THIRD FIVE-YEAR REVIEW REPORT FOR OGDEN RAILROAD YARD SUPERFUND SITE WEBER COUNTY, UTAH

Prepared by

UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF ENVIRONMENTAL QUALITY
FOR
U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 8
DENVER, COLORADO

BETSY SMIDINGER Digitally signed by BETSY SMIDINGER Date: 2021.07.29 12:14:11 -06'00'

Betsy Smidinger, Director
Superfund and Emergency Management Division

Table of Contents

LIST OF APPENDICES

LIST OF ABBREVIATIONS & ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CD	Consent Decree
CFR	Code of Federal Regulations
COC	Contaminant of Concern
cy	Cubic yard
DNAPL	Dense Non-Aqueous Phase Liquid
EPA	United States Environmental Protection Agency
FS	Feasibility Study
FYR	Five-Year Review
ICs	Institutional Controls
MCL	Maximum Contaminant Level
mg/kg	milligram per kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
OU	Operable Unit
O&M	Operation and Maintenance
PAH	Polycyclic Aromatic Hydrocarbon
PRP	Potentially Responsible Party
ROD	Record of Decision
RAOs	Remedial Action Objectives
RD	Remedial Design
RI	Remedial Investigation
RPM	Remedial Project Manager
RCRA	Resource Conservation Recovery Act
SAP	Sampling Analysis Plan
TBC	To be considered
UDEQ	Utah Department of Environmental Quality
UPRR	Union Pacific Railroad
VOCs	Volatile Organic Compounds

I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The Utah Department of Environmental Quality (UDEQ)/Division of Environmental Response and Remediation (DERR), in coordination with the U.S. Environmental Protection Agency (EPA), conducted this five-year review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the third five-year review for the Ogden Railroad Yard Site (Site). The triggering action for this statutory review is the completion date of the second five-year review report, September 16, 2016. The FYR has been prepared due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site is located in an active railroad yard which includes a light rail connection to Salt Lake City (SLC), commercial facilities (including museums), and an industrial area which was originally comprised of four operable units (OUs). Operable Unit 1 (OU1) is approximately 60 acres and includes the northern railyard and Goode Lake. Operable Unit 2 (OU2) was designated to address polychlorinated biphenyls (PCBs); however, the PCBs were subsequently determined to be unrelated to the Site, and OU2 was removed. Operable Unit 3 (OU3) was designated to address contamination for a wastewater treatment plant which was subsequently addressed through a time-critical removal action. Operable Unit 4 (OU4) is 234 acres, comprised of two contaminated groundwater plumes (North and South Vinyl Chloride Plumes). Consequently, this FYR addresses only OU1 and OU4.

Ogden Railroad Yard Summary of Risks

The cleanup work performed at the Ogden Railroad Yard continues to be protective of human health and the environment. At OU1, the groundwater-coffer dam and collection sump are working to prevent release of Dense Non-Aqueous Phase Liquids (DNAPL) to Goode Lake and Ogden River. The groundwater domestic use restrictions Institutional Controls (ICs) for both OU1 and OU4 are in place. The remedy at OU4 is protective of human health and the environment as no current exposure to groundwater exists. Sitewide, ICs and source control measures are in place, are being maintained as designed, and are inspected annually.

The Ogden Railroad Yard Superfund Site Five-Year Review was led by Michael Storck with UDEQ/DERR. Participants included Erna Waterman, EPA Remedial Project Manager, and Dave Allison, UDEQ/DERR, Community Involvement Coordinator. The review began on February 18, 2021.

Background

The Site is on the west side of the City of Ogden, approximately 41 miles north of Salt Lake City, in Weber County, Utah (Figure 1). Ogden is the largest city in Weber County with a population of about one million people. The Site is bounded on the west by the Weber River, on the north by Goode Lake and the Ogden River, on the east by Wall Avenue, and on the south by Riverdale Road. Portions of the Site are within the 500-year and 100-year flood plains. The mean elevation above sea level is approximately 4,300 feet. The Site is approximately 3.5 miles long by one-half mile wide and encompasses approximately 1,120 acres, about 300 acres of which are subject to the remedial actions. The Site has been used continuously as a railyard since 1869 and is currently an active railyard. The land is zoned for commercial use.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Ogden Railroad Yard		
EPA ID: UTD000716407		
Region: 8	**State:** UT	**City/County:** Weber County
SITE STATUS		
NPL Status: Non-NPL		
Multiple OUs? Yes	**Has the site achieved construction completion?** N/A	
REVIEW STATUS		
Lead agency: State		
Author name (Federal or State Project Manager): Michael Storck		
Author affiliation: UDEQ/DERR		
Review period: 2/17/2021 - 8/31/2021		
Date of site inspection: 4/13/2021		
Type of review: Statutory		
Review number: 3		
Triggering action date: 9/29/2016		
Due date *(five years after triggering action date)*: 9/30/2021		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

Past railroad operations, including spillage, improper handling of used oil, fuels, treatment sludges, and solvents, resulted in hazardous substances contaminating the Site. The EPA investigated exposure to soil, groundwater, surface water, and air in 2003 to complete a human health risk assessment (HHRA) in 2004. The HHRA concluded that the carcinogenic risks were highest for vinyl chloride in the groundwater. Non-carcinogenic risks were highest for ethylbenzene in groundwater and ethylbenzene and naphthalene in gases or vapors from groundwater. Also, an ecological risk assessment (ERA) was completed to investigate exposure to ecological receptors via soil, sediment, groundwater and surface water. Ecological risks were highest for benzo(a) pyrene and DNAPL in the pond sediments (Goode Lake).

Response Actions

UDEQ began investigating the Site in the early 1980's at the request of the Weber-Morgan Health Department to assess and evaluate environmental conditions. UDEQ identified 27 areas of suspected contamination. Because the Site was an operating facility, the property owner railroads conducted cleanup activities at various times, sometimes under a legal agreement and at other times on their own initiative.

The EPA began working with the UDEQ in 2000-2001 to assess Site conditions and to determine whether the Site should be proposed for inclusion on the National Priorities List (NPL). The EPA and UDEQ agreed that rather than listing the Site on the National Priorities List, they would address the Site as if it was a Superfund Alternative Approach (SAA) site. However, the Site was never formally designated as an SAA site as an alternative to listing the Site on the National Priorities List.

In 1996, the EPA issued an administrative order on consent to Union Pacific Railroad (UPRR) to perform a removal response action to excavate alkaline sludges located in an impoundment area from which contamination was migrating into surrounding soils, surface water and groundwater.

UPRR began remedial investigation work at the Site in 1997 to determine if areas of interest at the railyard facility warranted further investigations. In May 1999, UPRR and the EPA signed an administrative order on consent for UPRR to conduct a remedial investigation/feasibility study (RI/FS) at the Site. During the RI/FS, the boundaries of the Site were expanded northward to include what is now known as Goode Lake. The FS was completed in 2004, the Records of Decision (RODs) for OU1 and OU4 were signed on September 30, 2004, and an Explanation of Significant Differences (ESD) was signed on February 21, 2006, for OU4.

The remedial action objectives (RAOs) outlined in the ROD for OU l are as follows:

- Protect human and ecological receptors from exposure to DNAPL-contaminated sediments at Goode Lake
- Prevent unacceptable exposure risk to current and future human populations by direct contact, inhalation, or ingestion of contaminated groundwater
- Prevent potential future groundwater plume migration as necessary to protect current beneficial uses and potential beneficial uses of groundwater in the vicinity of the Site and to be protective of surface waters and their designated uses
- Restore the groundwater to beneficial uses (as technically practicable)
- Treat, contain, or remove DNAPL to prevent or minimize further spread of DNAPL

The RAOs outlined in the ROD for OU4 are as follows:

- Protect against unacceptable exposure risk to current and future human populations by direct contact, inhalation, or ingestion of VOCs (Volatile Organic Compounds) in VOC-impacted groundwater
- Prevent potential future groundwater plume migration as necessary to protect current beneficial uses and potential beneficial uses of groundwater in the vicinity of the Site, and to be protective of surface waters and their designated uses
- Restore the groundwater to beneficial uses (as technically practicable)
- Treat, contain, or remove sources of ongoing VOCs loading to the groundwater plume

The OUI remedy includes:

- Capping the DNAPL-impacted sediments in Goode Lake; prevention of further DNAPL movement into the pond through construction of a coffer dam, which is a DNAPL-collection drain system (Figure 2)
- Groundwater-coffer dam and collection sump monitoring to evaluate whether the DNAPL plume is moving toward Goode Lake or Ogden river and if DNAPL requires additional removal
- Groundwater Institutional Controls (ICs) to prevent use of groundwater for domestic, culinary or other indoor/outdoor use; ICs (environmental covenants) and engineering controls (fences) to ensure that contaminated areas remain undisturbed and the Site is not developed for residential use

The OU4 remedy includes:

- Removal of the main trunk line of the industrial sewer system; removal of contaminated soils underneath the trunk line; flushing the branch lines of the industrial sewer system; sludge recovery and disposal in an appropriate off-site facility; and capping the branch lines (Figure 3)
- Monitored Natural Attenuation (MNA) of the groundwater plumes (Northern and Southern Vinyl Chloride Plumes; Figures 4 and 5, respectively)
- An Explanation of Significant Difference (ESD) completed in 2006 incorporated EPA's MNA Guidance (April 1999) into the remedy.
- Groundwater ICs to prevent use of groundwater for domestic, culinary or other indoor/outdoor use; ICs (deed restrictions) and engineering controls (fences) to ensure that contaminated areas remain undisturbed and the Site is not developed for residential use

Status of Implementation

Selected remedies documented in the RODs were implemented during 2006 and 2007 and the construction activities were documented in the Final Remedial Action Construction Completion Report (CH2M HILL, 2007). At OU1 for soil the primary Contaminant of Concern (COC) is benzo (a) pyrene and the EPA Regional Screening Level (RSL) for industrial use is 2.1 mg/kg. At OU4 for groundwater the primary COC is vinyl chloride and the Maximum Contaminant Level (MCL) is 2 ug/L. The remedies implemented at OU1 and OU4 continue to be maintained through annual cofferdam and soil cover inspections and groundwater monitoring activities.

OU1:

At OU1, the City of Ogden maintains the cofferdam, lake levels, fencing, and soil cover. The cofferdam and soil cover are inspected annually in accordance with the approved Cofferdam and Soil Cover Operation and Maintenance Plan, and the inspection results are documented in reports distributed to the EPA, UDEQ, and the City of Ogden. The City of Ogden also periodically inspects the DNAPL collection and extraction points and disposes of DNAPL accumulations. UPRR continues to perform groundwater sampling and measurement of DNAPL thicknesses in the OU1 monitoring wells in accordance with the approved schedule to evaluate whether the DNAPL plume is moving toward the Goode Lake or Ogden River.

OU4:

At OU4, UPRR continues to gauge water level measurements and collect samples from selected monitoring locations in the northern and southern VOC plumes to assess the MNA remedy of the groundwater plumes. The gauging and sampling results at OU1 and OU4 are submitted to EPA and UDEQ in annual groundwater reports. In addition, UPRR also performs necessary well repair and well abandonment as part of the regular O&M at the Site.

OU1 and OU4 Monitoring Wells Abandonment:

On August 14, 2017, UPRR requested permission to abandon 50 monitoring wells at the Site that were not used for monitoring activities as specified in the 2016 Quality Assurance Project Plan (QAPP). The EPA and UDEQ approved the request on September 26, 2017. UPRR conducted a preliminary inventory in October 2017 and discovered that 15 of the 50 wells scheduled for abandonment could not be located. These wells were considered permanently lost. The remaining 35 wells were abandoned between May 21 and 24, 2018, by a licensed driller, and the wells were abandoned according to the *State of Utah, Water Well Handbook* (Administrative Rules R-655-4UAC), Utah Division of Water Rights, Office of Utah State Engineer (May 2018).

IC Summary Table

An environmental covenant was filed in July 2006 with UPRR and UDEQ to establish use limitations and restrictions for soil and groundwater as a result of contamination exceeding regulatory standards. Restrictions and use limitations include prohibition of use of groundwater including the installation of wells; a health and safety plan requirement for all soil excavations over four feet in depth; a water management plan for dewatering, pumping or if groundwater is encountered on the property; and a soil management plan if use of the property results in drill cuttings or excavations of soil at depths below four feet.

Table 1: Summary of Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Groundwater	Yes	Yes	OU1 & OU4	Prohibit Use of Groundwater including installation of new wells	Environmental Covenant (July 2006)

Systems Operations/Operation & Maintenance

In 2006 UPRR developed a Cofferdam and Soil Cover Operations & Maintenance Plan to meet the inspection requirements for the OU1 remedy constructed at Goode Lake. Components of the cofferdam structure are required to be inspected on an annual basis.

At OU1, UDEQ and the EPA conduct annual inspections of the cofferdam/soil cover with UPRR and Ogden City. During the September 29, 2020, annual cofferdam inspection, the components of the cofferdam structure were inspected. The inlet control structure was functional but had some minor floating debris present that did not require any mitigation. The groundwater discharge pipes were intact and flowing freely. The rip-rap section was intact but had vegetation coming up through the rip-rap. The soil cover east of the riprap also had vegetation

coming up through the surface. Ogden City plans to mitigate the vegetation, that may negatively impact the coffer dam, coming up through the riprap and the soil cover, by mechanical treatment (cutting/mowing). Ogden City completed the mitigation work in March 2021.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the last FYR as well as the recommendations from the last FYR and the current status of those recommendations.

Table 2: Protectiveness Determinations/Statements from the 2016 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1	Protective	The remedy at OU1 is currently protective of human health and the environment.
4	Protective	The remedy at OU4 is currently protective of human health and the environment.
Sitewide	Protective	The remedy at the Site is currently protective of human health and the environment.

Table 3: Status of Recommendations from the 2016 FYR

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
1	Invasive plants on vegetative cap and rip-rap of cofferdam	Remove invasive plants on vegetative cap and rip-rap of cofferdam	Completed	Ogden City treated the invasive plants by chemical treatment to remove the invasive plants found on the vegetative cap and rip-rap of the cofferdam.	10/31/2016

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

A public notice was published in the Ogden Standard Examiner newspaper on March 18, 2021, stating that there was an FYR and inviting the public to submit any comments to the EPA and UDEQ. The public notice stated the FYR was in progress and informed the community that the UDEQ and the EPA would be conducting an FYR to ensure that the remedy implemented at the Site remains protective of public health. The results of the review and report will be made available at the Site information repositories located at UDEQ office in Salt Lake City, Utah, and by appointment at the EPA office in Denver, Colorado. A copy of the announcement is in Appendix F.

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy that has been implemented to date. The results of these interviews are summarized below.

The Ogden City Engineering and Ogden Parks staff maintain the 21st Pond/Goode Lake where the OU1 cofferdam is located. Ogden City staff said there were no issues with the cofferdam. Fencing is in good condition and keeps people off the cofferdam; the cap has ample vegetation and shows no signs of erosion. Ogden City staff

said water conditions in the 21st Pond/Goode Lake have been maintained, and they have not observed any issues with the lake water levels over the last five years.

According to UPRR, the MNA remedy is working; the groundwater data for OU4 shows the north and south vinyl chloride plumes are static, trending in decreasing size, and not migrating off UPRR property.

The content of the interviews is provided in Appendix F.

Data Review

OU1:

The vegetative cap and the coffer dam are in good condition as noted in the last Annual Coffer Dam Inspection Report dated September 29, 2020. No DNAPL has been removed as no visible DNAPL has been seen in the collection sumps during previous inspections.

OU4:

North Vinyl Chloride Plume

Figure 6 shows side-by-side the 2016 and 2021 OU 4 North vinyl chloride plumes with 2, 10, 100, and 500 µg/L concentration contours. Figure 6 also shows the area (in square feet [ft^2]) of each plume contour from 2016 and 2021. The areal extent of the 2 µg/L plume contour decreased by 513,530 ft^2 from 2016 to 2021. The 10 and 100 µg/L plume contours increased by 151,136 and 126,714 ft^2 between 2016 and 2021, respectively. All vinyl chloride concentrations are below 500 µg/L; therefore, the plume 500 ug/L contour is not shown for 2021. The overall length of the plume has decreased between 2016 and 2021.

South Vinyl Chloride Plume

Figure 7 shows side-by-side the 2016 and 2021 OU 4 South vinyl chloride plumes with 2 and 10 µg/L concentration contours. Figure 7 also shows the area (in ft^2) of each plume contour from 2016 and 2021. With the decrease in vinyl chloride concentration below the MCL at 30-MW-1, the areal extent of the 2 µg/L plume contour decreased 460,309 ft^2 from 2016 to 2021. The extent of the 10 µg/L plume contour also decreased by 87,420 ft^2. The maximum VC concentration in the OU4 South Plume, measured at well 30-MW6D, decreased from 35.8 µg/L to 13.3 µg/L between 2016 and 2021.

Site Inspection

Michael Storck, UDEQ Project Manager; Dave Allison, UDEQ Environmental Planning Consultant; Terrence Mares, Jacobsen Project Manager and Phil Suiter, Ogden City Engineer inspected the Site on April 13, 2021. The purpose of the inspection was to assess the protectiveness of the remedy.

