



State of Utah
 DEPARTMENT OF NATURAL RESOURCES
 DIVISION OF OIL, GAS AND MINING

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June 24, 1997

TO: File

THRU: Daron Haddock, Permit Supervisor *DORH*

FROM: Jess Kelley, Reclamation Engineer *JK*

RE: Culvert Installation, Genwal Resources, Inc., Crandall Canyon Mine,
 ACT/015/032-SR96-1, Folder #2, Emery County, Utah

SUMMARY:

The permittee first submitted this significant revision for Division approval on January 19, 1996. During the review process, it has undergone a number of modifications. This memorandum constitutes this writer's final technical analysis of the plan which has emerged from that process. Its format is such that it can be inserted directly into the approved plan.

TECHNICAL ANALYSIS:

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR Sec. 783., et. al.

GENERAL

Regulatory Reference: 30 CFR Sec. 783.12; R645-301-411, -301-521, -301-721.

PERMIT AREA

Regulatory Requirements: 30 CFR Sec. 783.12; R645-301-521.

Analysis:

Plate 1-1--Lease Map shows the boundaries of the various leases which make up the permit area. Plate 4-2--Land Use Map shows both the lease boundaries and the permit area boundary. Both of these plates were certified in April of 1997 by Dan W. Guy, a professional engineer licensed and registered in the state of Utah. A description of the permit area is found on page 1-10 of the plan and is as follows:

Township 15 South, Range 6 East, Salt Lake Base & Meridian
Section 25: S $\frac{1}{2}$
Section 26: S $\frac{1}{2}$
Section 35: All
Section 36: All

Township 15 South, Range 7 East, Salt Lake Base & Meridian
Section 30: Lots 7-12, SE $\frac{1}{4}$
Section 31: All
Section 32: S $\frac{1}{2}$ SW $\frac{1}{4}$, SW $\frac{1}{4}$ SE $\frac{1}{4}$

Township 16 South, Range 6 East, Salt Lake Base & Meridian
Section 1: Lots 1-12, SW $\frac{1}{4}$
Section 2: All

Township 16 South, Range 7 East, Salt Lake Base & Meridian
Section 5: SW $\frac{1}{4}$
Section 6: Lots 1-4, NE $\frac{1}{4}$ NE $\frac{1}{4}$, S $\frac{1}{2}$ NE $\frac{1}{4}$

Findings:

The plan fulfills the requirements of this section.

Culvert Installation
ACT/015/032-96-1
June 24, 1997
Page 3

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

Analysis:

Affected Area Boundary Maps

Plate 1-1--Lease Map shows the boundaries of the various leases which make up the permit area. Plate 4-2--Land Use Map shows both the lease boundaries and the permit area boundary. Plate 5-3--Surface Facilities Map shows the actual disturbed area associated with the surface facilities, including the area and surface facilities associated with the 1997 expansion.

These plates were certified in April of 1997 by Dan W. Guy, a professional engineer licensed and registered in the state of Utah.

Permit Area Boundary Maps

Plate 1-1--Lease Map shows the boundaries of the various leases which make up the permit area. Plate 4-2--Land Use Map shows both the lease boundaries and the permit area boundary.

These plates were certified in April of 1997 by Dan W. Guy, a professional engineer licensed and registered in the state of Utah.

Findings:

The plan fulfills the requirements of this section.

OPERATION PLAN

MINING OPERATIONS AND FACILITIES

Regulatory Reference: 30 CFR Sec. 784.2, 784.11; R645-301-231, -301-526, -301-528.

Analysis:

General

See pages 5-5 to 5-10, Appendix 7-50.

The operation is located on U.S Forest Service (USFS) land on Crandall Creek, which is a tributary of Huntington Creek. The canyon in which the operation is located is very narrow with steep sides. Access to the site is by way of a USFS road from Huntington Canyon. At the upper end of the site is a USFS turnaround, parking area, and trail head. Through a special use permit, USFS allows the permittee to use this area for employee parking and snow storage.

There are in this area 2 minable coal seams: the lower Hiawatha seam and the upper Blind Canyon seam. This mine is entirely in the Hiawatha seam, but the permittee will conduct exploratory drilling in the future to determine the feasibility of mining the Blind Canyon seam. The seam is accessed directly through an outcrop and old workings.

