



Huntington Power Plant

*6 miles west of Huntington, Utah on Hwy. 31
P.O. Box 680
Huntington, Utah 84528*

December 7, 2017

Mr. Dan Hall,
Utah Division of Water Quality
195 North 1950 West
P.O. Box 144870
Salt Lake City, Utah 84114-4870

RE: Major Modification to Huntington Ground Water Discharge Permit UGW150002

Dear Mr. Hall,

PacifiCorp hereby requests a major modification to Ground Water Discharge Permit UGW150002 to allow additional intercepted groundwater from the Deer Creek Mine Rilda Canyon Portals to be a secondary source of Plant feed water. The main source of Plant feed is diverted from the Huntington Creek to the Raw Water Pond up-gradient of the Plant.

Mining operations at Deer Creek Mine have been permanently shut down since January, 2015. Discharges of intercepted groundwater are projected at two separate portal locations, Deer Creek Canyon and Rilda Canyon.

The Deer Creek Canyon portals were permanently sealed in April, 2015 with structures to allow the mine discharge to flow into the Deer Creek drainage when the southern portion of the Deer Creek workings fills to the discharge elevation. Outfall of mine water at this location is approved in the existing Deer Creek UPDES permit. Water has not yet reported to the Deer Creek Canyon portals outfall. This water will not be utilized at the Huntington Plant.

Intercepted groundwater is accumulating underground in the northwest portion of the mine and is projected to discharge from the Rilda Canyon portals after they are permanently sealed. Accumulating intercepted groundwater is currently being pumped underground from the Rilda Canyon workings to the Deer Creek Workings. In December, 2017, when the mine is permanently sealed and the dewatering systems are removed, intercepted groundwater will migrate towards the Rilda Canyon Portals. Forest Service and State regulations prohibit new point source water discharges within the National Forest boundaries. PacifiCorp has constructed a buried pipeline to transfer water from the Rilda Canyon portals to the Huntington Power Plant Raw Water Pond, where the water is to be added to the Huntington Plant Raw Water Pond and consumed in Plant operations. The Bureau of Land Management in cooperation with the United States Forest Service has evaluated the construction of the pipeline through the National Environmental Policy Act (NEPA). Construction of the pipeline was approved July 7, 2017. PacifiCorp modified the Deer Creek Mine Division of Oil, Gas and Mining (DOG M) permit for inclusion of the pipeline. PacifiCorp received approval from DOGM on April 18, 2017.

Two separate water sources will report to the Rilda Canyon Portals after permanent seals are installed. The first source of intercepted groundwater projected to discharge from the Rilda Canyon Portals is from a section of the mine referred to as 1st Right XC-30. 1st Right XC-30 is approximately 2000 feet from the Rilda Canyon Portals. Surface water infiltrates natural fractures in the strata near the coal seam outcrop and drips into the mine workings at a rate of approximately 15 gpm or less. Intercepted groundwater from 1st Right XC-30 will flow down gradient and reach the Rilda Canyon Portals approximately 1 week after the mine is permanently sealed. PacifiCorp received approval from DWQ to discharge this water into the Raw Water Pond on November 17, 2017.

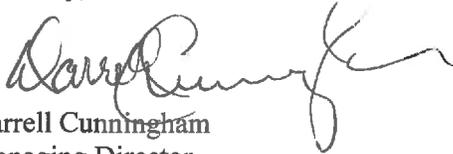
The second source of intercepted groundwater that will exit from the Rilda Canyon Portals will be water from the Mill Fork area of the mine that is farther from the portals than the 1st Right water mentioned above. This water source is 3.7 miles from the portals. At present, this water is being pumped underground to the southern mine workings and will eventually report to the Deer Creek portals as mentioned above. When the mine is permanently sealed (December 22, 2017) and the pumps are turned off and removed, intercepted groundwater will begin to flow toward the Rilda Canyon Portals. Intercepted groundwater will fill extensive low-lying areas of the underground mine workings and eventually report to the Rilda Canyon Portals. Estimated time for the Mill Fork Area intercepted groundwater to migrate to the Rilda Canyon Portals is approximately 6 – 9 months after the mine is permanently sealed. Flow rate from the Mill Fork Area is estimated at approximately 200 gpm to 300 gpm. Due to the difference in flow rates between the initial outflow and the additional larger outflow, PacifiCorp is submitting this as a separate major modification to the Groundwater Permit UTW150002 to allow this additional intercepted groundwater from the northwest portion of the mine to be added as a source of Plant feed water.

Water from the Mill Fork area of the mine will have a total iron content that is slightly elevated above background, due to a pyritic split in the coal in these mine workings. PacifiCorp has been sampling this water on a regular basis since 2008. Analyses show (Table 1, Figures 1 through 4) that the iron content in the intercepted water is declining at a predictable rate, that it is already in compliance with the applicable standards, and that the iron content will continue to diminish with time. The attached table compares water quality of the Plant Feed (Raw Water Pond) to the total Rilda Canyon outflow at two dilution rate factors: 1) Huntington Power Plant with 2 units operating at normal load, total water diversion 7,000 gpm, 2) Huntington Power Plant with 1 unit operating at normal load, total water diversion 3,500 gpm. Change in water quality to the Plant Feed – Raw Water Pond will be de minimis. PacifiCorp completed the buried pipeline from Rilda Canyon Portals to the Huntington Power Plant on November 28, 2017. Deer Creek Mine Rilda Canyon Portals will be permanently sealed by December 22, 2017. Near surface intercepted groundwater from 1st Right XC-30 is projected to begin entering the Raw Water Pond during the last week of December 2017. Water from the Mill Fork area is projected to begin flowing to the Raw Water Pond as early as June, 2018. PacifiCorp is requesting that this water be permitted for use in the Huntington Plant operations under a major modification to the existing permit.

As part of the construction of the pipeline riprap has been added to the pipe discharge location at the Raw Water Pond at the Huntington Plant to ensure there is no erosion. (Construction drawings for the riprap were submitted with the previous request).

As part of the arrangement for discharging mine water into the Raw Water Pond, two groundwater monitoring wells will be installed in the alluvium about 500 feet up-gradient and down-gradient from the Raw Water Pond to monitor any effects that the discharge of mine water may have on the water quality of the Raw Water Pond or the alluvium in which it is constructed. These wells are scheduled to be installed on December 7, 2017.

Sincerely,


Darrell Cunningham
Managing Director
Huntington Plant

cc: Mark Novak

Attachments: Table 1, Figure 1, Figure 2, Figure 3, Figure 4

Figure 1

Deer Creek Mine
11th West - 17th West Sealed Area Water Sampling
Parameter: pH (units)

