C/015/018 Incoming

INTERWEST MINING COMPANY
A SUBSIDIARY OF PACIFICORP

Interwest Mining Company
Huntington Office
P. O. Box 310
15 North Main Street
Huntington, UT 84528

#5413

April 24, 2017

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DIV. OF OIL, GAS & MINING

Utah Coal Program
Utah Division of Oil, Gas, and Mining
1594 West North Temple, Suite 1210
P.O. Box 145801
Salt Lake City, Utah 84114-5801

Subj: Clean Copy Submittal to the Amendment to Include New Water Monitoring Locations, Deer Creek Mine, C/015/0018, Emery County, Utah, Task ID #5413.

PacifiCorp, by and through its wholly-owned subsidiary, Interwest Mining Company, as mine manager, hereby submits clean copies to the Amendment to Include New Water Monitoring Locations, Deer Creek Mine, Task ID #5364.

PacifiCorp will be installing a buried mine water drainage line from the Rilda Canyon portals to the Huntington Power Plant as part of the mine closure. These water monitoring locations will provide for adequate monitoring of quantity and quality of the mine water discharge from the Rilda Canyon portals through the pipeline.

Water quality and quantity measuring points in the Water Monitoring Plan have each been given unique separate numbers, and these numbers are now included in the Water Monitoring Plan tables and on the Water Monitoring Plan map.

A C2 form has been included for placement in the Deer Creek MRP. Two clean copies of the revised pages in Volume 1 and Volume 9 of the Deer Creek MRP is included for placement into the Deer Creek Permit.

If there are any questions or concerns with this, please contact me at 435-687-4712, Chuck Semborski at 435-687-4720, or Dennis Oakley at 435-687-4825.

Sincerely,

Kenneth S. Fleck

Kenneth Fleck
Geology and Environmental Affairs Manager

Enclosures

Cc File

APPLICATION FOR COAL PERMIT PROCESSING
Detailed Schedule Of Changes to the Mining And Reclamation Plan

Permittee: PacifiCorp
Mine: Deer Creek Mine **Permit Number:** c/015/0018
Title: Clean Copy Submittal to the Amendment to Include New Water Monitoring Locations, Deer Creek Mine, C/015/0018, Emery County, Utah, Task ID #5364

Provide a detailed listing of all changes to the Mining and Reclamation Plan, which is required as a result of this proposed permit application. Individually list all maps and drawings that are added, replaced, or removed from the plan. Include changes to the table of contents, section of the plan, or other information as needed to specifically locate, identify and revise the existing Mining and Reclamation Plan. Include page, section and drawing number as part of the description.

			DESCRIPTION OF MAP, TEXT, OR MATERIAL TO BE CHANGED
☐ Add	☒ Replace	☐ Remove	Volume 1, Part 2, replace pages 2-220 thru 2-225
☐ Add	☒ Replace	☐ Remove	Volume 1, Part 2, replace Map HM-1A
☐ Add	☒ Replace	☐ Remove	Volume 9, Appendix A-1, replace entire Hydrologic Monitoring Program pages 1-13
☐ Add	☒ Replace	☐ Remove	Volume 9, Appendix A-1, replace entire Hydrologic Monitoring Schedule, 8 pages
☐ Add	☒ Replace	☐ Remove	Volume 9, Appendix A-1, replace Map HM-1A
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Any other specific or special instruction required for insertion of this proposal into the Mining and Reclamation Plan.	**Received by Oil, Gas & Mining**

PacifiCorp

Interwest Mining Company

Deer Creek Mine

C/015/0018

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Volume 1, Part 2 – Replace Pages 2-220 thru 2-225

R645-301-720: HYDROLOGIC RESOURCES AND MONITORING REQUIREMENTS

Hydrology

The Deer Creek Mine is part of the East Mountain property in which PacifiCorp holds coal mining interests. The East Mountain property encompasses multiple adjacent mining operations including; Cottonwood/Wilberg Mine, Deer Creek Mine, and the reclaimed Des Bee Dove Mine (Phase III Bond Released approved August 2014). PacifiCorp has collected comprehensive baseline information on the hydrologic resources of the East Mountain property that consists of ground and surface water investigations, climatological information, baseline cumulative impact area information, and probable hydrologic consequence determination to ensure the protection of the hydrologic balance of the Deer Creek Mine permit area and East Mountain property. This information is found in Volume 9, Volume 9A, and/or Volume 9B.

As part of the requirements of the Utah Coal Regulations R645-301-731.221 through R645-301-731.225, a hydrologic monitoring program has been established in cooperation with Utah Division of Oil, Gas, and Mining. The hydrologic monitoring program involves collecting water quality and quantity samples of ground and surface water for specific sites pertinent the Deer Creek Mine permit area.

The following details the hydrologic monitoring program for the Deer Creek Mine permit for surface and ground water monitoring sites, required sampling parameter list, and map showing site locations.

