Periodic Review
BNSF Parkwater Railyard Site

Facility Site ID 676, Cleanup Site ID 1318

Toxics Cleanup Program, Eastern Region

Washington State Department of Ecology
Spokane, Washington

April 2022

Document Information

This document is available on the Department of Ecology's BNSF Parkwater Railyard website[1].

Related Information

- Cleanup site ID: 1318
- Facility site ID: 676

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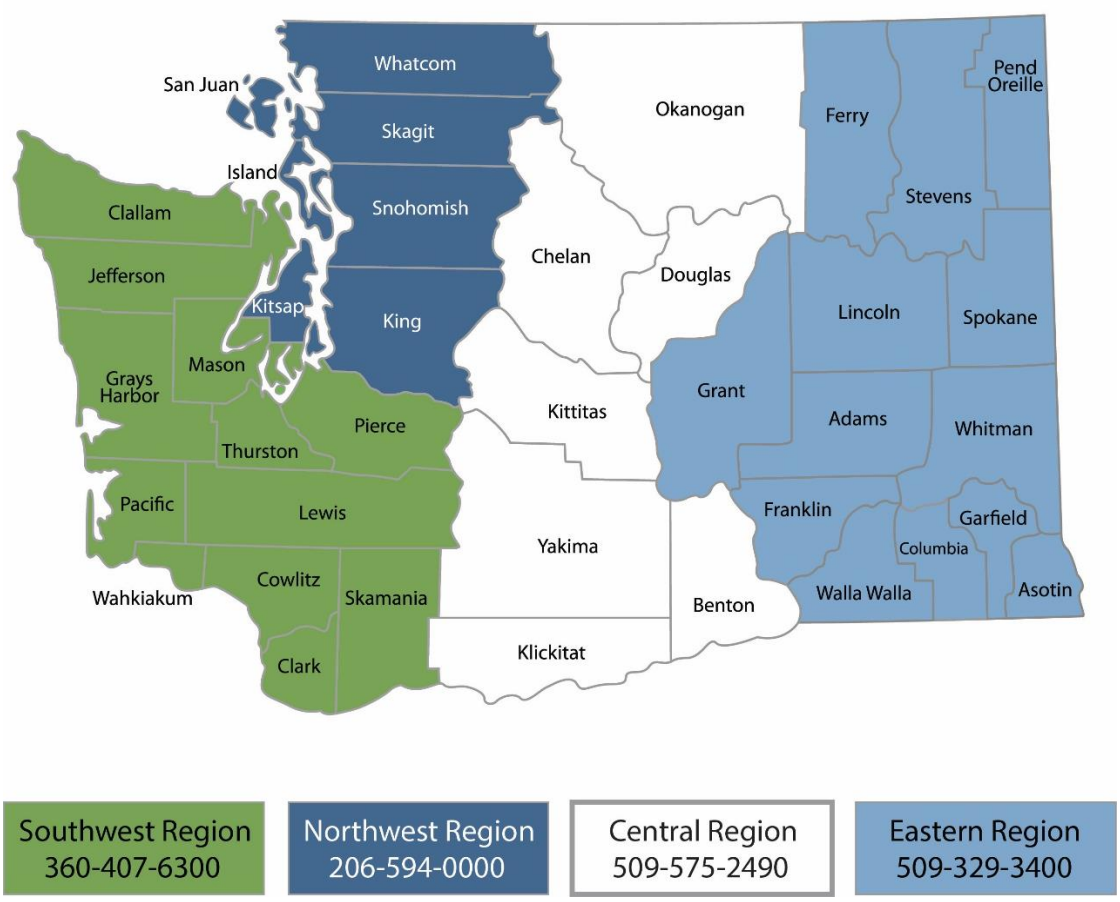
[1] https://apps.ecology.wa.gov/cleanupsearch/site/1318
[2] www.ecology.wa.gov/contact
[3] https://ecology.wa.gov/About-us/Accountability-transparency/Our-website/Accessibility