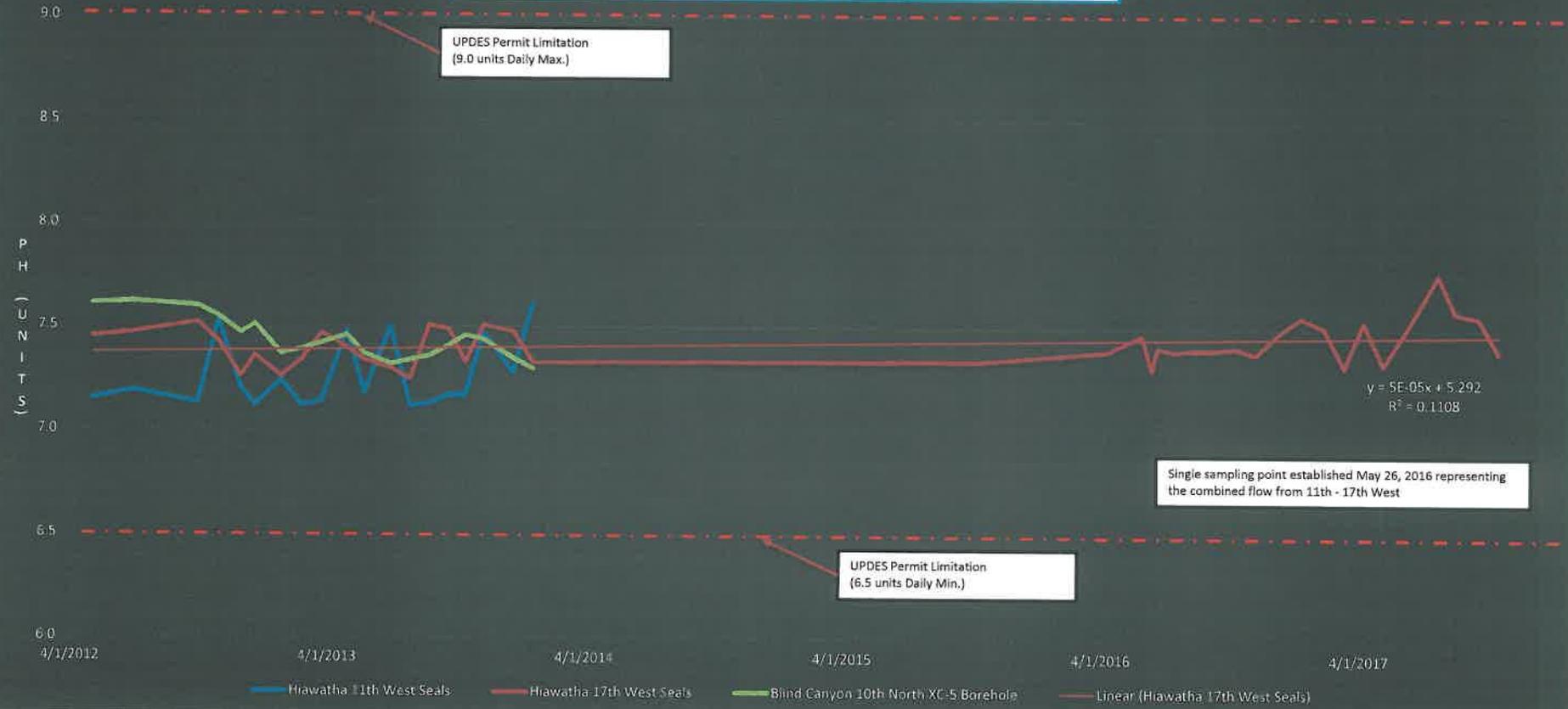


Figure 2

**Deer Creek Mine
11th West - 17th West Sealed Area Water Sampling
Parameter: Total Dissolved Solids (mg/L)**

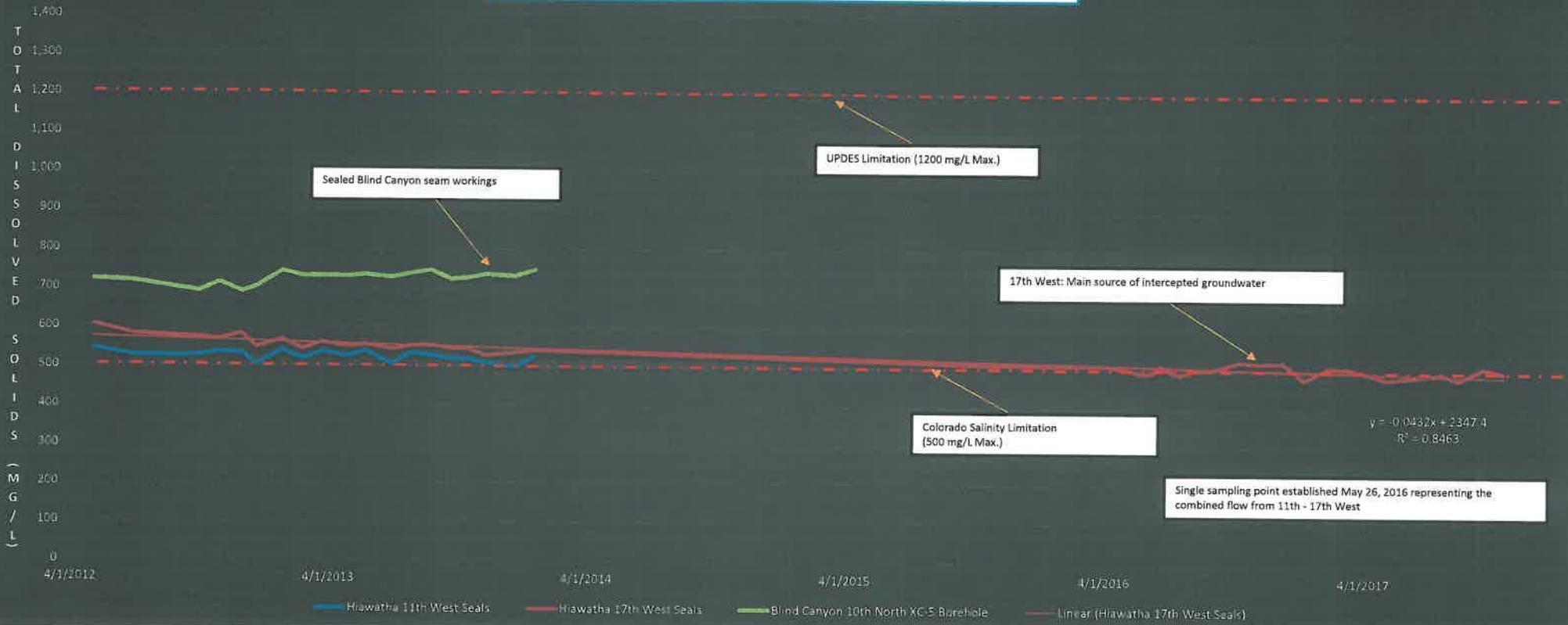


Figure 3

Deer Creek Mine 11th West - 17th West Sealed Area Water Sampling Parameter: Total Iron (mg/L)

