
**Cottonwood Mine
C/015/019
Deer Creek Mine
C/015/018
Des-Bee-Dove Mine
C/015/017**

Volume 9 Hydrologic Section

Text Section

Replace Pages xii

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January 06, 2005

Mine # C/015/0018
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LIST OF REFERENCES

- Danielson, T.W.; Remillard, M.D.; Fuller, R.H., Hydrology of the Coal- Resource areas in the Upper Drainages of Huntington and Cottonwood Creeks, Central Utah; U.S. Geological Survey-Water Resource Investigations, Open-File Report 81-539.
- Doelling, H.H., 1972, Wasatch Plateau Coal Fields, *in* Doelling, H.H. (ed.), Central Utah Coal Fields; Sevier-Sanpete, Wasatch Plateau, Book Cliffs and Emery, Utah Geological and Mineralogical Survey Monograph Series No. 3, Salt Lake City, Utah.
- Graham, M.J.; Tooley, J.E.; Price, D., Preliminary Hydrological Evaluation of the North Horn Mountain Coal-Resource Area, Utah, U.S. Geological Survey, Open-File Report 81-141.
- Lines, G.C., The Ground-water System and Possible Effects of Underground Coal Mining in the Trail Mountain Area, Central Utah, U.S. Geological Survey, Open-File Report 84-067.
- Mundroff, J.C.; 1972 Reconnaissance of Chemical Quality of Surface Water and Fluvial Sediment in the Price River Basin, Utah, Utah Department of Natural Resources Technical Publication.
- Price, D.; Arnow, T., Summary Appraisals of the Nation's Groundwater Resources-Upper Colorado Region, U.S. Geological Survey Professional Paper 813-C, Washington, D.C.
- Price, D.; Waddell, K.M., 1973, Selected Hydrologic Data in the Upper Colorado River Basin. U.S. Geological Hydrologic Investigations Atlas HA-477.
- Southeastern Utah Association of Governments, 1977 Waste Water Quality Management Planning Program (208) for Emery, Carbon, and Grand Counties, Utah, Price, Utah.
- Theis, C.V., 1957, The Source of Water Derived from Wells, Essentials Factors Controlling the Response of an Aquifer Development, U.S. Geological Survey Ground Water Notes 34.
- Vaughn Hansen, 1981, Hydrologic Inventory of the Skyline Property and Adjacent Areas, Carbon and Emery Counties, Utah, Report Prepared for Costal States Energy Company, Salt Lake City, Utah.

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LIST OF MAPS

| | |
|------------------|--|
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| HM-3 | East Mountain Property Hiawatha Coal Seam In-Mine Water Monitoring Locations |
| HM-4 | East Mountain Property Spring Map |
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| HM-7 | East Mountain Property Resistivity-Induced Polarization Survey |
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the groundwater system of the Cottonwood and Huntington Creek drainage systems could be impacted from a slight reduction in recharge; but this is more than offset by the interception of the groundwater, especially in terms of quality, which will be discussed later.

a. Mining Below The Right Fork Of Rilda Canyon

A portion of the Right Fork area of Rilda Canyon lies within the North Rilda Canyon area of the Deer Creek Mine. Due to the environmental sensitivity of the Right Fork area (specifically the sub-surface hydrologic alluvial system and associated surface riparian vegetation zone), a complete analysis of a proposed "no-subsidence / long term stability" design of the 5th North Mains development within the area of the Right Fork of North Rilda Canyon has been conducted addressing the long term ground stability and subsidence protection of the area with regards to proposed mining. All pre-mining and post-mining conditions have been evaluated based on the best geologic and engineering information currently available (refer to Volume 11 of the Deer Creek Mine MRP: R645-301-500 Engineering Section: Appendix 1).

Selection of the Right Fork stream crossing area was based on the results of an extensive surface exploration program conducted in the Right Fork of Rilda Canyon (refer to maps HM-9, ~~and HM-10 and HM-11~~, Volume 11 of the Deer Creek MRP). A series of six drill holes were completed in 1997 to document coal seam characteristics, structural geology and hydrologic conditions. Drilling was conducted on approximately 250 foot centers across the projected Mill Fork Graben from previously completed drill holes EM-158 and EM-56. No structural discontinuities were identified during drilling. Groundwater encountered during

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Appendices

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Entire Section**

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ENERGY WEST
HYDROLOGIC MONITORING PROGRAM
DEER CREEK, WILBERG/COTTONWOOD, DES-BEE-DOVE
and TRAIL MOUNTAIN MINES

I. MONITORING LOCATIONS

A. Surface Water Hydrology (refer to Deer Creek, Wilberg/Cottonwood, Des-Bee-Dove Mine: Volume 9 Map HM-1, Deer Creek Volume 12 R645-301-700: Hydrologic Monitoring Map MFS1851D Mill Fork Lease for East Mountain locations listed below / Trail Mountain Mine: Volume 3 Plate 7-1 and Plate 7-2 for Trail Mountain locations listed below)

1. Cottonwood Creek Drainage System

a. **Cottonwood Canyon Creek** (refer to Deer Creek, Wilberg/Cottonwood, Des-Bee-Dove Mine: Volume 9 Map HM-1 or Trail Mountain Mine Permit Volume 3 Plate 7-1)