Department of Ecology's Regional Offices

Map of Counties Served



Region	Counties served	Mailing Address	Phone
Southwest	Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Mason, Lewis, Pacific, Pierce, Skamania, Thurston, Wahkiakum	PO Box 47775 Olympia, WA 98504	360-407-6300
Northwest	Island, King, Kitsap, San Juan, Skagit, Snohomish, Whatcom	PO Box 330316 Shoreline, WA 98133	206-594-0000
Central	Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, Yakima	1250 W Alder St Union Gap, WA 98903	509-575-2490
Eastern	Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman	4601 N Monroe Spokane, WA 99205	509-329-3400
Headquarters	Across Washington	PO Box 46700 Olympia, WA 98504	360-407-6000

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Introduction

This report presents the Washington State Department of Ecology's (Ecology) periodic review for the BNSF Parkwater Railyard Site (Site). This periodic review is required as part of the site cleanup process under the Model Toxics Control Act (MTCA), Ch. 70A.305 Revised Code of Washington, implemented by Ecology. Periodic reviews evaluate post-cleanup site conditions and monitoring data to assure human health and the environment are being protected.

BNSF Railway Company (BNSF) conducted cleanup actions at the Site from 2013–2015. These actions addressed contaminated soils, but residual groundwater contamination remained at the Site. Groundwater monitoring has been ongoing since completing the cleanup action, and institutional controls are in place to ensure the remedy remains protective of human health and the environment.

Summary of Site Conditions

Site history

The Site, formerly known as Yardley, is an active rail yard and covers about 130 acres in an industrial area of Spokane, WA (Figure 1). It is bounded by Trent Avenue to the north, Havana Street to the west, Fancher Road to the east, and the BNSF mainline tracks to the south. The Spokane River lies one-half mile to the north of the Site.

The Site has been operated as a rail yard by BNSF and its predecessors since the early 1900s. Until 1959, the Site served as the central operations facility in the Spokane area for Northern Pacific Railroad supporting typical rail yard operations including fueling, maintenance and repair, intermodal operations, and switching. In 1970, Northern Pacific became part of Burlington Northern, Inc., created by the merger of the Northern Pacific, the Great Northern, the Chicago, Burlington & Quincy, and the Spokane, Portland & Seattle railways. When the roundhouse was demolished in 1959, these activities continued in a lesser capacity until 2004 when most fueling activities were moved to a new facility in Hauser, ID. From 2004 through the present, the Site supports light refueling, maintenance, and switching operations. Also on the Site is the Western Fruit Express Company's maintenance facility, used for rail car and equipment storage and maintenance, including generators. Approximately 3 acres of the Site were leased to other industries including Koch Materials, Tri-State Oil, Continental Coal Company, Service Asphalt, and Blackline.

The Site historically has contained numerous underground and aboveground storage tanks, primarily for diesel fuel but also for waste oil, gasoline, and cleaning solvent storage. Also, numerous smaller-scale fuel and oil releases have been documented at various areas of the Site. In some cases, limited investigations and/or excavations had occurred.

Only aboveground storage tanks remain: one 5,000-gallon waste oil, one 1,000-gallon lubricating oil, two 1,000-gallon waste oil, one 300,000-gallon diesel, one 25,000-gallon lubricating oil, and one 22,000-gallon waste oil. Six smaller aboveground tanks holding gasoline, diesel, heating oil, and waste oil are associated with the Western Fruit Express maintenance facility.

Site physical characteristics

Topography and climate

The Site is at an elevation of around 1950 feet and is relatively flat. The region is semi-arid, receiving around 16–18 inches of precipitation annually. The majority of the precipitation occurs in late fall through early spring; winter precipitation is usually snow. Summers are warm and dry. The annual mean temperature is about 50˚F.

Regional hydrogeology

The geology in the vicinity of the Site is primarily basalt flows of the Columbia Plateau overlain by Quaternary flood deposits. The flood deposits are composed of thickly bedded, poorly sorted boulders, cobbles, gravel, and sand. The coarse nature of the deposits results in very high permeabilities. Overlying the flood deposits are native surficial soils consisting of gravelly loam with thicknesses of up to 5 feet. Much of the Site has had surface modifications; currently, the ground surface is crushed gravel or asphalt. Many areas also have fill material, in some areas to a depth of 20 feet.

