

PacifiCorp

Cottonwood/Wilberg Mine

C015/019

**Miller Canyon
Reclamation Project
June 1999**

Appendix XXII

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MILLER CANYON RECLAMATION PROJECT JUNE 1999



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Report and Discussion of the Reclamation Plan for the Miller Canyon Portals

PacifiCorp conducted reclamation activities at the portal breakouts in Miller Canyon. Reclamation began on June 22, 1999 and was completed June 25, 1999. This report discusses the work conducted and provides information on resources of the area. The report is formatted to the Utah Coal Rules.

The Miller Canyon portals were developed as intake portals in October of 1981 (refer to location and plan view drawing in Attachment #1). This facility consist of three 8 ft. x 16 ft. portals on 100 ft. centers. The portals were used for intake purposes until the Wilberg Mine fire in December 1984. At that time they were temporarily sealed. The portal furthest east (portal #1) was reopened in 1985 for exploration purposes after the mine fire. The portals were subsequently sealed permanently (MSHA approved) in 1987.

Portal #1 is provided with a 2 inch water monitoring pipe. Small quantity discharges occur at this point. The discharges are monitored in accordance with stipulations in the UPDES Permit, UT-0022896-004. No discharges have been recorded at site 004 since 1996.

A recent field investigation (May, 1999) of the portals revealed that there has been some caving of the portal openings. The pipe in the #1 portal has been pinched off allowing mine discharge water to flow freely over the rock ledge to the canyon floor. The total disturbance of these portals is approximately 0.02 acres.

A field visit was conducted on June 16, 1999 of the portal area. In attendance were Jeff Defreest (USFS), Chris Colt (DWR), Chuck Semborski and Dennis Oakley (Energy West). This visit enabled the responsible managing agencies see the area in which the portals are located and review reclamation methods. The USFS, being the land managing agency, had interest with the reclamation methods. The DWR involvement was required because an of an active eagle nest that occurs in the canyon. The DWR required the eagle nest to be monitored by a qualified independent party. Both parties have concurred with the reclamation plan. Formal agreements by the USFS and DWR can be reviewed in Attachment 6.

Reclamation was accomplished utilizing helicopter support for transporting materials from the staging area in Cottonwood Canyon to the portal areas in Miller Canyon. The staging area in Cottonwood Canyon was located approximately 2 miles from the junction of State Highway 29 on Emery County Road 506. The Emery County road department occasionally uses this area as a road chip storage area. A road encroachment application was submitted to Emery County and approved on June 2, 1999. The approval is on file at the main office in Huntington, Utah.

R645-301-100: General

All requirements in this section have been met and can be found in the Cottonwood Portal MBI Volume 1, pages 1-1 through 1-66.

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R645-301-200: Soils

Soil from the Cottonwood/Wilberg waste rock site storage area and native material from above the portal area was utilized to establish a vegetative cover over the backfilled openings. Attachment #2 shows the location of the soil piles within the old Cottonwood/Wilberg waste rock site. Soil pile "B" was utilized for reclamation. This soil was excavated in 1995 from the Cottonwood Fan Portal (CFP) area. It was to be used for final reclamation of the fan portal area, but was not needed since a sufficient amount of soil was stored at the CFP site. Samples were taken from piles "A", "B", and "C" and sent to InterMountain Laboratory in Sheridan, Wyoming for analysis. These soils were found to be fair to good when compared to the soil suitability criteria in Appendix A of the *Guidelines for Management of Topsoil and overburden for Underground and Surface Coal Mining - 1988*. The analysis report is found in Attachment #2.

The soil from the CFP site was transported to the old Cottonwood/Wilberg waste rock site and stored in a fenced area as depicted in the figure in Attachment #2. The soil was then covered with curlex blanketing to protect it from wind and water erosion. An approved vegetative seed mix was used on the soil piles to promote biotic growth and provide erosion control.