- (1) SW-1 - Above Trail Mtn. Mine
(Approximately 5000 feet upstream from the inlet culvert for the disturbed area.) 2150 feet South, 2000 feet East of the Northwest corner of Section 24, Township 17 South, Range 6 East.
- (2) SW-2 - Below Trail Mtn. Mine
(Approximately 200 feet downstream from the outlet culvert for the disturbed area.) 1300 feet South, 1750 feet West of the Northeast corner of Section 25, Township 17 South, Range 6 East.
- (3) CCC01 - USGS Flume:
(Approximately 7800 feet downstream from the outlet culvert for the disturbed area.) 1500 feet North, 200 feet East of the Southwest corner of Section 31, Township 17 South, Range 7 East.
- (4) SW-3 - Below Trail Mtn. Mine
(Approximately 3800 feet above confluence with Straight Canyon) 2400 feet South, 2400 feet East of the Northeast corner of Section 6, Township 18 South, Range 6 East.

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- b. ***Unnamed Drainage off Straight Canyon*** (refer to Trail Mountain Mine Permit Volume 3 Plate 7-1)
 - (1) T-19
(Approximately 200 feet upstream from the from confluence with Straight Canyon) 2500 feet South, 1100 feet East of the Northeast corner of Section 3, Township 18 South, Range 6 East.
- c. ***Grimes Wash*** (refer to Deer Creek, Wilberg/Cottonwood, Des-Bee-Dove Mine: Volume 9 Map HM-1)
 - (1) GWR01 - Right Fork:
(Approximately 1500 feet upstream from the inlet culvert for the disturbed area.) 550 feet North, 1500 feet West of the Southwest corner of Section 22, Township 17 South, Range 7 East.
 - (2) GWR02 - Left Fork:
(Approximately 50 feet upstream from the inlet culvert for the disturbed area.) 200 feet South, 2350 feet East of the Northwest corner of Section 27, Township 17 South, Range 7 East.
 - (3) GWR03 - Below the mine:
(Approximately 500 feet downstream from the outlet culvert below the disturbed area.) 1770 feet South, 1820 feet West of the Northeast corner of Section 27, Township 17 South, Range 7 East.
- d. ***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.

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- (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.

2. Huntington Creek Drainage System

- a. **Huntington Creek** (refer to Deer Creek, Wilberg/Cottonwood, Des-Bee-Dove Mine: Volume 9 Map HM-1)
 - (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) HCC03 - Below Huntington Power Plant:
2500 feet north, 1500 feet east of the southeast corner of Section 6, Township 17 South, Range 8 East.
 - (4) 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, Wilberg/Cottonwood, Des-Bee-Dove Mine: Volume 9 Map HM-1)
 - (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.

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- (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 36, Township 16 South, Range 7 East.
- c. **Meetinghouse Canyon - South Fork** (refer to Deer Creek, Wilberg/Cottonwood, Des-Bee-Dove Mine: Volume 9 Map HM-1)
(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, Wilberg/Cottonwood, Des-Bee-Dove Mine: Volume 9 Map HM-1)
 - (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 NEWUA springs: 2500 feet South, 400 feet West of the Northeast corner of Section 29, Township 16 South, Range 7 East.

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- (5) RCF3 - Rilda Canyon - Below NEWUA springs: 2550 feet South, 1000 feet East of the Northeast corner of Section 28, Township 16 South, Range 7 East.
- (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 stage 1 final reclamation backfilling and grading monitoring will be conducted at points immediately above and below the last sediment pond(s).

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B. Groundwater Hydrology

1. East Mountain Springs (refer to Deer Creek, Wilberg/Cottonwood, Des-Bee-Dove Mine Permit : Volume 9 maps HM-4 and HM-5)

| | |
|-------------------|---------------------------|
| Burnt Tree * | 80-41 |
| Elk Spring * | 80-43 |
| Sheba Springs * | 80-44* |
| Ted's Tub | 80-46* |
| 79-2 | 80-47 |
| 79-10 * | 80-48 |
| 79-15 | 80-50 |
| 79-23 * | 82-51 |
| 79-24 | 82-52* |
| 79-26 * | 84-56* |
| 79-28 (Flag Lake) | 89-60(Alpine Spring) |
| 79-29 * | 89-61 |
| 79-32 | 89-65 |
| 79-34 | 89-66 |
| 79-35 * | 89-67 |
| 79-38 | 89-68 |
| 79-40 | Rilda Canyon-(Meters 2&3) |

* Recession Study Springs (Flow August & September)

2. Trail Mountain Springs (refer to Trail Mountain Mine Permit Volume 3 Plate 7-1)

| | |
|------|--------------------------------|
| T-6 | T-14 |
| T-8 | T-15 |
| T-9 | T-16 |
| T-10 | T-18 (Oliphant Mine Discharge) |

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

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

3. **Piezometric Data**

a. Surface

- (1) Rilda Canyon (refer to Deer Creek, Wilberg/Cottonwood,
Des-Bee-Dove Mine: Volume 9 Map HM-1)