The entire surface operation was initially located entirely on the north side of Crandall Creek. In 1997, the site underwent major modification. Crandall Creek was diverted into a 72-inch culvert over the entire length of the site. The bottom of the canyon was then filled with approximately 73,000 cubic yards of material to create a large working pad. The sediment pond was relocated and enlarged. The coal loading facilities were enlarged and relocated onto the new pad and a run-of-mine coal stockpile was created on the south side of Crandall Creek. A new bathhouse and office building was built up canyon from the coal loading facilities on the south side of Crandall Creek.

The construction sequence for the 1997 site expansion was as follows:

- A. Temporary silt fences were placed in the stream bed.
- B. A stream channel drain system was constructed, beginning at the outlet end.
 1. Vegetation was removed from the area to be disturbed. Geotextile fabric was placed on the stream channel surface.
 2. A layer of drain rock was placed on top of the geotextile fabric.
 3. An 18-inch perforated drain pipe was placed on the drain rock.

4. Another layer of drain rock was placed over and around the 18-inch drain rock.
 5. Another layer of geotextile fabric was placed on top of the drain rock.
 6. A layer of lightly-colored marker material was placed on top of the geotextile fabric.
 7. A layer of earth fill was placed on top of the marker material.
- C. A permanent riprap channel was constructed at the outlet end of the stream channel drain system to handle flow from that system and from the soon-to-be-placed main bypass culvert.
- D. The construction of the stream channel drain system was continued upstream.
- E. The main 72-inch bypass culvert was placed and backfilled.
- F. An inlet system and trash rack was installed at the inlet of the 72-inch bypass culvert. The stream was then diverted into the bypass culvert.
- G. The sediment pond was built.
- H. The main pad was built.

Type and Method of Mining Operations

See pages 5-8 to 5-9, 5-12, 5-13, Appendix 5-3.

Coal is mined by both room-and-pillar and longwall methods using a 3-entry system. Continuous mining machinery is, of course, used for entry and panel development and for second mining in those areas missed by the longwall machinery. Entries are 20 feet wide and are placed on 60-foot centers. Safety factors for rooms and main entries range, respectively, from 1.37 to 2.45 and from 1.39 to 4.37.

From 1991 through 1995, annual coal production increased from 877,500 tons to 1,660,900 tons using only continuous mining machinery. From 1995 through 2000, annual production using room-and-pillar and longwall methods is expected to be 2,500,000 tons.

Facilities and Structures

See pages 5-22 to 5-26, Plate 5-3.

The surface area is divided, roughly, into 3 areas: the pond and coal handling area, the office and shop area, and the portal area.

The pond and coal handling area is located at the lower end of the site. A 48-inch conveyor crosses the canyon from a transfer point just outside the belt portal to a run-of-mine coal stockpile on the south side of Crandall Creek. A 54-inch reclaim conveyor goes down canyon from the coal stockpile to a pair of crushers. From the crushers, a 48-inch feed conveyor goes to a 100-ton product bin which feeds 2 short 48-inch loading conveyors which in turn go to a pair of truck scales located adjacent to the 100-ton product bin. The sediment pond lies about 100 feet down canyon from the 100-ton product bin.

The office and shop area lies about 400 feet up canyon from the coal stockpile. It includes the bathhouse and office, the shop, the warehouse, the culinary water tank, the rock dust silo, the trash dumpsters, and the electrical substation.

The portal area lies across the canyon from and above the coal handling area. The slope below the portal area is covered with a layer of shotcrete. The portal area includes the portals, the fan housing, the fan transformer, a small office, and the belt transfer by which coal is transferred from the run-of-mine belt to the 48-inch coal stockpile conveyor which crosses the canyon.

Findings:

The plan fulfills the requirements of this section.

ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

Regulatory Reference: 30 CFR Sec. 784.24, 817.150, 817.151; R645-301-521, -301-527, -301-534, -301-732.

Analysis:

Road Systems

See pages 5-27 to 5-30, 5-34 to 5-35, Plate 5-3, 5-10, 5-19, Appendix 1-2.