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Surface Water Hydrology (for detailed information for the Deer Creek Mine see Volumes 9, 9A, and 9B)

Cottonwood Creek Drainage System

Indian Creek (refer to Deer Creek Volume 12 R645-301-700: Hydrologic Monitoring Map MFS1851D)

1) ICA
2) ICF
3) ICD
4) ICB

Huntington Creek Drainage System

Huntington Creek (refer to Volume 9, Hydrologic Section, Cottonwood/Wilberg and Deer Creek Mines, Map HM-1A)

1) HCC01
2) HCC02
3) HCC04

Deer Creek Canyon (refer to Volume 9, Hydrologic Section, Cottonwood/Wilberg and Deer Creek Mines, Map HM-1A)

1) DCR01
2) DCR04
3) DCR06

Meetinghouse Canyon-South Fork (refer to Volume 9, Hydrologic Section, Cottonwood/Wilberg and Deer Creek Mines, Map HM-1A)

1) MHC01

Rilda Canyon (refer to Volume 9, Hydrologic Section, Cottonwood/Wilberg and Deer Creek Mines, Map HM-1A)

1) RCF1
2) RCLF1
3) RCLF2
4) RCF2
5) RCF3
6) RCW4

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Mill Fork Canyon (refer to Deer Creek Volume 12 R645-301-700: Hydrologic Monitoring Map MFS1851D)

1) MFA01
2) MFB02
3) MFU03

Ground Water Hydrology (for detailed information for the Deer Creek Mine see Volumes 9 and 9A: Hydrologic Section, Cottonwood/Wilberg and Deer Creek Mines)

East Mountain Springs (refer to Volume 9, Hydrologic Section, Cottonwood/Wilberg and Deer Creek Mines, Map HM-4)

1) Sheba Springs
2) 80-50
3) Rilda Canyon Meter 3*

* NEWUSSD controls Rilda Canyon meters. Monitoring will be conducted when meters are functioning.

East Mountain Springs - Mill Fork Area (refer to Deer Creek Permit Volume 12 R645-301-700: Hydrologic Monitoring Map MFS1851D)

1) EM-216
2) MFR-30
3) JV-9
4) JV-34
5) RR-5
6) RR-15
7) RR-23A
8) MF-7
9) MF-10
10) MF-19B
11) MF-213
12) MF-219
13) SP1-26
14) SP1-29
15) MFR-10
16) UJV 101
17) UJV-206
18) UJV-213
19) EM Pond
20) Little Bear Spring
21) Grants Spring

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Piezometric Data - Surface

Rilda Canyon

1) P1
2) P5
3) P6
4) P7
5) EM-47

UPDES Monitoring Locations - UPDES Permit #UT0023604

1) 001 - Sediment Pond - Deer Creek Canyon
2) 002 - Mine Discharge - Deer Creek Canyon

Post Mine Closure Monitoring Locations - Deer Creek Mine

1. Deer Creek Mine
   Rilda Canyon Pipeline - terminus of pipeline DCRCP (refer to HM-1A)
2. Deer Creek Mine

   Rilda Canyon Pipeline - integrity evaluation meters (refer to Volume 11, R645-3-1-500 Engineering Section, Appendix I, Design Drawings Deer Creek Mine Water Relief Pipeline 2016 Rilda Canyon for location of upper and lower vaults - meter locations)

Required Monitoring Parameters

Field Measurements shall be collected during monitoring of surface and ground water sites. Field measurements include:

-Date and Time
-Flow
-pH
-Temperature
-Conductivity
-Dissolved Oxygen (perennial streams only)

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Surface and ground water samples shall be analyzed for quality utilizing the following parameters (in mg/L). Baseline parameters shall be collected every 5 years. Operational samples shall be

collected at all other times and as dictated by the monitoring schedule.

Laboratory Measurements:

#	*	-	Total Settleable Solids (UPDES Only)
#	*	-	Total Suspended Solids (Surface Only)
	*	-	Total Dissolved Solids
	*	-	Total Hardness ($CaCO_3$)
		-	Acidity ($CaCO_3$)
		-	Aluminum (Al) - Dissolved
		-	Arsenic (As) - Dissolved
		-	Boron (B) - Dissolved (Waste Rock Sites Only)
	*	-	Carbonate (CO_3^{-2})
	*	-	Total Alkalinity/Bicarbonate ($CaCO_3$)
		-	Cadmium (Cd) - Dissolved
	*	-	Calcium (Ca) - Dissolved
	*	-	Chloride (Cl-)
		-	Copper (Cu) - Dissolved
	*	-	Iron (Fe) - Total & Dissolved
		-	Lead (Pb) – Dissolved
	*	-	Magnesium (Mg) - Dissolved
	*	-	Manganese (Mn) - Total & Dissolved
		-	Molybdenum (Mo) - Dissolved
		-	Nitrogen: Ammonia (NH3) - reported as N
		-	Nitrite (NO_2) - reported as N
		-	Nitrate (NO_3^-) - reported as N
	*	-	Potassium (K) - Dissolved
	*	-	Oil & Grease*
		-	Ortho Phosphate (PO_4^{-3}) - reported as P
		-	Selenium (Se) - Dissolved (Waste Rock Sites Only)
	*	-	Sodium (Na) - Dissolved
	*	-	Sulfate (SO_4^{-2})
		-	Zinc (Zn) - Dissolved
	*	-	Cation-Anion Balance

Construction * Operational - Baseline

*UPDES & surface waters above & below mine sites

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Monitoring Schedule

Surface monitoring sites shall be field monitored quarterly for all field parameters except for Indian Creek Sites – monitoring to be conducted during base flow only. Surface sites shall also be analyzed for quality for all quality parameters listed except for Indian Creek sites – monitoring to be conducted during base flow only.

