	EB	NA	NA	12.9	91.4	5.94	9.35	97.7	262.7	0.64		

Event Comments: (1) SDB 12.8.25

(2) Will be sampled later in the week, SDB 12.8.25

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Client²: Groundwater Special StudiesProject³: Woodward Mine + Knife River GW Split 2025QAPP or SAP#⁴: DEQ25-LAB-0043-SAPSurvey⁵: 2025Survey Batch⁶: Dec-2025

2512080

* Office Use Only *
Affix Work Order Barcode HereSample Collector (s)⁷: Shane BennettSampling Agency⁸: DEQ LaboratoryQC Cat Code⁹: 26379LEAD Coordinator and Contact#¹¹: Shane Bennett 971-337-451Report Recipients¹²: Shane BennettTAT or Due Date¹⁰: 90 days

Report Recipients: Shane Bennett

Print Date: 12/9/25

Sample Information					Field Data ^{19, 20, 21, 24}										Item Comment: ^{22, 23, 24}
Item ¹³	STATION ID # ¹⁴	Collection Date ¹⁵ : 12.9.25			DTW	DTB	Temp	Sp Cond	pH	DO (lum)	DO Sat (lum)	ORP	Turb		
		Station Name ¹⁶	Time ¹⁷	Sample Type ¹⁸	ft (X.XX)	ft (X.XX)	°C (X.X)	umhos /cm (X)	SU (X.X)	mg/L (X.X)	% (X)	mV (X)	NTU (X)		
	42163	Woodward Mine MW-2 ①													
	42164	Woodward Mine MW-5 ①													
	42165	Woodward Mine MW-6 ①													
	42166	Woodward Mine MW-7 ①													
4	42168	Woodward Mine MW-9	1500	GS	24.74	40.0	12.8	688	7.49	4.74	NR	317.3	1.77		
5	42169	Woodward Mine MW-10	1750	GS	22.45	30.0	15.7	478.6	7.38	2.32	NR	294.3	2.65		
6	42170	Woodward Land & Timber LLC WW-2A	1230	GS	20.96	25.0	12.4	675	7.36	7.55	NR	330.1	6.0		
				FD											
	10000	Equipment Blank ①		EB	NA	NA									

Event Comments: ① SD3 12.10.25 - Either collected on 12/8 or will be collected on 12/10

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Client²: Groundwater Special StudiesProject³: Woodward Mine + Knife River GW Split 2025QAPP or SAP#⁴: DEQ25-LAB-0043-SAPSurvey⁵: 2025Survey Batch⁶: Dec-2025

2512080

* Office Use Only *
Affix Work Order Barcode HereSample Collector (s)⁷: Shane BennettSampling Agency⁸: DEQ LaboratoryQCat Code⁹: 26370 04/12/25LEAD Coordinator and Contact#¹¹: Shane Bennett 971-337-451Report Recipients¹²: Shane BennettTAT or Due Date¹⁰: 90 days 3/22/24

Sample Information					Field Data ^{19, 20, 21, 24}										Item Comment: ^{22, 23, 24}
Item ¹³	STATION ID # ¹⁴	Collection Date ¹⁵ : 12.10.25			DTW	DTB	Temp	Sp Cond	pH	DO (Lum)	DO Sat (Lum)	ORP	Turb		
		Station Name ¹⁶	Time ¹⁷	Sample Type ¹⁸	ft (X.XX)	ft (X.XX)	°C (X.X)	umhos /cm (X)	SU (X.X)	mg/L (X.X)	% (X)	mV (X)	NTU (X)		
	42163	Woodward Mine MW-2 (2)													
7	42164	Woodward Mine MW-5	1405	GS	20.11	71.0	13.8	734	7.59	0.59	NR (1)	64.0	3.83		
8	42165	Woodward Mine MW-6	1135	GS	67 32.6	62.0	14.5	816	7.20	5.28	NR	365.0	12.7		
9	42166	Woodward Mine MW-7	1600	GS	21.85	55.0	12.5	726	7.39	1.73	NR	235.4	1.99		
	42168	Woodward Mine MW-9 (2)													
	42169	Woodward Mine MW-10 (2)													
	42170	Woodward Land & Timber LLC WW-2A (2)													
				FD (2)											
	10000	Equipment Blank (2)		EB (2)	NA	NA									

Event Comments: (1) SDB 12.11.25

(2) Collected on 12/8 or 12/9 - SDB 12.11.25

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Client²: Groundwater Special Studies* Office Use Only *
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Sample Information				Check Equip. ²² & Method ²³ :									Comments ¹¹		
				☐ Quanti-Tray 2000®			☐ Quanti-Tray®								
				☐ Colilert-24 (freshwater)			☐ Enterolert - 24 (saltwater)			☐ Colilert - 18					
Item ¹³	Station ID # ¹⁴	Collection Date ¹⁵ : <u>12.8.25</u>	Station Name ¹⁶	Time ¹⁷	Sample Type ¹⁸	Small Well Count ²⁰	Large Well Count ²⁰	MPN ¹⁹ /100 mls	Small Well Count ²⁰	Large Well Count ²⁰	MPN ¹⁹ /100 mls	Small Well Count ²⁰	Large Well Count ²⁰	MPN ¹⁹ /100 mls	
1	42163		Woodward Mine MW-2			0	0	<1	0	0	<1				
	42164		Woodward Mine MW-5												
	42165		Woodward Mine MW-6												
	42166		Woodward Mine MW-7												
	42168		Woodward Mine MW-9												
	42169		Woodward Mine MW-10												
	42170		Woodward Land & Timber LLC WW-2A												
2	42163		Woodward Mine MW-2		FD				0	0	<1				
3	10000		Equipment Blank		EB				0	0	<1				

Event Comments:²³ ① SDB 12.9.25

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Client²: Groundwater Special StudiesProject³: Woodward Mine + Knife River GW Split 2025QAPP or SAP#⁴: DEQ25-LAB-0043-SAPSurvey⁵: 2025Survey Batch⁶: Dec-25* Office Use Only *
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Sample Collector (s)⁷: Shane BennettSampling Agency⁸: DEQ LaboratoryQCat Code⁹: 26370LEAD Coordinator and Contact#¹¹: Shane Bennett 971-337-451Report Recipients¹²: Shane BennettTAT or Due Date¹⁰: 90 days

Sample Information				Check Equip. ²² & Method ²³ :									Comments ²¹		
				☐ Quanti-Tray 2000® ☐ Colilert-24 (freshwater) ☐ Enterolert - 24 (saltwater) ☐ Colilert - 18											
Item ²³	Station ID # ¹⁴	Collection Date ¹⁵ : <u>12.10.25</u>	Station Name ¹⁶	Time ¹⁷	Sample Type ¹⁸	E.Coli			Total Coliforms			Enterococcus			
						Small Well Count ²³	Large Well Count ²³	MPN ¹⁹ /100 mls	Small Well Count ²³	Large Well Count ²³	MPN ¹⁹ /100 mls	Small Well Count ²³	Large Well Count ²³	MPN ¹⁹ /100 mls	
	42163		Woodward Mine MW-2 ①												
7	42164		Woodward Mine MW-5	1405					② 0	6	7.4				
8	42165		Woodward Mine MW-6	1135					0	6	2.1				
9	42166		Woodward Mine MW-7	1600					2	6	8.4				
	42168		Woodward Mine MW-9 ①												
	42169		Woodward Mine MW-10 ①												
	42170		Woodward Land & Timber LLC WW-2A ①												
					FD										
	10000		Equipment Blank ①		EB										

Event Comments²³:① Collected either 12/8 or 12/9 - SOB 12.11.25
② SOB 12.11.25

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Client²: Groundwater Special Studies

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Project³: Woodward Mine + Knife River GW Split 2025

QAPP or SAP#⁴: DEQ25-LAB-0043-SAP

Survey⁵: 2025

Survey Batch⁶: Dec-25

Sample Collector (s)⁷: Shane Bennett

Sampling Agency⁸: DEQ Laboratory

QC Cat Code⁹: 26370
TAT or Due Date¹⁰: 90 days

LEAD Coordinator and Contact#¹¹: Shane Bennett 971-337-451

Report Recipients¹²: Shane Bennett

Sample Information					Check Equip. ²² & Method ²³ :									
					☐ Quanti-Tray 2000® ☐ Colilert-24 (freshwater) ☐ Enterolert - 24 (saltwater) ☐ Colilert - 18									
Item ¹³	Station ID # ¹⁴	Collection Date ¹⁵ : <u>12.9.25</u>	Time ¹⁷	Sample Type ¹⁸	E.Coli			Total Coliforms			Enterococcus			Comments ²¹
		Small Well Count ²⁰			Large Well Count ²⁰	MPN ¹⁹ /100 mls	Small Well Count ²⁰	Large Well Count ²⁰	MPN ¹⁹ /100 mls	Small Well Count ²⁰	Large Well Count ²⁰	MPN ¹⁹ /100 mls		
	42163	Woodward Mine MW-2												
	42164	Woodward Mine MW-5												
	42165	Woodward Mine MW-5												
	42166	Woodward Mine MW-7												
4	42168	Woodward Mine MW-9	1500	GS				0	0	41				
5	42169	Woodward Mine MW-10	1750	GS				0	0	41				
6	42170	Woodward Land & Timber LLC WW-2A	1230	GS				0	0	41				
				FD										
	10000	Equipment Blank		FB										

Event Comments²³: ① SCS 12.11.25 - Collected on 12/8 or 12/10

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Oregon Department of Environmental Quality Bacteria Field Form

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Client²: Groundwater Special StudiesProject³: Woodward Mine + Knife River GW Split 2025QAPP or SAP#⁴: DEQ25-LAB-0043-SAPSurvey⁵: 2025Survey Batch⁶: Dec-2025* Office Use Only *
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Sample Collector (s)⁷: Shane BennettSampling Agency⁸: DEQ LaboratoryQCat Code⁹: 26370LEAD Coordinator and Contact#¹¹: Shane Bennett 971-337-4512Report Recipients¹²: Shane BennettTAT or Due Date¹⁰: 90 days

Incubator Information

Quality Control Measures	Incubator ID: <u>Bockell (Ambient)</u>			Incubator ID:	
	Date	Time	Temperature	Time	Temperature
Sample Setup ¹³	<u>12.8.25</u>	<u>2033</u>			
Sample Read ¹⁴	<u>12.9.25</u>	<u>2033</u>			
1st Incubator Temperature ¹⁵	<u>12.8.25</u>	<u>2033</u>	<u>35.0°C</u>		
2nd Incubator Temperature ¹⁶	<u>12.9.25</u>	<u>2033</u>	<u>35.1°C</u>		
1st NIST Temperature ¹⁷	<u>12.8.25</u>	<u>2033</u>	<u>34.8°C</u>		
2nd NIST Temperature ¹⁸	<u>12.8.25</u>	<u>2033</u>	<u>35.1°C</u>		
If Applicable: 1st Cooler Temp (am) ¹⁹	<u>12.8.25</u>	<u>NR</u>	<u>NR</u>		
If Applicable: 2nd Cooler Temp (pm) ²⁰	<u>12.8.25</u>	<u>2015</u>	<u>0.7°C</u>		

Event Comments:²¹ DOB 12.9.25

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Oregon Department of Environmental Quality Bacteria Field Form

Client²: **Groundwater Special Studies**

Project³: **Woodward Mine + Knife River GW Split 2025**

QAPP or SAP#⁴: **DEQ25-LAB-0043-SAP**

Survey⁵: **2025**

Survey Batch⁶: **Dec-2025**

Sample Collector (s)⁷: **Shane Bennett**

Sampling Agency⁸: **DEQ Laboratory**

QC Cat Code⁹: **26270 41844**

LEAD Coordinator and Contact#¹¹: **Shane Bennett 971-337-4512**

Report Recipients¹²: **Shane Bennett**

TAT or Due Date¹⁰: **90 days 01/12/26**

Incubator Information					
Quality Control Measures	Incubator ID: Drexel 5 Ambient			Incubator ID:	
	Date	Time	Temperature	Time	Temperature
Sample Setup ¹³	12.9.25	20:17			
Sample Read ¹⁴	12.10.25	20:39			
1st Incubator Temperature ¹⁵	12.9.25	20:17	35.1		
2nd Incubator Temperature ¹⁶	12.10.25	20:39	35.0		
1st NIST Temperature ¹⁷	12.9.25	20:17	35.1		
2nd NIST Temperature ¹⁸	12.10.25	20:39	34.9		
If Applicable: 1st Cooler Temp (am) ¹⁹ #4011926	12.9.25	1248	1.76		
If Applicable: 2nd Cooler Temp (pm) ²⁰	Thermometer is broken				

Event Comments:²¹

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Oregon Department of Environmental Quality Bacteria Field Form

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Client²: **Groundwater Special Studies**Project³: **Woodward Mine + Knife River GW Split 2025**QAPP or SAP#⁴: **DEQ25-LAB-0043-SAP**Survey⁵: **2025**Survey Batch⁶: **Dec-2025**

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2512080

Sample Collector (s)⁷: **Shane Bennett**Sampling Agency⁸: **DEQ Laboratory**QCat Code⁹: **26370-44844**LEAD Coordinator and Contact#¹¹: **Shane Bennett 971-337-4512**Report Recipients¹²: **Shane Bennett**TAT or Due Date¹⁰: **90 days 3/12/26**

Incubator Information

Quality Control Measures	Incubator ID: Boetel (Ambient)			Incubator ID:	
	Date	Time	Temperature	Time	Temperature
Sample Setup ¹³	12.10.25	2039			
Sample Read ¹⁴	12.11.25	2040			
1st Incubator Temperature ¹⁵	12.10.25	2039	35.0		
2nd Incubator Temperature ¹⁶	12.11.25	2040	35.0		
1st NIST Temperature ¹⁷	12.10.25	2039	34.9		
2nd NIST Temperature ¹⁸	12.11.25	2040	35.0		
If Applicable: 1st Cooler Temp (am) ¹⁹	(1)				
If Applicable: 2nd Cooler Temp (pm) ²⁰					

Event Comments:²¹ **① Thermometer was broken, could not record cooler temps.**

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Oregon Department of Environmental Quality Field Meter Continuing Calibration Verification (CCV)

Client¹: Groundwater Special Studies

Sample Collector(s)³: Shane Bennett

Date: 12.8.25

Conductivity		Meter ID ⁴ : <u>Columbo Shaft</u>		Accuracy Criterion: +/- 7%	
Pre time ⁷ : <u>1022</u>		Post time ⁸ : <u>1620</u>			
Std	Temp (°C)	Read (µS/cm)	Diff (%)	Pass ⁹ (Y/N)	
100	11.4	100.5	.5	Y	
1000	11.5	995	1.5	Y	

Dissolved O ₂		Meter ID ⁴ : <u>Columbo Shaft</u>		Sat Air Accuracy Criterion: +/- 0.3 mg/L Sat Water Accuracy Criterion: -0.3 to 0.4 mg/L	
Pre time ⁷ : <u>1022</u>		Post time ⁸ : <u>8 20:20</u>			
Standard Type Circle one ¹¹ :		Recalibrating? ¹⁰ (See Reverse Side)			
Temp (°C)	mmHg	% Sat Reading	mg/L Reading	Temp (°C)	mmHg
<u>12.7</u>	<u>289.4</u>	<u>97.9</u>	<u>9.43</u>	<u>20.7</u>	<u>684.8</u>
<u>14.2</u>	<u>490.0</u>	<u>97.2</u>	<u>9.24</u>	<u>10.9</u>	<u>8.22</u>
Std (mg/L)		Diff (mg/L)		Pass ⁹ (Y/N)	
<u>9.59</u>		<u>-1.2</u>		<u>Y</u>	
<u>9.30</u>		<u>-0.6</u>		<u>Y</u>	

Standards QA information ¹²					
pH			Conductivity (µS/cm)		
Std Value	7	10	4	100	1000
Lot #	<u>243529</u>	<u>242043</u>	<u>243557</u>	<u>2503H22</u>	<u>1408G05</u>
Exp. Date	<u>8/26</u>	<u>9/26</u>	<u>8/26</u>	<u>2/27</u>	<u>7/26</u>

Meter Comments (include errors, damage/leaks, repair needs, or other observations):

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Work Order #: 2512080

Project²: Woodward Mine + Knife River GW Split 2025

Survey⁴: 2025

Survey Batch⁵: Dec-2025

Sampling Agency: DEQ Laboratory

pH		Meter ID ⁴ : <u>Columbo Shaft</u>		Accuracy Criterion: +/- 0.2 SU Recalibration Criterion: +/- 0.1 SU	
Pre time ⁷ : <u>1022</u>		Post time ⁸ : <u>1620</u>			
Standard Type Circle one ¹¹ :		Recalibrating? ¹⁰ (See Reverse Side)			
Temp (°C)	Theo (SU)	Read (SU)	Diff (SU)	Pass ⁹ (Y/N)	
<u>4</u>	<u>11.6</u>	<u>4.00</u>	<u>3.96</u>	<u>-0.04</u>	<u>Y</u>
<u>7</u>	<u>11.5</u>	<u>7.05</u>	<u>7.08</u>	<u>.03</u>	<u>Y</u>
<u>10</u>	<u>11.5</u>	<u>10.17</u>	<u>10.25</u>	<u>.08</u>	<u>Y</u>

ORP		Meter ID ⁴ : <u>Columbo Shaft</u>		Accuracy Criterion: +/- 20mV	
Pre time ⁷ : <u>1022</u>		Post time ⁸ : <u>1620</u>			
Standard Type Circle one ¹¹ :		Recalibrating? ¹⁰ (See Reverse Side)			
Temp (°C)	Read (mV)	Diff (mV)	Pass ⁹ (Y/N)	Temp (°C)	Read (mV)
<u>220</u>	<u>12.9</u>	<u>213.3</u>	<u>-6.7</u>	<u>Y</u>	
<u>220</u>	<u>12.8</u>	<u>212.4</u>	<u>-7.6</u>	<u>Y</u>	

Turbidity		Meter ID ⁴ : <u>50822</u>		Accuracy Criterion: +/- 10%	
Pre time ⁷ : <u>1022</u>		Post time ⁸ : <u>1620</u>			
Std	Read (NTU)	Diff (%)	Pass ⁹ (Y/N)	Read (NTU)	Pass ⁹ (Y/N)
<u>4.04</u>	<u>3.69</u>	<u>9.5</u>	<u>Y</u>	<u>3.75</u>	<u>Y</u>
<u>506</u>	<u>522</u>	<u>3.2</u>	<u>Y</u>	<u>534</u>	<u>Y</u>
<u>52.8</u>	<u>50.8</u>	<u>3.8</u>	<u>Y</u>	<u>52.5</u>	<u>Y</u>

Temperature	
Date of last 2-Point Check ¹⁴	<u>12.5.25</u>

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Oregon Department of Environmental Quality Field Meter Continuing Calibration Verification (CCV)

Client: Groundwater Special StudiesSample Collector(s): Shane BennettDate: 12.9.25

Conductivity		Meter ID: <u>Shaft</u>		Accuracy Criterion: +/- 7%			
Pre time: <u>840</u>		Post time: <u>1814</u>					
Std	Temp (°C)	Read (µS/cm)	Diff (%)	Pass ⁹ (Y/N)	Temp (°C)	Read (µS/cm)	Pass ⁹ (Y/N)
100	10.8	101.1	1.1	Y	11.2	101.1	Y
1000	10.9	995	0.5	Y	11.3	993	Y

Dissolved O ₂		Meter ID: <u>Shaft</u>		Sat Air Accuracy Criterion: +/- 0.3 mg/L Sat Water Accuracy Criterion: -0.3 to 0.4 mg/L			
Pre time: <u>741</u>		Post time: <u>1814</u>					
Standard Type Circle one ¹¹ :		Recalibrating? ¹⁰ (See Reverse Side)					
Temp (°C)	mmHg	% Sat Reading	mg/L Reading	Temp (°C)	mmHg	% Sat Reading	mg/L Reading
<u>(Air)</u> 19.8	684.4	100.9	8.29	<u>(Air)</u> 11.4	688.6	100.6	9.96
Water	Std (mg/L)	Diff (mg/L)	Pass ⁹ (Y/N)	Water	Std (mg/L)	Diff (mg/L)	Pass ⁹ (Y/N)
	8.20	.09	Y		9.89	-.07	Y

Standards QA information ¹²							
pH				Conductivity (µS/cm)			
Std Value	7	10	4	100	1000	US	200mV
Lot #	243529	242043	243557	2503122	1408005		CU1
Exp. Date	8/26	6/26	8/26	3/27	7/26		6/26

Meter Comments (include errors, damage/flows, repair needs, or other observations):

Rev. 4.3

10/18/2024

For Office Use Only:

Page 14 of 16 Work Order #: 2512080Project: Woodward Mine + Knife River GW Split 2025Survey: 2025Survey Batch: Dec-2025Sampling Agency: DEQ Laboratory

pH		Meter ID: <u>Shaft</u>		Accuracy Criterion: +/- 0.2 SU Recalibration Criterion: +/- 0.1 SU			
Pre time: <u>840</u>		Post time: <u>1840</u>					
Standard Type Circle one ¹¹ :		Recalibrating? ¹⁰ (See Reverse Side)					
Temp (°C)	Theo (SU)	Read (SU)	Diff (SU)	Pass ⁹ (Y/N)	Temp (°C)	Theo (SU)	Read (SU)
4	11.5	4.00	3.92	Y	11.3	4.00	3.98
7	10.9	7.06	7.04	Y	11.2	7.05	7.07
10	10.9	10.18	10.19	Y	11.3	10.18	10.28

ORP		Meter ID: <u>Shaft</u>		Accuracy Criterion: +/- 20mV			
Pre time: <u>840</u>		Post time: <u>1840</u>					
Temp (°C)	Read (mV)	Diff (mV)	Pass ⁹ (Y/N)	Temp (°C)	Read (mV)	Diff (mV)	Pass ⁹ (Y/N)
220	13.3	213.1	-6.9	Y	11.4	211.7	-8.3

Turbidity		Meter ID: <u>50322 51386</u>		Accuracy Criterion: +/- 10%		
Pre time: <u>840</u>		Post time: <u>1840</u>				
Std	Read (NTU)	Diff (%)	Pass ⁹ (Y/N)	Read (NTU)	Diff (%)	Pass ⁹ (Y/N)
<u>4.04</u> ^{6.0}	<u>5.32</u> ^{5.32}	1.3	Y	5.96	21	Y
<u>40.6</u> ^{40.6}	<u>51.7</u> ^{40.2}	<u>1.0</u> ^{1.7}	Y	40.3	21	Y
<u>47.5</u> ^{50.0}	<u>53.3</u> ^{47.5}	<u>2.1%</u> ^{25.3}	Y	47.7	21	Y

Temperature
Date of last 2-Point Check ¹⁴
<u>12/5/25</u>

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Oregon Department of Environmental Quality Field Meter Continuing Calibration Verification (CCV)

Client¹: Groundwater Special StudiesSample Collector(s)³: Shane BennettDate: 12/10/25

Conductivity		Meter ID ⁶ : <u>Shaft</u>		Accuracy Criterion: +/- 7%			
Pre time ⁷ : <u>840</u>		Post time ⁸ : <u>1720</u>					
Std	Temp (°C)	Read (µS/cm)	Diff (%)	Pass ⁹ (Y/N)	Temp (°C)	Read (µS/cm)	Pass ⁹ (Y/N)
100	10.0	100.4	.4	Y	11.4	100.1	0.1 Y
1000	9.9	996	-.4	Y	11.4	995	0.5 Y

Dissolved O ₂		Meter ID ⁶ : <u>Shaft</u>		Sat Air Accuracy Criterion: +/- 0.3 mg/L Sat Water Accuracy Criterion: -0.3 to 0.4 mg/L			
Pre time ⁷ : <u>750</u>		Post time ⁸ : <u>1635</u>					
Standard Type Circle one ¹¹ :		Recalibrating? ¹⁰ (See Reverse Side)					
Temp (°C)	mmHg	% Sat Reading	mg/L Reading	Temp (°C)	mmHg	% Sat Reading	mg/L Reading
<u>Air</u> 8.2	686.3	101.4	10.80	<u>Air</u> 12.0	689.0	100.8	9.85
Water	Std (mg/L)	Diff (mg/L)	Pass ⁹ (Y/N)	Water	Std (mg/L)	Diff (mg/L)	Pass ⁹ (Y/N)
	10.63	-.17	Y		9.76	.09	Y

Standards QA information ¹²							
pH				Conductivity (µS/cm)		LIS	ORP
Std Value	7	10	4	100	1000		200mV
Lot #	243529	242043	243557	25031122	14088005		6CU1
Exp. Date	8/26	6/26	8/26	3/27	7/26		6/26

Meter Comments [include errors, damage/leaks, repair needs, or other observations]:

For Office Use Only:

Page 15 of 16Work Order #: 2512080Project²: Woodward Mine + Knife River GW Split 2025Survey⁴: 2025Survey Batch⁵: Dec-2025Sampling Agency: DEQ Laboratory

pH		Meter ID ⁶ : Shaft				Accuracy Criterion: +/- 0.2 SU Recalibration Criterion: +/- 0.1 SU				
Pre time ⁷ : 840		Recalibrating? ¹⁰ (See Reverse side)		☐		Post time ⁸ : 1635				
Std	Temp (°C)	Theo (SU)	Read (SU)	Diff (SU)	Pass ⁹ (Y/N)	Temp (°C)	Theo (SU)	Read (SU)	Diff (SU)	Pass ⁹ (Y/N)
4	9.4	3.40	3.94	-.06	Y	11.8	4.00	3.93	-.07	Y
7	9.3	7.06	7.06	0	Y	11.9	7.05	7.02	-.03	Y
10	9.3	10.19	10.28	-.09	Y	12.0	10.17	10.12	-.05	Y

ORP		Meter ID ⁶ : <u>Shaft</u>		Accuracy Criterion: +/- 20mV			
Pre time ⁷ : <u>840</u>		Post time ⁸ : <u>1635</u>					
Temp (°C)	Read (mV)	Diff (mV)	Pass ⁹ (Y/N)	Temp (°C)	Read (mV)	Diff (mV)	Pass ⁹ (Y/N)
220	10.0	213.3	-6.7 Y	12.3	214.2	-5.8 Y	

Turbidity		Meter ID ⁶ : <u>51386</u>		Accuracy Criterion: +/- 10%			
Pre time ⁷ : <u>840</u>		Post time ⁸ : <u>1635</u>					
Std	Read (NTU)	Diff (%)	Pass ⁹ (Y/N)	Read (NTU)	Diff (%)	Pass ⁹ (Y/N)	
6.0	592	1.3	Y	6.02	21	Y	
40.6	40.3	<1	Y	40.2	<1	Y	
475	476	<1	Y	478	<1	Y	

Temperature	
Date of last 2-Point Check ¹⁴	<u>12.5.25</u>

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Sample Receipt Checklist

Approved and current. Effective starting 5/29/2025. DEQ04-LAB-0043-FORM (version 2.0) Sample Receipt Checklist



Work Order Number: 151208D Date & Time Received: 12/11/25 1430

Project Name: FW Special Studies - Woodward Mine + Knap River Split

Shipping Containers

Number of shipping containers: 02

Samples require thermal preservation: ☒ Y ☐ N
Cooler(s) contained ice: ☒ Y ☐ N

Container / Cooler: 1 2

Corrective Actions

Temperature Check: 3.2 °C 1.2 °C _____ °C
If the samples require thermal preservation and do not meet program/method specific criteria, document non-conformance in Element and notify project manager.