There are 3 roads associated with this site: the Forest Development Road, the Forest Service Access Road, and the Portal Access Road. The Forest Development Road and the Forest Service Access Road are classified as primary roads. The Portal Access Road is classified as an ancillary road.

The Forest Development Road connects the site with the main road in Huntington Canyon. It was built by the U.S. Forest Service (USFS) and is thus outside the permit area. It is, however, maintained by the permittee as a primary road in accordance with a USFS road use permit. It will be retained as a permanent feature following final reclamation.

The Forest Service Access road goes from the entrance to the site to the Forest Service turnaround area at the upper end of the site. It was built by USFS but was upgraded by the permittee to accommodate this operation. It is a primary road. It will be retained as a permanent feature following final reclamation. It is shown in plan view on Plate 5-3--Surface Facility Map. A profile and typical cross section of this road are shown on Plate 5-10--Road Profile and Cross Section.

The Portal Access Road connects the warehouse area with the portal area. It is an ancillary road. It will be completely reclaimed during final reclamation. It is shown in plan view on Plate 5-3--Surface Facility Map. A profile and typical cross section of this road are shown on Plate 5-10--Road Profile and Cross Section.

With the major surface facilities expansion in 1997, the Forest Service Access Road from the site entrance to the Forest Service trail head parking area was modified and improved in several ways. The road was realigned and widened by 15 feet, which returned it to its original 2-lane width. The old truck scales were removed, the oil storage facility was modified and cleaned up, and the road was regraded and paved through that area. A third lane was constructed from the truck turnaround to the loadout. This did away with the necessity for trucks to use the road and thus eliminated the potential for hazardous encounters between trucks and automobile traffic. But perhaps the greatest improvement was the modernization of the truck loadout, which speeded the loading process and thus eliminated the "stacking" of trucks and the congestion that resulted from it.

The Forest Service trail head parking area was also improved during the 1997 surface facilities expansion. The greatest improvement was the improvement in its accessibility which resulted in the improvements made in the Forest Service Access Road. But other

improvements were made as well. The trail head parking area was regraded. By agreement with the Forest Service, the trail head parking area had previously been used for snow storage in the winter. With the removal of the old truck scales and the modification of the oil storage facility, space was created in that area for snow storage and it was no longer necessary for the permittee to store snow in the trail head parking area.

Other Transportation Facilities

See pages 5-27 to 5-28, Plate 5-3.

Besides the roads, there are also 3 conveyors among the surface transportation facilities: a 48-inch run-of-mine conveyor, a 54-inch reclaim conveyor, and a short 48-inch loading conveyor. The conveyors are shown on Plate 5-3--Surface Facility Map and discussed in Section 5.26.

Findings:

The plan fulfills the requirements of this section.

SPOIL AND WASTE MATERIALS

Regulatory Reference: 30 CFR Sec. 701.5, 784.19, 784.25, 817.71, 817.72, 817.73, 817.74, 817.81, 817.83, 817.84, 817.87, 817.89; R645-100-200, -301-210, -301-211, -301-212, -301-412, -301-512, -301-513, -301-514, -301-521, -301-526, -301-528, -301-535, -301-536, -301-542, -301-553, -301-745, -301-746, -301-747.

Analysis:

See pages 5-31 to 5-33.

The only excess spoil is sediment pond waste and no burned waste is disposed of at this site. The operation also generates no coal mine waste, coal refuse, or coal processing waste.

Sediment pond waste is either disposed of in underground workings or hauled to a permitted coal waste disposal facility. Noncoal waste (trash) is collected in dumpsters and hauled to a landfill by a contractor when necessary.

Culvert Installation
ACT/015/032-96-1
June 24, 1997
Page 9

Findings:

The plan fulfills the requirements of this section.

SUPPORT FACILITIES AND UTILITY INSTALLATIONS

Regulatory Reference: 30 CFR Sec. 784.30, 817.180, 817.181; R645-301-526.

Analysis:

See page 5-26, Plates 5-3, 5-8.

The electrical substation is the only support facility at this site. It is located on the facilities pad near the warehouse and adjacent to the rock dust bin. It is shown in plan view on Plate 5-3--Surface Facility Map and in more detail on Plate 5-8--Electrical Substation Installation.

Findings:

The plan fulfills the requirements of this section.