The Site appeared to be in very good condition and the remedies at OUI and OU4 are intact; the Site has been maintained in accordance with the ICs. No significant problems were observed during the Site inspection. During the inspection some invasive plants were observed on the vegetative cap and rip rap of the coffer dam, but they have not significantly impacted the remedy.
Site documents are up to date and available for review at the Weber County Library. Appendix C includes the Site Inspection Checklist. Appendix D includes the Inspection Photographs.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Question A Summary:

The review of documents and results of the Site Inspection indicate that the remedies at OU1 and OU4 are functioning as intended by the ROD.

Remedial Action Performance

At OU1, the remedy is functioning as intended as the DNAPL sediments on Goode Lake are contained by the vegetative cap, and DNAPL movement through the pond is mitigated by the cofferdam. At OU4, the North and South Vinyl Chloride Groundwater Plumes analytical data collected over the last five years shows the plume configuration is decreasing and MNA is functioning as intended. The ICs effectively control the use of groundwater. Annual monitoring and Site inspections are conducted to evaluate whether the remedy is effective and to ensure that cofferdam, fencing and cap are maintained as required. Reports required for groundwater sampling and inspection events adequately document ongoing MNA and the integrity of the cofferdam and vegetative cap. Concerns and maintenance issues identified have been promptly addressed by the City and UPRR.

System Operations/O&M

At OU1, annual inspections of the cofferdam and vegetative cap are conducted, and details of the inspections are documented in the Annual Cofferdam Inspection Report. Ogden City conducts O&M at OU4 that includes inspections of the fence and gates, DNAPL-collection sumps, rip-rap of the cofferdam and vegetative cap. O&M at OU4 ensures the remedy remains effective and protective of human health and the environment.

Implementation of Institutional Controls and Other Measures

At OU1 and OU4, groundwater ICs are in place to prevent the installation of new wells and restrict domestic, culinary or other indoor use. ICs (environmental covenant) and engineering controls (fences) are in place to ensure that contaminated areas remain undisturbed and that the Site is not developed for residential use.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Question B Summary:

There are no changes to ARARs or any new standards affecting the protectiveness of the remedy. The exposure assumptions used to develop the HHRA are still valid. There have been no changes in the toxicity factors for the Contaminants of Concern (COCs) that were used in the baseline risk assessment. These assumptions are considered to be conservative and reasonable in evaluating risk and developing risk-based cleanup levels.

Cleanup levels set for the Site were presented in the September 2004 ROD. Because the document was developed prior to the EPA's Risk Assessment Guidance for Superfund (RAGS) Part F (2009), the exposure assumptions for the inhalation exposure pathway were conducted differently. The exposure metric that was used in the Baseline Human Health Risk Assessment (BHHRA) (2003) used inhalation concentrations that were based on ingestion rate and body weight (mg/kg-day). The updated methodology in the EPA's RAGS Part F uses the concentration of a chemical in the air, with the exposure metric of ug/m3. As a result of this update to RAGS Part F, there is no significant change in cleanup levels.

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has been found that may question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Issues and Recommendations Identified in the Five-Year Review:

OU(s): 1	**Issue Category: Operations and Maintenance**			
	Issue: Invasive plants on rip-rap of cofferdam and vegetative cap			
	Recommendation: Removal of invasive plants by mechanical treatment (cutting) on rip-rap of cofferdam and vegetative cap.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	No	Other Ogden City	Other Ogden City	3/31/2021

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement(s)	
Operable Unit: **OU1**	*Protectiveness Determination:* Protective
Protectiveness Statement: **The remedy at OU1 is protective of human health and the environment as the groundwater-coffer dam and collection sump are working to prevent release of DNAPL to Goode Lake and Ogden River. ICs (environmental covenant) and engineering controls (fences) are in place to ensure that contaminated areas remain undisturbed and that the Site is not developed for residential use.**	

Protectiveness Statement(s)	
Operable Unit: **OU4**	*Protectiveness Determination:* Protective
Protectiveness Statement: **The remedy at OU4 is protective of human health and the environment as no current exposure to groundwater exists, due to the removal of the industrial sewer line and groundwater MNA. Groundwater ICs are in place to prevent the installation of new wells and restrict domestic, culinary or other indoor use.**	

VIII. NEXT REVIEW

The next five-year review report for the Ogden Railroad Yard Superfund Site is required five years from the completion date of this review.

APPENDIX A
OGDEN RAILROAD YARD FIGURES

SLC \\dc1vs01\GISProj\U\UPRR\UPRR_Ogden\UPRR_Ogden\MapFiles\5YR_2021\Fig01 - SiteLocationMap.mxd WOODSJ2 5/2/2021 12:23:27

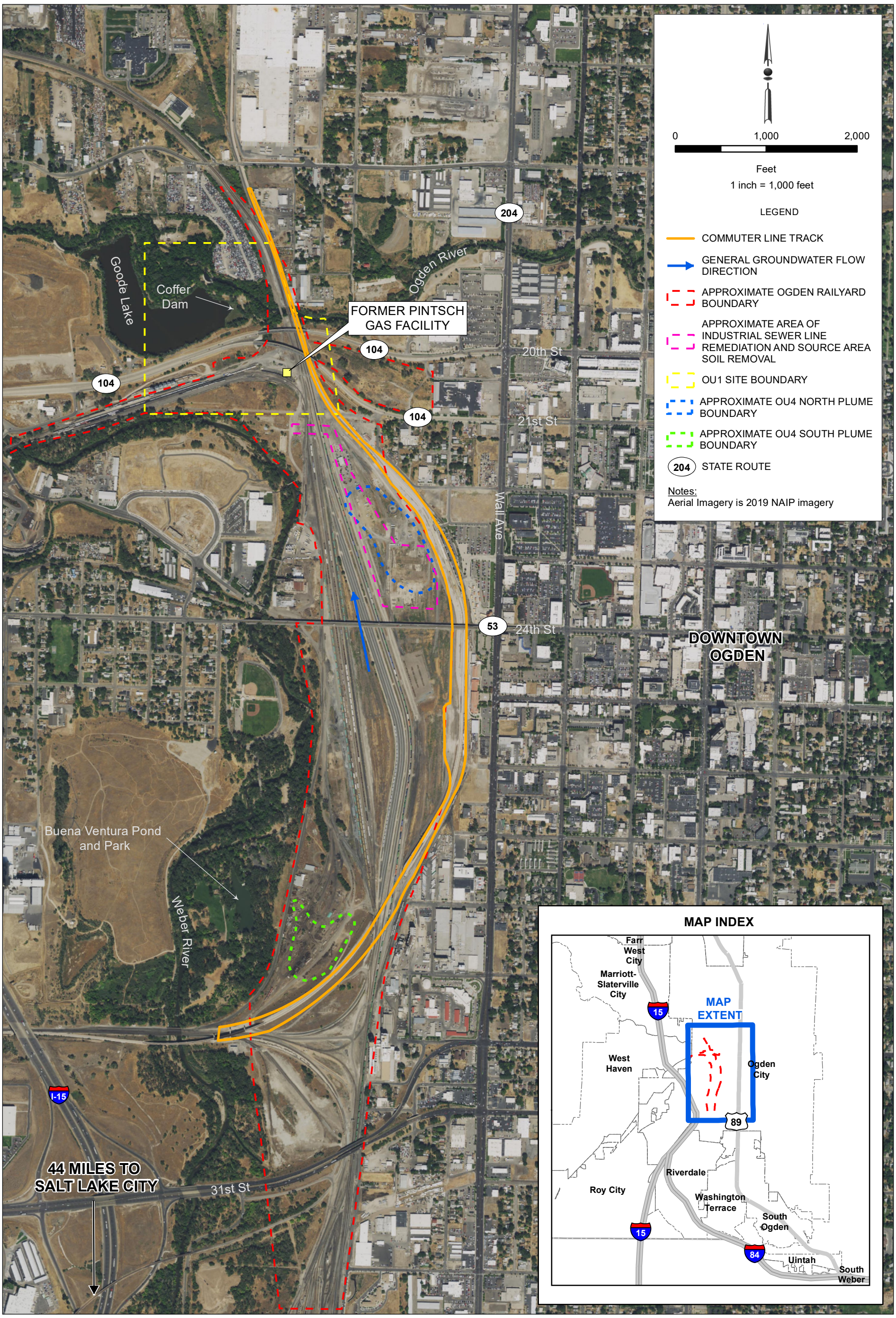


FIGURE 1
SITE LOCATION MAP
2021 FIVE YEAR REVIEW REPORT, OPERABLE UNITS 1 AND 4
UNION PACIFIC OGDEN RAILROAD FACILITY, OGDEN, UTAH

Jacobs

SLC \\dc1vs01\GISProj\U\UPRR\UPRR_Ogden\UPRR_Ogden\MapFiles\5YR_2021\Fig02 - OU1_CofferDam.mxd WOODSJ2 5/11/2021 17:38:34

0 75 150 Feet

1 inch equals 200 feet

LEGEND

WELL SAMPLING AND GAUGING FREQUENCY

- BIENNIAL
- FIVE YEAR
- WELL GAUGING ONLY FIVE YEAR FREQUENCY
- COFFER DAM
- FENCE

SOURCES:
1. THE FORRESTER GROUP, PILOT DNAPL RECOVERY SYSTEM OPERATIONAL REPORT, FEBUARY 2003 (FIGURE 2).
2. THE FORRESTER GROUP, OGDEN FEASIBILITY STUDY, SEPTEMBER 2004 (FIGURE 3-4).
3. POND ELEVATION IS ESTIMATED BASED ON ORIGINAL DESIGN ELEVATION OF 4268.50.
4. AERIAL IMAGERY IS 2018 ESRI WORLD IMAGERY (CLARITY)

FIGURE 2

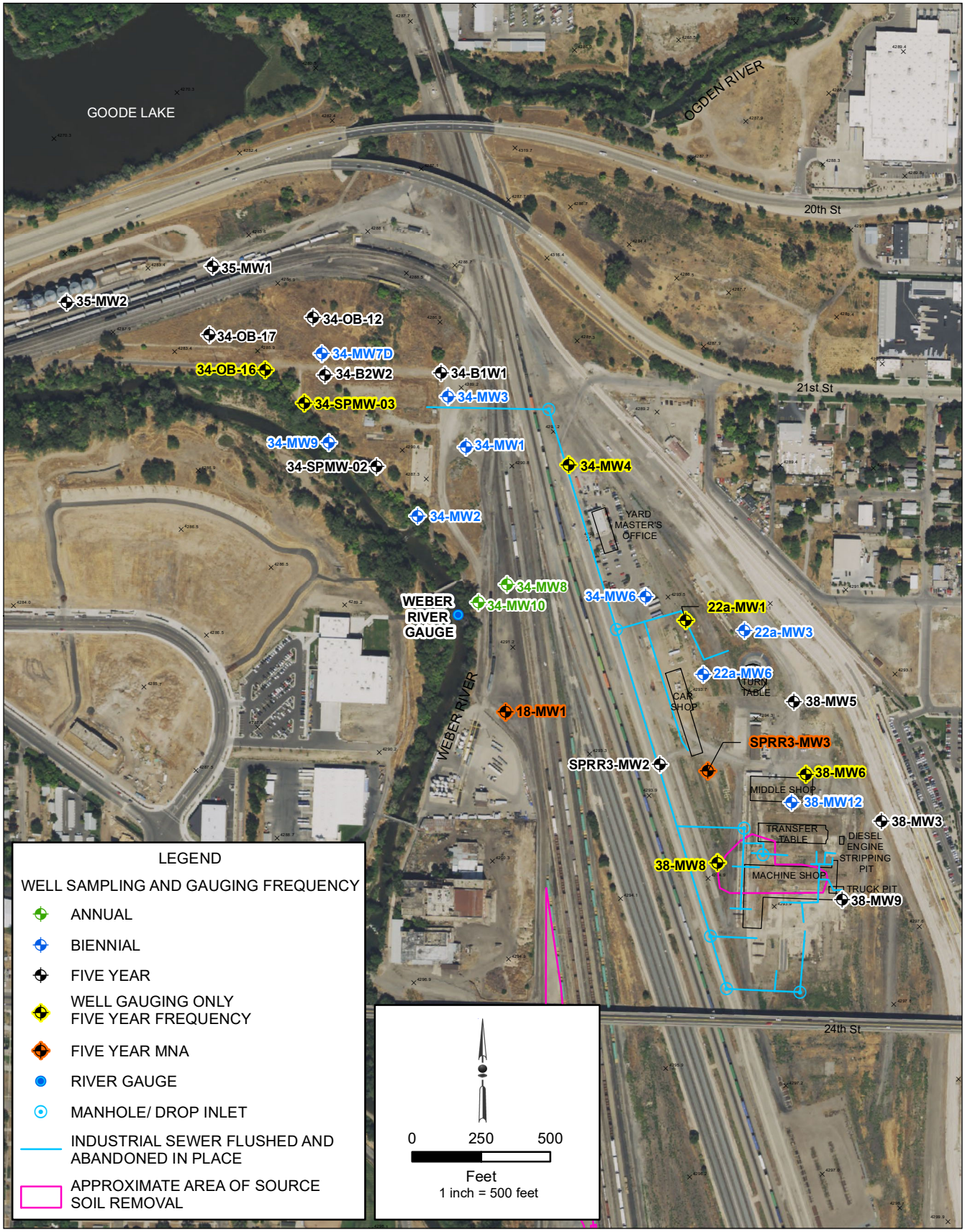
COFFER DAM AND OU 1 GROUNDWATER MONITORING WELLS

2021 FIVE YEAR REVIEW REPORT, OPERABLE UNITS 1 AND 4

UNION PACIFIC OGDEN RAILROAD FACILITY, OGDEN, UTAH

Jacobs

SLC \\dc1vs01\GISProj\U\UPRR\UPRR_Ogden\UPRR_Ogden\MapFiles\5YR_2021\Fig03 - OU4N_SewerLineSourceRemoval.mxd WOODSJ2 4/29/2021 12:12:00



AERIAL IMAGERY IS 2019 NAIP IMAGERY

FIGURE 3

SEWER LINE SOURCE REMOVAL AREA

2021 FIVE YEAR REVIEW REPORT, OPERABLE UNITS 1 AND 4
UNION PACIFIC OGDEN RAILROAD FACILITY, OGDEN, UTAH

Jacobs

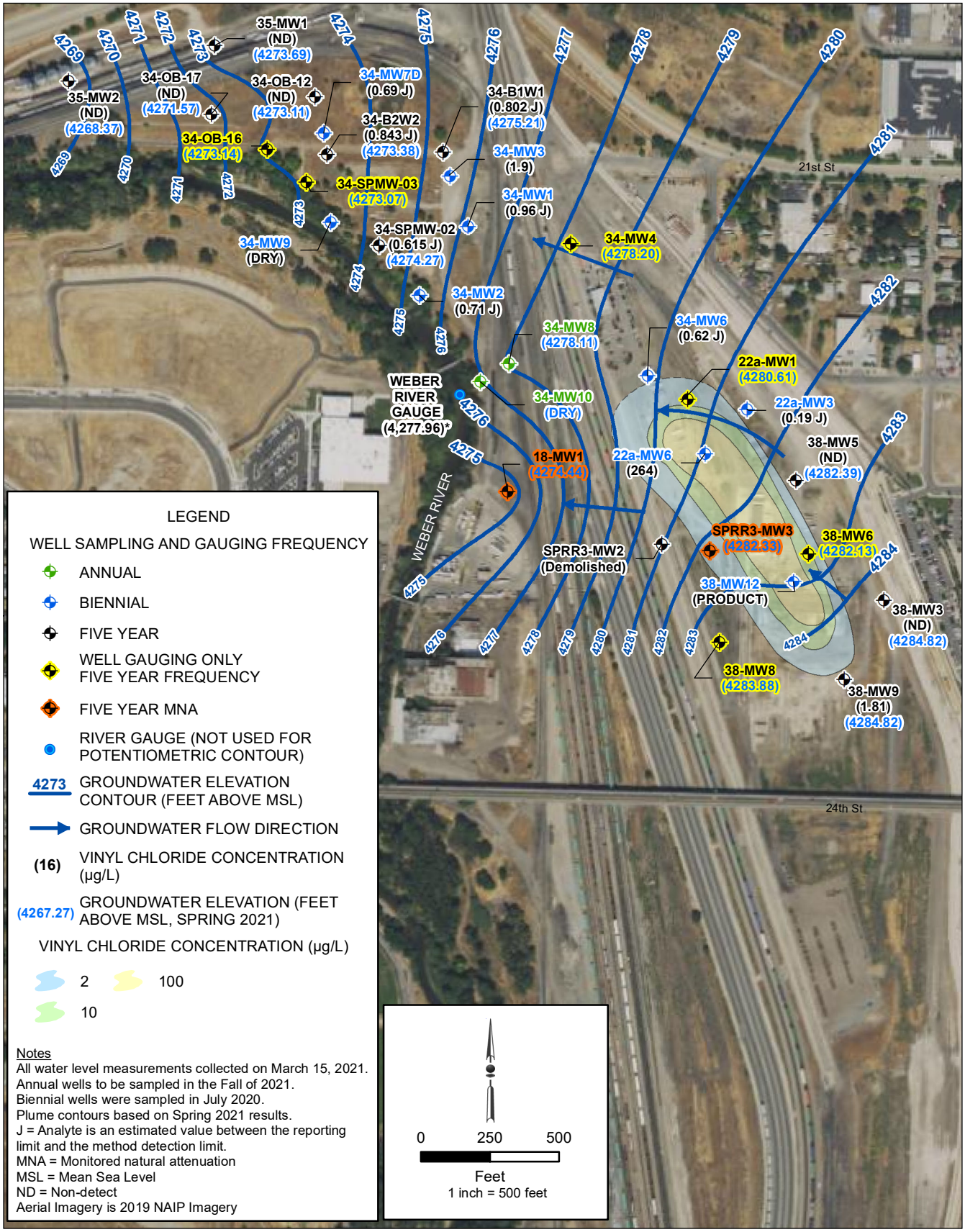


FIGURE 4

OU4 NORTH CVOC 2021 PLUME AREA

2021 FIVE YEAR REVIEW REPORT, OPERABLE UNITS 1 AND 4
UNION PACIFIC RAILROAD COMPANY, OGDEN, UT

Jacobs

SLC \\dc1vs01\GISProj\U\UPRR\UPRR_Ogden\UPRR_Ogden\MapFiles\5YR_2021\Fig05 - OU4S_PS_VC.mxd WOODSJ2 5/5/2021 17:39:38