East Mountain Springs (including the Mill Fork Area) shall be field monitored during the months of July and October. Rilda Canyon Springs - NEWUSSD: Meter 3 shall be field monitored monthly depending on access. East Mountain Springs (including the Mill Fork Area) shall also be analyzed for quality during the months of July and October. Rilda Canyon Springs - NEWUSSD: Meter 3 shall be monitored for quality monthly depending on access. All surface and ground water monitoring requirements for the Mill Fork Area are found in Volume 12, Deer Creek Mine, Mill Fork Lease, Section R645-301-700.

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Deer Creek Mine

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Volume 1, Part 2 – Replace Map HM-1A

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Volume 9, Appendix A-1 – Replace Hydrologic Monitoring Program, 13 pages

PACIFICORP
ENERGY WEST
HYDROLOGIC MONITORING PROGRAM
DEER CREEK MINE

I. MONITORING LOCATIONS – DEER CREEK MINE

A. Surface Water Hydrology (for maps refer to Deer Creek and Wilberg/Cottonwood Mine: Volume 9 Map HM-1A, Deer Creek Volume 12 R645-301-700: Hydrologic Monitoring Map MFS1851D Mill Fork Lease for East Mountain locations listed below

1. Cottonwood Creek Drainage System

a. ***Indian Creek*** (refer to Deer Creek Volume 12 R645-301-700: Hydrologic Monitoring Map MFS1851D)

(1) ICA - Indian Creek Above
(Approximately 2500 feet northwest of the Mill Fork permit boundary) 400 feet North, 2350 feet West of the Southwest corner of Section 3, Township 16 South, Range 6 East.

(2) ICF - Indian Creek Flume
(Approximately 2100 feet west of the Mill Fork permit boundary) 300 feet North, 3400 feet West of the Southwest corner of Section 10, Township 16 South, Range 6 East.

(3) ICD - Indian Creek Ditch
(Approximately 1600 feet west of the Mill Fork permit boundary, irrigation ditch for Upper Joes Valley) 240 feet North, 2850 feet West of the Southwest corner of Section 15, Township 16 South, Range 6 East.

(4) ICB - Indian Creek Below
(Approximately 3700 feet west of the Mill Fork permit boundary, junction of Indian Creek and FDR040) 70 feet North, 120 feet West of the Southwest corner of Section 16, Township 16 South, Range 6 East.

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2. Huntington Creek Drainage System

a. ***Huntington Creek*** (refer to Deer Creek and Wilberg/Cottonwood Mines: Volume 9 Map HM-1A)

(1) HCC01 - Above Deer Creek Confluence:
1400 feet north, 2200 feet west of the southeast corner of Section 36, Township 16 South, Range 7 East.

(2) HCC02 - Below Deer Creek Confluence:
300 feet north, 300 feet west of the southwest corner of Section 31, Township 16 South, Range 8 East.

(3) HCC04 - @ Research Farm*
800 feet north, 200 feet east of the southwest corner of Section 5, Township 17 South, Range 8 East.
*Not listed on map due to scale.

b. ***Deer Creek*** (refer to Deer Creek and Wilberg/Cottonwood Mines: Volume 9 Map HM-1A)

(1) DCR01 - Above the mine:
(Approximately 600 feet upstream from the mine facility.) 200 feet North, 800 feet West of the Southeast corner of Section 10, Township 17 South, Range 7 East.

(2) DCR04 - Near C1/C2 Belt Intersection:
(Approximately 5,000 feet downstream from the mine facility.) 300 feet North, 2000 feet East of the Southeast corner of Section 2, Township 17 South, Range 7 East.

(3) DCR06 - @ Huntington Creek Confluence:
(Approximately 15,000 feet downstream from the facility) 1400 feet north, 1100 feet east of the southeast corner of Section 6, Township 16 South, Range 7 East.

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c. ***Meetinghouse Canyon - South Fork*** (refer to Deer Creek, Wilberg/Cottonwood, Des-Bee-Dove Mine: Volume 9 Map HM-1)

(1) MHC01 - Meetinghouse Canyon South Fork (Approximately 200 feet upstream from the north and south convergence.) 800 feet North, 1500 feet East of the Southwest corner of Section 35, Township 16 South, Range 7 East.

d. ***Rilda Canyon*** (refer to Deer Creek and Wilberg/Cottonwood Mines: Volume 9 Map HM-1A)

(1) RCF-1 - Rilda Canyon - Right Fork: (Approximately 4000 feet upstream from the Right and Left fork convergence.) 400 feet South, 200 feet West of the Northeast corner of Section 30, Township 16 South, Range 7 East.

(2) RCLF1 - Rilda Canyon - Left Fork, below Rilda Canyon Portals: (Approximately 200 feet upstream from the Right and Left fork convergence.) 2400 feet North, 2100 feet West of the Southeast corner of Section 29, Township 16 South, Range 7 East.

(3) RCLF2 - Rilda Canyon - Left Fork, above Rilda Canyon Portals: (Approximately 1600 feet upstream from the Right and Left fork convergence.) 1600 feet North, 2300 feet West of the Southwest corner of Section 29, Township 16 South, Range 7 East.

(4) RCF2 - Rilda Canyon - Above NEWUSSD springs: 2500 feet South, 400 feet West of the Northeast corner of Section 29, Township 16 South, Range 7 East.

(5) RCF3 - Rilda Canyon - Below NEWUSSD springs: 2550 feet South, 1000 feet East of the Northeast corner of Section 28, Township 16 South, Range 7 East.