The primary aquifer underlying the Site is the Spokane-Valley Rathdrum-Prairie Aquifer, which is the sole source of drinking water for over 400,000 people in the greater Spokane area. It consists of unconsolidated glaciofluvial sediments and is largely unconfined. The aquifer flows from northern Idaho to the west and southwest down the Spokane Valley at rates of up to 80 feet per day. At the Site, depth to groundwater is about 65 feet with a seasonal variation of 10 to 15 feet, and flows to the west-northwest. Site-specific hydraulic conductivity testing was performed as a part of the Remedial Investigation. Rates were estimated to be around 20 feet per day, but given uncertainties in the measurement processes, data can only be reliably used to say that hydraulic conductivities and flow rates are indicative of a highly permeable aquifer. This information is consistent with other regional studies.

Previous site investigations

Multiple spills and releases have occurred in various areas of the facility over the operational history. A series of investigations have taken place to aid in determining the type, amount, extent, and source of petroleum hydrocarbon contamination, and BNSF has implemented some independent cleanup actions. Some of the investigations and independent cleanup activities occurred before Ecology promulgated the current MTCA cleanup standards. Details on the releases and investigations in each area of the Site can be found in the Cleanup Action Plan.

Nature and extent of contamination

Soils

Soil sampling activities at the Site were customized based on the specific activities and historical releases of various areas and prior investigation and cleanup work. A summary of each area that required remedial action is provided here, but details can be found in the Cleanup Action Plan.

- Fueling Area: Primary fueling area with three large underground storage tanks; documented diesel and free product in groundwater.
- Former Koch Materials Area: At least 13 aboveground tanks containing oils and asphalt; polycyclic aromatic hydrocarbons (PAHs), diesel, and metals in soil.
- Debris and Soil Deposit Areas: Contained debris and waste mixtures (soil, glass, ash, wood, concrete, brick, tile, metal, asphalt, drywall, sandblasting sand, and gravel); metals were in soil.
- Western Fruit Express Area: Used for the storage of generators and small fueling operations; soil contained polychlorinated biphenyls (PCBs), gas, diesel, and metals.
- Materials Storage Building and Platform: Contained three aboveground petroleum storage tanks; soil contaminated with petroleum, naphthalene, and PAHs.
- Diesel Shop: Area between buildings and near fueling operations; diesel- and oil-contaminated soil.
- Dismantling Spur: Location of a stockpile of PCB contaminated soil; metals contamination in soil.
- Yardley Office: Location of a diesel spill from a broken fuel line; metals-contaminated soil.
- Ralston Lead Track: Location of an unknown volume petroleum spill; soil contaminated with metals.

Groundwater

Groundwater has been investigated since 2001, when the first of 23 groundwater monitoring wells were installed in and around the Fueling Area (Figure 2). Monitoring data was collected periodically from 2001 to 2006, and has been collected consistently on a quarterly basis since 2006. The area has shown significant diesel impacts to groundwater, with concentrations up to 614,000 ppb (parts per billion) in the center of the source area (compared to the cleanup level of 500 ppb). Arsenic also exceeds cleanup levels (5 ppb) in groundwater in the same area as the diesel plume. Cleanup levels are shown in Table 1.

The plume of impacted groundwater historically extended to the west-southwest, in the direction of groundwater flow, for a distance of approximately 600 feet (Figure 2). Non-aqueous phase liquids had been on the groundwater surface near the source area, and there appeared to be a significant smear zone due to the high variation in groundwater levels.

Cleanup Action Plan

After BNSF completed the Remedial Investigation and Feasibility Study in November 2010, Ecology issued a Cleanup Action Plan in November 2011.

Cleanup standards

The two primary components of cleanup standards are cleanup levels and points of compliance.

Cleanup levels

Cleanup levels determine the concentration in which a particular hazardous substance does not threaten human health or the environment. Site cleanup levels were developed as follows:

- Groundwater – Method B cleanup levels protective of drinking water and surface water were used. Indicator hazardous substances were arsenic and total petroleum hydrocarbons – diesel (TPH-D).
- Soils – Method C industrial cleanup levels protective of groundwater and ecological receptors were used for Site soils. Indicator hazardous substances were arsenic, barium, cadmium, chromium, lead, TPH-D, and TPH-heavy oils.

Table 1 shows the final cleanup levels for the identified Site indicators after considering background concentrations, practical quantitation limits (PQLs), and total Site risk.

