Spring 3-2024

Attachment A Demonstration of Need for Butte Priority Soils Operable Unit (BPSOU) Temporary Construction Surface Water Performance Standards Variance Request for Grove Gulch Sedimentation Bay Remedial Action Site

Josh Bryson

Atlantic Richfield Company

Josh Bryson
Liability Manager

317 Anaconda Road
Butte MT 59701
Direct (406) 782-9964
Fax (406) 782-9980

Attachment A

Demonstration of Need

for

Butte Priority Soils Operable Unit (BPSOU)
Temporary Construction Surface Water Performance Standards Variance Request
for Grove Gulch Sedimentation Bay Remedial Action Site

Purpose

The purpose of this attachment is to provide a Demonstration of Need for the requested Grove Gulch Sedimentation Bay Remedial Action Site Temporary Construction Surface Water Performance Standards Variance Request. This Demonstration of Need provides a rationale for why a variance is needed from the BPSOU Record of Decision Amendment (RODA) surface water standards based on an evaluation of groundwater chemistry at the Grove Gulch Sedimentation Bay Remedial Action site.

Site-Specific Evaluation

The potential for the discharge of water during dewatering activities at the end of pipe to cause exceedance of the existing BPSOU Record of Decision (RODA) In-stream Surface Water Standard for chronic conditions is evaluated below for the Grove Gulch Sedimentation Basin site.

The method for evaluating the expected probability of exceedances of the requested temporary variance performance standards is to use predicted end of pipe concentrations derived from the expected dewatering effluent. The predicted end of pipe concentration of dissolved metals will be compared to the BPSOU RODA In-stream Surface Water Standard for chronic conditions, to determine if the end of pipe concentrations are predicted to exceed the RODA chronic surface water standard.

Groundwater Chemistry

Groundwater chemistry samples collected monthly from August 2020 through June 2021 from 10 project site piezometers were used as the basis for general groundwater chemistry expected during dewatering activity at the Grove Gulch Sedimentation Basin. This data was collected per the *Grove Gulch Groundwater Characterization Quality Assurance Project Plan* (AR 2021). The piezometers used are shown in Attachment 1.

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Results of the sampling can be found in the *Grove Gulch Groundwater Characterization Data Summary Report* (DSR)(Attachment E of the *Grove Gulch PDIER* (AR 2024)) and are also summarized in Attachment 2.

Implementation of BMPs

Implementation of construction dewatering BMPs specifically mentioned in the Montana DEQ General Permit for Construction Dewatering (silt fencing and straw bales installed at outfall; commercial filtration materials installed at outfall like dirt bags, silt sacks, etc.; coagulation or flocculation) are not anticipated to significantly change concentrations of COCs in dewatering water because COCs in dewatering water will primarily be present in the dissolved fractions and the above mentioned BMPs primarily address suspended particles and therefore the total recoverable fractions of COC concentrations (Clary, 2017). Therefore, anticipated conventional BMP measures are assumed to have no benefit to the dewatering discharge from the Grove Gulch site.

Results

A statistical analysis was conducted on groundwater sample results and compared to the BPSOU RODA In-stream Surface Water Standard for chronic conditions to identify any potential contaminants of concern (COCs) that would exceed at the end of pipe the during dewatering activities. The statistical analysis results are presented in Table 1.

Table 1: Grove Gulch Groundwater Chemistry Statistical Analysis

Analyte (ug/L) Dissolved	Average	Median	3rd Quartile	Maximum	BPSOU RODA In-Stream Surface Water Performance Standard (Chronic)
Arsenic	**47**	3.65	**11**	**1340**	10**
Cadmium	0.31	0.030	0.039	**7.8**	1.39*
Copper	11.8	0.94	2.83	**327**	17.08*
Lead	0.24	0.043	0.079	4.6	7.84*
Iron	**8,245**	**6,240**	**11,700**	**41700**	1000
Mercury	0.0035	0.0045	0.0045	0.044	0.05
Zinc	176	9.7	39.8	**2760**	218*

*Standard based on 203 mg/L hardness, which is an average hardness for groundwater data collected from 2020 to 2021 at the Grove Gulch site (AR 2023a)
**Human health standard

Atlantic Richfield Company

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Butte MT 59701

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The statistical analysis identifies arsenic and iron exceeding the BPSOU RODA In-stream Surface Water Standard for chronic conditions for the average groundwater concentrations and cadmium, copper, iron, and zinc exceeding for the maximum observed groundwater concentrations. These exceedances demonstrate a need for a temporary variance from BPSOU RODA In-stream Surface Water Standard for chronic conditions.