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(6) RCW4 - Rilda Canyon: (Approximately 1000 feet upstream from the confluence with Huntington Creek.) 850 feet North, 1900 feet West of the Southeast corner of Section 26, Township 16 South, Range 7 East.

e. ***Mill Fork Canyon*** (refer to Deer Creek Volume 12 R645-301-700: Hydrologic Monitoring Map MFS1851D)

(1) MFA01 - Mill Fork Canyon - Above Old Mine: (Approximately 2000 feet above old mine portals @ end of USFS development road.) 100 feet North, 1500 feet West of the Southeast corner of Section 17, Township 16 South, Range 7 East.

(2) MFB02 - Mill Fork Canyon - Above Huntington Creek Confluence: (Approximately 200 feet above confluence with Huntington Creek @ culvert outfall.) 100 feet South, 1900 feet East of the Northwest corner of Section 22, Township 16 South, Range 7 East.

(3) MFU03 - Mill Fork Canyon - Above Mill Fork Fault Crossing: (Approximately 700 feet upstream of projected Mill Fork Fault crossing) 1150 feet North, 1700 feet East of the Southwest corner of Section 17, Township 16 South, Range 7 East.

3. **Reclamation Monitoring:** Following final reclamation, backfilling and grading monitoring will be conducted at points immediately above and below the reclaimed site.

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HYDROLOGIC MONITORING PROGRAM
DEER CREEK MINE

B. Groundwater Hydrology – Deer Creek Mine

1. **East Mountain Springs** (refer to Deer Creek and Wilberg/Cottonwood Mines: Volume 9 maps HM-4)

   Sheba Springs
   80-50
   Rilda Canyon-(Meters ~~2&~~3) [1]

   [1]NEWUSSD controls Rilda Canyon meters. Monitoring will be conducted when meters are functioning.

2. **East Mountain Springs - Mill Fork Area** (refer to Deer Creek Permit Volume 12 R645-301-700: Hydrologic Monitoring Map MFS1851D)

   EM-216
   JV-9
   JV-34
   MF-7
   MF-10
   MF-19B
   MF-213
   MF-219
   MFR-10
   EMPOND
   Little Bear Spring
   MFR-30
   RR-5
   RR-15
   RR-23A
   SP1-26
   SP1-29
   UJV-101
   UJV-206
   UJV-213
   Grants Spring

3. **Piezometric Data**

   a. Surface

      (1) Rilda Canyon (refer to Deer Creek and Wilberg/Cottonwood Mines: Volume 9 Map HM-1a)

      P1
      P5
      P6
      P7
      EM-47

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C. UPDES Monitoring Locations – Deer Creek Mine (refer to HM-1A)

a. ***Deer Creek Mine***
UPDES UT0023604
001- Sediment Pond – Deer Creek Canyon
002- Mine Discharge – Deer Creek Canyon

D. Post Mine Closure Monitoring Locations – Deer Creek Mine

a. **Deer Creek Mine**
Rilda Canyon Pipeline – terminus of pipeline DCDRCP (refer to HM-1A)

b. **Deer Creek Mine**
Rilda Canyon Pipeline – integrity evaluation meters (refer to Volume 11, R645-301-500 Engineering Section, Appendix I, Design Drawings Deer Creek Mine Water Relief Pipeline 2016 Rilda Canyon for location of upper and lower vaults – meter locations)
1. DCDRCP – Meter 1: located near the Rilda Canyon Portals
2. DCDRCP – Meter 2: located near the Huntington Power Plant Raw Water Pond

II. MONITORING SCHEDULE – DEER CREEK MINE
(See enclosed monitoring schedules for operational, baseline, and reclamation monitoring)

A. Field Measurements

Field Measurements collected during quality sampling: Listed below are the sites which will be monitored by PacifiCorp - Energy West in accordance with the guidelines established by DOGM; i.e.

- Date and Time
- Flow
- pH
- Temperature
- Conductivity
- Dissolved oxygen (perennial streams only)

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ENERGY WEST
HYDROLOGIC MONITORING PROGRAM
DEER CREEK MINE

Surface Monitoring

Surface monitoring locations will be field monitored quarterly for all field parameters, except Indian Creek - monitoring to be conducted during base flow only.

1. Cottonwood Canyon Creek

a. Indian Creek

(1) ICA
(2) ICF
(3) ICD
(4) ICB

2. Huntington Canyon Drainage

a. Deer Creek

(1) DCR01
(2) DCR04
(3) DCR06

b. Huntington Creek

(1) HCC01
(2) HCC02
(3) HCC04

Flow in Huntington Creek is measured only at HCC01 by Utah Power, and will be reported in the Annual Hydrologic Report.

c. Meetinghouse Canyon - South Fork:

(1) MCH01

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d. Rilda Canyon

(1) RCF1*
(2) RCLF 1
(3) RCLF 2
(4) RCF2
(5) RCF3
(6) RCW4

* Baseline flow will be measured adjacent to EM-163

e. Mill Fork Canyon

(1) MFA01
(2) MFB02
a. MFU03

Groundwater Monitoring

1. East Mountain Springs (see monitoring location list I.B.1)

2. East Mountain Springs - Mill Fork Area (see monitoring location list I.B.3)

East Mountain Springs will be field monitored during the months of July and October. Rilda Canyon Springs - (NEWUSSD: Meter 3; when functioning) will be field monitored monthly depending upon access.