SIGNS AND MARKERS

Regulatory Reference: 30 CFR Sec. 817.11; R645-301-521.

Analysis:

See pages 5-6 to 5-7.

The required signs and markers are put in place and maintained at this site. They include mine and permit identification signs, perimeter markers, buffer zone markers, and topsoil markers.

Findings:

The plan fulfills the requirements of this section.

USE OF EXPLOSIVES

Regulatory Reference: 30 CFR Sec. 817.61, 817.62, 817.64, 817.66, 817.67, 817.68;
R645-301-524.

Analysis:

See page 5-14.

All blasting will be done in accordance with R645-301-524. All blasting will be done under the direction of a person trained, examined and certified as required by 30 CFR 850 and all other applicable regulations of the Utah Industrial Commission. As required by R645-301-524.700, blasting records will be kept at the site or at the mine office in Huntington, Utah for at least 3 years.

In accordance with R645-301-524.520, signals which are audible for at least one half mile will be given before and after blasting. Access to the blast area will be restricted. The operator will post blasting signs, in accordance with R645-301-524.510, in the vicinity of the blasting operations to indicate that blasting is taking place and explain the meaning of the audible signals.

The maximum weight of explosive detonated within any 8-millisecond period will be determined by the equation of R645-301-524.651. Blasting will be done only between sunrise and sunset unless otherwise approved by the Division as provided in R645-301-524.420. Flyrock will be prevented from leaving the permit area and will not be cast more than one half the distance to the nearest occupied building within the permit area.

Findings:

The plan fulfills the requirements of this section.

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

Analysis:

Affected Area Maps

The boundary of the actual disturbed area is shown adequately on Plate 5-3--Surface Facility Map. The boundary of the permit area--or affected area--is shown adequately on Plate 5-2--Mining Projections.

Plate 5-3 was certified in April of 1997 by Dan W. Guy, a professional engineer licensed and registered in the state of Utah. Plate 5-2 was prepared by or under the supervision of and certified in March of 1996 by R. Jay Marshall, a professional engineer licensed and registered in the state of Utah.

Mining Facilities Maps

The mining facilities are shown adequately on Plate 5-3--Surface Facility Map.

Plate 5-3 was certified in April of 1997 by Dan W. Guy, a professional engineer licensed and registered in the state of Utah.

Mine Workings Maps

Mine workings are shown on Plate 5-2--Mining Projections. Also shown on Plate 5-2 are the permit area boundary, the various lease boundaries, section lines, and areas of proposed development, as well as the locations of the portals and surface facilities.

Plate 5-2 was prepared by or under the supervision of and certified in March of 1996 by R. Jay Marshall, a professional engineer licensed and registered in the state of Utah.

Monitoring and Sample Location Maps

Plate 5-2--Mining Projections shows the locations of both exploratory drill holes and those holes that were drilled for the purpose of water monitoring.

Plate 5-2 was prepared by or under the supervision of and certified in March of 1996 by R. Jay Marshall, a professional engineer licensed and registered in the state of Utah.

Plate 2-1--Soil Types Study Map shows those locations where soil samples were taken for the characterization and delineation of the prevailing soil pedons.

Culvert Installation
ACT/015/032-96-1
June 24, 1997
Page 12

Plate 2-1 was prepared by or under the supervision of and certified by Richard B. White, a professional engineer licensed and registered in the state of Utah.

Plate 5-5 shows the locations of subsidence monitoring stations and control points.

Plate 5-5 was prepared by or under the supervision of and certified in January of 1996 by R. Jay Marshall, a professional engineer licensed and registered in the state of Utah.

Plate 7-12--Seep and Spring Locations shows the locations of seep and spring monitoring points. Plate 7-16--Stream Monitoring Stations shows the locations of stream monitoring points.

Plates 7-12 and 7-16 were prepared by or under the supervision of and certified by Richard B. White, a professional engineer licensed and registered in the state of Utah.

Findings:

The plan fulfills the requirements of this section.