References

Clary, J., J. Jones, M. Leisenring, P. Hobson, and E. Strecker. 2017. International Stormwater Best Management Practices (BMP) Database Summary Statistics. Prepared by Wright Water Engineers and Geosyntec Consultants for Water Environment & Reuse Foundation with support from the Urban Drainage and Flood Control District and the City and County of Denver. Accessible at www.bmpdatabase.org.

EPA 2002. Butte Priority Soils Operable Unit Consent Decree. September 2020

Atlantic Richfield, 2021. Silver Bow Creek/Butte Area NPL Site. Butte Priority Soils Operable Unit Final Grove Gulch Groundwater Characterization Quality Assurance Project Plan (QAPP). January 2021.

Atlantic Richfield, 2024. Silver Bow Creek/Butte Area NPL Site. Butte Priority Soils Operable Unit Final Grove Gulch Groundwater Characterization Data Summary Report. March 2024.

Atlantic Richfield Company

317 Anaconda Road
Butte MT 59701

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Liability Manager

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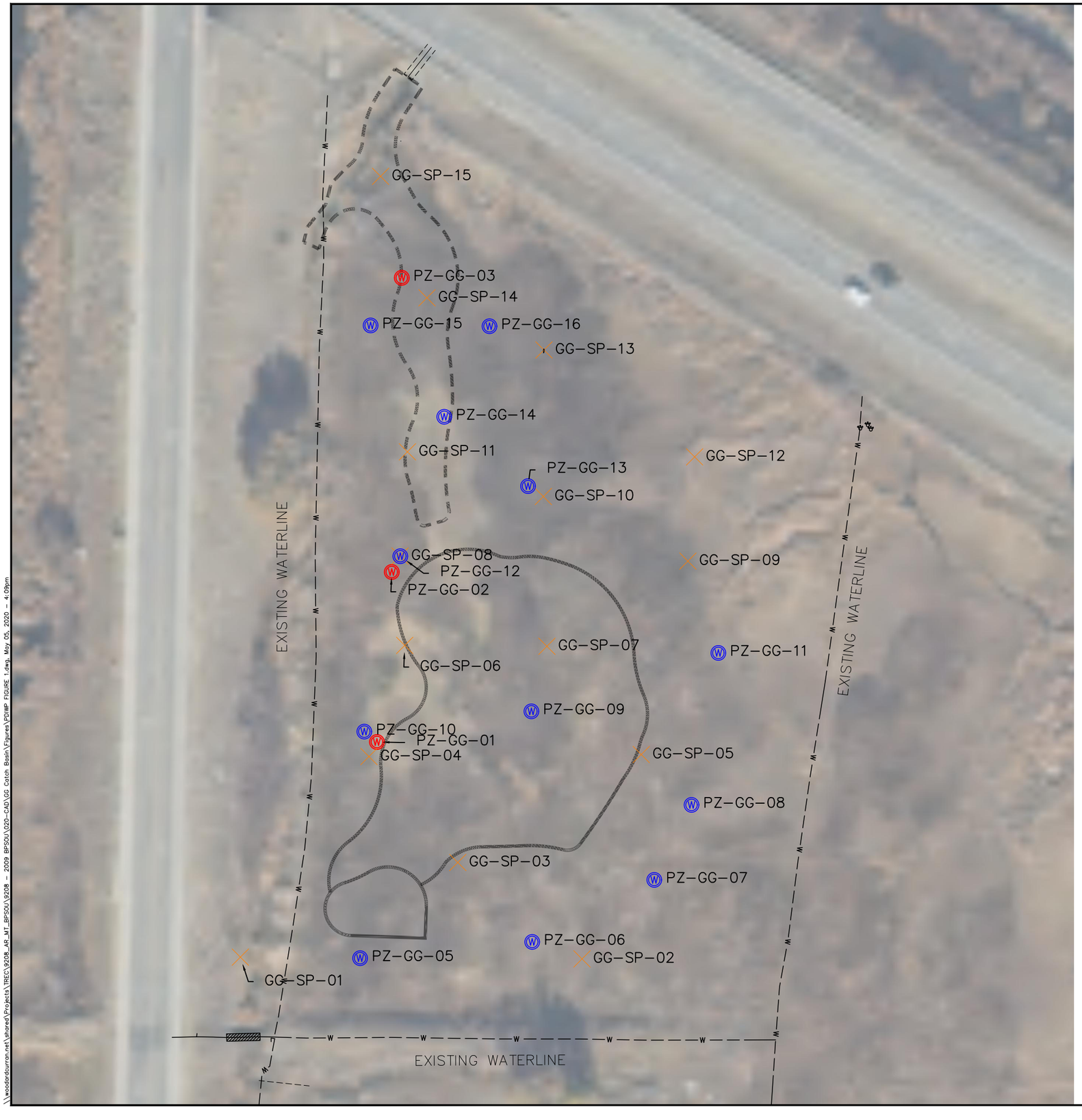
Attachments