P1

P5

P6

P7

EM-47

- (2) Cottonwood Canyon Creek

*East Mountain (refer to Deer Creek, Wilberg/Cottonwood,
Des-Bee-Dove Mine: Volume 9 Map HM-1)*

EM-31

CCCW-1A

CCCW-1S

CCCW-2A

CCCW-3A

CCCW-3S U

CCCW-3S L

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*Trail Mountain (refer to Trail Mountain Mine Permit
Volume 3 Plate 7-1)*

TM-1B

TM-3

- b. Underground: In-Mine
 - (1) Deer Creek Mine (Refer to Annual Hydrologic Reports for Locations : Map HM-2)

4. In-Mine Water Locations

- a. Deer Creek Mine (Refer to Annual Hydrologic Reports for Locations : Map HM-2)
- b. Wilberg/Cottonwood Mines (Refer to Annual Hydrologic Reports for Locations : Map HM-3)
- c. Trail Mountain Mine (Refer to Annual Hydrologic Reports for Locations : PLATE 7-3)

5. Waste Rock Wells (refer to Deer Creek, Wilberg/Cottonwood, Des-Bee-Dove Mine: Volume 9 Map HM-1)

- a. Deer Creek
- b. Cottonwood

C. UPDES Monitoring Locations

- a. ***Deer Creek Mine***
UPDES UT0023604
 - 001- Sediment Pond
 - 002- Mine Discharge
- b. ***Des-Bee-Dove Mines***
UPDES UTG040022
 - 001- Sediment Pond

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- c. ***Wilberg/Cottonwood Mines***
UPDES UT0022896
001- Mine Discharge @ Cottonwood Canyon (TMA)
002- Sediment Pond Discharge @ Cottonwood Canyon
003- Sediment Pond @ Mine Facilities
004- Mine Discharge @ Miller Canyon
005- Sediiment Pond Discharge @ Waste Rock Site
- d. ***Trail Mountain Mine***
UPDES UT0023728
001- Sediment Pond
002- Mine Discharge

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II. MONITORING SCHEDULE (*see enclosed monitoring table*)

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)

Surface Monitoring

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

1. Cottonwood Canyon Creek

- a. Cottonwood Canyon Creek
 - (1) SW-1
 - (2) SW-2
 - (3) Cottonwood Canyon Creek - USGS Flume
 - (4) SW-3
- b. Grimes Wash
 - (1) GWR01
 - (2) GWR02
 - (3) GWR03
- c. Indian Creek
 - (1) ICA
 - (2) ICF
 - (3) ICD
 - (4) ICB
- d. Straight Canyon
 - (1) T-19 (Unnamed Side Drainage)

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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: MCH01

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
- (3) MFU03

Groundwater Monitoring

- 1. East Mountain Springs (see monitoring location list)
- 2. Trail Mountain Springs (see monitoring location list)
- 3. East Mountain Springs - Mill Fork Area (see monitoring location list)
East/Trail Mountain Springs will be field monitored during the months of July and October. In addition, the East Mountain Recession Study Springs (denoted by asterisks in the Monitoring Location section) and Trail Mountain Springs will be field monitored for flow only from July through October. T-18: Oliphant Mine Discharge, will be collected and analyzed

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quarterly. Rilda Canyon Springs - NEWUA (meters 2 & 3) will be field monitored monthly depending upon access.

3. In-Mine
 - a. Deer Creek
 - b. Wilberg/Cottonwood
 - c. Trail MountainIn-mine locations will be field monitored quarterly for all field parameters except pH, conductivity, and dissolved oxygen.
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
 - P5
 - P6
 - P7
 - EM-47
 - (2) Cottonwood Canyon Creek (see Map HM-1 for locations)
 - EM-31
 - CCCW-1A
 - CCCW-1S
 - CCCW-2A
 - CCCW-3A
 - CCCW-3S U
 - CCCW-3S L
 - TM-1B
 - TM-3
5. Waste Rock Wells
 - a. Deer Creek
 - b. Cottonwood

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UPDES Monitoring

1. Deer Creek
2. Des-Bee-Dove
3. Wilberg/Cottonwood
4. Trail Mountain

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

Reclamation Monitoring

Surface Water Resources: (see enclosed monitoring table)

Surface monitoring locations will be field monitored monthly for flow and all field parameters quarterly until bond release.

Ground Water Resources: (see enclosed monitoring table)

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

Rilda Canyon Springs NEWUA (meters 2 & 3) will be field monitored monthly for flow depending upon access. East/Trail Mountain Springs (including Rilda Springs and T-18 [Oliphant Mine]) monitoring will be conducted until permit area reduction approval or unless otherwise approved by the Division.

Wells: Piezometric surface wells (Rilda Canyon and Cottonwood Canyon including TM-3 in Straight Canyon): will be field monitored for level only on a monthly basis depending upon access. Piezometric surface well monitoring will be conducted until permit area reduction approval or unless otherwise approved by the Division.

Waste Rock Wells and TM-1B: will be field monitored for level only on a quarterly basis. Monitoring will be conducted until sealing during Phase I reclamation.

