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State of Utah
DEPARTMENT OF NATURAL RESOURCES

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August 8, 2007

Erwin Sass, General Manager
Canyon Fuel Company, LLC
P.O. Box 1029
Wellington, Utah 84542

Subject: Approval of Methane Degasification Well G-19, Task ID #2812, Canyon Fuel Company, Dugout Mine, C/007/0039

Dear Mr. Sass:

We have completed our technical review of the Methane Degasification Well G-19 amendment. The above-referenced amendment is approved effective August 9, 2007. A stamped incorporated copy is enclosed for your copy of the Mining and Reclamation Plan.

An updated Technical Analysis (TA) for the Dugout Canyon Mine has been prepared as part of the amendment approval process (CD enclosed).

If you have any questions, please call me at (801) 538-5268 or Steve Christensen at (801) 538-5350.

Sincerely,

Pamela Grubaugh-Littig
Permit Supervisor

enclosure
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UTAH DNR OIL, GAS & MINING

State of Utah

Utah Oil Gas and Mining

Coal Regulatory Program

Dugout Mine
Canyon Fuel Company, LLC
Technical Analysis
August 8, 2007

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TECHNICAL ANALYSIS DESCRIPTION

The Division ensures that coal mining and reclamation operations in the State of Utah are consistent with the Coal Mining Reclamation Act of 1979 (Utah Code Annotated 40-10) and the Surface Mining Control and Reclamation Act of 1977 (Public Law 95-87). The Utah R645 Coal Mining Rules are the procedures to implement the Act. The Division reviews each permit or application for permit change, renewal, transfer, assignment, or sale of permit right for conformance to the R645-Coal Mining Rules. The Applicant/Permittee must comply with all the minimum regulatory requirements as established by the R645 Coal Mining Rules.

The regulatory requirements for obtaining a Utah Coal Mining Permit are included in the section headings of the Technical Analysis (TA) for reference. A complete and current copy of the coal rules can be found at http://ogm.utah.gov

The Division writes a TA as part of the review process. The TA is organized into section headings following the organization of the R645-Coal Mining Rules. The Division analyzes each section and writes findings to indicate whether or not the application is in compliance with the requirements of that section of the R645-Coal Mining Rules.

GENERAL CONTENTS

IDENTIFICATION OF INTERESTS

Regulatory Reference: 30 CFR 773.22; 30 CFR 778.13; R645-301-112

Analysis:

General Chapter 1 volume contains information on corporate ownership for Canyon Fuel Company's affiliated Utah mines: SUFCO Mine, Skyline Mine, Soldier Canyon Mine, Banning Loadout, and Dugout Canyon Mines (Section 111 of the MRP).

Section 112.400 of the MRP and Table 1-1 and Figure 1-1 (A - D) of General Chapter 1 provide a listing of affiliated coal mining operations under the control of Canyon Fuel Co., LLC. The listing includes the affiliated Utah mines itemized in Sec 111 and the successfully reclaimed bond release sites: Gordon Creek No. 2, 7, and 8, Gordon Creek No. 3 and 6, and Huntington Canyon No. 4 mine.

Figure 1-1 (A-D) also provides an organizational chart showing corporate ownership and control of Canyon Fuel Co., LLC by Arch Coal, Inc. The list of officers and directors for Canyon Fuel Co., LLC and its four corporate owners Arch Western Bituminous Group, LLC; Arch Western Resources, LLC; Arch Western Acquisitions Corp; and Arch Coal, Inc.) is found in Appendix 1-1. Appendix 1-1 was last updated in February 2006. Changes in officers are clearly noted with beginning and ending dates and are attested to by notarized statements from each corporate entity. [03212006]

The Permittee and operator of the Dugout Mine is Canyon Fuel Company, LLC (Sec. 112.200). The Resident Agent is C. T. Corporation Systems (50 W. Broadway; SLC, UT 84104). Canyon Fuel has offices in Colorado; Section 112.200 provides contact information. A letter signed by Gene DiClaudio, President of Arch Western Bituminous Group, LLC, dated March 15, 2005, authorizes Erwin Sass and David Spillman as persons with signatory authority for the Dugout Canyon Mine.

The information provided in Sec. 111 and 112 of General Chapter 1 indicates that the Permittee (Canyon Fuel Co., LLC) is owned by Arch Coal and/or its subsidiaries and Figure 1A outlines the corporate structure. And Sec. 112.100 indicates that Delta Housing Inc has a minor (1%) interest in the Arch Western Resources, LLC.

Officers and directors of Canyon Fuel Co., LLC, Arch Western Bituminous Group, LLC, Arch Western Resources, LLC and Arch Coal, Inc are found in App. 1-1.

Coal mining and reclamation operations related through corporate structure are listed in Table 1-1 and include the active sites: SUFCO, Skyline and Soldier Canyon Mines, the Banning

Loadout, and the following reclaimed sites: Gordon Creek No 3 & 6, Gordon Creek No. 2, 7, & 8, and Huntington No. 4 mines in Utah. [04212005]

Findings:

The information provided meets the regulatory requirements for legal and financial information.

VIOLATION INFORMATION

Regulatory Reference: 30 CFR 773.15(b); 30 CFR 773.23; 30 CFR 778.14; R645-300-132; R645-301-113

Analysis:

The Permittee submitted new corporate violation information to address the requirements of this section on September 10, 2003. The new information has been submitted for incorporation into the Dugout Canyon Mine mining and reclamation plan. The required information is contained in Chapter 1, pages 1-21, 1-22, and 1-23A-R of the MRP. The information was previously updated in January of 2003.

The newly submitted information contains the violation information for all of the ARCH Coal, Incorporated operations. All corporate violations that are pending exist at ARCH operations in the States of West Virginia or Virginia. There are no outstanding violations relative to ARCH's Canyon Fuel Company operations in the State of Utah.

Findings:

The information provided meets the requirements of the regulations.

RIGHT OF ENTRY

Regulatory Reference: 30 CFR 778.15; R645-301-114

Analysis:

Right of Entry information is found in the Dugout MRP, Chapter 1, Sec. 114 and in Appendices 1-1, 1-3, and 1-4. The Surface Owner Agreement between the Thayn Trust and Canyon Fuel Company is included in Appendix 4-2 of the MRP. The agreement will expire in 2019. Plates 7-1 and 7-2 show the location of a jeep trail on Gil L. Conover's land that is used to access the monitoring locations in the federal lease U-07064-027821. Appendix 4-4 provides documentation for the use of the trails. [03202007]

Canyon Fuel Company, LLC is the surface owner of the refuse site (Refuse Amendment Vol., p. 1-4). [02242003]

The 2.7 acres of land to be disturbed for the Pace Canyon fan portal falls in E1/2NW1/4NW1/4 Sec. 30 T.13 S., R. 13 E. The road accessing the site is under the jurisdiction of the BLM, although the road is gated and not accessible to the public (BLM, email, March 3, 2005). During a technical site visit on April 1, 2005, the Permittee indicated that a right of way from the BLM will be obtained such that drainage and surface improvements can be made to the route. [04212005]

The legal description relative to the SITLA lease addition is contained on p. 1-19 of Vol. 1, Chapter 1, Sec. 114, of the Dugout Canyon Mine MRP. See information relative to State Lease ML-48435-OBA, containing approximately 2,500 acres. [06192005]

Findings:

Information provided in the application is considered adequate to meet the requirements of this section of the regulations.

LEGAL DESCRIPTION AND STATUS OF UNSUITABILITY CLAIMS

Regulatory Reference: 30 CFR 778.16; 30 CFR 779.12(a); 30 CFR 779.24(a)(b)(c); R645-300-121.120; R645-301-112.800; R645-300-141; R645-301-115.

Analysis:

There are no areas designated as unsuitable for mining within the permit area (Vol. 1, Chap. 1, Sec. **115 Status of Unsuitability Claims**). The Permittee does not propose to conduct mining activities within three hundred feet of any occupied dwelling.

County road to the Dugout Canyon existed for many years, and was upgraded by the County to handle the increased traffic volume and weights needed for coal haulage to the Dugout Mine. The road is maintained via a toll charge paid by Canyon Fuel Company (Chap. 5, Sec. **527.200 Description of Transportation Facilities).** The County road ends at the mine site disturbed area perimeter. The Permittee does not conduct coal mining activities within 100 feet of the right of way of this public road, (R645-103-234).

All agreements between the County and Canyon Fuel Company for the road are in place. The County road ends at the mine site disturbed area perimeter; the in place agreements negate any concern by the Division relative to the Permittee conducting coal mining activities within 100 feet of the right of way of this public road, (R645-103-234).

The legal description of the state and federal lease areas, fee land, BLM land, and BLM right of way are provided in Sec. 114 of the MRP. The legal description of the BLM land disturbed for the Pace Canyon fan portal and shaft is found in App. 1-4.

At the location of the 2.7-acre fan portal disturbance, the Pace Canyon road is under BLM jurisdiction, but has no public access due to a locked gate marking the end of County maintenance (Sec. 521.100). [04212005]

Findings:

Information provided in the application meets the requirements of this section of the regulations.

PERMIT TERM

Regulatory References: 30 CFR 778.17; R645-301-116.

Analysis:

The State of Utah mining permit, issued by the Division was renewed on March 3, 2003, and remains in effect for a period of five years, (expiration on March 3, 2008).

Findings:

The minimum regulatory requirements of this section are being met by the Permittee.

PUBLIC NOTICE AND COMMENT

Regulatory References: 30 CFR 778.21; 30 CFR 773.13; R645-300-120; R645-301-117.200.

Analysis:

Certificates of Insurance are located in the General Chapter 1 Volume, App. 1-2. The insurance provider is Marsh USA, Inc. and the company affording coverage is Ace American Insurance Co. The Division of Oil Gas and Mining is listed as the Certificate holder.

The public notices for the Dugout Mine are located in App. 1-2. These include the proof of publication relative to the SITLA lease application. Public notice was not required for the Pace Canyon fan portal disturbance of 2.7 acres. [03212006]

Findings:

Information provided in the application meets the requirements of this section of the regulations.

FILING FEE

Regulatory Reference: 30 CFR 777.17; R645-301-118.

Analysis:

The Permittee met the required $5.00 application fee for coal mining permit.

Findings:

Information provided in the application meets the requirements of this section of the regulations.

PERMIT APPLICATION FORMAT AND CONTENTS

Regulatory Reference: 30 CFR 777.11; R645-301-120.

Analysis:

The Mining and Reclamation Plan (MRP) meets the requirements of R645-301-121.100 and R645-301-121.200 for the biology chapter and archeology section because the information is generally current, clear, and concise.

The MRP includes many different volumes, including the following "stand-alone" documents:

- "Dugout Canyon Mine – Leach Field Addendum A-1" (LFA, March 2001)
- "Refuse Pile Amendment – Dugout Canyon Mine" (RA, January 2003)
- "Methane Degasification Amendment" (MDA, 2003/2004).

The "stand-alone" volumes provide exclusive information, supporting documents, and maps for each project. [05052005]

Findings:

Information provided in the application is considered adequate to meet the requirements of this section of the regulations.

REPORTING OF TECHNICAL DATA

Regulatory Reference: 30 CFR 777.13; R645-301-130.

Analysis:

The MRP meets the requirements of R645-301-130 because all information was submitted in a legible and organized form. Qualified professionals conducted or directed the surveys and analysis. Technical information was submitted supporting engineering, geology, hydrology, soils, biology and archeology related documents. [05052005]

Findings:

Information provided in the application is considered adequate to meet the requirements of this section of the regulations.

MAPS AND PLANS

Regulatory Reference: 30 CFR 777.14; R645-301-140.

Analysis:

Maps included in the MRP have been certified by a Utah registered professional engineer. Maps are reviewed by the Division along with other documentation in the MRP within each section heading of this TA.

Findings:

The information provided meets the minimum regulatory requirements.

COMPLETENESS

Regulatory Reference: 30 CFR 777.15; R645-301-150.

Analysis:

The MRP is complete because it includes, at least, the minimum information required under R645-301.

Findings:

Information provided in the application meets the requirements of this section of the regulations.

ENVIRONMENTAL RESOURCE INFORMATION

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

GENERAL

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

Analysis:

The Dugout Canyon Mine is located within Dugout Canyon in the northern Book Cliffs-Roan Plateau region. Elevation of the mine facilities area ranges between approximately 7000 and 7150 feet above mean sea level.

Refuse Site [02/24/03]

The refuse site is located in T14S R12E Sec. 18. The site is located at an elevation of 5,900 feet on a pediment composed of gravelly alluvial deposits overlying the Mancos Shale. The triangular shaped site covers approximately 16 acres (RA Attachment 2-2) and is immediately adjacent to the county road. The land is owned by the Permittee. The site has been used as a source of gravel and fill for the county road construction and for the mine site.

Pinyon-juniper and Black sagebrush/galleta grass vegetation communities exist at the site. The soils of the area were evaluated by the Soil Conservation Service (SCS) and serve as the typical pedon of Haverdad loam 1 to 8 percent slopes in the 1988 Carbon County Soil Survey (App. S5 of RA Attachment 2-1). The SCS estimated the average annual precipitation to be about 12 – 14 inches.

Pace Canyon Fan Portal

The Pace Canyon Fan Portal covers 2.7 acres adjacent to a BLM roadway along Pace Creek, in a canyon directly south of Dugout Canyon. The site has a fan portal and air shaft and topsoil storage.

Degasification Wells

The Permittee has permitted numerous degasification wells to reduce methane build-up in the mine. Wells G-1 through G-17 and G-19 have been approved. The degasification wellsare shown on Figure 1-1. The degasification well sites will be developed near existing private roads in Pace Canyon, as shown on the figure and on figures in Attachment 5-1. Plans show how the site will be built to control erosion and prevent runoff impacts, Attachment 5-1. Information has also been provided for reclamation of the sites. [09/06/2006]

Findings:

General resource information is considered adequate to meet the requirements of this section.

PERMIT AREA

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

Analysis:

The Permittee has provided right of entry information in Section 114 of the MRP. The permit area encompasses 9,511 acres (577 acres federal, 920 acres state, and 8,014 acres of fee land, see Section 114 and Plate 1-4). The permit area and adjacent lands are shown on Figure 1-1 and other maps in the MRP. A legal description of the permit area is given in Section 114 of the MRP. [03202007]

The disturbed areas are shown on Sec. 114, App. 1-4 and Plate 1.4. The disturbed area boundary markers were surveyed in 2006. As a result of the survey, the facilities area increased by 0.6 acres (see map in Appendix 5-12). The disturbed area is 79.95 acres and divided as follows:

- Mine facility area including the Gilson pad and small substation, 20.80 areas.
- Degassification wells G-2 through G-17,, 24.85 acres
-
- Leach field/pipeline area 1.8 acres.
- Pace Canyon Fan Portal 2.7 acres.
- Refuse pile 26.8 acres.

  [03202007]

Findings:

The information provided meets the requirements of the regulations.

HISTORIC AND ARCHEOLOGICAL RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.12; R645-301-411.

Analysis:

The MRP meets the requirements of R645-301-411 regulations pertaining to historic resources. The MRP (Vol. 3, App. 4-1,Confidential Files in Division PIC room) includes numerous evaluations of historic resources that focus on the permit area. It also includes

narratives and maps of historic resources that may be included in or eligible for inclusion in the National Register. There is proof of coordination efforts from the SHPO. [05172006]

An intensive archaeological surface evaluation of the mine area was conducted in 1980 under the direction of Eureka Energy Company by Archeological-Environmental Research Corporation (AERC). Four sites were reported as being potentially eligible for listing in the National Register of Historic Places (NRHP) are within the permit area. The Fish Creek Mine and the Pace Canyon Mine were determined to not be eligible for nomination to the NRHP. AERC conducted another survey in November 1995 and determined that the Dugout Creek Mine was also not eligible for inclusion on the NRHP due to the lack of context and cultural integrity.

The MRP includes surveys for the Degas program: Confidential Binder, Vol. MDA, App. 4-1.

- G1-G6: Senulis 2003; Class III; one eligible site (42CB292)
- G7-G8: Senulis 2005a; Class I (literature search); no known sites
- G9-G10: Senulis 2005b; Class III; one historic resource (42CB2435); not eligible; DOGM issued a "no effect" finding
- G11-G12: Senulis 2005b; Class III; one historic resource (42CB2435); not eligible; DOGM issued a "no effect" finding
- G13-G-17: Senulis 2005 (G13, 14), 2001 (G15-17); 42CB1596; not eligible; DOGM issued a "no effect" finding
- G19: Senulis 2006; Class III; no resources; DOGM issued a "no effect" finding [07192007]

The Permittee submitted two ground surveys (Senco-Phenix, June 2001 and May 2004) conducted within the SITLA lease area. Both surveys were relatively limited in size and not far into the permit boundary (2000' east of the permit boundary). Regardless, both surveys show that there are no sites included in or eligible for inclusion in the NRHP within the surveyed area of the SITLA lease.

It is important that employees avoid all historic properties during the life of the project. In the event that construction or operations uncover historic properties, Section 106 of the National Historic Preservation Act and 36 CFR 800.13 require that the Permittee stop all work in the vicinity and notify the Division. The Permittee, Division, and other appropriate parties will develop a strategy to avoid the site or mitigate the impacts at that time.

Findings:

Information provided in the application is considered adequate to meet the requirements of this section of the regulations.

CLIMATOLOGICAL RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.18; R645-301-724.

Analysis:

Climatological resource information is found in App. 4-1. Figure 3 (p. A-2-4-6) is an isopleth of the mean annual precipitation for central Utah, showing the refuse site in a location receiving approximately 12 inches precipitation annually. The source of this information is the USGS. For a one-year period from May of 1978 to April of 1979, the annual precipitation amounted to 12.3 inches, with the maximum snow/rainfall occurring from November through March (Table 1, information from the Wellington weather monitoring station).

Figure 4 graphically summarizes the seasonal precipitation for the years 1958 to 1965 from the Sunnyside weather station.

Refuse Site

The elevation of the refuse site is approximately 5,900 feet. Precipitation information has been provided from the Price Warehouse at elevation 5,700 feet and from the Wellington station at 5,400 feet. The Wellington station is closer to the refuse site.

Over thirty years (1968 through 1997), the Price area has received an average annual precipitation of nine inches according to the Price Warehouse weather station data from the National Oceanic and Atmospheric Administration (NOAA). At the Wellington station over an eighteen-year period (1980 through1997), the average annual precipitation was also nine inches.

Data from the Utah Climate Center for the Price station indicates that the months of July through October have the greatest precipitation (with an average of one inch falling in each month). Snowfall is greatest in December and January (between six and nine inches each month). Data from the NOAA for the Wellington Station confirms that seasonally, the late summer and fall months provide the most consistent, highest monthly averages for precipitation. This pattern of precipitation suggests a late summer seeding might be successful. In late summer, the average monthly temperatures are in the mid-seventies (degrees Fahrenheit).

Findings:

Climatological resource information is considered adequate to meet the requirements of this section.

VEGETATION RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.19; R645-301-320.

Analysis:

The MRP meets the requirements of R645-301-321 because there is adequate discussion of plant communities observed within the permit area. The MRP contains many supporting documents on vegetation for the permit area. The baseline vegetation information is adequate for assessing reclamation potential and success as well as productivity values for the surface area affected by mining operations. [05052005]

Volume 3, App. 3-1 contains vegetation surveys of the main mine facilities and adjacent areas. The Refuse Pile volume contains the vegetation study (Attachment 3-1), maps (Figs. 3-1 and 3-2), and photos for the disturbance related to the refuse pile site. The volume for the degas well amendment also contains site-specific vegetation survey and productivity values for the G1-G19 sites. The Permittee never constructed G1 or G8. The vegetation map showing community types for the main mine site is in Vol. 1, Plate 3-1. [05172006]

The vegetation map delineates vegetative communities within and surrounding the permit area. The permit area ranges in elevation from 7000 to 8600 feet. The MRP describes vegetative cover, production and shrub density of the Douglas fir, mixed conifer, pinyon juniper, deciduous stream bank, and shrub/grass/juniper communities within the permit and adjacent areas.