3. Post Mine Closure – Deer Creek Mine Drainage
   a. Rilda Canyon Pipeline – terminus of pipeline DCDRCP
   b. Rilda Canyon Pipeline – integrity evaluation meters – flow only (refer to Volume 11, R645-301-500 Engineering Section, Appendix I, Design Drawings, Water Relief Pipeline 2016 Rilda Canyon for location of upper and lower vaults – meter locations)
      1. DCDRCP – Meter 1: located near the Rilda Canyon Portals
      2. DCDRCP – Meter 2: located near the Huntington Power Plant Raw Water Pond

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4. Piezometric Wells

a. Surface

Piezometric surface wells will be field monitored for level only on a monthly basis depending upon access.

(1) Rilda Canyon (see Map HM-1 for locations)

P1	P7
P5	EM-47
P6	

UPDES Monitoring

1. Deer Creek

UPDES sites 001 and 002 will be monitored as specified in the individual permits.

Reclamation Monitoring

Surface Water Resources: (see enclosed summary of operational, baseline, and reclamation monitoring schedules)
Surface monitoring locations will be field monitored monthly for flow and all field parameters quarterly until bond release.

Ground Water Resources: (see enclosed summary of operational, baseline, and reclamation monitoring schedules)

Springs — East Mountain Springs will be field monitored during the months of July and October.

Rilda Canyon Springs (NEWUSSD: Meter 3; when functioning) will be field monitored monthly for flow depending upon access. East Mountain Springs (including Rilda Springs) monitoring will be conducted until permit area reduction approval or unless otherwise approved by the Division.

Wells: Piezometric surface wells (Rilda Canyon Canyon): will be field monitored for level only on a monthly basis depending upon

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access. Piezometric surface well monitoring will be conducted until permit area reduction approval or unless otherwise approved by the Division.

Post Mine Closure:

Post Mine Closure monitoring locations will be field monitored monthly for flow including all field parameters until bond release.

UPDES: Sites will be monitored as specified in the individual permits

B. Quality Sampling (Laboratory Measurements)

1. Surface Water Hydrology: Water samples will be collected and analyzed quarterly (one sample at low flow and high flow) during the first or second week of the quarter, except for Indian Creek - quality samples will be collected during baseflow only. Parameters analyzed are those listed in the DOGM Guidelines for Surface Water Quality (see Table 1-Surface Water Quality Parameter List). Quarterly sampling was initiated during March 1988 and will continue throughout the year; i.e., June, September, and December. Baseline analysis was performed in 2016 and will be repeated every five years there-after.

a. Cottonwood Creek Drainage

(1) Indian Creek

(a) ICA
(b) ICD
(c) ICB

b. Huntington Creek Drainage

(1) Deer Creek

(a) DCR01
(b) DCR04
(c) DCR06

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(2) Huntington Creek

(a) HCC01
(b) HCC02
(c) HCC04

(3) Meetinghouse Canyon - South Fork:

(a) MCH01

(5) Rilda Canyon

(a) RCF1
(b) RCF3
(c) RCW4

(6) Mill Fork Canyon

(a) MFA01
(b) MFB02
(c) MFU03

Reclamation Monitoring - Surface Water Hydrology: Water samples will be collected and analyzed quarterly (one sample at low flow and high flow) during the first or second week of the quarter. Parameters analyzed are those listed in the DOGM Guidelines for Surface Water Quality (see Table 1-Surface Water Quality Parameter List). Sampling will be conducted on a quarterly basis until bond release. Baseline analysis will be performed on the 5th and 9th years following reclamation. In no case will baseline sampling time frame exceed 5 years converting from operational to reclamation monitoring.

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2. Groundwater Hydrology

a. East Mountain Springs: Water samples will be collected and analyzed during the months of July and October. Rilda Canyon Springs (NEWUSSD: Meter 3; when functioning) will be monitored for quarterly for quality. Parameters analyzed are those listed in the DOGM Guidelines for Groundwater Water Quality (see Table 2-Ground Water Quality Parameter List).

b. Wells: No analysis required

c. Post Mine Closure Rilda Canyon Pipeline – terminus of pipeline DCDRCP: One water sample will be collected and analyzed per location monthly. Parameters analyzed are those listed in the DOGM Guidelines for Groundwater Water Quality (see Table 2-Ground Water Quality Parameter List).

Baseline analysis was performed in 2016 and will be repeated every five years thereafter.

Reclamation Monitoring - Groundwater Hydrology:

a. East Mountain Springs: Water samples will be collected and analyzed during the months of July and October. Rilda Canyon Springs (NEWUSSD: Meter 3; when functioning) will be monitored quarterly for quality. Parameters analyzed are those listed in the DOGM Guidelines for Groundwater Water Quality (see Table 2-Ground Water Quality Parameter List). East Mountain Springs (including Rilda Springs) monitoring will be conducted until permit area reduction approval or unless otherwise approved by the Division.

b. Wells: Rilda Canyon wells will be sealed during final reclamation. Quarterly sampling will continue until sealing. Parameters analyzed are those listed in the DOGM Guidelines for Groundwater Water Quality (see Table 2-Ground Water Quality Parameter List).

c. Post Reclamation Monitoring: PacifiCorp commits to conduct annual surveys to identify new discharge locations within and below sealed portals. If discharge occurs, one water sample will be collected and analyzed per location quarterly. Parameters analyzed are those listed in

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the DOGM Guidelines for Groundwater Water Quality (see Table 2-Ground Water Quality Parameter List). Baseline analysis will be performed on the 5th and 9th year.