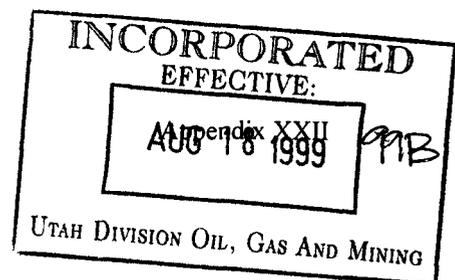
R645-301-300: Biology

Following backfilling and grading, an approved final seed mixture was placed on the reclaim site. This seed mixture is identical to the mixture used at the CFP reclamation site and discussed below. Revegetation techniques were as follows:

- ❖ After backfilling with rock material was complete, soil was transported by helicopter to the portals, unloaded, and the area was hand raked to ensure that all disturbed slopes were adequately covered with at least 18" of soil material. Native soil was also utilized as topsoil fill material at the portal area. Refer to the photo essay in Attachment #5.
- ❖ During soil placement, straw mulch was incorporated into the soil. The surface was then roughened to control runoff and erosion.
- ❖ The seed mixture was broadcast by hand onto the reclaimed slopes. See mixture below.
- ❖ The soil surface was then turned lightly by hand raking to cover the seeds.
- ❖ Straw mulch with netting was used to sufficiently cover the reclaimed area. Litter material (rocks and tree branches) were placed on top of the netting to secure it and protect against erosion.

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Seed Mixture - Final Revegetation for the Miller Canyon Portal Breakouts

<u>Common Name</u>	<u>Scientific Name</u>	<u>Lbs/Acre</u> <u>PLS*</u>
<u>Grasses</u>		
Western wheatgrass	Agropyron smithii	3
Bluebunch wheatgrass	Agropyron spicatum	3
Indian ricegrass	Oryzopsis hymenoides	3
Needle and thread grass	Stipa comata	1
Thickspike wheatgrass	Agropyron dasystachyum	1
Great Basin wildrye	Elymus ciaereus	2
<u>Forbs</u>		
Blueleaf aster	Aster glaucodes	.5
Utah sweet vetch	Hedysarum boreale	1
Lewis flax	Linum lewisii	1
Globemallow	Sphaeralcea coccinea	.5
Yarrow	Achillea millefolius	.5
Palmer penstemon	Penstemon palmeri	1
<u>Shrubs</u>		
Serviceberry	Amelanchier alnifolia	1
Fourwing saltbush	Atriplex canescens	2
Green Mormon tea	Ephedra viridis	1
Wyoming big sagebrush	Artemesia wyomingensis	.5
Big white rabbitbrush	Chrysothamunus nauseosus var. albicaulis	.5
	Total	22.5

The total disturbance before reclamation was approximately 0.02 acres. This equates to approximately 0.5 lbs. of pure live seed to complete revegetation at the Miller Canyon portals.

Fish and Wildlife

Fish and wildlife information is provided on pages 2-159 through 2-174 in Volume 2 of the Cottonwood/Wilberg MRP.

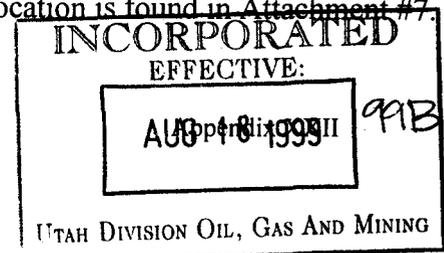
A raptor survey was conducted in May 1999 of the Miller Canyon area. One active eagle nest was located in the canyon approximately ½ mile west of the portals and 1000 feet higher in elevation. Chris Colt (Division of Wildlife Resources – Price District) had been informed of the reclamation activities to be conducted in the canyon. DWR required Energy West to monitor the nest for disturbance caused by reclamation activities in the canyon. Pat Johnston (private consultant) was hired by Energy West to monitor the nest. Her report and nest location is found in Attachment #7.