There are areas that were previously disturbed from past mining and coal exploration activities. The MRP describes these areas as once dominated by pinyon and juniper with a potential production of 800 pounds per acre. The MRP provides other production estimates that are project specific. The dominant shrub species by cover was big-tooth maple while rubber rabbitbrush had the greatest number of individuals present. The area is dominated by species that indicate the site has been disturbed. Yellow sweetclover contributed the most vegetative cover to the total cover of 37% (App. 3-1).

There are many areas illustrated on the vegetation map that have not been ground-truthed. Therefore, the map may illustrate particular vegetation communities may be present; when in actuality there may be different communities present. The Division should always inquire for either a quantitative survey or qualitative ground-truthing for any project that may include disturbance from construction of facilities or impacts from subsidence, respectively. [03202007]

The MRP includes the results of the vegetation surveys of the riparian and pinyon juniper *range sites* selected for the standards of success. These range sites are located in Fish Creek Canyon a few miles west of Dugout Canyon. The 1991 (BLM) and 1997 (NRCS) survey results showed the riparian community as "fair to poor" and "fair", respectively. A site visit in 1996 suggested the riparian area had not been as heavily grazed as reported in the past, but that it was still in a somewhat degraded condition. This community type is the most productive in terms of forage availability in the area. Further analysis of the riparian and pinyon juniper sites is in the 1998 vegetation survey.

The Permittee must recognize that one of the requirements for using range sites for the standard of success is that the site must be declared as fair or better condition. [05052005] Also

concerning standards for success, the Permittee must recognize that "previously disturbed" only includes coal-mining –related disturbances not other types of disturbances such as logging, roads, gas exploration etc..

Findings:

Information provided in the application is considered adequate to meet the requirements of this section of the regulations.

FISH AND WILDLIFE RESOURCE INFORMATION

Regulatory Reference: 30 CFR 784.21; R645-301-322.

Analysis:

GENERAL WILDLIFE

The MRP provides narrative, supporting documentation, or maps on ungulates, bats, aquatics, raptors, migratory birds, and reptiles. This information is adequate to meet the requirements of R645-301-322.

DWR considers all riparian areas as critical value for wildlife and R645-301-322.220 states that cliffs supporting raptors nests are habitats of unusually high value.

The *Study To Determine The Effects Of Coal Development On Wildlife In Southeastern Utah* (1979-1981; Vol. 3, App. 3-2) provides data for wildlife populations, condition, and behavior within the Sage-point Dugout Canyon project. Although this study provides valuable site-specific information, the Permittee should not consider it as baseline information for the current mine plan. The permit and facilities areas are much smaller than they were in an earlier proposal. [05052005]

Ungulates

The MRP (Vol. 3, App. 3-2) provides general information on many wildlife species including ungulates. Volumes 1 and 3 (App. 3-3) provide general wildlife, elk, and deer maps. A letter in the MRP (Vol. 3, App. 3-3) details that elk and deer range within the permit area. [05052005]

The permit area has both critical summer and winter big game habitat. There are areas designated as critical winter and summer deer habitat as well as high value winter and yearlong elk habitat (Confidential Files, Plate 3-2). [05052005]

The Permittee states that the local area supports yearlong pronghorn range in the salt desert shrub community of the lower elevation ranges along the Clark Valley Road.

Bats

A previous bat survey includes information on bat species and numbers as well as roosting and foraging habits near a portion of Dugout Creek (Vol. 3, App. 3-3). A few bats were found in the area; however, the spotted bat and Townsend's big eared bat or their habitats were not found. Additional surveys will be conducted in the zone of potential subsidence. Plate 3-3 shows the locations of escarpments within the permit area. Cliff escarpments are considered unusually high value for bats and raptors. The information in the MRP satisfies the requirement of condition 13 of the March 16, 1998 permit.

When the Permittee is required to conduct bat surveys, the Permittee will focus on all Utah sensitive bat species and conduct all bat surveys between May and September. The Permittee will consult with the Division if baseline surveys are positive for bats and operations significantly impact bat habitat. The Permittee may need to conduct a follow up survey and implement a mitigation project (Vol. 1, Sec. 322, p. 3-17).

The Permittee conducted a bat survey near the Pace Canyon fan breakout (May 2005; Vol. 3, App. 3-3). The results were positive for bats. There were no TE species observed, but there was one sensitive species (fringed myotis) observed primarily at a pond near survey site "Stop 7". The Permittee will consult with the Division if operations result in subsidence that significantly impacts the flow for spring site PC1A (this spring feeds the pond near Stop 7). The Permittee may need to conduct a follow up survey and implement a mitigation project.

The Permittee has conducted bat surveys for certain degas well projects (Vol. Methane Degasification Amendment, Att. 3-2). These surveys have been conducted along primarily Pace Creek and a pond near Stop 7.

Aquatics

The MRP does not include fish or macroinvertebrate surveys. There are water resources within the Pace Creek and SITLA lease areas that include small stretches of channels considered as ephemeral or perennial within the permit area. The Division, in consultation with DWR, does not recommend surveying for macroinvertebrates or fish within these stretches at this time. [05052005]

Amphibians and Reptiles

The MRP does not include amphibian and reptile surveys that are project specific, but has general information on a variety of species, including reptiles (Vol. 3, App. 3-2). The Permittee is aware that all amphibians and reptiles are legally protected. [05052005]

Raptors

The Permittee will conduct annual raptor surveys to obtain baseline data prior to mining disturbances including subsidence of cliff habitat (Vol. 1, Sec. 322, p. 3-13). The Permittee will also conduct follow up surveys within one year if nests were observed during the baseline surveys and if operations resulted in subsidence. Annual reports provide the results of the over-flight surveys. [05052005]

Flyover maps show nests for a diversity of raptor species including redtail hawk, prairie falcon, raven, and golden eagle. Other raptor surveys also include information on the prairie falcon, Cooper's hawk, and golden eagle observed along the access corridor to the mine facilities area (Vol. 3, App. 3-3).

Numerous active and tended golden eagle nests and prairie falcon scrapes are located outside but immediately adjacent to the permit area. No known raptor nests are within the area to be disturbed by facility construction.

App. 3-3 contains a report for a survey of birds of special interest done at the mine site. A loggerhead shrike was tentatively identified in this survey, and golden eagles were flying in the area. No other species of special interest were identified. This satisfies the requirements of permit condition 3 in the March 16, 1998, permit.

The Permittee will conduct ground surveys for goshawks in areas with suitable habitat and areas planned for mining facilities. DWR evaluated sites, during the annual flyover near DUGO104 and DUGO204 exploration holes for goshawk habitat. The results showed, however, that logging has compromised the dense canopy habitat making that area unsuitable for goshawks. DWR also evaluated the area for the Pace fan project and determined that the area was not suitable for goshawks. [05052005]

The Permittee will conduct ground surveys for Northern saw whet owls in areas with suitable habitat and areas planned for mining facilities. [05052005]

The 2004-raptor survey apparently covered the Pace and SITLA project areas. The MRP states that the results were positive for two golden eagle nests approximately 1 mile from the Pace project site. This distance is not within the 0.5 buffer zone.

The letter drafted by Barry Barnum (1996, Utah Fuel Company; Vol. 3, App. 3-3) details a raptor nest protection plan as it relates to subsidence. DWR no longer supports the ideas presented by Mr. Barnum, except under the extreme cases. The Permittee states they will evaluate raptor nests on a case-by-case basis and will mitigate using the best technology available. Any mitigation effort, however, is dependent on results of the on-ground surveys that year, safety, degree of subsidence, and the availability of alternative nest sites outside the subsidence area. The Permittee must contact the Division prior to any protection efforts. [05052005]

<u>THREATENED, ENDANGERED, AND SENSITIVE ANIMAL/PLANT SPECIES</u>

The MRP meets the requirements of R645-301-322 because there is adequate discussion, supporting documentation, and maps on TES species that could occur within or adjacent to the permit area. All supporting documents on TES plant and animal species show that there were no observations of threatened or endangered species. [05052005]

The volume - Methane Degasification Amendment provides results of a literature search and ground-truth surveys for many TES species, particularly plant species. The "withdrawn" volume - Degas Wells MW-6 and –8 (Att. 3-2) also provides results of ground-truth surveys for twenty-seven plant and two animal species. The volume - Degas Wells MW-6 and –8 (Att. 3-3) contains the David Willey report on Mexican spotted owl (MSO). [05052005]

The MRP contains current USFWS and Utah Natural Heritage Program lists of TES species that could occur in Carbon County, Utah. The Degasification Amendment contains a copy of the corporate TES permit (exp. 12/31/05) for EIS with Mel Coonrod as principal officer. [05052005]

The Permittee has conducted site-specific TES surveys over the years. There is, however, no general threatened, endangered and sensitive species (TES animal and plant) official evaluation that focuses on the SITLA lease area. The Division was concerned of subsidence possibly impacting TES plant and animal species. DWR provided an updated TES list and reported that there are no records of occurrence for any TES species in T13 S, R13 E, S17, 19-21, 28-30. They mentioned, however, that there are recent records of occurrence in the vicinity for ferruginous hawk (over 2 miles from area) and historical records of occurrence for Northern goshawk (approximately 4 miles from area).

TES Plants

All supporting documents on TES species show that there were no observations of any threatened or endangered species. The documents show, however, that the permit area supports habitat for the following sensitive plants: canyon sweetvetch (*Hedysarum occidentale* var. *canone*), tufted cryptantha (Cryptantha caespitosa), Helenium hymenoxys (Hymenoxys helenioides), and Graham beardtongue (Penstemon deaveri). The Division is aware of a large population of canyon sweetvetch in Fish Creek Canyon, a population along Dugout Creek approximately one-half mile below the gate, a population along Pace Creek near the fan facility site, and that the plant could occur in other parts of the permit area. [05052005]

TES Animals

TES supporting documents show that the permit area supports habitat for the following TES animals: MSO, black-footed ferret, bald eagle, and peregrine falcon. The MSO survey showed no MSO responses within a half-mile radius around the testing area (G1-G6 degas wells). The results, however, showed responses for great horned and northern saw-whet owls. The peregrine falcon has been observed in several recent surveys of the Carbon County area. No confirmed sightings of black-footed ferrets have occurred within Carbon County during 1995, 1996, and the first quarter of 1997 (DWR, Sec. 322.200). [05052005]

Mexican Spotted Owl (MSO)

The MRP provides results for a two-year calling survey (Vol. 3, App. 3-3; EIS, 2003/2004) for drill holes G1-6 as well as a short reach along Pace Creek. The results for both surveys were negative for MSO individuals, but show there were northern saw-whet and great horned owls. The Division does not consider that additional MSO ground-truthing or calling surveys are necessary for the Pace fan, SILTA lease, or other projects with MSO habitat and within reasonable distance to the survey points. [05052005]

For future reference, the Division would like the Permittee to know that calling surveys are only required after ground-truthing results are positive for MSO. The cost and time involved in the ground-truthing surveys are considerably less than for the calling survey. [05052005]

Findings:

Information provided in the application is considered adequate to meet the requirements of this section of the regulations.

SOILS RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.21; 30 CFR 817.22; 30 CFR 817.200(c); 30 CFR 823; R645-301-220; R645-301-411.

Analysis:

Chapter 2, Soils, Sections 220 through 224, discusses the soil resources within the Dugout Mine permit area, in Dugout and Pace Canyons. Relevant soils information includes current and published soil surveys, characterizations, and substitute topsoil identification. The Analysis section discusses resource information as follows:

- Soil Survey Information
- Disturbed Soils
- Undisturbed Soils
- Soil Productivity
- Substitute Topsoil

Soil Survey Information

Soil survey information is provided by both a general-area Order-III and a site-specific Order-I soil surveys. The Order-III survey is reproduced from the SCS "Soil Survey of the Carbon County Area" and is delineated on a general area soils map (Plate 2-1). According to the SCS soil survey, soils present on the east/south-east facing slopes of Dugout and Pace Canyons are part of the Rock outcrop-Rubbleland-Travessilla complex (#96) while those on

the west/north-west facing slopes are shown as Croydon loam (#21) at lower elevations and Midfork family-Comodore complex (#62) at higher elevations in the upper reaches of the canyon. The predominantly stoney to gravelly sandy loam soils formed from sandstone, shale colluvium, and alluvium. Due to steepness of slope and soil quality, all of these soils are highly erosive. Shallow soils dominate the east facing side slopes while generally deeper soils characterize the west facing toe slopes.

Generally, the predominantly stoney to gravelly sandy loam soils formed from sandstone, shale colluvium, and alluvium. Soils within the Rock outcrop-Rubbleland-Travessilla complex and the Midfork family-Comodore complex are typically well drained with moderate permeability, rapid runoff, and are highly susceptible to water erosion. Soils within the Croydon loam have moderately slow permeability, and therefore, depending on slope, erosion characteristics vary from slight to severe. The main point is that because of steepness of slope and soil quality, all of these soils are highly erosive. Shallow soils dominate the east facing side slopes while generally deeper soils characterize the west facing toe slopes.

Dugout Mine Facilities Canyon

The Order-I survey of **Dugout Canyon** was conducted by Chris Hansen of EarthFax Engineering, Inc. (A Qualification statement for performing the Dugout Canyon soil survey and a personal Resume are provided in App. 2-3 with the Soil Test Pit Logs.) A total of 12 soil test pits were excavated and are located on Plate 2-2, Disturbed Area Soil Map. Soil test pits located in disturbed/overburden soils include TP-2, 3, and 11; the remaining pits were located in Datino Variant (Type TS) soils with one pit (TP 16) in Rock Outcrop, Rubbleland, Travessilla (Map Unit 96). All sampling and characterization was according to the Division's Guidelines for Topsoil and Overburden', (Table 2-1 provides laboratory data and analytical summaries, MRP Pits 7, 14 and 14A were not sampled, but pit descriptions were used to estimate soil volumes.)

Undisturbed Soils Dugout Mine Facilities Canyon

The remainder of the facilities area has soils that appear to be **undisturbed** or have been only slightly disturbed. Soils present in the canyon bottom lie within the disturbed and undisturbed areas of the mine. The undisturbed soils were identified by the Order-I survey as part of the SCS listed soil unit Datino Variant complex, and were given the distinction "Soil Type TS." According to the SCS Carbon County soils survey, the Datino Variant soil complex is characterized as very deep, well drained, moderate permeable soils on mountain slopes being formed in colluvium derived dominantly from sandstone and shale. The SCS survey defines Datino Variant soils as loamy-skeletal, mixed Typic Haploborolls. The typic subgroup of Haploborolls[2] is defined as freely drained soils with a moderately thick brownish mollic epipedon. Typic Haploborolls were formed in alluvium during the late-Pleistocene or Holocene ages, do not have a shallow lithic (stone) contact, and do not have deep wide cracks in most years. The USDA handbook further states that where slopes are suitable, Haploborolls are mostly under cultivation.

Undisturbed TS soils, as represented by soil test pits TP-1, 4, 5, 6, 7, 8, 9, 14, and 14A, are found on both sides of Dugout Creek in the northeastern portion and in the southwestern portion of the facilities area. The TS soils are found in flat lying areas and on slopes with grades up to 40 percent or more. The soil supports vegetation consisting of sage, cottonwood, Gambel oak, grass, pinyon, and fir. Information condensed from soil test pit TP-4, TP-6 and lower sections of pit TP-1 show soil horizons 01 (1 inch), Al (1 to 5 inches), B2 (5 to 14 inches), B3 (14 to 28 inches), and C (28 inches to 9 feet). Portions of TP-5 and TP-8 soil profiles appear to have been reworked by Dugout Creek; the upper four feet of TP-1 soil profile appear disturbed. Undisturbed Type TS soils have acceptable physical and chemical characteristic results consistent with requirements outlined by the Division's soil and overburden guidelines as recorded in Table 2-1.

Other undisturbed soils located within the Disturbed Area Boundary and described by the SCS soils Order-III survey include Croydon loam, Comodore-Datino Variant complex, and Rock Outcrop-Rubbleland-Travessilla complex soils.

Disturbed Soils Dugout Mine Facilities Canyon

A large portion of the mine facility's area is covered by overburden and disturbed soils consisting of soil mixed with coal waste and/or waste rock from previous mining operations. These soils are described by soil test pits TP-2, TP-3, and TP-11. The overburden is a mixture of rock and/or coal waste with Travessilla soils. The Travessilla soils are classified by the SCS soil survey as loamy, mixed (calcareous) mesic, Lithic Ustic Torriorthents. The overburden is found in the flat areas and on most of the steep slopes; is moderately well drained, and supports sage brush, juniper, rabbit brush, and a variety of grasses. Soil thickness varies from a few feet to more than eight feet. Generally, the overburden soils are described as a "gravelly loam" with rock concentrations between 10 and 40 percent and rock size that varies from gravel to boulder. Rock fragments are composed of sandstone with some siltstone blocks.

Refuse Site

The **waste rock disposal** site was disturbed in 1998 and 1999 for gravel and fill to construct the adjacent county road. Undisturbed soils surrounding the site fall into the following Soil Conservation Service Map Units:

- 49, Haverdad Loam, alkali 0 – 3% slopes,
- 50, Haverdad loam, moist, 1 to 5% slopes, and
- 66, Mivida gravelly fine sandy loam, 3 to 8 % slopes (Soils Map RA Plate 2-1 and App. S5 of RA Attachment 2-1 Soils Report).

Mivida, Map Unit 66, would have been the pre-dominant soil prior to disturbance according to the 1988 Carbon County Soil Survey Sheet No.21. [The Mivida soil is the State Soil of Utah (http://www.ut.nrcs.usda.gov/soils/flashsite).] The typical pedon for the Mivida Series described in the NRCS, 1988 Carbon County Soil Survey was located in the NW corner of Sec. 18, T.14 S., R. 12 E, within one half-mile of the waste rock disposal site.

The disturbed soils of the **refuse disposal site** were surveyed in 1999 by Mr. Daniel Larsen, Soil Scientist with Environmental Industrial Services of Helper, Utah. Using supporting information obtained from 10 pits and twenty-two soil samples, Attachment 2-1 identifies and describes thirteen soil map units at the site. The soil map units are shown on Soils Inventory Map SM-1 in Attachment 2-1. The map units have been reproduced on Soils Map RA Plate 2-1, except that RA Plate 2-1 does not show the soil type L that covers an area of about 50 X 85 feet (approximately 0.1 acres). The plan indicates on p. 2-5 that Map unit L was a pile of gravel on top of the soil that has been removed from the site. (However, during a site visit on January 21, 2003, the pile of gravel was still on the site. It is a very small pile and can be removed prior to soil salvage.) Soil characteristics at the site are described in RA Attachment 5-2. [02/24/03]

Pace Canyon

The soil survey of **Pace Canyon** was conducted by Dan Larsen of Environmental Industrial Services, Inc. (2003 BLM Environmental Assessment) and supplemented by additional test pits in November 2004. Photographs, test pit descriptions, and a soils map from the 2004 survey of Pace Canyon are found in App. 2-3. The Division confirmed the depth of topsoil along either side of the access road during a site visit on April 1, 2005. These deep soils with an 18-inch A horizon are on lesser slopes and cover approximately 1.3 acres (App. 2-9). The soils are Cryoborolls and are similar to the Senchert family or Croydon series soils. [04/21/2005]

Degas Well Sites [07312007]

Appendix 2-2, Volume 1 of the MRP provides a general outlook on the soils of the Book Cliffs in the vicinity of the Dugout Mine. Figure 1-1 and Plate 1-4 (**Methane Degassification Amendment Volume**) shows the location of the degas wells. Table 1-1 provides locations of the wells and Table 1-2 states each well's acreage. Total acreage for the well sites G-1 through G-17 comes to 24.85 acres. Degas well site 19 will disturb an additional 2.3 acres (Table 1.2). Total disturbed acreage for all degas wells is therefore 27.15 acres (Division calculation).