3. UPDES Monitoring Sites

a. Deer Creek Mine

UPDES sites will be monitored as specified in the individual permits.

III. ANNUAL REPORTS

All data collected regarding the hydrology of East Mountain will be summarized by the applicant in an annual Hydrologic Monitoring Report. Copies of the report will be submitted to the Utah State Division of Oil, Gas and Mining. In addition, any raw data collected will be submitted to the Utah State Division of Oil, Gas and Mining on a quarterly basis.

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PacifiCorp

Interwest Mining Company

Deer Creek Mine

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Volume 9, Appendix A-1 – Replace Hydrologic Monitoring Schedule, 8 pages

PACIFICORP
ENERGY WEST MINING COMPANY
HYDROLOGIC MONITORING SCHEDULE
DEER CREEK MINE

SURFACE HYDROLOGY - OPERATIONAL SAMPLING (Table 1)

Drainage System	Drainage	Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Cottonwood Creek Drainage System	*Joes Valley*	ICA	Based Flow Monitoring Only (October or November)									Operational		
	Indian Creek	ICD	Based Flow Monitoring Only (October or November)									Operational		
		ICB	Based Flow Monitoring Only (October or November)									Operational		
Huntington Drainage System	*Deer Creek*	DCR01	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational
		DCR04	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational
		DCR06	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational
	Huntington Creek	HCC01	Flow *	Flow *	Operational*	Flow *	Flow *	Operational*	Flow *	Flow *	Operational*	Flow *	Flow *	Operational*
		HCC02			Operational*			Operational*			Operational*			Operational*
		HCC04			Operational*			Operational*			Operational*			Operational*
			* Flow in Huntington Creek is measured @ HCC01 by Utah Power, and will be reported in the Annual Hydrologic Report											
	Meetinghouse Canyon	MCH01	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational
	Rilda Canyon	RCF1*	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational
		RCLF1	Flow	Flow	Field	Flow	Flow	Field	Flow	Flow	Field	Flow	Flow	Field
		RCLF2	Flow	Flow	Field	Flow	Flow	Field	Flow	Flow	Field	Flow	Flow	Field
		RCF2	Flow	Flow	Field	Flow	Flow	Field	Flow	Flow	Field	Flow	Flow	Field
		RCF3	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational
		RCW4	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational
			* Baseline flow will be measured adjacent to EM-163											
	Mill Fork Canyon	MFA01	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational
		MFB02	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational
		MFU03	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational

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HYDROLOGIC MONITORING SCHEDULE

DEER CREEK MINE

GROUNDWATER HYDROLOGY - OPERATIONAL SAMPLING (Table 2)

Groundwater Type			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Springs	*East Mountain*	*(Includes Mill Fork Springs)*							Operational	Flow *	Flow *	Operational		
										* Recession Springs				
	East Mountain-Rilda Canyon Meter		Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational
Wells	*Rilda Canyon Wells*		Level	Level	Level	Level	Level	Level	Level	Level	Level	Level	Level	Level

UPDES SAMPLING - (Table 1)

			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mine Water Discharge	*Deer Creek*	DCD	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational
Sediment Pond Discharge	*Deer Creek*	1 Outfall	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational

POST MINE CLOSURE SAMPLING - (Table 2)

			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mine Water Rilda Canyon Pipeline	*Deer Creek*	DCDRCP	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational
	Deer Creek	Meters [See Note]	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow

Note:
DCDRCP - Meter 1: located near Rilda Canyon Portals
DCDRCP - Meter 2: located near Huntington Plant Raw Water Pond

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HYDROLOGIC MONITORING SCHEDULE
DEER CREEK MINE

SURFACE HYDROLOGY - BASELINE SAMPLING (Table 1) - 2016, 2021

Drainage System	Drainage	Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Cottonwood Creek Drainage System	*Joes Valley*	ICA	Based Flow Monitoring Only (October or November)									Baseline		
	Indian Creek	ICD	Based Flow Monitoring Only (October or November)									Baseline		
		ICB	Based Flow Monitoring Only (October or November)									Baseline		
Huntington Drainage System	*Deer Creek*	DCR01	Flow	Flow	Baseline	Flow	Flow	Baseline	Flow	Flow	Baseline	Flow	Flow	Baseline
		DCR04	Flow	Flow	Baseline	Flow	Flow	Baseline	Flow	Flow	Baseline	Flow	Flow	Baseline
		DCR06	Flow	Flow	Baseline	Flow	Flow	Baseline	Flow	Flow	Baseline	Flow	Flow	Baseline
	Huntington Creek	HCC01	Flow *	Flow *	Baseline*	Flow *	Flow *	Baseline*	Flow *	Flow *	Baseline*	Flow *	Flow *	Baseline*
		HCC02			Baseline*			Baseline*			Baseline*			Baseline*
		HCC04			Baseline*			Baseline*			Baseline*			Baseline*
			* Flow in Huntington Creek is measured @ HCC01 by Utah Power, and will be reported in the Annual Hydrologic Report											
	Meetinghouse Canyon	MCH01	Flow	Flow	Baseline	Flow	Flow	Baseline	Flow	Flow	Baseline	Flow	Flow	Baseline
	Rilda Canyon	RCF1*	Flow	Flow	Baseline	Flow	Flow	Baseline	Flow	Flow	Baseline	Flow	Flow	Baseline
		RCLF1	Flow	Flow	Field	Flow	Flow	Field	Flow	Flow	Field	Flow	Flow	Field
		RCLF2	Flow	Flow	Field	Flow	Flow	Field	Flow	Flow	Field	Flow	Flow	Field
		RCF2	Flow	Flow	Field	Flow	Flow	Field	Flow	Flow	Field	Flow	Flow	Field
		RCF3	Flow	Flow	Baseline	Flow	Flow	Baseline	Flow	Flow	Baseline	Flow	Flow	Baseline
		RCW4	Flow	Flow	Baseline	Flow	Flow	Baseline	Flow	Flow	Baseline	Flow	Flow	Baseline
			* Baseline flow will be measured adjacent to EM-163											
	Mill Fork Canyon	MFA01	Flow	Flow	Baseline	Flow	Flow	Baseline	Flow	Flow	Baseline	Flow	Flow	Baseline
		MFB02	Flow	Flow	Baseline	Flow	Flow	Baseline	Flow	Flow	Baseline	Flow	Flow	Baseline
		MFU03	Flow	Flow	Baseline	Flow	Flow	Baseline	Flow	Flow	Baseline	Flow	Flow	Baseline