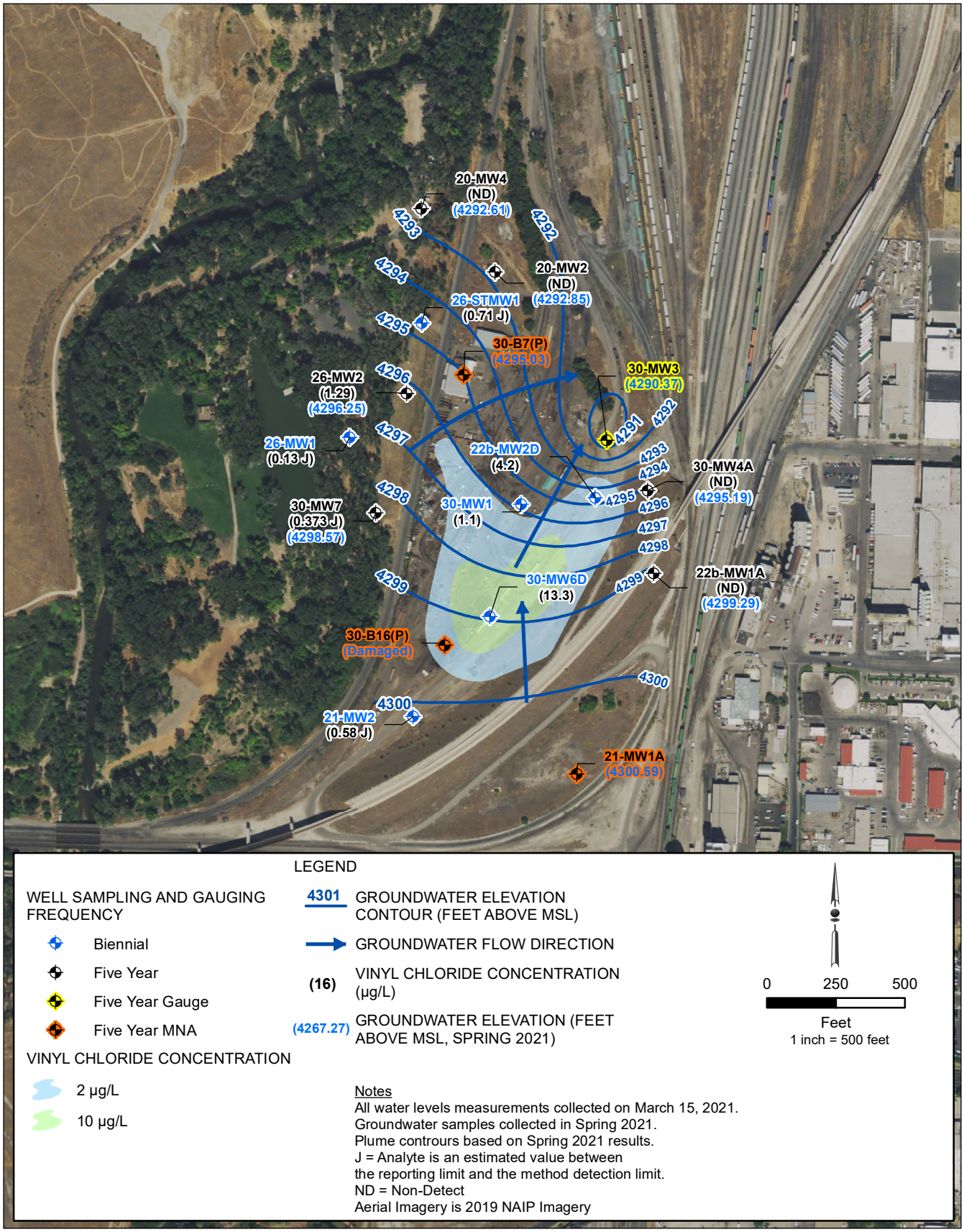


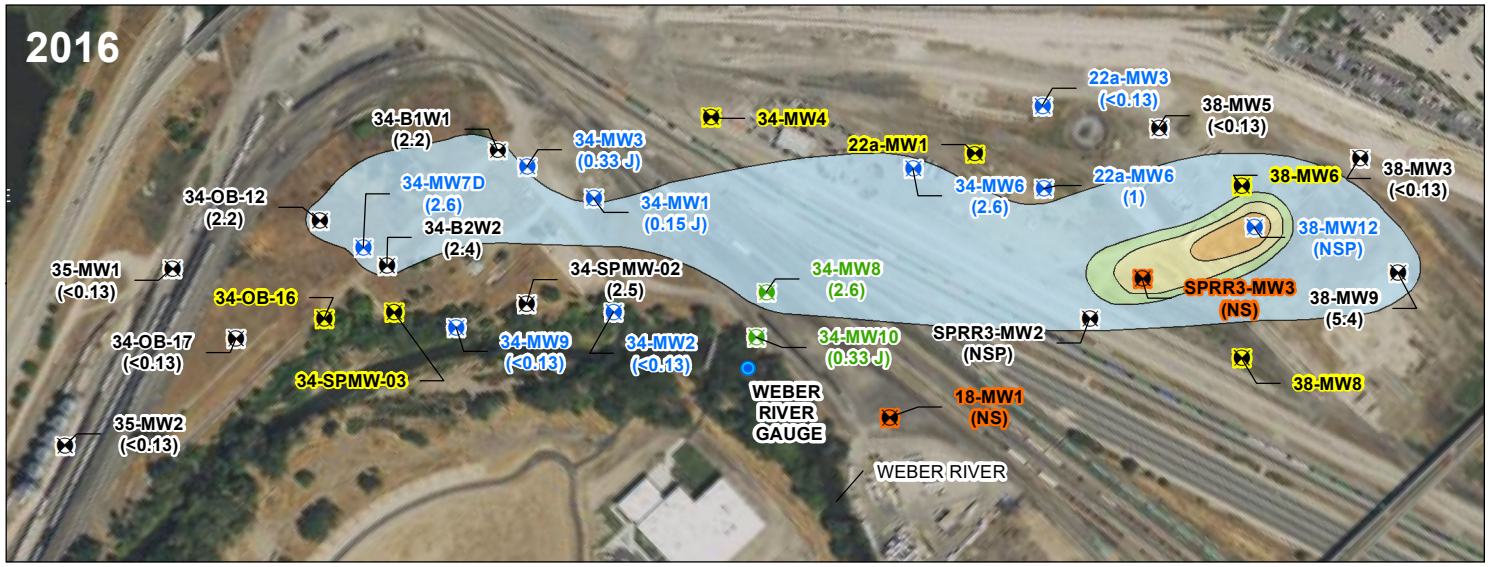
FIGURE 5

OU4 SOUTH CVOC 2021 PLUME AREA

2021 FIVE YEAR REVIEW REPORT, OPERABLE UNITS 1 AND 4
UNION PACIFIC RAILROAD COMPANY, OGDEN, UT

Jacobs

SLC \\dc1vs01\GISProj\U\UPRR\UPRR_Ogden\UPRR_Ogden\MapFiles\5YR_2021\Fig06 - OU4N_2016v2021.mxd WOODSJ2 5/11/2021 16:32:21



LEGEND

WELL SAMPLING AND GAUGING FREQUENCY

- ANNUAL
- BIENNIAL
- FIVE YEAR
- WELL GAUGING ONLY FIVE YEAR FREQUENCY
- FIVE YEAR MNA
- (16) VINYL CHLORIDE CONCENTRATION (µg/L)
- RIVER GAUGE
- GROUNDWATER FLOW DIRECTION

VINYL CHOLORIDE CONCENTRATION

- 2 µg/L
- 10 µg/L
- 100 µg/L
- 500 µg/L

0 500

1 inch equals 500 feet

Notes:
Ft^2 = Square Feet
ug/L = Micrograms per liter
J = Analyte is an estimated value between the reporting limit and the method detection limit.
MNA = Monitored natural attenuation
ND = Non-detect
NS = Not sampled
NSP = Not sampled due to product
Aerial Imagery is 2019 NAIP imagery

	Spring 2016	Spring 2021	Change from 2016
Plume Area 2 µg/L	946,990 ft^2	433,460 ft^2	-513,530 ft2
Plume Area 10 µg/L	92,886 ft^2	244,022 ft^2	151,136 ft2
Plume Area 100 µg/L	56,649 ft^2	142,610 ft^2	126,714 ft2
Plume Area 500 µg/L	15,896 ft^2	0 ft^2	-15,896 ft2

FIGURE 6

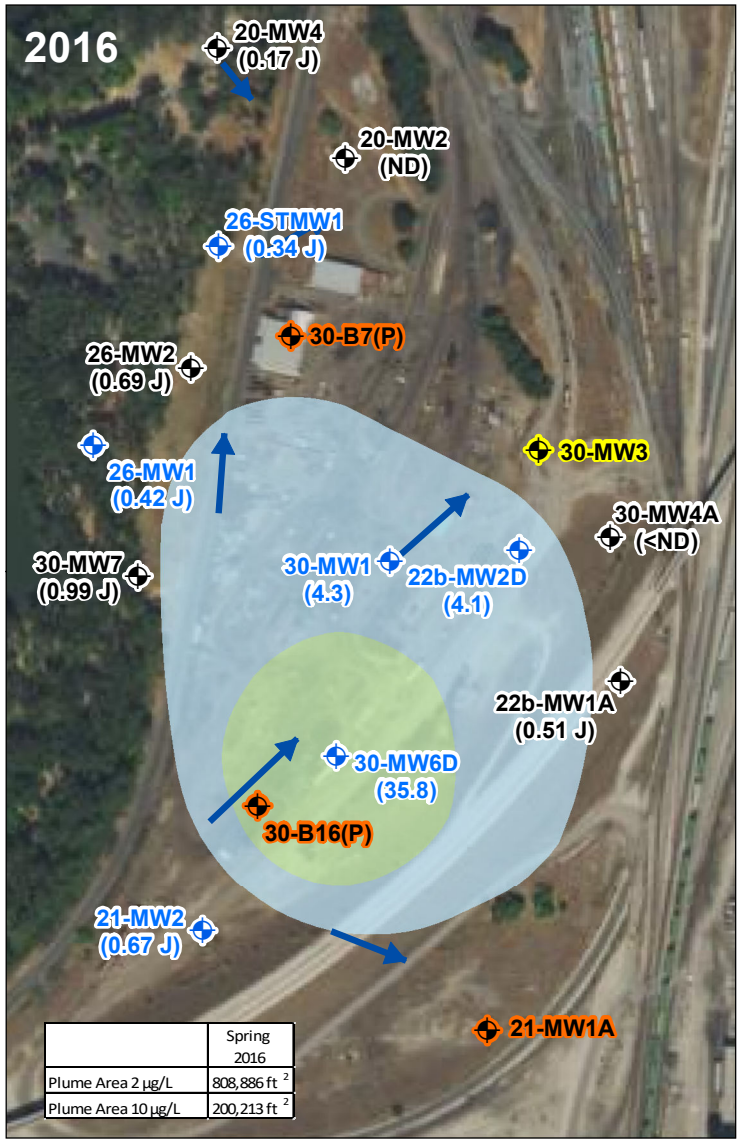
OU4 NORTH SPRING 2016 AND 2021 CVOC PLUME AREAS

2021 FIVE YEAR REVIEW REPORT, OPERABLE UNITS 1 AND 4

UNION PACIFIC RAILROAD COMPANY, OGDEN, UT

Jacobs

SLC \\dc1vs01\GISProj\U\UPRR\UPRR_Ogden\UPRR_Ogden\MapFiles\5YR_2021\Fig07 - OU4S_2016v2021.mxd WOODSJ2 5/5/2021 15:31:27



	Spring 2016
Plume Area 2 µg/L	808,886 ft ^{2}
Plume Area 10 µg/L	200,213 ft ^{2}

	Summer 2021	Change from 2016
Plume Area 2 µg/L	348,577 ft ^{2}	-460,309 ft2
Plume Area 10 µg/L	112,793 ft ^{2}	-87,420 ft2

0 200 400

1 inch equals 400 feet

LEGEND

WELL SAMPLING AND

- ANNUAL
- BIENNIAL
- FIVE YEAR
- WELL GAUGING ONLY FIVE YEAR FREQUENCY
- FIVE YEAR MNA
- (16) VINYL CHLORIDE CONCENTRATION (µg/L)
- GROUNDWATER FLOW DIRECTION

VINYL CHLORIDE CONCENTRATION

- 2 µg/L
- 10 µg/L

Notes:
Ft^2 = Square Feet
ug/L = Micrograms per liter
J = Analyte is an estimated value between the reporting limit and the method detection limit.
MNA = Monitored natural attenuation
ND = Non-detect
Aerial Imagery is 2019 NAIP imagery

FIGURE 7

OU4 SOUTH SPRING 2016 AND 2021 CVOC PLUME AREAS

2021 FIVE YEAR REVIEW REPORT, OPERABLE UNITS 1 AND 4

UNION PACIFIC RAILROAD COMPANY, OGDEN, UT

Jacobs

APPENDIX B
OGDEN RAILROAD YARD TABLES

TABLE 4
Operable Unit 1 Analytical Results—PAHs
2021 Five Year Review Report, Operable Units 1 and 4