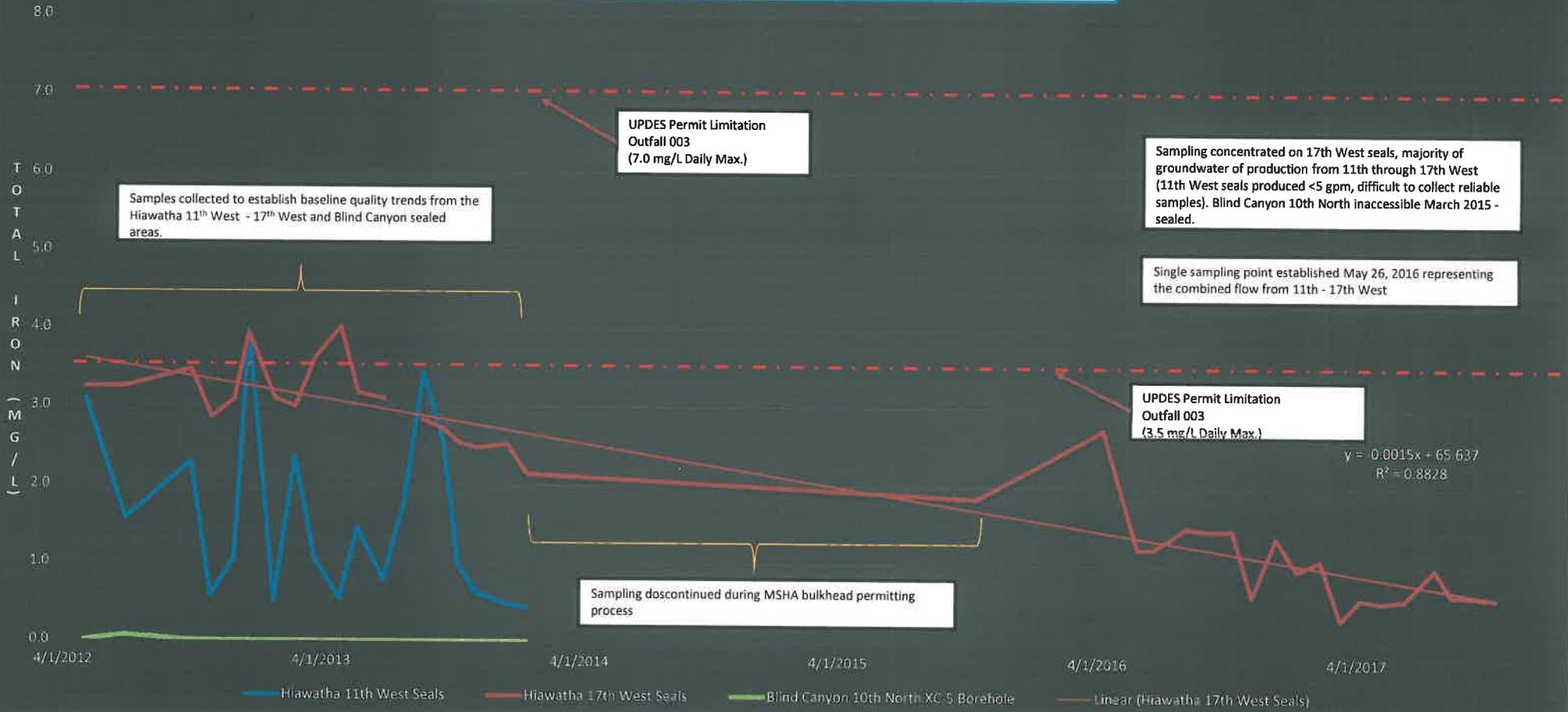


Figure 4

**Deer Creek Mine
11th West - 17th West Sealed Area Water Sampling
Parameter: Sulfate (mg/L)**

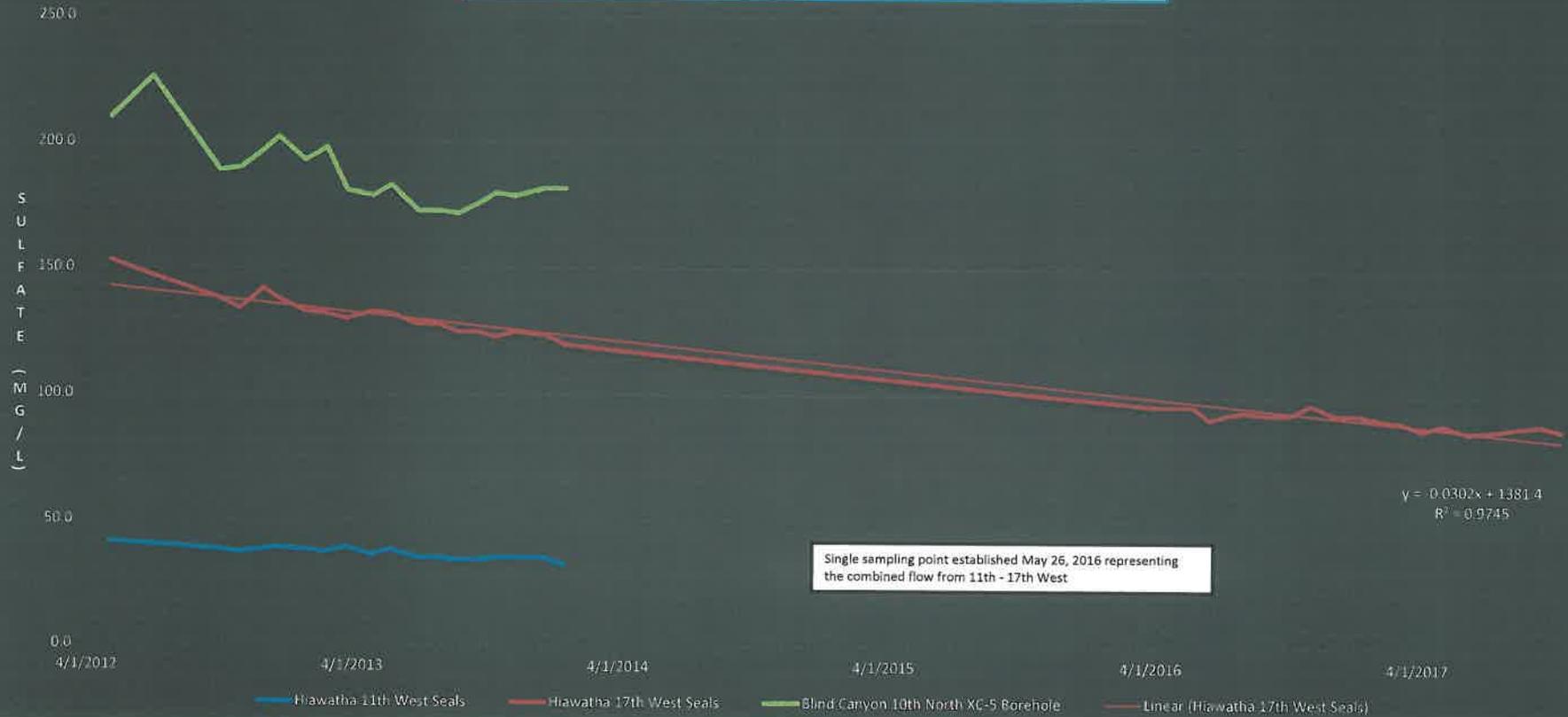


Figure 1

**Deer Creek Mine
11th West - 17th West Sealed Area Water Sampling
Parameter: pH (units)**

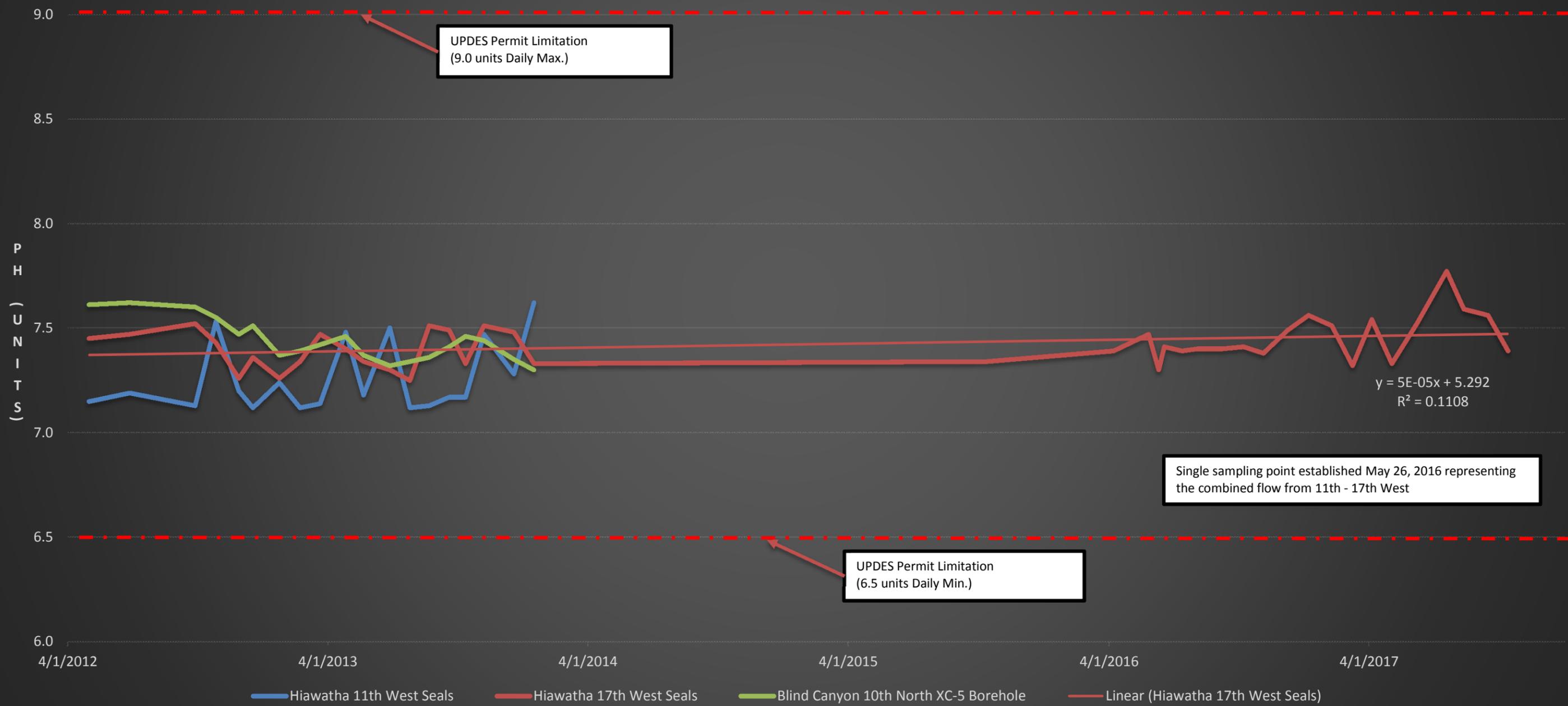


Figure 2