Points of compliance

The point of compliance is defined in MTCA as the point or points where cleanup levels shall be attained (Washington Administrative Code [WAC] 173-340-200). Once those cleanup levels have been attained at that point, the site is no longer considered a threat to human health and the environment.

WAC 173-340-740(6) gives the point of compliance requirements for soil. For soil cleanup levels based on protection of groundwater, the point of compliance is in the soils throughout the Site.

The point of compliance for groundwater is defined in WAC 173-340-720(8). Groundwater points of compliance are established for the entire Site from the top of the saturated zone to the lowest potentially affected portion of the aquifer.

Site cleanup

Ecology issued the Cleanup Action Plan in November 2011. The selected remedial action for soil was a combination of excavation/off-site disposal and capping. All areas with soil exceeding cleanup levels in the Diesel Shop Area received an asphalt cap, the Koch Asphalt and East & West Debris Areas received a 6-inch gravel cap, and all other areas received excavation and disposal.

A groundwater interim action was implemented in March 2009, which used air sparging (AS) and soil vapor extraction (SVE) to remediate the petroleum plume. Eleven AS wells and eight SVE wells were installed to increase oxygen flow and enhance bioremediation of diesel fuel. After regular monitoring of the system, the SVE wells were changed to bioventing (a vacuum was no longer used to remove vapors from the subsurface) in June 2010. Significant reductions in diesel concentrations had been observed. The groundwater remedial action specified in the Cleanup Action Plan required continued operation of the groundwater treatment system in bioventing mode.

In January 2012, the system was temporarily shut down to see if diesel concentrations would rebound. Concentrations still exceeded cleanup levels, but significant rebound wasn't observed. Therefore, the groundwater system was shut down and monitoring continued.

Soil cleanup occurred between September 2013 and February 2015. Ecology approved the final Cleanup Action Report in 2017. Environmental covenants were filed for both soil and groundwater, and remedial action components were added to BNSF's internal land use notification system.

Periodic Review

Regulation

WAC 173-340-420(2) requires Ecology to conduct a periodic review of a site every five years under the following conditions:

(a) Whenever Ecology conducts a cleanup action;
(b) Whenever Ecology approves a cleanup action under an order, agreed order, or consent decree;
(c) Or, as resources permit, whenever Ecology issues a no further action opinion;
(d) And, one of the following conditions exists:
    (1) Institutional controls or financial assurance are required as part of the cleanup.
    (2) Where the cleanup level is based on a practical quantitation limit.
    (3) Where, in the department's judgment, modifications to the default equations or assumptions using site-specific information would significantly increase the concentration of hazardous substances remaining at the site after cleanup, or the uncertainty in the ecological evaluation or the reliability of the cleanup action is such that additional review is necessary to assure long-term protection of human health and the environment.

When evaluating whether human health and the environment are being protected, the factors Ecology shall consider include [WAC 173-340-420(4)]:

(a) The effectiveness of ongoing or completed cleanup actions.
(b) New scientific information for individual hazardous substances or mixtures present at the Site.
(c) New applicable state and federal laws for hazardous substances present at the Site.
(d) Current and projected Site and resource uses.
(e) Availability and practicability of more permanent remedies.
(f) The availability of improved analytical techniques to evaluate compliance with cleanup levels.

Ecology shall publish a notice of all periodic reviews in the *Site Register* and provide an opportunity for public comment.

Basis

Because the Site underwent a cleanup action Ecology approved under a consent decree and institutional controls were required as part of the cleanup action, periodic reviews are required at a frequency of at least every five years.

This review is based on six years of compliance monitoring data documenting Site conditions and contaminant concentrations.

Effectiveness of completed cleanup actions

Evaluating the cleanup action effectiveness involves assessing contaminant levels and trends to determine if the cleanup actions are performing as expected.

Soil caps are inspected on an annual basis and are performing as intended. Any surface damage is noted, reported to Ecology in an annual Cap Integrity Report, and repaired as needed. Fencing, signage, and impermeable caps are also inspected to ensure they remain intact and in place.

Compliance monitoring has been ongoing for groundwater in accordance with the approved Compliance Monitoring Plan. Groundwater was sampled quarterly through 2016, and then semi-annually, to evaluate compliance with cleanup levels. As discussed in Section 3.2, an Interim Action groundwater treatment system was operated from 2009 through 2012.