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HYDROLOGIC MONITORING SCHEDULE

DEER CREEK MINE

GROUNDWATER HYDROLOGY - BASELINE SAMPLING (Table 2) - 2016, 2021

Groundwater Type			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Springs	*East Mountain*	*(Includes Mill Fork Springs)*							Baseline	Flow *	Flow *	Baseline		
										* Recession Springs				
	East Mountain-Rilda Canyon Meter		Flow	Flow	Baseline	Flow	Flow	Baseline	Flow	Flow	Baseline	Flow	Flow	Baseline
Wells	*Rilda Canyon Wells*		Level	Level	Level	Level	Level	Level	Level	Level	Level	Level	Level	Level

UPDES SAMPLING - (Table 1)

			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mine Water Discharge	*Deer Creek*	**DCD**	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational
Sediment Pond Discharge	*Deer Creek*	**1 Outfall**	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational

POST MINE CLOSURE SAMPLING - (Table 2)

			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mine Water Rilda Canyon Pipeline	*Deer Creek*	**DCDRCP**	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
	Deer Creek	**Meters** [See Note]	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow

Note:
DCDRCP - Meter 1: located near Rilda Canyon Portals
DCDRCP - Meter 2: located near Huntington Plant Raw Water Pond

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HYDROLOGIC MONITORING SCHEDULE
DEER CREEK MINE

SURFACE HYDROLOGY - RECLAMATION SAMPLING (Table 1)

Drainage System	Drainage	Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
*Cottonwood Creek Drainage System**	*Joes Valley*	ICA	Based Flow Monitoring Only (October or November)									Operational		
	Indian Creek	ICD	Based Flow Monitoring Only (October or November)									Operational		
		ICB	Based Flow Monitoring Only (October or November)									Operational		
*Huntington Drainage System**	*Deer Creek*	DCR01			Operational			Operational			Operational			Operational
		DCR04			Operational			Operational			Operational			Operational
		DCR06			Operational			Operational			Operational			Operational
	Huntington Creek	HCC01			Operational**			Operational**			Operational**			Operational**
		HCC02			Operational**			Operational**			Operational**			Operational**
		HCC04			Operational**			Operational**			Operational**			Operational**
			** *Flow in Huntington Creek is measured @ HCC01 by Utah Power, and will be reported in the Annual Hydrologic Report*											
	Meetinghouse Canyon	MCH01			Operational			Operational			Operational			Operational
	Rilda Canyon	RCF1***			Operational			Operational			Operational			Operational
		RCLF1			Field			Field			Field			Field
		RCLF2			Field			Field			Field			Field
		RCF2			Field			Field			Field			Field
		RCF3			Operational			Operational			Operational			Operational
		RCW4			Operational			Operational			Operational			Operational
			*** *Baseline flow will be measured adjacent to EM-163*											
	Mill Fork Canyon	MFA01	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational
		MFB02	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational
		MFU03	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational

** Analyzed for Baseline Parameters During the Fifth (5) and Ninth (9) Year After Final Reclamation*
In no case will baseline sampling time frame exceed 5 years converting from operational to reclamation monitoring.

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ENERGY WEST MINING COMPANY
HYDROLOGIC MONITORING SCHEDULE
DEER CREEK MINE

GROUNDWATER HYDROLOGY - RECLAMATION SAMPLING (Table 2)

Groundwater Type

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Springs	**East Mountain (Includes Mill Fork Springs)**							Operational			Operational		
	Spring monitoring will be conducted until permit area reduction approval or unless otherwise approved by the Division.												
	East Mountain-Rilda Canyon Meter	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational	Flow	Flow	Operational
	Rilda Spring monitoring will be conducted until permit area reduction approval or unless otherwise approved by the Division.												
	Spring monitoring will be conducted until permit area reduction approval or unless otherwise approved by the Division.												
Wells	**Rilda Canyon Wells***	Level	Level	Level	Level	Level	Level	Level	Level	Level	Level	Level	Level
	Rilda Canyon well monitoring will be conducted until permit area reduction approval or unless otherwise approved by the Division.												
	** Monitored monthly subject ot access*												

UPDES SAMPLING - (Table 1)