**Deer Creek Mine
11th West - 17th West Sealed Area Water Sampling
Parameter: Total Dissolved Solids (mg/L)**

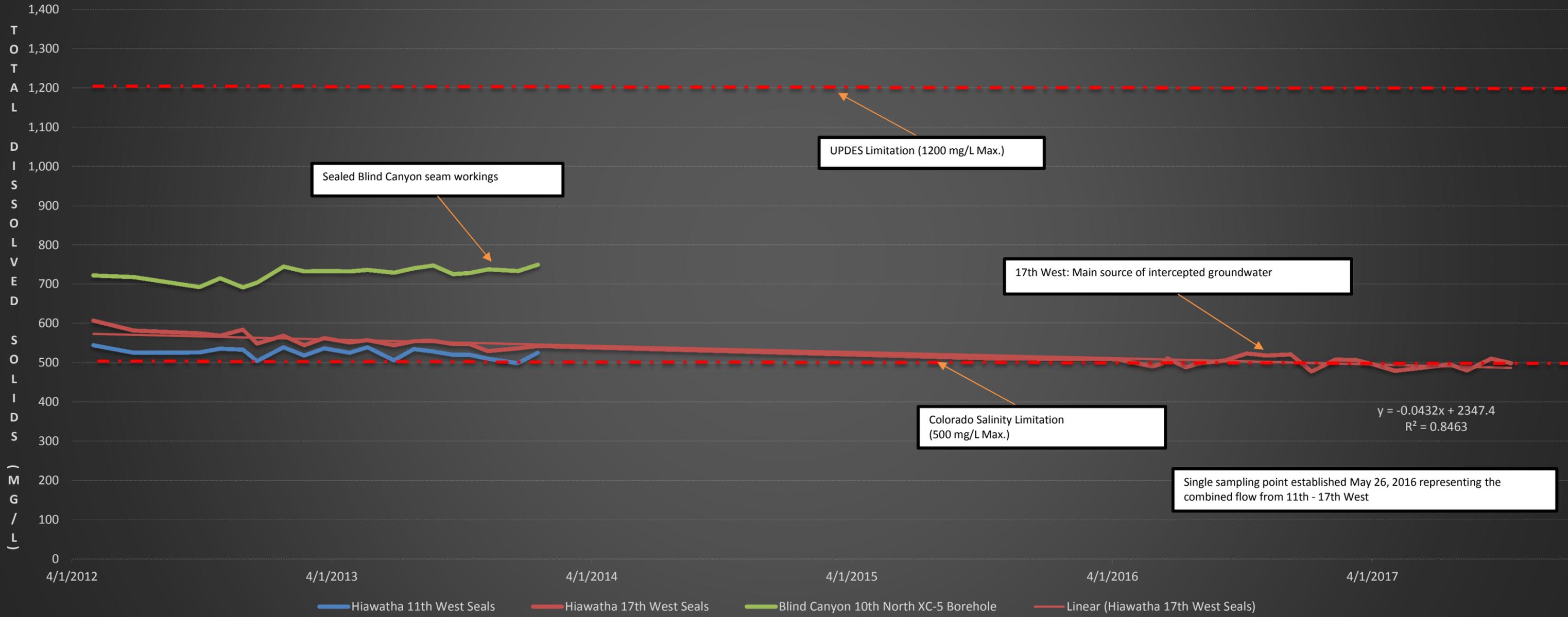


Figure 3

Deer Creek Mine 11th West - 17th West Sealed Area Water Sampling Parameter: Total Iron (mg/L)

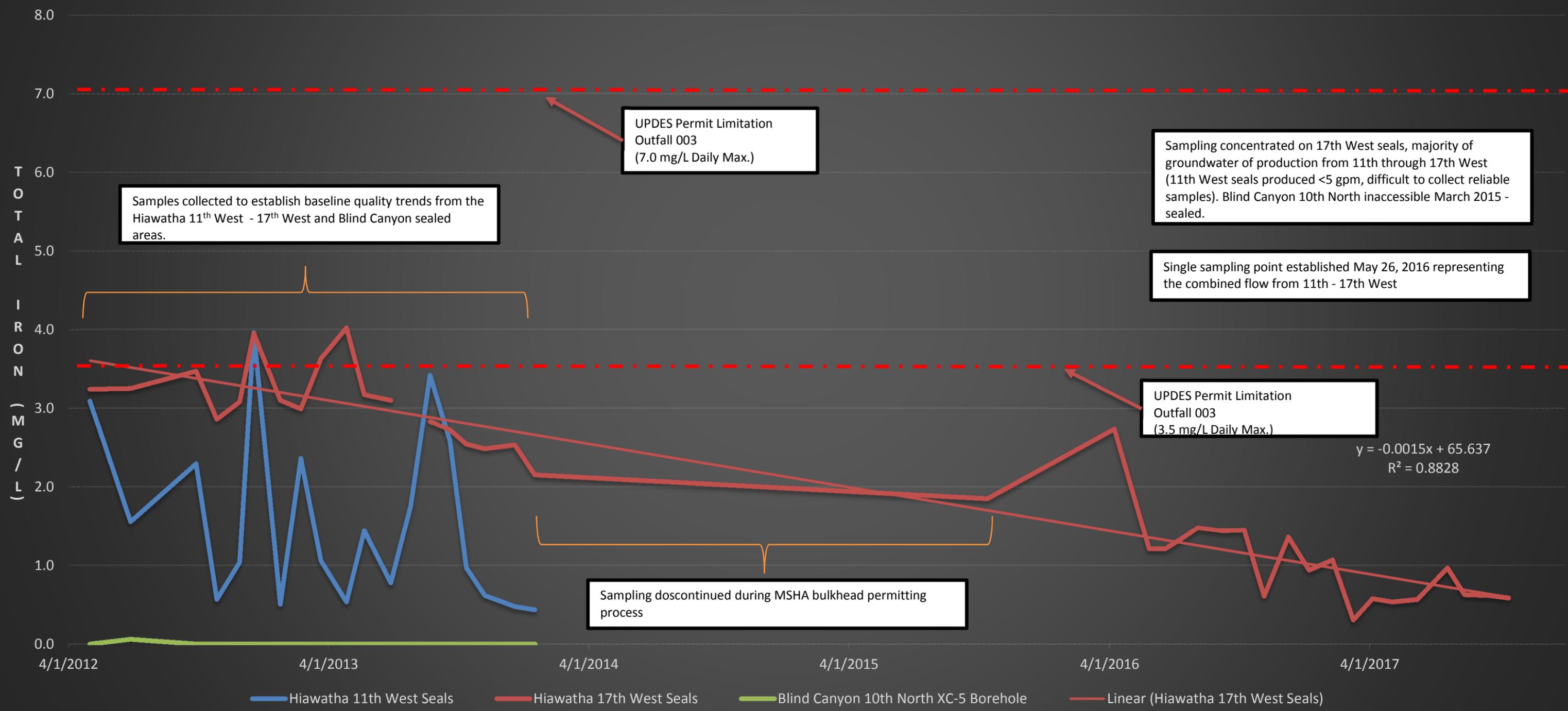


Figure 4

Deer Creek Mine
11th West - 17th West Sealed Area Water Sampling
Parameter: Sulfate (mg/L)