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Through the establishment of a mine discharge in portal #1, a riparian habitat has formed. Final reclamation of the portals consisted of establishing french drains in each of the portals. A french drain will conduct mine discharge from the portals to the rock ledge directly outby the portals. Mine discharge will flow freely down the rock face to the canyon floor. Historically the discharge dissipates completely within approximately 100 feet down the canyon. The mine discharge has been a good water source for wildlife that occupies the area in and around Miller Canyon. Typical springtime discharge quantities are less than approximately 2.0 gpm and decrease as the year progresses. A water sample of the discharge was taken in May 1999 and found that it meets drinking water standards for TDS. The water analysis is found in Attachment #3. Historical records of baseline and operational sampling is included in this attachment. Minimum, maximum, and mean values of various parameters are displayed in these reports. A Bioassay toxicity testing report from 1995 and 1996 is also included. Water quality is presented in more detail in the R645-301-700: Hydrology Section.

R645-301-400: Land Use and Air Quality

Post-mining land use for the Cottonwood mine is grazing and wildlife. Given the fact that the portals are located on steep (nearly vertical) rock outcrops, this area is only considered for wildlife. It is highly unlikely that cattle could access the steep ledges in and around the portal areas. Recent site visits found no signs of any cattle grazing in the immediate area.

R645-301-500: Engineering

As stated earlier, backfilling and grading was conducted utilizing helicopter support. A staging area was located along side County Road 506 in Cottonwood Canyon. The helicopter lifted the rock and soil material and transported it to the portal sites using a long-line and cargo box. The material was dumped at each of the three portals.

The initial reclamation plan (submitted June 4, 1999) called for approximately 48 yards of material to complete each portal. It was anticipated that the helicopter would be able to transport 1200 to 1400 pounds. As transportation began, it was found that only about 600 to 700 pounds could be lifted. The only other resource for material was the surrounding area of the portals. Large boulders and soil was utilized along with approximately 150 helicopter loads. It was estimated that approximately 50 cubic yards of material was imported by helicopter. The remainder of the material to fill the portals came from the surrounding area.

Six inch rock material was utilized first to create a french drain to enable mine discharge to flow from the portal area. Refer to the typical cross-section in Attachment #4. As the helicopter dumped its load at the portal, the rock material was moved by hand to insure all areas of the portal were covered. The rock material was pushed back into the portal as far as possible for complete closure.

Soil material was placed to a thickness of at least 18 inches. Litter material was placed on the newly graded soil to control erosion. The area was revegetated as outlined in R645-301-300: Biology. A photo essay of the reclamation sequence (before, during, and after) is displayed in Attachment #5.

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Lastly, the 2 inch water monitoring pipe that runs in excess of 500 feet down the canyon was removed. The pipe was transported out of the canyon by helicopter and disposed at the county landfill.

R645-301-600: Geology

This section provides useful geologic information for understanding ground water and surface water resources in the area. These resources are dependent on the geology of East Mountain. Refer to the following hydrology section for a full discussion of water related resources.

Stratigraphy of the Miller Canyon Portal Area.

The rock formations exposed in the Miller Canyon Portal area are restricted to the Upper Cretaceous period. The formations, in ascending order, Star Point Sandstone, Blackhawk. The Star Point Sandstone, which is a prominent cliff former, consists of several eastward thinning marine sandstone tongues of medial Campanian age (Clark, 1928). Westward thinning wedges of the Masuk Shale interfinger with the basal tongues of the Star Point Sandstone. The three members are the basal Panther Sandstone, the middle Storrs Sandstone, and the upper Spring Canyon Sandstone. These sandstone units are generally separated from each other by westward projecting tongues of Mancos Shale. The basal Panther Sandstone is approximately 100 feet thick and consists of massive, well indurated, crossbedded delta front sandstones. The Storrs Sandstone is located about 120 feet above the top of the Panther Member and consists of 50 feet of soft, friable sandstone. The Spring Canyon is located about 80 feet above the top of the Storrs Member and consist of 100 feet of massive, fine to medium grain, crossbedded delta front sandstones. Even though the Star Point formation exists throughout the entire East Mountain property, the low permeability and lack of recharge limit its usefulness as a water producing aquifer. Permeability and the limiting factors of recharge, i.e., very little outcrop exposure and limited vertical groundwater migration, are caused by the mudstone layers of the upper formations.