The specific soils information for degasification well sites G-2 through G-19 is found in Attachment 2-1 (**Methane Degasification Amendment**) of the MRP. (Sites G-1 and G-8 were not developed.)

Baseline soil chemistry information for soils at sites G-2 through G-7 was collected at the time of disturbance (Attachment 2-1), all subsequent sites were surveyed and soil analyzed prior to disturbance. The following parameters were analyzed: texture (particle size analysis), pH, Electrical Conductivity, Sodium Adsorption Ratio, percent $CaCO_3$, plant available Nitrogen, Potassium, and Phosphorus (Section 243). Soil sample analyses are found in Attachment 2-1.

The sites are located at approximately 7,400 to 8,900 ft (see Fig 1-1 and Plate 1.4). The site descriptions, drawings, and photographs are in Attachment 2-1. Some of the sites were previously disturbed by logging (Section 222.400, Table 3-1, pg 3-16, Attachment 2-1 section

4.3), previous exploration or road construction (sites G-6, G-9, G-11, G-12, G-14, G-15, G-16, G-17, G-19).

Site descriptions, sketches, profiles, and soil analyses are in Attachment 2-1.

Soil Productivity

Soil productivity for the undisturbed and/or slightly disturbed soils for the main mine facility area is reported by the 1996 survey for living cover percentages as recorded in Sec. 321.100.

Soil Productivity information for the Refuse site is located in Sec. 200 of the RA Volume.

Soil Productivity information for the degas well sites is included in Methane Degas Volume Attach. 3-1.

Substitute Topsoil

Dugout Mine Facilities Canyon

The disturbed soils within the mine area have been significantly altered by previous mining activities and have lost their native identities. These disturbed soils, or overburden materials, typically contain waste rock and/or coal waste. With the exception of rock fragments and coal waste, these overburden materials have physical and chemical properties that are within the Division acceptable range for soil and overburden guidelines and could therefore be considered a substitute topsoil. High percentages of rock fragments are compatible with native soils and do not present a reclamation hazard. Indeed, to reclaim and restore the land to pre-mining conditions will require soils with indigenous rock fragment volumes and content. Therefore, it is not only acceptable, but desirable to salvage soils containing intrinsic rock. Waste and coal waste will be segregated from the soils and disposed of properly.

Findings:

The information provided meets the regulatory requirements of this section.

LAND-USE RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.22; R645-301-411.

Analysis:

Land use resource information is given in Chapter 4 of the plan. Premining land uses for the permit area are wildlife habitat, rangeland, and timber harvest. The land has not been developed or improved for these uses. Recreational use of the permit area is limited due to lack of access through private property. Carbon County has zoned the permit area for mining and grazing (Sec. 4.11.120). Logging operations were conducted within the permit area in 1996 as shown on a map in Exhibit B, App. 4-3. Cascade Resources, logging contractor, reported harvesting six million board feet from the areas shown in Exhibit B. Most of these areas are within the Dugout Creek drainage.

Coal mining has occurred within Dugout Canyon since 1925. The Red Glow Mine on the east side of Dugout Canyon was hand-developed by D. J. Collins in 1925. The Rock Canyon seam on the west side of Dugout Canyon was first mined in 1952 by E.S.O. Coal Company. The Knight Ideal Coal Company mined the Rock Canyon and Gilson coal seams between 1958 and 1964. They extracted approximately 1,326,000 tons of coal by room and pillar and partial pillar extraction in that period. No coal has been mined since 1964, although the portals have been opened and explored several times since then.

The Fish Creek and Snow Canyon Mines, which operated in the early 1900's, are also located within the permit area. The site of the Pace Canyon fan portals is located at the former Snow Mine. The Snow Mine became active in 1906 with largest output occurring between 1932-1940. The site was inventoried in 1980, but was not recommended for nomination to the historic register. A subsequent investigation of the site in 2001 revealed that the site had been destroyed by logging activity. Plate PC5-4 shows an access road through the fan portal site and indicates the pre-disturbance mine workings on the east side of the creek and the mine dumps within the disturbed area boundary on the west side of the creek. [04/21/2005]

The Thayn Trust Surface Use Agreement is included in App. 4-2. This agreement outlines the use of CFC owned surface, grazing allotments BLM #4079 and State #21722 and water rights by the Thayn's in exchange for surface use of the lands described in Exhibit A of the Agreement. Exhibit A indicates that all of Sec. 30 T 13 S, R 13 E is owned by the Thayn Trust, except lots 1 and 2 (which are U.S.A., BLM administrated properties, Plate 1-1). The Thayn family trust also owns the rights to grazing in Pace Canyon Allotment #24085 as well as the lands above the Pace Canyon site. The holding corral for livestock (80 head) is located outside of the lease area, ½ mile downstream of the Pace Canyon fan portal site (Plate 4-1 and Sec. 411.130). The main watering source in the immediate area is Pace Canyon creek. [04/21/2005]

Appendix 4-2 contains the BLM (surface owner) comments concerning the post mining land use in Pace Canyon. [04/21/2005]

Findings:

Information provided in the proposal in considered adequate to meet the requirements of this section of the regulations.

ALLUVIAL VALLEY FLOORS

Regulatory Reference: 30 CFR 785.19; 30 CFR 822; R645-302-320.

Analysis:

The MRP presents several factors that preclude the mine permit area from being classified as an alluvial valley floor (AVF). Based on information presented, the following findings can be made:

- No significant deposits of stream-laid alluvium exist within the permit area. The closest areas of alluvium occur outside the permit area, approximately 2,000 feet downstream area along Dugout Creek and 600 feet north in the headwaters of Pine Canyon.
- Stream-laid deposits within the disturbed area do not "hold" Dugout Creek as required by the AVF definition. The Dugout Creek is generally held by underlying bedrock.
- No irrigated agriculture has or does occur within the permit and adjacent areas.
- No flood irrigation or sub-irrigation of stream-laid deposits have historically occurred within the disturbed area.
- Topographic conditions within the disturbed area preclude future flood irrigation of the site.

Refuse Site

Information contained in Sec. 9 of the Refuse Amendment Volume of the MRP adequately addresses and summarizes the potential for alluvial valley floor impacts. Based on information provided in Chapter 9 of the Refuse Amendment Volume, no impacts will occur to designated alluvial valley floors outside of the permit area due to mining and reclamation operations.

Findings:

The information provided adequately addresses the minimum requirements of the Environmental Resources Information – Alluvial Valley Floors section of the regulations.

PRIME FARMLAND

Regulatory Reference: 30 CFR 785.16, 823; R645-301-221, -302-270.

Analysis:

There is no prime farmland within the Dugout Canyon Mine permit area. The Utah Agricultural Experiment Station Research Report Number 76 entitled "Important Farmlands of Parts of Carbon, Emery, Grand, and Sevier Counties" does not include lands in R 12 E, T 13 S or

R.13 E., T. 13 S. The disturbed areas of Dugout Mine, Pace Canyon fan portal and degas well sites on the plateau are at elevations of 6,500 to 9,000 feet. Prime farmland does not exist at these elevations in the Book Cliffs. The growing season is short (60 days) and there is no developed water source.

The 1988 Carbon County Soil Survey identifies Croydon Loam, Comodore-Datino Variant complex, Midfork family-Comodore complex, Beje-Trag Complex, Senchert/Toze Family Complex and Rock outcrop-Rubbleland-Travessilla complex as soils within the Dugout Mine disturbed areas. Many of these soils are deep, but none are irrigated for farming. Comodore-Datino Variant, Midfork family-Comodore complex, and Rock outcrop-Rubbleland-Travessilla complex soils have limited uses due to steep slopes, surface stones and boulders, and abundant rock outcrops. Recent Natural Resources Conservation Service (NRCS) letters concerning prime farmland are found in Attachment 2-1 of the MRP.

Refuse Site

The Dugout Mine Refuse site is at a lower elevation (5,900 ft) along the Dugout Canyon Road than the main mine facilities. The refuse site is adjacent to non-irrigated rangeland managed by the BLM. As noted in RA Sec. 221, the prime farmland status of the area was investigated in April 1996 by the Natural Resources Conservation Service. A letter from the NRCS is located at the end of RA Attachment 3-1 Vegetation Data. In the letter, the State Soil Scientist, William Broderson, writes that the area could not contain important farmlands because there is no developed irrigation system on arid soils.

Two of the soils identified in App. S5 of RA Attachment 2-1, soil #50 Haverdad loam and soil Hernandez family soils are potentially prime farmland soils, when irrigated. Soil #50 Haverdad loam is in the land use capability class II-e-2. Soils in the Hernandez family range from land use capability class II-e-2 to III-e-2.

The recent use of the site (1988 – 1999) has been for a gravel pit and much of the original soil surface has been lost. The Dugout Canyon Mine is the landowner. The post-mining land use is wildlife habitat and grazing.

Findings:

The Division concurs with the NRCS that there is no source of irrigation for farming and no prime farmlands in the Dugout permit area. This information adequately addresses the minimum requirements of the Environmental Resource Information – Prime Farmland section of the regulations.

GEOLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR 784.22; R645-301-623, -301-724.

Analysis:

The Permittee meets the requirements of R645-301-600. Geologic resource information is described in Chapter 6 and associated plates. The stratigraphy and structural geology is described down to and including the stratum immediately below the lowest coal seam to be mined and the aquifer below the lowest coal seam to be mined that may be adversely impacted by mining. This description includes the areal and structural geology of the permit and adjacent areas, and other parameters that influence the required reclamation. It also shows how areal and structural geology may affect the occurrence, availability, movement, quantity, and quality of potentially impacted surface and ground water. The description is based on maps and plans required as resource information for the plan, detailed site-specific information, and, geologic literature and practices.

Descriptions of the stratigraphy and lithology of strata from the Mancos Shale up to the Colton Formation and of Quaternary pediment gravels and alluvium are in Sec. 624.100. That section also contains a discussion of geologic structure and a very brief description of the nature, depth, and thickness of the coal seams and the interburden between the Sunnyside, Rock Canyon, and Gilson seams. Geologic information exists on Plate 6-4 (Rock Canyon Seam Overburden Thickness), Plate 6-5 (Rock Canyon Seam / Gilson Seam Interburden map), Plate 6-6 (Rock Canyon Seam Isopach map – "Confidential), and Plate 6-7 Gilson Seam Thickness Isopach map – "Confidential").

The Gilson and Rock Canyon seams are both sufficiently developed to allow for economic mining in the permit area but only the Rock Canyon seam will be mined. Mineable coal in the Rock Canyon seam ranges from 5 to 8 feet in thickness (p. 6-15). Although the current permit application does not include federal acreage, an R2P2 for the logical mining unit that includes Soldier Canyon and Dugout Canyon Mines and federal lease U-07064-027821 is included in the confidential binder.

Appendix 6-1 (Confidential binder) contains cutting and core logs for drill holes 3-1, 9-1, 9-2, 10-1, 11-1, 13-1, 13-2, 14-1, 15-1, 15-2, 15-3, 19-2, HCC-4 (H-4), KCC-A and KCC-E. Collar or ground elevations are included in App. 6-1. Drill hole locations and elevations are shown on Plate 6-1.

Some bore holes have been logged from the surface to total depth, for others only the coal seams and adjacent strata have been logged. Together, the logs describe lithologic characteristics and thickness of each stratum from the surface to below the coal seams. Ground water occurrence was not marked on these logs at the time the holes were bored (p. 6-17). Bore hole logs were used to construct the cross sections on Plate 6-3, which show the interval from the Sunnyside coal zone to below the Gilson coal zone. Figure 6-1 is a more general cross section from the surface to the Mancos Shale.

Analysis reports on coal, floor, and roof samples from the Rock Canyon and Gilson seams are found in App. 6-2 (Confidential binder). Floor and roof samples of the Rock Canyon seam were collected from one of the portals of the abandoned Rock Canyon seam mine in Dugout Canyon (portals shown on Plate 5-1) and a sample of coal was taken from a fresh

coal outcrop located a few-hundred feet inside. The location where the coal, roof, and floor samples were collected for the Gilson seam is shown on Figure Al in App. 6-2 in the confidential binder.

Samples were analyzed for acid- or toxic-forming and alkalinity-producing materials, including total sulfur but not pyritic or other specific forms of sulfur. BTU, ash, and sulfur content of the Rock Canyon coal are briefly summarized at the end of Sec. 624.100.

Clay content was determined for the roof and floor rock samples. The sample from the roof of the Gilson seam contained 20 % clay, but clay content of the other roof and 2 floor samples was less than 10%. Drill-hole logs indicate lithology of strata immediately above and below the mineable coal varies within the permit and adjacent areas.

Rock Canyon coal thickness in the permit area ranges from 5 to 8 feet, except in the north-central part of the permit area, where coal thins to under 3 feet (Plate 6-6). Maximum subsidence can be projected as 3.5 to 5.6 feet, based on the assumption that the surface will subside up to 70% of the thickness of the extracted coal. Overburden thickness ranges from 600 feet in the south part of the permit area to over 2,400 feet in the north. Overburden consists of the upper Blackhawk Formation, the Castlegate Sandstone, and the Price River, North Horn, and Flagstaff Formations, which are described in Sec. 624.100. Gilson to Rock Canyon interburden thickness is 30 to 80 feet over most of the permit area, and up to 100 feet at the west edge (Plate 6-5), and Rock Canyon to Sunnyside thickness is 140 to 180 feet.

The application includes geologic information in sufficient detail to assist in determining the probable hydrologic consequences of the operation upon the quality and quantity of surface and ground water in the permit and adjacent areas, including the extent to which surface and ground water monitoring is necessary; and determining whether reclamation as required by the R645 Rules can be accomplished and whether the operation has been designed to prevent material damage to the hydrologic balance outside the permit area.

Findings:

Information in the geologic resource section is considered adequate to meet the requirements of this section.

HYDROLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

Analysis:

Sampling and Analysis

The Permittee has met the requirements of R645-301-723 by collecting and analyzing all water samples according to the methods in either "Standard Methods for the Examination of Water and Wastewater" or the methodology in 40 CFR Parts 136 and 434, where they had control of the sampling process. Much of the original baseline water-quality data in App. 7-7, and the Division's Electronic Water Quality Database was not obtained directly by the Permittee, and thus they had no control over either collection or analysis methods. The Permittee has overseen all sampling and analysis since mining operations began, including baseline for additional lease areas.

Baseline Information

Ground-water information

The Permittee has met the requirements of R645-724.100 by providing the following information as it pertains to the permit and adjacent areas:

- The location and ownership of existing wells, springs, and other groundwater resources; and
- Seasonal quality and quantity of groundwater;
- Data to show seasonal variation and usage.

The Permittee discusses groundwater resources in Sec. 724.100 of the MRP. They depict the locations of wells and springs on Plate 7-1 and water rights (ownership) on Plate 7-2. There is only one producing well in the permit area, the Gilson Well, for which the Permittee holds the water rights; all other wells are strictly for water monitoring.

Appendix 7-1 of the MRP lists all water right information for the permit and adjacent area, including approved usage.

The Permittee lists all baseline groundwater data in Apps. 7-2 (flow, quality), and 7-4 (depth, level). The Division also houses all water monitoring data on its Electronic Water Database, which the public may access at http://linux1.ogm.utah.gov/cgi-bin/appx-ogm.cgi.

The baseline data includes springs emanating from the Colton, Flagstaff, North Horn, Price River, Castlegate, Blackhawk, Star Point and Mancos formations. The Permittee describes each of these, in correlation with the baseline data in Sec. 724.100 of the MRP.

The Permittee provided a substantive discussion of other subsurface water, or lack thereof, in Sec. 724.100. They have not encountered any saturated coal zones since mining began at Dugout. Most water they have encountered has come from isolated sand channels above the coal seam. Additionally, the Permittee has conducted extensive exploration in the area and did not encounter any water while drilling the SITLA Lease (all holes completed below the Gilson Coal Seam).

The Permittee has provided maps showing there are no springs on or adjacent to, the degasification well sites. Ground water could be contacted during drilling. The Permittee has addressed this issue in the PHC Determination in Section 728.300. Drilling mud may come in contact with groundwater during drilling. Contact with groundwater should be limited to the drilling phase. The drilling mud will coat the radius of the degasification well where drilling pressures are greater than the groundwater pressure. If the groundwater has a higher pressure than the drill mud then very little contamination should take place. Once drilling is completed, the casing will be grouted in the well hole to prevent any groundwater migration between strata.

The Permittee states that any groundwater flow over 15 gallons per minute (gpm) will be monitored, Section 728.300, (March 16, 2006 Amendment). Vickie Miller explained in a telephone conversation on April 28, 2006, the value of 15 gpm is the minimum flow that can be detected by the driller. Any water will be monitored at the well-head or after it punches through to the mine; however, the purpose of reporting water contacted during drilling is to help identify the geology and hydrologic characteristics of the strata in the vicinity of drilling.

Surface-water information

The Permittee has met the requirements of R645-724.200 by providing the following information as it pertains to the permit and adjacent areas:

- The name, location, ownership, and description of all streams, lakes, and impoundments in the permit and adjacent areas;
- The location of any discharge into any surface water body in the permit area;
- Seasonal quality and quantity of surface water; and
- Data to show seasonal variation and usage.

The Permittee discusses surface water resources in Sec. 724.200 of the MRP. They depict the locations of streams, and mine-water discharge points on Plate 7-1 and water rights (ownership) on Plate 7-2. There are no lakes in the permit area, and the only impoundments are the sedimentation ponds related to the mine and waste-rock sites. The Permittee discharges water from the main portal area, and the Pace Canyon Portal, when necessary.

Appendix 7-1 of the MRP lists all water right information for the permit and adjacent area, including approved usage.

The Permittee lists all baseline surface water data in Apps. 7-7 (flow, quality), and 7-5 (streamflow). The Division also houses all water monitoring data on its Electronic Water Database, which the public may access at http://linux1.ogm.utah.gov/cgi-bin/appx-ogm.cgi.

The baseline data includes the major watersheds within the permit area, which are: Dugout Creek, Soldier Creek, Pace Creek, and Rock Creek. They also include major tributaries such as Pine and Fish Creeks.

Although the Permittee currently plans to leave a barrier to protect Pace Creek from subsidence, they may have to change the mine layout if conditions change. Therefore, they have supplied information at the end of Sec. 731.200 as to how they would document the pre-subsidence condition of the stream, and how they would repair any damage. Because the Permittee has provided this information, they may undermine the stream, *if the Division approves a different mine layout.* The Permittee commits to mitigate, if necessary, implementing the Best Technology Currently Available (BTCA).

Baseline Cumulative Impact Area Information

The Dugout Mine belongs to the Book Cliffs Area II CHIA. The addition of the SITLA Lease, Pace Canyon Portal and the 40 acres in Federal Lease U-07064-027821will not change the CHIA boundaries since they were included in the previous CHIA. There will be no mining operations in hydrologic basins other than those approved in the current permit, therefore the Division does not require additional cumulative impact area information.

Sufficient information is available in the MRP and from Federal and State agencies to complete the CHIA.

Modeling

No numerical groundwater modeling was conducted in support of the calculations in the MRP, although some that has been published by others, such as Lines, is referenced. . Surface water calculations were presented for area runoff flow based on the SCS-TR-55 for Type II storms.

Alternative water resource information

The statement is made on p. 7-40 that "No surface mining will be conducted in the permit and adjacent areas. Therefore, this section does not apply to the Dugout Canyon Mine." Because of the way R645-301-727 and the definition of "Surface Coal Mining and Reclamation Activities" are written in the Utah Coal Mining Rules, the Permittee's response is adequate. Regardless, the determination of the Probable Hydrologic Consequences (PHC) has indicated that coal-mining activities will not result in the contamination, diminution, or interruption of ground-water or surface-water sources within the permit or adjacent areas, so there is no need for information regarding alternative water sources.