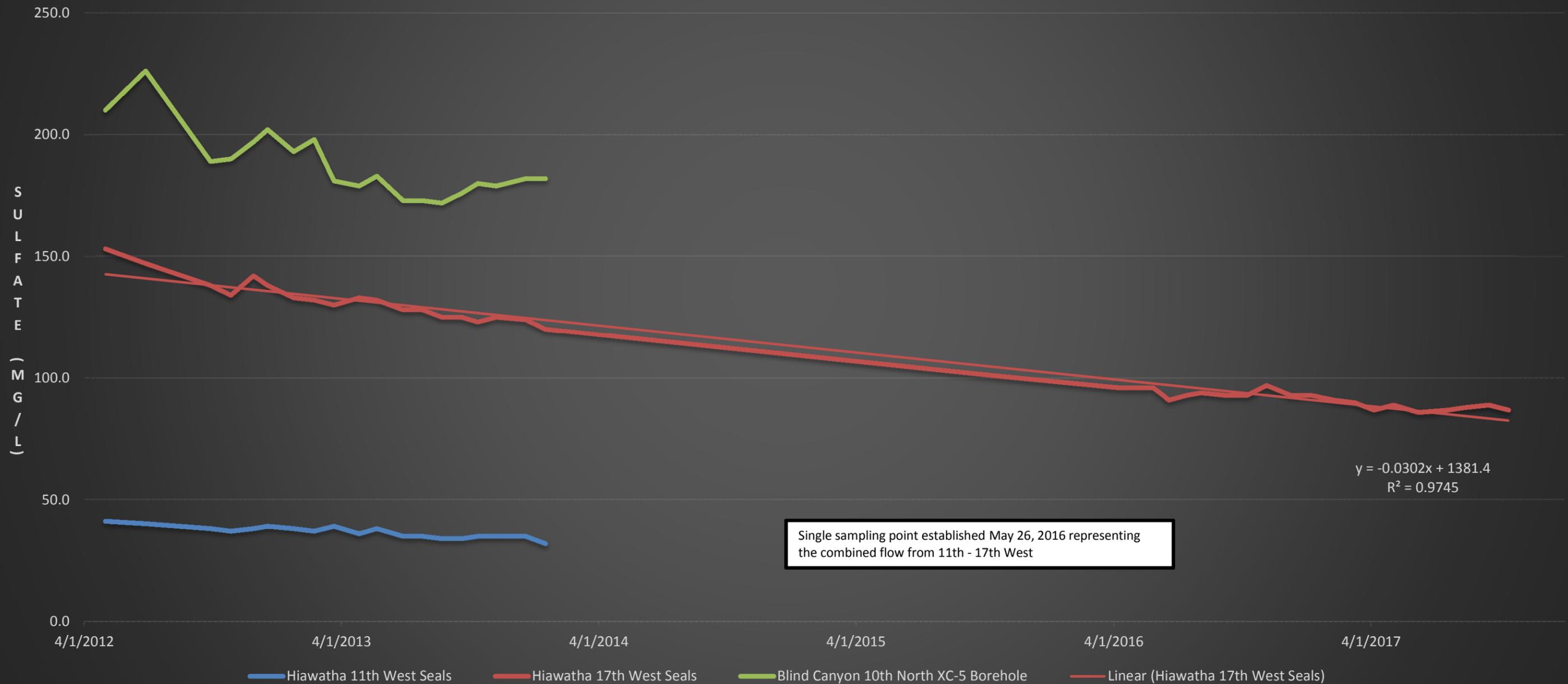


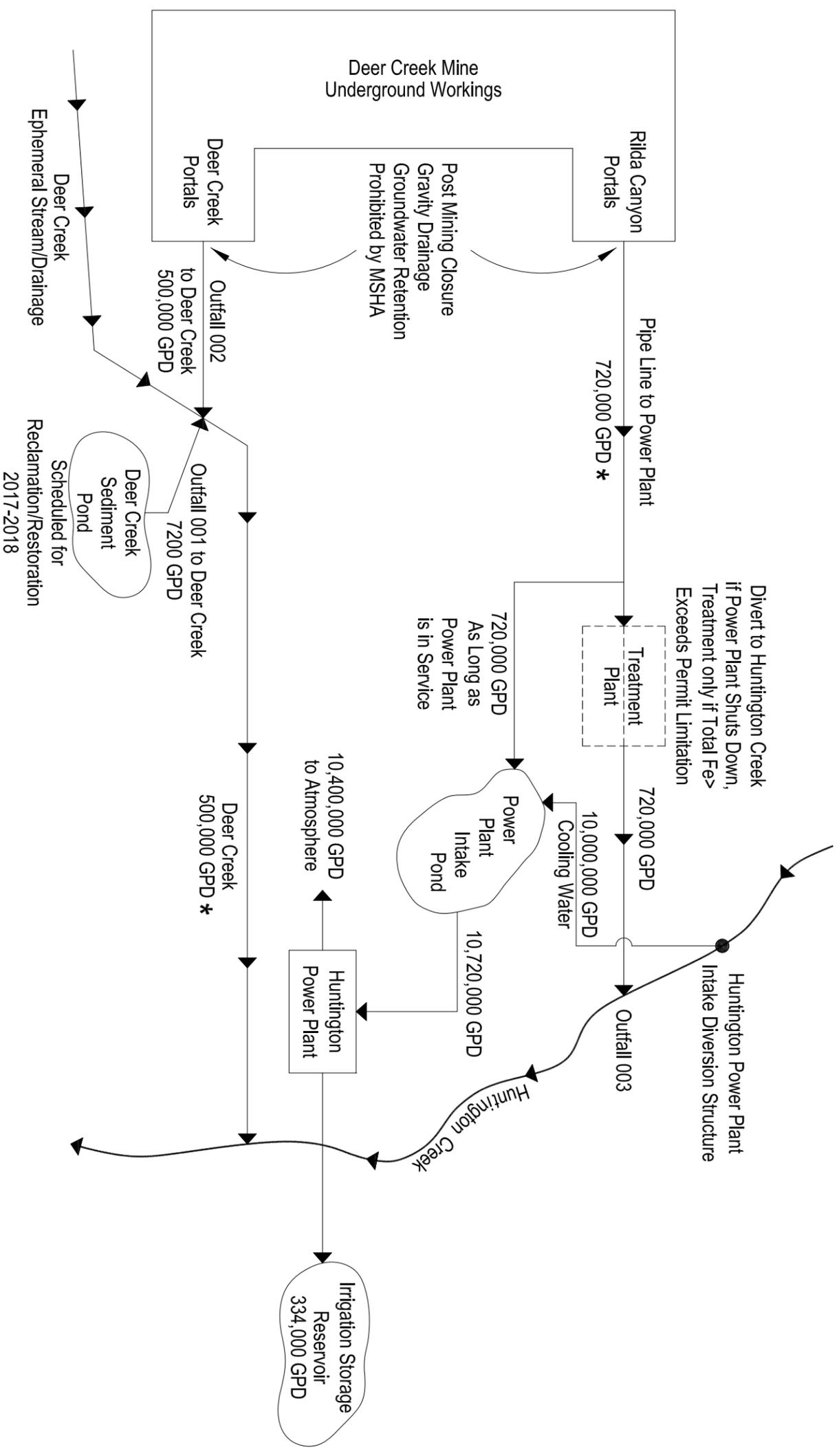
Table 1
Deer Creek Mine Discharge
Huntington Plant Raw Water Pond
Water Quality Analysis