Well ID	Screen Interval (ft bgs - ft bgs)	Date	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Benzo(a)pyrene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	1-Methylnaphthalene
Units			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MCL			NE	NE	NE	NE	NE	NE	NE	0.2	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
33-MP2	10.4 - 15.4	03/03/11	56	<0.059	9.9	0.41 [J]	<0.069	<0.089	<0.079	0.14 [J]	0.25 [J]	<0.079	4.5	28	<0.069	<0.069	<0.079	26	7.6	42
		05/30/12	53 [J]	2.4 [J]	10	0.27 [J]	<0.068	<0.088	<0.078	<0.078	0.36 [J]	<0.078	5.0	20	<0.068	18 [J]	190 [J]	31	6.4	66 [J]
		05/06/16	59.5	3.8	10.5	0.41	0.067 [J]	0.10	0.093	0.16	0.44	<0.010	5.4	24.1	0.067 [J]	NR	19.4	20.0	7.9	NR
		03/18/21	70.3	2.96	10.7	0.360	0.0428 [J]	<0.0202	<0.0184	0.0401 [J]	0.288	<0.0160	5.45	24.5	<0.0158	0.999	22.3	23.3	10.5	96.1
33-MP4	11 - 26	03/02/11	0.088 [J]	<0.059	<0.049	<0.079	<0.069	<0.089	<0.079	<0.079	<0.079	<0.079	0.15 [J]	<0.069	<0.069	0.62 [J]	0.64 [J]	0.35 [J]	<0.11	0.29 [J]
		05/05/16	0.19 [J]	<0.015	0.063 [J]	0.047 [J]	<0.011	<0.0202	<0.0184	<0.0184	<0.0179	<0.015	<0.17 [J]	0.11	<0.014	NR	<0.21 [J]	<0.35 [J]	0.17	NR
		03/17/21	0.0937	<0.0171	<0.0190	<0.0203	<0.0168	<0.0202	<0.0184	<0.0184	<0.0179	<0.0160	0.0275 [J]	0.0361 [J]	<0.0158	<0.0674	0.164 [J]	0.100	0.0643	0.0694 J
		3/17/21 DUP	0.0945	<0.0171	<0.0190	<0.0203	<0.0168	<0.0202	<0.010	<0.010	0.050 J	<0.0160	<0.0270	0.0365 [J]	<0.0158	<0.0674	0.170 [J]	0.0956	0.0518	0.0693 J
33-MW1	3 - 13	03/01/11	21	<0.057	6.2	0.41 [J]	<0.067	<0.086	<0.076	0.15 [J]	0.20 [J]	<0.076	4.5	17	<0.067	<0.067	<0.076	16	7.2	18
		05/29/12	1.9 [J]	41 [J]	1.3 [J]	0.15 [J]	<0.068 [UJ]	<0.088 [UJ]	<0.078 [UJ]	<0.078 [UJ]	0.22 [J]	<0.078 [UJ]	2.7 [J]	15 [J]	<0.068 [UJ]	<0.068 [UJ]	5.3 [J]	0.28 [J]	4.3 [J]	6.4 [J]
		05/09/16	27.2	1.6	1.3	0.13	0.15	0.15	0.18	0.15	0.20	0.25	2.6	13.9	0.12	NR	1.2	0.89	2.5	NR
		03/16/21	No sample collected due to well blocked at 6.65 feet below top of casing.																	
33-MW2	8.5 - 13.5	03/10/11	24	2.2	2.3	1.1 [J]	0.81 [J]	0.41 [J]	1.4 [J]	**1.4 [J]**	1.1 [J]	<0.079	2.5	11	0.63 [J]	<0.069	<0.079	8.3	5.9	44
		05/05/16	No sample collected due to product in purge water.																	
		03/16/21	No sample collected due to product.																	
33-MW3	7.5 - 12.5	03/10/11	<0.079	<0.059	<0.049	<0.079	<0.069	<0.089	<0.079	<0.079	<0.079	<0.079	<0.069	<0.069	<0.069	<0.069	<0.079	<0.059	<0.11	<0.089
		05/06/16	4.4	0.36	0.16	<0.0070	<0.019	<0.0050	<0.0090	<0.010	<0.011	<0.011	<0.35 [J]	2.9	<0.011	NR	42.8	<0.30 [J]	0.78	NR
		03/17/21	2.77	0.180	0.0443 [J]	0.0579	<0.0168	<0.0202	<0.0184	<0.0184	0.0504	<0.0160	0.467	2.02	<0.0158	<0.0674	<0.0917	0.0307 [J]	1.42	<0.0687
		3/17/21 DUP	2.77	0.195	0.0407 [J]	0.0678	<0.0168	<0.0202	<0.0184	<0.0184	0.0594	<0.0160	0.548	2.21	<0.0158	<0.0674	<0.0917	0.0321 [J]	1.59	<0.0687
33-MW4	6 - 13	03/10/11	8.7	<0.059	0.91 [J]	<0.079	<0.069	<0.089	<0.079	<0.079	<0.079	<0.079	<0.069	2.8	<0.069	<0.069	0.70 [J]	<0.059	<0.11	5.0
		05/09/16	24.7	0.72	2.8	<0.011	<0.012	<0.013	<0.011	<0.011	<0.011	<0.017	1.0	12.5	<0.015	NR	31.5	9.6	1.2	NR
		03/16/21	No sample collected due to well blocked at 10.80 feet below top of casing.																	
33-MW5	4 - 9	03/03/11	20	1.0	2.0	<0.079	<0.069	<0.089	<0.079	<0.079	<0.079	<0.079	0.73 [J]	7.6	<0.069	<0.069	31	2.4	1.1 [J]	21
		05/30/12	8	0.60 [J]	2.9	0.44 [J]	<0.069	<0.088	<0.078	<0.078	0.48 [J]	<0.078	2.9	2.6	<0.069	<0.069	0.25 [J]	0.57 [J]	4.5	0.48 [J]
		05/12/14	12	0.66 [J]	0.45 [J]	<0.25	<0.18	<0.16	<0.35	<0.13	<0.24	<0.29	0.63 [J]	4	<0.29	<0.14	1.4 [J]	<0.29	0.12 [J]	2.3
		05/06/16	No sample collected due to product in purge water.																	
		03/16/21	No sample collected due to product.																	
33-MW5A	4 - 19	03/11/11	<0.079	<0.059	<0.049	<0.079	<0.069	<0.089	<0.079	<0.079	<0.079	<0.079	<0.069	<0.069	<0.069	0.13 [J]	1.2 [J]	<0.059	<0.11	<0.089
		05/09/16	<0.014	<0.017	<0.014	<0.013	<0.012	<0.013	<0.011	<0.011	<0.011	<0.017	0.072 [J]	<0.013	<0.015	NR	<0.046	<0.12 J	<0.030	NR
		03/16/21	No sample collected due to low water level.																	
33-MW11	3 - 8	03/11/11	0.18 [J]	<0.060	<0.050	<0.080	<0.070	<0.090	<0.080	<0.080	<0.080	<0.080	<0.070	<0.070	<0.070	<0.070	1.7 [J]	<0.060	<0.11	<0.090
		05/09/16	0.084 [J]	<0.017	<0.014	<0.013	<0.012	<0.013	<0.011	<0.011	<0.011	<0.017	<0.082 [J]	<0.030	<0.015	NR	<0.10 [J]	<0.15 [J]	<0.030	NR
		03/17/21	1.17	0.0301 [J]	0.0217 [J]	<0.0203	<0.0168	<0.0202	<0.0184	<0.0184	<0.0179	<0.0160	0.0297 [J]	0.217	<0.0158	0.130 [J]	0.445	0.066	0.097	0.352
33-MW11FP	17 - 27	03/01/11	36 [J]	<0.057	6.4 [J]	0.45 [J]	<0.067	<0.086	<0.076	**0.24 [J]**	0.30 [J]	<0.076	4.5	21 [J]	<0.067	<0.067	<0.076	17 [J]	7.5	25 [J]
		05/29/12	44 [J]	1.6 [J]	7.5 [J]	0.39 [J]	<0.068 [UJ]	<0.088 [UJ]	<0.078 [UJ]	<0.078 [UJ]	0.39 [J]	<0.078 [UJ]	5.2 [J]	18 [J]	<0.068 [UJ]	1.9 [J]	2.2 [J]	21 [J]	7.2 [J]	58 [J]
		05/06/16	48.2	2.4	6.7	0.44	0.14	0.13	0.14	**0.22**	0.52 [J]	0.043 [J]	5.7	20.7	0.10 [J]	NR	<0.24 [J]	16.2	8.2	NR
		03/17/21	30.50	1.28	4.11	0.338	0.0622	<0.0202	0.0220 [J]	0.0545	0.308	<0.0160	4.35	14.6	0.0200 [J]	1.03	7.27	7.72	8.70	31.5

TABLE 4
Operable Unit 1 Analytical Results—PAHs
2021 Five Year Review Report, Operable Units 1 and 4

Well ID	Screen Interval (ft bgs - ft bgs)	Date	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Benzo(a)pyrene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	1-Methylnaphthalene
Units			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MCL			NE	NE	NE	NE	NE	NE	NE	0.2	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
33-MW12FP	9 - 19	03/07/11	<0.079	<0.059	<0.050	<0.079	<0.069	<0.089	<0.079	<0.079	<0.079	<0.079	<0.069	<0.069	<0.069	<0.069	0.66 [J]	<0.059	<0.11	<0.089
		05/30/12	0.16 [J]	<0.059	<0.049	<0.078	<0.069	<0.088	<0.078	<0.078	<0.078	<0.078	<0.069	0.11 [J]	<0.069	0.24 [J]	0.44 [J]	0.34 [J]	2.2 [J]	<0.088
		05/09/16	0.13	<0.017	<0.014	<0.013	<0.012	<0.013	<0.011	<0.011	<0.011	<0.017	<0.058 [J]	0.072 [J]	<0.015	NR	0.19 [J]	<0.16 [J]	<0.030	NR
		03/17/21	<0.0190	<0.0171	<0.0190	<0.0203	<0.0168	<0.0202	<0.0184	<0.0184	<0.0179	<0.0160	<0.0270	<0.0169	<0.0158	<0.0674	<0.0917	<0.0180	<0.0169	<0.0687

NOTES:
< = Less than the method detection limit
DUP = Field duplicate sample collected at this location on this date
EPA = United States Environmental Protection Agency
ID = Identifcation
J = The analyte is an estimated value between the reporting limit and the method detection limit.
MCL = Maximum Contaminant Level (the maximum concentration of the contaminant allowable by the EPA in drinking water)
µg/L = Microgram per Liter
NE = Not Established
ND = Not Detected at or above adjusted reporting limit.
NR = Not Reported
PAH = Polycyclic Aromatic Hydrocarbons
UJ = Estimated detection limit. The result is estimated and may be a false negative due to related QC problems.
PAHs analyzed using EPA Method 8270
Bold Type = Analyte detected above the MCL
NR = Not Reported

TABLE 5
Operable Unit 1 Analytical Results—VOCs and TEPH Diesel
2021 Five Year Review Report, Operable Units 1 and 4

Well ID	Screen Interval (ft bgs - ft bgs)	Date	TEPH Diesel	Benzene	1,1-Dichloroethane	1,2-Dichloroethane	Ethylbenzene	Isopropylbenzene	p-Isopropyltoluene	Methylene chloride	n-Propylbenzene	Toluene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Acetone	m,p-Xylene	o-Xylene	Methyl Ethyl Ketone (2-Butanone)	Vinyl chloride
Units			mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MCL			1*	5	NE	5	700	NE	NE	NE	NE	1,000	NE	NE	NE	10,000 (as total)		NE	2
33-MP2	10.4 - 15.4	03/03/11	0.62	3.2	<0.11	<0.14	25	NR	NR	<0.15	NR	1.7	NR	NR	<0.99	19		<0.76	<0.11
		05/31/12	**1.2**	**6.0**	<0.11	<0.14	48	NR	NR	<0.15	NR	8.2	NR	NR	<0.99	38		<0.76	<0.11 [UJ]
		05/06/16	0.97	4.4	<0.050	<0.12	30.3	5.9	0.55 J	<0.15	3.2	2.1	9.1	3.1	<1.9	17		<0.42	<0.13
		03/17/21	<0.0222	4.77	<0.100	<0.0819	30.0	4.96	<0.120	<0.430	3.27	3.9	12.2	3.84	<11.3	14.4	8.35	<1.19	<0.234
33-MP4	11 - 26	03/02/11	<0.045	0.12 [J]	<0.11	<0.14	0.14 [J]	NR	NR	<0.15	NR	0.42 [UJ]	NR	NR	<0.99	<0.26		<0.76	<0.11
		05/05/16	<0.045	<0.10	<0.050	<0.12	<0.18	<0.070	<	<0.15	<	<0.42	<0.090	<0.10	<1.9	<0.42		<0.42	<0.13
		03/17/21	<0.0222	<0.0941	<0.100	<0.0819	<0.137	<0.105	<0.120	<0.430	<0.0993	<0.278	<0.322	<0.104	<11.3	<0.430	<0.174	<1.19	<0.234
		3/17/21 DUP	0.0453 [J]	<0.0941	<0.100	<0.0819	<0.137	<0.105	<0.120	<0.430	<0.0993	<0.278	<0.322	<0.104	<11.3	<0.430	<0.174	<1.19	<0.234
33-MW1	3 -13	03/01/11	0.53	**11**	<0.11	<0.14	37	NR	NR	<0.18	NR	1.4	NR	NR	<0.99	12		<0.76	<0.11
		05/29/12	0.46 [J]	**23**	<0.11	<0.14	44	NR	NR	<0.15	NR	1.7	NR	NR	<0.99	12		<0.45	<0.11
		05/09/16	0.46 J	**10.4**	<0.050	<0.12	21.5	4.5	<0.10	<0.15	2.1	0.92 J	1.3	0.73 J	<1.9	9.3		<0.42	<0.13
		03/16/21	No sample collected due to well blocked at 6.65 feet below top of casing.																
33-MW2	8.5 -13.5	03/10/11	**2.0**	**10**	<0.11	<0.14	12	NR	NR	<0.15	NR	0.72 [J]	NR	NR	4.4 [J]	33		<0.76	<0.11
		05/05/16	No sample collected due to product in purge water.																
		03/16/21	No sample collected due to product.																
33-MW3	7.5 - 12.5	03/10/11	0.067 [J]	0.085 [J]	<0.11	<0.14	0.35 [J]	NR	NR	<0.15	NR	<0.15	NR	NR	<0.99	0.54 [J]		<0.76	<0.11
		05/06/16	<0.25	0.13 J	<0.050	<0.12	0.23 J	0.17 J	<0.10	<0.15	<0.10	0.30 J	0.29 J	0.11 J	<1.9	<0.42		<0.42	<0.13
		03/17/21	0.0457 [J]	<0.0941	<0.100	<0.0819	<0.137	<0.105	<0.120	<0.430	<0.0993	<0.278	<0.322	<0.104	<11.3	<0.430	<0.174	<1.19	<0.234
		3/17/21 DUP	0.0922 [BJ]	<0.0941	<0.100	<0.0819	<0.137	<0.105	<0.120	<0.430	<0.0993	<0.278	<0.322	<0.104	<11.3	<0.430	<0.174	<1.19	<0.234
33-MW4	6 - 13	03/10/11	0.21 [J]	<0.080	<0.11	<0.14	16	NR	NR	<0.15	NR	0.61 [J]	NR	NR	<0.99	12		<0.76	<0.11
		05/09/16	0.74	1.8	<0.050	<0.12	51.1	7.4	0.26 J	<0.15	3.0	3.0	16.5	3.3	<1.9	42.1		<0.42	<0.13
		03/16/21	No sample collected due to well blocked at 10.80 feet below top of casing.																
33-MW5	4 - 9	03/03/11	0.32 [J]	0.92 [J]	<0.11	<0.14	15	NR	NR	<0.15	NR	0.76 [J]	NR	NR	<0.99	7.9		<0.76	<0.11
		05/30/12	0.089 [J]	0.11 [J]	<0.11	<0.14	0.29 [J]	NR	NR	<0.15	NR	<0.15	NR	NR	<0.99	0.30 [J]		<0.76	<0.11
		05/12/14	0.12 [J]	0.48 [J]	<0.11	<0.14	1.3	NR	NR	<0.15	NR	<0.15	NR	NR	1.6 [J]	1.2		<0.76	<0.11
		05/06/16	No sample collected due to product in purge water.																
		03/16/21	No sample collected due to product.																
33-MW5A	4 - 19	03/11/11	<0.044	<0.080	<0.11	<0.14	0.65 [J]	NR	NR	<0.15	NR	<0.15	NR	NR	<0.99	0.42 [J]		<0.76	<0.11
		05/09/16	<0.044	<0.10	<0.050	<0.12	<0.18	<0.070	<0.10	<0.15	<0.10	<0.15	<0.090	<0.10	<1.9	<0.42		<0.42	<0.13
		03/16/21	No sample collected due to low water level.																
33-MW11	3 - 8	03/11/11	<0.045	<0.080	<0.11	<0.14	<0.11	NR	NR	<0.15	NR	<0.15	NR	NR	<0.99	<0.26		<0.76	<0.11
		05/09/16	<0.045	<0.10	<0.050	<0.12	<0.18	<	<0.10	<0.15	<0.10	<0.15	<0.090	<0.10	<1.9	<0.26		<0.42	<0.13
		03/17/21	0.064 [J]	<0.0941	<0.100	<0.0819	<0.137	<0.105	<0.120	<0.430	<0.0993	<0.278	<0.322	<0.104	<11.3	<0.430	<0.174	<1.19	<0.234

TABLE 5
Operable Unit 1 Analytical Results—VOCs and TEPH Diesel
2021 Five Year Review Report, Operable Units 1 and 4

Well ID	Screen Interval (ft bgs - ft bgs)	Date	TEPH Diesel	Benzene	1,1-Dichloroethane	1,2-Dichloroethane	Ethylbenzene	Isopropylbenzene	p-Isopropyltoluene	Methylene chloride	n-Propylbenzene	Toluene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Acetone	m,p-Xylene	o-Xylene	Methyl Ethyl Ketone (2-Butanone)	Vinyl chloride
Units			mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MCL			1*	5	NE	5	700	NE	NE	NE	NE	1,000	NE	NE	NE	10,000 (as total)		NE	2
33-MW11FP	17 - 27	03/01/11	0.50 [J]	1.3	<0.11	<0.14	5.1	NR	NR	<0.15	NR	0.73 [J]	NR	NR	<0.99	4.5		<0.76	<0.11
		05/29/12	0.72 [J]	0.58 [J]	<0.11	<0.14	5.7	NR	NR	<0.15	NR	0.77 [J]	NR	NR	<0.99	5		<0.76	<0.11
		05/06/16	0.89	1.4 J	<0.050	<0.12	8.7 J	4.0 J	<0.10	<0.15	3.6 J	<0.15	15.7	5.5 J	<1.9	<0.42		<0.42	<0.13
		03/17/21	**1.050 [B]**	0.293 [J]	<0.100	<0.0819	3.90	1.90	0.611 [J]	<0.430	1.67	0.398 [J]	4.03	1.76	<11.3	2.14	1.53	<1.19	<0.234
33-MW12FP	9 - 19	03/07/11	<0.045	<0.080	<0.11	<0.14	<0.11	NR	NR	<0.15	NR	<0.15	NR	NR	<0.99	<0.26		<0.76	<0.11
		05/30/12	0.094 [J]	<0.080	<0.11	<0.14	0.15 [J]	NR	NR	<0.15	NR	<0.15	NR	NR	<0.99	<0.26		<0.76	<0.11
		05/09/16	<0.044	<0.10	<0.050	<0.12	<0.18	<0.070	<0.10	<0.15	<0.10	<0.15	<0.090	<0.10	<1.9	<0.42		<0.42	<0.13
		03/17/21	0.0548 [J]	<0.0941	<0.100	<0.0819	<0.137	<0.105	<0.120	<0.430	<0.0993	<0.278	<0.322	<0.104	<11.3	<0.430	<0.174	<1.19	<0.234
Goode Lake[1]	Surface Sample	03/08/11	NR	<0.24 [UJ]	<0.11	<0.14	1.1	NR	NR	<0.15	NR	<0.15	NR	NR	<0.99	0.71 [J]		<0.76	<0.11
		05/30/12	NR	0.12 [J]	<0.11	<0.14	0.29 [J]	NR	NR	<0.15	NR	<0.15	NR	NR	2.7 [J]	<0.26		<0.76	<0.11
		05/12/14	NR	<0.080	<0.11	<0.14	0.21 [J]	NR	NR	<0.18	NR	<0.15	NR	NR	2.1 [J]	<0.26		<0.76	<0.11
		05/06/16	NR	<0.10	<0.050	<0.12	<0.18	<0.070	<0.10	<0.18	<0.10	<0.15	<0.090	<0.10	<1.9	<0.42		<0.42	<0.13
		09/19/17	NR	<0.060	<0.050	<0.12	<0.18	<0.070	<0.10	<0.15	<0.10	<0.17	<0.090	<0.10	<1.9	<0.42		<0.59	<0.13
		04/24/18	NR	0.49 [J]	<0.050	<0.12	1.1	0.13 [J]	NR	<0.15	<0.10	<0.17	0.28 [J]	<0.10	<2.7 [UJ]	<0.42		<0.59	<0.13
		09/30/19	NR	<0.079	<0.097	<0.14	<0.12	<0.20	<0.19	<0.27	<0.19	<0.14	<0.20	<0.15	<3.3	<0.34		<0.70	<0.11
		02/01/21	NR	<0.0941	<0.100	<0.0819	<0.137	<0.105	<0.120	<0.430	<0.0993	<0.278	<0.322	<0.104	<11.3	<0.430	<0.174	<1.19	<0.234
		03/17/21	NR	<0.0941	<0.100	<0.0819	<0.137	<0.105	<0.120	<0.430	<0.0993	<0.278	<0.322	<0.104	<11.3	<0.430	<0.174	<1.19	<0.234