AERIAL PHOTOGRAPHY SOURCE:
STATE OF MONTANA OCTOBER, 2018

\\woodardcurran.net\shared\Projects\TREC\0208_AR_MT_BPSOU\0208 – 2009 BPSOU\020-CAD\GG Catch Basin\Figures\PDIWP FIGURE 1.dwg, May 05, 2020 – 4:09pm

BAR SCALE
1" = 30'
30' 0 30' 60'

LEGEND

- 2018 PIEZOMETER
- 2020 PIEZOMETER
- 2019 SOIL SAMPLE LOCATION
- APPROXIMATE CATCH BASIN FOOTPRINT
- APPROXIMATE VEGETATED CATCH BASIN OUTLET CHANNEL FOOTPRINT
- EXISTING WATERLINE

Woodard & Curran
1800 W. Koch, Suite 6
Bozeman, Montana 59715
406.586.8384 | www.woodardcurran.com

COMMITMENT & INTEGRITY DRIVE RESULTS

REV	DESCRIPTION	DATE
0		

DESIGNED BY: SJRG
DRAWN BY: SJRG
CHECKED BY:
PDIWP FIGURE 1.dwg

PIEZOMETER AND SAMPLE LOCATIONS

ATLANTIC RICHFIELD
BUTTE, MT

BUTTE PRIORITY SOILS OU GROVE GULCH PDI WORK PLAN

JOB NO.:0233054.0
DATE: 3/1/2024
SCALE: 30
SHEET: 1 OF 1

FIGURE
1

Attachment 2: GG Groundwater Chemistry

Month	Well	Arsenic Concentration (mg/L)	Iron Concentration (ug/L)	Copper (ug/L)	Aluminum (ug/L)	Zinc (ug/L)
Aug-20	PZ-GG-05	10	8600	0.43	7.1	3.3
	PZ-GG-06	4.2	14300	0.44	7.1	2.9
	PZ-GG-07	2.1	12	2	7.1	53
	PZ-GG-08	2.4	91	2.1	13	37
	PZ-GG-09	2.6	6000	0.43	7.1	2.3
	PZ-GG-11	2.2	720	0.43	7.1	4.6
	PZ-GG-13	10	6900	1.1	7.1	17
	PZ-GG-14	3.6	110	3.4	10	15
	PZ-GG-15	7.9	14500	0.61	18	3
	PZ-GG-16	27	26900	1.1	7.5	7.9
Sep-20	PZ-GG-05	15.9	5220	0.93	7.1	20
	PZ-GG-06	3.8	12900	0.43	7.1	4.5
	PZ-GG-07	2	12	2.7	7.1	55.5
	PZ-GG-08	2.1	58.6	0.97	22	29.7
	PZ-GG-09	3	5630	0.43	7.1	4.1
	PZ-GG-11	2	629	0.43	7.1	7.1
	PZ-GG-12	1340	37700	6.3	19.1	775
	PZ-GG-13	14.8	5900	0.43	7.1	14.4
	PZ-GG-14	7.2	11300	0.43	12.9	8.8
	PZ-GG-15	5.9	12900	0.74	15.6	3.7
	PZ-GG-16	39.1	23800	0.49	27.9	13.9