Comparison

Parameter	Deer Creek Mine Mine Discharge Samples								Huntington Plant Raw Water Plant Feed				Mine Discharge - Project discharge rate 315 gpm Huntington Plant two units operating at normal load		Mine Discharge - Project discharge rate 315 gpm Huntington Plant one unit operating at normal load		
	11th - 17th West				1st Right XC-30				Projected Mine Discharge Combined 11th-117th West and 1st Right Weighted Average Mean	Plant Feed				Weighted Average Mean	Variance of Pre and Post Mine Discharge to Plant Feed	Weighted Average Mean	Variance of Pre and Post Mine Discharge to Plant Feed
	Min	Max	Mean	Std.Dev.	Min	Max	Mean	Std.Dev.		Min	Max	Mean	Std.Dev.				
Hardness, mg equivalent CaCO3/L, mg/L	261	337	304.2	18.26	286	309	296.0	9.56	303.82	183	293	246.1	33.89	248.7	2.60	251.3	5.20
Acidity, mg/L	5	26	12.8	7.35	6	6	6	3.00	12.46	ND	ND	ND					
Alkalinity, mg CaCO3, mg/L	317	373	357.7	15.49	230	272	258.8	19.38	353	143	243	211.2	31.02	217.6	6.37	223.9	12.74
Bicarbonate Alkalinity as CaCO3, mg/L	317	373	357.7	15.49	230	272	258.8	19.38	353	132	299	211.5	39.84	217.9	6.36	224.2	12.71
Carbonate Alkalinity as CaCO3, mg/L	ND	ND	ND	0	ND	ND	ND			7	14	10.33	5.49	9.87	-0.47	9.40	-0.93
Nitrogen, Ammonia, mg/L	0.6	3.9	1.59	1.15	ND	ND	0.1		1.52	0.1	0.6	0.27	0.16	0.32	0.06	0.38	0.11
pH (units)	7.32	8.33	7.52	0.24	7.79	8.15	7.9	0.17	7.54	8.06	8.54	8.32	0.15	8.29	-0.04	8.25	-0.07
Conductivity umhos/cm	772	934	850.1	35.24	541	560	554.3	8.88	835	364	571	494.1	81.57	509.4	15.36	524.8	30.71
Total Dissolved Solids, mg/L	478	523	500.5	14.23	290	322	306.8	14.45	491	208	372	306.1	55.31	314.4	8.31	322.7	16.62
Nitrate, mg/L	0.05	0.19	0.105	0.06	ND	ND	0.05		0.10	0.17	0.43	0.27	0.15	0.27	-0.01	0.26	-0.02
Nitrite, mg/L	0.09	0.11	0.1	0.03	ND	ND	0.05		0.10	0.14	0.21	0.17	0.08	0.16	0.00	0.16	-0.01
Nitrate + Nitric as Nitrogen, mg/L	0.11	0.41	0.3	0.18	0.25	0.37	0.29	0.05	0.29	0.1	0.43	0.25	0.15	0.25	0.00	0.25	0.00
Chloride, mg/L	10	12	11.3	0.59	3	3	3	0.00	10.88	6	28	14.73	6.57	14.56	-0.17	14.39	-0.35
Sulfate, mg/L	86	97	91	3.10	31	33	32	1.15	87.71	16	60	42.13	15.96	44.18	2.05	46.24	4.10
Ortho-Phosphate-P, mg/L	ND	ND	ND		ND	ND	ND			ND	ND	ND					
Fluoride mg/L	0.52	0.560	0.5325	0.2387	0.17	0.19	0.18	0.0115	0.51	NS	NS	NS					
Mercury, ug/L	0	0	0.1	0	0.036	0.036	0.036	0.018	0.10	ND	ND	ND					
Aluminum, mg/L (dissolved)	0.04	0.06	0.05	0.02	ND	ND	0.03		0.05	0.05	0.08	0.065	0.02	0.06	-0.001	0.06	-0.001
Arsenic, mg/L (total)	0.02	0.03	0.02	0.01	ND	ND	0.01		0.02	0.01	0.03	0.0175	0.01	0.02	0.0002	0.02	0.0005
Arsenic, mg/L (dissolved)	0.02	0.02	0.02	0.01	ND	ND	0.01		0.02	0.01	0.02	0.015	0.01	0.02	0.0002	0.02	0.0004
Boron, mg/L	0.19	0.24	0.21	0.06	0.02	0.03	0.0275	0.01	0.21	0.01	0.04	0.031	0.01	0.04	0.01	0.05	0.02
Cadmium, mg/L (total), mg/L	ND	ND	ND		ND	ND	ND			0.003	0.003	0.003	0.0008	0.00	-0.0001	0.00	-0.0003
Cadmium, mg/L (dissolved), mg/L	ND	ND	ND		ND	ND	ND			0.009	0.009	0.009	0.0023	0.01	-0.0004	0.01	-0.0008
Calcium, mg/L	49.26	65.37	57.99	3.82	57.27	63.34	60.37	2.49	58.11	50.06	69.71	59.31	5.18	59.25	-0.05	59.20	-0.11
Chromium, mg/L (total)	0.001	0.005	0.003	0.001	0.001	0.002	0.00	0.001	0.00	0.001	0.008	0.0027	0.002	0.00	0.00001	0.00	0.00001
Cobalt, ug/L (Dissolved)	0.03	0.61	0.24	0.29	0.11	0.15	0.13	0.08	0.24	NS	NS	NS					
Cobalt, ug/L (Total)	0.03	0.65	0.44	0.36	0.07	0.07	0.07	0.04	0.42	NS	NS	NS					
Copper (total), mg/L	ND	ND	ND		ND	ND	ND			0.01	0.1	0.026	0.025	0.03	0.00	0.02	0.00
Copper (dissolved), mg/L	ND	ND	ND		ND	ND	ND			0.01	0.02	0.012	0.006	0.01	0.00	0.01	0.00
Iron, (total), mg/L	0.31	1.48	0.92	0.39	ND	ND	0.05		0.88	0.06	0.4	0.161	0.11	0.19	0.03	0.23	0.06
Iron, (dissolved), mg/L	0.04	0.04	0.04	0.01	ND	ND	0.03		0.04	ND	ND	ND					
Lead, (total), mg/L	ND	ND	ND		ND	ND	ND			ND	ND	ND					
Lead, (dissolved), mg/L	ND	ND	ND		ND	ND	ND			ND	ND	ND					
Magnesium, (dissolved) mg/L	33.61	42.82	38.75	2.38	34.55	36.63	35.26	0.95	38.57	14.07	28.9	23.739	5.36	24.41	0.67	25.07	1.33
Manganese, (total), mg/L	0.003	0.023	0.02	0.01	0.002	0.002	0.002	0.00		0.008	0.028	0.018	0.01	0.02	-0.001	0.02	-0.002
Manganese, (dissolved), mg/L	0.003	0.023	0.02	0.01	ND	ND	ND			0.002	0.023	0.010	0.01	0.01	-0.0004	0.01	-0.0009
Molybdenum, (dissolved), mg/L	0.008	0.017	0.01	0.005	0.006	0.009	0.008	0.001	0.01	0.005	0.016	0.008	0.005	0.01	0.0002	0.01	0.0003
Nickel, (total), mg/L	0.02	0.037	0.03	0.005	ND	ND	ND			0.001	0.009	0.004	0.003	0.00	-0.0002	0.00	-0.0003
Potassium, (dissolved), mg/L	10.12	16.77	12.34	2.36	1.89	2.05	1.9525	0.07	11.83	1.15	2.44	1.946	0.43	2.39	0.44	2.84	0.89
Selenium, (total), ug/L	0.00021	0.0013	0.0008	0.0003	0.54	0.96	0.75	0.4657	0.04	0.00095	0.03	0.015	0.0077	0.02	0.001	0.02	0.002
Silver, (total), ug/L	ND	ND	0.002		0.016	0.016	0.016	0.008	0.003	0.003	0.003	0.003	0.0008	0.00	-0.00001	0.00	-0.00003
Sodium, (dissolved), mg/L	53.27	66.72	61.85882	3.17	9.01	9.61	9.2125	0.28	59.23	4.91	18.69	11.546	4.55	13.69	2.15	15.84	4.29
Thallium, (dissolved), ug/L	ND	ND	0.01		0.01	0.01	0.01	0.005774	0.01	NS	NS	NS					
Thallium, (total), ug/L	0.00008	0.00008	0.00008	4.6E-05	0.01	0.09	0.05	4.9E-02	0.00	NS	NS	NS					
Zinc, (total), mg/L	0.008	0.012	0.01	0.003	ND	ND	0.004		0.01	0.007	0.861	0.434	0.222	0.41	-0.02	0.40	-0.04
Zinc, (dissolved), mg/L	0.049	0.049	0.049	0.012	ND	ND	0.004		0.05	0.032	0.08	0.056	0.022	0.06	-0.0004	0.06	-0.0008