NOTES:
< = Less than the method detection limit
bgs = Below Ground Surface
B = The same analyte is found in the associated blank
DUP = Field duplicate sample collected at this location on this date
EPA = United States Environmental Protection Agency
ft = Feet
ID = Identification
ISL = UDEQ Initial Screening Level for total petroluem hydrocarbons—diesel
J = The analyte is an estimated value between the reporting limit and the method detection limit.
MCL = Maximum Contaminant Level (the maximum concentration of the contaminant allowable by the EPA in drinking water)
µg/L = Microgram per Liter
mg/L = Milligram per Liter
NA = Not Available
NE = Not Established
NR = Not Reported
TEPH = Total Extractable Petroleum Hydrocarbon
U = Method blank contamination; analyte was not detected at the specified detection limit.
UJ = Estimated detection limit. The result is estimated and may be a false negative due to related QC problems.
UDEQ = Utah Department of Environmental Quality
VOC = Volatile Organic Compound
Only compounds detected above the laboratory reporting limit are listed in the table.
VOCs analyzed using EPA Method 8260
TEPH Diesel analyzed using EPA Method 8015
Bold Type = Analyte detected at or above the MCL or ISL for total TPH
[1]Goode Lake sample was not analyzed for TEPH Diesel.
*This is the UDEQ Initial Screening Level.

TABLE 6
Operable Unit 4 North Analytical Results—CVOCs
2021 Five Year Review Report, Operable Units 1 and 4

Well ID	Screen Interval (ft bgs - ft bgs)	Date	1,1,1-Trichloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dichloroethane	1,4-Dioxane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Benzene	Chloroethane (Ethyl chloride)	Chloromethane (Methyl chloride)	Ethylbenzene	Trichloroethene	Tetrachloroethene	Vinyl chloride
Units			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MCL			200	5	NE	7	5	NE	70	100	5	NE	NE	700	5	5	2
18-MW1[(1)]	5 - 15	5/10/16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		3/18/21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
22a-MW3	3 - 13	03/02/11	<0.15	<0.28	1.7	<0.19	<0.14	NA	<0.060	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	0.21 [J]	1.7 [J]
		06/01/12	<0.15	<0.22	2.3	<0.19	<0.14	NA	<0.060	<0.090	<0.080	<0.080	<0.18	<0.11	<0.87 [UJ]	<0.13	0.59 [J]
		05/14/14	<0.15	<0.22	<0.30	<0.19	<0.14	<31	<0.060	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	<0.13	<0.11
		05/10/16	<0.11	<0.20	<0.50	<0.20	<0.12	<17.2	<0.080	<0.020	<0.060	<0.015	<0.080	<0.18	<0.17	<0.10	<0.13
		5/10/16 DUP	<0.11	<0.20	<0.50	<0.20	<0.12	<17.2	<0.080	<0.020	<0.060	<0.015	<0.080	<0.18	<0.17	<0.10	<0.13
		04/26/18	<0.11	<0.20	1.6	<0.20	<0.12	NA	0.21 [J]	<0.20	<0.060	<0.15	<0.080	<0.18	<0.17	<0.10	0.66 [J]
		07/02/20	<0.12	<0.10	0.84 [J]	<0.22	<0.14	<10.0	<0.17	<0.17	<0.079	<0.42	<0.16	<0.12	<0.17	0.25 [J]	0.19 [J]
22a-MW6	6 - 16	03/02/11	<0.15	<0.28	1.2	1.2	<0.14	NA	2.0	<0.090	0.12 [J]	<0.080	<0.18	0.12 [J]	<0.18	0.14 [J]	1.2 [J]
		06/01/12	160	<0.28	660	1.8	<0.14	NA	1.7	2.4	3	130	<0.18	0.27 [J]	<0.78 [UJ]	1.3	**1,300**
		05/14/14	23	<0.28	140	0.30 [J]	<0.14	<31	0.10 [J]	0.34 [J]	0.15 [J]	19	<0.18	<0.11	<0.18	0.33 [J]	**300**
		05/10/16	0.27 [J]	<0.20	2.2	<0.20	<0.12	<17.2	<0.080	<0.020	<0.060	<0.015	<0.080	<0.18	<0.17	<0.10	1.0
		04/26/18	37.6	0.39 [J]	208	<0.20	<0.12	NA	0.36 [J]	<0.20	0.65 [J]	34.8	<0.080	<0.18	<0.17	0.26 [J]	**215**
		07/01/20	59.2	<0.50	270	<1.1	<0.70	<50.0	<0.85	<0.85	0.71 [J]	40.2	<0.80	0.90 [J]	<0.85	<1.1	**264**
34-B1W1	Unkown	03/07/11	<0.15	<0.28	0.29 [J]	<0.19	<0.14	NA	2.0	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	<0.13	**3.3**
		03/07/11 DUP	<0.15	<0.28	0.26 [J]	<0.19	<0.14	NA	2.0	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	<0.13	**3.2**
		05/12/16	<0.11	<0.20	0.20 [J]	<0.20	<0.12	<17.2	0.17 [J]	<0.020	<0.060	<0.015	0.21 [J]	<0.18	<0.17	<0.10	**2.2**
		03/17/21	<0.149	<0.158	<0.100	<0.188	<0.0819	NA	0.387 [J]	<0.149	<0.0941	<0.192	<0.960	<0.137	<0.190	<0.300	0.802 [J]
34-B2W2	Unkown	03/02/11	<0.15	<0.28	3.3	<0.19	<0.14	NA	2.2	<0.090	0.11 [J]	<0.080	<0.18 [UJ]	<0.11	<0.18	<0.13	**4.2 [J]**
		06/01/12	<0.15	<0.28	2.7	<0.19	<0.14	NA	0.36 [J]	<0.090	<0.080	0.88 [J]	<0.18	<0.11	<0.23 [UJ]	<0.13	0.70 [J]
		05/11/16	<0.11	<0.20	0.74 [J]	<0.20	<0.12	<17.2	0.41 [J]	<0.020	<0.060	<0.015	<0.080	<0.18	<0.17	<0.10	**2.4**
		03/17/21	<0.149	<0.158	0.670 [J]	<0.188	<0.0819	NA	0.320 [J]	<0.149	<0.0941	<0.192	<0.430	<0.137	<0.190	<0.300	0.843 [J]
		3/17/21 DUP	<0.149	<0.158	0.621 [J]	<0.188	<0.0819	NA	0.322 [J]	<0.149	<0.0941	<0.192	<0.430	<0.137	<0.190	<0.300	0.692 [J]
34-MW1	5 - 15	03/02/11	<0.15	<0.28	<0.11	1.2	<0.14	NA	2.1	<0.090	0.096 [J]	<0.080	<0.18	<0.11	<0.18	0.43 [J]	1.2 [J]
		06/01/12	<0.15	<0.28	<0.11	<0.19	<0.14	NA	1.1	<0.090	<0.080	<0.080	<0.18	<0.11	<0.9 [UJ]	<0.13	**22**
		6/1/12 DUP	<0.15	<0.28	<0.11	<0.19	<0.14	NA	1.1	<0.090	<0.080	<0.080	<0.18	<0.11	<0.82 [UJ]	<0.13	**20**
		05/16/14	<0.15	<0.28	<0.11	<0.19	<0.14	<31	0.86 [J]	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	<0.13	1.6 [J]
		05/10/16	<0.11	<0.20	<0.50	<0.20	<0.12	<17.2	0.32 [J]	<0.020	<0.060	<0.015	<0.080	<0.18	<0.17	0.45 [J]	0.15 [J]
		04/26/18	<0.11	<0.20	<0.050	<0.20	<0.12	NA	0.47 [J]	<0.20	<0.060	<0.15	<0.080	<0.18	<0.17	0.41 [J]	0.47 [J]
		07/01/20	<0.12	<0.10	<0.097	<0.22	<0.14	<10.0	0.62 [J]	<0.17	<0.079	<0.42	<0.16	<0.12	<0.17	0.22 [J]	0.96 [J]
34-MW2	5 - 15	03/09/11	0.19 [J]	<0.28	0.60 [J]	<0.19	<0.14	NA	0.75[J]	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	<0.13	1.2 [J]
		06/01/12	<0.15	<0.28	3.7	<0.19	<0.14	NA	0.75[J]	<0.090	0.12 [J]	<0.080	<0.18	<0.11	<0.18	<0.13	**2.1**
		05/15/14	<0.15	<0.28	0.11	0.87 [J]	<0.14	<31	0.14[J]	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	<0.13	<0.11
		05/11/16	<0.11	<0.20	<0.50	<0.20	<0.12	<17.2	0.11 [J]	<0.020	<0.060	<0.015	<0.080	<0.18	<0.17	<0.10	<0.13
		04/26/18	<0.11	<0.20	0.44 [J]	<0.20	<0.12	NA	1.5	<0.20	<0.060	<0.15	<0.15 [J]	<0.18	<0.17	<0.10	0.80 [J]
		07/01/20	<0.12	<0.10	0.38 [J]	<0.22	<0.14	<10.0	1.6	<0.17	<0.079	<0.42	<0.16	<0.12	<0.17	<0.22	0.71 [J]

TABLE 6
Operable Unit 4 North Analytical Results—CVOCs
2021 Five Year Review Report, Operable Units 1 and 4

Well ID	Screen Interval (ft bgs - ft bgs)	Date	1,1,1-Trichloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dichloroethane	1,4-Dioxane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Benzene	Chloroethane (Ethyl chloride)	Chloromethane (Methyl chloride)	Ethylbenzene	Trichloroethene	Tetrachloroethene	Vinyl chloride
Units			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MCL			200	5	NE	7	5	NE	70	100	5	NE	NE	700	5	5	2
34-MW3	5 - 15	03/04/11	<0.15	<0.28	0.66 [J]	<0.19	<0.14	NA	2.1	<0.090	<0.080	<0.080	<0.18	<0.11	0.25 [J]	0.67 [J]	1.1 [J]
		06/01/12	<0.15	<0.28	2.9	<0.19	<0.14	NA	1.8	<0.090	<0.080	<0.080	<0.18	<0.11	<1.0 [U]	0.33 [J]	**30**
		05/16/14	<0.15	<0.28	<0.11	<0.19	<0.14	<31	0.86 [J]	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	0.15 [J]	**3**
		5/16/14 DUP	<0.15	<0.28	0.36 [J]	<0.19	<0.14	<31	0.89 [J]	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	0.13 [J]	**3**
		05/10/16	<0.11	<0.20	0.58 [J]	<0.20	<0.12	<17.2	0.34 [J]	<0.020	<0.060	<0.015	<0.080	<0.18	0.19 [J]	0.42 [J]	0.33 [J]
		04/25/18	<0.11	<0.20	0.40 [J]	<0.20	<0.12	NA	1.2	<0.20	<0.060	<0.15	<0.080	<0.18	0.32 [J]	0.26 [J]	1.9
		07/01/20	<0.12	<0.10	0.28 [J]	<0.22	<0.14	<10.0	1.1	<0.17	<0.079	<0.42	<0.16	<0.12	0.31 [J]	0.28 [J]	1.9
		7/1/20 DUP	<0.12	<0.10	0.30 [J]	<0.22	<0.14	<10.0	1.1	<0.17	<0.079	<0.42	<0.16	<0.12	0.28 [J]	<0.22	1.7
34-MW6	5 - 15	03/04/11	7.2	<0.28	400	<0.19	<0.14	NA	2.0	0.17 [J]	2.3	39	<0.18	0.43 [J]	<0.18	0.38 [J]	**34**
		06/01/12	6.6	<0.28	200	<0.19	<0.14	NA	<0.060	<0.090	1.9	45	<0.18	<0.11	<0.75 [UJ]	0.36 [J]	**43**
		05/14/14	0.44 [J]	<0.28	61	<0.19	<0.14	<31	<0.060	<0.090	0.70 [J]	1.5 [J]	<0.18	<0.11	<0.18	<0.13	1.4 [J]
		05/13/16	<0.15	<0.22	3.9	<0.20	<0.12	<17.2	<0.080	<0.020	0.18 [J]	14.7	<0.080	<0.18	<0.17	<0.10	**2.6**
		04/26/18	<0.11	<0.20	16.9	<0.20	0.13 [J]	NA	0.31 [J]	<0.20	0.59 [J]	19.7	<0.080	<0.18	<0.17	<0.10	**28.8**
		07/02/20	<0.12	<0.10	3.1	<0.22	<0.14	<10.0	<0.17	<0.17	<0.079	1.2	<0.16	<0.12	<0.17	<0.22	0.62 [J]
		7/2/20 DUP	<0.12	<0.10	3.0	<0.22	<0.14	<10.0	<0.17	<0.17	<0.079	1.2	<0.16	<0.12	<0.17	<0.22	0.54 [J]
34-MW7D	14 - 19	03/04/11	<0.15	<0.28	2.3	<0.19	<0.14	NA	2.0	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	<0.13	**2.6**
		06/01/12	<0.15	<0.28	2	<0.19	<0.14	NA	<0.060	<0.090	<0.080	<0.080	<0.18	<0.11	<0.19 [UJ]	<0.13	<0.11
		05/15/14	<0.15	<0.28	0.77[J]	<0.19	<0.14	<31	<0.060	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	<0.13	1.1 [J]
		05/12/16	<0.11	<0.20	0.83 [J]	<0.20	<0.12	<17.2	0.30 [J]	<0.020	<0.060	<0.015	<0.080	<0.18	<0.17	<0.10	**2.6**
		04/26/18	<0.11	<0.20	0.60 [J]	<0.20	<0.12	NA	0.26 [J]	<0.20	<0.060	<0.15	<0.080	<0.18	<0.17	<0.10	0.36 [J]
		07/01/20	<0.12	<0.10	0.61 [J]	<0.22	<0.14	<10.0	0.28 [J]	<0.17	<0.079	<0.42	<0.16	<0.12	<0.17	<0.22	0.69 [J]
34-MW8	4 - 14	03/04/11	<0.15	<0.28	5.1	<0.19	<0.14	NA	2.1	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	0.16 [J]	1.1 [J]
		10/31/11	<0.15	<0.28	<0.11	<0.19	<0.14	NA	0.47 [J]	<0.090	<0.080	<0.080	<0.18	<0.11	0.18 [J]	<0.13	<0.11
		06/01/12	<0.15	<0.25	1.6	<0.19	<0.14	NA	0.52 [J]	<0.090	<0.080	<0.080	<0.18	<0.11	<0.29 [UJ]	<0.13	<0.11
		10/08/12	<0.15	<0.28	13	<0.19	<0.14	NA	0.67 [J]	<0.090	0.96 [J]	3.1	<0.18	<0.11	<0.18	<0.13	**21**
		10/23/13	Could not locate monitoring well														
		10/09/14	0.44 [J]	<0.28	350	0.19 [J]	<0.14	<31	2.0	0.47 [J]	2.1 [B]	<0.080	<0.18	<0.11	0.57 [J]	0.14 [J]	**140**
		09/22/15	0.58 [J]	<0.20	220	<0.20	<0.12	<17.2	0.65 [J]	0.34 [J]	0.41 [J]	<0.15	<0.30 [J]	<0.18	0.49 [J]	0.29 [J]	**10.3**
		05/11/16	<0.11	<0.20	97.8	<0.20	<0.12	<17.2	0.28 [J]	<0.020	<0.060	<0.015	0.13 [J]	<0.18	0.31 [J]	<0.10	**2.6**
		09/27/16	<0.11	<0.20	20.2	<0.20	<0.12	<17.2	0.17 [J]	<0.020	<0.060	<0.015	<0.15	<0.18	<0.17	0.38 [J]	0.30 [J]
		9/27/16 DUP	<0.11	<0.20	19.3	<0.20	<0.12	<17.2	<0.080	<0.020	<0.060	<0.015	<0.15	<0.18	<0.17	0.37 [J]	0.35 [J]
		09/19/17	<0.11	<0.20	13.6	<0.20	<0.12	NA	0.33 [J]	<0.20	<0.060	<0.15	<0.080	<0.18	<0.17	<0.10	0.49 [J]
		09/27/18	<0.11	<0.20	1.8	<0.20	<0.20 [UJ]	NA	0.40 [J]	<0.20	<0.060	<0.15	<0.080	<0.18	0.19 [J]	<0.10	0.56 [J]
		09/30/19	<0.12	<0.10	18	<0.22	<0.14	NA	0.79 [J]	<0.17	0.32 [J]	0.82 [J]	<0.16	<0.12	<0.17	<0.22	**5.2**
		09/29/20	No sample collected. Weber River water level is higher or equal to the 34-MW8 monitoring well water level.														