RECLAMATION PLAN

GENERAL REQUIREMENTS

Regulatory Reference: PL 95-87 Sec. 515 and 516; 30 CFR Sec. 784.13, 784.14, 784.15, 784.16, 784.17, 784.18, 784.19, 784.20, 784.21, 784.22, 784.23, 784.24, 784.25, 784.26; R645-301-231, -301-233, -301-322, -301-323, -301-331, -301-333, -301-341, -301-342, -301-411, -301-412, -301-422, -301-512, -301-513, -301-521, -301-522, -301-525, -301-526, -301-527, -301-528, -301-529, -301-531, -301-533, -301-534, -301-536, -301-537, -301-542, -301-623, -301-624, -301-625, -301-626, -301-631, -301-632, -301-731, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-732, -301-733, -301-746, -301-764, -301-830.

APPROXIMATE ORIGINAL CONTOUR RESTORATION

Regulatory Reference: 30 CFR Sec. 784.15, 785.16, 817.102, 817.107, 817.133; R645-301-234, -301-270, -301-271, -301-412, -301-413, -301-512, -301-531, -301-533, -301-553, -301-536,

Culvert Installation
ACT/015/032-96-1
June 24, 1997
Page 13

-301-542, -301-731, -301-732, -301-733, -301-764.

Analysis:

See pages 5-38, 5-43.

During final reclamation, the entire operations area will be regraded and restored to its approximate original contour. All cut slopes and highwalls will be eliminated. This will be made possible by the presence of surplus fill material which was hauled in during the 1997 surface facilities expansion.

Findings:

The plan fulfills the requirements of this section.

BACKFILLING AND GRADING

Regulatory Reference: 30 CFR Sec. 785.15, 817.102, 817.107; R645-301-234, -301-537, -301-552, -301-553, -302-230, -302-231, -302-232, -302-233.

Analysis:

See 5-43, Appendices 5-21, 5-22.

Reclamation will occur in 2 phases: Phase I and Phase II. Phase I reclamation will involve demolition of the surface facilities, portal sealing, and backfilling and grading. Phase II will take place 2 years after Phase I, after vegetation has been established and the area has stabilized. Phase II will involve removal and regrading of the sediment pond.

For purposes of planning and explanation, the area has been divided into 7 separate reclamation areas, as shown in Figure 1: 1) the Old Substation Area, 2) the Shop Area, 3) the Portal Area, 4) the Old Loadout Area, 5) the Forest Service Road, 6) the Expansion Area, and 7) the Phase II Reclamation Area or Sediment Pond Area. In practice, however, these areas will be reclaimed either simultaneously or within days or weeks of each other.

Reclamation will take place according to the following scheme:

PHASE I

1. Demolition and Removal of Surface Facilities--Portal Area

The underground bath house, mine fan, portable fan transformer, belt transfer station, portal access road guard rail, water pipelines, and diversion culvert above the portals will be demolished and removed. All shotcrete will be removed from the area above the portal access road, the area above the portals, and the area above the old coal loadout.

2. Removal and Disposal of Expansion Area Fill Material inside Mine Portals

At the same time the surface facilities in the portal area are being demolished, the truck loadout, conveyors, coal reclaim facilities and crusher will be demolished and removed from the expansion area. Approximately 20,410 cubic yards of fill material which will not be needed in backfilling and grading will be disposed of in old mine entry areas inside the portal.

3. Sealing and Backfilling of Portals

After excess fill material has been disposed of inside the portal, the portals will be sealed and backfilled. The seals will be concrete block structures and will be placed 25 to 35 feet in from the portals.

4. Backfill, Grade and Topsoil--Portal Area

The portal area will be backfilled, returned to its approximate original contour and covered with at least 12 inches of suitable topsoil material.

5. Revegetation--Portal Area

Revegetation will be done in the sequence: 1) application of fertilizer, 2) hydroseeding, 3) hydromulching, and 4) planting of containerized plants. Hydroseeding will combine seed with tackifier and a small amount of mulch. Hydromulching will combine wood mulch and tackifier. Containerized plants will be planted in the second year of reclamation.

6. Demolition--Old Substation Area

The mine powerline and its termination structure will be demolished and removed.

7. Backfill, Grade and Topsoil--Old Substation Area

As excess fill material is disposed of in old mine entries, additional fill from the expansion area will be used to backfill and grade the old substation area. The area will be returned to its approximate original contour and covered with 12 inches of suitable topsoil material.

8. Revegetation--Old Substation Area

The area will be revegetated according to the 4-step sequence set forth above for the revegetation of the portal area.