Probable Hydrologic Consequences Determination

The PHC is found in Sec. 728 of the MRP. An original PHC determination prepared by Mayo and Associates in 1996 is in App. 7-3. Previous studies in the vicinity of the Soldier Canyon Mine were reviewed for information on geology, hydrology, and hydrogeology and for data on discharge, sediment, and other surface and ground water parameters. Seventeen

additional ground and surface water samples were collected in 1995 for chemical and isotopic analyses. The Permittee describes in this section the potential impacts of the drill sites. The drill sites may temporally affect perched lenses of perched groundwater adjacent to the degasification well as a result of using drilling mud. The annulus of the degasification well will be sealed with cement to prevent migration of groundwater between strata. The degasification wells will be sealed when no longer needed. The quality and quantity of surface and groundwater flow. Any impacts (if any) to groundwater will be temporary. Any groundwater contacted may not be an aquifer under the definition of the rules. To be an aquifer the strata has to be able to store water and transmit groundwater in sufficient quantities for a specific use. Groundwater is not used for drinking.

The Permittee plans to minimize potential surface water impacts by utilizing berms and / or silt fences around the disturbed areas of the methane degasification well sites and topsoil piles. The silt fences will treat intercepted runoff before it leaves the site.

Permittee shows disturbed area sizing values for the pad in Attachment 7-1. The area includes the road disturbance and water bars. The permittee has calculated the amount of runoff that will be generated during the 10-yr/24-hr precipitation event and checked to ensure the size of the silt fences will treat the runoff.

Adverse impacts to the hydrologic balance

Potential adverse effects to the hydrologic balance from mining operations identified in App. 7-3 (p. 60) are: decreased stream flows and spring discharges due to capture of surface or ground water by subsidence, bedrock fracturing, and aquifer dewatering; increased stream flows due to increased discharge of ground water from the Blackhawk Formation through the mine workings; and increased ground water recharge to overlying ground water systems.

The PHC of the MRP (p. 745) states that potential impacts to the availability of surface and groundwater from the Dugout Canyon Mine operations include both decreased and increased stream flows and spring discharges caused by mine-related subsidence, bedrock fracturing, and aquifer dewatering.

Chemical and isotopic analyses of ground water, data from hydrographs, and the behavior of ground water systems in and adjacent to the Soldier Canyon Mine indicate that the mine has not adversely impacted ground water quantity or quality. Subsidence and surface fracturing have not occurred above the Soldier Canyon Mine. Mining locally dewaters strata immediately adjacent to the Blackhawk Formation but does not appear to draw additional recharge from other overlying or underlying ground water systems. Similar geologic, hydrogeologic, and hydrologic conditions exist at the Dugout Canyon Mine and the operations should not adversely impact water quantity or quality in ground water systems overlying and underlying the coal to be mined.

The Permittee has installed various sediment control measures to prevent contributions of sediment to the stream. Mine water discharge has been identified as having the potential of

transporting fine sediments downstream and possibly eroding the channel banks. The volume of mine water discharge is variable. Preventative measures are planned in the form of riprap to dissipate energy, if found to be necessary.

Potential adverse effects to the hydrologic balance as a result of the methane degasification wells are discussed in the Methane Degasification Amendment (Volumes 1 and 2). Little to no impacts are anticipated to the hydrologic balance since 1) the potential impacts are limited to the drilling and construction of the wells; 2) BTCA techniques for sediment control are implemented to contain the surface disturbance of the well pad; 3) Hydrogeologic information from in-mine observations and PHC information included in the MRP support that minimal groundwater is encountered in the geologic formations underlying the degas wells; and 4) any water encountered during drilling and construction of the well will need to be sealed off from the well in order for it to function as an ambient vent of methane gas. During the installation of degas wells G-1 thru G-17, no measurable water was encountered during the drilling, construction or operation of the wells. During initial drilling, the sites will be graded to ensure that storm runoff will flow towards the berms surrounding the drill pad area. The berms will direct the runoff to the lowest point(s) within the pad area where a silt fence and/or straw bale dike(s) will treat the runoff (See Attachment 5-1 of the Methane Degasification Amendment).

Acid forming or toxic forming materials

The probable impacts from acidity, total suspended solids and total dissolved solids were assessed by the Permittee. There is no significant potential for contamination of surface and ground waters in the permit and adjacent areas from such materials (p. 7-41). . Information in Chapter 6 and 7 indicates there are no acid- and toxic-forming materials at the Dugout Canyon Mine to cause adverse impacts from drilling. No acid or toxic forming materials have been identified in the soils or strata of the Dugout Canyon Mine (See Chapter 6, Section 623 of the Methane Degasification Amendment). Additional information regarding acid-toxic forming materials can also be found in Appendix 6-2 of the approved MRP.

Important water quality parameters

Data suggest the TDS concentration of water in Dugout Creek may roughly double during lowest flow if water is discharged from the mine to the creek (p. 742). The Permittee has analyzed baseline and operational data from surface water monitoring sites in Pace Creek. Data suggest the TDS concentration of water in Pace Creek could potentially double during lowest flow if water is discharged from the Mine to the creek. Dominant ions (sodium and bicarbonate) in the Blackhawk Formation water closely match those in Dugout Creek during periods of low streamflow (sodium, manganese, bicarbonate, and sulfate). During periods of high streamflow the dominant cation in Dugout Creek is calcium. Use of powdered limestone or dolomite (calcium magnesium carbonate) rather than gypsum (calcium sulfate) as rock dust in the mine should reduce the possible chemical influence of mine-discharge water on Dugout Creek. Based on experience at the Soldier Canyon Mine, there is minimal potential for tension

cracks to locally divert water deeper into formations, which could result in increased leaching and increased TDS concentrations (pp. 7-43 and 7-44).

Dugout Creek is classified as class 2B (secondary contact recreation use), 3C (non-game fish and other aquatic life use), and 4 (agricultural use). If discharges occur from the Dugout Canyon Mine to Dugout Creek, TDS concentration of these discharges will not exceed applicable water-quality standards. Pace Creek is classified as class 2B (secondary contact recreation use), 3C (non-game fish and other aquatic life use), and 4 (agricultural use). If discharges occur from the Dugout Canyon Mine to Pace Creek, TDS concentration of these discharges will not exceed applicable water-quality standards. Iron and manganese concentrations in waters from the Blackhawk Formation and Dugout Creek indicate that the concentration of iron and manganese in the creek should not be significantly affected by discharges from the mine (p. 7-43).

Ground water and surface-water availability

The Permittee has evaluated potential adverse effects to the hydrologic balance from mining operations. Impacts can include decreased and increased stream flows and spring discharges due to capture of surface or ground water by mine-related subsidence, bedrock fracturing, and aquifer dewatering; increased stream flows due to increased discharge of ground water from the Blackhawk Formation through the mine workings; and increased ground-water recharge to overlying ground water systems. It appears that the Soldier Canyon Mine has not decreased groundwater discharge in overlying or underlying groundwater systems. It is unlikely that coal mining will affect the discharges of any spring as a result of mining in the Dugout Canyon permit and adjacent areas (App. 7-3 and MRP - pp. 7-45 through 7-47).

Considerable seasonal and climatic variability are noted in the hydrographs of springs in the permit and adjacent areas, but data for both Soldier Creek and springs that overly the Soldier Canyon Mine workings do not show discharge declines, which may be attributed to either subsidence or bedrock fracturing. The Blackhawk groundwater system in the vicinity of mined coal seams is compartmentalized both vertically and horizontally. Coal mining locally dewaters overlying rock layers in the Blackhawk Formation but does not appear to draw additional recharge from overlying or underlying groundwater systems (p. 7-46).

Steady-state inflow to the Dugout Canyon Mine is expected to be approximately 220 gpm (p. 749). Mine consumption is estimated to be 30 gpm, leaving 190 gpm (306 acre-feet/yr) discharge to Dugout Creek, which would represent an increase of approximately 6% over average annual flow of 5,100 acre-feet/yr (p. 7-50). Estimated maximum discharge from the Dugout Canyon Mine will be approximately 400 gpm. If this maximum rate were sustained for a full year, it would be a 13% increase in the estimated average annual flow of Dugout Creek (p. 7-50).

The potential for mine water discharge and increased flow rates in Dugout Creek are based on the studies of Lines (1985 - MRP for reference). Actual data that could be used to correlate coal production rates to mine water discharge rates at the Soldier Canyon Mine and

to predict mine water discharge rates for the Dugout Canyon Mine are not in the MRP. Annual reports provide some information.

The Permittee has evaluated potential adverse effects to the hydrologic balance from the fan portal in Pace Creek. If water is discharged from the air shaft to Pace Creek, there will be an increase in the average stream flow.

Groundwater and surface water availability relative to the installation and operation of methane degasification wells is addressed in the Methane Degasification Amendment. When encountered during the drilling of the methane degasification wells, groundwater aquifers will be sealed using drilling mud. At the completion of the well installation, the casing is grouted in the well hole, sealing aquifers to prevent groundwater migration, including groundwater migrating down the outside of the casing into the mine. The Permittee has committed to recording any groundwater inflows greater than 15 gallons per minute should they be encountered during the drilling of the degasification wells. During reclamation, the degasification wells are filled with cement. The development and construction of the degas wells does not have the potential to decrease creek flow or spring discharges. The wells are not designed to capture water, dewater aquifers or cause subsidence. Methane gas (not water) is pumped from the wells following construction.

The degasification wells are not used to access water to be discharged to the surface. As discussed previously, no measurable water has been encountered during the drilling, construction and operation of the degasification wells. The degasification wells can not function if significant water is encountered.

Flooding or streamflow alteration

Runoff from all disturbed areas will flow through a sedimentation pond or other sediment-control device prior to discharge to Dugout Creek, which will minimize or preclude flooding impacts to downstream areas. There is a potential that mine water will be discharged from the mine to Pace Creek. The amount of discharge is unknown at this time. Discharges will be monitored. Geomorphology studies will be conducted on Pace Creek to determine if impacts from mine discharge take place.

Flooding and streamflow alteration were assessed by the Permittee for streams in the permit area and this will be done for Pace Creek. The volume of flow may increase in Pace Creek if water is discharged from the mine. The Permittee has submitted designs for a sedimentation pond and other sediment-control devices that will treat runoff prior to discharge to Pace Creek. The structures are designed to be stable. Flow routing through sediment control structures will reduce peak flows from the disturbed area. Runoff from the disturbed area will flow through a catch basin or other sediment-control device prior to discharge to Pace Creek. This will minimize or preclude flooding impacts to downstream areas.

The volume of streamflow will increase in Dugout Creek if water is discharged from the mine to the creek. Potential impacts to the creek channel include displacement of fines on the channel bottom and minor widening of the channel. It is anticipated that the stream bank vegetative community will increase in density and vigor as a result of mine-water discharges, and this vegetation will in turn minimize widening of the channel.

Once mining ceases the mine will be sealed, discharges will cease, and flows in Dugout and Pace Creeks will return to pre-mining discharge levels. Following reclamation, stream channels altered by mining operations will be returned to a stable state. Reclamation channels have been designed to safely pass the peak flow resulting from the 10-year, 6-hour or the 100-year, 6-hour precipitation event, so flooding in the reclaimed areas will be minimized. Interim sediment-control measures and maintenance of the reclaimed areas during the post-mining period will preclude deposition of significant amounts of sediment in downstream channels, maintain the hydraulic capacity of the channels, and control adverse off-site flooding.

Subsidence tension cracks that appear on the surface will increase the secondary porosity of the formations overlying the Dugout Canyon Mine. During the period prior to healing of these cracks this increased percolation may decrease runoff during the high-flow season, and during low-flow periods the increased percolation from the high-flow season may return to the stream as base flow. The net result will be a decrease in the flooding potential of the stream (pp. 7-44 and -45).

Sediment yield from the disturbed area

The potential impact of mining and reclamation on sediment yield is an increase in sediment in surface waters downstream from disturbed areas. Sediment-control measures such as sedimentation ponds and diversions will be installed to minimize this impact while the mine is being actively operated, and silt fences and straw-bale dikes will be installed to control erosion as vegetation becomes established during reclamation. These measures will reduce the amount of erosion and control adverse impacts to the environment.

Subsidence cracks that intersect steep-gradient stream channels could increase the sediment yield of the stream; however, sediment would also tend to fill such cracks and return the stream to pre-subsidence conditions, so the potential impact to sediment yield from subsidence in the permit area would be minor and of short duration (p. 7-42).

The potential impact of mining and reclamation on sediment yield is an increase in sediment in surface waters downstream from disturbed areas. However, sediment-control measures, consisting of berms and silt fences, will be installed to minimize this impact while drilling and venting activity is conducted. The sediment controls will remain in place until the site is no longer needed. The degasification wells will be plugged and the site regraded and revegetated. These measures will reduce the amount of erosion and control adverse impacts to the environment.

A series of silt fences and berms will be utilized during the construction of the degasification wells. The hydrologic design calculations are provided in Attachment 7-1 of the Methane Degasification Amendment. The Permittee utilized a 10 year-24 hour design storm event in determining the proper sizing and spacing of the berms and silt fences.

Potential Hydrocarbon Contamination

Diesel fuel, oils, greases, and other hydrocarbon products will be stored and used at the site for a variety of purposes. Diesel and oil stored in above-ground tanks at the mine surface facilities may spill onto the ground during filling of the storage tank, leakage of the storage tank, or filling of vehicle tanks. Similarly, greases and other oils may be spilled during use in surface and underground operations. The probable future extent of the contamination caused by diesel and oil spillage is expected to be small because the tanks will be located above ground and spillage during filling of the storage or vehicle tanks will be minimized to avoid loss of an economically valuable product. A Spill Prevention Control and Countermeasure Plan (SPCC) provide inspection, training, and operation measures to minimize the extent of contamination resulting from the use of hydrocarbons at the site. This plan is not required to be submitted as part of the MRP; however, a copy will be maintained at the mine site as required by the Utah Division of Water Quality (p. 7-50).

Road Salting

No salting of roads will occur within the permit area so this potential impact is not a concern (p. 7-50).

Coal Haulage

Coal will be hauled over a County road from the Dugout Canyon Mine to the Soldier Creek Road and from there to its ultimate destination. In the event of a spill from the trucks, coal may wash into local streams. Possible impacts to the surface water are increased total suspended solids concentrations and turbidity from the fine coal particulates. The probability of a spill occurring in an area sufficiently close to a stream channel to introduce coal to the streambed is considered small.

Wind may carry coal dust or small pieces of coal from the open top of the coal trucks into creeks near the roads. The impact from fugitive coal dust is considered to be insignificant due to the small amounts lost during haulage in the permit and adjacent areas (p. 7-50).

Ground-Water Monitoring Plan

The Permittee has met the requirements of R645-301-731.210 and applicable subsections by including a groundwater monitoring plan in the MRP which:

- Is based on the PHC determination and all other baseline geologic, and hydrologic information in the MRP;
- Includes parameters related to the suitability of the water for current and post-mining land uses, and the protection of the hydrologic balance; and
- Identifies the quantity and quality parameters to be monitored, sampling frequency, and site locations.

Table 7-4 contains the groundwater-monitoring plan for the Dugout Canyon Mine. The table includes sites and parameters to be monitored, and monitoring frequency. The groundwater-monitoring plan for the refuse pile is in Sec. 731.200 of the Refuse Amendment. The Permittee discusses the basis for the plan in Sec. 731.200 of the MRP and the Refuse Amendment.

Additional groundwater monitoring is not required in connection with the installation and operation of the methane degasification wells. The wells are designed not to intercept groundwater. In addition, after installation, the well holes are grouted to prevent groundwater from entering the casing. The degasification wells are designed to vent methane gas and do not function properly if water is allowed to enter the casing.

Surface-Water Monitoring Plan

The Permittee has met the requirements of R645-301-731.220 and applicable subsections by including a groundwater monitoring plan in the MRP which:

- Is based on the PHC determination and all other baseline geologic, and hydrologic information in the MRP;
- Includes parameters related to the suitability of the water for current and post-mining land uses, and the protection of the hydrologic balance; and
- Identifies the quantity and quality parameters to be monitored, sampling frequency, and site locations.

Table 7-5 contains the surface water-monitoring plan for the Dugout Canyon Mine. The table includes sites and parameters to be monitored, and monitoring frequency. The surface water-monitoring plan for the refuse pile is in Sec. 731.200 of the Refuse Amendment. The Permittee discusses the basis for the plan in Sec. 731.200 of the MRP and the Refuse Amendment.

Additional surface water monitoring is not required in connection with the installation and operation of the methane degasification wells. The wells are designed to vent methane gas. The wells are designed to prevent water from entering the casing. As such, the wells are designed to prevent surface water from entering the well holes. In addition, the wells are not designed to pump water to the surface.

Findings:

The information provided adequately addresses the minimum requirements of the Environmental Resources – Geologic Resource Information section of the regulations.

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

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

Analysis:

Affected Area Boundary Maps

The Permittee has met the requirements of R645-301-521.141. Plate 5-5 clearly shows the boundaries of all affected areas over the estimated total life of the coal mining and reclamation operations. Plate 1-4 and Figures 5-27 through 5-28 show the boundaries of the degasification well sites and adjacent area.

Each of the degasification well applications contains maps describing the areas that were impacted by the development of the proposed well. Each well contains figures depicting pre-operation contours, drilling equipment layout, as well as cross sections depicting pre-drilling, drilling and post-drilling areas affected. The figures in Attachment 5-1 show the boundaries of all degasification well sites.

Archeological Site Maps

The MRP meets the requirements of R645-301-411.141 because there are archeological maps showing known resource locations within the permit area. These maps are in the Confidential Files (Division PIC).

Coal Resource and Geologic Information Maps

Surface geology for the permit and adjacent areas is shown on Plate 6-1, a certified map. Elevations (to the nearest 40 feet) and locations of test borings are also shown on Plate 6-1. Coal crop lines are shown on Plates 6-1 and 6-2. Strike and dip of strata at the surface are shown on Plate 6-1 for several locations within and adjacent to the southwest corner of the permit area: dip is also indicated by cross-section A-A' (Figure 6-1). Strike and dip are apparently uniform over a larger area, but explicit information for the larger area would be useful.

Limited information on nature, depth, and thickness of the Rock Canyon seam, which is the coal seam to be mined, is on bore hole logs in App. 6-1 (Confidential binder) and on cross-sections B-B' and C-C' (Plate 6-3). Similar information on the overlying Sunnyside seam and the underlying Gilson seam is on cross-sections B-B' and C-C' (Plate 6-3), and also on bore hole logs in App. 6-1. Overburden is shown on borehole logs in App. 6-1. Plate 6-4 is an isopach map of the Rock Canyon seam overburden thickness and Plate 6-5 is an isopach map of the Rock Canyon to Gilson seam interburden thickness. Isopach thickness maps of the Rock Canyon and Gilson seams are on Plates 6-6 and 6-7 in the confidential binder. There is no isopach thickness map of the Sunnyside seam, the principal rider seam.

Cultural Resource Maps

The MRP meets the requirements of R645-301-411.141 because there are archeological maps showing known resource locations within the permit area. These maps are in the Confidential Files (Division PIC).

Existing Structures and Facilities Maps

The Permittee met the requirements of R645-301-521.122 by documenting the location of the existing structures on Plate 4-1. The existing structures include a power line that will be upgraded and existing dirt roads in the permit area.

Existing Surface Configuration Maps

Plate 5-2 shows the existing surface configuration of the disturbed area. The plate meets the minimum requirements of this section.

Figures for each proposed degasification well depicted the pre-operational drilling contours for each well site.