Diesel achieved cleanup levels for four consecutive monitoring events and was removed from compliance monitoring in April 2020. Total arsenic values were still present exceeding cleanup levels, so monitoring continued until March 2022. At that time, arsenic was below cleanup levels for four consecutive monitoring events. One sample, with a concentration of 5.2 parts per million (ppm), was within statistical requirements for compliance monitoring. WAC 173-720(9)(e) allows that if no single sample is more than twice the cleanup level and less than 10 percent of the concentrations exceed the cleanup level, then the site has met cleanup levels. These requirements have been met. Charts showing concentration trends are provided in figures 3 through 5.

WAC 173-340-720(c)(vi) requires that when active groundwater restoration is performed (as here, with the active AS/SVE system), compliance with cleanup levels shall be determined when the groundwater characteristics are no longer influenced by the cleanup action. Since the groundwater treatment system had been shut down since 2012, this standard has been met.

New scientific information for individual hazardous substances or mixtures present at the Site

There is no new scientific information that affects the Site.

New applicable state and federal laws for hazardous substances present at the Site

No new federal or state laws exist that would apply to contaminants at the Site.

Current and projected site use

The Site is zoned as heavy industrial, and site use as a large switching and rail support yard will not change. The soil environmental covenant remains in place to protect capped areas.

Availability and practicability of higher preference technologies

The Site has achieved cleanup levels, so no additional remedies will be required.

Availability of improved analytical techniques

The Site has achieved cleanup levels, so no additional remedies will be required.

Conclusions

The Site has met soil and groundwater cleanup levels and no further work is required, beyond maintaining soil caps. Therefore, the Site will be removed from Ecology's Hazardous Sites List. In addition, the environmental covenant for groundwater will be removed. Both actions require public notice and opportunity to comment.

References

GeoEngineers, 2009, *Interim Action Work Plan, Parkwater Railyard*.

GeoEngineers, 2011, *Parkwater Remedial System Temporary Shutdown*.

Kennedy/Jenks Consultants, 2017, *Final Soil Cleanup Action Report, Parkwater Rail Yard Site*.

Washington State Department of Ecology, 2001, Model Toxics Cleanup Act Regulation Chapter 173-340 WAC.

Washington State Department of Ecology, 2011, *Final Cleanup Action Plan, Parkwater Railyard Site*.