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

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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). Quarterly sampling was initiated during March 1988 and will continue throughout the year; i.e., June, September, and December. Baseline analysis was performed in 2001 and will be repeated every five years thereafter.

a. Cottonwood Creek Drainage

(1) Cottonwood Canyon Creek

(a) SW-1

(b) SW-2

(c) SW-3

(2) Grimes Wash

(a) GWR01

(b) GWR02

(c) GWR03

(3) Indian Creek

(a) ICA

(b) ICF

(c) ICD

(d) ICB

(4) Straight Canyon

(a) T-19

b. Huntington Creek Drainage

(1) Deer Creek

(a) DCR01

(b) DCR04

(c) DCR06

(2) Huntington Creek

(a) HCC01

(b) HCC02

(c) HCC04

(3) Meetinghouse Canyon - South Fork: MCH01

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- (4) Rilda Canyon
 - (a) RCF1
 - (b) RCF3
 - (c) RCW4
- (5) 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). 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.

2. Groundwater Hydrology

- a. East/Trail Mountain Springs: Water samples will be collected and analyzed during the months of July and October. Rilda Canyon Springs (NEWUA: Meters 2 & 3) and T-18 (Oliphant Mine Discharge) will be monitored for quarterly for quality. Parameters analyzed are those listed in the DOGM Guidelines for Groundwater Water Quality (see Table #2).
- b. In-Mine: Two water samples will be collected and analyzed per mine quarterly. Parameters analyzed are those listed in the DOGM Guidelines for Groundwater Water Quality (see Table #2).
- c. Wells: TM-1B will be sampled quarterly. Parameters analyzed are those listed in the DOGM Guidelines for Groundwater Water Quality (see Table #2).
- d. Waste Rock Wells: One water sample will be collected and analyzed per location quarterly. Parameters analyzed are those listed in the DOGM Guidelines for Groundwater Water Quality (see Table #2).

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Baseline analysis was performed in 2001 and will be repeated every five years thereafter.

Reclamation Monitoring - Groundwater Hydrology:

- a. East/Trail Mountain Springs: Water samples will be collected and analyzed during the months of July and October. Rilda Canyon Springs (NEWUA: Meters 2 & 3) will be monitored quarterly for quality. Parameters analyzed are those listed in the DOGM Guidelines for Groundwater Water Quality (see Table #2). East/Trail Mountain Springs (including Rilda Springs and T-18 [Oliphant Mine Discharge]) monitoring will be conducted until permit area reduction approval or unless otherwise approved by the Division.
- b. In-Mine: Two water samples will be collected and analyzed per mine quarterly until the mine is sealed or the sites become inaccessible. Parameters analyzed are those listed in the DOGM Guidelines for Groundwater Water Quality (see Table #2).
- c. Wells: Well TM-1B will be sealed during Phase I reclamation. Quarterly sampling will continue until sealing. Parameters analyzed are those listed in the DOGM Guidelines for Groundwater Water Quality (see Table #2).
- d. Waste Rock Wells: Waste rock wells will be sealed during Phase I reclamation. One water sample will be collected and analyzed per location quarterly until well sealing. Parameters analyzed are those listed in the DOGM Guidelines for Groundwater Water Quality (see Table #2).
- e. 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 the DOGM Guidelines for Groundwater Water Quality (see Table #2). Baseline analysis will be performed on the 5th and 9th year.

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and TRAIL MOUNTAIN MINES

3. UPDES Monitoring Sites

- a. Deer Creek Mine
- b. Des-Bee-Dove Mines
- c. Wilberg/Cottonwood Mines
- d. Trail Mountain Mine

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

III. ANNUAL REPORTS

All data collected regarding the hydrology of East/Trail Mountain will be summarized by the applicant in an annual Hydrologic Monitoring Report. Copies of the report will be submitted to the; U.S. Forest Service; and 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
ENERGY WEST
HYDROLOGIC MONITORING PROGRAM**

**TABLE 1
SURFACE WATER (UPDES Monitoring) BASELINE, OPERATIONAL, POSTMINING
WATER QUALITY PARAMETER LIST**

Field Measurements:

- * - Water Level or Flow
- * - pH
- * - Specific Conductivity (umhos/cm)
- * - Dissolved Oxygen (ppm) (Perennial Streams Only)
- * - Temperature

Laboratory Measurements: (mg/l)

- # * - Total Settleable Solids (UPDES Only)
- # * - Total Suspended Solids
- * - Total Dissolved Solids
- * - Total Hardness (CaCO₃)
- Acidity (CaCO₃)
- Aluminum (Al) - Dissolved
- Arsenic (As) - Dissolved
- Boron (B) - Dissolved (Waste Rock Sites Only)
- * - Carbonate (CO₃⁻²)
- * - Bicarbonate (HCO₃⁻)
- 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 (NO₂) - reported as N
- Nitrate (NO₃⁻) - reported as N
- * - Potassium (K) - Dissolved
- * - Oil & Grease (UPDES & Above & Below Mine Sites Only)
- Ortho Phosphate (PO₄⁻³) - reported as P
- Selenium (Se) - Dissolved (Waste Rock Sites Only)
- * - Sodium (Na) - Dissolved
- * - Sulfate (SO₄⁻²)
- Zinc (Zn) - Dissolved
- * - Cation-Anion Balance