Mine Workings Maps

Plate 5-1 shows the location of the mine workings that existed before the Division issued the permit. Plate 5-1 shows the Pre-SMCRA mine workings in the Rock Canyon and Gilson seams and the old mine openings. Richard White certified plate 5-1. Plate PC5-2 shows the location of surface facilities, their elevations and dimensions.

The Permittee supplied a P.E. certified map of the Gilson seam mine workings that depicted the proposed degasification well surface locations. Many wells will intercept the Mine workings from inclined bores. Each well depicts the longwall panel with which it is associated.

Monitoring and Sampling Location Maps

Locations and approximate elevations of boreholes are shown on Plate 6-1. Collar elevations, some estimated from topographic maps, and elevations of cored sections are given in App. 6-1 (Confidential binder).

Elevations and locations of monitoring stations used to gather data on water quality and quantity in preparation of the application are on Plate 7-1.

There is no permanent wildlife monitoring sites.

No map of air quality monitoring sites has been required by the Division.

Permit Area Boundary Maps

Figure 1-1, Figure 1-2 and Plate 5-2 meets the requirements of R645-301-521.131, 8645-301521.132, and R645-301-521.141.

Subsurface Water Resource Maps

A potentiometric surface map for the Castle Gate Sandstone, covering the eastern portion of the permit and adjacent areas, is shown on Plate 7-3. There are no maps, plans, or cross-sections showing potentiometric surfaces for shallower or deeper strata. Subsurface water within the permit and adjacent areas occurs mainly in perched aquifers in the Blackhawk Formation, the underlying Star Point Sandstone, and in overlying strata, so an exact areal and vertical distribution of ground water is not known. There is no map of a potentiometric surface for a regional aquifer.

Data in the MRP indicate an irregular potentiometric surface in the Blackhawk Formation, near the Soldier Canyon Mine, that is influenced by the outcrop of the Blackhawk Formation in nearby Soldier Canyon, the mine workings, and the non-uniformity of screen length and placement within the strata, and the lateral discontinuity of the strata (p. 7-28). There is no portrayal of seasonal differences of head in different aquifers on cross sections or contour maps, but hydrographs for several springs and graphs of water levels in four monitoring wells are provided.

The relationship of geology to ground water is discussed extensively in the text, yet there is no map that relates geology to ground water occurrence, in particular the location of springs in relation to surface exposures of stratigraphic units.

Spring 10 in the Soldier Canyon Mine permit area issues from the North Horn Formation but the water may originate in a deeper formation and reach the surface through a fracture. The chemistry and long-term hydrographs of Spring SP-10 are more consistent with a deep source, rather than a shallow source such as seen in springs issuing from the Flagstaff, North Horn, and Price River Formations. Isotopic and solute compositions are similar to those in ground water from the Blackhawk Formation. There is no fracture mapped but the major water-bearing fracture in the Soldier Canyon Mine coincides approximately with the surface

location of this spring. The subsurface water resources adjacent to the degasification wells are identified on Plate 7-1, MRP, Hydrologic Monitoring Stations.

Surface and Subsurface Ownership Maps

Plate 1-1 and Plate 1-2 meets the requirements of R645-301-521.131 and R645-301-521.132 because these plates show the surface and coal ownership. The Permittee gives the legal descriptions of the fee land and coal leases in Chapter 1 of the MRP.

Surface Water Resource Maps

There are no water-supply intakes for current users of surface waters flowing into, out of, and within the permit and adjacent area. Surface waters that will receive discharges from affected areas in the permit area are shown on Plate 7-1. Location of surface water bodies such as streams, lakes, ponds, springs, constructed or natural drains, and irrigation ditches within the permit and adjacent areas are shown on Plate 7-1.

Vegetation Reference Area Maps

The MRP meets the requirements of R645-301-323.100 because the vegetation maps illustrate community types within the disturbed area and the reference areas for the mine (Vol. 2, Ch. 3, Fig. 3-1 and 3-1E; Vol. Methane Degasification Amendment; Vol. Refuse Pile Amendment; and Vol. Dugout Canon Mine – Leach Field Addendum A-1). [07062006]

The Permittee plans to use reference areas for certain projects, but use range sites for other projects including the main facilities area.

The SITLA lease and 40-acre extension (2007)do not include facilities, therefore, there are no reference areas associated with these projects.

Reclamation maps show the location of the habitat enhancement mitigation project of the riparian area along Dugout Creek.

Well Maps

There are oil wells within the permit and adjacent areas. There are no water wells in the permit and adjacent areas, except the Gilson Well, which the Permittee owns. There are twelve methane degasification well sites shown on Plate 1-4.

Contour Maps

Plate 5-4 shows the existing topography, Plate 5-2 shows the topography during mining and Plate 5-5 shows the topography after reclamation. The Division reviewed these plates and determined that they adequately showed the surface configurations. Plate PC5-2 shows the existing topography and the topography during mining. Plate PC 5-5 shows the topography

after reclamation. Figures in Attachment 5-1 show the operational topography for drill holes G-11 and G-12. It also shows the topography after reclamation. The figures now show the relationship of the disturbed area to the stream channel of Pace Canyon Creek. [09/06/2006]

Findings:

Information provided adequately addresses the minimum requirements of the Environmental Resource Information - Maps, Plans, and Cross Sections of Resource Information section of the regulations.

OPERATION PLAN

MINING OPERATIONS AND FACILITIES

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

Analysis:

General

The Permittee describes the Dugout Mine as an underground mine. The coal will be extracted by room-and-pillar and longwall methods. Estimated production will be 4,600,000 tons per year.

Type and Method of Mining Operations

The Permittee met the requirements for R645-301-523 by giving the Division a description of the mining method. The Permittee is using a combination of longwall and room and pillar mining to produce coal. The current production estimate is 4.6 million tons per year. The Permittee minimized the surface facilities area (Sec. 523, MRP).

Facilities and Structures

The Permittee lists facilities and structures that existed at the mine site just before the permit issuance. The Permittee also lists the facilities and structures that they plan to construct in Sec. 526 and 528 of the MRP. The Division has enough information to evaluate those structures. The Division's analysis of each structure is given in the section of the TA that deals specifically with that structure.

Findings:

The Permittee met the minimum requirements of this section.

EXISTING STRUCTURES

Regulatory Reference: 30 CFR 784.12; R645-301-526.

Analysis:

The two pre-existing structures in the permit area were the main access road and the power lines. The main access road is owned by the County up to the Permittee's property line.

The dirt road continues through the disturbed area. The Pace Canyon access road is also a pre-existing access, and same is classified as a Carbon County road up to the private gate located on Thayn property. There is a power line in the permit and disturbed area. The only potential user for the power line is the Permittee. The Permittee plans on upgrading and moving the power line during construction.

There are several dirt roads, jeep trails and wheel tracks in the permit area. Those roads are owned by the Permittee and / or the heirs of the Milton and Ardith Thayn trust. Access is limited. The Division will not require the Permittee to identify each of the dirt roads, jeep trail and wheel tracks that will not be used for mining activities or used only for monitoring and data collection activities. [09/06/2006]

Findings:

The Permittee has met the minimum regulatory requirements of this section.

PROTECTION OF PUBLIC PARKS AND HISTORIC PLACES

Regulatory Reference: 30 CFR784.17; R645-301-411.

Analysis:

There are no known public parks or historic places within the permit area.

Appendix 4-1 contains cultural resource information. There are two cultural resource sites in the vicinity of the main facility area, but only one of these is considered eligible for listing in the National Register of Historic Places. The other is the historic Dugout Canyon Mine, and it will be obliterated by the new mine. The possible NRHP site is outside the disturbed area and should not be affected by mine construction itself.

The consultant that did the cultural resources survey for the main facility area recommended there be no blasting within 600 feet of site 42 Cb 92, and the road passes within about 220 feet of the site. The contractor doing the road construction was warned about this situation but blasted anyway. However, it does not appear the site was damaged.

Findings:

Information provided in the proposal is considered adequate to meet the requirements of this section of the regulations.

RELOCATION OR USE OF PUBLIC ROADS

Regulatory Reference: 30 CFR 784.18; R645-301-521, -301-526.

Analysis:

The Permittee did not relocate a public road in connection with any activities. The main mine facility contains a public road within the disturbed area boundaries. The county road ends at the BLM/State property boundary, which is located approximately 300 feet northeast of the southwest edge of the disturbed area boundary. The public will be protected from coal mining operations by:

- Maintaining a berm along the south edge of the road at the outlet of culvert UC-5 and the energy dissipater, whose height will be equal to at least the axle height of the vehicles, which frequent the road.

- Maintaining a berm along the north edge of the road adjacent to the sedimentation pond, whose height will be equal to at least the axle height of the vehicles, which frequent the road.

The protection facilities are similar to those in other coal mines. Signs will warn the public that they are entering an active mine. The berms will protect the public from the hazards associated with the ponds.

Findings:

The Permittee met the minimum requirements of this section.

AIR POLLUTION CONTROL PLAN

Regulatory Reference: 30 CFR 784.26, 817.95; R645-301-244, -301-420.

Analysis:

Section 420 of Chapter 4 discusses compliance with the Clean Air Act. The first two pages of the 2005 Air Quality Order DAQE# AN1634004-03 are provided in Appendix 4-1 of the MRP. The Permittee declined to provide the entire public document and instructed the Division to obtain the complete AO from the Division of Air Quality. The complete document was obtained and has been placed into the 2007 Incoming folder for the mine. [03202007]

The application indicates that a Notice of Intent (NOI) was filed with the DAQ to change the Air Quality Order to increase allowable twelve-month throughput from 5 million tons to 7

million tons. According to the DEQ, the NOI application was filed on April 14, 2006 and has been amended several times since, with the last amendment dated January 2007.

Appendix 5-12 illustrates the "maximum potential" coal storage area. Given the height of the stacking tube (74 ft.) and the 35° angle of repose for coal and the 68 lbs/ft^3 density of bituminous coal, the Division calculates the area required for the two 7,500 stockpiles indicated on the process flow diagram in Figure 5-2, to be approximately 3.2 acres. The **maximum potential** storage area indicated on Appendix 5-12 was approximated by the Division to be 3 acres. The January 2007 Notice of Intent for the increase to 7 MT included a 2.5 acre stockpile area. [03202007]

Figure 5-2 and the 2005 AO indicate the capabilities of the in-mine conveyor (3,600 Tons/hr); the crusher (1,300 Tons/hr), and loadout bin (275 Ton). Based upon this information, the stockpile size will likely increase under a 7 MT throughput plan. Figure 5-12 more accurately portrays the size of the stockpile than the image on Plate 5-2, especially given the increase in throughput to 7 million tons and the known limitations in crushing and loading capability. The Division recommends that the surface facility map be redrawn to project the more accurate footprint. In addition, during a phone conversation on March 16, 2007 with the Permittee, the Division recommended that in future communication between the Permittee and the DAQ, the Appendix 5-12 footprint of the stockpile be described. [03202007]

Findings:

Information provided in the proposal is considered adequate to meet the requirements of this section of the regulations.

COAL RECOVERY

Regulatory Reference: 30 CFR 817.59; R645-301-522.

Analysis:

Mining operations at the Dugout Canyon Mine occur in both the Rock Canyon Seam and the Gilson Seam.

The Division has reviewed the coal recovery plan in the confidential folder. The guidelines for coal recovery are similar to those approved by the BLM for coal recovery on federal leases.

Methane degasification wells are drilled to depths varying from 1,250 to 2,050 ft, depending on the amount of overburden at the well location. All boreholes will be stopped at a depth that correlates to twenty-five feet above the roofline elevation of the Gilson coal seam. No coal will be recovered from the seams that are being mined within the Dugout Mine permit area. No test borings or drill cores are planned at the well sites.

SITLA has determined that the approval of degasification wells within their coal leases require a review to determine if the wells will affect the Plan of Operation for the SITLA / Dugout lease. The USDOI / BLM reviews the application for the degasification well submittals and makes recommendations to SITLA relative to the potential of the wells for affecting the SITLA Plan of Operation. Based upon the BLM recommendations, SITLA either revises the Plan of Operation, or leaves it in the original form. Either way, SITLA must approve the degasification wells that will intercept mine workings within their lease.

SITLA notified the State of Utah, Division of Oil, Gas and Mining on May 15, 2006 that the agency consents to the additional proposed wells G-13 through G-17. It must also be noted that this SITLA concurrence **includes all future degasification drill holes upon the SITLA Dugout Canyon coal tract, until otherwise revoked, until such time as the tract may revert to Federal ownership.** [09/06/2006]

Findings:

The Permittee has met the minimum regulatory requirements of this section.

SUBSIDENCE CONTROL PLAN

Regulatory Reference: 30 CFR 784.20, 817.121, 817.122; R645-301-521, -301-525, -301-724.

Analysis:

Renewable Resources Survey

The area of potential subsidence is currently used for livestock grazing and wildlife habitat, with limited timber production on adjacent lands to the east of Dugout Canyon (Sec. 411.120). Hydrologic resources in the area are discussed in Chapter 7 of this MRP. Information regarding baseline groundwater conditions is provided in Sec. 724. 100. There are no transmission lines, pipelines, or agricultural drainage tile fields within the area of potential subsidence.

The Division and Permittee determined that renewable resources have the potential to be damaged from subsidence. Therefore, the Permittee submitted a subsidence control plan.

Subsidence Control Plan

The subsidence control plan is as follows:

A description of the coal mining, including the size, sequence, and timing for development of underground workings.

Plate 5-7 adequately shows the areas where subsidence is expected to occur. The Permittee will use longwall and room and pillar mining.

A description of the physical conditions that affect subsidence and subsidence related damage.

Subsidence control measures are discussed in Volume 3, Chapter 5, page 5-28 of the approved mining and reclamation plan. As stated in the text, "anticipated" areas of subsidence are depicted on Plate 5-7, PROPOSED MINE SEQUENCE AND PLANNED SUBSIDENCE BOUNDARY. The depicted subsidence boundary was determined by using a thirty-degree angle of draw, as required under R645-301-525.542. The text states that the actual angle of draw is anticipated to be less based upon results of mining and subsidence studies in the general area. It is generally accepted that angles of draw in Utah mines vary from 15 to 22 degrees, but can reach 28 degrees in some geologic areas. Therefore, the thirty-degree angle is justified in determining the area of influence where secondary coal extraction can affect surface areas.

Appendix 5-11 has determined that a 30-degree angle of draw is prudent for determining areas of potential subsidence damage above and / or adjacent to extracted longwall panels.

Plate 5-7 depicts areas where 500-foot barrier pillars are left between longwall panels, as well as areas where the only abutment remaining between the panels consists of the chain pillars left by the development of the gate roads. The Permittee has initiated the leaving of these 500-foot barrier pillars for the purpose of ground control and to minimize sudden energy releases (bounces, or coal bursts) at the longwall face. This has been done to provide an additional measure of protection for CFC underground employees. Canyon Fuel Company expects these pillars "to behave elastically based on underground observations in the GIL 1 tailgate.

Paragraph one of section **3.4 Gate Pillar Behavior**, (See page 11, APPENDIX 5-11) briefly discusses the affects of gate road pillar designs on the subsidence trough over a retreating long wall panel. The MTI report states that in general, "based upon a comprehensive case study by the USBM in 1991, Dyni showed that the narrow 30-foot wide **yield** pillars commonly used in the two-entry Utah reserves crushed completely with no influence (or subsidence humps) above the gate roads. This is in general agreement with measurements over the long wall panels in the Price River coal and detailed underground measurements at the RC Seam confirming that the "gate pillars crushed behind the face (Malecki and others 2003)".

A review of the map provided as part of the 2005 subsidence report for the Dugout Canyon Mine reveals that long wall panels GIL 2 and GIL 3 were developed using the two entry gate road development with the thirty foot wide pillars (50 foot center width) separating the two entries. The GIL-4 and GIL-4A panels will be developed using the same design.

Barrier pillars are left on an as needed basis as determined by the Mine's planning department. Face widths have been increased to approximately 875 feet. Therefore, the discussion of the affects that the 30 foot width by 120 foot length gate road pillars have on the

subsidence trough over the long wall panel is appropriate to meet the concerns of the Division. The yield pillars are designed to crush and are doing what they have been designed to do.

APPENDIX 5-11, section **4.0 PREDICTED GROUND MOVEMENTS,** page 14, contains a discussion of the methodology used to develop the mine design in order to minimize surface deformation at the Dugout Canyon Mine. As noted in paragraph three of section **4.1 Methodology,** Maleki Technologies, Inc., "used a three-dimensional influence function method while accounting for site-specific conditions using the subsidence monitoring data from both the Rock Canyon and Gilson seams. These methods have become very popular for the prediction of subsidence and surface strains within the last two decades (USBM, 1983; Peng and others 1994; SDPS 2000). They are superior to graphical methods because they can be used to model an entire longwall block while allowing an examination of the sensitivity of results to variations in seam thickness, pillar designs, panel dimensions and overburden thickness".

Figure 7 predicts tensile strains in the two sections analyzed for four panels in the Gilson Block 2 area. The MTI report states "horizontal strain patterns have been presented while accounting for variations in topography and mining conditions. Figure 7 clearly shows final compression within the center of the panels and tension near barrier pillars". "Surface strains are generally higher at lower elevations. This indicates a greater potential for localized fracturing over an area of more shallow cover." "...calculated strains do not reach levels that can cause surface fractures".

The Malecki report states on page 15 that "the panel and barrier designs which have been adopted for the Gilson Block 2 area for ground control and safety limit surface deformation and potential fracturing".

Section **2.0 SUBSIDENCE MECHANISM**, page 6 of the MTI report contains a discussion of the three subsidence phases associated with trough subsidence, and elaborates on the sub-critical, critical and super-critical phases which overburden reacts to as coal is extracted from beneath it. All troughs react on the lateral axis of the extraction area, as well as the longitudinal axis.

Page 6 of the MTI report states the following; "in the Gilson Block 2, CFC is utilizing panel-barrier designs to control overburden caving, seismicity and surface deformation (MTI 2005). Considering panel width to average overburden depth ratios for the project area (0.4 to 1.0), these long wall panels **are considered to have sub-critical widths, and thus the great majority of subsidence is expected during the mining of individual long wall panels. The subsidence process is expected to be mature within 2 years after mining".**

It must be realized that the MTI report is a "general" report for a "general' area using "general" conditions, such as depth of cover, constant geologic member thicknesses / member strengths, with virtually little or no consideration made for thinning members, faults, or other geologic conditions which are virtually unpredictable. Unseen conditions are impossible to predict, and the affect that they may have on subsidence within a specific area may not be predictable until the impacts are observed.

As noted on Page 6 of the MTI report, "subsidence characteristics for any coal field depends on site-specific conditions and mining practices, including strata competence, geologic structure, topography, extraction height, extraction speed, and mine designs. The site specific subsidence parameters for the Gilson study area were addressed using local and regional monitoring results within Utah coal fields".

The report "Prediction of Surface Deformation Resulting from Longwall Mining Over the Gilson North-East Block" addresses the minimum regulatory requirements of **R645-301-525.**

A description of subsidence monitoring.

Subsidence monitoring is discussed in Volume 3, Chapter 5, Pages 5-28 through 5-30 of the Dugout Canyon Mine MRP. The plan discusses the installation methods for the various survey control points located throughout the permit area. The currently approved plan requires one monitoring point per longwall panel. These are monitored once a year, for new areas that have undergone coal extraction. All survey points are checked during this single evaluation. Subsidence monitoring is conducted annually.

The submitted data contains the surface elevation at each monitoring point when the station was installed, as well as the surface elevation at that point when the survey was conducted. Interim elevation changes by year are not reported.

One monitoring point per panel is approved by the current plan. Monitoring points are generally located inside of the tension/compression zone, but vary in location from these locations, up to and including the center of the longwall face.