			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mine Water Discharge*	***Deer Creek***	**DCD**	As Needed Basis According to UPDES Permit Stipulations											
**** After Portal Sealing (Deer Creek Canyon and Rilda Canyon), PacifiCorp Will Monitor Down Dip For Development Of Groundwater Seeps/Springs Until Bond Release***														
Sediment Pond Discharge	***Deer Creek***	**1 Outfall**	As Needed Basis According to UPDES Permit Stipulations											

POST MINE CLOSURE SAMPLING - (Table 2)

			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mine Water Rilda Canyon Pipeline	***Deer Creek***	**DCDRCP**	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational
	Deer Creek	**Meters** [See Note]	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow

Note:
DCDRCP - Meter 1: located near Rilda Canyon Portals
DCDRCP - Meter 2: located near Huntington Plant Raw Water Pond

Rilda Canyon Pipeline and Meter (s) monitoring will be conducted until permit area reduction approval or unless otherwise approved by the Division.

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PacifiCorp

Interwest Mining Company

Deer Creek Mine

C/015/0018

Clean Copy Submittal to the Amendment to Include New Water Monitoring Locations, Deer Creek Mine, C/015/0018, Emery County, Utah, Task ID #5364

Volume 9, Appendix A-1 – Replace Map HM-1A

FOR DETAILED HYDROLOGY REFER TO MAP MFS1851D IN VOLUME 12

DRAINAGE DIVIDE

DRAINAGE DIVIDE

DRAINAGE DIVIDE

HUNTINGTON CREEK DRAINAGE

ISOLATED RECHARGE UNSATURATED STRATA

(PRIMARY VERTICAL RECHARGE)

COTTONWOOD CREEK DRAINAGE

LEGEND

- PACIFICORP EAST MOUNTAIN PROPERTY BOUNDARY
- PERMIT AREA BOUNDARY
- FAULT (DASHED WHERE INFERRED)
- WATER MONITORING STATION WITH FLUME
- WATER MONITORING STATION
- MONITORING WELL
- DRAINAGE DIVIDE
- UPDES DISCHARGE LOCATION (UT-0022896-002)
- TYPICAL GROUND WATER MOVEMENT
- GAS WELL
- WATER MONITORING LOCATIONS (EM-150)
- DRILL HOLE

DATE	REVISIONS	BY	CHK
4-3-97	REVISED TRAIL MTN. MINE LEASE BOUNDARY	KJL	
5-20-97	ADDED FOREST SERVICE SPECIAL USE PERMIT	KJL	
9-18-97	ADDED RILDA CANYON RIGHT FORK TRAIL	KJL	
3-19-98	REVISED PERMIT BOUNDARIES	KJL	
1-28-99	UPDATED PERMIT BOUNDARY U-06039	KJL	
1-24-00	REVISED PERMIT BOUNDARIES	KJL	
1-02-02	RELOCATED UT-0022896-001 TO TMA	KJL	
3-7-02	ADDED IBC TO U-06039	KJL	
2-16-04	ADDED MILL FORK LEASE ML-48258	KJL	
4-14-05	UPDATED DRILL HOLES IN ML-48258	KJL	
2-14-06	UPDATED DRILL HOLES IN ML-48258	KJL	
3-21-07	UPDATED DRILL HOLES IN ML-48258	KJL	
5-6-09	UPDATED DRILL HOLES IN ML-48258	KJL	
8-11-09	ADDED DRILL HOLE EM-212 AND REVISED ROADS TO REFLECT AERIAL PHOTOGRAPH	KJL	
3-17-11	ADDED DRILL HOLES EM-213, EM-214, AND EM-215 & UPDATED LEASE RELINQUISHMENT	KJL	
2-16-12	REVISED TO INCLUDE 2011 EXPLORATION DRILL HOLES THROUGH EM-225	KJL	
11-13-12	REVISED TO INCLUDE 2012 EXPLORATION DRILL HOLES, ADDED COTTONWOOD CREEK GAGING STATION	KJL	
1-31-13	ADDED LEASE MODIFICATION BOUNDARIES	KJL	
2-20-14	REVISED DEER CREEK PERMIT BOUNDARY AND UPDATED DRILL HOLES FROM 2013	KJL	
9-2-14	REMOVED COTTONWOOD & TRAIL MOUNTAIN PERMIT BOUNDARIES AND HIGHLIGHTED DEER CREEK MINE MONITORING LOCATIONS	KJL	
5-18-15	ADDED 6 MONITORING WELLS IN 1ST RIGHT AND MILL FORK ACCESS #2	KJL	
10-7-15	REMOVED WATER MONITORING LOCATIONS 80-48, 89-65, 89-66, 89-67, 89-68, DCWR1, AND EM-31	KJL	
2-1-17	REVISED MONITORING SITES, ADDED RILDA PIPELINE, REVISED DEER CREEK PERMIT	KJL	
3-20-17	ADDED DCDRCP METERS 1 AND 2	KJL	

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STATE OF UTAH — KENT D. STRINGHAM — 5223167-2202 — RESIDENCE — 3/24/2017 — REGISTERED PROFESSIONAL ENGINEER AND LAND SURVEYOR

CAD FILE NAME/DISK#: HM-1A

HM-1A

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DEER CREEK MINE
EAST MOUNTAIN PROPERTY
HYDROLOGY DATA MAP

DRAWN BY:	K. LARSEN	CE-10478-EM	
SCALE:	1"=1500'	DRAWING #:	
DATE:	MARCH 20, 2017	SHEET 1 OF 1	REV.