TABLE 6
Operable Unit 4 North Analytical Results—CVOCs
2021 Five Year Review Report, Operable Units 1 and 4

Well ID	Screen Interval (ft bgs - ft bgs)	Date	1,1,1-Trichloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dichloroethane	1,4-Dioxane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Benzene	Chloroethane (Ethyl chloride)	Chloromethane (Methyl chloride)	Ethylbenzene	Trichloroethene	Tetrachloroethene	Vinyl chloride
Units			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MCL			200	5	NE	7	5	NE	70	100	5	NE	NE	700	5	5	2
34-MW9	2 - 12	03/07/11	<0.15	<0.28	<0.11	<0.19	<0.14	NA	<0.060	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	<0.13	<0.11
		06/01/12	<0.15	<0.28	<0.11	<0.19	<0.14	NA	<0.060	<0.090	<0.080	<0.080	<0.18	<0.11	<0.19 [UJ]	<0.13	<0.11
		05/15/14	0.16 [J]	<0.28	<0.11	<0.19	<0.14	<31	0.094 [J]	<0.090	<0.080	<0.080	<0.18	<0.11	<0.21	<0.13	<0.11
		05/11/16	<0.11	<0.20	<0.50	<0.20	<0.12	<17.2	<0.080	<0.020	<0.060	<0.015	<0.080	<0.18	<0.17	<0.10	<0.13
		04/26/18	No sample collected. Well is dry.														
		07/01/20	No sample collected. Well is dry.														
34-MW10	5 - 10	03/08/11	<0.15	<0.28	<0.11	<0.19	<0.14	NA	0.42 [J]	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	<0.13	0.16 [J]
		10/31/11	<0.15	<0.28	<0.11	<0.19	<0.14	NA	0.53 [J]	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	<0.13	<0.11
		10/31/11 DUP	<0.15	<0.28	<0.11	<0.19	<0.14	NA	0.57 [J]	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	<0.13	<0.11
		05/31/12	<0.15	<0.28	<0.11	<0.19	<0.14	NA	0.43 [J]	<0.090	<0.080	<0.080	<0.18	<0.11	<0.85 [UJ]	<0.13	<0.11
		10/08/12	<0.15	<0.28	0.31 [J]	<0.19	<0.14	NA	0.38 [J]	<0.090	0.099 [J]	<0.080	<0.18	<0.11	<0.18	<0.13	**3.7**
		10/8/12 DUP	<0.15	<0.28	0.43 [J]	<0.19	<0.14	NA	0.36 [J]	<0.090	0.094 [J]	<0.080	<0.18	<0.11	<0.18	<0.13	**4.3**
		10/23/13	<0.15	<0.28	340	0.30 [J]	<0.14	NA	3.2	0.66 [J]	2.1	<0.080	<0.18	0.20 [J]	0.28 [J]	<0.13 [J]	**140**
		10/23/13 DUP	<0.15	<0.28	350	0.27 [J]	<0.14	NA	3.1	0.64 [J]	2.0	<0.080	<0.18	<0.11	0.29 [J]	<0.13	**150**
		10/09/14	<0.15	<0.28	240	0.36 [J]	<0.14	<31	1.8	0.62 [J]	2.0 [B]	<0.080	<0.18	<0.11	0.53 [J]	<0.13	**55**
		09/22/15	<0.11	<0.20	185	<0.20	<0.12	<17.2	0.61 [J]	0.45 [J]	0.41 [J]	<0.15	<0.80	0.23 [J]	0.31 [J]	<0.10	**2.8**
		9/22/15 DUP	<0.11	<0.20	187	<0.20	<0.12	<17.2	0.64 [J]	0.45 [J]	0.39 [J]	<0.15	<0.20 [J]	<0.18	0.30 [J]	<0.10	**2.8**
		05/10/16	<0.11	<0.20	5.6	<0.20	<0.12	<17.2	0.37 [J]	0.26 [J]	<0.060	<0.015	<0.080	<0.18	<0.17	<0.10	0.33 [J]
		09/27/16	<0.11	<0.20	8.8	<0.20	<0.12	<17.2	0.54 [J]	0.23 [J]	<0.060	<0.015	<0.15	<0.18	<0.17	<0.10	0.38 [J]
		09/19/17	<0.11	<0.20	1.7	<0.20	<0.12	NA	0.43 [J]	<0.20	<0.060	<0.15	<0.080	<0.18	<0.17	<0.10	0.58 [J]
		09/27/18	No sample collected. Well is dry.														
		09/30/19	<0.12	<0.10	8.5	<0.22	<0.14	NA	0.70 [J]	<0.17	<0.079	<0.42	<0.16	<0.12	<0.17	<0.22	**4.0**
		09/29/20	No sample collected. Weber River water level is higher or equal to the 34-MW10 monitoring well water level.														
34-OB-12	Unkown	03/07/11	<0.15	<0.28	0.17 [J]	<0.19	<0.14	NA	<0.060	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	<0.13	1.4 [J]
		05/30/12	<0.15	<0.28	<0.11	<0.19	<0.14	NA	<0.060	<0.090	<0.080	<0.080	<0.18	0.19 [J]	<0.18	<0.13	<0.11
		05/12/16	<0.11	<0.20	0.17 [J]	<0.20	<0.12	<17.2	<0.080	<0.020	<0.060	<0.015	<0.080	<0.18	<0.17	<0.10	**2.2**
		03/17/21	<0.149	<0.158	<0.100	<0.188	<0.0819	NA	<0.126	<0.149	<0.0941	<0.192	<0.960	<0.137	<0.190	<0.300	<0.234
34-OB-17	Unkown	03/15/11	<1	<1	0.13 [J]	<1	<1	NA	<1	<1	<1	<2	<5	<1	<1	<1	<2
		05/12/16	<0.11	<0.20	<0.50	<0.20	<0.12	<17.2	<0.080	<0.020	<0.060	<0.015	<0.080	<0.18	<0.17	<0.10	<0.13
		03/18/21	<0.149	<0.158	<0.100	<0.188	<0.0819	NA	<0.126	<0.149	<0.0941	<0.192	<0.960	<0.137	<0.190	<0.300	<0.234
34-SPMW-02	Unkown	03/09/11	<0.15	<0.28	1.1	<0.19	<0.14	NA	<0.060	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	<0.13	0.89 [J]
		06/01/12	<0.15	<0.28	0.38 [J]	<0.19	<0.14	NA	<0.060	<0.090	<0.080	<0.080	<0.18	<0.11	<0.21 [UJ]	<0.13	<0.11
		05/11/16	<0.11	<0.20	0.25 [J]	<0.20	<0.12	<17.2	<0.080	<0.020	<0.060	<0.015	<0.080	<0.18	<0.17	<0.10	**2.5**
		03/18/21	<0.149	<0.158	<0.379 [J]	<0.188	<0.0819	NA	<0.126	<0.149	<0.0941	<0.126	<0.149	<0.137	<0.190	<0.300	0.615 [J]
35-MW1	10 - 20	05/11/16	<0.11	<0.20	<0.50	<0.20	<0.12	<17.2	<0.080	<0.020	<0.060	<0.015	<0.080	<0.18	<0.17	<0.10	<0.13
		03/17/21	<0.149	<0.158	0.103 [J]	<0.188	<0.0819	NA	<0.126	<0.149	<0.0941	<0.126	<0.149	<0.137	<0.190	0525 [J]	<0.234
35-MW2	5 - 15	05/11/16	<0.11	<0.20	<0.50	<0.20	<0.12	<17.2	<0.080	<0.020	<0.060	<0.015	<0.080	<0.18	<0.17	<0.10	<0.13
		03/17/21	<0.149	<0.158	<0.100	<0.188	<0.819	NA	<0.126	<0.149	<0.0941	<0.126	<0.149	<0.137	<0.190	<0.300	<0.234

TABLE 6
Operable Unit 4 North Analytical Results—CVOCs
2021 Five Year Review Report, Operable Units 1 and 4

Well ID	Screen Interval (ft bgs - ft bgs)	Date	1,1,1-Trichloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dichloroethane	1,4-Dioxane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Benzene	Chloroethane (Ethyl chloride)	Chloromethane (Methyl chloride)	Ethylbenzene	Trichloroethene	Tetrachloroethene	Vinyl chloride
Units			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MCL			200	5	NE	7	5	NE	70	100	5	NE	NE	700	5	5	2
38-MW3	5 - 15	03/03/11	<0.15	<0.28	<0.11	<0.19	<0.14	NA	<0.060	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	<0.13	<0.11
		05/10/16	<0.11	<0.20	<0.50	<0.20	<0.12	<17.2	<0.080	<0.020	<0.060	<0.015	<0.080	<0.18	<0.17	<0.10	<0.13
		03/18/21	<0.149	<0.158	<0.100	<0.188	<0.819	<0.188	<0.126	<0.149	<0.0941	<0.126	<0.149	<0.137	<0.190	<0.300	<0.234
38-MW5	3.5 - 13.5	03/03/11	<0.15	<0.28	<0.11	<0.19	<0.14	NA	<0.060	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	0.27[J]	<0.11
		05/10/16	<0.11	<0.20	<0.50	<0.20	<0.12	<17.2	<0.080	<0.020	<0.060	<0.015	<0.080	<0.18	<0.17	0.20 [J]	<0.13
		03/18/21	<0.149	<0.158	0.135 [J]	<0.188	<0.819	<0.188	<0.126	<0.149	<0.0941	<0.126	<0.149	<0.137	<0.190	<0.300	<0.234
38-MW9	3 - 13	03/09/11	<0.15	<0.28	3.7	<0.19	<0.14	NA	2.5	<0.090	<0.14 [UJ]	<0.080	<0.18	<0.11	0.50 [J]	<0.13	**4.3**
		06/01/12	<0.15	<0.28	5.6	<0.19	<0.14	NA	4.6	<0.090	0.15 [J]	<0.080	<0.18	<0.11	<1.7 [U]	<0.13	**4.5**
		05/13/16	<0.11	<0.20	3.7	<0.20	<0.12	<17.2	3.3	<0.020	<0.060	<0.015	<0.080	<0.18	<0.17	<0.10	**5.4**
		03/18/21	<0.149	<0.158	3.16	<0.188	<0.819	<0.188	3.49	<0.149	<0.0941	<0.126	<0.149	<0.137	<0.190	<0.300	1.81
38-MW12	4 - 14	03/08/11	**3,100**	<14	880	**50**	<7.0	NA	**3700**	**16 [J]**	<4.0	140	<9.0	<5.5	**200**	**37 [J]**	**560**
		03/08/11 DUP	**3200**	<14	890	**43 [J]**	<7.0	NA	3900	**18 [J]**	<4.0	130	<9.0	<5.5	**210**	**36 [J]**	**550**
		06/01/12	**3,800 [J]**	<5.6	1400	**79**	<2.8	NA	**4,100**	<23	4.1 [J]	160	<3.6	<2.2	**72**	**26**	**680**
		05/14/14	**2300**	1.1	500	**43**	0.38 [J]	<31	**1,700**	**39 [J]**	0.43 [J]	60	<0.18	0.62 [J]	**310**	**14**	**660**
		05/10/16	No samples collected due to product in purge water.														
		04/23/18	No samples collected due to product.														
		07/01/20	No samples collected due to product.														
SPRR3-MW2	3 - 13	03/17/11	<0.15	<0.28	0.73 [J]	<0.19	<0.14	NA	<0.060	<0.090	0.41 [J]	<0.080	<0.18	<0.11	<0.32 [UJ]	<0.13	0.92 [J]
		05/11/16	No samples collected due to product in purge water.														
		03/16/21	No sample collected. Monitoring well demolished.														
SPRR3-MW3[1]	3 - 13	05/10/16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		03/18/21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NOTES:
CVOC = Chlorinated Volatile Organic Compound
ID = Identification
J = This qualifier indicates that the analyte is an estimate value between the reporting limit and the method detection limit.
µg/L = Microgram per Liter
MCL = Maximum Contaminant Level
MNA = Monitored Natural Attenuation
NA = Not Analyzed.
ND = Not detected at or above adjusted reporting limit
NE = Not Established
NM = Not Measured
UJ = Estimated detection limit.The result is estimated and may be a false negative due to related QC problems.
QAPP = Quality Assurance Project Plan
< = Less than the method detection limit
Bold Type = Analyte detected at or above the MCL
[1]Per the QAPP (CH2M, 2016) well only sampled for MNA parameters.

TABLE 7
Operable Unit 4 South Analytical Results—CVOCs
2021 Five Year Review Report, Operable Units 1 and 4

Well ID	Screen Interval (ft bgs - ft bgs)	Date	1,1,1-Trichloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,4-Dioxane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Benzene	Chloroethane (Ethyl Chloride)	Chloromethane (Methyl Chloride)	Ethylbenzene	Trichloroethene	Vinyl Chloride
Units			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MCL			200	5	NE	7	NE	70	100	5	NE	NE	700	5	2
20-MW2	4 - 14	3/10/11	<0.15	<0.28	<0.11	<0.19	NA	<0.060	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	<0.11
		5/12/16	<0.11	<0.20	<0.50	<0.20	<17.2	<0.080	<0.20	<0.060	<0.15	<0.080	<0.18	<0.17	<0.13
		3/19/21	<0.149	<0.158	<.100	<0.188	NA	<0.126	<0.149	0.219 [J]	<0.192	<0.960	<0.137	<0.190	<0.234
20-MW4	3 - 13	3/17/11	<0.15	<0.28	<0.11	<0.19	NA	<0.060	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	<0.11
		5/16/16	<0.11	<0.20	<0.50	<0.20	<17.2	<0.080	<0.20	<0.060	<0.15	<0.080	<0.18	<0.17	0.17 [J]
		3/19/21	<0.149	<0.158	<.100	<0.188	NA	<0.126	<0.149	<0.0941	<0.192	<0.960	<0.137	<0.190	<0.234
21-MW2	4 -14	3/8/11	<0.15	<0.28	<0.11	<0.19	NA	5.1	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	**2.6**
		5/15/14	<0.15	<0.28	<0.11	<0.19	NA	2.2	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	1.7 [J]
		5/15/14 DUP	<0.15	<0.28	<0.11	<0.19	NA	2.3	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	1.6 [J]
		5/17/16	<0.11	<0.20	<0.50	<0.20	<17.2	1.4	<0.20	<0.060	<0.15	<0.080	<0.18	<0.17	0.67 [J]
		4/25/18	<0.11	<0.20	<0.050	<0.20	NA	0.96 [J]	<0.20	<0.060	<0.15	<0.080	<0.18	<0.17	0.39 [J]
		7/2/20	<0.12	<0.10	<0.050	<0.22	<10.0	1.2	<0.17	<0.079	<0.42	<0.16	<0.12	<0.17	0.58 [J]
22b-MW1A	5.5 - 15.5	3/3/11	<0.15	<0.28	<0.11	<0.19	NA	2.1	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	1.2 [J]
		3/3/11 DUP	<0.15	<0.28	<0.11	<0.19	NA	2.1	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	1.4 [J]
		3/16/11	<0.15	<0.28	<0.11	<0.19	NA	2.1	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	1.2 [J]
		5/17/16	<0.11	<0.20	<0.50	<0.20	<17.2	0.27 [J]	<0.20	<0.060	0.46 [J]	<0.080	<0.18	<0.17	0.51 [J]
		3/19/21	<0.149	<0.158	<.100	<0.188	NA	1.48	<0.149	<0.0941	<0.192	<0.960	<0.137	<0.190	<0.234
		3/19/21 DUP	<0.149	<0.158	<.100	<0.188	NA	1.24	<0.149	<0.0941	<0.192	<0.960	<0.137	<0.190	<0.234
22b-MW2D	10 - 15	5/15/14	<0.15	<0.28	<0.11	<0.19	<31	2	<0.090	0.15 [J]	<0.080	<0.18	<0.11	<0.18	**9**
		5/13/16	<0.15	<0.28	<0.11	<0.19	<17.2	1.6	<0.090	0.14 [J]	<0.080	<0.18	<0.11	<0.18	**4.1**
		5/13/16 DUP	<0.11	<0.20	<0.50	<0.20	<17.2	1.6	<0.20	0.16 [J]	<0.15	0.30 [J]	<0.18	<0.17	**5.8**
		4/25/18	<0.11	<0.20	<0.050	<0.20	NA	1.4	<0.20	0.14 [J]	<0.15	<0.080	<0.18	<0.17	**2.8**
		4/25/18 DUP	<0.11	<0.20	<0.050	<0.20	NA	1.2	<0.20	0.12 [J]	<0.15	<0.080	<0.18	<0.17	**2.6**
		7/2/20	<0.12	<0.10	<0.097	<0.22	<10.0	1.7	<0.17	0.11 [J]	<0.42	<0.16	<0.12	<0.17	**4.2**
26-MW1	1.5 - 11.5	3/1/11	<0.15	<0.28	<0.11	<0.19	NA	2.2	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	1.1 [J]
		5/31/12	<0.15	<0.28	<0.11	<0.19	NA	0.51 [J]	<0.090	<0.080	<0.080	<0.18	<0.11	<0.89 [UJ]	<0.11 [UJ]
		5/15/14	<0.15	<0.28	<0.11	<0.19	<31	0.34 [J]	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	0.37 [J]
		5/16/16	<0.11	<0.20	<0.50	<0.20	<17.2	0.38 [J]	<0.20	<0.060	<0.15	0.37 [J]	<0.18	<0.18	0.42 [J]
		4/25/18	<0.11	<0.20	<0.050	<0.20	NA	0.40 [J]	<0.20	<0.060	<0.15	<0.080	<0.18	<0.17	0.45 [J]
		7/2/20	<0.12	<0.10	<0.097	<0.22	<10.0	<0.17	<0.17	<0.079	<0.42	<0.16	<0.12	<0.17	0.13 [J]
26-MW2	2 - 12	3/11/11	<0.15	<0.28	<0.11	<0.19	NA	<0.060	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	<0.11
		5/16/16	<0.11	<0.20	<0.50	<0.20	<17.2	0.42 [J]	<0.20	<0.060	<0.15	<0.080	<0.18	<0.17	0.69 [J]
		3/19/21	<0.149	<0.158	<.100	<0.188	NA	0.811 [J]	<0.149	<0.0941	<0.192	<0.960	<0.137	<0.190	1.29