The Blackhawk Formation overlies the Star Point Sandstone and is 625-800 feet thick in the Miller Canyon Portal area. The Blackhawk consists of alternating sandstones, siltstones, shales and coal deposited in a deltaic environment. Although coal is generally found throughout the Blackhawk Formation, the economic seams are restricted to the lower 150 feet of the formation. The Hiawatha seam was naturally exposed prior to development mining at the Miller Canyon. The seam is approximately seven and half (7 ½) feet thick and consist of several mudstone splits in the upper portion of the seam. The sandstones contained within the Blackhawk Formation are fluvial and increase in number in the upper portions of the formation. Many of the tabular sandstone channels form local perched water tables. Several small seeps occur along the boundary of the Blackhawk and Star Point Sandstone formations.

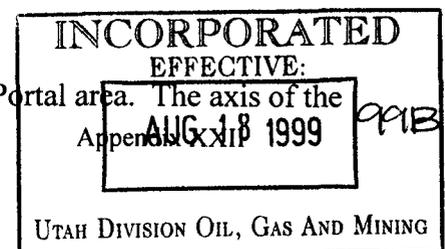
Structure – Miller Canyon Portal Area.

There are no identified faults or major folds within the Miller Canyon Portal area.
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Straight Canyon Syncline lies to the northwest of the Miller Canyon Portal area (See Volume 8 Structural Contour Map - Hiawatha Seam). The Hiawatha seam in the Miller Canyon area has a dip of approximately 2° to the northwest.

R645-301-700: Hydrology

This section provides a detailed description of the hydrology, including groundwater and surface water of the Miller Canyon area.

To provide necessary ventilation to the western portion of the Wilberg Mine, entries were developed in 1981 from the 3rd South Mains to Miller Canyon. Ventilation breakouts in Miller Canyon consist of 3 portals in the Hiawatha Seam located near the head of Miller Canyon approximately one hundred and fifty (150) feet above the canyon floor. Topography in the area is extremely steep and access is limited. During development of 7th West and 4th South, several sandstone channel systems were encountered which produced minor quantities of groundwater (<20 gpm). Earth berms were constructed at the portal locations to prevent the discharge of intercepted groundwater. PacifiCorp (Utah Power & Light Company) applied for additional NPDES (UPDES) discharge point (location 004) in 1982 and started reporting in the first quarter of 1983. Discharge from the portals was initiated after the sealing in 1984. Due to the steep topography, a 2" discharge pipe was installed to assist in sample collection. Discharge from the Miller Canyon breakouts average less than 20 gpm and steadily decreased from 1994 to 1996 to less than 5 gpm. No discharge has been reported from the portals since August 1996. Field investigations conducted in May 1999 identified minor seeps at portals two and three, and discharge from portal one was estimated at less than 3 gpm. Flow from portal area reaches the canyon floor, but dissipates within 100 feet from the portal area.

Groundwater Resources - Seeps

The characteristics and usefulness of a groundwater resource are dependent upon the geology of the water-bearing strata and on the geology and hydrology of the recharge area. Groundwater movement and storage characteristics are dependent on the characteristics of the substratum. To facilitate an understanding of groundwater of the East Mountain property including the Miller Canyon area refer to Volume 9 - Hydrologic Section for a complete discussion of pertinent regional hydrologic and geologic features.