Construction * Operational - Baseline

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HYDROLOGIC MONITORING PROGRAM**

**TABLE 2
GROUND WATER BASELINE, OPERATIONAL, POSTMINING
WATER QUALITY PARAMETER LIST**

Field Measurements:

- * - Water Level or Flow
- * - pH
- * - Specific Conductivity (umhos/cm)
- * - Temperature

Laboratory Measurements: (mg/l)

- * - Total Dissolved Solids
- * - Total Hardness (CaCO₃)
- Acidity (CaCO₃)
- Aluminum (Al) - Dissolved
- Arsenic (As) - Dissolved
- Boron (B) - Dissolved (Waste Rock Sites Only)
- * - Carbonate (CO₃⁻²)
- * - Bicarbonate (HCO₃⁻)
- 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 (NO₂) - reported as N
- Nitrate (NO₃⁻) - reported as N
- * - Potassium (K) - Dissolved
- Ortho Phosphate (PO₄⁻³) reported as P
- Selenium (Se) - Dissolved (Waste Rock Sites Only)
- * - Sodium (Na) - Dissolved
- * - Sulfate (SO₄⁻²)
- Zinc (Zn) - Dissolved
- * - Cation-Anion Balance

* Operational - Baseline

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HYDROLOGIC MONITORING PROGRAM
DEER CREEK/COTTONWOOD-WILBERG/DES-BEE-DOVE/TRAIL MOUNTAIN MINES

SURFACE HYDROLOGY - OPERATIONAL SAMPLING (Table 1)

| <u>Drainage System</u> | <u>Drainage</u> | <u>Location</u> | <u>Jan</u> | <u>Feb</u> | <u>Mar</u> | <u>Apr</u> | <u>May</u> | <u>Jun</u> | <u>Jul</u> | <u>Aug</u> | <u>Sep</u> | <u>Oct</u> | <u>Nov</u> | <u>Dec</u> | |
|---|--|-------------------------|--|-------------|--------------|--------------|-------------|--------------|--------------|-------------|--------------|--------------|-------------|--------------|--------------|
| Cottonwood Creek Drainage System | Cottonwood Canyon Creek | SW1 | Flow | Flow | Operational | Flow | Flow | Operational | Flow | Flow | Operational | Flow | Flow | Operational | |
| | | SW2 | Flow | Flow | Operational | Flow | Flow | Operational | Flow | Flow | Operational | Flow | Flow | Operational | |
| | | CCC01 | Flow | Flow | Field | Flow | Flow | Field | Flow | Flow | Field | Flow | Flow | Field | |
| | | SW3 | Flow | Flow | Operational | Flow | Flow | Operational | Flow | Flow | Operational | Flow | Flow | Operational | |
| | Grimes Wash | GWR01 | Flow | Flow | Operational | Flow | Flow | Operational | Flow | Flow | Operational | Flow | Flow | Operational | |
| | | GWR02 | Flow | Flow | Operational | Flow | Flow | Operational | Flow | Flow | Operational | Flow | Flow | Operational | |
| | | GWR03 | Flow | Flow | Operational | Flow | Flow | Operational | Flow | Flow | Operational | Flow | Flow | Operational | |
| | Joes Valley Indian Creek | ICA | Based Flow Monitoring Only (October or November) | | | | | | | | | | Operational | | |
| | | ICD | Based Flow Monitoring Only (October or November) | | | | | | | | | | Operational | | |
| | | ICB | Based Flow Monitoring Only (October or November) | | | | | | | | | | Operational | | |
| Huntington Drainage System | Deer Creek | T-19 | Flow | Flow | Operational | Flow | Flow | Operational | Flow | Flow | Operational | Flow | Flow | Operational | |
| | | DCR01 DCR04 DCR06 | Flow | Flow | Operational | Flow | Flow | Operational | Flow | Flow | Operational | Flow | Flow | Operational | |
| | | | Flow | Flow | Operational | Flow | Flow | Operational | Flow | Flow | Operational | Flow | Flow | Operational | |
| | Huntington Creek | | HCC01 | 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 |
| | | | RCLF1 | 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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DEER CREEK/COTTONWOOD-WILBERG/DES-BEE-DOVE/TRAIL MOUNTAIN MINES