TABLE 7
Operable Unit 4 South Analytical Results—CVOCs
2021 Five Year Review Report, Operable Units 1 and 4

Well ID	Screen Interval (ft bgs - ft bgs)	Date	1,1,1-Trichloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,4-Dioxane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Benzene	Chloroethane (Ethyl Chloride)	Chloromethane (Methyl Chloride)	Ethylbenzene	Trichloroethene	Vinyl Chloride
Units			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MCL			200	5	NE	7	NE	70	100	5	NE	NE	700	5	2
26-STMW1	3.5 - 13.5	3/9/11	<0.15	<0.28	<0.11	<0.19	NA	0.25 [J]	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	<0.11
		5/31/12	<0.15	<0.28	<0.11	<0.19	NA	<0.060	<0.090	<0.080	<0.080	<0.18	0.39 [J]	<0.18	<0.11
		5/31/12 DUP	<0.15	<0.28	<0.11	<0.19	NA	0.20 [J]	<0.090	<0.080	<0.080	<0.18	<0.11	<0.90 [UJ]	<0.11
		5/15/14	<0.15	<0.28	<0.11	<0.19	<31	0.18 [J]	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	0.49 [J]
		5/16/16	<0.11	<0.20	<0.50	<0.20	<17.2	0.27 [J]	<0.20	<0.060	<0.15	0.11 [J]	<0.18	<0.17	0.34 [J]
		4/25/18	<0.11	<0.20	<0.050	<0.20	NA	0.22 [J]	<0.20	<0.060	<0.15	<0.080	<0.18	<0.17	0.34 [J]
		7/2/20	<0.12	<0.10	<0.097	<0.22	<10.0	0.30 [J]	<0.17	<0.079	<0.42	<0.16	<0.12	<0.17	0.71 [J]
30-MW1	3.5 - 13.5	3/17/11	<0.15	<0.28	<0.11	<0.19	NA	0.29 [J]	<0.090	0.87 [J]	<0.080	<0.18	<0.11	<0.18	**12**
		5/31/12	<0.15	<0.28	<0.11	<0.19	NA	0.34 [J]	<0.090	0.57 [J]	<0.080	<0.18	<0.11	<0.83 [UJ]	**16**
		5/15/14	<0.15	<0.28	<0.11	<0.19	<31	<0.060	<0.090	0.37 [J]	<0.080	<0.18	<0.11	<0.18	**11**
		5/13/16	<0.11	<0.20	<0.50	<0.20	<17.2	0.19 [J]	<0.20	0.37 [J]	<0.15	<0.080	<0.18	<0.17	**4.3**
		4/25/18	<0.11	<0.20	<0.050	<0.20	NA	1.2	<0.20	<0.060	<0.15	<0.080	<0.18	<0.17	**5.6**
		7/2/20	<0.12	<0.10	<0.097	<0.22	<10.0	0.24 [J]	<0.17	<0.079	<0.42	<0.16	<0.12	<0.17	1.1
30-MW4A	5 - 15	3/10/11	<0.15	<0.28	<0.11	<0.19	NA	<0.060	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	<0.11
		03/10/11 DUP	<0.15	<0.28	<0.11	<0.19	NA	<0.060	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	<0.11
		5/31/12	<0.15	<0.28	<0.11	<0.19	NA	<0.060	<0.090	0.31 [J]	<0.080	<0.18	<0.11	<0.46 [UJ]	<0.11
		5/17/16	<0.11	<0.20	<0.50	<0.20	<17.2	<0.080	<0.20	0.17 [J]	<0.15	<0.080	<0.18	<0.17	<0.11
		3/19/21	<0.149	<0.158	<.100	<0.188	NA	<0.126	<0.149	<0.0941	<0.192	<0.960	<0.137	<0.190	<0.234
30-MW6D	14 - 19	3/10/11	<0.15	<0.28	<0.11	<0.19	NA	7.6	<0.090	0.32 [J]	<0.080	<0.18	<0.11	<0.18	**72**
		5/31/12	<0.15	<0.28	<0.11	<0.19	NA	3.6	<0.090	0.40 [J]	<0.080	<0.18	<0.11	<086 [UJ]	**52**
		5/15/14	<0.15	<0.28	<0.11	<0.19	<31	1.8	<0.090	0.25 [J]	<0.080	<0.18	<0.11	<0.18	**53**
		5/13/16	<0.15	<0.28	<0.11	<0.19	<17.2	1.6	<0.090	0.36 [J]	<0.080	0.16 [J]	<0.11	<0.18	**35.8**
		5/13/16 DUP	<0.11	<0.20	<0.50	<0.20	<17.2	1.6	<0.20	0.37 [J]	<0.15	ND	<0.18	<0.17	**36.6**
		4/25/18	<0.11	<0.20	<0.050	<0.20	NA	1.7	<0.20	0.26 [J]	<0.15	<0.080	<0.18	<0.17	**40.6**
		4/25/18 DUP	<0.11	<0.20	<0.050	<0.20	NA	1.6	<0.20	0.24 [J]	<0.15	<0.080	<0.18	<0.17	**37.8**
		7/2/20	<0.12	<0.10	<0.097	<0.22	<10.0	0.94 [J]	<0.17	0.21 [J]	<0.42	<0.16	<0.12	<0.17	**13.3**
30-MW7	2 - 12	3/11/11	<0.15	<0.28	<0.11	<0.19	NA	0.64 [J]	<0.090	<0.080	<0.080	<0.18	<0.11	<0.18	<0.11
		5/16/16	<0.11	<0.20	<0.50	<0.20	<17.2	2.0	<0.20	<0.060	<0.15	0.11 [J]	<0.18	<0.17	0.99 [J]
		3/19/21	<0.149	<0.158	<.100	<0.188	NA	0.668 [J]	<0.149	<0.0941	<0.192	<0.960	<0.137	<0.190	0.373 [J]
30-B7 (P)(1)	3 - 13	5/13/16	No Sample collected due to product.												
		3/19/21	No Sample collected due to product.												

TABLE 7
Operable Unit 4 South Analytical Results—CVOCs
2021 Five Year Review Report, Operable Units 1 and 4

Well ID	Screen Interval (ft bgs - ft bgs)	Date	1,1,1-Trichloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,4-Dioxane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Benzene	Chloroethane (Ethyl Chloride)	Chloromethane (Methyl Chloride)	Ethylbenzene	Trichloroethene	Vinyl Chloride
Units			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MCL			200	5	NE	7	NE	70	100	5	NE	NE	700	5	2
30-B16 (P)[1]	3 - 13	5/17/16	No Sample collected. Well is damaged.												
		3/19/21	No Sample collected. Well is damaged.												

NOTES:
CVOC = Chlorinated Volatile Organic Compound
ID = Identification
J = This qualifier indicates that the analyte is an estimate value between the reporting limit and the method detection limit.
µg/L = Microgram per Liter
MCL = Maximum Contaminant Level
MNA = Monitored Natural Attenuation
NA = Not Analyzed
ND = Not detected at or above adjusted reporting limit
NE = Not Established
NM = Not Measured
UJ = Estimated detection limit.The result is estimated and may be a false negative due to related QC problems.
QAPP = Quality Assurance Project Plan
< = Less than the method detection limit
Bold Type = Analyte detected at or above the MCL
[1]Per the QAPP (CH2M, 2016) well only sampled for MNA parameters.

APPENDIX C
SITE INSPECTION CHECKLIST

APPENDIX C
SITE INSPECTION CHECKLIST

OGDEN RAILROAD YARD

FIVE YEAR REVIEW SITE INSPECTION CHECKLIST

I. SITE INFORMATION

Site name:	**Date of inspection:**
Location and Region:	**EPA ID:**
Agency, office, or company leading the five-year review:	**Weather/temperature:**

Remedy Includes: (Check all that apply)

☐ Landfill cover/containment
☑Access controls
☑ Institutional controls
☐ Groundwater pump and treatment
☐ Surface water collection and treatment
☑ Other Cofferdam_____
_____

☑Monitored natural attenuation
☐ Groundwater containment
☐ Vertical barrier walls

Attachments: ☑ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager**
   Name Terrence Mares Title Project Manager Date 4/13/21
   Interviewed ☑ at site ☐ at office ☐ by phone Phone no. 385-474-8535
   Problems, suggestions; ☐ Report attached _____
   _____

2. **O&M staff** _____ _____ _____
   Name Title Date
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____
   _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency Ogden City
Contact
Name Phil Suiter Title: Engineer Date 4/13/21 Phone no.801-629-8971
Problems; suggestions; ☐ Report attached _____
_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

4. **Other interviews** (optional) □ Report attached.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)				
1.	**O&M Documents**			
	☑ O&M manual	☐ Readily available	☑☐ Up to date	☐ N/A
	☑ As-built drawings	☐ Readily available	☑ Up to date	☐ N/A
	☑ Maintenance logs	☐ Readily available	☑☐ Up to date	☐ N/A
	Remarks_____			
2.	**Site-Specific Health and Safety Plan**	☐ Readily available	☐ Up to date	☑ N/A
	☐ Contingency plan/emergency response plan	☐ Readily available	☐ Up to date	☑ N/A
	Remarks_____			
3.	**O&M and OSHA Training Records**	☐ Readily available	☐ Up to date	☑ N/A
	Remarks_____			
4.	**Permits and Service Agreements**			
	☐ Air discharge permit	☐ Readily available	☐ Up to date	☑ N/A
	☐ Effluent discharge	☐ Readily available	☐ Up to date	☑ N/A
	☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☑☐ N/A
	☐ Other permits_____	☐ Readily available	☐ Up to date	☑☐ N/A
	Remarks_____			
5.	**Gas Generation Records**	☐ Readily available	☐ Up to date	☑ N/A
	Remarks_____			
6.	**Settlement Monument Records**	☐ Readily available	☐ Up to date	☑ N/A
	Remarks_____			
7.	**Groundwater Monitoring Records**	☐ Readily available	☑ Up to date	☐ N/A
	Remarks_____			
8.	**Leachate Extraction Records**	☐ Readily available	☐ Up to date	☑ N/A
	Remarks_____			
9.	**Discharge Compliance Records**			
	☐ Air	☐ Readily available	☐ Up to date	☑ N/A
	☐ Water (effluent)	☐ Readily available	☐ Up to date	☑ N/A
	Remarks_____			
10.	**Daily Access/Security Logs**	☐ Readily available	☑ Up to date	☐ N/A
	Remarks_____			

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☑ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other_____

2. **O&M Cost Records**

☐ Readily available ☑ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate_____ ☐ Breakdown attached

Total annual cost by year for review period if available

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☐ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☑ Location shown on site map ☑ Gates secured ☐ N/A

Remarks_____

B. Other Access Restrictions

1. **Signs and other security measures** ☑ Location shown on site map ☐ N/A

Remarks: No trespassing signs are in place around OU1 site perimeter

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☑ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☑ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) _____
Frequency _____
Responsible party/agency- Union Pacific Railroad & Ogden City
Contact
Name Terrence Mares Title Project Manager Date 4/13/21 Phone no. 385-474-8535

Reporting is up-to-date ☑ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☑ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☑ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☐ No ☑ N/A
Other problems or suggestions: ☐ Report attached

_____
_____
_____
_____

2. **Adequacy** ☑ ICs are adequate ☐ ICs are inadequate ☐ N/A

Remarks_____
_____
_____

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☐ No vandalism evident

Remarks: Graffiti observed on sludge pit cement embankment at OU4
_____

2. **Land use changes on site** ☑ N/A

Remarks_____
_____

3. **Land use changes off site** ☑ N/A

Remarks_____
_____

VI. GENERAL SITE CONDITIONS

A. Roads ☑ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☑ Roads adequate ☐ N/A

Remarks_____
_____

B. Other Site Conditions

Remarks _____

_____

_____

_____

_____

_____

VII. LANDFILL COVERS ☐ Applicable ☑ N/A

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident
Areal extent_____ Depth_____
Remarks_____

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
Lengths_____ Widths_____ Depths_____
Remarks_____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent_____ Depth_____
Remarks_____

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
Areal extent_____ Depth_____
Remarks_____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
☐ Trees/Shrubs (indicate size and locations on a diagram)
Remarks_____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
Remarks_____

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
Areal extent_____ Height_____
Remarks_____

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident
☐ Wet areas ☐ Location shown on site map Areal extent_____
☐ Ponding ☐ Location shown on site map Areal extent_____
☐ Seeps ☐ Location shown on site map Areal extent_____
☐ Soft subgrade ☐ Location shown on site map Areal extent_____
Remarks_____

9.	**Slope Instability** ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability Areal extent_____ Remarks_____ _____
B. Benches	☐ Applicable ☑ N/A (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)
1.	**Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay Remarks_____ _____
2.	**Bench Breached** ☐ Location shown on site map ☐ N/A or okay Remarks_____ _____
3.	**Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay Remarks_____ _____
C. Letdown Channels	☐ Applicable ☑ N/A (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)
1.	**Settlement** ☐ Location shown on site map ☐ No evidence of settlement Areal extent_____ Depth_____ Remarks_____ _____
2.	**Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation Material type_____ Areal extent_____ Remarks_____ _____
3.	**Erosion** ☐ Location shown on site map ☐ No evidence of erosion Areal extent_____ Depth_____ Remarks_____ _____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____
_____

5. **Obstructions** Type_____ ☐ No obstructions
☐ Location shown on site map Areal extent_____
Size_____
Remarks_____
_____

6. **Excessive Vegetative Growth** Type_____
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent_____
Remarks_____
_____

D. Cover Penetrations ☐ Applicable ☑ N/A

1. **Gas Vents** ☐ Active ☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance
☐ N/A
Remarks_____
_____

2. **Gas Monitoring Probes**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

3. **Monitoring Wells** (within surface area of landfill)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A
Remarks_____
_____

E. Gas Collection and Treatment ☐ Applicable ☑ N/A

1. **Gas Treatment Facilities**
☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
☐ Good condition ☐ Needs Maintenance
Remarks_____
_____

2. **Gas Collection Wells, Manifolds and Piping**
☐ Good condition ☐ Needs Maintenance
Remarks_____
_____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
☐ Good condition ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

F. Cover Drainage Layer ☐ Applicable ☑ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
Remarks_____
_____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
Remarks_____
_____

G. Detention/Sedimentation Ponds ☐ Applicable ☑ N/A

1. **Siltation** Areal extent_____ Depth_____ ☐ N/A
☐ Siltation not evident
Remarks_____
_____

2. **Erosion** Areal extent_____ Depth_____
☐ Erosion not evident
Remarks_____
_____