ND - None Detected
NS - Not Sampled
Used minimum detection limit in calculation

LINE DRAWING



Schematic of Water Flow
 PacifiCorp/Deer Creek Mine
 UPDES #UT0023604
 Huntington, Emery County, Utah

* Flows will Diminish with Time

CAD FILE NAME/DISK#: UPDES DISCHARGE POINTS QUAD MAP



PACIFICORP
 A MIDAMERICAN ENERGY HOLDINGS COMPANY

DEER CREEK MINE
 UPDES PERMIT #UT0023604
 SCHEMATIC OF WATER FLOW

DRAWN BY: K. LARSEN	DRAWING #:
SCALE: NONE	SHEET 1 OF 1
DATE: AUGUST 16, 2016	REV. _____

**STATE OF UTAH
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER QUALITY
UTAH WATER QUALITY BOARD
SALT LAKE CITY, UTAH 84114-4870**

**GROUND WATER DISCHARGE PERMIT
Permit No. UGW150002**

I. SPECIFIC PERMIT CONDITIONS

A. Ground water Classification and Protection Levels

Table 1. Average Background Concentrations in Compliance Monitor Wells

Plant Site Wells

HSW-1	4.5	3.8	3,849
HCP-6	0.74	1.7	2,013
HPS-1	0.69	5.19	4,730
HWW-4	0.52	1.4	1,479
HRW-1			
HRW-2			

Table 2. Protection Levels in Compliance Monitoring Wells

Well	Ground Water Class	Nitrate as N (mg/l)	Total Dissolved Solids (mg/l)
NH1 W	III	10.7	5,847
NH3 W	II	9.7	2,527
NH6 W	II	2.6	1,311
NH8 W	II	3.4	589
NH9 W ²	II	1.6	1,969
RG-1	III	12.4	6,300
HSW-1	III	6.5	4,905
HCP-6	II	1.9	2,390
HPS-1	III	8.4	6,544
HWW-4	II	2.2	1,863
HLF-6O	*	4.1	9,131
HLF-7Od	*	183	21,205
HLF-3Nd ¹	III	0.4	4,951
HLF-3Ns ¹	III	0.6	5,017
HLF-4N ¹	III	0.14	4,500
HDP-1	*	18	12,536
HDP-2	*	41	16,863
HRW-1			
HRW-2			

B. Permitted Facilities

Table 3. Huntington Plant Permitted Facilities

Permitted Facilities	Discharge Control Technology	Volume	Associated Ground Water Well(s)
Irrigation Storage Pond	24" clay liner	327 ac-ft	HWW-7
Truck Wash Sump	concrete	48,000 gal	HPS-1
Wastewater Decanting Basins	concrete	303,000 gal	HWW-4
Waste Disposal/Neutralizing Basin	concrete	275,000 gal	HWW-4
Holding Basin	concrete	72,000 gal	HWW-4
Lacey's Pad Sump	concrete	3,600 gal	HSW-1
Dewatering Sump	concrete	3,740 gal	HSW-1, HCP-6
Process Sump	concrete	5,500 gal	HWW-4, HPS-1
U1 Bottom Ash Bunker Sump	concrete	1,500 gal	HWW-4, HPS-1
U2 Bottom Ash Bunker Sump	concrete	1,500 gal	HWW-4, HPS-1
Plant Drains Settling Basin	concrete	45,000 gal	HWW-4, HPS-1
Lift Station Sump	concrete	16,000 gal	NH-6W
Cooling Tower #1 Sump	concrete	842,000 gal	HWW-4, HPS-1
Cooling Tower #2 Sump	concrete	842,000 gal	HWW-4, HPS-1
Raw Water Settling Basin	24" clay liner	336 ac-ft	HRW-1, HRW-2

E. Monitoring

1. General Provisions
2. Ground Water Monitoring

Table 4. Location of Monitoring Wells

Well	North Latitude	West Longitude	Elevation (top of casing)	Depth of Screened Interval (feet below TOC)
NH1 W	39° 22.032'	111° 03.566'	6185.8	4.5-24.5
NH2 W	39° 22.088'	111° 03.728'	6196.6	5-20
NH3 W	39° 22.169'	111° 03.622'	6193.9	5.5-20.5
NH4 W	39° 22.353'	111° 04.117'	6254.5	39-64
NH5 W	39° 22.427'	111° 04.078'	6249.1	19-44
NH6 W	39° 22.515'	111° 04.026'	6241.8	10-25
NH7 W	39° 22.516'	111° 04.323'	6292.4	15-40
NH8 W	39° 22.706'	111° 04.326'	6273.7	5-25
NH9 W	39° 22' 16.5212"	111° 03' 49.2981"	6210.8	15-25
NH10 W	39° 22' 19.0324"	111° 03' 43.5297"	6221.8	25-35
RG-1	39° 22.440'	111° 03.463'	6362.2	45-75
HLF-4O	39° 22.108'	111° 04.670'	6592.3	46-66
HLF-6O	39° 22.044'	111° 04.706'	6567.05	46.4-56.4
HLF-7Od	39° 22.165'	111° 04.612'	6549.14	50-60

HLF-3Nd	39° 21.985'	111° 04.562'	6575.73	115-125
HLF-3Ns	39° 21.985'	111° 04.562'	6575.76	48-66
HLF-4N	39° 22.024'	111° 04.529'	6554.8	100-110
HDP-1	39° 22.252'	111° 04.487'	6388.27	13.4-18.4
HDP-2	39° 22.410'	111° 04.402'	6327.11	13.8-23.8
HSW-1	39° 22.546'	111° 04.640'	6437.27	80-100
HPS-1	39° 22.737'	111° 04.602'	6441.44	75-85
HWW-4	39° 22.920'	111° 04.695'	6389.32	41-51
HCP-6	39° 22.597'	111° 04.813'	6452.41	80-90
HRW-1	39° 23'11.9277"	111° 05'34.7099"	6522.91	59-79
HRW-2	39° 23'04.2937"	111° 05'17.8026"	6433.67	20-38

Appendix C Monitoring Program

**Table II. Monitoring Locations
Huntington Power Plant**

Potential Source Areas w/ Well IDs	Purpose	Justification
Ash Landfill (Old)		
LF-1O	CAP/BMP	Upgradient well for Old Ash Lf
LF-2O	CAP/BMP	Downgradient well for Old Ash Lf
LF-3O	CAP/BMP	Upgradient well for Old Ash Lf and storm water pond
LF-4O	CAP/BMP	Downgradient well for Old Ash Lf and storm water pond
LF-6O	CAP/BMP	Downgradient well for Old Ash Lf and storm water pond
LF-7Od	CAP/BMP	Downgradient well for Old Ash Landfill
Ash Landfill (New)*		
HLF-3Ns	GWD/BMP	Downgradient well for New Ash Landfill
HLF-3Nd	GWD/BMP	Downgradient well for New Ash Landfill
HLF-4N	GWD/BMP	Downgradient well for New Ash Landfill
Coal Pile		
HCP-4	BMP	Upgradient well for Coal Pile
HCP-6	BMP	Downgradient well for the Coal Pile
Process Ponds		
HWW-4	/CAP	Downgradient well for WW Holding Basins
HWW-7	BMP	Downgradient well for Evaporation Pond
HSW-1	BMP/CAP	Downgradient well for Storm Water
Plant Site		
HPS-1	BMP	Downgradient for Plant Activities
Fuel Oil Sump MW	BMP	Downgradient for Fuel Oil Sump
Research Farm		