GROUNDWATER HYDROLOGY - OPERATIONAL SAMPLING (Table 2)Groundwater Type

| | | | <u>Jan</u> | <u>Feb</u> | <u>Mar</u> | <u>Apr</u> | <u>May</u> | <u>Jun</u> | <u>Jul</u> | <u>Aug</u> | <u>Sep</u> | <u>Oct</u> | <u>Nov</u> | <u>Dec</u> |
|----------------|--|-------------------------------------|------------|------------|-------------|------------|------------|-------------|-------------|------------|-------------|-------------|------------|-------------|
| Springs | East Mountain | (Includes Mill Fork Springs) | | | | | | | Operational | Flow * | Flow * | Operational | | |
| | East Mountain-Rilda Canyon | | Flow | Flow | Operational | Flow | Flow | Operational | Flow | Flow | Operational | Flow | Flow | Operational |
| | Trail Mountain | | | | | | | | Operational | Flow | Flow | Operational | | |
| | Oliphant | T-18 | | | Operational | | | Operational | | | Operational | | | Operational |
| In-Mine | Cottonwood | | | | Operational | | | Operational | | | Operational | | | Operational |
| | Deer Creek | | | | Operational | | | Operational | | | Operational | | | Operational |
| | Trail Mountain | | | | Operational | | | Operational | | | Operational | | | Operational |
| Wells | Cottonwood Waste Rock Well | | | | Operational | | | Operational | | | Operational | | | Operational |
| | Cottonwood Canyon Wells | | Level | Level | Level | Level | Level | Level | Level | Level | Level | Level | Level | Level |
| | (includes Straight Canyon TM-3) | | | | | | | | | | | | | |
| | Deer Creek Waste Rock Well | | | | Operational | | | Operational | | | Operational | | | Operational |
| | Deer Creek In-Mine Well | | | | Level | | | Level | | | Level | | | Level |
| | Rilda Canyon Wells | | Level | Level | Level | Level | Level | Level | Level | Level | Level | Level | Level | Level |
| | Trail Mountain (TM-1B) | | Level | Level | Operational | Level | Level | Operational | Level | Level | Operational | Level | Level | Operational |

UPDES SAMPLING - (Table 1)

| | | | <u>Jan</u> | <u>Feb</u> | <u>Mar</u> | <u>Apr</u> | <u>May</u> | <u>Jun</u> | <u>Jul</u> | <u>Aug</u> | <u>Sep</u> | <u>Oct</u> | <u>Nov</u> | <u>Dec</u> |
|--------------------------------|-----------------------|-------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Mine Water Discharge | Cottonwood | TMA | Operational |
| | | Miller | Operational |
| | Deer Creek | DCD | Operational |
| | Trail Mountain | TMD | Operational |
| Sediment Pond Discharge | Cottonwood | 2 Outfalls | Operational |
| | Deer Creek | 1 Outfall | Operational |
| | Des-Bee-Dove | 1 Outfall | Operational |
| | Trail Mtn | 1 Outfall | Operational |

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DEER CREEK/COTTONWOOD-WILBERG/DES-BEE-DOVE/TRAIL MOUNTAIN MINES

SURFACE HYDROLOGY - BASELINE SAMPLING (Table 1) - 2006

| <u>Drainage System</u> | <u>Drainage</u> | <u>Location</u> | <u>Jan</u> | <u>Feb</u> | <u>Mar</u> | <u>Apr</u> | <u>May</u> | <u>Jun</u> | <u>Jul</u> | <u>Aug</u> | <u>Sep</u> | <u>Oct</u> | <u>Nov</u> | <u>Dec</u> | |
|---|--|-----------------|--|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--|
| <i>Cottonwood Creek Drainage System</i> | <i>Cottonwood Canyon Creek</i> | SW1 | Flow | Flow | Baseline | Flow | Flow | Baseline | Flow | Flow | Baseline | Flow | Flow | Baseline | |
| | | SW2 | Flow | Flow | Baseline | Flow | Flow | Baseline | Flow | Flow | Baseline | Flow | Flow | Baseline | |
| | | CCC01 | Flow | Flow | Field | Flow | Flow | Field | Flow | Flow | Field | Flow | Flow | Field | |
| | | SW3 | Flow | Flow | Baseline | Flow | Flow | Baseline | Flow | Flow | Baseline | Flow | Flow | Baseline | |
| | <i>Grimes Wash</i> | GWR01 | Flow | Flow | Baseline | Flow | Flow | Baseline | Flow | Flow | Baseline | Flow | Flow | Baseline | |
| | | GWR02 | Flow | Flow | Baseline | Flow | Flow | Baseline | Flow | Flow | Baseline | Flow | Flow | Baseline | |
| | | GWR03 | Flow | Flow | Baseline | Flow | Flow | Baseline | Flow | Flow | Baseline | Flow | Flow | Baseline | |
| | <i>Joel Valley Indian Creek</i> | ICA | Based Flow Monitoring Only (October or November) | | | | | | | | | | Baseline | | |
| | | ICD | Based Flow Monitoring Only (October or November) | | | | | | | | | | Baseline | | |
| | | ICB | Based Flow Monitoring Only (October or November) | | | | | | | | | | Baseline | | |
| <i>Straight Canyon</i> | T-19 | Flow | Flow | Baseline | Flow | Flow | Baseline | Flow | Flow | Baseline | Flow | Flow | Baseline | | |
| <i>Huntington Drainage System</i> | <i>Deer Creek</i> | 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 | |
| | <i>Huntington Creek</i> | 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 | | | | | | | | | | | | | | |
| | <i>Meetinghouse Canyon</i> | MCH01 | Flow | Flow | Baseline | Flow | Flow | Baseline | Flow | Flow | Baseline | Flow | Flow | Baseline | |
| | <i>Rilda Canyon</i> | 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 | | | | | | | | | | | | | | | |
| <i>Mill Fork Canyon</i> | 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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GROUNDWATER HYDROLOGY - BASELINE SAMPLING (Table 2) - 2006Groundwater Type