3. **Outlet Works** ☐ Functioning ☐ N/A
Remarks_____
_____

4. **Dam** ☐ Functioning ☐ N/A
Remarks_____
_____

H. Retaining Walls ☐ Applicable ☑ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
Horizontal displacement_____ Vertical displacement_____
Rotational displacement_____
Remarks_____
_____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
Remarks_____
_____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☑ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
Areal extent_____ Depth_____
Remarks_____
_____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
☐ Vegetation does not impede flow
Areal extent_____ Type_____
Remarks_____
_____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent_____ Depth_____
Remarks_____
_____

4. **Discharge Structure** ☐ Functioning ☐ N/A
Remarks_____
_____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☑ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
Areal extent_____ Depth_____
Remarks_____
_____

2. **Performance Monitoring** Type of monitoring_____
☐ Performance not monitored
Frequency_____ ☐ Evidence of breaching
Head differential_____
Remarks_____
_____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☑ Applicable ☐ N/A	
A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☑ N/A	
1.	**Pumps, Wellhead Plumbing, and Electrical** ☐ Good condition☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A Remarks_____
2.	**Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances** ☐ Good condition☐ Needs Maintenance Remarks_____
3.	**Spare Parts and Equipment** ☐ Readily available ☐ Good condition☐ Requires upgrade ☐ Needs to be provided Remarks_____
B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☑ N/A	
1.	**Collection Structures, Pumps, and Electrical** ☐ Good condition☐ Needs Maintenance Remarks_____
2.	**Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances** ☐ Good condition☐ Needs Maintenance Remarks_____
3.	**Spare Parts and Equipment** ☐ Readily available ☐ Good condition☐ Requires upgrade ☐ Needs to be provided Remarks_____

C. Treatment System	☐ Applicable ☑ N/A
1.	**Treatment Train** (Check components that apply) ☐ Metals removal ☐ Oil/water separation ☐ Bioremediation ☐ Air stripping ☐ Carbon adsorbers ☐ Filters_____ ☐ Additive (*e.g.*, chelation agent, flocculent) _____ ☐ Others_____ ☐ Good condition ☐ Needs Maintenance ☐ Sampling ports properly marked and functional ☐ Sampling/maintenance log displayed and up to date ☐ Equipment properly identified ☐ Quantity of groundwater treated annually_____ ☐ Quantity of surface water treated annually_____ Remarks_____ _____
2.	**Electrical Enclosures and Panels** (properly rated and functional) ☐ N/A ☐ Good condition☐ Needs Maintenance Remarks_____ _____
3.	**Tanks, Vaults, Storage Vessels** ☐ N/A ☐ Good condition☐ Proper secondary containment ☐ Needs Maintenance Remarks_____ _____
4.	**Discharge Structure and Appurtenances** ☐ N/A ☐ Good condition☐ Needs Maintenance Remarks_____ _____
5.	**Treatment Building(s)** ☐ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair ☐ Chemicals and equipment properly stored Remarks_____ _____
6.	**Monitoring Wells** (pump and treatment remedy) ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ All required wells located ☐ Needs Maintenance ☐ N/A Remarks_____ _____
D. Monitoring Data	
1.	Monitoring Data ☑ Is routinely submitted on time ☑ Is of acceptable quality
2.	Monitoring data suggests: ☐ Groundwater plume is effectively contained ☑ Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
☑ Properly secured/locked ☑ Functioning ☑ Routinely sampled ☑ Good condition
☑ All required wells located ☑ Needs Maintenance ☐ N/A
Remarks_____
_____

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

OU1 remedy includes a vegetative cap to contain DNAPL sediments on the eastern end of Goode Lake; construction of a cofferdam to prevent DNAPL migration into the pond; and groundwater cofferdam collection sump monitoring to evaluate if DNAPL plume is migrating to Goode Lake or the Ogden River. The vegetative cover is in good condition and effectively contains the DNAPL sediments. The armored cofferdam is in good condition and effectively acts as an impermeable barrier to prevent groundwater contaminant migration into Good Lake and the Ogden River. The perimeter fence is in excellent condition and prevents trespassing onto the vegetative cap. The gates are locked and secure and the no trespassing signage placed on the fence is legible and in good condition.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

O&M activities at OU1 include conducting an annual cofferdam inspection of the remedy. UPRR has developed an annual cofferdam inspection checklist. Annually the cofferdam is inspected by DERR, the EPA, UPRR's contractor, Jacobs, and Ogden City. Ogden City is responsible for completing maintenance and repair issues at OU1. As needed (annually each spring) Ogden City mechanically treats (cutting) the vegetative cap and armor cofferdam to remove evasive weeds. The perimeter fence, locked gates and signage are repaired as needed to prevent trespassing. O&M activities by Ogden City ensure current and long-term protectiveness of the remedy.

C.	Early Indicators of Potential Remedy Problems
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future. No issues or observations have been found with regards to the cost, scope of the O&M or frequency of repairs that would impact the protectiveness of the remedy currently or in the future.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. No observations for optimization of the remedy have been found for this review period.

APPENDIX D
INSPECTION PHOTOGRAPHS

PHOTOGRAPHIC LOG

Inspection Date: April 13, 2021	Ogden Railyard Third Five Year Review	

Photo No.1	Date: 4/13/21

Description:OU1 Goode Lake;North Collection DNAPL Sump

Photo No.2	Date: 4/13/21

Description:OU1 Vegetative Cap

PHOTOGRAPHIC LOG

Inspection Date: April 13,2021	Ogden Railyard Third Five Year Review	

Photo No.3	Date: 4/13/21

Description: OU1 Armored Cofferdam

Photo No.4	Date: 4/13/21

Description: OU1 Drainage Pipe into Goode Lake

PHOTOGRAPHIC LOG

Inspection Date: April 13, 2021	Ogden Railyard Third Five Year Review	

Photo No.5	Date: 4/13/21

Description: OU1 Goode Lake Buoy Cable System

Photo No.6	Date: 4/13/21

Description: OU1 Gates/Fence Perimeter Intact

PHOTOGRAPHIC LOG

Inspection Date: April 13, 2021	Ogden Railyard Third Five Year Review	

Photo No.7	Date: 4/13/21

Description: OU1 Vegetative Cap Cofferdam Protective Remedy

Photo No.8	Date: 4/13/21

Description: OU1 Warning Signs attached fence perimeter

PHOTOGRAPHIC LOG

Inspection Date: April 13, 2021	Ogden Railyard Third Five Year Review	

Photo No.9	Date: 4/13/21

Description: OU4 Old Wastewater Treatment Building on North side/no longer is use

Photo No.10	Date: 4/13/21

Description: OU4 Durbano Metals Salvage Yard

PHOTOGRAPHIC LOG

Inspection Date: April, 13, 2021	Ogden Railyard Third Five Year Review	

Photo No.11	Date: 4/13/21

Description: OU4 site looking North

Photo No.12	Date: 4/13/21

Description: OU4 site looking Southeast

APPENDIX E
REFERENCES

- EPA Ogden Railroad Yard OU1 Record of Decision, September 2004
- EPA Ogden Railroad Yard OU4 Record of Decision, September 2004
- EPA Ogden Railroad Yard OU4 Explanation of Significant Difference. February 2006
- UPRR/UDEQ Ogden Railroad Yard Environmental Covenant, July 2006
- CH2M HILL Final Remedial Action Construction Completion Report, July 2007
- Union Pacific Ogden Railroad Sampling Analysis Plan/Quality Assurance Project Plan/OU1 & OU4, September 2016
- EPA Ogden Railroad Yard Second Five Year Review Report, September 2016
- 2016 Annual Groundwater Monitoring Report/OU1 & OU4/Jacobsen, February 2017
- UPRR Request Approval Letter for Monitoring Wells/Piezometers Abandonment, August 2017
- UPPR EPA/UDEQ Approval Letter for Monitoring Wells/Piezometers Abandonment, September 2017
- 2017 Annual Cofferdam and Soil Cover Inspection Report/Jacobsen, November 2017
- 2017 Annual Groundwater Monitoring Report/OU1 & OU4/Jacobsen, March 2018
- 2018 Annual Groundwater Monitoring Report/OU1 & OU4/Jacobsen, May 2019
- 2019 Annual Groundwater Monitoring Report/OU1 & OU4/Jacobsen, March 2020
- 2020 Annual Cofferdam and Soil Cover Inspection Report/Jacobsen, November 2020
- 2020 Annual Groundwater Monitoring Report/OU1 & OU4/Jacobsen, March 2021

APPENDIX F
COMMUNITY INTERVIEWS

Alternative Superfund Site
Ogden Railroad Five-Year Review
Interview of Local Agencies

Site Name: EPA ID: UTD000716407	Date: 13 April 2021
Type of Contact: Site Visit	Contact Made By: Dave Allison, UDEQ/DERR Community Involvement Coordinator and Michael Storck, UDEQ/DERR Project Manager
Person Contacted	
Philip Suiter, Civil Engineer Jacob Chadwick, Parks Department	Ogden City Engineering/Parks Department 2549 Washington Blvd Ogden, UT 84401 engineering-info@ogdencity.com

1. Is your organization/department aware of the Ogden Railroad Alternative Superfund Site and the actions taken/underway to address environmental contamination? Ogden City Staff said they were aware of their involvement with the cleanup site which includes park maintenance of the 21st Pond (known as Goode Ski Lake) cofferdam. The cofferdam is located on the southeast portion of the pond and was constructed to prevent contaminants from the Union Pacific Railroad Yard entering through groundwater.

2. What's your overall impression (your general sentiment) of the actions taken/underway at the Ogden Railroad Alternative Superfund Site? Ogden City Staff said there have not been any environmental issues over the last five years with the 21st Pond/Goode Ski Lake cofferdam. Past cleanup remedies are protective and have worked to keep contamination out of the pond and away from the public who fish and water ski on the lake.

The cofferdam is functioning with ample vegetation cover, fencing is in good shape, as well as visible signage. No burrowing animal holes have been found and phragmites efforts are being made. The outfall area from the Ogden River looks good without any obstructions as well. Ogden City Staff said everything is working well.

3. Does your office conduct routine communications and/or activities (site visits, inspections, reporting activities, participation in meetings, etc.) which pertain to or involve the Ogden Railroad Alternative Superfund Superfund Site? If so, please briefly summarize the purpose and results of these communications and/or activities over the last five years. The Ogden Parks Staff frequents the 21st Pond/Goode Ski Lake area with regular trail maintenance duties and haven't noticed any issues with the water conditions over the last five years.

4. Are you aware of any community concerns regarding the Ogden Railroad Alternative Superfund Site, as it pertains to actions taken or underway to address environmental contamination? If so, please give details. Ogden City Staff said they have not received any complaints regarding the past history of the site or the cofferdam area.

5. Over the past five years, have there been any complaints, violations, or other incidents (e.g., vandalism, trespassing, or emergency responses) at or related to the Ogden Railroad Alternative Superfund Site requiring your office to respond? If so, please give details of the events and results of the response. Ogden City Staff said there were not any incidents they've had to respond to with the cofferdam area. Some minor vandalism with cuts to the fencing of the park, signs, and graffiti. Nothing impacting the integrity of the remedy and easy repairs to make.

6. Do you feel well informed about the activities and progress over the last five years at the Ogden Railroad Alternative Superfund Site? Do you know how to contact the Environmental Protection Agency and/or UDEQ – DERR if you have questions or concerns about the Ogden Railroad Alternative Superfund Site? Ogden City said they are involved and informed as necessary with the Utah Department of Environmental Quality (UDEQ) and through the Five-Year Review process. The City would contact UDEQ with any developing concerns and possibly the Weber-Morgan Health Department if an environmental issue were to occur.

7. Over the past five years, have there been any changes in your department's policies or regulations that might impact the Ogden Railroad Alternative Superfund Site from a perspective of land use, water rights, redevelopment, and site management? Any changes to your role? If so, please describe the changes and potential impact each might have. Ogden City Staff said their current land use responsibilities have remained unchanged over the last five years. The 21st Street Pond/Goode Ski Lake serves as part of a popular trail system, people fish, as well as the water skiing course, and Ogden City does not see it's use going away any time soon.

8. Over the past five years, have there been any changes in land use surrounding the Ogden Railroad Alternative Superfund Site to your knowledge? Are you aware of potential future changes in land use? If so, please describe including any concerns you and/or your agency might have with land use changes. Ogden City Staff said they are not aware of any future development plans at or near the 21st Pond/Goode Ski Lake area.

9. Do you have any comments, suggestions, or recommendations regarding the Ogden Railroad Alternative Superfund Site management (for example, questions pertaining to institutional controls)? If you have questions or are aware of potential problems in the future, what problems might arise? What are your agencies' concerns if such do arise? Ogden City Staff said institutional controls such as maintaining the cofferdam and overall park care are working without any issues. The 21st Pond/Goode Ski Lake area is a popular recreation area in Ogden and any cleanup activities in the past have not impacted the site's use or expected into the future.

Alternative Superfund Site
Ogden Railroad Five-Year Review
Interview of Local Agencies

Site Name: EPA ID: UTD000716407	Date: 13 April 2021
Type of Contact: Site Visit	Contact Made By: Dave Allison, UDEQ/DERR Community Involvement Coordinator and Michael Storck, UDEQ/DERR Project Manager
Person Contacted	
Terence Mares, Staff Engineer	Jacobs Engineering Group Union Pacific Railroad Yard Contractor 4246 South Riverboat Road Suite 210 Taylorsville, Utah 84123 www.jacobs.com

1. Is your organization/department aware of the Ogden Railroad Alternative Superfund Site and the actions taken/underway to address environmental contamination? Terence Mares is a staff engineer for Jacobs contracted to by Union Pacific Railroad (UPPR) Environmental Division to conduct annual sampling and reporting for the Ogden Railroad Yard site. Mares has worked on the site for 20 years, including source removal activities at Operable Units 1 and 4 prior to the current site remedy of monitored natural attenuation (MNA).

2. What's your overall impression (your general sentiment) of the actions taken/underway at the Ogden Railroad Alternative Superfund Site? Mares said the north and south vinyl chloride groundwater plumes in OU4 on the UPPR property are historically trending in decreasing size and not migrating off property. Annual sampling results are being completed at this time and will be included in the review report. Mares said institutional controls at OU1, the 21st Street Pond/Goode Ski Lake and sitewide environmental covenants and soil management plans are in place to ensure the site remains protective of human health and the environment.

3. Does your office conduct routine communications and/or activities (site visits, inspections, reporting activities, participation in meetings, etc.) which pertain to or involve the Ogden Railroad Alternative Superfund Superfund Site? If so, please briefly summarize the purpose and results of these communications and/or activities over the last five years. Mares conducts annual sampling of 20 monitoring wells surrounding the plume areas and a surface water sample near the cofferdam in OU1. Mares compiles the sampling report in accordance with the Quality Assurance Project Plan (QAPP) on behalf of the UPRR to the U.S. Environmental Protection Agency (EPA), Region 8, and the Utah Department of Environmental Quality Division of Environmental Response and Remediation (UDEQ-DERR). Mares is a primary contact for the EPA and UDEQ Project Managers and has regular conversations regarding site activities during the year.

4. Are you aware of any community concerns regarding the Ogden Railroad Alternative Superfund Site, as it pertains to actions taken or underway to address environmental contamination? If so, please give details. Mares said he is not aware of any community or stakeholder concerns with the MNA remedy contained on UPRR property and without public access.

5. Over the past five years, have there been any complaints, violations, or other incidents (e.g., vandalism, trespassing, or emergency responses) at or related to the Ogden Railroad Alternative Superfund Site requiring your office to respond? If so, please give details of the events and results of the response. Mares said there have not been any incidents regarding the site or difficulties conducting monitoring or operation and maintenance activities for the site**.**

6. Do you feel well informed about the activities and progress over the last five years at the Ogden Railroad Alternative Superfund Site? Do you know how to contact the Environmental Protection Agency and/or UDEQ – DERR if you have questions or concerns about the Ogden Railroad Alternative Superfund Site? Mares said UPRR and the regulators have worked well together on this site with basically the same UDEQ and EPA project managers for years. Everyone is responsive to address any questions which makes communication easier and without any delays. Mares said he has no problem calling UDEQ or EPA at any time.

7. Over the past five years, have there been any changes in your department's policies or regulations that might impact the Ogden Railroad Alternative Superfund Site from a perspective of land use, water rights, redevelopment, and site management? Any changes to your role? If so, please describe the changes and potential impact each might have. Mares said the UPRR will operate in the same manner for the foreseeable future and the Ogden railroad yard is an important transportation corridor for the area. Mares said the MNA remedy is working and the plumes are stable and UPRR does not have plans to alter current remedial efforts for the site.

8. Over the past five years, have there been any changes in land use surrounding the Ogden Railroad Alternative Superfund Site to your knowledge? Are you aware of potential future changes in land use? If so, please describe including any concerns you and/or your agency might have with land use changes. Mares said there are no UPRR plans to change track lines or alter land use in the future. Any utility work which would require digging would be subject to the Soils Management Plan (SMP).

9. Do you have any comments, suggestions, or recommendations regarding the Ogden Railroad Alternative Superfund Site management (for example, questions pertaining to institutional controls)? If you have questions or are aware of potential problems in the future, what problems might arise? What are your agencies' concerns if such do arise? Mares said there are a couple of monitoring wells which may need repair or replacement. Other minor well maintenance, everything is working well for the overall management of the site.