Potential Source Areas w/ Well IDs	Purpose	Justification
NH1W	GWD/BMP	Downgradient for Research Farm
NH2W	GWD/BMP	Lower Research Farm
NH3W	GWD/BMP	Lower Research Farm
NH4W	GWD/BMP	Mid-Research Farm/Downgradient of Duck Pond Drainage
NH5W	GWD/BMP	Mid-Research Farm
NH6W	GWD/BMP	Mid-Research Farm
NH7W	GWD/BMP	Upgradient of Research Farm
NH8W	GWD/BMP	Upgradient of Research Farm
NH-9W	GWD/BMP	Downgradient Research Farm
NH-10W	GWD/BMP	Upgradient of Research Farm
RG-1	GWD/BMP	Downgradient Research Farm
Raw Water Settling Basin		
HRW-1	GWD/BMP	Upgradient of Raw Water Settling Basin
HRW-2	GWD/BMP	Downgradient of Raw Water Settling Basin
Surface Water Locations		
H-1	GWD/BMP	Upgradient Huntington Creek
H-2	GWD/BMP	Midpoint on Huntington Creek
UPL-9	GWD/BMP	Downgradient Huntington Creek
Raw Water Settling Basin	GWD/BMP	Raw Water Settling Basin
H-11	CAP	Spring
H-12	CAP	Duck Pond
NF-OLF	CAP	Downgradient of Old Landfill
SF-NLF	CAP	Downgradient of New Landfill
West End Canyon	CAP	Downgradient of Plant Activities
UPL-13	GWD/BMP	Routine Network for Research Farm
Landfill @ Pumphouse	CAP	Downgradient of New Landfill
Duckpond @ Pumphouse	CAP	Downgradient of Old Landfill
Ck@DP3	CAP	Downgradient of old/new Landfill

Appendix D

Ground Water & Surface Water Sampling and Analysis Plan Huntington Power Plant

- 1.0 INTRODUCTION
- 2.0 GROUND WATER & SURFACE WATER MONITORING PLAN
 - 2.1 Monitoring Network
 - 2.1.1 Ground Water
 - 2.1.2 Surface Water

**Table III. Monitoring Locations
Huntington Power Plant**

Potential Source Areas w/ Well IDs	Purpose	Justification
Ash Landfill (Old)		
LF-1O	CAP/BMP	Upgradient well for Old Ash Landfill
LF-2O	CAP/BMP	Downgradient well for Old Ash Landfill
LF-3O	CAP/BMP	Upgradient well for Old Ash Landfill
LF-4O	CAP/BMP	Downgradient well for Old Ash Landfill
LF-6O	CAP/BMP	Downgradient well for Old Ash Landfill
LF-7Od	CAP/BMP	Downgradient well for Old Ash Landfill
Ash Landfill (New)*		
HLF-3Ns	CAP/BMP	Downgradient well for New Ash Landfill
HLF-3Nd	CAP/BMP	Downgradient well for New Ash Landfill
HLF-4N	CAP/BMP	Downgradient well for New Ash Landfill
Coal Pile		
HCP-4	BMP	Upgradient well for the Coal Pile
HCP-6	BMP	Downgradient well for the Coal Pile
Plant Site		
HFOS-mw	CAP	Downgradient well for historic oil spill
HPS-1	BMP	Downgradient well for Plant
Process Ponds		
HWW-4	BMP	Downgradient well for Wastewater Decanting Basins and Drying Pad
HWW-7	BMP	Downgradient well for Evaporation Pond
HSW-1	BMP	Downgradient well for Drying Pad
Research Farm		
NH1W	GWD/BMP	Downgradient for Research Farm
NH2W	GWD/BMP	Lower Research Farm

Potential Source Areas w/ Well IDs	Purpose	Justification
NH3W	GWD/BMP	Lower Research Farm
NH4W	GWD/BMP	Mid-Research Farm/Downgradient of Duck Pond Drainage
NH5W	GWD/BMP	Mid-Research Farm
NH6W	GWD/BMP	Mid-Research Farm
NH7W	GWD/BMP	Upgradient of Research Farm
NH8W	GWD/BMP	Upgradient of Research Farm
NH-9W	GWD/BMP	Mid-Research Farm
NH-10W	GWD/BMP	Upgradient of Research Farm
RG-1	GWD/BMP	Downgradient for Research Farm
Raw Water Settling Basin		
HRW-1	GWD/BMP	Upgradient of Raw Water Settling Basin
HRW-2	GWD/BMP	Downgradient of Raw Water Settling Basin
Surface Water Locations		
H-1	GWD/BMP	Upgradient Huntington Creek
H-2	GWD/BMP	Midpoint on Huntington Creek
UPL-9	GWD/BMP	Downgradient Huntington Creek
Raw Water Settling Basin	GWD/BMP	Raw Water Settling Basin
H-11	CAP	Spring
H-12	CAP	Duck Pond Surface
Drain-O	CAP	Downgradient of Old Landfill
Drain-N	CAP	Downgradient of New Landfill
West End Canyon	CAP	Downgradient of Landfill
UPL-13	GWD/BMP	Routine Network for Research Farm
Landfill @ Pumphouse	CAP	Downgradient of Landfill
Duck Pond @ Pumphouse	CAP	Downgradient of Landfill
HG-FD	CAP	Downgradient of Landfill
Creek at DP3	CAP	Downgradient of Landfill

Huntington Raw Water Settling Basin**Surface Water Sample - Up Gradient**

Year	Quarter	Boron	Calcium	Magnesium	Potassium	Sodium	Carbonate	Bicarbonate	Chloride	Conductivity	Nitrate	pH	Sulfate	TDS
2012	Sep	<0.50	52	18	2.1	7.7	<20.0	172	10.1	405	0.14	8.25	31.1	208
2013	July	<0.50	53	19	2.3	10.7	<20.0	195	11.2	427	0.10	8.13	39.3	212
2013	Aug	<0.50	51	17	2.1	8.6	<20.0	181	9.7	418	0.15	7.94	34.7	244
2013	Sep	<0.50	58	24	2.3	11.7	<20.0	214	11.8	514	0.16	8.53	48.4	288
2013	Oct	<0.50	53	23	1.8	9.2	<40.0	208	43.8	421	0.03	7.60	48.5	240
2014	Apr	<0.50	57	18	1.5	8.4	<40.0	200	11.8	453	1.20	7.81	34.5	272
2014	Jun	<0.50	51	15	1.1	6.0	<20.0	166	6.43	411	0.17	8.34	19.4	200
2014	Aug	<0.50	52	18	1.4	9.0	<20.0	170	8.3	410	0.19	8.52	28.0	260
2014	4th	<0.50	57	23	1.9	9.7	24.1	169	12.6	451	0.08	8.49	38.4	228
2015	4th	<0.50	47	17	1.2	6.2	16.9	147	6.62	386	<0.01	8.47	17.7	156
2016	4th	<0.50	50	17	1.4	7.2	<10.0	181	9.56	418	<0.01	8.18	28.6	228
2017	4th	<0.50	52	22	1.5	10.7	<10.0	200	10.5	484	0.13	8.57	32.5	236
2017	Dec											7.38		

HRW-1**Ground Water Sample - Up Gradient**

Year	Quarter	Boron	Calcium	Magnesium	Potassium	Sodium	Carbonate	Bicarbonate	Chloride	Conductivity	Nitrate	pH	Sulfate	TDS
2017	Dec											6.62		

HRW-2**Ground Water Sample - Down Gradient**

Year	Quarter	Boron	Calcium	Magnesium	Potassium	Sodium	Carbonate	Bicarbonate	Chloride	Conductivity	Nitrate	pH	Sulfate	TDS
2017	Dec											7.05		



Aluminum	Temp °C	spec cond
----------	---------	-----------

0.17	14.3	0.502
0.20	19.7	0.485
0.24	15.9	0.454
0.10	11.2	0.586
<0.10	7.1	0.503
0.26	8.1	0.567
0.15	13.7	0.414
0.15	16.0	0.453
0.16	12.0	0.462
<0.10	12.9	0.370
<0.10	10.5	0.400
<0.10	7.5	0.434
	2.0	0.594



elevation	Temp °C	spec cond
-----------	---------	-----------

6449.42	10.9	1.44
---------	------	------



elevation	Temp °C	spec cond
-----------	---------	-----------

6413.40	10.1	0.54
---------	------	------