Thermometer ID: IR1/IR2/THERM2 Therm 2

Sample Condition

Yes No

- ☒ Were samples collected in the appropriate containers?
- ☒ Were sample labels recorded clearly and do they match COC?
- ☒ Were samples received intact and without damage?
- ☒ Were sample volumes sufficient for the requested analyses?
- ☒ Were all samples received within their holding times?

Corrective Actions

If the response is "No" document nonconformances and contact the sample collector and/or project manager to determine if analysis will proceed. All decisions to proceed, cancel, or resample must be documented in Element.

Sample Preservation

Yes No

- ☒ Were samples taken same day as temperature recorded?
- ☒ Was sample preservation checked at the time of sample receipt?
- ☒ Were all samples properly preserved (where appropriate)?

Corrective Actions

If the response is "No" follow procedure outlined in DEQ06-LAB-0054-SOP section 7.2. Document the corrective action on the "Sample Preservation Form" and in Element in the Container and Analysis comment section.

Chain of Custody

Yes No

- ☒ Was a custody seal present? ☐ On Cooler ☐ On Container
- ☒ Was the custody seal intact? ☐ On Cooler ☐ On Container
- ☒ Was the Chain of Custody form present and properly signed? ☐ Not Present ☐ Not Signed

Comments:

Received By/Date:

Shanfuad 12/11/25



Oregon

Tina Kotek, Governor

Department of Geology and Mineral Industries

Mineral Land Regulation & Reclamation

229 Broadalbin Street SW

Albany, OR 97321

(541) 967-2039

Fax: (541) 967-2075

www.oregon.gov/dogami

October 31, 2024

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To: John Eisler
Crook County Community Development Director
300 NE 3rd Street
Prineville, OR 97754

RE: October 20, 2025, Letter with Questions from Crook County to DOGAMI.

Dear John:

DOGAMI appreciates the concerns and questions expressed by Crook County to DOGAMI in the letter dated October 20, 2025. Before responding we would like to note that definitions set at the local land use level can be and often are different than definitions set at the state level. For example, the Deschutes County definition of "surface mining" (see Deschutes County Code copied and linked below) is similar to, but has significant differences, from DOGAMI's definition of "surface mining" (see ORS 517.750(16) copied below). As such, the definitions and perspective provided below should not be applied without considering Crook County's authority related to land use and authority related to surface mining operations.

Although the questions below are being asked in relation to a particular mine site, the Knife River Woodward Site (DOGAMI ID# 07-0159), Crook County should consider their applicability to other mine sites more generally, especially those mine sites conducting similar activities within the area surrounding the Woodward and Vanier properties.

Select Deschutes County Code definitions related to Surface Mining ([DCC 18.04.030](#), [DCC 18.52; Surface Mining](#)):

- "Surface mining":
 - A. Includes:
 1. All or any part of the process of mining by removal of the overburden and extraction of natural mineral deposits thereby exposed by any method including, open pit mining operations, auger mining operations, processing, surface impacts of underground mining, production of surface mining refuse and the

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construction of adjacent or off-site borrow pits, except those constructed for access roads; and

2. Mining which involves more than 1,000 cubic yards of material or excavation prior to mining of a surface area of more than one acre.

B. Does not include:

1. The construction of adjacent or off-site borrow pits which are used for access roads to the surface mine;
 2. Excavation and crushing of sand, gravel, clay, rock or other similar materials conducted by a landowner, contractor or tenant on the landowner's property for the primary purpose of construction, reconstruction or maintenance of access roads and excavation or grading operations conducted in the process of farming or cemetery operations, on-site road construction and other on-site construction, or nonsurface impacts of underground mines; and
 3. Batching and blending of mineral and aggregate into asphaltic concrete or portland cement concrete.
- **"Surface mining, minerals":** means includes, but is not limited to, soil, select fill, coal, clay, stone, sand, gravel, aggregate, pumice, cinders, metallic ore, and any other inorganic solid excavated from a natural deposit in the earth for commercial, industrial, or construction use.
 - **"Surface mining, operator":** means any person or entity engaged in surface mining.
 - **"Surface mining, processing":** means processing includes crushing, washing, milling and screening as well as batching and blending of mineral aggregate into asphaltic concrete and portland cement concrete. (NOTE: Processing of mineral and aggregate material into secondary products, such as building materials, is allowed in industrial zones and may be sited as part of a limited use combining zone in conformance with all plan amendment and zone change requirements of the County comprehensive plan and zoning ordinance.)

Select DOGAMI Definitions from Oregon Revised Statute (ORS) [Chapter 517](#):

ORS 517.750 Definitions for ORS 517.702 to 517.989. As used in ORS 517.702 to 517.989, unless the context requires otherwise:

(12) "Processing" includes, but is not limited to, crushing, washing, milling and screening as well as the batching and blending of mineral aggregate into asphalt and portland cement concrete located within the operating permit area.

(13) "Reclamation" means the employment in a surface mining operation or exploration of procedures reasonably designed to:

- (a) Minimize, as much as practicable, the adverse effects of the surface mining operation or exploration on land, air and water resources; and
- (b) Provide for the rehabilitation of surface resources adversely affected by the surface mining operations or exploration through the rehabilitation of plant cover, soil stability and water resources and through other measures that contribute to the subsequent beneficial use of the explored, mined or reclaimed lands.

(16)(a) "Surface mining" includes:

(A) All or any part of the process of mining minerals by the removal of overburden and the extraction of natural mineral deposits thereby exposed by any method by which more than 5,000 cubic yards of minerals are extracted or by which at least one acre of land is affected within a period of 12 consecutive calendar months, including open-pit mining operations, auger mining operations, processing, surface impacts of underground mining, production of surface mining refuse and the construction of adjacent or off-site borrow pits, except those constructed for use as access roads.

(B) Removal or filling, or both, within the beds or banks of any waters of this state that is the subject of a memorandum of agreement between the Department of State Lands and the State Department of Geology and Mineral Industries in which the State Department of Geology and Mineral Industries is assigned sole responsibility for permitting as described in ORS 517.797.

(b) "Surface mining" does not include:

- (A) Excavations of sand, gravel, clay, rock or other similar materials conducted by the landowner or tenant for the primary purpose of construction, reconstruction or maintenance of access roads on the same parcel or on an adjacent parcel that is under the same ownership as the parcel that is being excavated;
- (B) Excavation or grading operations, reasonably necessary for farming;
- (C) Nonsurface effects of underground mining;
- (D) Removal of rock, gravel, sand, silt or other similar substances removed from the beds or banks of any waters of this state pursuant to a permit issued under ORS 196.800 to 196.900;
- (E) Excavations or reprocessing of aggregate material, or grading operations, within the highway right of way reasonably necessary for the construction, reconstruction or maintenance of a highway as defined in ORS 801.305;
- (F) Excavation or movement of materials on site at a landfill, as defined in ORS 459.005, for the primary purpose of construction, reconstruction or maintenance of access roads or for landfill operations, including but not limited to landfill cell construction and daily, interim and final cover operations, if the excavation or movement of materials is covered by a permit issued by the Department of Environmental Quality under ORS 459.205 to 459.385;
- (G) Excavation or grading operations necessary for construction and maintenance of utilities or drainage facilities, where the excavated material is used on site and is not sold into the commercial market as aggregate material; or
- (H) Excavation or grading operations that:
 - (i) Are associated with on-site construction activities; and
 - (ii) Do not result in any excavated materials being sold into the commercial market.

DOGAMI Responses to Questions

Question 1: *CUP Condition of Approval 2 states that activities on tax lot 703 (the EFU parcel) "will be limited to sand and gravel extraction and water storage only. No processing will be allowed on this portion of the subject property zoned for exclusive farm use." The "water storage" refers to what is now termed the "settling ponds." I am not sure if the Planning*

Commission was fully aware of exactly how the operations at this site would take place, but to me, the settling ponds seem to be an inseparable part of processing. Does DOGAMI view the "settling ponds" as solely water storage or a component of aggregate processing?

DOGAMI and DEQ regulatory considerations related to processing:

- **DOGAMI statutory definition of processing ORS 517.750(12):** "Processing" includes, but is not limited to, crushing, washing, milling and screening as well as the batching and blending of mineral aggregate into asphalt and portland cement concrete located within the operating permit area.
- **DEQ WPCF 1000 General Permit, "SOURCES COVERED BY THIS PERMIT":** Sand, gravel and other non-metallic mineral quarrying and mining operations that dispose of all process wastewater and storm water by recirculation, evaporation, and/or controlled seepage with no discharge to surface waters. Asphalt mix batch plants, concrete batch plants, and other related activities located on site are also covered.

Based on DOGAMI's statutory definition of processing (see ORS 517.750(12) above) and the use of the ponds for the disposal of process water under the DEQ WPCF 1000 General Permit, the settling ponds are an integral part of the facility processing operations. The settling ponds are also used for water storage. Note that a 7-acre pond is shown in the western portion of tax lot 703 on the site plan map, dated August 3, 2015 (attached), that was submitted to both Crook County and DOGAMI as part of the initial permitting of the site by both agencies. However, it was not clear in the application materials that the pond was going to be used for process water settling as part of the processing operations. DOGAMI Operating Permit Condition #9 (attached) states "The Permittee must, conduct all processing within Tax Lot 702". Based on the above considerations, the current use of the "settling ponds" on tax lot 703 for the settling of process water is inconsistent with both the state and county approvals. DOGAMI suggests a follow-up conversation to discuss compliance options.

***Question 2:** CUP Condition of Approval 26 uses the undefined term "mining ponds." It has been explained to me that a mining pond is a cell excavated below the water table such that there is standing water in the open cell. Once fill is provided to a level that the open cell no longer has standing water it is no longer a "mining pond." Is my understanding consistent with DOGAMI's interpretation of that term?*

Yes, your understanding is consistent with DOGAMI's general use of the term "mine ponds". Please note that DOGAMI Statutes and Administrative Rules do not provide a formal definition of the term "mine pond(s)". Also, DOGAMI reviewed several reputable glossaries of geologic and mining terms but could not find any common definition of the term "mine pond(s)". As DOGAMI's Floodplain Mining Reclamationist, I have used the term very generally to mean any excavation pit created by mining that has since filled or partially filled with groundwater or surface water if the ponding occurs on a seasonal basis. The operating and reclamation plan for any mine site must specify if a pond will be left following the completion of mining operations. The operating and reclamation plan dated June 5, 2015, for the Woodward site (attached)

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notes that ponds will be created during the mining operation, however, no ponds will be left following final site reclamation.

Question 3: *CUP Condition of Approval 22 and 23 state, respectively:*

- *The site will be reclaimed concurrently with mining as cells are completed; and*
- *All reclamation activities will be subject to a reclamation plan approved by the Department of Geology and Mineral Industries.*

These two conditions have proven to be incompatible. With DOGAMI permit no. 07-0159, both the Woodward site and the subsequent Vanier site are considered the same project, with final reclamation not due until all aggregate operations are complete. Under our local land use, these are two separate CUPs and any activities on Vanier are irrelevant to the timeliness obligations of final reclamation on the Woodward site. My issue is that the wording-"All reclamation activities will be subject to" DOGAMI's reclamation plan seemingly trumps the previous condition of approval. In DOGAMI's eyes, can Crook County enforce the prior condition requiring final reclamation (other than the cell open as part of the Sampling Plan) despite being in compliance with the DOGAMI permit? Alternatively, could the DOGAMI permit enforce the CUP reclamation requirements in this unique case?

From DOGAMI's perspective, the Woodward CUP conditions 22 and 23, mentioned above, are not necessarily incompatible. The DOGAMI approved operating and reclamation plan, dated June 5, 2015, for the Woodward site (attached) states the site will be reclaimed concurrently, which is consistent with the intent of Woodward CUP Condition of Approval #22. There are several portions of the Woodward Site where former excavation areas have not been reclaimed back to agriculture consistent with the Woodward CUP condition 22. These include, 1) the excavation area (mine cell) that has been incorporated into the Groundwater Investigation Sample Analysis Plan, 2) the portion of the site with the settling ponds, and 3) an area in the south-central portion of tax lot 703 just north of tax lot 702 that is currently being used for stockpiling. The mine cell that was incorporated into the Groundwater Investigation Sample Analysis Plan (SAP) should be considered an exception to allow for at least one year of sampling data to be collected under the SAP to address concerns regarding potential impacts to groundwater. The fact that the other two areas, the portion of the site containing the process water ponds, and the portion of the site that was mined and is now being used for stockpiling, have not been concurrently reclaimed to agriculture per the Woodward CUP condition 22 is inconsistent with both the CUP and the DOGAMI operating and reclamation plan.

The Woodward site and proposed Vanier expansion being covered under the same DOGAMI permit but separate land use approvals is not necessarily problematic. The operating and reclamation plans for the Woodward and Vanier properties (attached) include concurrent reclamation. DOGAMI notes that mining of the processing area on Tax Lot 702 is not yet complete so concurrent reclamation per CUP 217-15-000115-PLNG (Woodward CUP) Condition of Approval #22 does not yet apply to the unmined portions of the processing area. In addition, processing of aggregate is an allowed activity in some industrial zones (see the Deschutes County Code definition for "Surface mining, processing" above). If the processing of aggregate is allowed in the heavy industrial zone encompassing tax lot 702, then the continuation of

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aggregate processing on that tax lot following the excavation of the aggregate material could be considered concurrent reclamation. Tax Lot 702 would be 'reclaimed' to heavy industry, in this case, aggregate processing with the aggregate coming from the Vanier property.

One of the challenges with concurrent reclamation for DOGAMI is that there is often no specific time frame or specific trigger in the reclamation plan for when the concurrent reclamation needs to be completed. Woodward CUP Condition of Approval #22 appears to be clear in that as soon as excavation is completed in a mine cell the mine cell should be reclaimed back to agriculture. No portion of the DOGAMI permit or permit conditions prohibits Crook County from enforcing the land use conditions of approval.

Please let us know if you have any additional questions or would like to discuss these responses in more detail. You can contact me at 541 231-8368 or vaughn.balzer@dogami.oregon.gov.

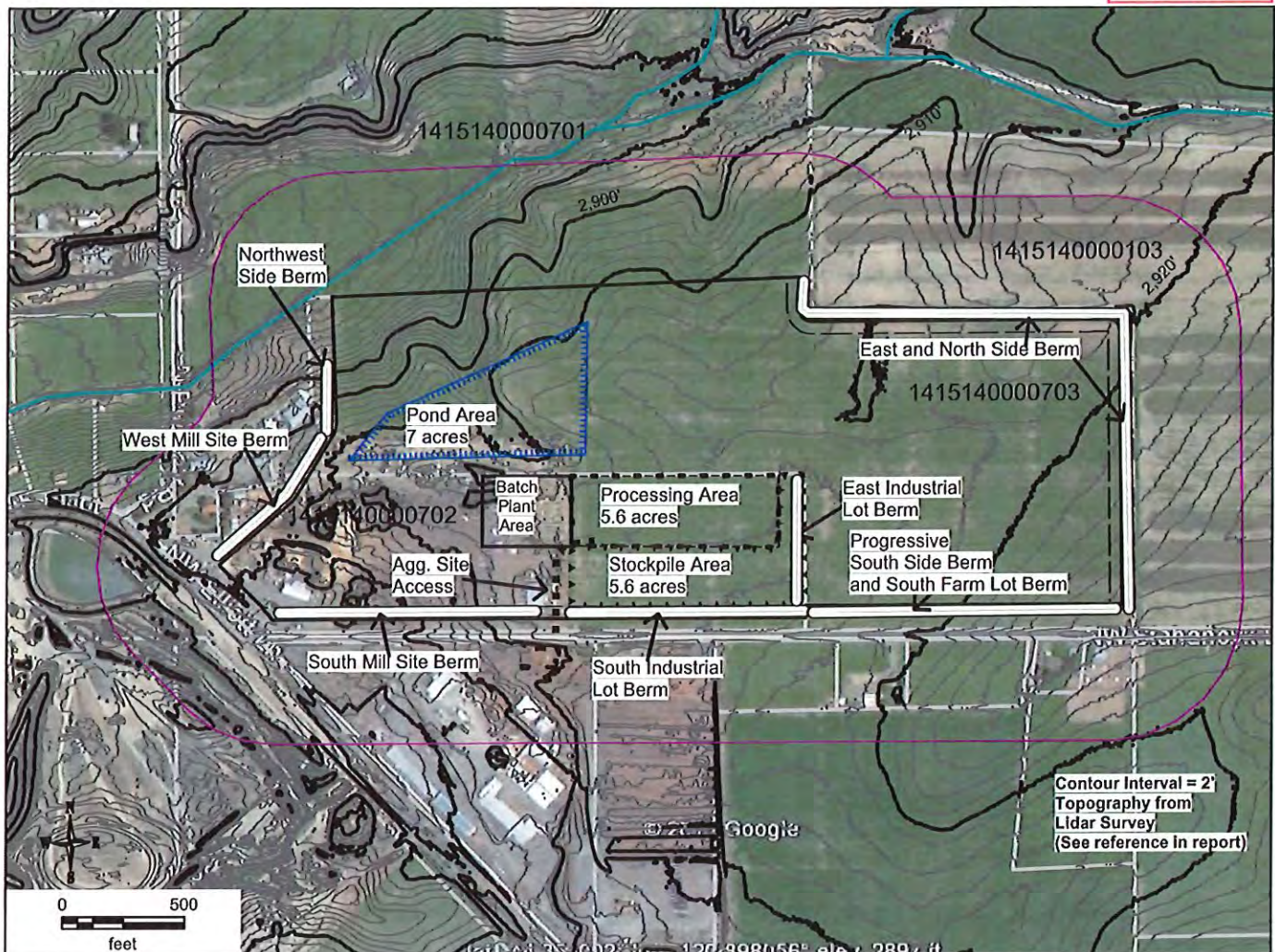
Sincerely,



Vaughn Balzer
Floodplain Mining Reclamationist – Rules Coordinator
DOGAMI – MLRR

Attachments:

1. August 3, 2015, Woodward Site Plan
2. DOGAMI Operating Permit ID# 07-0159
3. June 5, 2015, Woodward Operating and Reclamation Plan
4. February 12, 2024, Vanier Application, and Operating and Reclamation Plan



Screening Berm

Berms constructed in accordance with the Screening Plan.

Proposed Mining Area



Stockpile Area



Aggregate Site Ingress/Egress Route



Aggregate Processing Area



Pond Area for Water Management



2 ponds

Un-named Drainage (OID Drain)



Flows toward the southwest.

Modified Figure 6. Site Plan
Woodward Site
August 3, 2015

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*Oregon Dept. of Geology & Mineral Industries
Mineral Land Regulation & Reclamation Program
229 Broadalbin St. SW
Albany OR 97321-2246
(541) 967-2039*

Attachment 2

OPERATING PERMIT -- Renewal ISSUED SUBJECT TO ANY LISTED CONDITIONS
--

Knife River Corp. NW - Tangent
32260 Old Highway 34
Tangent OR 97389-9770

ID No.: 07-0159
Site Name: Woodward Site
County: Crook
Twp R S TL: 14S15E14 702, 14S15E14 703

This permit shall be in effect, unless revoked or suspended for cause, from the date of issuance and shall remain in effect so long thereafter as the Permittee pays the annual fee to renew the permit, complies with the provisions of ORS 517.750 through 517.955 as applicable, the Rules as promulgated to administer the Oregon Mined Land Reclamation Act, the approved reclamation plan, and any conditions attached to this permit, and maintains a performance bond as required by the Act.

Issuance of this permit is not a finding of compliance with state-wide planning goals or the acknowledged comprehensive plan. The applicant must receive land-use approval from local government before using this permit.

NOTE: Reclamation plans may be modified per ORS 517.831 and OAR 632-(030) and (035)-0035.

CONDITIONS: (Conditions may be appealed per OAR 632-030-0056 or OAR 632-035-0050. If an appeal is made, this permit is invalid until the condition(s) appealed is/are resolved and the permit reissued.)

Standard Permit Conditions

1. Unauthorized disturbances*. (a) The permittee must not allow mining operations to physically disturb any area outside of the permit boundary or Limited Exemption area. Physical disturbance includes, but is not limited to, disturbances caused by landslide, erosion or fly rock. If such disturbances occur, the operator must restore the disturbed area to a condition that is comparable to what it was prior to the disturbance. Further, if areas outside of the permit boundary are disturbed, DOGAMI may increase the amount of the required financial security to cover the cost of such restoration, require reclamation, require a permit amendment, or take other enforcement action. (b) The permittee must not allow mining operations to physically disturb any area within the permit boundary in a manner that is inconsistent with the operating permit or the operating and reclamation plans. Such disturbance includes, but is not limited to, damage to berms, visual screening, or setbacks designed to protect waterbodies or wildlife. If disturbances occur, the permittee must restore the disturbed area to a condition that is consistent with the operating and reclamation plan. If areas within the permit boundary plan are disturbed in a manner that is inconsistent with the operating permit or the operating and reclamation plan, DOGAMI may increase the amount of the required financial security to cover the cost of such restoration, require reclamation, require a permit amendment, or take other enforcement action.

SEE PAGE TWO FOR ADDITIONAL CONDITIONS

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Renewed September 26, 2025



Vaughn Balzer
Reclamationist

RENEWAL IS REQUIRED BY JUNE 30, 2026

c: Crook County Planning Department
Craig Woodward - Prineville
Robert Vanier, Jr. - Dayville

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The Permittee must:

Standard Permit Conditions Cont.:

2. Protection of groundwater and surface water. The permittee must implement effective best management practices (BMPs) to prevent groundwater and surface water contamination from mining operations. The permittee must obtain, before commencing operations and maintain during operations, a DEQ water pollution control facility permit or coverage under WPCF 1000 general permit, for the disposing of any process water by evaporation or seepage in ponds or by irrigation. The permittee must not discharge process wastewater to surface waters unless DEQ has issued an individual NPDES permit to allow such discharge. The permittee must obtain DEQ NPDES 1200-A general permit coverage, or coverage under a DEQ issued individual NPDES permit prior to discharging stormwater (including pit dewatering water) from the mining operation and haul roads draining to surface waters.
3. Erosion prevention. The permittee must stabilize soil and overburden stockpiles through vegetation or other measures, such as mulching or covering, to prevent wind and rain erosion at all times.
- * Unauthorized disturbances: Permit condition #1 is a notification meant to inform the permittee of the potential consequences of conducting unauthorized mining activity.