Groundwater resources of the Miller Canyon area are limited to a series of seeps located near the formational contact between the Blackhawk and Star Point Sandstone formations and the gravity discharge from the old mine workings. The source of the groundwater seeps is from the winter snowpack which melts and infiltrates the lower Blackhawk Formation through vertical fractures. The groundwater flows down vertically until it intersects mudstone layers above and below the Hiawatha seam. Groundwater flow continues horizontally downdip through the permeable sandstone channels located above the Hiawatha seam and the upper member of the Star Point Sandstone Formation until it intersects the land surface in the form of seeps. Flow from the seeps is incorporated into the Miller Canyon Reclamation and quality determination. During reclamation, seeps facilitate post mine gravity discharge from the

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portals, french drains were installed to prevent slope failure due to saturation of the fill (refer to Attachment #4 for a typical of a french drain). Construction of the french drain consisted of a layer of rock material to a depth of at least 6" to cover the affected area. The french drain was then covered with larger rock material and finally soil. The size of the drain systems was dependent upon topographic constraints along with size of the seep.

Post Mine Gravity Discharge

Gravity discharge from intercepted groundwater in the Wilberg Mine will occur as seeps from the individual portals. As mentioned early, several small seeps occur along the formational boundary between the Blackhawk and Star Point formations. Flow from the formational seeps is insufficient for sample collection.

Surface Water Resources

The PacifiCorp permit area including the Miller Canyon portal area is located in the headwater region of the San Rafael River Basin. The surface drainage system of the Miller Canyon area is confined exclusively to the Cottonwood Canyon Creek drainage system (refer to Vol. 9 - Hydrologic Section: Map HM-1). For a complete discussion of the surface water systems of the East Mountain property including the Miller Canyon refer to Volume 9 - Hydrologic Section.

The Miller Canyon area consists of approximately 0.02 acres located on a south-facing slope in the Miller Canyon drainage. Surface flow prior to the mine development in 1981 consisted of sheet flow downslope until intersecting Miller Canyon drainage system.

Surface Water Quality

Miller Canyon is an ephemeral drainage which flows to Cottonwood Canyon Creek. The portals are located approximately one half (1/2) mile from the confluence of Miller Canyon and Cottonwood Canyon Creek. In 1983 the portal location was incorporated into the Wilberg/Cottonwood UPDES permit: UT-0022896, as outfall location 004. Discharge water quality from the portal area is monitored according to UPDES permit stipulations. Discharge has not occurred from the portal area since 1996. Water quality and quantity of the receiving stream - Cottonwood Canyon Creek, is monitored above and below the Miller Canyon at site SW-2 and SW-3 as specified in Appendix A of Volume 9 - Hydrologic Section . Results of the monitoring including hydrographs and water quality statistics are reported in the Annual Hydrologic Report.

Sampling and Analysis

Water quality sampling and analysis of samples collected by PacifiCorp were done according to the "Standard Methods for the Examination of Water and Wastewater." Attachment #2 consists of historic water quality data for the Miller Canyon discharge. Also within Attachment #3 is a quality

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sample analysis taken on May 17, 1999. This sample compared well with the historical data, which suggests a stabilization of water quality from the mine water discharge.

In addition to the routine water quality sampling, PacifiCorp conducted bioassay sampling to satisfy the UPDES permit. Samples collected from Miller Canyon passed the fifty (50) percent mortality criteria established in the permit. This information is also found in Attachment #3.

R645-301-800: Bonding and Insurance

The Cottonwood/Wilberg Mine reclamation bond is \$2,071,098.00. Costs associated with this project do not affect the bond liability. Insurance was provided for and updated in February 1999.