| | | | <u>Jan</u> | <u>Feb</u> | <u>Mar</u> | <u>Apr</u> | <u>May</u> | <u>Jun</u> | <u>Jul</u> | <u>Aug</u> | <u>Sep</u> | <u>Oct</u> | <u>Nov</u> | <u>Dec</u> |
|-------------------------------|--|-------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Springs | East Mountain | <i>(Includes Mill Fork Springs)</i> | | | | | | | Baseline | Flow * | Flow * | Baseline | | |
| | East Mountain-Rilda Canyon | | Flow | Flow | Baseline |
| | Trail Mountain | | | | | | | | Baseline | Flow | Flow | Baseline | | |
| | Oliphant | T-18 | | | Baseline | | | Baseline | | | Baseline | | | Baseline |
| In-Mine | Cottonwood | | | | Baseline | | | Baseline | | | Baseline | | | Baseline |
| | Deer Creek | | | | Baseline | | | Baseline | | | Baseline | | | Baseline |
| | Trail Mountain | | | | Baseline | | | Baseline | | | Baseline | | | Baseline |
| Wells | Cottonwood Waste Rock Well | | | | Baseline | | | Baseline | | | Baseline | | | Baseline |
| | Cottonwood Canyon Wells | | Level |
| | <i>(includes Straight Canyon TM-3)</i> | | | | | | | | | | | | | |
| | Deer Creek Waste Rock Well | | | | Baseline | | | Baseline | | | Baseline | | | Baseline |
| | Deer Creek In-Mine Well | | | | Level | | | Level | | | Level | | | Level |
| | Rilda Canyon Wells | | Level |
| Trail Mountain (TM-1B) | | Level | Level | Baseline | Level | Level | Baseline | Level | Level | Baseline | Level | Level | Baseline | |

UPDES SAMPLING - (Table 1)

| | | | <u>Jan</u> | <u>Feb</u> | <u>Mar</u> | <u>Apr</u> | <u>May</u> | <u>Jun</u> | <u>Jul</u> | <u>Aug</u> | <u>Sep</u> | <u>Oct</u> | <u>Nov</u> | <u>Dec</u> |
|--------------------------------|-----------------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Mine Water Discharge | Cottonwood | TMA | Operational |
| | | Miller | Operational |
| | Deer Creek | DCD | Operational |
| | Trail Mountain | TMD | Operational |
| Sediment Pond Discharge | Cottonwood | 3 Outfalls | Operational |
| | Deer Creek | 1 Outfall | Operational |
| | Des-Bee-Dove | 1 Outfall | Operational |
| | Trail Mtn | 1 Outfall | Operational |

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SURFACE HYDROLOGY - RECLAMATION SAMPLING (Table 1)

| <u>Drainage System</u> | <u>Drainage</u> | <u>Location</u> | <u>Jan</u> | <u>Feb</u> | <u>Mar</u> | <u>Apr</u> | <u>May</u> | <u>Jun</u> | <u>Jul</u> | <u>Aug</u> | <u>Sep</u> | <u>Oct</u> | <u>Nov</u> | <u>Dec</u> | |
|--|--|--|------------|--|-------------|---------------|------------|-------------|---------------|------------|-------------|---------------|-------------|-------------|---------------|
| Cottonwood Creek Drainage System* | Cottonwood Canyon Creek | SW1 | | | Operational | | | Operational | | | Operational | | | Operational | |
| | | SW2 | | | Operational | | | Operational | | | Operational | | | Operational | |
| | | CCC01 | | | Field | | | Field | | | Field | | | Field | |
| | | SW3 | | | Operational | | | Operational | | | Operational | | | Operational | |
| | | Grimes Wash | GWR01 | | | Operational | | | Operational | | | Operational | | | Operational |
| | | | GWR02 | | | Operational | | | Operational | | | Operational | | | Operational |
| | | | GWR03 | | | Operational | | | Operational | | | Operational | | | Operational |
| | | 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 | | |
| | Straight Canyon | T-19 | | | Operational | | | Operational | | | Operational | | | 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** |
| | | <i>** Flow in Huntington Creek is measured @ HCC01 by Utah Power, and will be reported in the Annual Hydrologic Report</i> | | | | | | | | | | | | | |
| | | 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 |
| | | <i>*** Baseline flow will be measured adjacent to EM-163</i> | | | | | | | | | | | | | |
| | 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.

Hydrologic Monitoring Program
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DEER CREEK/COTTONWOOD-WILBERG/DES-BEE-DOVE/TRAIL MOUNTAIN MINES

GROUNDWATER HYDROLOGY - RECLAMATION SAMPLING (Table 2)