Additional Permit Conditions

The Permittee must:

4. salvage all available topsoil material (top 18 inches) and stockpile on site for final reclamation. Barren stockpiles and berms must be seeded in a cover crop or otherwise secured against erosion.
5. clearly mark in the field and maintain all setbacks between mine operations and the DOGAMI permit boundary, as specified in Final Decision 217-15-000115-PLNG Condition 5.
6. maintain a 20-foot excavation setback on the northern boundary of tax lot 703, until documentation is submitted to and approved by DOGAMI, demonstrating that if tax lot 701 (located to the north of tax lot 703) is sold then the sale of the property will not result in conflicts with the new landowner.
7. amend the DOGAMI operating permit before initiating any de-watering activity of the mine excavation. Pit de-watering is not allowed under this permit action.
8. create final excavated and fill slopes of 3H:1V or flatter.
9. conduct all processing within tax lot 702.
10. at the end of mining, reclaim tax lot 702 to a level compatible with industrial development.
11. at the end of mining, reclaim tax lot 703 to a level compatible with exclusive farm use - 2. Livestock should be excluded from all seeded areas for two growing seasons.
12. maintain a minimum 30-foot setback between the excavation area and the edge of the irrigation pipeline easement.
13. limit the depth of the excavation to 20 feet below original ground surface.

MUCH OF THE INFORMATION REQUESTED CAN BE EXPLAINED ON THE MINE PLAN MAP.

The map must be a stamped survey from a Professional Land Surveyor on a topographic base map. Surveyed coordinates must be supplied. See *Guide to Surveying and Marking*.

Map Requirements Include (but are not limited to)

1. Scale (1" = 100' to 500')
2. North arrow
3. Appropriate legal description(s) and tax lot numbers, etc.
4. Permit boundary (must be labeled)
5. Location of plant, office, and maintenance facilities
6. Locations of all intermittent water courses, perennial streams, springs, wetlands, and wells
7. Present mine areas and future mining blocks
8. Areas for topsoil and overburden storage or spoil locations, including berms
9. Location of all proposed access roads
10. All property lines within 500' of the permit boundary
11. Location of processing and stockpile areas, plus visual and sound berms or screens
12. Setbacks from property lines, streams, etc.
13. Utility poles, gas line rights-of-way, etc.
14. Storage location of chemicals and petroleum products
15. Date of map preparation and name of the person preparing map

Pre- and post-mining cross-sections of the land surface may be required.

1. PRE-MINE CONDITIONS Heavy Lot 702 - Industrial

- a) Current land use and zoning Lot 703 - EFU 2
- b) Average depth of topsoil 18"
- c) Type and density of vegetation Pasture grass; dense before grazing
- d) Are there any springs, seeps, intermittent or perennial streams on or near the site? ☒ yes ☐ no
If yes, list here and locate on mine plan map.
Unnamed stream flowing SW near NW corner of the site.
- e) Has a wetland delineation been completed? ☐ yes ☒ no
If yes, attach report.
- f) Has a landslide investigation been completed on this property? ☐ yes ☒ no
If yes, attach report.

2. POST-MINING LAND USE

- a) What is the planned post-mining beneficial use of the permit area?
☒ Agriculture Lot 703
☐ Range/Open Space _____
☐ Forestry _____
☐ Housing/Construction _____
☐ Wildlife/Wetland _____
☐ Recreation _____
☒ Other Industrial; Lot 702

The post-mining use must be compatible with the local comprehensive plan or have specific land-use approval. For significant aggregate sites zoned for mining, local government must determine the post-mining land use.

3. RECLAMATION TIMING

- a) How many days after mining is completed will reclamation begin? _____

OR

- b) If reclamation will be concurrent with mining, explain the procedure for concurrent reclamation.

At the completion of each mining cell it will be graded with silty overburden and then covered with the reserved topsoil and cultivated for pasture grass.

4. OPERATING PLAN

- a) Mining method(s) to be employed (mark all that apply):
☒ single bench ☐ multiple bench ☐ pond excavation
☐ placer mine ☐ side hill cut ☐ hill top removal
☐ other: _____
- b) Equipment to be used for mining:
Excavator, loader, haultrucks
- c) Will there be on-site processing? ☒ yes ☐ no
 If yes, check type of processing:
☒ wash water contained in a closed system
 source of water: Ochoce Irrigation District
☐ wash water discharged off site
☐ dry processing
☐ other: _____
- d) Will blasting be employed? ☐ yes ☒ no
- e) Distance to closest structure not owned by permittee.
260'
- f) Disposition of removed vegetation.
Vegetation will be grazed or harvested with remainder cultivated into topsoil.

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- g) Soil types which will be disturbed by mining, processing, or reclamation.

Ochoco - Prineville complex

- h) Average soil salvage depth 18"
 i) Overburden removal depth Avg. 5.6'
 j) Will soil, overburden, rock waste or crusher reject dumps or stockpiles be created during mining? ☐ yes ☐ no
 If yes, list the estimated volume of each at the end of this form and locate on a mine plan map.

Additional information may be required for large dumps or those located on steep terrain.

- k) Will this plan require excavating across any property lines? Same ownership ☒ yes ☐ no
 l) How and where will soil or subsoils be stored for reclamation? Locate storage areas on mine plan map.
Up to 100,000 cubic yards can be stored in the screening berms surrounding the mining area.
 m) What measures will be taken to reduce compaction and prevent water and wind erosion of the topsoil stockpiles and when will they be implemented?
They will be planted with native seed immediately and irrigated.
 n) What will be the minimum property line setback:
 for the excavation 50'
 for processing or storage 100'

5. WATER RESOURCE PROTECTION

- a) Will mining occur below groundwater level? ... ☐ yes ☒ no
 b) Will mine site dewatering be necessary? ☐ yes ☒ no
 If yes, explain procedure and estimated depth to which water will be drawn down inside of the mine and where water will be discharged.
Some perched water was encountered in several test pits. It is not expected to result in a discharge.

WRD

A permit may be required from the Water Resources Department for dewatering activity.

- c) Will process water be contained on site? ☒ yes ☐ no
 d) Will storm water be contained on site? ☒ yes ☐ no
 e) Will a pond(s) be used to contain water? ☒ yes ☐ no
 Explain containment procedures.

Processing area will be established on top of gravel deposit to allow for stormwater infiltration. Process water will be circulated through ponds for infiltration.

If the answer to c) or d) is no, please explain discharge procedures.

A permit from the Department of Environmental Quality may be required for off-site discharges and is required for any discharge into public waters, wetlands, streams or lakes. Contact DOGAMI for these permits.

DEQ

- f) Will any drainages/streams be relocated? ☐ yes ☒ no
 If yes, complete Section 11.
 g) What will be the minimum undisturbed setback(s) of the operation from all stream(s) or drainage(s)? 100'

List the name of stream(s) or drainage(s) and setback from each at the end of this form and locate on a mine plan map.

- h) How will the buffer(s) be identified and protected during mining and reclamation?
Aggregate does not extend to within 100' of drainage.
 i) Describe methods employed to control erosion in the permit area. Be specific, i.e., seeding and mulching, sediment basins or ponds, contour ditching, waterbars, etc.
Seeding with irrigation; sediment basins and ponds; reclaim to pasture soon after mining
 j) Will settling ponds/dams be constructed? ☒ yes ☐ no
 State the number and size of the impoundment(s) and how they will be built. Will the pond be excavated or will berms be constructed? Locate on a mine plan map.
Ponds will be excavated.
 k) If dams will be constructed, how high will they be and what is the maximum amount of water (in acre feet) to be impounded behind each dam?
NA

If a dam is higher than 10 feet, and stores more than 9.2 acre feet of water, approval from the Water Resources Dept. is required prior to construction.

WRD

- l) If berms or a dam will be constructed, describe construction details and attach a sketch showing construction methods.

NA

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- m) How deep will impoundment(s) be? <10'
- n) If the impoundment(s) are to be removed upon completion of mining, how will they be drained and/or filled?
Water will be irrigated and infiltrated over the site then filled.
- o) Will settling ponds, wetlands, or a water impoundment be left upon final reclamation?..... ☐ yes ☒ no

6. GROUNDWATER INFORMATION

- a) Proposed mine depth in SE corner 30'
- b) Groundwater depth (Under static (pre-mine) conditions) 24'
- c) What is groundwater depth estimate based on?
Water well on site (log attached)
CR00 50140
- d) Flow direction of groundwater, if known. Interpreted to be to W-SW
- e) Distance to closest well outside the permit boundary.
CR00 329 300'

Wells within permit area must be shown on mine plan map. Attach a copy of the well log(s).

7. VISUAL AND NOISE SCREENING

Screening can be very effectively employed to isolate sites from public notice and to minimize noise from operations.

- a) Does a natural landform or vegetative screen currently exist along the permit boundary?..... ☐ yes ☒ no
If yes, what screen width will be maintained during mining?
50'
- b) Will a berm and/or vegetation be established to develop a visual screen for the operation?..... ☒ yes ☐ no
If yes, describe the height and width of the berms and/or the type and density of vegetation; show location on mine map.

(Crushed rock stockpiles, although not permanent, can also be used to reduce noise from the operation.)

10' high soil berm with native grass vegetation

8. EQUIPMENT AND STRUCTURES REMOVED

- a) Upon final reclamation, will all structures, visual berms, equipment, and refuse be removed?..... ☒ yes ☐ no
If no, explain what will be left.

9. RECLAMATION TECHNIQUES

- a) What will be done with oversized rock not used during mining?
It will be crushed and sold or sold as drain rock

- b) What will be the average depth of soil replaced on the area to be reclaimed?
QWRD

If less than 12" of topsoil is available, a substitute material may be required.

- c) Will additional material be utilized as a soil substitute to complete the revegetation?..... ☐ yes ☒ no
If yes, specify type(s), amount(s), and source(s).

- d) Will any waste products, such as tailings, crusher rejects, etc., be generated during mining?..... ☒ yes ☐ no
If yes, what will be done with them?

Fines from aggregate washing will be incorporated into reclamation fill with the existing silt.

- e) How will processing and stockpile sites be reclaimed? If they are to be revegetated, explain procedures which will be employed to decompact areas prior to topsoiling/seeding.

Processing and stockpile sites are to be reclaimed for industrial use as a level gravel-covered lot on to pasture grass.

10. REVEGETATION TECHNIQUES

- a) Species to be seeded/planted by type and amount.
Landowner will plant with his desired pasture grass for his livestock.
- b) Describe method and time of year for planned planting.
Landowner's decision based on livestock needs.
- c) List fertilizers and lime to be used (include amount).
Landowner's decision based on his evaluation for livestock needs.
- d) List type and amount of mulch or other erosion control techniques such as erosion netting.
mulch not anticipated to be necessary. Irrigation available.

Vegetative survival comparable to the density of original ground cover will normally be considered acceptable.

11. RECLAMATION PROCEDURES - POST-MINE DRAINAGE CONTROL AND RECONSTRUCTION

- a) During reclamation, will stream channel and/or bank stabilization and rehabilitation be necessary? .. ☐ yes ☒ no
If yes, attach plans..... ☐ n/a

A Division of State Lands' permit is required for relocation of all perennial and some intermittent water courses.

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- b) How will surface water runoff and erosion be controlled upon completion of mining? Describe and list structures that will be used.

Gentle slopes on agricultural field planted with hay crop.

12. RECLAMATION PROCEDURES - IMPOUNDMENTS & POND DECOMMISSIONING

- a) Will dewatering be required? ☒ yes ☐ no
- b) Will it be necessary to backfill a water filled excavation pit or pond? ☐ yes ☒ no
- c) How will settling ponds be stabilized and revegetated?
Water will be removed, pond filled, and topsoil placed and cultivated for pasture use.
- d) How will quality of imported backfill be monitored to protect groundwater quality?
None anticipated.

Monitoring may be required to ensure groundwater protection.

13. RECLAMATION PROCEDURES - LAND SHAPING

Long continuous slopes should be avoided or broken up with surface contours, ditches, or complex slope shape.

- a) What will be the:
- steepest above-water excavated slopes left after mining? ($1\frac{1}{2}$:1 is generally maximum) 3:1
 - steepest above-water fill slopes left after mining? (2:1 is generally maximum) 3:1
- b) What will be done to ensure the stability of excavated slopes?
Final slopes are mostly gentle for livestock access. Site will be planted with pasture grass.
- c) What will be done to ensure the stability of fill slopes?
Graded to low slopes followed by planting.

- d) Will this site be shaped or backfilled to blend in with surrounding topography? ☒ yes ☐ no

14. POST-MINING WATER IMPOUNDMENT(S)

- a) Number of impoundment(s) NA
- b) Use of impoundment(s) NA
- c) Total surface area in acres NA
- d) Average depth NA
- e) How much is the water level expected to fluctuate annually? NA
- f) What will be the steepest and flattest in-water slopes left after mining? NA

Generally 3:1 in-water slopes are the steepest allowable, except off islands. To increase potential for wetland habitat establishment, 5:1 to 20:1 slopes are needed.

- g) Will shallow ponds, shorelines, or other areas conducive to wetland plant development be left? ☐ yes ☒ no
- h) What will be the impoundment water source? NA

WRD A water right for the water source may be needed needed from the Water Resources Department.

- i) What will be done for wildlife & fish enhancement, e.g. fish structures, islands, peninsulas, and irregular shorelines? NA
- j) If wetlands are to be constructed, explain the methods and final configuration. NA

15. OTHER PERMITS

In order to assist other agencies in the review of this plan and their ability to ascertain compliance with their laws, list all permits by type and number that are held (or applications filed) for this mine site or processing equipment (such as fill/removal permits, water rights, air quality and stormwater or waste water permits).

Agency/Permit Type

Permit Number

16. LANDOWNER CONSENT

As surface or mineral rights owner, I concur with the proposed subsequent use for any mining operation and with the operating and reclamation plan as submitted. I also agree to allow access to the State Department of Geology and Mineral Industries or their contractor for reclamation of the mine site if it is declared abandoned by the Department of Geology and Mineral Industries. By my signature below, I certify that I have a legal right to sign this document.

Appropriate signatures are needed for EACH land parcel.

I CONCUR (Surface Rights)

Name (Please Print or Type)

Signature

Title

Date

Craig Woodward
Craig Woodward
Owner
5-4-15

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I CONCUR (Mineral Rights):

Name (Please Print or Type)

Signature

Title

Date

17. APPLICANT'S ACCEPTANCE

Name (Please Print or Type)

Signature

Title

Date

Ronald D. Myers
Assistant Secretary

Ronald D. Myers
Assistant Secretary

Jan 05, 2015

18. PREPARED BY (IF OTHER THAN APPLICANT)

Name (Please Print or Type)

Signature

Title

Company

Date

ID No. _____

16. LANDOWNER CONSENT

As surface or mineral rights owner, I concur with the proposed subsequent use for any mining operation and with the operating and reclamation plan as submitted. I also agree to allow access to the State Department of Geology and Mineral Industries or their contractor for reclamation of the mine site if it is declared abandoned by the Department of Geology and Mineral Industries. By my signature below, I certify that I have a legal right to sign this document.

Appropriate signatures are needed for EACH land parcel.

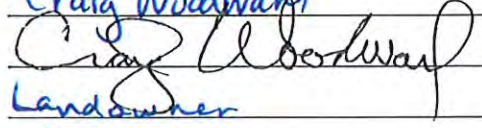
I CONCUR (Surface Rights)

Name (Please Print or Type)

Signature

Title

Date

Craig Woodward

Landowner
Nov - 23 - 2015

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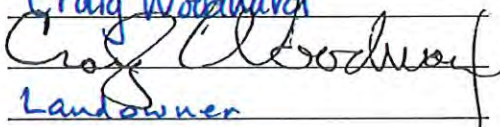
I CONCUR (Mineral Rights):

Name (Please Print or Type)

Signature

Title

Date

Craig Woodward

Landowner
Nov - 23 - 2015

17. APPLICANT'S ACCEPTANCE

Name (Please Print or Type)

Signature

Title

Date

18. PREPARED BY (IF OTHER THAN APPLICANT)

Name (Please Print or Type)

Signature

Title

Company

Date

ID No. 07-0159



Oregon Department of Geology and Mineral Industries
Mineral Land Regulation and Reclamation Program
229 Broadalbin Street SW
Albany, OR 97321-2246
(541) 967-2039
Fax (541) 967-2075

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Operating Permit Application Form Division 30 & Division 35*

*DOGAMI may require additional information for Division 35 applications.

CONFIDENTIALITY NOTICE

Any production records, mineral assessments and trade secrets submitted by a mine operator or landowner to the State Department of Geology and Mineral Industries shall be confidential. [1999 c.492 §10 (enacted in lieu of ORS 517.900)]

Primary Point of Contact

To ensure effective communications and timely processing, a Primary Point of Contact (PPC) is recommended for this application. The PPC should be a representative of the applicant with signature authority or a designated agent. Documentation of signature authority and/or designated agent is required for all applicants registered to do business in the state of Oregon. DOGAMI specific Designated Agent and Signature Authority forms are available on our website.

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Section 1: Contact Information**1a. Applicant / Proposed Permittee**Name of Applicant: **Knife River Corporation - Northwest**Mailing Address: **32260 Old Highway 34**City: **Tangent**State:
OregonZip: **97389**Telephone: **541-918-5100**Fax: **541-918-5375**Email: **jeff.steyaert@kniferiver.com**Preferred method of contact ☒ Telephone ☒ Email**1b. Primary Contact for the Application**Name: **Jeff Steyaert**Mailing Address: **32260 Old Highway 34**City: **Tangent**State:
OregonZip: **97389**Telephone: **541-918-5100**Fax: **541-918-5375**Email: **jeff.steyaert@kniferiver.com**Preferred method of contact ☒ Telephone ☒ Email**1c. Application Prepared By**Name: **Jeff Steyaert**Mailing Address: **32260 Old Highway 34**City: **Tangent**State:
OregonZip: **97389**Telephone: **541-918-5100**Fax: **541-918-5375**Email: **jeff.steyaert@kniferiver.com**Preferred method of contact ☒ Telephone ☒ Email**1d. Operator Information**Name: **Knife River Corporation - Northwest**Mailing Address: **32260 Old Highway 34**City: **Tangent**State:
OregonZip: **97389**Telephone: **541-918-5100**Fax: **541-918-5375**Email: **jeff.steyaert@kniferiver.com****1e. Contact Person for Field Visits**Name: **Jeff Steyaert**Preferred method of contact ☒ Telephone ☒ EmailTelephone: **541-918-5100**Fax: **541-918-5375**Email: **jeff.steyaert@kniferiver.com****1f. Landowner Information**Name of Landowner (1): **VANIER ROBERT J JR & LANI**Mailing Address: **PO BOX 326**City: **DAYVILLE**State:
OregonZip: **97825**

Telephone:

Fax:

Email:

Name of Landowner (2): **Craig Woodward**Mailing Address: **P.O. Box 663**City: **Prineville**State:
OregonZip: **97754**Telephone: **541-447-3841**

Fax:

Email: **wtg@bendnet.com****1g. Mineral Estate Owner Information – If Split Estate**Name of Mineral Estate Owner (1): **VANIER ROBERT J JR & LANI**Mailing Address: **PO BOX 326**City: **DAYVILLE**State:
OregonZip: **97825**

Telephone:

Fax:

Email:

Name of Mineral Estate Owner (2): **Craig Woodward**Mailing Address: **P.O. Box 663**City: **Prinville**State:
OregonZip: **97754**Telephone: **541-447-3841**

Fax:

Email: **wtg@bendnet.com**

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Section 2: Project Description

2a. Location Information

Address and/or highway and milepost of surface mine:

4755 NW Stahancyk Lane, Prineville, OR, 97754

Distance from the nearest named community: **5.4 mile(s)** from **Prineville, Oregon 97754**

Directions to site (from the nearest town or major intersection):

From Prineville, head northeast on SE Knowledge St toward SE 2nd St. Turn left onto US-26 W/NE 3rd St. Continue to follow US-26 W for 5.4 miles. Turn right onto N E Elliot/NW Elliott Ln. Continue to follow N E Elliot for 0.4 miles. Continue onto NW Elliott Ln and turn left onto NW Stahancyk Ln. In 0.2 miles the entrance into the site is on the left.

Legal Description:

County: **Crook**

Township: **14S** Range: **15E** Section: **14** Tax Lot(s): **103**

Township: **14S** Range: **15E** Section: **14** Tax Lot(s): **702**

Township: **14S** Range: **15E** Section: **14** Tax Lot(s): **703**

Township: _____ Range: _____ Section: _____ Tax Lot(s): _____

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Latitude/Longitude: **Latitude: 44.351456°; Longitude -120.889293°**

Site Name: **Woodward Site**

Does this site have a current DOGAMI Operating Permit, Exploration Permit, Exclusion Certificate, or Grant of Limited Exemption, or has it been permitted in the past? ☒ yes ☐ no

If yes: Specify DOGAMI ID# **07-0159**

Is there an approved Limited Exemption Closure Plan on file with DOGAMI? ☐ yes ☒ no

2b. Application Type

Please indicate the purpose of this application:

☐ New Operating Permit – skip to 2c.

☒ Amendment to a current Operating Permit

If you are applying for an Amendment to a current Operating Permit, please describe in detail the intended modifications:

The intent of this permit modification is to include the Vanier property (1415140000103) within the Woodward Operating Permit boundary (07-0159) and to permit dewatering activity of individual mine cells into onsite groundwater infiltration trenches.

The Proposed Operating and Reclamation Plans in this Amendment will (check one):

☒ Replace the existing approved plan(s) on file with DOGAMI and apply to the entirety of the site upon completion of this Amendment. ☐ Pertain only to the Amendment area and are in addition to the existing approved plan(s) on file with DOGAMI.

2c. Third Party Permits and Approvals

Do you know of any state, federal or local government permits or approvals that will be required for this mining operation? ☒ yes ☐ no

If yes: Please list any state, federal or local government permits or approvals and describe the status:

Crook County Land Use Approval

DEQ WPCF 1000; DEQ File: 124758

DEQ ACDP; 37-0349

*Note: DOGAMI can only issue an Operating Permit if all required state, federal, and local government approvals have been obtained, otherwise a Provisional Operating Permit will be issued. POP's are not applicable to Operating Permit Amendment applications.

2d. Permit Acreage and Boundaries

Specify the approximate total number of acres to be covered under the Operating Permit

Approx.

189.75

acres

Does the proposed permitted acreage coincide with the area approved by the local land use jurisdiction?

☒ yes ☐ no

If no: Explain:

Have the boundaries of the proposed permit area been marked on the ground with temporary or permanent boundary markers?

☒ yes ☐ no

If yes: Describe boundary markers: Staking and signage

What is the total number of acres to be affected by mining related activities in the 12 months following permit issuance (include excavation, processing, stockpiling and land clearing)? ~70 acres

2e. Site Conditions

General Topography in the vicinity of the permit area (check all that apply):

☐ mountains ☐ hills/buttes ☒ valleys ☐ plains ☐ badlands
☐ floodplain ☐ other: _____ ☐ other: _____

Site Specific Topography (describe the topography within the permit area):

Current Land Use(s) for all tax lots or parcels within the permit area (check all that apply):

☐ range/open space ☐ forestry ☒ industrial ☐ wildlife/wetland ☐ recreation
☐ residential ☒ commercial ☒ agriculture ☐ other: _____ ☐ other: _____

Structures, Facilities & Surface Disturbances:

☐ none ☒ residential ☒ farm/ranch
☒ industrial/commercial ☐ roads ☐ overhead power lines or facilities
☒ underground utilities (e.g. electrical, fiber optic, water, sewer, etc.) ☐ oil/gas structures or pipelines ☐ other: _____

Additional Description (optional):

Vegetation (general description of the dominant grasses, forbs, shrubs and trees located within the permit area):

Pasture grass

Listed sensitive, threatened or endangered fish and/or wildlife species (within the permit area and nearby water ways):

N/A

Surface Water Features within or near the permit area (includes features that may contain water at any time, including seasonal and stormwater runoff):

☐ none ☐ river _____ ☒ stream/creek unnamed drainage ☒ spring
☐ lake/pond ☒ irrigation ditch/canal ☐ ephemeral drainage ☒ wetlands*

*The DOGAMI Wetland Supplemental Form may be required to be submitted with this application package.