Figures

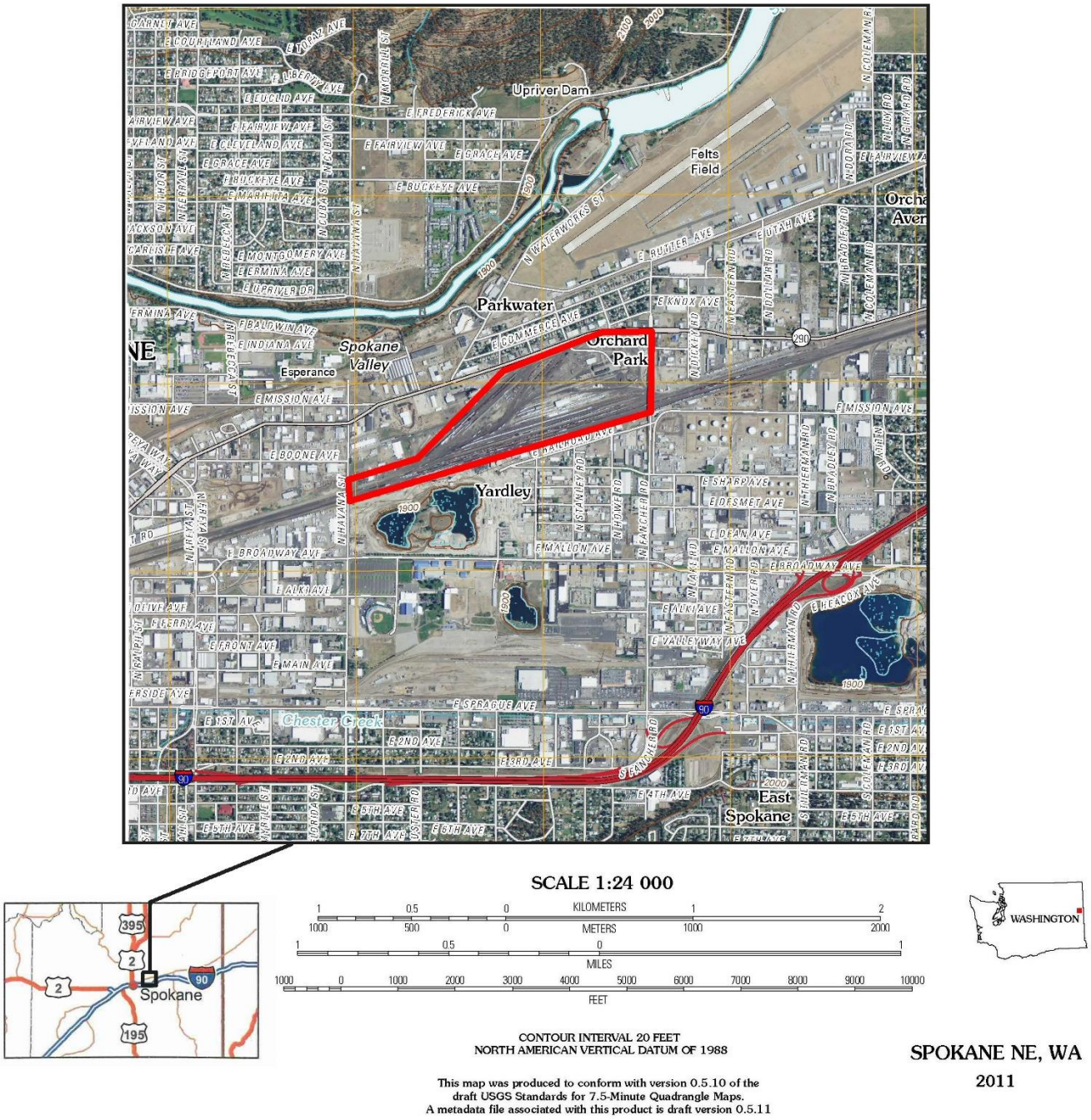

Figure 1: Site location

Reference: 2007 aerial photograph provided by Spokane County.

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. The approximate limit of the historic diesel plume is based on observations in bailer samples and not groundwater samples collected using low-flow sampling methodology.