The Division feels that the monitoring of the tension / compression zone, and its lengths which parallel the gate roads is also important. The Division bases this need upon the fact that subsidence impacts are more likely to propagate to the surface in these tension /compression areas such that they are visible, and capable of affecting soil resources, surface water flows, or create hazards for wildlife or human beings.

The approved plan states "subsidence monitoring will … entail direct ground surveys and visual surveys of the permit area. The annual subsidence monument survey conducted of the monument elevations is considered to be the direct ground survey.

The Permittee also submits documentation describing the visual surveys that have been conducted for each monitoring year. This document contains information relative to areas surrounding monitored seeps, springs, streams, or any other surface activities. In addition, roads used to access hydrologic monitoring stations are visually evaluated during monitoring activities. This record is submitted as part of the annual subsidence monitoring report.

Page 5-30 of the currently approved Mine plan states the following; "in addition to ground surveys, aerial photogrammetric methods will be included in the surveys when the areas

become too large to feasibly handle with ground surveys. This method may be added to enhance the ground surveys...". Visual checks for subsidence will be made during all surface activities, especially during water monitoring activities."

Surface lands above the Dugout Canyon Mine are generally covered with vegetation and soils, compared to the SUFCO Mine. At SUFCO, surface cracks are easily visible as the Castlegate sandstone is exposed at the surface. At Dugout, the Castlegate is covered with soils and vegetation. Any cracks that are visible at the Dugout Mine are going to have to be within the Castlegate itself, be very wide, or have a great deal of displacement. [09/06/2006]

Performance Standards For Subsidence Control

The annual report for 2005 indicated that virtually no effects of mining related subsidence were visible. The areas inspected included surface along Pace Creek, access roads to surface water monitoring sites, and degasification well locations.

Page 6 of the Malecki report discusses the three phases of subsidence that surface areas go through during secondary coal extraction utilizing long wall mining techniques. The center of the panel (or basin, as settling occurs) is where the *subcritical phase* will first report data, and the rate of settling once the faces passes outby this monitoring point. Once the *subcritical phase* is completed, the strata immediately progresses through the *critical phase,* when the maximum amount of subsidence will occur from the extraction of the associated coal seam. The *supercritical phase* occurs as adjacent panels are extracted and the pillars supporting the gate roads are crushed out such that the trough is relatively flat bottomed until an abutment is reached.

The Permittee is now extracting a deeper coal seam (the Gilson). The continued installation and monitoring of the single monitoring point per panel is justified in providing monitoring data for the deeper seam conditions, which will in turn provide information for the development of better ground control techniques. It will also provide data to confirm that the designs used for the gate road pillar designs and barrier pillars are adequate or inadequate in controlling heavy cover. This is imperative to ensure the safety of the mineworkers.

The subsidence control plan has been reviewed by the Division and found to meet the minimum performance standards. [09/06/2006]

Notification

Under R645-301-525.300, the Permittee must notify all owners and occupants of surface properties and structures above the underground workings. The notification will include, at a minimum an identification of specific areas in which mining will take place, dates that specific areas will be undermined, and the location where the Permittee's subsidence control plan may be examined. In Sec. 525.300 of the MRP, the Permittee commits to notify all surface owners and occupants.

Plate 5-7 depicts the "PROPOSED" MINE SEQUENCE AND PLANNED SUBSIDENCE BOUNDARY that shows the anticipated dates when development and secondary coal extraction will occur in specific areas of the coal reserve through 2010. Surface topography of the permit area is also depicted, as are coal leases.

The anticipated potential subsidence boundary is depicted at a 30-degree angle of draw. The approved mine permit boundary, and all surface ownerships involved with the current Dugout Mine permit area are also depicted.

PLATE 5-7 is P.E. certified by Mr. David G. Spillman, Manager of Technical Services for the Permittee. [09/06/2006]

Findings:

The approved mining and reclamation plan meets the minimum regulatory requirements of this section of the R645 Coal Mining Rules. [09/06/2006]

SLIDES AND OTHER DAMAGE

Regulatory Reference: 30 CFR Sec. 817.99; R645-301-515.

Analysis:

In Sec. 515.100 of the MRP the Permittee states:

If a slide occurs within the permit area that may have a potential adverse effect on the public, property, health, safety, or the environment, the Permittee will notify the Division by the fastest available means following discovery of the slide and will comply with any remedial measures required by the Division.

The Permittee has met the minimum requirements of R645-301-515.100 by including a commitment to report slides.

In Sec. 515.200 of the MRP the Permittee states:

If any examination of inspection of an impoundment discloses that a potential hazard is associated with that impoundment that may have an adverse effect on the public, property, health, safety, or the environment, the person who examined the impoundment will promptly inform the Division of the finding and of the emergency procedures for public protection and remedial action. If adequate procedures cannot be formulated or implemented, the Division will be notified immediately.

The Permittee has met the minimum requirements of R645-301-515.200 by including a commitment to notify the Division in case of an impoundment hazard.

Findings:

The Permittee has met the minimum regulatory requirements of this section.

FISH AND WILDLIFE INFORMATION

Regulatory Reference: 30 CFR Sec. 784.21, 817.97; R645-301-322, -301-333, -301-342, -301-358.

Analysis:

Protection and Enhancement Plan

The MRP meets the requirements of R645-301-333, R645-301-342, or R645-301-358 because it provides information on TES and discussion concerning protection and enhancement during construction and reclamation phases. The Permittee plans to use the best technology available to minimize impacting wildlife and its critical habitat. The Permittee also plans to use enhancement measures during the reclamation and postmining phases that consider planting species appropriate for PMLU. [05052005]

The Permittee commits to wildlife awareness and protection training in its annual training curriculum for all employees and haulage contractors. Loading, unloading, and staging of materials as well as all mining and supplier personnel and equipment will operate within disturbed area boundaries. DWR requests limiting construction periods between December 1 and April 15 (dates are approximate depending on actual snow conditions).

Ungulates

The permit area includes habitat for deer, elk, and pronghorn. The Permittee must comply with exclusionary periods during construction and reclamation phases. The general exclusionary periods for ungulates are December 1 through April 15 and May 15 through July 5.

The Permittee will reclaim the site using a seed mix compatible for ungulates.

Bats

The Permittee implemented a vegetation mitigation project in exchange for impacting local bat populations around 1997. The Permittee planted willows in the stream channel above the mine site with a success rate of about 75% as of 2001. The project is on going with the need to transplant additional willows at time of final reclamation. The MRP details this mitigation project (pp. 3-19 through 3-20).

The Division, in consultation with DWR, determined that the Permittee must also conduct baseline bat surveys in riparian habitat within zones of expected subsidence. The

Permittee must survey for all Utah sensitive bat species and conduct all bat surveys between May and September. The Permittee will consult with the Division if baseline surveys are positive for bats and operations significantly impact bat habitat. The Permittee may need to conduct a follow up survey and implement a mitigation project. The Permittee conducted a bat survey near the Pace Canyon fan breakout (May 2005; Vol. 3, App. 3-3; See Environmental Section of this TA for more information).

Raptors

The Permittee must comply with raptor exclusionary periods for the start up of construction and reclamation phases of mining. The general exclusionary periods for raptors are February 1 through July 15, but may be different, waived or extended depending on species or evaluation/survey results.

The Permittee conducts annual fly-over raptor surveys to obtain baseline data prior to mining disturbances including subsidence of cliff habitat (Vol. 1, Sec. 322, pg. 3-13). The Permittee also conducts follow up surveys within one year if nests were observed during the baseline surveys and if operations resulted in subsidence. The Permittee will conduct ground surveys for goshawks and northern saw-whet owls in forested areas with suitable habitat and areas planned for mining facilities. All raptor reports are provided in Confidential Binder, Ch. 3, Vol. MRP, Raptor Surveys.

The 2005 fly-over survey map shows that the types of raptor nests observed within or adjacent to the permit area are: golden eagle, red-tail hawk (or other buteo), falcon, and raven.

The 2004 Northern saw-whet owl nesting box mitigation project entailed the Permittee, DWR, and Division putting up twenty-six nesting boxes designed to attract the Northern saw-whet owl and other small-medium sized cavity nesting birds. The Division requested the Permittee to mitigate for the owl because degas drilling occurred during the exclusionary period (March 31-August 31).

The MRP states that all power lines within disturbed areas will be raptor safe. The Permittee will follow the publication "Power Line Contacts by Eagles and Other Large Birds".

Endangered and Threatened Species

The Carbon County TES list includes Graham Beardtongue, Uinta Basin hookless cactus, bonytail chub, Colorado pikeminnow, humpback chub, razorback sucker, Mexican spotted owl (MSO), black-footed ferret, bald eagle, and western yellow-billed cuckoo (candidate).

No endangered or threatened plant or animal species are known within the area. As required by R645-301-358.100, the Permittee must promptly report to the Division any state or federally listed endangered or threatened species within the permit area of which they become aware. Seasonal or migrating bald eagles are expected and a wintering bald eagle would not need to be reported.

To date, the Division has determined that mining operations would have no effect on TE species or their habitat listed for Carbon County because:

- There have been no observations of TE plant species during vegetation surveys.
- There were no MSO observed in the area during the calling survey.
- The bald eagle is an occasional user of the area, but typically only in the winter when there is no start-up of construction or reclamation projects.
- There have been no recent sitings of prairie dog or black-footed ferret.
- The water balance for mining operations is a net gain to the Colorado River drainage.
- There is no habitat to support western yellow-billed cuckoo.

The Division will not initiate informal communication with the USFWS because they no longer provide concurrence letters for "no effect" determinations (January 2006).

Colorado River Fish

The USFWS has determined that water depletions from the Upper Colorado River System are a major source of impact to four endangered fish species (Colorado pikeminnow [squawfish], humpback chub, bonytail chub, and razorback sucker). The Permittee calculated the current value of water contributed (335 acre-ft) to the Colorado River System is greater than the total value of water consumed (147 acre-ft) from mining operations. The overall water balance for the Dugout Canyon mine is a net gain of 188 acre-ft. [12152005]

The Division may require the Permittee to resubmit water consumption calculations with midterm applications or new amendments that include significant changes to the permit or surface disturbance areas. [03202007]

Bald and Golden Eagles

There are many raptor nests within the Dugout properties including golden eagles. There are no known bald eagle nests. The Permittee will conduct annual raptor surveys to obtain baseline data prior to mining disturbances including subsidence of cliff habitat (Vol. 1, Sec. 322, p. 3-13). The Permittee must also conduct follow up surveys within one year if nests were observed during the baseline surveys and if operations resulted in subsidence.

Raptor nests within the permit area are identified in the environmental resource section of this analysis. Every nest but one is in the area that would be subsided, and five of the seven are in the subsidence zone for the current permit term. Section 332 describes potential effects as displacement, injury or death of birds and nest destruction. The plan says that upon notification or suspicion of raptor nests in the permit boundary, the Permittee will verify the existence of any nests, determine their conditions, and locate their locations in relation to recoverable resources. Information collected in this inventory will be discussed with various agency personnel, and the Permittee and the agencies will determine methods of avoidance,

explore alternative methods of protection or removal, and develop mitigation plans when needed. Consultation would begin nine months or the summer period prior to the period of potential subsidence. These commitments satisfy condition 10 of the permit issued March 16, 1998.

Wetlands and Habitats of Unusually High Value for Fish and Wildlife

Robert Thompson, a Forest Service botanist, states that there are no known wetlands within the main facilities area. It is possible a narrow band of wetland exists along the stream corridor, but the concern for disturbance (during the review process) was the stream and its associated riparian area rather than any possible wetland.

A culvert will contain Dugout Creek throughout the length of the disturbed area, and this will significantly affect wildlife within the area. Section 322.200 details a plan to mitigate for the loss of riparian habitat due to the culvert. The mitigation includes seeding some very steep road fills near the stream, planting willows in some sections of the stream, and possibly installing in-stream structures to promote channel stability. The seed mix includes two introduced species that would not normally be allowed, but they are rhizomatous species that are needed to stabilize the very steep slopes. One ton per acre of a hydromulch called Ecofiber was sprayed after the area was hydro seeded. There are a few willows along Dugout Creek in the mitigation area but not nearly as many as one would expect. This may be because they have been grazed or otherwise eliminated through people's actions rather than because of the ecology. Coyote willows are present in Soldier Canyon to the west.

Mining operations for the SILTA lease may result in subsidence of water resources within the permit area. The Permittee provides a monitoring plan and will mitigate if operations impact the Pace Creek stream channel (Vol. 2 Sec. 731.200, pg. 7-62). The monitoring program will include conducting a premining subsidence video tape survey of the stream channel from surface water monitoring location - PC1A to where Pace Creek leaves the SW 1/4SW 14 Sec. 22, T13S, R13E.

The Permittee describes short-term and possible long-term impacts to two species (mollusk [Physella virgata] and tiger salamander) that may be dependent on local water resources. The Permittee discusses mobility and mortality of these species as well as noting that subsidence in the SITLA lease area may impact individuals. Nevertheless, the Permittee also states that the subsidence plan provides measures that should repair subsidence-related material damage, including mollusk and salamander habitat. [05052005]

The Permittee provides a mitigation plan for the subsidence to the Pace Creek channel that includes filling cracks with bentonite. If mitigation efforts are not successful and there is impact to stream bank habitat, the Permittee must coordinate with the Division and DWR to develop a mitigation plan. (Refer to R645-301-332; R645-301-320.)

Findings:

Information provided in the proposal is considered adequate to meet the requirements of this section of the regulations.

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-230.

Analysis:

Chapter 2, Soils, Sections 230 through 234, discusses the soil's operation plan for the Dugout Canyon Mine. Relevant information includes soil salvage, stockpiling, and topsoil substitutes and supplements. The Analysis section discusses operational information as follows:

- Topsoil and Subsoil Removal
- Topsoil Substitutes and Supplements
- Topsoil Storage

Topsoil Removal and Storage

Dugout Mine Facilities Canyon

The MRP describes salvage of both topsoil and subsoils within Type TS soils in **Dugout Canyon** areas #2, 3, and 4. All A, B and C horizons will be salvaged from TS soils, which are deep rich Mollisols, with excellent quality subsoil. These B and C horizon soils were salvaged, segregated and stockpiled as substitute topsoil.

Soils salvaged prior to construction are those labeled with TS on Plate 2-2. The A, B and C horizons were be salvaged. Undisturbed soils marked #96 will not be disturbed although they were within the disturbed boundary. These southwest facing, undisturbed soils are therefore considered a buffer zone.

The following areas of TS soils were identified as either needing protection during operations or as requiring salvage if they are threatened by future activities at the mine: (1) The soils on the southwest facing slope where the north and east drainages of Dugout Creek unite. (2) The soils on the west-facing slope in the area of the coal storage pile. A discussion of the salvage of these soils is located in App. 2-6.

Canyon Fuel Company salvaged soils from steep slopes within the **culvert expansion area** along Dugout Creek. Timing is critical to help maximize safety and slope integrity during salvage operations by coordinating culvert installation and fill placement immediately after soil removal. The placed fills will stabilize the hillsides and will remain in place at final reclamation. Plate 2-5A provides the locations of steep slope soil removal (as per the commitment at the bottom of page 2-29 of the MRP).

Installation of a culvert in Dugout Creek will result in the removal and storage of 1,568 CY of riparian soil. The soil removal volumes are based on the assumption and calculations provided in App. 2-5. Soils removed during culvert construction, Area #5 Soils, were stored separately from other soils and are expressly designated for reclamation of the Dugout Creek, riparian area. The Area #5 soils described in Section 231.100 of the MRP, were placed at the south end of the north pile (App. 2-6 and Plate 2-3).

Soils on the northwest-facing slope of the stream on the opposite bank from the operations pad at the location of the sediment pond were not be salvaged due to their importance in stabilizing the steep stream bank. The idea of protecting the soils with geotextile fabric was discarded after it was determined that the stream bank would not be re-exposed during reclamation, since the channel will be moved westward to improve stability of the slope. Therefore, this 300-foot length of stream bank soils will be buried in the fill in order to stabilize the entire slope above. The Division concurs with this judgment.

The estimated volumes of stockpiled soils are presented in App. 2-5 (Soil Removal from Within the Culvert Expansion Area) and App. 2-6 (Topsoil, Substitute Topsoil, and Storage Pile Calculations). These estimates were followed by as-built information in 2006. There exist four stockpiles at the Dugout portion of the Soldier Canyon Storage Area (Plate 2-3). The first pile was created during Phase I construction. The second stockpile was created during Phase II construction of the mine site (permit issued on 10/16/98). A third pile contains riparian soils from the Gilson water well development. The fourth pile created during substation construction is part of the soil/rock storage area specified on Plate 2-3. All piles are signed. The plan includes information on pile construction in Sections 224, 231.100, 231.400 and Plate 2-2 and App. 2-5. Table 2-2 provides topsoil salvage by location and an as-built volume for each stockpile. The total volume of all stockpiles was surveyed and found to be 26,247 yd^3 of soil (Table 2-2 and Sec. 233.200). [09/06/2006]

Pace Canyon

In **Pace Canyon**, the soil survey indicates that variable soil depths (from 0 – 36 inches) are salvageable (App. 2-3). The soils map indicates that most of the disturbed area is steep terrain that will not provide topsoil for salvage. Areas along either side of the existing road that have been either undisturbed or affected (but with no effect to soil pedology) will be the source of topsoil salvage. The MRP indicates in Sec. R645-301-232.100 that soil recovery will be maximized and topsoil and subsoil will be salvaged and stored together. Consequently, the presence of a qualified person to direct the salvage is indicated. For the purposes of calculation, an average of 18 inches salvaged from 1.3 acres is assumed in App. 2-9. A salvage quantity of 3,100 cu yds was calculated for Pace Canyon. The topsoil will be sampled at the time of salvage for the parameters indicated in MRP Sec. R645-301-233.300. [04212005]

Refuse Site

The triangular shaped permit area covers 26.8 acres (Sec. 114, p. 1-24) of which 15.8 acres will be disturbed (RA Attachment 2-2). The refuse storage area will consume 5.7 acres. The rest of the site (10.1 acres) will either be dedicated for topsoil storage, access roads, general storage or undisturbed. Map Unit H and J will be undisturbed. [02242003]

Topsoil Substitutes and Supplements

The Facilities area (Area 1 on Plate 2-2). Soils from Area 1 will be utilized as substitute topsoil at final reclamation if they are not contaminated. Appendix 2-6 provides calculations showing that if 2 feet of material is recovered from this location, approximately 6.504 CY of additional substitute topsoil could be available after testing and approval for use. Any waste will be segregated from the soil material and material heavily contaminated with coal waste will not be used.

Culvert installation and pad construction will require importing fill. The MRP commits to demonstrate the suitability of the imported fill by determining if the fill is acid- and/or toxic-forming prior to placement. Acid and/or toxic-forming materials will not be used.

Refuse Site [02/24/03]

There is no topsoil available for salvage on the previously disturbed site. However, there are areas of suitable substitute topsoil. The application indicates that a soil scientist will be on-site during soil salvage operations. RA Plate 2-1 outlines areas of substitute topsoil salvage and depths of salvage. RA Attachment 2-1 indicates that no soil will be salvaged in map units H and J on the eastern leg of the triangular disturbed area. The plan indicates that the combined acreage of H and J is approximately 11.2 acres (Sec. 242.100 and RA Attachment 2-2). The acreage to be reclaimed totals 16.1 acres (RA Attachment 2-2). The total permit area would then be 11.2 + 16.1 = 27.3, within 0.5 acres of the 26.8 acres stated in Sec. 114 of the plan.

However, the plan does not account for the acreage of disturbance in the area J soils for the construction of the sediment pond spillway. During the week of February 17th, 2003, Mr. Dan Larsen evaluated the soils in Map Units J and H. This soils information was included with as-built details.