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2f. Surrounding Area Conditions

Land Use(s) within 1,500 feet of the permit area (check all that apply):

- | | | | | |
|---|-------------------------------------|---|---|---------------------------------------|
| ☐ range/open space | ☐ forestry | ☒ industrial | ☐ wildlife/wetland | ☐ recreation |
| ☒ residential | ☐ commercial | ☒ agriculture | ☐ other: _____ | ☐ other: _____ |

Structures, Facilities & Surface Disturbances within 1,500 feet of the permit area (check all that apply):

- | | | |
|--|--|--|
| ☐ none | ☒ residential | ☒ farm |
| ☒ industrial/commercial | ☒ roads | ☒ overhead power lines or facilities |
| ☒ underground utilities (e.g. electrical, fiber optic, water, sewer, etc.) | ☐ oil/gas structures or pipelines | ☐ other: _____ |

What is the distance to the nearest structure not owned by the permittee? <75 feet

Surface Water Features within 1,500 feet of the permit area (check all that apply):

- | | | | |
|------------------------------------|--|--|---|
| ☐ none | ☐ river _____ | ☒ stream/creek <u>unnamed drainage</u> | ☒ spring |
| ☐ lake/pond | ☒ irrigation ditch/canal | ☐ ephemeral drainage | ☒ wetlands* |

*The DOGAMI Wetland Supplemental Form may be required to be submitted with this application package.

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Section 3: Proposed Operating Plan

3a. Development Plans & Equipment

What type of surface mine will be developed?

- | | | | |
|--|---|---------------------------------------|--|
| ☒ single bench | ☐ multiple bench | ☐ sidehill cut | ☐ hilltop removal |
| ☒ open pit | ☒ pond excavation | ☐ other: _____ | ☐ other: _____ |

What is the primary commodity? (Select One)

- | | | | |
|--------------------------------------|---|---|---------------------------------------|
| ☐ lava | ☐ decomposed granite | ☐ pumice | ☐ topsoil |
| ☐ borrow/fill | ☐ diatomaceous earth | ☒ sand and gravel | ☐ bentonite |
| ☐ cinder | ☐ dredge tailings | ☐ shale | ☐ other: _____ |

What is the primary use? (Select One)

- | | | | |
|--|--|--|---------------------------------------|
| ☐ asphalt aggregate | ☒ concrete aggregate | ☐ landscaping materials | ☐ other: _____ |
| ☐ base rock aggregate | ☐ construction fill | ☐ rip rap | |

What is the general deposit type?

- | | | |
|----------------------------------|--|--|
| ☐ bedrock | ☐ river/floodplain (alluvial)* | ☐ river channel terrace |
| ☐ talus | ☒ other: <u>Older terrace deposits</u>
<u>(Qto; Upper and Middle Pleistocene;</u>
<u>DOGAMI Bulletin 108; McClaughry</u>
<u>et al., 2021)</u> | ☐ unknown |

*The DOGAMI Floodplain Supplemental Form may be required to be submitted with this application package.

Check all mining methods and on-site activities that apply:

- | | | | | |
|--|---|---|---|---|
| ☐ drilling and blasting | ☒ ripping and loading | ☒ crushing | ☒ washing | ☒ screening |
| ☒ shovel/loader/scrapper | ☐ material recycling | ☒ stockpiling | ☐ other: _____ | ☐ other: _____ |

Equipment to be used for mining and processing includes (check all that apply):

- | | | | | |
|--|---|--|--|---|
| ☒ loaders | ☒ dozers | ☒ excavators | ☒ trucks | ☒ screeners |
| ☒ crushers | ☐ drilling equipment | ☐ other: _____ | ☐ other: _____ | |

Date to begin mining activities: **Permit issuance**

Expected duration (in years): **Based on market demands:**
est. 7+ years

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3b. Water Management

Indicate the proposed use(s) of water (check all that apply):

- | | | |
|--|---|--|
| ☒ wash plant | ☐ asphalt plant | ☒ concrete batch plant |
| ☒ dust control | ☒ crusher | ☐ other: _____ |

Note: A DEQ permit will be required for process water generated and stored on site.

If applicable: Is the water source within 300 feet of the permit area?

☒ yes ☐ no

If yes: Identify the source of water to be used and show its location on a map:

- | | | | | |
|--|-------------------------------|------------------------------|---|---|
| ☒ irrigation ditch | ☐ pond | ☐ pit | ☐ groundwater well | ☒ other: <u>and future</u>
<u>groundwater well</u> |
|--|-------------------------------|------------------------------|---|---|

Note: A water right may be required by the Oregon Water Resource Department.

Will water be stored on site?

☒ yes ☐ no

If yes: What will the water be stored in?

- | | | |
|---|---|---|
| ☐ detention/retention pond | ☐ lined detention/retention pond | ☐ water storage tank |
| ☒ other: <u>Existing process water settling ponds (closed loop)</u> | | |

What is the approximate depth that groundwater is first encountered? **approx. 17 to 20** feet below ground surface

What source or method was used to determine depth to groundwater? **Test pits and monitoring wells**

Have monitoring wells been constructed on site or are monitoring wells proposed?

☒ yes ☐ no

If yes: A DOGAMI Groundwater Supplemental Form must be submitted with this application.

Will excavation operations be conducted below groundwater level?	☒ yes ☐ no
Will dewatering be conducted at this site?	☒ yes ☐ no
If yes: A DOGAMI Groundwater Supplemental Form must be submitted with this application and a DEQ Permit may be required.	
Has a DEQ water quality permit been obtained for the site?	
If yes: DEQ Permit # <u>WPCF 1000 No.: 124758</u>	

3c. Designated Setbacks	
Will surface mining operations require crossing external property lines?	☐ yes ☒ no
What will be the minimum undisturbed property line setback for:	
Excavation operations: <u>ranging from zero to 100</u> feet wide	
Processing operations: <u>50</u> feet wide	
Stockpiling operations: <u>50</u> feet wide	
If proposing disturbances within the setbacks (such as visual berms or roads), explain:	
1. An internal haul road from the Vanier property to the Woodward property will cross the internal excavation only setback located along the eastern boundary of TL 703. 2. Berms shall be placed at the time mining begins in adjacent mining cells to minimize the amount of disturbed ground. Berms may be placed within the 100-foot property line setback area. Berms shall be removed upon completion of the mining operation. [See Crook Co. Landuse conditions of approval 217-21-000573-PLNG #3]	
Specify the minimum undisturbed setback(s) between mining operations and:	
Overhead utilities (poles or towers): <u>N/A</u> feet wide	
Underground utilities (e.g. electrical, fiber optic, water, sewer, etc.): _____ feet wide	
Right-of-Way/Easement Road: <u>N/A</u> feet wide	
Other: _____ feet wide	
☒ not applicable (none of the above-listed items are present within the proposed permit area)	
Are setbacks shown on the attached map(s)?	☒ yes ☐ no
If no: Explain:	
Have setbacks been marked on the ground with permanent or temporary boundary markers?	☒ yes ☐ no
If no: Explain:	

3d. Designated Buffers	
Does a naturally vegetated area (buffer) exist along a river, stream or natural drainage?	☐ not applicable ☐ yes ☒ no
If no or not applicable, skip to 3e.	
What are the minimum undisturbed buffers for the following:	
River (Ordinary High Water Line): <u>N/A</u> feet wide	
Stream (Ordinary High Water Line): <u>N/A</u> feet wide	
Natural drainage: <u>100</u> feet wide	
Riparian Vegetation: <u>N/A</u> feet wide	
Have the undisturbed buffers been marked on the ground with permanent or temporary boundary markers?	☐ yes ☒ no
Have conservation/protection buffers been established?	☒ not applicable ☐ yes ☐ no
If yes: check all that apply:	
☐ unstable slopes ☐ wildlife habitat ☐ water quality ☐ other: _____	
Describe the nature and configuration of the conservation buffer(s):	

3e. Visual Screening

Does a natural landform or vegetative screen currently exist?

Along the permit boundary

Within the permit boundary

Along the property boundary

Within the property boundary

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☒ yes ☐ no

☒ yes ☐ no

☒ yes ☐ no

☒ yes ☐ no

If yes to any of the above: Describe: **Existing vegetated berm**

Will a berm be constructed along the permit boundaries to develop a visual screen?

☒ yes ☐ no

If yes: The average height of the constructed screen/berm will be 8 feet tall and 32 feet wide.

Will a vegetative screen be established along the permit boundaries to develop a visual screen?

☐ yes ☒ no

If yes: If planting trees, what is the estimated height at maturity? N/A feet tall

Please describe (include species and planting densities): **Berms will be stabilized with a pasture seed mix (12 lbs/ac)**

Will a fence be installed along the permit boundary for safety or visual screening?

☐ yes ☒ no

Will the screening/fencing/berm be maintained for the life of the surface mine?

☐ not applicable ☒ yes ☐ no

If no: Explain: **Note: Additional Berms shall be placed at the time mining begins in adjacent mining cells to minimize the amount of disturbed ground. Berms may be placed within the 100-foot property line setback area. Adjacent berms may be removed and used for concurrent reclamation of adjacent mine cells. All berms will be removed upon completion of the mining operation. [See Crook Co. Landuse conditions of approval 217-21-000573-PLNG #3]**

3f. Vegetation

Will vegetation be removed sequentially from areas to be mined to prevent unnecessary erosion?

☒ yes ☐ no

If no: Explain:

Will small trees and other transplantable vegetation be salvaged for use in revegetating other phases?

☐ yes ☒ no

Wood and other organic debris will be (check all that apply):

☐ recycled

☐ removed from site

☐ chipped

☐ burned

☐ buried

☒ piled and composted on site for growth medium or mulch

☐ other: _____

☐ other: _____

Note: A DEQ permit is generally required for burial of debris and may be required for burning.

Will coarse wood (logs, stumps) and other large debris be salvaged for fish and wildlife habitat?

☒ not applicable ☐ yes ☐ no

3g. Soil and Overburden Salvage and Stabilization

Identify and characterize the type(s) of soil present within the site area per NRCS Web Soil Survey:

Ochoco - Prineville complex; Boyce silt loam

Will growth medium and overburden materials be salvaged?

☒ yes ☐ no

Explain: **Salvaged soil material will be stockpiled on site and used for reclamation.**

Will growth medium and overburden materials be segregated and stored separately during stripping operations?

☒ yes ☐ no

Explain proposed stripping, handling, and storage of growth medium and overburden materials: **Salvaged soil materials will be stripped and stockpiled in a vegetated berm located proximal to the excavation.**

For the areas to be stripped:

Thickness of growth medium averages ~18 ☒ inches ☐ feet

Thickness of overburden averages ~1-16 ☐ inches ☒ feet

Depth to bedrock is approximately >250 ☐ inches ☒ feet (below ground surface).

Total volume of growth medium available within the permit area is ~100,000 to 153,000 cubic yards.

Total volume of stored growth medium is approx. 12,000 cubic yards and will require 1.88 acres for storage.

Total volume of stored overburden is approx. 8,000 to 129,000 cubic yards and will require 1.25 to 20 acres for storage.

Will growth medium and overburden materials be moved directly to mined out portions of the site for concurrent reclamation?	☒ yes ☐ no
Will the storage areas be cleared of all vegetation and organic matter prior to stockpiling? If no: Explain:	☒ yes ☐ no
Will subsurface drainage for the storage area be established prior to material placement? Explain:	☐ yes ☒ no
Will growth medium and overburden materials be stabilized with vegetation to prevent water and wind erosion if stored for more than one season? If no: Explain:	☒ yes ☐ no
Are the storage areas delineated on the attached map(s)?	☒ yes ☐ no

3h. Surface Mine Excavations

What is the total number of acres to be affected by mining related activities (include excavation, processing, stockpiling and land clearing)? <u>~70</u> acres	
What is the maximum vertical depth to be mined below the existing topographic grade? <u>35</u> feet	
What will be the lowest elevation of the excavated mine relative to mean sea level? <u>2,865</u> feet	
What will be the highest elevation of the excavated mine relative to mean sea level? <u>2,902</u> feet	
Will benches be developed as mining operations advance? If yes: The average dimensions of the benches will be approximately: _____ foot vertical faces separated by _____ foot horizontal benches resulting in an interim sloping configuration of _____ H: _____ V (e.g. 1½H:1V, 2H:1V) If no: The interim sloping configuration of the excavation slopes will be: _____ H: _____ V (e.g. 1½H:1V, 2H:1V).	☐ yes ☒ no
Will excavation operations result in the creation of ponds/water-filled excavation areas? If yes: The interim sloping configuration of the in-water slopes will be _____ H: _____ V (e.g. 3H:1V).	☐ yes ☒ no
Will oversize be generated on site? If yes: Specify the location for storage:	☐ yes ☒ no
Will any waste products such as tailings or crusher fines be generated during mining? If yes: Specify the location for storage: Reject, crusher fines and overburden will be used during concurrent reclamation.	☒ yes ☐ no
Are the storage/stockpile areas delineated on the attached map(s)?	☒ yes ☐ no

3i. Best Management Practices and Stormwater Controls

Will all stormwater runoff be contained on site? If no: A DEQ (NPDES) Permit may be required.	☒ yes ☐ no
Methods to control erosion and minimize sedimentation within the permit area include (check all that apply):	
☒ minimize the areas stripped	☐ divert natural runoff around the site
☒ internal sloping	☐ conveyance ditches
☒ water bars	☒ settling/infiltration ponds
☒ seeding and mulching	☐ other: _____
☒ graveled roads and working areas	☐ rock check dams
☐ retention berms	☐ other: _____

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Section 4: Reclamation Plan

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4a. Post-Mining Land Use

Subsequent Land Use(s) of the permit area (check all that apply):

- ☐ range/open space ☐ forestry ☒ industrial ☐ wildlife/wetland ☐ recreation
☐ residential ☐ commercial ☒ agriculture ☐ other: _____ ☐ other: _____

If more than one post-mining land use is selected provide a map delineating where each use is applicable.

What will be the average elevation of the reclaimed mine floor relative to mean sea level? av. 2,890-ft msl feetIs the proposed post-mining land use compatible with the existing local land use jurisdiction? ☒ yes ☐ no

If no: Explain:

Is the final local land use approval for surface mining attached? ☒ yes ☐ no

If no: Explain:

4b. Reclamation Schedule

Will reclamation activities be conducted concurrently with mining? ☒ yes ☐ no

If no: How many days after mining is completed will reclamation operations begin?

If yes: Has the permit area been divided into cells/phases for sequential mining? ☒ yes ☐ no

4c. Final Excavation Slopes

Will final excavation slopes be constructed using the benching method? ☐ yes ☒ no

If yes: The average dimensions of the final benches will be approximately _____ foot vertical faces separated by _____ foot horizontal benches resulting in an interim sloping configuration of _____ H: _____ V (e.g. 1½H:1V, 2H:1V).

Will final slopes be constructed via a continuous slope? ☒ yes ☐ no

If yes: The completion of Section 4d is required.

Will reclamation blasting be used to reduce the entire highwall to a scree or rubble slope less than 2H:1V? ☐ yes ☒ noIf yes: Will access to benches be maintained for reclamation blasting? ☐ yes ☒ noWill selective blasting will be used to remove benches and walls and to create chutes, buttresses, spurs, scree slopes, and rough cliff faces that appear natural or blend in with surrounding topography? ☐ yes ☒ noWill final excavation slopes be steeper than 1½H:1V? ☐ yes ☒ no

If yes: The DOGAMI Slope Stability Supplemental Form must be submitted with this application.

Will small portions of benches or vertical faces be left to provide habitat for raptors and other cliff-dwelling birds? ☐ yes ☒ noWill the final excavation slopes vary in steepness? ☒ yes ☐ noIf yes: Explain: **All final sloping configurations will be contoured to benefit post-mining industrial and agricultural practices**Are cross-sections of the final excavation slopes attached? (may be required) ☒ yes ☐ noWill measures be taken to limit access to the top and bottom of hazardous slopes? ☐ yes ☒ noExplain: **All final slopes will be graded to a mostly gentle slope for cultivated crops or level for the industrial areas.**

4d. Final Fill Slopes

Will above-water final fill slopes be constructed on site? ☒ yes ☐ no

If no: Skip to 4e.

Will final fill slopes be steeper than 2H:1V or exceed 100 lineal feet in length? ☐ yes ☒ noWhat will be the final sloping configuration of fill slopes? **ranging from 10 to 100H: 1V** (e.g. 2H:1V)

If yes: The DOGAMI Slope Stability Supplemental Form must be submitted with this application.

Will the final fill slopes vary in steepness?	☒ yes ☐ no
If yes: Explain: The fill slopes along the setback will be 10 to 20H:1V or flatter. The backfilled floor will be 100H:1V or flatter.	
Will fill slopes have a sinuous appearance in both profile and plan view?	☐ yes ☒ no
If no: Explain: Final contours will transition into the surrounding topography.	
Will the final grouser tracks of equipment be preserved and oriented to trap moisture, growth medium, and seeds, to encourage seed germination and inhibit erosion (track walking)?	☒ yes ☐ no

4e. Working Floors

Will flat working areas be formed into gently rolling hills to blend in with the surrounding area?	☐ yes ☒ no
If yes: Give details: Final sloping configurations will be contoured to benefit post-mining industrial and agricultural practices	
Will the working floor be gently graded into sinuous drainage channels to preclude sheet-wash erosion during heavy rain events?	☐ yes ☒ no
If yes: Give details: Final sloping configurations will be contoured to benefit post-mining industrial and agricultural practices	
Will the working floor and other compacted areas be, plowed, ripped, or blasted to decompact the upper surface prior to spreading growth mediums to foster revegetation?	☒ yes ☐ no
Explain (If yes, include depth of decompaction): The excavation will be backfilled, ripped, disked and returned to an agricultural field.	

4f. Imported Fill

Will imported materials be necessary to complete reclamation?	☐ yes ☒ no
If no: Skip to 4g.	
If yes: Give volumes needed to meet reclamation plan: _____	
Are the locations for fill stockpiling and permanent placement shown on the map(s)?	☐ yes ☒ no
How will the quality of imported fill be monitored to ensure it meets DEQ clean fill standards?	_____
Will the backfill materials be mixed or screened to ensure uniformity for compaction and stability?	☐ yes ☒ no

4g. Backfilling Operations

Will an excavation area be located below natural grade requiring backfilling?	☒ yes ☐ no
If no: Skip to 4h	
What will be the total depth of backfilled materials? Variable, Approx. 15 to 18-ft feet.	
Will backfilling be conducted in lifts?	☒ yes ☐ no
If yes: Specify the average depth of the lifts: 3 feet.	
Will the backfilled slopes be compacted?	☒ yes ☐ no
Explain: Excavation will be reclaimed back to agricultural (TLs: 703 and 103) and Industrial (TL: 702) uses. To an extent, track and wheel mounted equipment will compact the material during placement.	
Will compaction testing be conducted under supervision/direction of an Oregon Certified Engineering Geologist or Geotechnical Engineer to determine the compaction percentage? (may be required subject to post-mining land use)	☐ yes ☒ no
Will backfilling be completed utilizing on site overburden materials?	☒ yes ☐ no
If yes: Explain: Any remaining overburden material will be utilized during concurrent reclamation of each mining cell.	
Will you be backfilling into water?	☐ yes ☒ no
If no: Skip to 4h	

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Will dewatering be necessary for the backfilling operations?	☒ yes ☐ no
If yes: A DOGAMI Groundwater Supplemental Form is required to be submitted with this application and a DEQ NPDES Permit may be required.	
Will backfilling be limited to the dry season or otherwise conducted under dry conditions?	☐ yes ☒ no
If no: A DOGAMI Slope Stability Supplemental Form may be required.	
Will the excavation pit/pond be <i>entirely</i> backfilled to natural ground surface elevation?	☐ yes ☒ no
If no: The completion of Section 4h is required for in-water sloping configurations.	

4h. Ponds and Wetlands
Will stormwater controls or excavation operations intersect the groundwater table resulting in the creation of ponds and/or wetlands? ☐ yes ☒ no
If no: Go to Section 4i.
Specify the construction method and dimensions for each settling/infiltration pond to remain on site: Pond #1 will be approximately _____ acres in size and approximately _____ feet deep and constructed via: ☐ excavation ☐ retention berms ☐ combination of both Pond #2 will be approximately _____ acres in size and approximately _____ feet deep and constructed via: ☐ excavation ☐ retention berms ☐ combination of both
All in-water sloping configurations will be constructed at _____ H: _____ V or flatter to a minimum depth of _____ feet below the low-water level of the ponds(s). Per OAR 632-030-0027(5), all in-water sloping configurations must be established at 3H:1V or flatter from the ordinary high-water level to six feet below the ordinary low-water level for permanent water impoundments.
If not already present, will soils, silts, and clay-bearing materials be placed below water level to enhance revegetation for fish and wildlife habitat? ☐ yes ☐ no
If yes: Give details:
Will wetlands be constructed on site? ☐ yes ☐ no
If yes: Give details:
Will wildlife and fish habitat/enhancements be developed? ☐ yes ☐ no
If yes: Check all that apply: ☐ varied water depths ☐ islands ☐ peninsulas ☐ fish structures ☐ shallow areas (<18 inches deep) ☐ sinuous/irregular shorelines ☐ other: _____ ☐ other: _____
What species are the habitat/enhancements intended to benefit?
Will final pond(s) be utilized for agriculture, forestry or supply water (impoundment)? ☐ yes ☐ no
If no: Skip to 4i.
Has approval from other agencies with jurisdiction to regulate impoundment of water been obtained? ☐ yes ☐ no
If yes: Attach written approval.
What measures will be taken to prevent seepage from the site from adversely affecting the stability of impoundments and adjacent slopes? (check all that apply): ☐ monitoring ☐ relief drains ☐ weep holes ☐ compaction ☐ grouting ☐ installing upstream blanket ☐ none
Give details:
What measures have been taken to design impoundments to resist seismic hazards?