Figure 2: Well locations

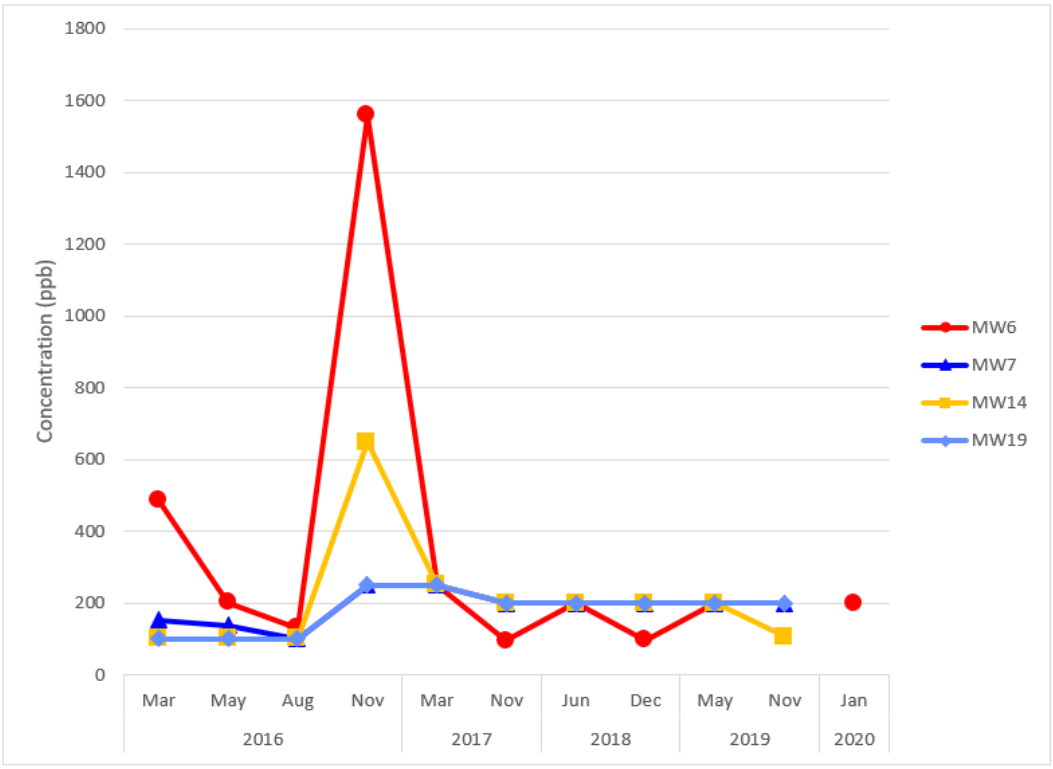

Figure 3: diesel concentrations

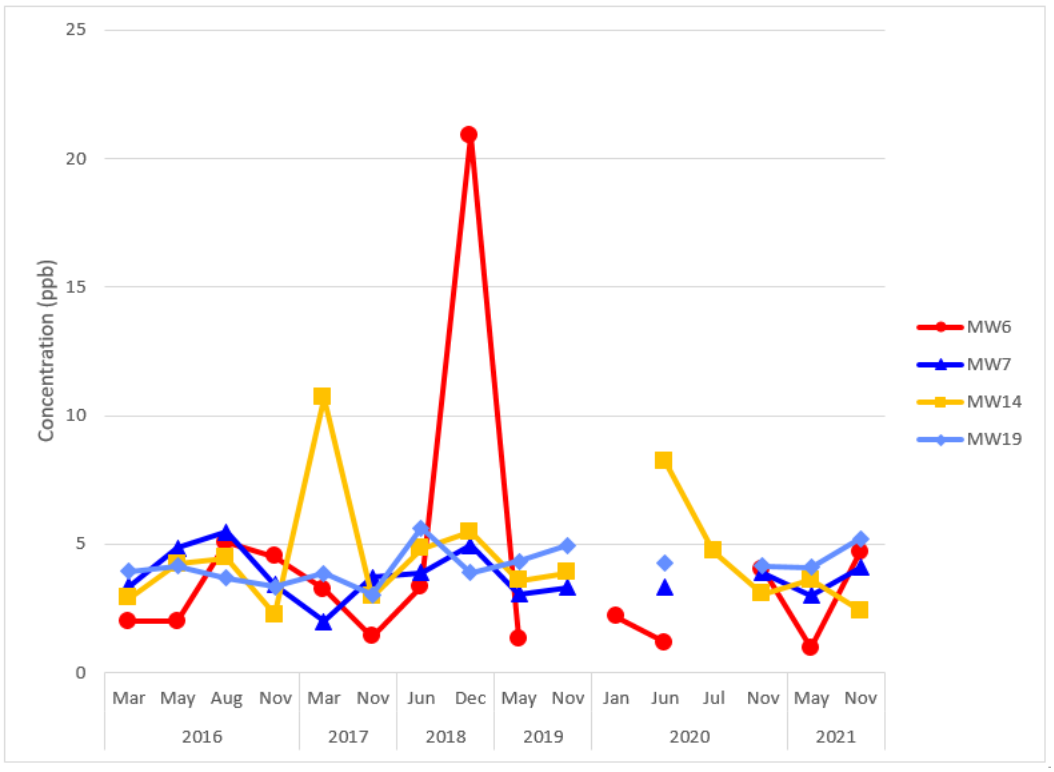

Figure 4: Total arsenic concentrations

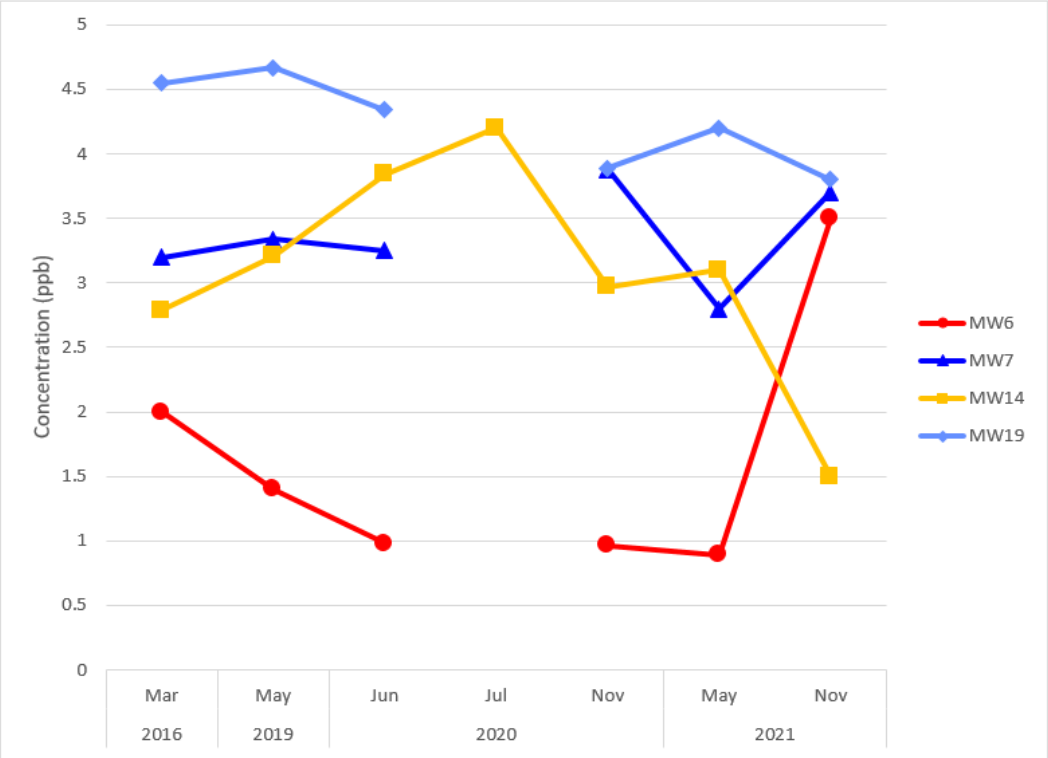

Figure 5: Dissolved arsenic concentrations

Tables

Table 1: Cleanup Levels

Indicator	Groundwater CUL (ppb)	Groundwater basis	Soil CUL (ppm)	Soil basis
Arsenic	5	background	9	background
Barium			1648	protection of groundwater
Cadmium			1	background
Chromium			18	background
Lead			1000	Method A industrial
Diesel-range organics	500	Method A	2000	Method A industrial
Motor oil			2000	Method A industrial

CUL = cleanup level
ppb = parts per billion
ppm = parts per million

Table 2: Groundwater Data

Red or * means exceeds cleanup level.
All concentrations are in parts per million.

Indicator	Diesel	Diesel	Diesel	Diesel	Total Arsenic	Total Arsenic	Total Arsenic	Total Arsenic	Dissolved Arsenic	Dissolved Arsenic	Dissolved Arsenic	Dissolved Arsenic