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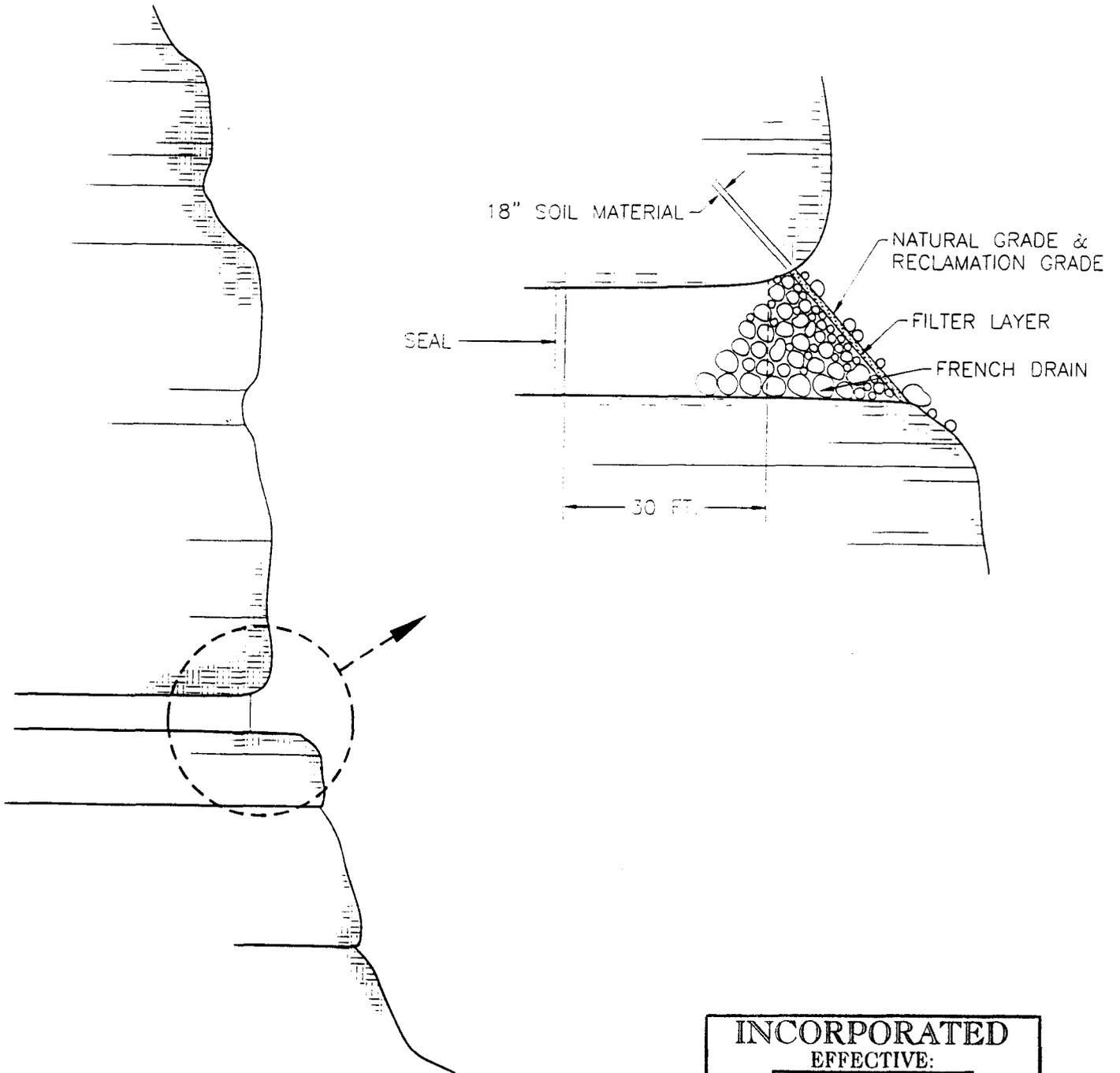
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ENERGY WEST MINING COMPANY HUNTINGTON, UTAH 84528		
COTTONWOOD MINE MILLER CANYON BREAKOUTS RECLAMATION CROSS SECTION		
DRAWN BY:	K. LARSEN
SCALE:	NONE	DRAWING #:
DATE:	JUNE 2, 1999	SHEET <u>1</u> OF <u>1</u> REV. ___

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Attachment 6

**Replace Divider Sheet
Insert BLM Concurrence Letter**

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Attachment # 6

- ❖ Concurrence Letter from USFS
- ❖ Concurrence Letter from DWR

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Insert Attachment 8