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4i. Growth Medium Replacement	
Will the importation of growth medium be required to complete reclamation?	☐ yes ☒ no
Explain (if yes, describe source):	
Will growth medium materials be replaced on all above-water slopes and/or benches?	☒ yes ☐ no
If no: Explain:	
Will growth medium be distributed evenly over the site?	☒ yes ☐ no
If no: Specify:	
Soil will be replaced on the mine floor to an approximate depth of <u>18</u> ☒ inches ☐ feet	
Soil will be replaced on established benches to an approximate depth of <u>No Benches</u> ☐ inches ☐ feet	
If growth medium is in short supply, will it be strategically placed to conserve moisture and promote revegetation?	☒ yes ☐ no
If no: Explain:	
Will growth medium be moved when conditions are exceptionally wet or dry?	☐ not applicable ☐ yes ☒ no
If yes: Explain:	
If applicable: will clay/silt from settling ponds be used to supplement the growth medium materials?	☒ yes ☐ no
Will any additional materials be utilized as a growth medium substitute to complete revegetation (e.g. reject fines)?	☐ not applicable ☒ yes ☐ no
If yes: Explain: Reject fines may be used to supplement the final reclamation soil replacement thickness.	
Will all growth medium be replaced with equipment that will minimize compaction, or will growth medium be plowed, disced, or ripped following placement?	☒ yes ☐ no
If no: Explain:	
Will all replaced growth medium be stabilized in a timely manner with vegetation and/or mulch to prevent loss by erosion, slumping, or crusting?	☒ yes ☐ no
If no: Explain:	

4j. Revegetation	
The average precipitation on site is <u>12</u> inches per year.	
Will the site be revegetated?	☒ yes ☐ no
If no: The site will not be revegetated because:	
☐ Demonstration plots and areas will be used to show that active revegetation is not necessary.	
☐ Revegetation is inappropriate for the approved subsequent use of this surface mine.	
Will revegetation activities start during the first proper growing season (e.g. fall for grasses, fall or late winter for trees and shrubs) following restoration of slopes?	☒ yes ☐ no
If yes: Give details: Revegetation activities will start in the fall of the year.	
If no: Explain:	
Will vegetation test plots be used to determine optimum vegetation plans?	☐ yes ☒ no

4k. Planting and/or Seeding Techniques and Specifications	
Describe the method and time of year for planting and/or seeding: Pasture seed mix will be seeded during fall of the year.	
Give seeding details (lbs/acre of grass, legume, or forb mixture): 12 lbs per acre	
Give planting details (stems/acre of trees and shrubs, size and type of plant stock): Pasture seed mix will be broadcast seeded	

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Additional planting/seeding techniques include:

- | | | |
|--|---|--|
| ☐ ripping, discing and/or tilling | ☐ blasting to create permeability | ☐ mulching |
| ☐ irrigation | ☐ fertilization | ☐ planting dormant trees and shrubs |
| ☐ importation of clay or organic-rich growth medium | ☐ other growth medium conditioners or amendments | ☐ seeds to be protected with growth medium or mulch |
| ☐ other: _____ | | |

Describe the noxious weed and invasive plant control measures: **Noxious weeds and invasive plants will be identified, controlled and removed.**

4l. Drainage and Stormwater Controls

- Will the reclaimed surface mine site be internally drained? ☐ yes ☒ no
- Will natural runoff be directed to a natural drainage or safe outlet upon completion of reclamation? ☐ not applicable ☒ yes ☐ no
If applicable: Explain: **See final sloping configuration map.**
- Will the construction of ditches and channels be necessary to limit erosion and siltation? ☐ yes ☒ no
If applicable: Explain:
- Will conveyance ditches and channels be lined with vegetation or riprap? ☒ not applicable ☐ yes ☐ no
If applicable: Explain:
- Will it be necessary to stabilize or rehabilitate stream channels or banks? ☐ yes ☒ no
If yes: Give details:

4m. Site Cleanup

- Will all mining-related equipment be removed from the site? ☐ yes ☒ no
If no: Explain: **Wash plant and crushing equipment will remain within the post mining secondary beneficial use Industrial zoned TL 702**
- Will all structures and buildings be removed from the site? ☐ yes ☒ no
If no: Explain: **Permitted readymix plant maybe installed and operated within the post mining secondary beneficial use Industrial zoned area TL 702**
- Will all visual and/or retention berms be removed from the site? ☐ yes ☒ no
If no: Explain: **Visual berms may remain within the post mining secondary beneficial use Industrial zoned area TL 702**
- Will all debris, refuse, and/or hazardous material be removed from the site? ☐ yes ☒ no
If no: Explain: **Some debris, refuse and/or hazardous material may remain within the post mining secondary beneficial use Industrial zoned area TL 702**
- Will all stockpiles be sold, graded, and or removed from the site? ☐ yes ☒ no
If no: Explain: **Stockpiles may remain within the within the post mining secondary beneficial use Industrial zoned area TL 702**
- Will all oversize be sold, reduced, or removed from the site? ☐ yes ☒ no
If no: Explain: **Oversize may remain within the within the post mining secondary beneficial use Industrial zoned area TL 702**

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Signature Page

APPLICANT

I am applying for an Operating Permit under ORS 517.790. My signature below attests that the information provided in this application is accurate and true to the best of my knowledge. Any misrepresentation in these materials will be considered grounds for denial for an Operating Permit.

Applicant's Printed Name

Applicant's Signature

Title

Date

PREPARED BY

I prepared this application for the applicant above. My signature below attests that the information provided in this application is accurate and true to the best of my knowledge. Any misrepresentation in these materials will be considered grounds for denial for an Operating Permit.

Preparer's Printed Name

Preparer's Signature

Title

Date

LANDOWNER(S)

I have read, understand, and acknowledge receipt of all information provided in this application. By signing this form, I am granting consent to the mining activities as outlined in this application on my property.

Clay Woodward

Landowner (1) Printed Name

Clay Woodward

Landowner (1) Signature

owner

Title

9/21/23

Date

Landowner (2) Printed Name

Landowner (2) Signature

Title

Date

MINERAL ESTATE OWNER(S)

I have read, understand, and acknowledge receipt of all information provided in this application. By signing this form, I am granting consent to the mining activities as outlined in this application on my property.

Clay Woodward

Mineral Estate Owner (1) Printed Name

Clay Woodward

Mineral Estate Owner (1) Signature

owner

Title

9/21/23

Date

Mineral Estate Owner (2) Printed Name

Mineral Estate Owner (2) Signature

Title

Date

Attach additional signature pages as necessary

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APPLICANT

I am applying for an Operating Permit under ORS 517.790. My signature below attests that the information provided in this application is accurate and true to the best of my knowledge. Any misrepresentation in these materials will be considered grounds for denial for an Operating Permit.

JEFFREY R. STEYAERT

Applicant's Printed Name
Jeffrey R. Steyaert
Assistant Secretary

Title

Jeffrey R. Steyaert

Applicant's Signature

9-25, 2023

Date

PREPARED BY

I prepared this application for the applicant above. My signature below attests that the information provided in this application is accurate and true to the best of my knowledge. Any misrepresentation in these materials will be considered grounds for denial for an Operating Permit.

JEFFREY R. STEYAERT

Preparer's Printed Name
Jeffrey R. Steyaert
Assistant Secretary

Title

Jeffrey R. Steyaert

Preparer's Signature

9-25-2023

Date

LANDOWNER(S)

I have read, understand, and acknowledge receipt of all information provided in this application. By signing this form, I am granting consent to the mining activities as outlined in this application on my property.

ROBERT VANIER

Landowner (1) Printed Name

OWNER

Title

Robert Vanier

Landowner (1) Signature

9/22/2023

Date

LANI VANIER

Landowner (2) Printed Name

OWNER

Title

Lani Vanier

Landowner (2) Signature

9/22/2023

Date

MINERAL ESTATE OWNER(S)

I have read, understand, and acknowledge receipt of all information provided in this application. By signing this form, I am granting consent to the mining activities as outlined in this application on my property.

ROBERT VANIER

Mineral Estate Owner (1) Printed Name

LAND OWNER

Title

Robert Vanier

Mineral Estate Owner (1) Signature

9/22/2023

Date

LANI VANIER

Mineral Estate Owner (2) Printed Name

OWNER

Title

Lani Vanier

Mineral Estate Owner (2) Signature

9/22/2023

Date

Attach additional signature pages as necessary

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From: [Rory Isbell](#)
To: [BJORK Mary F * WRD](#)
Subject: Attachments - Application # LL-2023
Date: Tuesday, April 7, 2026 4:37:48 PM
Attachments: [ExK_Crooked-River-Amended-SJ-Opinion.pdf](#)
[ExJ_CODaily_Crook County water crisis worsens with more toxins found_In Focus_centraloregondaily.com.pdf](#)
[ExI_In search of source for Crook County well pollution, Oregon presses mining company to investigate itself - OPB.pdf](#)
[ExH_Combined 3-20-2023 KR-Mn CGE Memorandum.pdf](#)

You don't often get email from rory@colw.org. [Learn why this is important](#)

Email 3/3. Attachments H through K.

-Rory

Rory Isbell (he/him)
Staff Attorney & Rural Lands Program Director
Central Oregon LandWatch
2843 NW Lolo Drive, Suite 200
Bend, Oregon 97703
541-647-2930 x804

*On the ceded homelands of the Wasq'u (Wasco)
and Tana'nma (Warm Springs) people*

To advocate for fair, sustainable land use, visit our [Take Action](#) page

Jefferson County Circuit Court
129 SW E Street, Suite 101
Madras, OR 97741-1794
www.courts.oregon.gov/Jefferson
541.475.3317
Reply to ()

Daina A. Vitols
Circuit Court Judge



Annette C. Hillman
Presiding Judge

Crook County Circuit Court
300 NE Third Street
Prineville, OR 97754-1919
www.courts.oregon.gov/Crook
541.447.6541
Reply to (✓)

Wade L. Whiting
Circuit Court Judge

Twenty-Second Judicial District

February 11, 2025

Sarah Liljefelt
Kevin Sasse
Dunn Carney Allen Higgins & Tongue LLP
851 SW Sixth Avenue, Ste. 1500
Portland, OR 97204-1357

Shaunee Morgan
YoungWoo Joh
Kate Morrow
Department of Justice
100 SW Market Street
Portland, OR 97201

Andrew Missel
Advocates for the West
3701 SE Milwaukie Avenue, Ste. B
Portland, OR 97202

Re: *Upper Crooked River Conservationists, et al. v. Oregon Water Resources
Department, et al.*
Crook Co. Circuit Court Case No. 23CV46779

AMENDED OPINION LETTER

Dear Counsel:

This matter came before the Court on December 9, 2024, for a hearing on a Petitioner's Upper Crooked River Conservationists (UCRC) and Shotgun Creek Ranch LLC., (Shotgun Creek) Motion for Partial Summary Judgment on their first claim for relief. In addition, a hearing on Respondent's Oregon Water Resources Department (OWRD) and Water Resource's Commission (WRC) Motion and Intervenor/ Respondent's WaterWatch of Oregon (WaterWatch) Cross Motions for Summary Judgment of Petitioner's first and second claims for relief. The Court heard argument from the parties and the Court took the matter under advisement. The Court having reviewed the filings and considered argument from all parties makes the following findings and conclusions of law.

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A First Amended Complaint was filed on February 28, 2024, by Petitioners, UCRC and Shotgun Creek alleging two claims for relief under the Oregon Administrative Act (APA) to challenge a permitting decision. The first claim for relief alleges in summary that the OWRD granted an unlawful instream water right outside of their statutory authority in violation of the law. The second claim for relief alleges in summary that OWRD issued a water right permit failing to follow the required statutory procedures and consider the public interest issues raised and processed in Application S-89128 using an expedited process without consideration of any public interest issues in a contested hearing in violation of the law.

On April 22, 2024, Petitioners, UCRC and Shotgun Creek filed a Motion for Partial Summary Judgment against Respondent, addressing the first claim for relief, on the grounds that there are no genuine issues of material fact, rather the issue is solely one of law and they are entitled to judgment as a matter of law. The Petitioners request the Court enter a judgment in favor of Petitioners as a matter of law. Petitioners argue that their alternative second claim for relief is moot if the Court concludes that OWRD committed an error in approving the permit under the first claim for relief. Alternatively, even if the Court denies Petitioner's Motion for Partial Summary Judgment on the first claim for relief, Petitioners argue in response to OWRD and WaterWatch's Motions for Summary Judgment on the second claim for relief, that OWRD still committed error when it summarily dismissed public interest comments and proceeded to use an expedited permitting program entitling requesting Respondent's Motion for Summary Judgment on claim 2 be denied.

On September 10, 2024, Respondents OWRD and WRC filed a Motion for Summary Judgment and a Response to Petitioner's Motion for Partial Summary Judgment. Respondents argue that the Bureau of Reclamation's (Bureau) Application S-89128 did not request an instream water right and the Final Order did not approve an instream water right, rather it was an application for the right to use stored water for a beneficial use. The Court should grant summary judgment for Respondents on the first claim for relief and affirm the Final Order. Further that Respondents are entitled to summary judgment on claim 2 because OWRD acted within its authorized discretion in determining that no public interest issues were raised in the public comments and again requesting that the Court affirm the Final Order.

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On September 20, 2024, Intervenor-Respondent WaterWatch filed a Cross Motion for Summary Judgment and a Response to Petitioner's Motion for Partial Summary Judgment. WaterWatch argues that OWRD did not violate the law when it granted an ordinary secondary water right to the Bureau to use water stored in the Prineville Reservoir for downstream fish and wildlife purposes and the Court grant WaterWatch's Cross Motion for Summary Judgment on the first claim for relief. WaterWatch argues that they are entitled to summary judgment on the second claim for relief as well arguing that OWRD did not err in determining that no public interest issues were identified in the Bureau's application for a secondary water right and OWRD correctly processed the application using the expedited process set out in ORS 537.147.

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All parties agree that the relevant material facts in this matter are undisputed.

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Addressing the Motion for Summary Judgment, summary judgment is appropriate "...if the pleadings, depositions, affidavits, declarations and admissions on file show that there is no genuine issue of material fact and that the moving party is entitled to prevail as a matter of law...". ORCP 47(C). Once the moving party meets this burden, the opposing party must produce *prima facie* evidence sufficient to demonstrate there are genuine issues of material fact in dispute on any issue for which it has the burden of proof at trial. See e.g., McKinley v. State Dept. of Motor Vehicles, 179 Or App 350, 357-58 (2002). The court must evaluate the record in the case at bar and view it in "... a manner most favorable to the adverse party..." If the court concludes that no objectively reasonable juror could return a verdict for the adverse party, then summary judgment is proper. ORCP 47(C); Jones v. General Motors Corp., 325 Or 404, 420 (1997). In deciding a Motion for Summary Judgment, the court must view the evidence in a light most favorable to the party opposing the motion. If there is a genuine issue of material fact, summary judgment must be denied.

I have had the opportunity to review the pleadings in their entirety, supporting declarations, the relevant statutes and case law relied upon by the parties as cited authority and taken time to consider the matter and arguments raised by the parties. I will not reiterate arguments in their entirety rather I will summarize them for the purpose of analysis. In addition, Plaintiffs requested special findings of fact and conclusions of law – noting, however, "that the only findings of fact required for the motion are undisputed, and the issue of solely one of law," so the findings of fact will include the court's analysis of the legal issues and conclusions of law.

First Claim for Relief

The question before the Court as it relates to the First Claim for Relief is whether the OWRD granted an unlawful instream water right outside of their statutory authority in violation of the law as alleged by Petitioners.

Petitioners argue that the Bureau's application S-89128¹ was a request for an instream water right which is governed in Oregon under the 1987 Instream Water Rights Act. The OWRD processed the application as a private water right following the incorrect process and erring in granting a water right to an entity not entitled to apply for or hold such right. ORS 537.332-.360. The Bureau's application expressly requested an instream water right.² OWRD's Final Order and Permit clearly authorize an instream water right. The Application proposes to release water from the Prineville Reservoir for instream fish and wildlife use and the Application uses the term instream use no less than six times and the Permit grants such instream use of water within the natural stream channel of the Crooked River from Prineville Reservoir to Lake Billy Chinook.³ OWRD processed the Application under ORS 537.147, which authorizes any person to appropriate private water rights from stored water. The Bureau did not request a private water right from stored water, they requested and were granted a public, instream use of water with the public benefit for the use of fish and wildlife meeting the statutory

¹ Liljefelt Dec. Ex. 1

² Id.

³ Id. Ex. 1 & 4

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definition of an instream water right. ORS 537.332. Petitioner's challenge only the legality of the Application and Permit as it relates to the instream fish and wildlife use of 68,887 acres of water and not the 10,000 acres of out of stream use water designated for supplemental irrigation. Instream water rights may only be granted to one of three state agencies none of which is the Bureau. Petitioner's set forth that OWRD acted contrary to the Instream Water Rights Act as set forth in the text, context, and legislative history.

Respondent OWRD argues that Petitioner's claims are without merit because the Bureau applied for and was approved for, a secondary permit to use stored water for fish and wildlife use. OWRD argues that the Bureau applied for a right to use stored water for a beneficial use. ORS 537.147. Respondent argues that Petitioners have rewritten the definition of an instream water right and rely on language used in the Bureau's Application to support their premise that an instream water right was erroneously granted. Respondent relies on the facts in this case, setting forth that Petitioners' argument has no basis in Oregon Water Law.

Respondent WaterWatch argues that the Bureau's Application was nothing more than an ordinary secondary water right. OWRD regulations confirm that one way for a grantee (of stored water) to dedicate water to instream use is to obtain a secondary water right that allows for an instream use following release from storage. OAR 690-093-0110. This instream use is not an instream water right, this is a secondary water right held by the Bureau not OWRD and subject to the Instream Water Rights Act. The Bureau sought and OWRD issued a secondary water right to put stored water to a beneficial use, specifically fish and wildlife consistent with the purpose set out in the Bureau's Storage Certificate. The fact that the water is to be used for an instream purpose and that fact that the purpose benefits the public, does not mean that the Instream Water Rights Act applies.⁴

In this case, the parties disagree as to whether the Bureau's Application and OWRD's Final Order relate to an instream water right governed by the Instream Water Rights Act or a permit request to use stored water. Starting with the definition of "instream water right" means a water right held in trust by the Water Resource Department for the benefit of the people of the State of Oregon to maintain water instream use for public use. ORS 537.332. In this case, the Bureau holds a certificate of storage, last amended in 2014 the Crooked River Collaborative Water Security and Jobs Act of 2014 (Crooked River Act), Pub. L. No. 113-244 (2014).⁵ The Bureau has a fully vested water right. Under the Instream Water Rights Act, only three Oregon agencies may apply for an instream water right. ORS 537.336. If approved, the Water Resource Commission (WRC) shall issue a certificate with the OWRD as trustee for the people of Oregon. ORS 537.341. This meets the statutory definition of instream water right. The Court is not persuaded by Petitioner's argument that the Bureau's Permit S-55394⁶ is a new instream water right. In this case, the Bureau applied for a permit to use stored water, water they hold in storage in the Prineville Reservoir as set forth by the Crooked River Act. The Bureau's Application follows the process set forth in ORS 537.147 and is consistent with a request for a secondary use.

⁴ Missel Dec. Ex. 6 and 7.

⁵ Liljefelt Dec. Ex. 6.

⁶ Liljefelt Dec. Ex 4.

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Secondary use conforms with the use allowed under the primary certificate granted to the Bureau. All parties agree that “beneficial use is the basis, the measure and the limit of all rights to the use of water in this state.” ORS 540.610. This case is not unique in Oregon, wildlife and fish have been considered beneficial uses and secondary water rights to use stored water have been granted for instream use. *Bridge Creek Ranch, LLC v. OWRD*, 329 Or App 568 (2023).⁷ The Bureau storage right was modified under the Crooked River Act requiring the Bureau to use water to benefit fish and wildlife and provide instream flows from the Prineville Reservoir downstream to Lake Billy Chinook. OWRD’s permit grants a secondary use consistent with the storage right granted to the Bureau. The Storage Certificate allows storage for downstream fish and wildlife use.⁸ Notably, Petitioners are not arguing that the Bureau’s secondary use of stored water for irrigation use falls under the Instream water Rights Act. They are arguing that use of stored water in-stream for the benefit of fish and wildlife invalidates the Permit under the law. The Court is not persuaded by Petitioner’s argument that the use of the terms “instream” or “beneficial use” triggers the Instream Water Rights Act. The Court finds that there is no *new* instream water right granted by OWRD Permit⁹ to the Bureau that would trigger the Instream Water Rights Act and application process set forth in ORS 537.332-360. OWRD processed Application S-89128¹⁰ as an application to put stored water to use consistent with Oregon law. ORS 537.147. That use is consistent with the priority water right granted to the Bureau. The Court is ruling that OWRD’s Final Order and Permit S-55394 dated September 15, 2023, is affirmed as it authorizes a permit to the Bureau to use stored water and was not issued in violation of the law with respect to the First Claim for Relief. ORS 183.484.

Therefore, the Court denies Petitioner’s Motion for Partial Summary Judgment and grants Respondents’ Cross Motions for Summary Judgment on the First Claim for Relief.

Second Claim for Relief

Petitioner’s Second Claim for Relief challenges the expedited process used by the OWRD finding that no public interest issues were raised in the public comments arguing public interest issues were raised without consideration and conducting a public interest review as required by ORS 537.153.

Respondent OWRD’s Motion for Summary Judgment argues that OWRD did not err in determining that no public interest issues were identified in relation to the Bureau’s Application and thus, correctly processed the Application using the expedited procedure set forth in ORS 537.147. WaterWatch adopts Respondent OWRD’s arguments and relies on their relevant arguments made during the Motion to Dismiss. OWRD argues that the determination of whether public interest issues were raised is within the sole discretion of the agency citing ORS 537.170(8) (...before issuing a final order, the director or commission...shall make the final determination of whether the proposed use...would impair or be detrimental to the public interest....).

⁷ See also, Id.

⁸ Ratcliffe Dec. Ex. 8 at 39-41.

⁹ Liljefelt Dec. Ex 4

¹⁰ Liljefelt Dec. Ex 1 and Ratcliffe Dec Ex. 8.

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Respondent argues that OWRD acted within its discretion to continue with the expedited process and determining that no public interest issues were raised. OWRD officials thoroughly reviewed and discussed all the comments that the agency received, even seeking input from technicians with expertise in the basin.¹¹ Respondent sets forth that none of public comments provided a factual basis but simply recited language from ORS 537.170(8).

Petitioners' Response relies on ORS 537.147, that the department may only issue a water right permit "upon determining that no public interest issues as identified in ORS 537.170(8) have been raised through the public comments." Petitioners argue that multiple comments were submitted¹² raising or identifying the statutory public interest issues and the department engaged in a process determining whether those public comments were of a quality or weight as to deny moving the application out of the expedited process to the procedure set forth in ORS 537.153. ORS 537.147 does not give the department the discretion to evaluate the public interest issues raised, only that if public interest issues are identified, "then the department shall treat the application under this section as an application under ORS 537.150 and perform the public interest review required by ORS 537.153(2)." It is only in ORS 537.153 that involves the rebuttable presumption that may be overcome by the preponderance of evidence of specific public interest under ORS 537.170(8) would be impaired or detrimentally affected." ORS 537.147 does not grant the agency the discretion to determine whether any public interest issues would be impaired or detrimentally affected, only that if a public interest issue is raised through submitted comments, a review hearing shall be held.

In this case, the OWRD received comments¹³ after the public notice that refer to public interest issues outlined in ORS 537.170(8). It appears from the record that the OWRD went through the analysis as set forth in ORS 537.153 in making a determination that no public interest issues were raised even seeking input from technicians with expertise before determining that no public interest issues were raised triggering the public interest review required by ORS 537.153(2). OWRD did receive comments that purported to raise public interest issues and those were summarily disregarded by the agency without following the process set forth in ORS 537.150 and 537.153(2). It appears to this Court that OWRD went through the analysis required after a public review without conducting the public review. OWRD may certainly come to the same conclusion after public review however, the Court finds that the agency failed to comply with ORS 537.147(3) when public interest issues were raised during the comment period. In a time when transparency is vital for trust in public agencies and for issues involving water rights in particular, the public has the right to be heard when they raise public interest issues, then the agency may use their discretion and go through the analysis of whether the secondary use by the Bureau would impair or be detrimental to a public interest. ORS 537.153.

¹¹ Ratcliffe Dec. paragraphs 35-45.

¹² Liljefelt Supp. Dec. Ex 4.

¹³ Id.

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The Court is denying Respondent OWRD and WaterWatch's Motions for Summary Judgment on the Second Claim for Relief.

I am directing that Respondent OWRD prepare an order consistent with the ruling on the Motions. A status hearing was held on February 10, 2025, and the parties correctly identified an error on the Court's Opinion letter dated 2-10-25. I have amended the opinion letter further clarifying and correcting the Court's findings and conclusions. I appreciate the parties work on this case on behalf of their clients.

The Second Claim for Relief remains pending. Based upon the evidence presented for the Respondent's Motions for Summary Judgment, unless the parties request an evidentiary trial with additional evidence, the Court having considered the record of the case thus far, intends to Remand the Final Order back to OWRD for the limited purpose to perform the public interest review required by ORS 537.147(3) and ORS 537.153(2). The Court finds based on the record of the case thus far, that the agency exercise of discretion outside the range of discretion and in violation of a statutory provision. ORS 183.484(8). I will defer to the parties how they would like to proceed and am happy to consider any further evidence before making a final determination.

Very truly yours,



Annette C. Hillman
Circuit Court Judge

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https://www.centraloregondaily.com/news/in-focus/crook-county-toxic-well-water/article_8f41b9c8-0371-11f0-a4c7-a7c981b78a28.html

FEATURED

New tests reveal more toxins, including arsenic, in Crook County well water crisis

Mar 18, 2025

David Klugh

Assistant News Director



PRINEVILLE, Ore. -- Imagine after years of enjoying clear, clean groundwater for drinking, bathing, washing and even livestock -- suddenly having to haul in jugs of water to provide every drop you use. That change in lifestyle is the nightmare still being lived by folks in Crook County more than three years after they began complaining about dramatic changes to their well water quality.

In Central Oregon Daily's initial report in August 2024, the problems were pretty much limited to high levels of manganese and aluminum. Now, after an initial round of testing by the Oregon Department of Environmental Quality, new toxins have appeared and so have new concerns for these troubled waters.

Living in crisis mode year after year after year can be exhausting. For the McCormick family, life in crisis has become the norm. Every day drinking, cooking and cleaning takes a bit more muscle for these Crook County residents since the well that helped to make their house a home turned against them.

READ PART 1: Troubled Waters: Crook County property owners' years-long battle over tainted groundwater

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Hauling in water to avoid well water

"It is a lot harder than you think to have to haul in water for absolutely everything," said Ashley McCormick. "My kids do not bathe here. We have to go bother my poor grandmother every night after basketball practice to have our showers there because it's not something I'm comfortable with. After what happened to Mason last time, I don't want to put him through that again."

Mason is McCormick's son. And what he was put through two years ago was an outbreak of hives, rashes, and up-all-night itching after taking a bath in water likely tainted with dangerous amounts of metals like manganese, iron and aluminum.