Attachment 2: GG Groundwater Chemistry

Month	Well	Arsenic Concentration (mg/L)	Iron Concentration (ug/L)	Copper (ug/L)	Aluminum (ug/L)	Zinc (ug/L)
Oct-20	PZ-GG-05	1.3	60.2	4.1	7.1	19.3
	PZ-GG-06	4	14900	1.3	7.1	10.1
	PZ-GG-07	1.6	12	2.4	7.1	48.3
	PZ-GG-08	1.8	48.6	2.6	7.1	24.5
	PZ-GG-09	3.2	5900	0.52	7.1	3.6
	PZ-GG-11	1.7	696	0.43	7.1	4.8
	PZ-GG-12	58.3	2080	169	8.2	714
	PZ-GG-13	9.6	7350	0.43	7.1	3.1
	PZ-GG-14	3.3	8810	0.43	7.1	2.3
	PZ-GG-15	2.9	9660	0.95	8.6	2.3
	PZ-GG-16	23.3	23300	1.3	15.9	9
Nov-20	PZ-GG-05					
	PZ-GG-06	3	14300	0.52	7.1	9.3
	PZ-GG-07	1.7	12	3.2	7.1	54.3
	PZ-GG-08					
	PZ-GG-09					
	PZ-GG-11	1.2	739	0.43	7.1	5.1
	PZ-GG-12	20.6	771	163	7.1	1620
	PZ-GG-13	9.6	7520	0.43	8.6	5
	PZ-GG-14	3.9	9120	0.43	8.4	4.7
	PZ-GG-15	3.2	11100	0.43	12.1	2.3
	PZ-GG-16					

Attachment 2: GG Groundwater Chemistry

Month	Well	Arsenic Concentration (mg/L)	Iron Concentration (ug/L)	Copper (ug/L)	Aluminum (ug/L)	Zinc (ug/L)
May-21	PZ-GG-05	571	41700	3.5	13.2	23.5
	PZ-GG-06	63	9500	10.5	9.7	165
	PZ-GG-07	1.3	12	2.4	7.1	23.8
	PZ-GG-08	1.5	42.8	1.2	7.1	24
	PZ-GG-09	3.6	6480	0.82	7.1	2.3
	PZ-GG-11	1.2	428	0.43	7.1	7.1
	PZ-GG-12	29.4	2430	167	7.5	1920
	PZ-GG-13	9.5	5830	5.6	166	127
	PZ-GG-14	3.7	10300	5.7	519	2760
	PZ-GG-15	2.5	10800	0.43	9.7	2.3
	PZ-GG-16	32.6	14200	11.7	7.1	129
Jun-21	PZ-GG-05	25.9	7160	1.7	7.1	27
	PZ-GG-06	3.4	12000	0.43	7.1	3
	PZ-GG-07	1.3	12	1.8	7.1	13
	PZ-GG-08	2.1	110	1.3	7.1	30
	PZ-GG-09	3.9	6970	0.56	7.1	2
	PZ-GG-11	1.3	175	0.47	7.1	9
	PZ-GG-12	56.8	200	327	15.1	2490
	PZ-GG-13	5.3	5430	0.43	16.4	2
	PZ-GG-14	3.7	10000	3.3	7.1	3
	PZ-GG-15	3.9	10100	0.43	11.5	2
	PZ-GG-16	65.4	13100	1.9	7.3	66

3rd Quartile

As (ug/L)	**Fe (ug/L)**	**Cu (ug/L)**	**Al (ug/L)**	**Zn (ug/L)**
11	11700	2.65	10.75	33.5

Cells highlighted in red indicate values above DEQ-7 chronic Aquatic Life standards at 160 mg/l hardness