RA Table 2-2 estimates the volume of salvageable soil as 44,317 cubic yards. The acreage of recovery totals 16.1 acres. Half of the substitute topsoil will come from areas B, C and E described in RA Table 2-1 as gravelly, loam and gravelly, clay loam. Soils in map units B and C are suitable as subsoil (Sec. 3.4 of Attachment 2-1) and will be stored in a subsoil stockpile described in Sec. 231.100. The least rocky soils and most suitable substitute topsoil in the project area are those in map units D, E, and F. Soils from areas D, E, F, K, and G will be stored in a topsoil stockpile (Sec. 231.100).

Section 232.100 indicates that the figures for substitute topsoil recovery in RA Table 2-2 and RA Attachment 2-2 are "based on an average of the recommendations for recovery in Table

3.41 of Attachment 2-1 Soils Report." In the case of soil units A, B, C, E, G, K, L, and M soil recovery has been over estimated. The total over estimation is approximately 5,840 cu yds. The excess soil will be placed in the subsoil pile. The boulders (unit K) will be stockpiled separately (Sec. 234.100). Most of the piled gravel (unit L) has been moved from the site, with the remaining gravel to be removed before soil salvage.

Pace Canyon

Soil will be removed from 1.3 acres of the 2.7-acre **Pace Canyon** site. The plan indicates that an average 12 inches will be salvaged from this 1.3 acres. However, the Division observed that there was a minimum of 18 inches available in this 1.3-acre area with subsoils available for salvage to an even greater depth. A greater depth of salvage is required for reclamation of the 2.7-acre site, since only a portion of the site will be supplying topsoil for the total site. At an average depth of 18 inches, the 1.3-acre topsoil retrieval area will supply 3,192 cu yds of soil. [04212005]

Topsoil Storage

As stated in the MRP, the topsoil stockpile will be located at the **Soldier Canyon Mine topsoil storage area** (Plate 2-3) with the Dugout stockpile marked and kept separate from the Soldier Canyon Mine stored soils. A contiguous containment berm separates the Dugout soil pile from the Soldier Canyon Mine piles. The containment berm is designed as a self contained Alternate Sedimentation Control Area (ASCA). Section 231.400 gives the construction, modification, use, and maintenance of the storage piles. The pile is designed to hold a maximum volume of 17,000 CY of soil. The total projected volume of soil salvage from Dugout, culvert expansion area, and topsoil borrow is 28,455 CY of soil. An expansion of the Soldier Canyon Mine topsoil storage area (App. 2-7) will handle this additional material.

At the time of permitting, the Soldier Canyon Mine soil stockpile was infested with Cheatgrass. Therefore, the Permittee committed to maintain, to the extent possible, the stockpile's interim vegetation in a noxious weed- and Cheatgrass-free state. Discussion has focused on controlling the Cheatgrass using both selective and non-selective herbicides in early spring before dormancy breaks with other desirable plants, and by using pre-emergent herbicides in the fall to kill germinating Cheatgrass.

Refuse Site [02/24/03]

Substitute topsoil will be stockpiled in the northwest corner of the disturbed area (RA Plate 5-1 and Plate 2-2). Subsoil and topsoil will be stockpiled separately (Sec. 234.100). Each pile will be signed. As built drawings of the soil stockpiles will be provided for the site. The 30,542 cu yds of subsoil will be stored on 2.1 acres. The 13,775 cu yds of topsoil will be stored on 1.3 acres. A road will pass along the eastern edge of the substitute topsoil stockpiles. A ditch and berm will surround the piles.

The soil will be placed in 1.5 to 2 foot lifts with track equipment. The soil stockpile will be twenty feet deep and at least 200' wide. The stockpile will be stabilized with interim seed mix (grasses) described in Sec. 341.200. The plan indicates in Sec. 242.200 that soils will be handled when they are in a loose or friable condition.

Pace Canyon [04/21/05]

Two stockpiles will be located in Pace Canyon for reclamation of the fan portal (App. 2-9 and Plate PC5-2). Both will be located on undisturbed ground that is demarcated with marker strips. These stockpiles will hold 566 and 3,027 cu yds. They will be constructed with 2h:1v side slopes (App. 2-9). Figure 1 in App. 2-9 indicates the maximum depth of the south stockpile will be 15 – 17 feet. The maximum depth of the north stockpile will be 10 ft deep.

The north stockpile will be surrounded with a subsoil berm (Sec. 234.200). This berm will be three feet tall at its lowest point (designs for this berm are on pg 37 of Attachment 1 in App. 7-12). The south stockpile will have berms on either side directing flow to a silt fence. At the lower portions, this berm will be two feet tall (designs in App. 7-12 Attachment 1, pp. 36-38). [05252005]

The Pace Canyon site will be fenced to protect the topsoil stockpiles from grazing and to protect the livestock herd in Pace Canyon Grazing Allotment No. 24085. [04212005]

Topsoil at Pace Canyon will also be temporarily stockpiled above the portal and along the channel diversion area for immediate replacement above the portal collar after construction of the portal and channel diversion (Plate PC5-2 and MRP Sec. 242.100.) The temporary stockpile will be protected with a silt fence. As built volumes will be reported. [04212005]

The MRP states that stockpiled soil in jeopardy of being detrimentally affected in terms of soil quantity and quality by mine operations may be temporarily redistributed. Such action will only take place by prior approval of DOGM with appropriate amendment changes to the MRP.

Sites G-8 through G-19 and G-31:
[07312007]

Site configurations are provided in Attachment 5-1. Disturbed acreage for each well site is tallied in Table 1-2. Topsoil salvage areas vary from 0.32 acres at site G-6 to 2.75 acres at sites G-13 (Table 1-2).

Topsoil removal volumes are listed in Table 2-1 and Section 222.400 and Attachment 2-2. Stripping depths will vary from site to site based upon the soil survey. Within each site, stripping depths may also vary with topography and previous disturbance. Section 231.100 indicates that at site G-19 only 1.27 acres of the 2.3 total have topsoil that will be recovered and stockpiled. (The soil survey sketch in Attachment 2-1 and topsoil calculations in Attachment 2-2 confirm this statement.) Topsoil will not be salvaged from beneath the topsoil storage areas.

Topsoil stockpile volumes are provided in Table 2-1 and approximate dimensions are listed in Table 2-2. Stockpiles are constructed against the slope, therefore height measurements reflect the original ground surface. Stockpiles for sites G-11 and G-12 will be constructed with 1.5h:1v side slopes (Attach. 2-2). Stockpiles at G-19 will be of two types: 1) long and low along a pre-disturbed roadway and 2) a stockpile against the highwall at the pad site (Table 2-2 and Attachment 2-2). Stockpile dimensions and slopes are illustrated. The landowner's concurrence with stockpiling topsoil along the access road is provided in Attachment 2-3. This statement is not notarized, but is accepted in good faith.

Erosion control methods for all stockpiles will include creation of stable slopes (ordinarily no steeper than 2h:1v), a berm around the base of the stockpile, surface gouging of the pile face and seeding with seed listed in Table 3-2.

At some pad sites, stockpile slopes steeper than 2h:1v have been created temporarily. The steeper stockpile slopes allow for less disturbed area, but create difficult conditions for vegetation establishment. These steeper slopes are temporary and will be reduced during contemporaneous reclamation of the drilling pad sites. A projected date for contemporaneous reclamation of each sites is provided in the table in Attachment 5-2.

Subsoil will be excavated for use as berms and to create a mudpit at each site (Sec. 231.100, Methane Degassification Volume).

Findings:

The information provided meets the regulatory requirements of this section.

VEGETATION

Regulatory Reference: R645-301-330, -301-331, -301-332.

Analysis:

The MRP meets the requirements of R645-301-330, R645-301-331, and R645-301-332 because the Permittee will disturb the smallest area as possible for facilities, apply interim or contemporaneous reclamation when applicable, and mitigate for subsidence-related impacts. The Permittee will stabilize disturbance by grading, seeding, and mulching (Vol. 1, Sec. 341). Section 341 provides the interim seed mixture. [05052005]

The Permittee will stabilize disturbance by grading, seeding, and mulching (Vol. 1, Sec. 341). Section 341 provides the interim seed mixture.

The Permittee initiated a cheatgrass control program for the lower topsoil stockpiles at the Soldier Canyon Mine. While control has not been completely successful, it has reduced the

amount of cheatgrass. The Permittee will need to continue control efforts. The requirements for permit condition 5 of the March 16, 1998 permit has been met.

The MRP includes a mitigation plan for the subsidence to the Pace Creek channel (within the SITLA lease area) that includes filling cracks with bentonite. If mitigation efforts are not successful and there is impact to stream bank habitat, the Permittee must coordinate with the Division and DWR to develop a mitigation plan that may have a vegetation component.

Findings:

Information provided in the proposal is considered adequate to meet the requirements of this section of the regulations.

SUBSIDENCE CONTROL PLAN

Regulatory Reference: 30 CFR 784.20, 817.121, 817.122; R645-301-521, -301-525, -301-724.

Analysis:

Renewable Resources Survey

The pre-subsidence survey consists of the hydrology information in the MRP, Chapter 7 and aerial photographs taken in 2006. The former establishes the location of state appropriated water supplies within the permit area and the latter, a lack of existing structures in the 40 acres (Appendix 5-12). Letters describing that this information was available from the Division files were mailed to the landowners on February 22, 2007. According to the March 7, 2007 cover letter associated with this application, Gil L. Conover declared that there were no structures on the surface within the angle of draw (see Plate 5-7 for angle of draw). [03202007]

Notification

Surface landowners and the water conservancy district have been notified.[03202007]

Findings:

Information provided meets the minimum required for pre-subsidence survey.

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:

R645-301-527. 100, requires the Permittee to classify each road in the permit area as either primary or ancillary. All roads in the disturbed area are classified as primary and will meet primary road standards.

There are several dirt roads, Jeep trail and wheel tracks in the permit area. Some of the dirt roads are public roads, such as the access road to the Pace Canyon Portal. The Division does not require the Permittee to permit or reclaim public roads.

The Permittee does not plan on using any of the dirt roads, Jeep trails and wheel tracks for mining and reclamation activities except for access to monitoring and data collection sites.

The Division will not require the Permittee to classify the dirt roads, Jeep trails and wheel tracks that are located outside the disturbed area boundaries provided the roads are not used for mining and reclamation activities with the exception of access to monitoring and data collection sites. If the dirt roads, Jeep trails or wheel tracks are used for any mining or reclamation activities with the exception of access to monitoring and data collection site the Permittee must then classify the road.

Road Classification System

Main Mine Facility

Within the disturbed area of the main mine facility there are primary and ancillary roads (MRP, Sec. 527.100 lists each road). There is only one ancillary road, which is the survey monument road. All other roads are primary roads because of frequent use or used to haul coal.

Cross sections and profiles of roads that will be used or maintained by the Permittee are provided in Figure 5-2. Information regarding road drainage structures is presented in Chapter 7.

The road that accesses the mine is a County road that extends from the Soldier Creek Road (Utah Highway 53) to the mine (a distance of approximately 7.5 miles).

The primary roads within the surface facilities have a 16-foot width. As indicated in Figure 5-2, the roads consist of 2 to 4 inches of granular material, asphalt, or concrete on a compacted, in-place subgrade. The surfaces of the roads are crowned in the middle and slopes at angles of 1% to 2% for drainage. The grades of the disturbed area primary roads do not exceed 10%.

Figure 5-2 shows road cross sections. The road cross sections show the drainage ditches, road surface and embankments.

In Sec. 542.600 of the MRP the Permittee states:

All roads not to be retained for an approved postmining land use will be reclaimed immediately after they are no longer needed for mining and reclamation operations. Roads, which will be retained through the disturbed area for access to private land within the permit area are noted on Plate 5-3. All remaining roads within the disturbed area will be reclaimed. All roads to be reclaimed will be graded and /or backfilled as indicated above. Topsoil will be applied to the regraded surfaces and the area will be revegetated as discussed in Chapter 2 and 3 respectively.

Degas Well Roads. Roads, which were used to develop the degasification wells located within the permit area, are generally "pre-existing" and as such, are the property of the surface landowner. Their use is permitted via the agreement between the surface land owner and the Permittee. Any roadway lengths that are developed in order to establish any degasification well pad (i.e., accesses) are primary roads that are reclaimed upon completion of the venting process.

Pace Canyon Portal Road. The road that provides surface access to the Pace Canyon area is on Bureau of Land Management surface. This road was relocated thirty to fifty feet to the SE for a length of approximately 550 feet in order to construct a pad large enough to accommodate the facilities associated with the Pace Canyon fan portal. This road will be relocated during the reclamation activities of the Pace Canyon fan. Thus, it will be retained for access to the Roan Cliffs, and serve as access for the approved post-mining land use in the area.

Control of Damage to Public or Private Property. All roads used by the Permittee have been or will be designed in accordance with applicable County and State standards. By designing according to these standards, damage to public or private property will be been minimized.

Road Surfacing

All ancillary roads will be asphalt-surface, gravel surface, or unimproved dirt roads. No acid- or toxic-forming materials will be used in the road surfaces.

Plans and Drawings

The plans and drawings for the roads in the disturbed area are located in Sec. 527.200 and Chapter 7. Plate PC5-2, Surface Facilities shows the original and (re-located) location of the Pace Canyon road. Plate PC5-5 shows the location of the Pace Canyon road after the reclamation of the fan portal has been completed. FIGURE PC-1 (App. 5-10) depicts a cross-section for the 550-foot roadway length in Pace Canyon.

Slope Stability

The stability of the county road embankment has been evaluated where it passes adjacent to the sedimentation pond. Results of this evaluation are presented in App. 5-4. This analysis indicates that the access road embankment has a minimum safety factor of 4.2 under

static unsaturated conditions and 2.1 under static saturated conditions. These values exceed the safety factor of 1.3 required by R645-301-534.130.

All other roads in the permit area exist on private land owned by Sage Point Coal Company (the parent company of SCM), or by the heirs of the Milton and Ardith Thayn Trust. The Permittee anticipates no stability problems for these roads.

Environmental Protection and Safety

The design and reconstruction of the main mine facilities access road will be the responsibility of Carbon County. Safety and environmental protection were primary concerns during the design of other roads within the surface-facilities area. The grade, width, and surface materials used for the roads were selected to be appropriate for the planned duration and use of the roads.

Primary Roads

The only primary roads in the main mine facilities area is the coal haul road in the disturbed area, and the 550 foot roadway length within the disturbed area of Pace Canyon. Part of the haul road will be the county road that accesses the mine site. The design and reconstruction of this public road will be the responsibility of Carbon County. The road will be maintained by the County to meet its design standards throughout the life of the mining and reclamation activities. SCCC will assist the County to ensure that catastrophic events are repaired as soon as practical after the damage occurs.

As noted in Sec. 534.100, the embankment of the county road adjacent to the sedimentation pond will have a minimum static safety factor in excess of 1.3. Any portion of the road within the permit area that is not to be retained for use under an approved post-mining land use will be reclaimed immediately after it is no longer needed for mining and reclamation operations.

Road Alignment

Selection of the final alignment of the reconstructed access road will be the responsibility of Carbon County. The alignment will be located generally along the alignment of the existing dirt road.

The current road location had been in existence for many years and had not experienced major stability problems. Thus, the road will be located on the most stable available surface, giving consideration also to safety and environmental protection.

Road Surfacing

The county road, which accesses the mine site will be surfaced with a non-rutting asphalt concrete. This surface will be designed to account for the anticipated volume of traffic as well as the weight and speed of vehicles using the road.

Road Maintenance

The access road will be maintained by Carbon County. The Permittee will maintain all roads in the permit area that are used for coal mining activities. The Permittee commits to maintain the Pace Canyon road above, below, and within the Pace Canyon facility.

Road Culverts

The technical analysis for the road culverts is in the hydrology section of the TA.

Performance Standards

The Permittee has met all the engineering performance standards for primary roads regarding location, design, construction, use and maintenance of the roads. Those engineering standards include:

- Prevent or control damage to public or private property.
- Use nonacid- and nontoxic-forming substances in road surfacing.
- Maintain all roads to meet the performance standards of this part and any additional criteria specified by the Division. A road damaged by a catastrophic event, such as a flood or earthquake, shall be repaired as soon as is practicable after the damage has occurred.
- The construction or reconstruction of primary roads shall be certified in a report to the Division by a qualified, Utah Registered Professional Engineer. The report shall indicate that the primary road has been constructed or reconstructed as designed and in accordance with the approved plan.
- Each primary road embankment shall have a minimum static factor of 1.3. The Division may establish engineering design standards for primary roads through the State program approval process, in lieu of engineering tests, to establish compliance with the minimum static safety factor of 1.3 for all embankments.
- Primary roads shall be surfaced with material approved by the Division as being sufficiently durable for the anticipated volume of traffic and the weight and speed of vehicles using the road.

Primary Road Certification

Under R645-301-512.250, a professional engineer certified that the slopes are stable and certified the design of the primary roads.

Other Transportation Facilities

The Permittee described the conveyor systems that will be used to transport coal from the portals to the coal stockpiles.

Findings:

The Permittee has met the minimum regulatory 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:

Disposal Of Noncoal Mine Wastes

In Sec. 528.300 of the MRP the Permittee states:

Non-coal (non-waste rock) waste generated in the permit area will be temporarily stored in a dumpster to be situated at a convenient location within the disturbed area. This dumpster will be located adjacent to the office/bath house shown on Plate 5-2. This waste will be disposed of periodically through Carbon County at a permitted landfill.

Liquid wastes such as oil and solvents will be contained and disposed of or recycled, in accordance with applicable State and Federal regulations, at facilities that are permitted to accept such wastes. Small quantities of such wastes (e.g. resulting from cleanup or small spills, etc.) May be contained onto absorbent pads prior to disposal. In all cases, disposal and/or recycling will be only at sites that are permitted by appropriate regulatory authorities to accept such waste.

No non-coal (non-waste rock) waste will be permanently disposed of within the permit area other than, potentially, some durable rock-type construction materials such as cinder block, which may be disposed of underground. Non-coal (non-waste rock) waste will be temporarily stored at the site prior to permanent off-site disposal either in a dumpster or in the temporary waste-rock storage area. Off-site disposal will be only at sites that are permitted by appropriate regulatory authorizes to accept such waste.

It is currently anticipated that no non-coal waste that is defined as hazardous under 40 CFR 261 will be generated at the mine. If such waste is generated in the future, it will be handled in accordance with the requirements of Subtitle C of the Resource Conservation and Recovery Act and any implementing regulations.

The Permittee committed in Sec. 528.300 of the MRP to dispose of all non-coal waste in either in state approved landfill or in an on site disposal area. The Permittee has committed to dispose of all non-coal waste in an approved manner.

Coal Mine Waste

The Division defines coal mine waste as coal processing waste and underground development waste. Coal processing waste means earth materials separated from the coal during cleaning, concentrating, or the processing or preparation. In Sec. 528.300, the MRP states that the Permittee will not process their coal at the Dugout Canyon Mine beyond crushing.

The Division defines underground development waste as waste-rock mixtures of coal, shale, claystone, siltstone, limestone, or related materials that are excavated moved, and disposed of from underground workings in connection with underground coal mining and reclamation activities. In Sec. 528.200 of MRP, the Permittee states:

Underground development waste, which is generated at the Dugout Canyon Mine, will be temporarily stored at the mine site or permanently stored underground (Sec. 536.500) or buried at the Dugout Mine refuse disposal site (Sec. 536.200). [02242003]

Refuse Piles

Coal mine-waste consisting of shale, sandstone, and sediment pond waste will be stored in the refuse pile (Sec. 536.200). RA Attachment 5-4 and the MRP App. 5-7 contain laboratory analysis of waste material that is representative of the type of material to be disposed at the waste rock site:

- A 1995 analysis of the Rock Canyon Seam and the Gilson Seam, roof and floor.
- A 1998 analysis of waste rock.
- A 2001 analysis of sediment pond clean-out material.
- A 2002 analysis of rock from the Gilson Well development.