"My biggest concern is what I have done to them unknowingly years ago when we were still drinking it. Drinking and eating, everything you do revolves around water and we consumed a lot of it," McCormick said.



Mason McCormick ended up with an outbreak of hives and rashes.

And how could she have known? In 2017, when the Crook County Commission chose to grant Knife River a permit to begin mining gravel directly into the groundwater source, less than a mile from the McCormick's and dozens of other private wells, property owners were told over and over again -- their water would not be impacted.

Fast forward to today and Ashley's neighbor, Julie Thompson, who just spent \$11,000 on a brand new filtration system, remembers that public hearing like it was yesterday.

"Nobody wanted it to happen. The room was completely full of people and the number one question was, 'Is this going to affect our water?' And everybody was assured 'no. It will not affect your water. We're not going to be in the water. It will all be fine,'" Thompson said.

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Residents convinced they know the cause

Knife River didn't just have to go into the water, it had to go through it to mine all that gravel, potentially stirring up centuries of solid, untouched minerals. The folks around here have been convinced Knife River, its mining and rock washing operations, are the source of their troubled waters.

During our initial reporting on this crisis, Knife River was quick to invite us onto the property and to share their science-based reasoning that they are not to blame for contributing to the water quality issues here.

"Well, our position is that Knife River has not changed the quality of the water since we have been here," Knife River Operations Director Chris Doan said last August.

We reached out to Knife River for this follow-up story as well. It was again happy to accommodate our questions but made it clear their position has not changed. It sent a statement saying, "We are confident data will continue to confirm our work has had no impact on water quality," and that "...hot spots of manganese occur across Crook County."



Knife River gravel mine

And that is true, but at what levels? Thanks to pressure from the county, state and Oregon's U.S. Senators Jeff Merkley and Ron Wyden, a first round of state-sponsored well testing has just been completed.

"It's very clear"

The results of those tests for well owners? Bad just got a lot worse.

"There are much higher levels than we thought that were there on certain domestic wells, which are clearly unhealthy," said Ed Fitch, the attorney representing the well owners. He's also the mayor of Redmond. He's worked with the property owners for the last two years, pro bono.

The Oregon Health Authority report to the neighbors is now showing new, even more dangerous elements are appearing in the water, including arsenic.

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"It's very clear that the mine is causing this problem. It wasn't there before the mine started, the mine is the only thing that has changed and it's clear that's the connection," Fitch said.

Fitch said that connection is bolstered by the fact that the highest concentrations of toxic elements continue to be found down-gradient of the mine -- the direction the aquifer is flowing.

But something else has changed here. The reason so many more toxic elements are being found in the well water out here is still an unknown. One possibility is that perhaps some of those minerals were not tested for until now.

Unlined holding ponds

Another possibility is that the Knife River gravel mining operation is no longer mining gravel. This facility has pretty much become a rock washing operation, with all of that contaminated water going directly into unlined holding ponds which, according to the property owners' own geologist engineer, are also dug through the groundwater source. Knife River now imports thousands of tons of rock from other sites and washes it here.



Knife River holding pond

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"The ponds that they discharge the processed water to -- that dirty bath water -- gets put into settling ponds that are in the aquifer. There's a reason why those ponds have water in the bottom all the time, all year round, whether they're working or not," geologist Jim Newton said. "So that just means they have a much more direct conduit from their wash water to the aquifer."

While it took a year for the state to respond to complaints about the mine and the water, there is no denying the ball is now rolling. The state testing that was just completed did give well owners a better grasp on just how dangerous their water has become. And the county-approved expansion of the Knife River mining operation on adjacent land has been paused indefinitely.

That still does not explain so much hesitation on the part of the county, state and federal government to step in.

Take a ride with fifth-generation local Dick Zimmerlee. He understands the process can get complicated. After all, private wells are not regulated. But he says that has never been the point.

"It's not the private well. It's the resource. So there's a resource under here that is the aquifer. The private well is just where the crap ends up," Zimmerlee said. "The state, absolutely, and the EPA, absolutely, have the authority and the duty, as far as we can understand it, to actually regulate the resource to make sure it's safe."



Ashley McCormick and Julie Thompson

The lack of public trust in Knife River isn't just limited to questions of contamination. The county's director of community development, John Eisler, left his position in the county attorney's office, partly to devote time to this crisis.

"There have been numerous complaints about operations there," Eisler said.

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Clean water may be decades away

Greg Svelund with DEQ admits that even if the mining operation were proven to be the culprit tomorrow and ceased operations, a return to clean well water could be decades away.

"I don't think their situation in five years is going to be different no matter what action is taken today. That is the honest truth. That's hard to tell people," Svelund said.

It's not what homeowners like Ashley McCormick want to hear.

"It's overwhelming and it's defeating. And it's very hard to normalize this to my children. And it just makes me wonder what they're going to think when they grow up. That's a sad thing. That's what they're going to remember," McCormick said.

Knife River has been compelled to begin its own on-site testing program with independent supervision. If DEQ can get the legislature to approve the costs, a second round of well testing will begin sometime this summer.

In the meantime, Fitch has gathered other attorneys in preparation for a class action lawsuit against Knife River.

As for the state's primary mining regulator, the Oregon Department of Geology and Mineral Industries, it remains confident the well water contamination is the result not of the mining operation, but of drought and natural geology of the area.

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In search of source for Crook County well pollution, Oregon presses mining company to investigate itself



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By **Emily Cureton Cook** (OPB)

Aug. 26, 2025 5:13 p.m.

Knife River wants state approval for an expansion.



Knife River VP of its South Central Division Chris Doan and Technical Services Manager Matt Ropp tour the Woodward site on April 12, 2023.

Emily Cureton Cook / OPB



STREAMING NOW
Here and Now

Negotiations over how a mining company will monitor itself amid accusations of groundwater pollution in Crook County are expected to come to a head this week.

Friday is the deadline state regulators gave Knife River, a giant of the construction materials industry, to submit a final draft plan for a water sampling plan tied to its sand and gravel mining operations near Prineville.

[The company runs a site there that's been under scrutiny since 2022](#), when nearby residents started documenting well water choked with black sludge.

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The sludge turned up in toilet tanks. It broke pipes and ruined appliances. Other residents photographed mysterious skin rashes and unexplained livestock deaths. The neighborhood organized to test its wells. Those tests showed elevated levels of heavy metals and other pollutants that put human health at risk, results that [have since been reconfirmed by state-led investigations](#).

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STREAMING NOW
Here and Now

black particles reveal themselves.

Emily Cureton Cook / OPB

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Pinpointing the source of the contamination has been complicated. Knife River denies it caused the water problems. Oregon's environmental and mining regulators hope the company's monitoring plan will reveal a definitive cause, while some residents have already lost their trust in state oversight.

The contaminants turning up in wells "are not unusual for the area and reflect naturally occurring groundwater conditions," Knife River spokesperson Jay Frank said in an email.

The company is motivated to prove its innocence because it wants to expand operations in the rural area populated by farmers and landowners five miles northwest of Prineville.

Before state regulators will permit that expansion, they're pressing Knife River to show its gravel mine and processing plant does not add manganese and other pollutants to the groundwater. Too much manganese in water can cause bad smells and stains, and ingesting high levels can be toxic, leading to neurological problems.

Oregon Department of Environmental Quality spokesperson Greg Svelund said it's taken eight months for Knife River and regulators to get on the same page about the technical requirements of a monitoring plan.

"We really don't know what's going on and we need more data," Svelund said.

According to a draft of the plan, Knife River will monitor 17 wells and also collect data on surface water and soils at its site. After the state receives at least a year's worth of data, it will need time to analyze it, Svelund said.

Meanwhile, some residents have been without safe drinking water from the tap for years. Ashley McCormick and her family live immediately downhill from the existing mine site. They've been hauling drinking water in 5-gallon jugs for nearly three years. Her kids are now 9, 11, and 13.

"It wears them out," McCormick said this week. "When we have friends come over, the first thing all the kids say to their friends is, 'Don't drink it. The water's not safe.'"



On June 9, 2024, Crook County resident Ashley McCormick listens to a meeting of her neighbors with U.S. Senator Jeff Merkley. In 2022, lab testing found levels of manganese in her well water that exceeded federal guidelines for health concern.
Emily Cureton Cook / OPB

Last month, DEQ-backed water testing of 58 wells near the existing mining site reconfirmed elevated levels of various contaminants, most commonly manganese, arsenic and iron. [The results mirrored findings from a previous round of state testing last year.](#)

Knife River's Frank pointed out that there is no data on water quality pre-dating mining operations. Real estate transactions in Oregon don't require such tests.

Unlike public water supplies serving cities, private wells in Oregon are virtually unregulated.

That makes the last two years of state-sponsored well testing in Crook County unusual

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Health Authority, according to a statement by OHA toxicologist David Farrer.

“Now that individual well users have their data along with individualized health interpretations, OHA staff is drafting a Health Consultation report that is intended for public release later this fall,” Farrer said in an email.

That report will “include at least one recommendation to all Oregonians that use private domestic wells to get their wells tested if they haven’t already,” he added.

Oregon Gov. Tina Kotek’s office said this week that she “is directing the agencies to work with greater urgency to get the Knife River testing complete and deliver answers to residents,” spokesperson Anca Matica said in a statement.

As OPB first reported in 2023, Oregon mining regulators initially dismissed residents’ groundwater complaints and ignored possible permit violations by the multibillion-dollar construction materials company. [Federal lawmakers stepped in to pressure Oregon to vet the complaints more deeply.](#)

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Crook County resident Dick Zimmerlee points out the window of his home office, to show U.S. Senator Jeff Merkley where a Knife River mining site is in relation to the home. June 9, 2024.

Emily Cureton Cook / OPB

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At its existing Woodward site near Prineville, the company's processing plant separates out the rocks from valuable construction materials like sand and gravel. It then uses unlined ponds to hold the wastewater. If allowed to expand, this plant would process what the company digs out of nearby farmland.

"Knife River has not lined the process water ponds, in keeping with statewide accepted practice," Frank said. "We find no evidence suggesting the process water ponds are influencing any area drinking water wells."

McCormick said her trust in state oversight has evaporated. She's skeptical of Knife

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“We all feel very alone,” she said. “We’re not scientists, we don’t work for DEQ, we don’t work for the state. We don’t do geology stuff, but reading over this, it doesn’t make sense,” she said of the company’s draft plan.



A field at the Woodward site on April 12, 2023. Knife River's permit for sand and gravel mining requires it to return the land to a farmable condition.

Emily Cureton Cook / OPB

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Memorandum



21145 Scottsdale DR, Bend, Oregon 97701
360-907-4162 newtonjim@hotmail.com

March 20, 2023

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TO:

Ed Fitch, Attorney
Fitch & Neary, PC
210 SW 5th Street, Unit 2
Redmond, OR 97756

FROM:

Jim Newton, P.E., R.G., C.W.R.E.

RE: RESIDENTIAL WELLS WITH REPORTED HIGH MANGANESE NEAR KNIFE RIVER MINE SITE, CROOK COUNTY, OREGON

Dear Ed:

This memorandum has been prepared by Jim Newton of Cascade Geoengineering, LLC (CGE) and provides a brief summary of groundwater conditions that may indicate concerning levels of manganese near the Woodward/Knife River Mine Site located near the city of Prineville, Oregon (Site), shown generally on the attached Figure 1 Vicinity Map. A visit to domestic wells located around the Site and a review of water samples results from some of these domestic wells indicate that elevated levels of manganese are probably occurring as a result of the Site mine. A brief summary of the area well locations as related to the Site mine and water sample data results are presented below.

Background

The Site was permitted by the Oregon Department of Geology and Mineral Industries (DOGAMI) and developed as a sand and gravel pit mine site around 2016. Mining of the Site generally consisted of Cascade Geoengineering, LLC 21145 Scottsdale DR, Bend, Oregon 97701 360-907-4162 w www.cascadegeoengineering.com

excavation below native ground surface at depths up to or exceeding 30 feet below ground surface (bgs) into a shallow aquifer to extract sand and gravels in support of a commercial sand and gravel mine operation. The site since this time has continued to be mined and concurrently reclaimed as required by DOGAMI, with some areas viewed as being reclaimed to fields that may be of use for agriculture-also a requirement of the Site DOGAMI reclamation plan. The original mine Site has largely been developed, and based on reported conditions during county land use hearings in 2021 and 2022, it sounds as though mining of the Site is likely complete, or nearing completion, with reclamation of a portion of the Site still underway. An expansion of the Site was applied for by Knife River on the adjacent property located immediately east and north of the Site, and subsequent approval from Crook County was granted in 2022, however development of this expansion area has not begun. The current Site and expansion area are shown on the attached Figure 2 referenced as the 'Woodward/KR Site'.

Jim Newton has been involved with the Site since prior to development of the mine, as Mr. Newton was previously contacted by neighboring property owners located immediately south of the entrance of the Site located on Stahancyk Lane, referenced on the attached Figure 2 as site #25 and #26/27, based on potential concerns to groundwater in the area. Since this time, Mr. Newton has also been contacted by Mr. Richard Zimmerlee, a rental resident of the expansion Site located in the northeast corner of the expansion Site area (shown on Figure 2 as site 10). Mr. Zimmerlee and other neighbors were opposed to expansion of the Site based on concerns over incompatibility of the Site with surrounding agricultural land uses, potential impacts to shallow groundwater, amongst other sentiments. Since approximately November 2022, Mr. Newton was contacted by Mr. Zimmerlee and several neighbors of the Site regarding concerns over groundwater quality associated with water samples from their wells testing high for aluminum and manganese.

APPROACH

Considering the concerns expressed by Mr. Zimmerlee and results of water samples collected from Mr. Zimmerlee's domestic well and several neighbors, CGE reviewed the water sample laboratory test results collected from Mr. Zimmerlee and a several neighbors' wells noting elevated levels of aluminum and manganese (the U.S. Environmental Protection Agency (EPA) has a secondary maximum contaminant limit (mcl) for manganese of 0.050 milligrams per liter), with both aluminum-when tested for aluminum-and manganese reporting exceedances of the EPA 0.050 milligrams per liter (mg/L)-a note about EPA secondary mcls, the EPA allows states to regulate secondary mcls with discretion and although Oregon does not have an action level for Mn, California does, which is 0.500 mg/L, as according to the Oregon Water Resources Board, Mn does have the potential to cause neurological impacts at elevated levels. Further, the action levels for all secondary mcls are only enforced by states for public water systems that are regulated by the Oregon Health Authority-Drinking Water Services (OHA-DWS), as there is no enforcement for exempt domestic wells, defined as wells serving less than three homesites (laboratory reporting results for each well tested that CGE had access to these results are included in Attachment A).

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Considering these water samples, it was recommended to Mr. Zimmerlee to contact DOGAMI and Oregon Department of Environmental Quality (DEQ) in an effort to engage with these state agencies that regulate mining and groundwater quality, respectively, in Oregon. Email correspondence sent by Mr. Fitch, attorney for Mr. Zimmerlee, was sent to both DOGAMI and DEQ in November 2022, however, little response was received prior to January 1, 2023, and a subsequent letter was from DOGAMI authored by Bob Brinkman and Vaughn Balzer dated February 10, 2023 was received by Mr. Fitch and distributed to CGE February 15, 2023. This February DOGAMI letter noted limited water sampling data was collected and reviewed as part of the groundwater quality review and a conclusion that, *"Based on those contextual observations and the groundwater sampling data submitted by Mr. Zimmerlee and Knife River, there appears to be no evidence substantiating groundwater contamination derived from the Woodward site to Mr. Zimmerlee's, Mr. Porfily's or Mrs. Mikulski's residential wells or the well at 4144 Stahancyk Ln., Prineville OR 97754."* Based on the DOGAMI letter dated February 10, 2023 included a limited review of water sample data, and although the letter references data reported, there were not attachments or enclosures included with the letter to Mr. Fitch or CGE, although the signature page did indicate that three enclosures were part of the letter.

With the response from DOGAMI noting no influence from the Site is recognized, and with such a limited amount of data reviewed as noted in the DOGAMI letter, CGE set out to collect additional data that may support the DOGAMI conclusion, or, contradict the DOGAMI conclusion of no affect of groundwater quality as a result of mining activity at the Site. CGE conducted a site visit with Mr. Zimmerlee on March 14, 2023, to obtain GPS locations of neighbor wells around the Site and review reported laboratory water sample results from several of domestic wells that have been largely tested for manganese (Mn) since around December 2021 thru February 2023. Additional neighbor well owners have noted they are having water samples collected for testing for Mn as well, however, these results are not available at the time of this memorandum. Although additional water tests are likely forthcoming, concerns over groundwater quality is great at this time and waiting for further results may simply delay a more thorough response from DOGAMI and DEQ associated with groundwater quality that may be a result of mining or reclamation activities associated with SITE.

SUMMARY OF DOMESTIC WELL LOCATIONS AND AVAILABLE LABORATORY WATER SAMPLE RESULTS

CGE has prepared a map with the locations of domestic wells surrounding the Site shown on the attached Figure 2. These well locations were chosen based on interest from these neighbors to have their wells included in a response to the DOGAMI letter, and, although laboratory water sample results are not available for all of these wells, those that currently have lab results are shown and discussed herein. Further, a review of Oregon Water Resources Department (OWRD) well logs for many of these wells was further conducted to determine general depth of the wells and generally the occurrence of groundwater (OWRD has only required well logs to be filed since around 1956, and since nearly all of these homes with wells are more than 10 years, with many nearly 100 years in age, several installed wells do not appear to have OWRD well logs associated with them). Additionally included on Figure 2 are the results of the Mn lab reported values for each well with test results, and other than Elbeck, site #13, all other water samples

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were collected in a range of 2021 and 2023; and the Kriege #25 and Mikulski #26 were included in the DOGAMI letter (DOGAMI letter is included as Attachment B to this letter).

A review of the water sample results are interesting, as the DOGAMI letter referenced a groundwater elevation map included in a report prepared Stantec Consulting Services, Inc. of Colorado dated March 2021 for the Site and the expansion area (Stantec). The Stantec groundwater elevation map is included herein as Attachment C, and as DOGAMI references a general groundwater flow direction of northeast to southwest is indicated by the Stantec groundwater elevation map-although the Stantec report fails to follow Oregon State Board of Geologist Examiners Hydrogeologic Report Guideline, Second Edition, dated May 30, 2014, and CGE has noted several inaccuracies in the Stantec report and groundwater elevation map, CGE somewhat agrees that the likely groundwater flow direction is likely northeast to southwest-possibly more accurately described as east-northeast to west-southwest, the overall trend of groundwater flow seems similar enough to the DOGAMI description. Considering additional data reviewed by CGE, including depth of domestic wells and overall groundwater occurrences, there does appear to be a reasonable connection of groundwater conditions being degraded in the downgradient direction from the Site.

A review of water samples reporting for Mn shows concentrations in the 'up-gradient' groundwater flow direction, those wells that are located east of the Site, and 'cross-gradient' direction, those wells that are located to the side (or in this case, more directly north or south of the Site) of the Site, and those wells that are 'down-gradient' of the Site note concerning results. The wells located up-gradient and cross-gradient to the Site have Mn levels ranging between 0.0956 to 0.129 mg/L (there is a single well noted by DOGAMI as a non-detect, or 'ND', noted of Figure 2 as #26 Mikulski; however, the DOGAMI report notes water was collected from a water tap, and since this domestic well is equipped with a reverse osmosis water treatment system that can remove Mn, and no other reference to how the water sample was collected, this data is ignored herein). It may appear, without more detailed groundwater investigation, that the background Mn concentration within the aquifer may be in this range of 0.0956 to 0.129 mg/L.

A review of water samples reporting Mn are wells located down-gradient groundwater flow direction of the Site shows much different results. These down-gradient wells report Mn levels ranging from 0.158 mg/L to 0.484 mg/L with the highest Mn level of 0.484 mg/L (shown on Figure 2 as #17 D. Porfily) being located closest of the domestic wells with Mn results, this well is approximately 1/8 mile nearly due west of the northwest corner of the Site. Further, wells with levels reporting Mn levels of 0.158, 0.172, 0.182, and 0.190 mg/L range in distance from the Site of up to 1/2 mile or less. There is one well located approximately 3/4 mile northwest of the Site that reports a Mn result of 0.481 mg/L, although this site is down-gradient, it is also at greater distance than other wells that would indicate a likely greater groundwater connection to the Site based on proximal distance alone.

Further review of the two wells with reported Mn indicate that wells completed at shallower depths than those completed to deeper depths in the immediate down-gradient direction flow direction show the two highest reported levels of Mn, reported as 0.416 and 0.484 mg/L (shown on Figure 2 as #18 McCormick

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and #17 D. Porfily, respectively). Additionally, the McCormick OWRD well log CROO-948 is completed to a depth of 75-feet bgs with a reported static water level (swl) of 40-feet bgs, and Porfily OWRD well log of CROO-939 is completed to a depth of 51-feet with a swl reported of 30-feet bgs. This further supports those domestic wells completed into the first encountered, or shallow, aquifer at depths less than 100-feet bgs are likely most affected by the Site, than those completed to greater depths with deeper first water reported. This is supported as the well #15 Vice well is furthest well with Mn results that is down-gradient from the Site, is completed in the shallow aquifer, and reports Mn of 0.182 mg/L.

COMPARISON TO PREVIOUS YEARS

CGE requested of Mr. Zimmerlee that any neighboring domestic wells with results of water samples collected prior to the Site mine development in 2016 please provide these results. Based on Mr. Zimmerlee's request to neighboring well owners, there are no lab results of water quality prior to 2016, although there is a single well with lab results from #13 Elbek with results from November 2017, reporting 0.172 mg/L. The owner of #13 Elbek is in the process of obtaining new water samples for testing of Mn for comparison to the lab results from 2017.

Although the fact that neighbors do not have water sample results from prior to 2016 is not ideal, understandable as Mn or other metals testing were not required of domestic well users. The occurrence of Mn can be visually observed in household areas with tanks or detention canisters, such as toilet tanks or water filter canisters. All of the homes sites in the area that were included herein are long standing residences dating to likely more than 20 years to nearly 100 years before 2023. These owners, many of whom have been in residence for more than 40 years (Mr. D. Porfily is a long-standing resident of 40 years), that have collected water samples have noted a buildup of black sediment/sludge in their toilet tanks or water filter canisters. Such a sediment/sludge had not been observed prior to 2021. This anecdotal evidence of a change in groundwater conditions in the last few years does support finding that changes in the nature of groundwater has potentially changed dramatically since 2016, the establishment of the Site for mining.

SUMMARY

Based on the information included herein, and the significant concern of neighbors related to groundwater quality and the fact that groundwater is the only source of water for their homes other than bottled water, it is the recommendation of CGE that further investigation of the groundwater conditions in the area around the Site be conducted expeditiously. This investigation should determine any connection to the Site, and, if so, determine solutions, such investigations tend to be very expensive and time consuming. CGE further recommends you contact DEQ groundwater quality section, Oregon Health Authority-Drinking Water Services, and DOGAMI to conduct additional testing and groundwater investigations.

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CLOSURE

If you have questions regarding this memorandum, please feel free to contact me at your convenience. I can be reached by email at newtonjim@hotmail.com, or by telephone at 360-907-4162.

Sincerely,



Expires 5/1/2023



Renews 1/1/2025

Jim Newton, PE, RG, CWRE
Principal – Engineer-Geologist
Cascade Geoengineering, LLC

Attachments: Figures (2)

Attachment A – Area Wells Groundwater Sample Mn Laboratory Results

Attachment B – DOGAMI Letter dated February 10, 2023

Attachment C – Stantec Groundwater Elevation Map, Dated March 2021, Figure 3.