9. Demolition and Removal of Surface Facilities--Shop Area

The shop/warehouse building, substation, rock dust bin, oil storage facility, parking lot asphalt and a portion of the retaining wall separating the shop area from the Forest Service road will be demolished and removed.

10. Backfill, Grade and Topsoil--Shop Area

Fill from the expansion area will be used to backfill and grade the shop area. The area will be returned to its approximate original contour and covered with 12 inches of suitable topsoil material.

11. Revegetation--Shop Area

The area will be revegetated according to the 4-step sequence set forth above for the revegetation of the portal area.

12. Demolition and Removal of Surface Facilities--Old Loadout Area

By the time of final reclamation, the surface facilities in this area will have been removed during the 1997 surface facilities expansion. The remaining asphalt will be removed as will the upper portion of the coal pile retaining wall.

13. Backfill, Grade and Topsoil--Old Loadout Area

Fill from the expansion area will be used to backfill and grade the old loadout area. The area will be returned to its approximate original contour and covered with 12 inches of suitable topsoil material.

14. Revegetation--Old Loadout Area

The area will be revegetated according to the 4-step sequence set forth above for the revegetation of the portal area.

15. Reclaim Forest Service Road North of Expansion Area

The Forest Service road from the site entrance to the trail head will be reconfigured according to the Special Use Permit of August 26, 1989. The width of the asphalt surface will be reduced from a 27-foot subgrade with a 22-foot running surface to a 20-foot subgrade with a 14-foot running surface. The unpaved area will be covered with 12 inches of topsoil and revegetated as described above for the revegetation of the portal area.

16. Demolition and Removal of Surface Facilities--Expansion Area

The overhead conveyor, stacking tube, reclaim vault, tunnel/escapeway tube, crusher building, loadout conveyor, truck loadout and loading platform will be demolished and removed from the area.

17. Removal of Fill Material and Recontouring--Expansion Area

As discussed above, the fill material from this area will be used to backfill the portal area, the old substation area, the shop area and the old loadout area. The surplus will be disposed of in old mine entry areas or hauled offsite for disposal.

The reclamation of this area will be done differently from that of the other areas. For reclamation purposes, the area has been divided into 3 rather distinct subareas: the north slope area, the south slope area and the Crandall Creek channel area. The north slope area will be reclaimed like the other areas. The south slope area and the Crandall Creek channel area will be reclaimed quite differently, as will described below.

18. Restoration of South and North Slope Areas--Expansion Area

Fill material will be removed in 5-foot to 10-foot lifts. As the light-colored marker material is encountered, it will be removed and the underlying geotextile material peeled back to expose the original, undisturbed topsoil. The topsoil will be revived, revegetated and worked by hand in 5-foot to 10-foot increments as the fill material is removed and it (the topsoil) is uncovered.

19. Revegetation--South Slope Expansion Area

As the protective geotextile is removed, the underlying topsoil will be reclaimed in 5-foot to 10-foot increments. The topsoil will first be treated with PAM (polyacrylamide) to lessen its compaction and enhance its capacity to absorb moisture. It will then be revived with an inoculum. Seed will then be broadcast and raked in by hand. A wood fiber mulch will then be applied over the seed and the entire surface sprayed with a bonded fiber matrix tackifier.

20. Removal and Disposal of 72-inch Bypass Culvert

When the 72-inch bypass culvert has been uncovered, Crandall Canyon Creek will be diverted into the 18-inch underdrain. The bedding material around the 72-inch culvert will then be removed. The culvert itself will be removed in 20-foot lengths from its inlet to a point just above the sediment pond, where a new inlet headwall will be constructed. This will leave in place approximately 400 feet of culvert. Crandall Creek will continue to flow through the 18-inch underdrain until the north slope area has been reclaimed.

21. Topsoiling--North Slope Expansion Area

The north slope area is not as steep as the south slope. Thus, after the 72-inch culvert has been removed, the north slope will be covered with 12 inches of topsoil like the other areas outside of the south slope.

22. Revegetation--North Slope Expansion Area

This area will be revegetated according to the 4-step sequence set forth above for the revegetation of the portal area.