Groundwater Type

| | | <u>Jan</u> | <u>Feb</u> | <u>Mar</u> | <u>Apr</u> | <u>May</u> | <u>Jun</u> | <u>Jul</u> | <u>Aug</u> | <u>Sep</u> | <u>Oct</u> | <u>Nov</u> | <u>Dec</u> |
|--|--|------------|-------------|-------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|-------------|
| Springs | East Mountain (Includes Mill Fork Springs) | | | | | | | Operational | | | Operational | | |
| | <i>Spring monitoring will be conducted until permit area reduction approval or unless otherwise approved by the Division.</i> | | | | | | | | | | | | |
| | East Mountain-Rilda Canyon | Flow | Flow | Operational | Flow | Flow | Operational | Flow | Flow | Operational | Flow | Flow | Operational |
| | <i>Rilda Spring monitoring will be conducted until permit area reduction approval or unless otherwise approved by the Division.</i> | | | | | | | | | | | | |
| | Trail Mountain | | | | | | | Operational | | | Operational | | |
| | Oliphant T-18 | | | Operational | | | Operational | | | Operational | | | Operational |
| <i>Spring monitoring will be conducted until permit area reduction approval or unless otherwise approved by the Division.</i> | | | | | | | | | | | | | |
| In-Mine | Deer Creek/Cottonwood/Trail Mtn. samples will be collected and analyzed quarterly until the mine is sealed or the sites become inaccessible | | | | | | | | | | | | |
| <i>Oliphant Mine discharge monitoring will be conducted until permit area reduction approval or unless otherwise approved by the Division.</i> | | | | | | | | | | | | | |
| Wells | Cottonwood Waste Rock Well | | | Operational | | | Operational | | | Operational | | | Operational |
| | <i>Cottonwood Waste Rock Well will be sealed during Phase I reclamation. One water sample will be collected and analyzed per location quarterly until well sealing</i> | | | | | | | | | | | | |
| | Cottonwood Canyon Wells* | Level | Level | Level | Level | Level | Level | Level | Level | Level | Level | Level | Level |
| | (includes Straight Canyon TM-3) | | | | | | | | | | | | |
| | <i>Cottonwood Canyon well monitoring will be conducted until permit area reduction approval or unless otherwise approved by the Division.</i> | | | | | | | | | | | | |
| | Deer Creek Waste Rock Well | | | Operational | | | Operational | | | | Operational | | |
| <i>Deer Creek Waste Rock Well will be sealed during Phase I reclamation. One water sample will be collected and analyzed per location quarterly until well sealing</i> | | | | | | | | | | | | | |
| Rilda Canyon Wells* | Level | Level | Level | Level | Level | Level | Level | Level | Level | Level | Level | Level | Level |
| <i>Rilda Canyon well monitoring will be conducted until permit area reduction approval or unless otherwise approved by the Division.</i> | | | | | | | | | | | | | |
| Trail Mountain (TM-1B) | Level | Level | Operational | Level | Level | Operational | Level | Level | Operational | Level | Level | Level | Operational |
| <i>TM-1B well will be sealed during Phase I reclamation. One water sample will be collected and analyzed per location quarterly until well sealing</i> | | | | | | | | | | | | | |
| <i>* Monitored monthly subject of access</i> | | | | | | | | | | | | | |

UPDES SAMPLING - (Table 1)

| | | | <u>Jan</u> | <u>Feb</u> | <u>Mar</u> | <u>Apr</u> | <u>May</u> | <u>Jun</u> | <u>Jul</u> | <u>Aug</u> | <u>Sep</u> | <u>Oct</u> | <u>Nov</u> | <u>Dec</u> |
|--|-----------------------|-------------------|--|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Mine Water Discharge** | Cottonwood | TMA | As Needed Basis According to UPDES Permit Stipulations | | | | | | | | | | | |
| | | Miller | As Needed Basis According to UPDES Permit Stipulations | | | | | | | | | | | |
| | Deer Creek | DCD | As Needed Basis According to UPDES Permit Stipulations | | | | | | | | | | | |
| | Trail Mountain | TMD | As Needed Basis According to UPDES Permit Stipulations | | | | | | | | | | | |
| ** After Portal Sealing, PacifiCorp Will Monitor Down Dip For Development Of Groundwater Seeps/Springs Until Bond Release | | | | | | | | | | | | | | |
| Sediment Pond Discharge | Cottonwood | 2 Outfalls | As Needed Basis According to UPDES Permit Stipulations | | | | | | | | | | | |
| | Deer Creek | 1 Outfall | As Needed Basis According to UPDES Permit Stipulations | | | | | | | | | | | |
| | Des-Bee-Dove | 1 Outfall | As Needed Basis According to UPDES Permit Stipulations | | | | | | | | | | | |
| | Trail Mtn | 1 Outfall | As Needed Basis According to UPDES Permit Stipulations | | | | | | | | | | | |

**Cottonwood Mine
C/015/019
Deer Creek Mine
C/015/018
Des-Bee-Dove Mine
C/015/017**

Volume 9 Hydrologic Section

Map HM-9

Replace

4 COPIES INCLUDED

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**Cottonwood Mine
C/015/019
Deer Creek Mine
C/015/018
Des-Bee-Dove Mine
C/015/017**

Volume 9 Hydrologic Section

Map HM-10

Replace

4 COPIES INCLUDED

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**Deer Creek Mine
C/015/018**

Volume 12 Mill Fork Lease

**R645-301-700 Hydrology
Appendix A**

**Remove Entire Section
and Insert Reference Page**

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DEER CREEK MINE

VOLUME 12

MILL FORK LEASE

**R645-301-700
HYDROLOGY**

APPENDIX A

*** REFER TO VOLUME 9 APPENDIX A FOR A COPY OF THE
APPROVED HYDROLOGIC MONITORING PROGRAM***