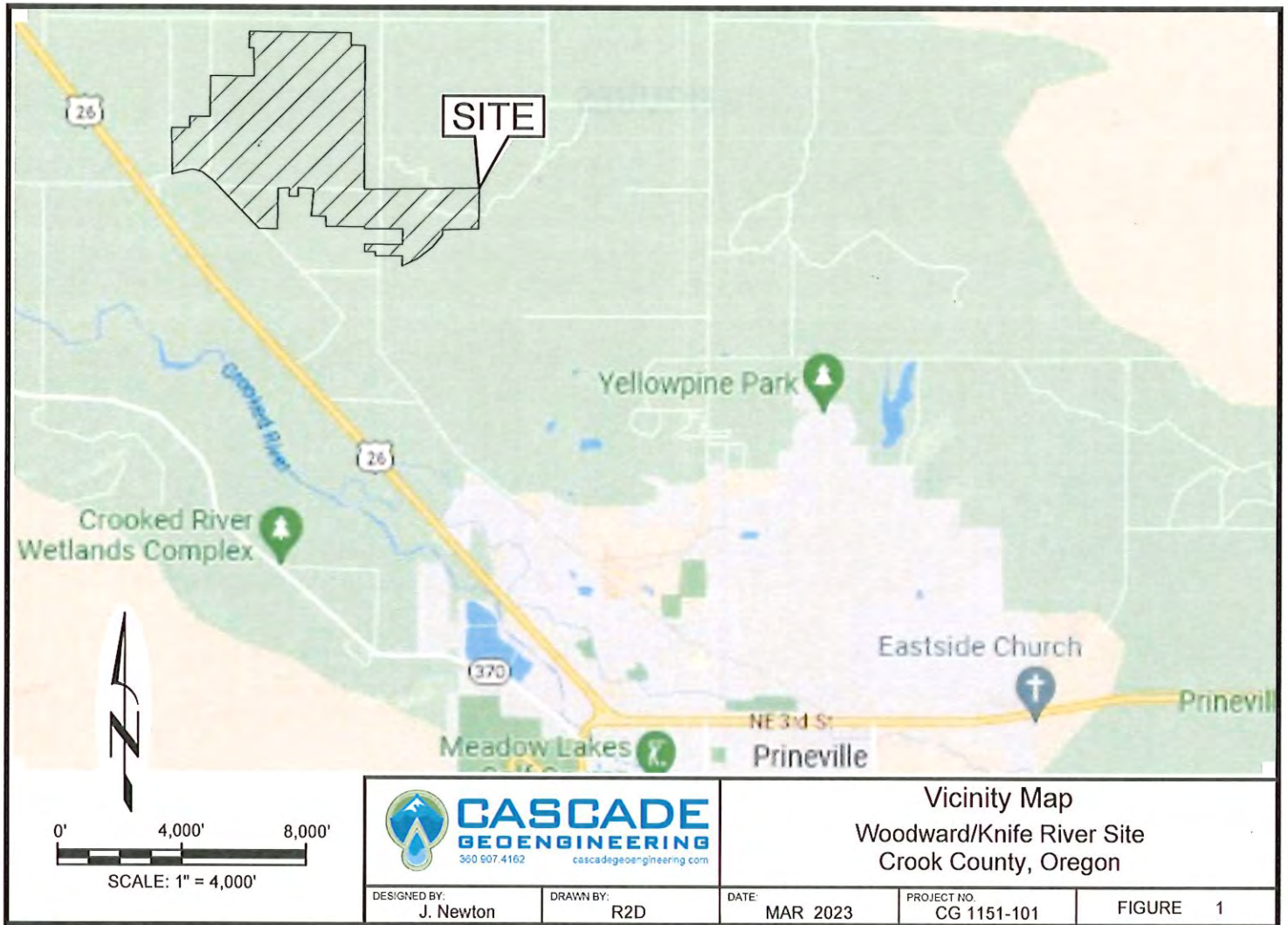
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FIGURES

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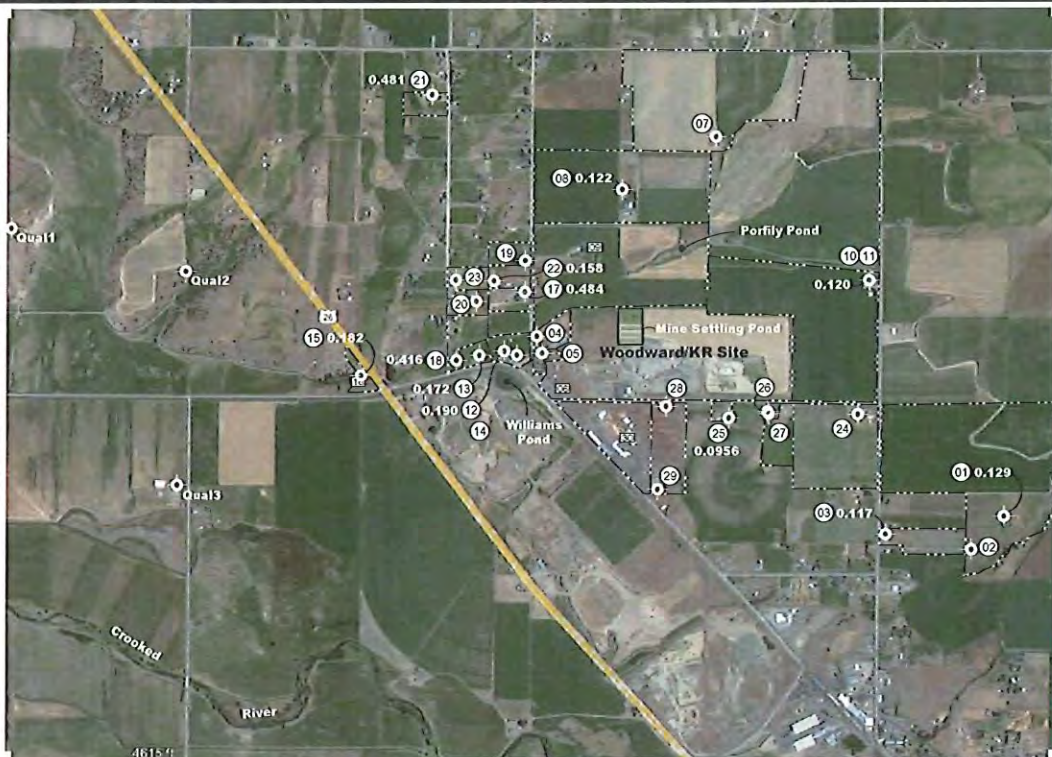
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Well ID	Well Owner	Well Log C CRUD #	Well Elevation	Water Elevation
1	Holmes	52200	2,829	0.128
2	ESMons	52281	2,829	
3	Adams	52344	2,818	0.117
4	Williams	907	2,875	
5	Williams	907	2,902	
6	Woodward	55140		
7	Zimmerman	53421	2,827	
8	Zedick	3177	2,821	0.122
9				
10/11	ZmVam		2,829	0.120
12	Byrd	24900	2,883	0.120
13	Ebak		2,882	0.172
14	Rick		2,885	
15	Voss	279	2,885	0.182
16	S Forly			
17	D Forly	650	2,883	0.484
18	McCormick	648	2,883	0.418
20	Puhm	53361	2,911	
21	Stewart	61758	2,867	
22	Phaden	54463	2,914	0.481
23	Smith	530	2,914	0.158
24	Pack		2,900	
25	Johnson	870	2,930	
26	Kemper	338	2,934	0.3958
27	Maujick	977	2,934	
28	Maujick	84359		N/D
29	Starford	85018	2,919	
30	Starford	54577	2,919	
31		54787		
Qual1	Qual1		2,897	
Qual2	Qual2		2,867	
Qual3	Qual3		2,830	

Elevations Obtained by Google Earth Pro



Well Locations - Elevated Manganese
Woodward/KR Site
Crook County, Oregon



DESIGNED BY: J. Newton
DRAWN BY: R2D
DATE: MARCH 2023
PROJECT NO: CG 1151-101
FIGURE: 2

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ATTACHMENT A

Groundwater Laboratory Sample Results (Mn)

Swain


**NEILSON
RESEARCH
CORPORATION**

Neilson Research Corporation
245 S Grape St
Medford, OR 97501
TEL: (541) 770-5678 FAX: (541) 770-2901
Website: www.nrclabs.com

Analytical Report

WO#: 23020427
Date Reported: 2/16/2023

CLIENT:	Box R Waterlab	Collection Date:	2/9/2023 11:10:00 AM
Lab ID:	23020427-01	Received Date:	2/10/2023 9:55:00 AM
Client Sample ID:	X053430	Matrix:	DRINKING WATER
Project:	X053430 Scotty Swain	PWS #:	
Sample Location:	Well	Source ID:	WELL
Sample Address:	5853 NW Puckett Rd Prineville, OR 97754	Sample Collector:	SCOTTY SWAIN
		Residual Chlorine	

Analyses	Method	NELAP Status	Result Qual	DF	RL Units	EPA Date Limit Analyzed	Analyst
Manganese	E200.8	A	0.158 * 1		0.00500 mg/L	0.0500 02/15/23 12:40	CSB

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QUALIFIERS

* Value exceeds Maximum Contaminant Level.
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit

CI Sample container temperature is out of limit as specified at testcode
MI Recovery outside control limits due to Matrix Interference
PL Permit Limit

Original

NELAP

NELAP A Accredited in accordance with NELAP ORELAP 100016, OR-028

Results are out of the EPA limits

Kriege

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Table 1

2022 2nd Quarter Groundwater Sampling

Drinking Water Monitoring

Prineville, Oregon

Sample Identification	Sample Location	Sampled By	Sample Date	Depth to Water (feet)	Bacteriological Results					Analytical Results (milligrams per liter)					Field Parameters			
					Total Coliform	E. Coli	DRO	ORO	GRO	Iron	Manganese	TDS	Water Temp	pH	Conductivity	Turbidity		
4144	Kriege	Hudspeth	6/29/2022	31.58	Absent	Absent	<0.05	<0.1	<0.2	0.039	0.100	221	18.9	8.25	0.169	0.46		
4144	Kriege	Hudspeth	3/15/2022	28.33	Absent	Absent	<0.05	<0.1	<0.2	0.186	0.111	219	11.2	7.35	0.008	1.97		
4144	Kriege	Hudspeth	12/14/2021	31.33	Absent	Absent	<0.05	<0.1	<0.02	0.200	0.0996	215	11.3	8.23	0.249	0.15		
4144	Kriege	Hudspeth	10/6/2021	29.46	Absent	Absent	<0.05	<0.1	<0.02	0.186	0.110	204	13.6	8.37	0.340	1.05		
4144	Kriege	Hudspeth	6/16/21	26.21	Absent	Absent	<0.05	<0.1	<0.02	0.147	0.108	229	14.9	7.85	0.348	0.83		
4144	Kriege	Hubler	03/09/21	28.47	Absent	Absent	<0.05	<0.1	<0.02	0.193	0.102	206	11.5	8.26	0.330	0.00		
4144	Kriege	Hubler	12/08/20	26.37	Absent	Absent	<0.05	<0.1	<0.02	0.200	0.109	230	11.8	8.30	0.302	2.77		
4144	Kriege	Hudspeth	09/16/20	25.87	Absent	Absent	<0.05	<0.1	<0.02	0.145	0.12	209	15.4	8.05	0.348	13.34		
4144	Kriege	Hudspeth	06/16/20	26.43	PRESENT	Absent	<0.05	<0.1	<0.02	0.0787	0.111	200	15.3	8.25	0.322	0.21		
4144	Kriege	Hudspeth	03/24/20	NA	Absent	Absent	<0.05	<0.1	<0.02	0.185	0.11	206	8.9	8.12	0.333	0.48		
4144	Kriege	Hudspeth	11/19/19	25.43	Absent	Absent	<0.05	<0.1	<0.02	0.198	0.0977	200	10.9	8.33	0.336	0.62		
4144	Kriege	Hudspeth	09/18/19	27.83	Absent	Absent	<0.05	<0.1	<0.02	0.231	0.102	232	14.3	8.16	0.334	0.49		
4144	Kriege	Hudspeth	06/28/19	26.48	Absent	Absent	<0.05	<0.1	<0.02	0.116	0.0967	219	14.4	8.01	0.332	0.55		
4144	Kriege	Hudspeth	04/02/19	23.8	Absent	Absent	<0.05	<0.1*	<0.02	0.283	0.0882	208	13.77	8.31	0.335	0.48		
4144E	Kriege	P. Emahiser	12/18/18	22.9	Absent	Absent	<0.05	<0.1	<0.02	0.228	0.103	187						
4144E	Kriege	Scott Yankey	09/18/18	23.81	Absent	Absent	<0.05	<0.1	<0.02	0.058	0.0931	169						
4144E	Kriege	Scott Yankey	06/19/18	24.2	PRESENT	Absent	<0.05	<0.1	<0.02	0.075	0.0979	208						
4144E	Kriege	Scott Yankey	03/15/18	23.35	Absent	Absent	<0.05	<0.1	<0.02	0.262	0.103	220						
4144E	Kriege	Scott Yankey	01/03/18	22.92	Absent	Absent	<0.05	<0.1	<0.02	0.135	0.099	189						

NOTES:

DRO = total petroleum hydrocarbons (TPH) as diesel-range organics by Method NW-HCID

GRO = TPH as gasoline-range organics by Method NW-HCID

ORO = TPH as oil-range organics by Method NW-HCID

Dissolved iron and manganese by Method 200.7

TDS = total dissolved solids by Method SM 2540-C

< denotes analyte not detected at or exceeding the laboratory method reporting limit listed
Depth to water measured from top of well access port.

x* = data qualifier- possible water pump oil

Temp = degrees Celsius

Conductivity = mS/cm = milli Siemens per Centimeter

Turbidity = NTU = nephelometric turbidity unit

Rhoden


**NEILSON
RESEARCH
CORPORATION**

Neilson Research Corporation
245 S. Gage St.
Medford, OR 97501
TEL: (541) 776-5678 FAX: (541) 776-2661
Website: www.neilsonlab.com

Analytical Report

WO#: 23010368
Date Reported: 1/16/2023

CLIENT: Box R Waterlab
Lab ID: 23010368-01
Client Sample ID: X053069
Project: X053069 Jared Rhoden
Sample Location: Bathroom Faucet
Sample Address: 6651 NW Green Valley Acres Rd
Prineville, OR 97754

Collection Date: 1/6/2023 3:00:00 PM
Received Date: 1/10/2023 5:38:00 PM
Matrix: DRINKING WATER
PWS #:
Source ID: WELL
Sample Collector: SKM/BOX R
Residual Chlorine

Analyses	Method	NELAP Status	Result Qual	DF	RL Units	EPA Date Limit Analyzed	Analyst
Arsenic	E200.8	A	0.0235	1	0.00100 mg/L	0.0100 01/13/23 1:14	KVP
Manganese	E200.8	A	0.181	1	0.00500 mg/L	0.0500 01/13/23 1:14	KVP

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QUALIFIERS

* Value exceeds Method - Check method used
H Holding time for preparation of analysis exceeded
ND Not Detected at the Reporting Limit

C Sample temperature not at least as specified in method
M Recovery on the normal holding time Matrix Spike/Recovery
H Holding time

Original

NELAP A Accredited in accordance with NELAP ORELAP 160016, OR-028

Results are out of the EPA limits

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McCormick



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245 S Grape St
Medford, OR 97501
TEL: (541) 770-5678 FAX: (541) 770-2901
Website: www.nrclabs.com

Analytical Report

WO#: 21021096
Date Reported: 3/1/2021

Box R Waterlab
567 NW Second Street
Prineville, OR 97754

Sample Information:

5602 NW Green Valley Rd
Prineville, OR 97754

Lab ID: 21021096-01

Collection Date: 2/17/2021 5:00:00 PM

Received Date: 2/19/2021 10:00:00 AM

Client Sample ID: X044868

Sample Collector: Michael McCormick

Matrix: DRINKING WATER

Source: Well

Sample Location: Kitchen Sink

Top 35 AnalysisTM

Analyses	Method	NELAP Status	Result	Qual	DF	RL	Units	EPA Limit	Date Analyzed	Analyst
Aluminum	E200.7	A	ND		1	0.0200	mg/L	0.200	02/22/21 18:28	SJS
Antimony	E200.8	A	ND		1	0.000500	mg/L	0.00600	02/22/21 22:48	SJS
Arsenic	E200.8	A	0.00314		1	0.00100	mg/L	0.0100	02/22/21 22:48	SJS
Barium	E200.8	A	0.0256		1	0.000500	mg/L	2.00	02/22/21 22:48	SJS
Beryllium	E200.7	A	ND		1	0.000500	mg/L	0.00400	02/22/21 18:28	SJS
Boron	E200.7	A	ND		1	0.0500	mg/L		02/22/21 18:28	SJS
Cadmium	E200.8	A	ND		1	0.000100	mg/L	0.00500	02/22/21 22:48	SJS
Calcium	E200.7	A	42.8		1	1.00	mg/L		02/22/21 18:28	SJS
Chloride	E300.0	A	12.4		1	1.00	mg/L	250	02/19/21 22:35	KEC
Chromium	E200.8	A	ND		1	0.00100	mg/L	0.100	02/22/21 22:48	SJS
Copper	E200.8	A	0.0380		1	0.000500	mg/L	1.30	02/22/21 22:48	SJS
Fluoride	E300.0	A	ND		1	0.200	mg/L	4.00	02/19/21 22:35	KEC
Hardness, Total (As CaCO ₃)	A2340B	A	198		1	6.62	mg/L	250	02/22/21 18:28	SJS
Iron	E200.7	A	0.0543		1	0.0150	mg/L	0.300	02/22/21 18:28	SJS
Lead	E200.8	A	ND		1	0.000100	mg/L	0.0150	02/22/21 22:48	SJS
Lithium	E200.7	A	ND		1	0.100	mg/L		02/22/21 18:28	SJS
Magnesium	E200.7	A	22.1		1	1.00	mg/L		02/22/21 18:28	SJS
Manganese	E200.7	A	0.416	*	1	0.0200	mg/L	0.0500	02/22/21 18:28	SJS
Molybdenum	E200.8	A	ND		1	0.00100	mg/L		02/22/21 22:48	SJS
Nickel	E200.8	A	0.000559		1	0.000500	mg/L	0.100	02/22/21 22:48	SJS

QUALIFIERS

* Value exceeds Maximum Contaminant Level
E Value above quantitation range
J Analyte detected below quantitation limits
ND Not Detected at the Reporting Limit
R RPD outside accepted recovery limits

C1 Sample container temperature is out of limit as specified at testbed
H Holding times for preparation or analysis exceeded
MI Recovery outside control limits due to Matrix Interference
PL Permit Limit

NELAP A Accredited in accordance with NELAP ORELAP 100016, OR-028

Original

Results are out of the EPA limits

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D Porfily



Neilson Research Corporation
245 S Grape St
Medford, OR 97501
TEL: (541) 770-5678 FAX: (541) 770-2901
Website: www.nrclabs.com

OWRD Analytical Report

WO#: 22091125
Date Reported: 10/4/2022

Box R Waterlab
567 NW Second Street
Prineville, OR 97754

Sample Information:

5757 NW Puckett Rd
Prineville, OR 97754

Lab ID: 22091125-01

Collection Date: 9/21/2022 8:15:00 AM

Received Date: 9/23/2022 10:55:00 AM

Client Sample ID: X051919

Sample Collector: Don Porfily

Matrix: DRINKING WATER

Source: Well

Sample Location: Kitchen Sink

Top 35 AnalysisTM

Analyses	Method	NELAP Status	Result	Qual	DF	RL	Units	EPA Limit	Date Analyzed	Analyst
Aluminum	E200.7	A	ND		1	0.0200	mg/L	0.0500-0.200	09/28/22 17:15	KMF
Antimony	E200.8	A	ND		1	0.000500	mg/L	0.00600	09/28/22 12:36	KMF
Arsenic	E200.8	A	0.00148		1	0.00100	mg/L	0.0100	09/28/22 12:36	KMF
Barium	E200.8	A	0.0465		1	0.00200	mg/L	2.00	09/28/22 12:36	KMF
Beryllium	E200.7	A	ND		1	0.000500	mg/L	0.00400	09/28/22 17:15	KMF
Boron	E200.7	A	ND		1	0.0500	mg/L		09/28/22 17:15	KMF
Cadmium	E200.8	A	ND		1	0.000500	mg/L	0.00500	09/28/22 12:36	KMF
Calcium	E200.7	A	48.1		1	1.00	mg/L		09/28/22 17:15	KMF
Chloride	E300.0	A	8.62		1	0.500	mg/L	250	09/23/22 20:17	KER
Chromium	E200.8	A	ND		1	0.00200	mg/L	0.100	09/28/22 12:36	KMF
Copper	E200.8	A	0.0356		1	0.00200	mg/L	1.30	09/28/22 12:36	KMF
Fluoride	E300.0	A	0.235		1	0.200	mg/L	4.00	09/23/22 20:17	KER
Hardness, Total (As CaCO ₃)	A2340B	A	225		1	6.62	mg/L	250	09/28/22 17:15	KMF
Iron	E200.7	A	0.115		1	0.0150	mg/L	0.300	09/28/22 17:15	KMF
Lead	E200.8	A	ND		1	0.000500	mg/L	0.0150	09/28/22 12:36	KMF
Lithium	E200.7	A	ND		1	0.100	mg/L		09/28/22 17:15	KMF
Magnesium	E200.7	A	25.4		1	1.00	mg/L		09/28/22 17:15	KMF
Manganese	E200.8	A	0.484		1	0.00500	mg/L	0.0500	09/28/22 12:36	KMF
Molybdenum	E200.8	A	ND		1	0.00100	mg/L		09/28/22 12:36	KMF
Nickel	E200.8	A	ND		1	0.00100	mg/L	0.100	09/28/22 12:36	KMF

QUALIFIERS

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

- C1 Sample container temperature is out of limit as specified at testcode
- H Holding times for preparation or analysis exceeded
- MI Recovery outside control limits due to Matrix Interference
- PL Permit Limit

NELAP

NELAP A Accredited in accordance with NELAP ORELAP 100016, OR-028

Original

Results are out of the RPA limits

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245 South Grape Street, Medford, Oregon 97501 541-770-5678 Fax 541-770-2901

Analysis Report

ORELAP 100016
EPA 08/022

Box R Waterlab
567 NW Second Street
Prineville, OR 97754

Lab Order: 1711664
NRC Sample ID: 1711664-01A
Collection Date: 11/16/2017 12:45:00 PM
Received Date: 11/17/2017 12:26:00 PM
Reported Date: 11/27/2017 2:21:57 PM

Sample Information:

X030261 Jenn Breese
5139 NW Elliott Ln
Prineville, OR 97754

E/bek

Client Sample ID: X030261
Collectors Name: PMM
Sample Location: 5139 NW Elliott Ln
Source: Well
Matrix: Drinking Water

TOP 20 ANALYSIS TM

Analyses	Method	NELAP Accredited	Result	Qual	MRL	Units	EPA Limit	Date Analyzed
Aluminum	EPA 200.7	A	ND		0.01	mg/L	0.05 - 0.2	11/20/2017
Arsenic	EPA 200.8	A	0.0252	*	0.001	mg/L	0.010	11/21/2017
Barium	EPA 200.8	A	0.0181		0.0005	mg/L	2.0	11/21/2017
Boron	EPA 200.7	A	0.0717		0.05	mg/L	N.L.	11/20/2017
Cadmium	EPA 200.8	A	ND		0.0001	mg/L	0.005	11/21/2017
Calcium	EPA 200.7	A	21.1		1	mg/L	N.L.	11/20/2017
Chloride	EPA 300.0	A	3.10		1	mg/L	250	11/17/2017 4:53:26 PM
Copper	EPA 200.8	A	0.0111		0.0005	mg/L	1.3 AL	11/21/2017
Fluoride	EPA 300.0	A	0.260		0.2	mg/L	4	11/17/2017 4:53:26 PM
Hardness, Total (As CaCO3)	SM 2340B	A	84.4		6.62	mg/L	250	11/20/2017
Iron	EPA 200.7	A	0.333	*	0.015	mg/L	0.3	11/20/2017
Lead	EPA 200.8	A	0.000601		0.0001	mg/L	0.015 AL	11/21/2017
Lithium	EPA 200.7	A	ND		0.1	mg/L	N.L.	11/20/2017
Magnesium	EPA 200.7	A	7.69		1	mg/L	N.L.	11/20/2017
Manganese	EPA 200.7	A	0.172	*	0.02	mg/L	0.05	11/20/2017
Nitrate Nitrogen	EPA 300.0	A	ND		0.2	mg/L	10	11/17/2017 4:53:26 PM
pH	SM 4500H-B	A	7.84	HR	0.1	pH Units	6.5 - 8.5	11/17/2017 5:20:00 PM
Sodium	EPA 200.7	A	39.5		1	mg/L	N.L.	11/20/2017
Specific Conductance	SM 2510B	A	295		1	µmhos/cm		11/17/2017
Sulfate	EPA 300.0	A	2.49		0.5	mg/L	250	11/17/2017 4:53:26 PM
Zinc	EPA 200.7	A	ND		0.05	mg/L	5.0	11/20/2017

Notes: MRL - Minimum Reporting Limit ND - Not Detected at the MRL N.L. - No Limit
TM - Top 20 is a registered trade mark of Neilson Research Corporation, Oregon Accredited Laboratory: ORELAP 100016, OR-028
Please Note: If the test results indicate a need for water treatment or conditioning, additional testing may be required.