23. Restoration of the Stream Channel

The stream channel will be restored after the north slope has been covered with topsoil. Using the underdrain system as a platform, small equipment will remove the underdrain and its associated bedding material in 20-foot increments, starting at the inlet and going to the new inlet to the 72-inch culvert. Here the underdrain will be capped and the creek diverted again into the 72-inch culvert. As the underdrain is removed, silt fence will be placed on either side of the stream to provide sediment control.

24. Revegetation of the Stream Channel

The stream channel will be revegetated in the same way as the south slope area.

The topsoil will first be treated with PAM (polyacrylamide) to lessen its compaction and enhance its capacity to absorb moisture. It will then be revived with an inoculum. Seed will then be broadcast and raked in by hand. A wood fiber mulch will then be applied over the seed and the entire surface sprayed with a bonded fiber matrix tackifier.

25. Sediment Control and Treatment

Through Phase I reclamation, the sediment pond will remain in place to treat runoff from the north side of the site. As has been mentioned, during removal of the underdrain and in areas which do not drain to the pond, silt fences will be installed for sediment control.

26. Topsoil Stockpile Location Reclamation

Following removal of topsoil from storage sites, the underlying ground will be scarified. The areas will then be revegetated according to the 4-step sequence set forth above for the revegetation of the portal area.

PHASE II

27. Phase II Reclamation--Sediment Pond Removal

The removal of the sediment pond and the remaining 72-inch culvert and underdrain system will be done following the same procedure as in Phase I reclamation. The reclamation of the area will also be according to the procedures set forth above for the north slope, the south slope and the stream channel.

In order to assess the stability of the reclamation fills, the permittee commissioned a stability analysis, which is found in Appendix 5-21. The stability analysis was done in March of 1997 by JME Companies of Lakewood, Colorado. It was based on soil engineering parameters determined for this site by EarthFax Engineering of Salt Lake City, Utah in a study done in November of 1990.

Stability was assessed at 6 sample locations. Actual measured values of cohesion ranged from 700 psf to 1600 psf, but the study assumed a more conservative value of 200 psf in order to more accurately model a non-engineered fill such as those at this site. The study found that the static stability safety factor for these samples ranged from a minimum of 1.40 to a maximum of 2.44. These values are well above the value of 1.3 required by R645-301-553.130.

Findings:

The plan fulfills the requirements of this section.

ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

Regulatory Reference: 30 CFR Sec. 701.5, 784.24, 817.150, 817.151; R645-100-200, -301-513, -301-521, -301-527, -301-534, -301-537, -301-732.

Analysis:

See pages 5-27 to 5-30, 5-34 to 5-35, Plate 5-3, 5-10, 5-19, Appendix 1-2.

There are 3 roads associated with this site: the Forest Development Road, the Forest Service Access Road, and the Portal Access Road. The Forest Development Road and the Forest Service Access Road are classified as primary roads. The Portal Access Road is classified as an ancillary road.

The Forest Development Road connects the site with the main road in Huntington Canyon. It was built by the U.S. Forest Service (USFS) and is thus outside the permit area. It is, however, maintained by the permittee as a primary road in accordance with a USFS road use permit. It will be retained as a permanent feature following final reclamation.

The Forest Service Access road goes from the entrance to the site to the Forest Service turnaround area at the upper end of the site. It was built by USFS but was upgraded by the permittee to accommodate this operation. It is a primary road. It will be retained as a permanent feature following final reclamation. It is shown in plan view on Plate 5-3--Surface Facility Map. A profile and typical cross section of this road are shown on Plate 5-10--Road Profile and Cross Section.

The Forest Service road will be reconfigured according to the Special Use Permit of August 26, 1989. The width of the asphalt surface will be reduced from a 27-foot subgrade with a 22-foot running surface to a 20-foot subgrade with a 14-foot running surface. The unpaved area will be covered with 12 inches of topsoil and revegetated.

The Portal Access Road connects the warehouse area with the portal area. It is an ancillary road. It will be completely reclaimed during final reclamation. It is shown in plan view on Plate 5-3--Surface Facility Map. A profile and typical cross section of this road are shown on

Culvert Installation
ACT/015/032-96-1
June 24, 1997
Page 20

Plate 5-10--Road Profile and Cross Section.