Well	MW-06	MW-7	MW-14	MW-19	MW-06	MW-7	MW-14	MW-19	MW-06	MW-7	MW-14	MW-19
Mar 2016	488	153	100	100	2	3.36	2.89	3.94	2	3.2	2.79	4.55
May 2016	201	138	100	100	2	4.85	4.23	4.16				
Aug 2016	131	100	100	100	5.05	5.48	4.45	3.67				
Nov 2016	1560	250	648	250	4.5	3.42	2.25	3.34				
Mar 2017	250	250	250	250	3.23	2	10.7	3.87				
Nov 2017	95	200	200	200	1.39	3.7	2.95	3.02				
Jun 2018	200	200	200	200	3.34	3.88	4.82	5.64				
Dec 2018	96	200	200	200	20.9	4.95	5.48	3.89				
May 2019	200	200	200	200	1.31	3.05	3.58	4.32	1.4	3.34	3.21	4.67
Nov 2019	200	200	106	200		3.32	3.9	4.96				
Jan 2020	488				2.17							
Jun 2020					1.17	3.34	8.2	4.29	0.979	3.25	3.84	4.34
Jul 2020							4.73				4.2	
Nov 2020					4.03	3.89	3.06	4.16	0.966	3.88	2.97	3.89
May 2021					0.96	3	3.6	4.1	0.89	2.8	3.1	4.2
Nov 2021					4.7	4.1	2.4	5.2	3.5	3.7	1.5	3.8