Result above the EPA Limit



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$\Delta_{\text{max}} = 1.5 \times 10^{-3} \text{ m}$
 $\Delta_{\text{min}} = 0.5 \times 10^{-3} \text{ m}$
 $\Delta_{\text{avg}} = 1.0 \times 10^{-3} \text{ m}$
 $\Delta_{\text{avg}} = 1.0 \times 10^{-3} \text{ m}$

Analytical Report

WFO 210204Z
Date Reported 2-6-2023

Client: Hox II Water Lab
Lab ID: 23070058-01
Client Sample ID: N051271
Project: N051271 Lady Bird
Sample Location: Hox Dib
Sample Address: 6089 NW Elton Ln
Prineville, OR 97754

Collection Date:	1/31/2023 10:00:00 AM
Received Date:	2/1/2023 9:45:00 AM
Matrix:	DRINKING WATER
PWS#:	
Source ID:	WELL
Sample Collector:	SKM BOX R
Residual Chlorine	

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Analysis	Method	SEI AP Status	Result	DI Qual	RI Units	EPA Date Limit Analyzed	Analyst
Manganese	E-200-B	A	0.100	1	0.0200 mg/L	02/08/23 22:40	CJS

190

QUALIFIERS

NEP

[illegible]

1. The first is a request to return the
2. The second is a request to return the

Original



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Medford, OR 97501
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Analytical Report

WO#: 22090818
Date Reported: 9/26/2022

Box R Waterlab
567 NW Second Street
Prineville, OR 97754

Sample Information:

6487 NW Lamonta
Prineville, OR 97754

Lab ID: 22090818-01

Collection Date: 9/15/2022 11:30:00 AM

Received Date: 9/16/2022 10:11:00 AM

Client Sample ID: X051866

Sample Collector: Dick Zimmerlee

Matrix: DRINKING WATER

Source: Well

Sample Location: Faucet

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Top 35 AnalysisTM

Analyses	Method	NELAP Status	Result	Qual	DF	RL	Units	EPA Limit	Date Analyzed	Analyst
Aluminum	E200.7	A	0.317	*	1	0.0200	mg/L	0.0500-0.200	09/21/22 10:45	KMF
Antimony	E200.8	A	ND		1	0.000500	mg/L	0.00600	09/20/22 17:22	KHG
Arsenic	E200.8	A	0.00456		1	0.00100	mg/L	0.0100	09/20/22 17:22	KHG
Barium	E200.8	A	0.0353		1	0.00200	mg/L	2.00	09/20/22 17:22	KHG
Beryllium	E200.7	A	ND		1	0.000500	mg/L	0.00400	09/21/22 10:45	KMF
Boron	E200.7	A	ND		1	0.0500	mg/L		09/21/22 10:45	KMF
Cadmium	E200.8	A	ND		1	0.000500	mg/L	0.00500	09/20/22 17:22	KHG
Calcium	E200.7	A	48.4		1	1.00	mg/L		09/21/22 10:45	KMF
Chloride	E300.0	A	7.43		1	0.500	mg/L	250	09/16/22 20:07	KN
Chromium	E200.8	A	ND		1	0.00200	mg/L	0.100	09/20/22 17:22	KHG
Copper	E200.8	A	0.0127		1	0.00200	mg/L	1.30	09/20/22 17:22	KHG
Fluoride	E300.0	A	0.334		1	0.200	mg/L	4.00	09/16/22 20:07	KN
Hardness, Total (As CaCO ₃)	A2340B	A	208		1	6.62	mg/L	250	09/21/22 10:45	KMF
Iron	E200.7	A	0.235		1	0.0150	mg/L	0.300	09/21/22 10:45	KMF
Lead	E200.8	A	0.00196		1	0.000500	mg/L	0.0150	09/20/22 17:22	KHG
Lithium	E200.7	A	ND		1	0.100	mg/L		09/21/22 10:45	KMF
Magnesium	E200.7	A	21.2		1	1.00	mg/L		09/21/22 10:45	KMF
Manganese	E200.8	A	0.120	*	1	0.00500	mg/L	0.0500	09/20/22 17:22	KHG
Molybdenum	E200.8	A	0.00170		1	0.00100	mg/L		09/20/22 17:22	KHG
Nickel	E200.8	A	0.00137		1	0.00100	mg/L	0.100	09/20/22 17:22	KHG

QUALIFIERS

* Value exceeds Maximum Contaminant Level.
E Value above quantitation range
J Analyte detected below quantitation limits
ND Not Detected at the Reporting Limit
R RPD outside accepted recovery limits

C1 Sample container temperature is out of limit as specified at testcode
H Holding times for preparation or analysis exceeded
MI Recovery outside control limits due to Matrix Interference
PL Permit Limit

NELAP

NELAP A Accredited in accordance with NELAP ORELAP 100016, OR-028

Results are out of the EPA limits

Original



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245 S Grove St
Medford, OR 97501
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Analytical Report

WO#: 22120632
Date Reported: 12/21/2022

CLIENT: Box R Waterlab
Lab ID: 22120632-02
Client Sample ID: X052805
Project: X052804-805 Brian Zednick
Sample Location: Well Frost Free
Sample Address: 6222 NW Puckett Rd
Prineville, OR 97754

Collection Date: 12/9/2022 1:30:00 PM
Received Date: 12/13/2022 10:25:00 AM
Matrix: DRINKING WATER
PWS #:
Source ID: WELL
Sample Collector: BRYAN ZEDNICK
Residual Chlorine:

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Analyses	Method	NELAP Status	Result	DF Qual	RL Units	EPA Date Limit Analyzed	Analyst
Aluminum	E200.7	A	ND	1	0.0200 mg/L	0.200 12/15/22 22:35	CSB
Manganese	E200.7	A	0.122	1	0.0200 mg/L	0.0500 12/15/22 22:35	CSB

QUALIFIERS

* Value exceeds NELAP and ORELAP Level
† Value above quantitation limit
M† Recovery outside of 100% due to Matrix Interference
H† Field Error

C Sample not analyzed because results are expected to be blank
I Blank filter used for preparation but not analyzed
ND Not Detected - Below Reporting Limit
R ELU (excess sample) too large to analyze

Original

NELAP NELAP Accredited in accordance with NELAP ORELAP 161016, OR-028

Results are out of the EPA limits



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Analytical Report

WO#: 23010175
Date Reported: 1/12/2023

Box R Waterlab
567 NW Second Street
Prineville, OR 97754

Lab ID: 23010175-01

Collection Date: 12/29/2022 9:40:00 AM

Received Date: 1/5/2023 10:25:00 AM

Sample Information:

4692 NW Lamonta Rd
Prineville, OR 97754

Client Sample ID: X052961

Sample Collector: Cassie Adamson

Matrix: DRINKING WATER

Source: Well

Sample Location: Kitchen Sink

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Top 35 AnalysisTM

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Analyses	Method	NELAP Status	Result	Qual	DF	RL	Units	EPA Limit	Date Analyzed	Analyst
Aluminum	E200.7	A	ND		1	0.0200	mg/L	0.0500-0.200	01/10/23 17:11	CSB
Antimony	E200.8	A	ND		1	0.000500	mg/L	0.00600	01/09/23 19:40	CSB
Arsenic	E200.8	A	0.00367		1	0.00100	mg/L	0.0100	01/09/23 19:40	CSB
Barium	E200.8	A	0.0135		1	0.00200	mg/L	2.00	01/09/23 19:40	CSB
Beryllium	E200.7	A	ND		1	0.00200	mg/L	0.00400	01/10/23 17:11	CSB
Boron	E200.7	A	ND		1	0.0500	mg/L		01/10/23 17:11	CSB
Cadmium	E200.8	A	ND		1	0.000500	mg/L	0.00500	01/09/23 19:40	CSB
Calcium	E200.7	A	16.2		1	1.00	mg/L		01/10/23 17:11	CSB
Chloride	E300.0	A	2.03		1	0.500	mg/L	250	01/05/23 18:41	KN
Chromium	E200.8	A	ND		1	0.00200	mg/L	0.100	01/09/23 19:40	CSB
Copper	E200.8	A	ND		1	0.00200	mg/L	1.30	01/09/23 19:40	CSB
Fluoride	E300.0	A	0.220		1	0.200	mg/L	4.00	01/05/23 18:41	KN
Hardness, Total (As CaCO ₃)	A2340B	A	69.5		1	6.62	mg/L	250	01/10/23 17:11	CSB
Iron	E200.7	A	0.133		1	0.0150	mg/L	0.300	01/10/23 17:11	CSB
Lead	E200.8	A	ND		1	0.000500	mg/L	0.0150	01/09/23 19:40	CSB
Lithium	E200.7	A	ND		1	0.100	mg/L		01/10/23 17:11	CSB
Magnesium	E200.7	A	7.04		1	1.00	mg/L		01/10/23 17:11	CSB
Manganese	E200.8	A	0.117		1	0.00500	mg/L	0.0500	01/09/23 19:40	CSB
Molybdenum	E200.8	A	ND		1	0.00100	mg/L		01/09/23 19:40	CSB
Nickel	E200.8	A	ND		1	0.00100	mg/L	0.100	01/09/23 19:40	CSB

QUALIFIERS

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

- C1 Sample container temperature is out of limit as specified at testbed
- H Holding times for preparation or analysis exceeded
- MI Recovery outside control limits due to Matrix Interference
- PL Permit Limit

NELAP

NELAP A Accredited in accordance with NELAP ORELAP 100016, OR-028

Original

Results are out of the EPA limits



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Analytical Report

WO#: 23010165
Date Reported: 1/12/2023

Box R Waterlab
567 NW Second Street
Prineville, OR 97754

Lab ID: 23010165-01

Collection Date: 12/29/2022 7:30:00 AM

Received Date: 1/5/2023 10:25:00 AM

Sample Information:

Client Sample ID: X052962

Sample Collector: Hank Simmons

Matrix: DRINKING WATER

Source: Well

Sample Location: Outside Stand Pipe

2600 NW Garden Ln
Prineville, OR 97754

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Top 35 AnalysisTM

Analyses	Method	NELAP Status	Result	Qual	DF	RL	Units	EPA Limit	Date Analyzed	Analyst
Aluminum	E200.7	A	ND		1	0.0200	mg/L	0.0500-0.200	01/10/23 17:08	CSB
Antimony	E200.8	A	ND		1	0.000500	mg/L	0.00600	01/09/23 19:35	CSB
Arsenic	E200.8	A	0.00541		1	0.00100	mg/L	0.0100	01/09/23 19:35	CSB
Barium	E200.8	A	0.00984		1	0.00200	mg/L	2.00	01/09/23 19:35	CSB
Beryllium	E200.7	A	ND		1	0.00200	mg/L	0.00400	01/10/23 17:08	CSB
Boron	E200.7	A	ND		1	0.0500	mg/L		01/10/23 17:08	CSB
Cadmium	E200.8	A	ND		1	0.000500	mg/L	0.00500	01/09/23 19:35	CSB
Calcium	E200.7	A	24.1		1	1.00	mg/L		01/10/23 17:08	CSB
Chloride	E300.0	A	2.97		1	0.500	mg/L	250	01/05/23 18:29	KN
Chromium	E200.8	A	ND		1	0.00200	mg/L	0.100	01/09/23 19:35	CSB
Copper	E200.8	A	ND		1	0.00200	mg/L	1.30	01/09/23 19:35	CSB
Fluoride	E300.0	A	ND		1	0.200	mg/L	4.00	01/05/23 18:29	KN
Hardness, Total (As CaCO ₃)	A2340B	A	97.6		1	6.62	mg/L	250	01/10/23 17:08	CSB
Iron	E200.7	A	0.350	*	1	0.0150	mg/L	0.300	01/10/23 17:08	CSB
Lead	E200.8	A	ND		1	0.000500	mg/L	0.0150	01/09/23 19:35	CSB
Lithium	E200.7	A	ND		1	0.100	mg/L		01/10/23 17:08	CSB
Magnesium	E200.7	A	9.09		1	1.00	mg/L		01/10/23 17:08	CSB
Manganese	E200.8	A	0.129	*	1	0.00500	mg/L	0.0500	01/09/23 19:35	CSB
Molybdenum	E200.8	A	ND		1	0.00100	mg/L		01/09/23 19:35	CSB
Nickel	E200.8	A	ND		1	0.00100	mg/L	0.100	01/09/23 19:35	CSB

QUALIFIERS

* Value exceeds Maximum Contaminant Level.
E Value above quantitation range
J Analyte detected below quantitation limits
ND Not Detected at the Reporting Limit
R RPD outside accepted recovery limits

C1 Sample container temperature is out of limit as specified at testcod
H Holding times for preparation or analysis exceeded
MI Recovery outside control limits due to Matrix Interference
PL Permit Limit

NELAP

NELAP A Accredited in accordance with NELAP ORELAP 100016, OR-028

Original

Results are out of the EPA limits

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ATTACHMENT B
DOGAMI Letter dated February 10, 2023



Oregon

Tina Kotek, Governor

Department of Geology and Mineral Industries
Mineral Land Regulation & Reclamation
229 Broadalbin Street SW
Albany, OR 97321
(541) 967-2083
Fax: (541) 267-2075
www.oregon.gov/dogami

February 10, 2023

Fitch & Neary P.C.
210 SW 5th Street, Suite #2
Redmond, OR 97756

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Re: Woodward (DOGAMI ID# 07-0159) Complaints Filed

Dear Mr. Fitch,

The following represents DOGAMI's review to date of the complaints submitted by you and your clients regarding the Woodward site (DOGAMI ID# 07-0159). DOGAMI takes very seriously its directive to prevent unacceptable adverse impacts to environmental resources of the state from mining operations.¹

Site Information:

The Woodward site (DOGAMI ID# 07-0159: Enclosure 1) is located 3.5 miles Northwest of Prineville in Crook County. The street address for the site is 4755 NW Stahancyk Ln., Prineville OR 97754 and the site includes two tax lots: Township 14 south, Range 15 east, Section 14, Tax Lot 702 (35.36 acres) and Township 14 south, Range 15 east, Section 14, Tax Lot 703 (76.08 Acres). Knife River has been working on expanding the mine site onto the adjacent Vanier property which is located immediately east of the existing site on Township 14 south, Range 15 east, Section 14, Tax Lot 103 (77.98 Acres). The street address for the Vanier property is 6487 NW Lamonta Rd, Prineville, OR 97754. DOGAMI received an operating permit application for this property on February 8, 2023.

Mining at the Woodward site consists of the removal of soil and overburden followed by the excavation of the sand and gravel resource to a depth of approximately 20 feet below the pre-mining surface. After each excavation cell is mined out, they are back filled with clean fill and overburden prior to the placement of soil and the planting of the site for agriculture. The sand and gravel mined is processed on site under the DEQ WPCF 1000 General Permit (DEQ File No. 124758: Enclosure 2) allowing the disposal of process water via infiltration and evaporation.

Complaints Received:

On January 6, 2023, DOGAMI received your complaint letter alleging ground water contamination from the Knife River Woodward site (DOGAMI ID# 07-0159) has adversely impacted residential wells on 22 properties near and adjacent to the site. Your January 6, 2023 complaint included the residence used by Mr. Zimmerlee (6487 NW Lamonta Rd, Prineville, OR, 97754), and a residence used by Karen Mikulski (3992 Stahancyk Ln., Prineville OR 97754). Both Mr. Zimmerlee and Ms. Mikulski previously submitted complaints about the Knife River Woodward site to DOGAMI, and those complaints did not specifically allege groundwater contamination.

¹ ORS 517.760.

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Your letter asks DOGAMI to suspend backfilling operations until the allegations in the complaint are "addressed and resolved". DOGAMI contacted Knife River on January 20, 2023, by phone and Knife River is not currently placing backfill at the site. Your January 6, 2023, letter provided no documentation to substantiate the groundwater contamination claim. The complaint included an unlabeled tax lot map showing the tax lots of the 22 properties included in the complaint.

On January 20, 2023, DOGAMI received a faxed copy of your complaint with the addition of mailing addresses for the 22 complainants and two forms that appeared to be from two of the complainants, but the forms were illegible and could not be deciphered.

The January 6, 2023 complaint follows a complaint that was submitted to DEQ via email on October 20, 2022 from Richard Zimmerlee alleging that Knife River's Woodward mining operation has resulted in elevated Aluminum (Al) and Manganese (Mn) concentrations in his domestic water supply on the Vanier Property (6487 NW Lamonta Rd, Prineville, OR 97754). The complaint to DEQ was forwarded to DOGAMI on October 21, 2022 and included "Top 35" analyses of 3 water samples including:

1. A tap water sample from the residence on the Vanier property (6487 NW Lamonta Rd, Prineville, OR 97754). The depth of the residential supply well is not known but suspected to be relatively shallow and set in the alluvial aquifer. Total Al - 0.317 mg/L, Total Mn - 0.12 mg/L.
2. A water sample from a surface water pond referred to as the Porfily pond (location assumed to be a surface pond associated with a surface drainage to the north of the site near 44°21'13.75"N, 120°54'4.32"W). Total Al - 0.224 mg/L, Total Mn - 0.0294 mg/L.
3. A tap water sample from the Porfily house (5757 NW Puckett Rd., Prineville, OR 97754). The depth of this well is 260 feet below the ground surface with the top of the casing screen at 240 feet below the ground surface. Total Al - Not Detected (reporting limit 0.02 mg/L), Total Mn - 0.485 mg/L.

This review considers the October 20, 2022 complaint to DEQ and the January 6, 2023 complaint to DOGAMI alleging contamination of groundwater from the Woodward mining facility.

Complaint Review to Date:

DOGAMI informed Knife River of the groundwater contamination complaint that was submitted to DEQ on October 20, 2022 and Knife River submitted a report for DOGAMI's consideration by Hudspeth Land and Water titled "Woodward Area Groundwater Sampling Summary" (Enclosure 3). The report included water sample analyses of Total Al and Mn concentrations from 4 additional water samples as well as groundwater monitoring data from quarterly water sampling of two wells located immediately south of the site across Stahancyk Ln. The quarterly water sampling data included analyses of dissolved Mn concentrations at the two wells being monitored from 2017 through 2022.

Table 1 from the Woodward Area Groundwater Sampling Summary report includes the Total Al and Mn concentrations for the 3 water samples submitted to DEQ by Mr. Zimmerlee as well as analyses from 4 additional water samples collected by a Knife River consultant, Hudspeth Land and Water. The 4 additional water samples include:

1. A duplicate/repeat tap water sample from the residence on the Vanier property (6487 NW Lamonta Rd, Prineville, OR 97754). The depth of the residential supply well is not known but suspected to be relatively shallow and set in the alluvial aquifer. Total Al - 0.0232 mg/L, Total Mn - 0.0731 mg/L.
2. A tap water sample from the residence of Karen Mikulski (3992 Stahancyk Ln., Prineville OR 97754). This residential supply well is set at a dept of 50 feet below the ground surface with the top of the

casing screen at 30 feet below the ground surface. Total Al - 0.156 mg/L, Total Mn - Not Detected (Reporting Limit 0.005 mg/L).

3. A tap water sample from a residence located to the south of the Woodward property (4144 NW Stahancyk Ln., Prineville, OR 97754) and immediately west of the residence of Karen Mikulski. This residential supply well is set at a depth of 260 feet below the ground surface with the top of the casing screen at 255 feet below the ground surface. Total Al - Not Detected (reporting limit 0.02 mg/L), Total Mn - 0.0956 mg/L.
4. A surface water sample collected from a surface water drainage/slough located north of the site and up stream of the presumed location of the Profily pond (44°21'32.28"N, 120°53'12.80"W). Total Al - 1.21 mg/L, Total Mn - 0.0116 mg/L.

The report from Knife River also included dissolved Mn water concentration data from the quarterly monitoring of two wells immediately south of the site across Stahancyk Ln., including the residence of Karen Mikulski (3992 NW Stahancyk Ln., Prineville, OR 97754), and a neighboring residence to the west (4144 NW Stahancyk Ln., Prineville, OR 97754). These analyses are provided in Tables 2 and 3 of the Woodward Area Groundwater Sampling Summary report. The quarterly monitoring began in the first quarter of 2017, just prior to the initiation of mining operations at the Woodward site and well in advance of the placement of reclamation backfill. The quarterly monitoring program remains ongoing.

The well at 4144 NW Stahancyk Ln. extends to 255 feet below the ground surface and is set in a water bearing zone in contact with clay and claystone lithologies. The well at 3992 NW Stahancyk Ln. extends to 50 feet below the ground surface and the water bearing zone is in contact with the alluvial sand and gravel material that is the focus of the mining at the Woodward site. Note that per Tables 2 and 3 of the Hudspeth report, the dissolved Mn concentrations in the deeper 4144 well range from 0.0882-0.114 mg/L, while the shallower 3992 well had concentrations of Mn that were undetectable or below the laboratory reporting limits (0.0216-0.002 mg/L). The difference in Mn concentrations of these two wells appears attributed to the fact that the wells are set in two different aquifers in different geologic materials.

The variation in Total Al and Mn concentrations in Table 1 of the Hudspeth report shows the water in the shallow alluvial aquifer being higher in Al and lower in Mn and the water deeper aquifer being low in Al and higher in Mn concentrations. DOGAMI notes that both surface water samples (the Profily Pond and the Slough) have high Al concentrations and relatively low Mn concentrations.

The data for the two monitoring wells adjacent to the Woodward mine site do not show any systematic changes in the concentrations of dissolved Mn over time. The concentrations of dissolved Mn in the water from the shallow well at the residence of Karen Mikulski (3992 NW Stahancyk Ln., Prineville, OR 97754) has not changed since the monitoring began in 2017 indicating that Knife River's mining operations has not caused changes to the ground water with respect to dissolved Mn.

The Woodward Area Groundwater Sampling Summary report also includes Attachment 2 "Woodward/Vanier Aggregate Mine Hydrogeologic Characterization" (Enclosure 3). This Stantec report allows DOGAMI to consider the spatial context of the data provided in the Woodward Area Groundwater Sampling Summary. Based on DOGAMI's review of the hydrogeologic characterization report the following observations are noted:

1. Figure 3 of the Stantec report shows the groundwater at the site generally flows from northeast to southwest.
2. Based on Figure 3 of the Stantec report, Mr. Zimmerlee's residence at 6487 NW Lamonta Rd, Prineville, OR 97754, is located over 1000 feet upgradient from the Woodward mine site and

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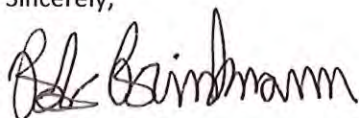
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therefore the mining operations would not be expected to contribute to the concentrations of AL and Mn found in the groundwater at the Zimmerlee residence.

3. Based on Figure 3 of the Stantec report, Mrs. Mikulski's residence at 3992 Stahancyk Ln., Prineville OR 97754 is located approximately 350-feet cross gradient from the Woodward mine site. The quarterly monitoring of that well by Knife River does not show an increase in Mn concentrations in the water in that well from the 1st quarter 2017 through the 4th quarter of 2022.
4. Based on Figure 3 of the Stantec report, the well at 4144 Stahancyk Ln., Prineville OR 97754 (also part of the Fitch & Neary complaint) is located approximately 350-feet cross to slightly down gradient from the Woodward mine site. The quarterly monitoring data in the Woodward Area Groundwater Sampling Summary report from Knife River shows a range in Mn concentrations that would be expected for naturally occurring background concentrations from the 1st quarter 2017 through the 4th quarter of 2022.

Based on those contextual observations and the groundwater sampling data submitted by Mr. Zimmerlee and Knife River, there appears to be no evidence substantiating groundwater contamination derived from the Woodward site to Mr. Zimmerlee's, Mr. Porfily's or Mrs. Mikulski's residential wells or the well at 4144 Stahancyk Ln., Prineville OR 97754. This review is based on the information submitted to date. DOGAMI will review the issue if new and relevant information is submitted to DOGAMI. DOGAMI will prepare a technical report considering the totality of information submitted to DOGAMI prior to taking action on the application for the Vanier Property.

Sincerely,



Bob Brinkmann
Hydrogeologist
DOGAMI-MLRR



Vaughn Balzer
Floodplain Mining Reclamationist
DOGAMI-MLRR

cc: Sarah Lewis, MLRR Program Manager, DOGAMI
Ruarri Day-Stirrat, Director and State Geologist, DOGAMI
Jeff Steyaert, Knife River Corporation – NW

Enclosures:

- E1 – 07-0159 Operating Permit (renewed through June 2023)
- E2 – DEQ-WPCF 1000 Permit Assignment Letter (dated June 2, 2016)
- E3 – Woodward Area Groundwater Sampling Summary (dated December 22, 2022)

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ATTACHMENT C

Stantec Groundwater Contour Map