Findings:

The plan fulfills the requirements of this section.

MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-323, -301-512, -301-521, -301-542, -301-632, -301-731.

Analysis:

Affected area boundary maps.

The boundary of the actual disturbed area is shown adequately on Plate 5-3--Surface Facility Map. The boundary of the permit area--or affected area--is shown adequately on Plate 5-2--Mining Projections.

Plate 5-3 was certified in April of 1997 by Dan W. Guy, a professional engineer licensed and registered in the state of Utah. Plate 5-2 was prepared by or under the supervision of and certified in March of 1996 by R. Jay Marshall, a professional engineer licensed and registered in the state of Utah.

Bonded area map.

The boundary of the actual disturbed area, which in this case is identical to the bonded area, is shown adequately on Plate 5-3--Surface Facility Map.

Plate 5-3 was certified in April of 1997 by Dan W. Guy, a professional engineer licensed and registered in the state of Utah.

Reclamation backfilling and grading maps.

Reclamation topography is shown by contours on Plate 5-16--Reclamation (Phase I) and Plate 5-17--Reclamation (Phase II). Reclamation topography is shown by cross sections on Plates 5-17A and 5-17B, both of which are designated Reclamation Cross Sections.

Culvert Installation
ACT/015/032-96-1
June 24, 1997
Page 21

Plates 5-16, 5-17, 5-17A and 5-17B were certified in April of 1997 by Dan W. Guy, a professional engineer licensed and registered in the state of Utah.

Reclamation facilities maps.

Reclamation facilities are shown on Plate 5-16--Reclamation (Phase I) and Plate 5-17--Reclamation (Phase II).

Plates 5-16 and 5-17 were certified in April of 1997 by Dan W. Guy, a professional engineer licensed and registered in the state of Utah.

Final surface configuration maps.

The final surface configuration, after removal of the sediment pond, is shown by contours on Plate 5-17--Reclamation (Phase II).

Plate 5-17 was certified in April of 1997 by Dan W. Guy, a professional engineer licensed and registered in the state of Utah.

Findings:

The plan fulfills the requirements of this section.

BONDING AND INSURANCE REQUIREMENTS

Regulatory Reference: 30 CFR Sec. 800; R645-301-800, et seq.

Analysis:

Form of Bond (Reclamation Agreement)

The bond will be a surety agreement between the permittee and a bonding company. However, the details of the bond, i.e., its amount and the bonding company which holds it, are not yet known to the Division. The permittee must post a bond and provide the Division with its details before the permit can be issued.

Determination of bond amount.

See page 5-42, Appendix 5-20.

The reclamation bond was increased in 1997 to take into account the cost of reclaiming the surface facilities expansion. Using information provided by the permittee, which is found in Appendix 5-20, the Division determined the necessary bond amount to be at least \$1,645,000. The following table, which is found on page 5-42, is a summary of the reclamation cost calculations:

Direct Costs	
Demolition and Removal Total	\$649,612
Earth Work Total	\$426,786
Drainage Total	\$55,650
Revegetation Total	\$21,344
Topsoil Total	\$64,166
Total Direct Costs	\$1,217,558
Indirect Costs	
Monitoring and Maintenance (10%)	\$121,756
Contingency (10%)	\$121,756
Engineering Redesign (5%)	\$60,878
Mobilization/Demobilization (2.5%)	\$30,439
Contract Management Fee (5%)	\$60,878
Total Indirect Costs	\$395,707
Total Reclamation Costs (1997 Dollars)	\$1,613,265
Escalation (2.52% for 1 year)	\$40,654
Reclamation Cost (1999 Dollars)	\$1,653,919
Reclamation Cost (Rounded to Nearest \$1000)	\$1,654,000

Findings:

The plan fulfills the requirements of this section. However, before the facilities expansion and culvert installation can proceed, the permittee must post a reclamation bond for *at least* \$1,654,000 and provide a copy of the bond agreement to the Division.

Culvert Installation

ACT/015/032-96-1

June 24, 1997

Page 23

RECOMMENDATION:

It is recommended that this significant permit revision be approved, subject only to the stipulation that the permittee post a reclamation bond in the amount of *at least* \$1,654,000 before the permit is issued and construction is allowed to proceed.

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