The Rock Canyon coal sample, the Sodium Adsorption Ratio, pH and Available Water Capacity are rated poor. Both the Rock Canyon and the Gilson Roof coal samples are sodic since the Exchangeable Sodium Percentages of both exceed 15% (i.e., 17% and 25%, respectively). The Gilson Seam coal and roof have little carbonate buffering capacity. The pulverized material has a texture of sand, sandy loam or loam.

Appendix 5.7 of the MRP contains the analytical results of waste rock samples taken in 1998. This waste also had little buffering capacity. This waste has a fair rating for Electrical Conductivity (EC = 4.36 mmhos/cm). The 2001 analysis of the sediment pond clean out material has a high EC (6.84 mmhos/cm) reflecting the probable use of salts on road surfaces during the winter.

The refuse pile has the capacity for 48,900 cu yds (72,600 Tons at a unit weight of 1.10 lb/ft^3) of coal mine-waste (RA Attachment 5-3). The life of the site is estimated at 15 years (Sec. 536.100) with a production of 5,000 Tons/yr. Geotechnical characteristics of this waste are described in RA Attachment 5-2. The waste has a Unified Soil Classification of GP-GM (gravel sand silt mixture).

A representative sample will be collected of every 2000 cu yds (or 2,970 Tons) to be analyzed for the full suite of parameters required by Table 6 of the 1988 Division Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining (Sec. 536.200). The full suite of parameters includes: Sodium Adsorption Ratio, particle size analysis, Total and Nitrate-nitrogen, % Organic Carbon, Exchangeable Sodium and Available Water Capacity. This rate of sampling amounts to 24 samples for the completed 6-acre site. This information would be best supplied with the Annual Report for the Dugout Canyon Mine site. [02242003]

The Dugout Canyon waste rock facility is also permitted to temporarily store high ash coal. [09/06/2006]

Impounding Structures

In Sec. 533 of the MRP the Permittee states:

There are two impoundments associated with the disturbed areas at the Dugout Canyon Mine. The largest of these is the mine site sediment pond located in Dugout Canyon. A slope-stability analysis, which was performed on this pond embankment, is provided in App. 5-4. According to this analysis, the minimum safety factors for the sedimentation pond embankment are 4.2 under static unsaturated conditions, 2.1 under static saturated conditions, and 1.6 under seismic saturated conditions. All analyses were performed assuming that the pond was full to its maximum design depth. These safety factors exceed the minimum requirements of R645-301-533.100.

The second impoundment is a sediment trap located at the southern end of the Pace Canyon fan portal disturbance. Appendix 7-12 contains the P.E. certified design for the Pace Canyon sediment trap.

Foundation Considerations

Soils investigations have been conducted at the site of the surface facilities. Results of these investigations are presented in Chapter 2 and App. 5-4 of this MRP. During these investigations, foundation conditions in the area of the sedimentation pond were evaluated. Based on these investigations, no conditions were encountered which suggested that the foundations upon which the pond would be constructed would be unstable. The slope-stability analyses presented in App. 5-4 indicate that the pond foundations will also be stable under operating conditions.

Prior to construction of the sedimentation pond, all vegetative matter and topsoil will be removed from the foundation area. Detailed cross sections of the sedimentation pond are presented on Plate 7-4 of this MRP.

Slope Protection

The outslopes and inslopes of the sedimentation pond will be revegetated following construction to minimize surface erosion and protect the embankments against sudden drawdown. The seed mix to be used for this revegetation effort is described in Sec. 34 1.200 of this MRP.

In the event of a storm, rapid drawdown in the sedimentation pond would be restricted to the vertical distance between the spillway and the peak water level, a distance of 0.20 foot (Plate 74). Draw down of this magnitude is not considered significant and, therefore, not of erosional concern.

During normal decant of the sedimentation pond, flow rates (and draw down) will be controlled. Hence, it is unlikely that this draw down will cause surface erosion of the embankment face.

Embankment Faces

Embankment inslopes and outslopes will be revegetated following construction of the sedimentation pond, as outlined in Sec. 533.300. Riprap will also be placed on the upstream face of the embankment near the discharge structure.

Highwalls

No highwalls will be located below the water lines of the sedimentation pond.

MSHA Criteria

Neither the mine site sediment pond nor the sediment trap located in Pace Canyon meets the size criteria of 30 CFR 216(a).

Pond Operation and Maintenance Plans

The sedimentation pond has been designed in accordance with R645-301-740. Details of these designs and the requirements for operation and maintenance of the pond are presented in Chapter 7 of this MRP. Appendix 7-12 contains the P.E. certified design for the Pace Canyon sediment trap.

The mine site sediment pond does not meet the criteria for being classified as an MS HA pond because the structure is less than 20 feet high, does not impound more than 20 acre-

feet nor is the sediment pond located where failure would be expected to cause loss of life or serious property damage. Sediment ponds that do not meet the MSHA criteria have fewer stringent design and performance standards.

The designs for the sediment pond and sediment trap are in Appendices **7-8** and 7-12 of the MRP. See also Plate 7-4. All designs and drawings are certified by a registered professional engineer.

The report on the slope stability analysis is in App. **5-4.** The engineer that did the analysis concluded that the minimum safety factors for the sediment pond embankment are 4.2 under static unsaturated conditions, 2.1 under static saturated conditions and **1.6** under seismic saturated conditions.

Stability during rapid drawdown is discussed in App. **5-4** of the MRP. The analysis indicates that the upstream slope of the embankment will be stable and have a safety factor of **1.6.**

Only the upstream slope was evaluated for stability during rapid draw down. The Permittee believes that when rapid draw down does occur failure will first occur on the upstream slope. The Division agrees with that belief and considered the rapid drawdown analysis adequate.

Burning And Burned Waste Utilization

In Sec. 528.300 of the MRP the Permittee states:

If coal mine waste fires occur at the Dugout Canyon Mine, they will be controlled in the manner outlined in the MRP.

Waste rock will only be temporarily stored at the surface of the Dugout Canyon Mine prior to ultimate disposal. If spontaneous combustion of this material does occur, the burning material will be removed from the pile using a backhoe or other appropriate means. The affected waste rock will then be spread so that the material can cool. The extinguished material will then be returned to the waste pile.

The plan to handle burning waste rock is adequate. The plan is similar to those used by other mines and the Abandoned Mines Land Program.

Return of Coal Processing Waste to Abandoned Underground Workings

The Permittee does not propose to return coal-processing waste underground.

Excess Spoil

In Sec. 512.200 of the MRP the Permittee states that they will generate no excess spoil from the permit area. The Permittee has met the minimum regulatory requirements for handling excess spoil.

Findings:

The Permittee met the minimum requirements of this section.

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

General

Underground mining and reclamation activities are planned to be conducted to minimize disturbance of the hydrologic balance within the permit and adjacent areas, to prevent material damage to the hydrologic balance outside the permit area, and to support approved postmining land uses in accordance with the terms and conditions of the approved permit and the performance standards of this part. The Division has not required additional preventive, remedial, or monitoring measures to assure that material damage to the hydrologic balance outside the permit area is prevented.

By defining terms, stating objectives, and identifying responsibilities, the Division's Coal Regulatory Program Directive Tech-004 (Tech-004) is meant to clarify the Division's position on what constitutes an appropriate monitoring program and provides methodology for consistently amending these monitoring programs. Under Tech-004, amendments to monitoring programs will be approved on a site-specific basis.

The monitoring plan at Dugout Canyon Mine conforms to the amended monitoring plan approved for the Soldier Canyon Mine, which is based on Tech-004. The amended Soldier Canyon Mine monitoring plan was approved in accordance with the procedure in Sec. 5E of Tech-004:

a. Canyon Fuel Company appears to be the owner of the surface in all areas where monitoring was stopped. Canyon Fuel Company also owns the water rights for the springs that have been removed from the monitoring plan. The only surface-water right involved that is not owned by the mine is upstream of the mine, beyond the area affected by subsidence, and the monitoring point on that reach of stream is to be replaced by one downstream, closer to the mine.

b. Historical quality data show that, except for some problem samples, a good cation anion balance exists with these data.
c. Data can be used in a regression analysis to demonstrate that conductivity correlates to the specific water quality of that site, as measured by TDS.
d. The site is not critical to the ongoing PHC determination.
e. Monitoring is no longer necessary to achieve the purposes set forth in the approved monitoring plan.
f. Subsidence monitoring information indicates that further subsidence is not likely and that future mining will not occur in adjacent areas that could affect these water sources.

Sites above and below the disturbed areas and discharge points of both the Soldier Canyon (G5, G-6, and G-10) and Dugout Canyon Mine (DC-1, DC-2, and DC-3) are monitored quarterly for flow and operational field and laboratory parameters.

Ground-water monitoring

Operational ground-water monitoring protocols are given on Table 7-4, and for the Refuse Amendment, in Sec. 731.200. Locations of wells and springs to be monitored are on Plate 7-1. Four springs are to be monitored for operational water quality and quantity: SC-14, SC-65, SC-100, and SP-20 (same as S-30). Water rights have not been filed on these springs. Operational ground-water quality parameters to be monitored at the Dugout Canyon Mine are listed in Table 74 of the MRP. They correspond with the operational parameters in Table 4 of Tech-004 except that total alkalinity and hardness are not included.

The springs will be monitored for 2 years for the parameters listed in Table 74, and then regular quarterly operational monitoring of the springs will be reduced to field parameters only: flow, pH, specific conductance, and temperature. This is one notable variation from the recommended schedule in Tech-004.

There are no ground water sites on the Pace Canyon fan portal area. The Permittee commits that no water will be discharged prior to obtaining the necessary UPDES permit. The Permittee has submitted a cover letter for the application to DEQ / DWQ for amending the in-place UPDES permit for the Dugout Canyon Mine (App. 7-6). The amending of the in-place permit will permit additional outfall(s) in Pace Canyon allowing Dugout Canyon to discharge to Pace Creek.

During the first "wet" year and first "dry" year following permit issuance, spring flows will be measured weekly between April 1 and August 31 as conditions permit, with the intent of preparing base flow hydrographs from the data. Wet and dry years will be defined based on snow-pack measurements as of March 1 for the Price-San Rafael area, with a wet year being the first year after permit issuance when the snow pack water content is greater than 110% of normal and a dry year being the first year following permit issuance when the snow pack is less than 70% of normal.

If the first 2 years of quarterly monitoring have not already included "wet" and "dry" years, then operational water-quality parameters for the springs will be determined semi-annually during the "wet" and "dry" years when they occur.

The Permittee selected SC-14, SC-65, SC-100, and SP-20 for monitoring because "These springs are reasonably accessible and, based on the historical data, are representative of conditions within their respective formations (p. 7-54). However, there is actually little historic data for these springs, and it is necessary to rely on data from the Soldier Canyon Mine and surrounding springs to extrapolate baseline information. Springs SC-14, SC-65, SC-100, and SP-20 will be monitored quarterly, when accessible, for at least 2 years, and water samples during this period will be analyzed for the parameters listed in Table 7-4 (p. 7-54).

There are flow data for SC-65 from July 1976, September and October 1995, August and October 1997, and June 1998. Water-quality data were determined for August 1997, and a few water-quality parameters were determined for July 1976. Flows were measured in 1995 at other Colton Formation springs: in September and October at SC-45, SC-46, SC-50, and SC-99, and in October 1995 only at SC-110 and SC-111, but water-quality parameters were not measured. Additional water-quality data for SC-65 are needed before mining disturbs this area, which will not be at least until such time as federal lease U-07064-027821 to the east is added to the permit area. This spring will be monitored quarterly, when accessible, for at least 2 years, and water samples will be analyzed for the parameters listed in Table 7-4 (p. 7-54).

SP-20 has data from 1976 to 1981 that includes both flow and quality determinations, but total iron and manganese are notably absent; total iron and manganese were included in water-quality data from September and October 1995 and August 1997 (S-30) and operational parameters were monitored in October 1997 (S-30) and June 1998. Nearby springs that also flow from the Flagstaff Formation, SP-15, SP-17, and SP-18, have data back to June 1976 that include some total iron and total manganese concentrations. Data are available to deduce water-quality conditions for the area around SP-20, but water-quality conditions specific to SP-20 need to be determined. This spring will be monitored quarterly, when accessible, for at least 2 years, and water samples will be analyzed for the parameters listed in Table 7-4 (p. 7-54).

For spring SC-14, there are flow data from September and October 1995 and June 1998, but there are no water-quality data. SC-14's flow is small but appears to be the largest from the North Horn Formation in the area. Nearby springs SC-15, SC-16, SC-16, and SC-17 that also issue from the North Horn Formation were dry when visited in 1995. SP-13, SP-16, SP-19, SC-87, and SC-102, other North Horn springs located within a few miles, were dry or had low flows or just seepage in 1995. There is basically no water-quality information for SC-14 or related springs. Additional water-quality data are needed before mining disturbs this area, which will not be until after the year 2001 according to the mining sequence shown on Plate 5-7 of the MRP. This spring will be monitored quarterly, when accessible, for at least 2 years, and water samples will be analyzed for the parameters listed in Table 7-4 (p. 7-54).

Spring SC-100 has flow data from September and October 1995, August and October 1997, and June 1998 but water-quality data for August 1997 only. Nearby springs SC-59, SC-82, SC-83, SC-84, SC-85, SC-104, SC-105, SC-114, and SC-115 (Flagstaff) and SC-101 (North Horn) have had low flows and no analyses for water quality. The USGS measured some water-quality parameters in nearby springs G-95, G-96, and G-97 in July 1980. Additional water-quality data are needed for SC-100 before mining disturbs this area, which will not be at least until such time as federal lease U-07064027821 to the east is added to the permit area. This spring will be monitored quarterly, when accessible, for at least 2 years, and water samples will be analyzed for the parameters listed in Table 74 (p. 7-54).

Tech-004 recommends that for springs, water-quality samples be analyzed for baseline parameters every fifth year. Page 7-56 includes a commitment to collect one water sample at each spring sampling point during low flow period every fifth year, during the year preceding re-permitting, to be analyzed for baseline parameters.

Water depth in wells will be monitored quarterly. Wells GW-10-2, GW-11-2, and GW-24-1 (all completed in the Castlegate Sandstone) and springs SC-65 (Colton Formation), SP-20 (Flagstaff Formation), SC-14 (North Horn Formation), and SC-100 (Flagstaff Formation at contact with North Horn Formation) will be used to monitor ground water conditions in the Dugout Canyon Mine permit area.

During Phase I construction in September 1998 ground water was discovered discharging from the old Gilson coal-seam workings on the east side of Dugout Canyon. This water had been seeping undetected through the alluvium and into the stream channel. Beginning in the fourth quarter of 1998, this water will be monitored at point MD-1, shown on Plate 7-1 (p. 7-56).

The Permittee has committed to submit all ground water monitoring data for the mine site by the end of the quarter following sampling. If analysis of any ground water sample indicates noncompliance with the permit condition, the Permittee will notify the appropriate regulatory agencies and take immediate appropriate action.

The groundwater monitoring outlined in the Refuse Pile Amendment Volume, Sec. 731.200 – Water Monitoring, has been modified per the Division request. Since DH-1 is screened within alluvial sediments, the Operator has committed to conducting water quality analysis for eight (8) consecutive quarters beginning in first quarter 2003, after which water quality analysis will be conducted once annually. The parameters to be analyzed are outlined in Table 7-4 of the currently approved M&RP. This commitment adequately addresses an earlier cited deficiency. [02242003]

Degasification wells G-1 through G-17 and G-19 have been approved to remove methane gas. Additional groundwater monitoring is not required in connection with the installation and operation of the methane degasification wells. The wells are designed not to intercept groundwater. In addition, after installation, the well holes are grouted to prevent groundwater from entering the casing. The degasification wells are designed to vent methane gas and do not

function properly if water is allowed to enter the casing. The Operational groundwater monitoring plan is adequate to determine impacts to groundwater resources as a result of mining activity including the installation and operation of methane degasification wells.

In March 2007 the Division approved a 40-acre addition to the Dugout Canyon Mine area. The addition allowed the Permittee to continue mining by accessing Federal Lease U-07064-027821. State Appropriated Water right #91-3033 was identified within the 40-acre addition. Water right #91-3033 allows for stock watering directly from the spring. The Permittee added the spring to the ground water monitoring program outlined on page 7-58 of the MRP. Water right #91-3033 is identified as spring site 259A within the text of the MRP and depicted on Plate 7-1, Hydrologic Monitoring Stations, as slated for active monitoring.

Surface Water Monitoring

Operational surface-water monitoring protocols are given on pages 7-57 through 7-59. Sites DC-1, DC-2, and DC-3, located above and below the disturbed areas, PC-1A and PC-2 in Pace Canyon, RC-1 in Rock Canyon, Fan, near the Pace Canyon Portal, and UPDES discharge points, are to be monitored quarterly for flow and operational field and laboratory parameters. Operational surface-water quality parameters to be monitored at the Dugout Canyon Mine are listed in Table 7-5 of the MRP. They correspond with the operational parameters in Table 3 of Tech-004 except that total alkalinity and hardness are not included.

In addition, DC-2, DC-3, DC-4, DC-5, PC-1A, PC-2, and RC-1 are to be monitored weekly between April 1 and August 31 during the first "wet" year and first "dry" year following permit issuance. Flows will be measured with the intent of preparing baseflow hydrographs from the data, and samples will be collected during the high-flow and low-flow seasons at DC-4 and DC-5 to be analyzed for tritium and operational water-quality parameters.

For surface water, Tech-004 recommends one water-quality sample at low flow every fifth year, either during the year preceding re-permitting or at midterm review, to be analyzed for baseline parameters. In addition to the regular monitoring, the MRP contains a commitment to collect one water sample at each sampling point during low flow period every fifth year, during the year preceding re-permitting, to be analyzed for baseline parameters (p. 7-59).

The surface-water monitoring outlined in Sec. 731.200 of the Refuse Pile amendment adequately addresses the surface drainage in the area. [02242003]

The Permittee continues to conduct the R645 required water-monitoring program for the permit area. There are no surface water sites on or next to the drill hole pad. The channels adjacent to the escarpment are ephemeral.

Additional surface water monitoring is not required in connection with the installation and operation of the methane degasification wells. The wells are designed to vent methane gas.

The wells are designed to prevent water from entering the casing. As such, the wells are designed to prevent surface water from entering the well holes. In addition, the wells are not designed to pump water to the surface. The Operational Surface Water Monitoring plan is sufficiently designed to detect impacts to surface water resources as a result of mining activity including the installation and operation of the methane degasification wells.

Acid- and Toxic-Forming Materials and Underground Development Waste

Parameters defining acid- and toxic-forming materials will periodically be monitored as described in Chapter 6 and 7 of the MRP indicate that acid- and toxic-forming materials are not present within the permit area. . In the event that acid- or toxic-forming materials are identified, they will be disposed at the refuse disposal site as described in Chapter 5 and the Refuse Amendment Volume of the MRP. If any acid- or toxic materials are identified, they will be covered with a minimum of 4-feet of cover.

Pace Canyon

The main channel in Pace Canyon is classified as an intermittent stream channel by definition of the regulations, although it functions as an ephemeral drainage. Stream buffer zone markers were installed along Pace Canyon Creek and adjacent to the side drainage above the new culvert. [09/06/2006]

Two coal mine waste piles remaining on the surface from the Snow Mine were sampled on April 1, 2005 for analysis as described in Sec. 513.400. This coal mine waste will be hauled to the Dugout Waste Rock site for final disposal. [04/21/2005]

Excavated material from shaft development will be used to develop the fan portal site pad, except that oxidized coal will be hauled to the waste rock site (Sec. 528.300) and for every 2000 cubic yards hauled, one sample will be taken for analysis as per Sec. 536.200 of the Waste Rock Amendment Volume. [04212005]

Waste rock will not be used during reclamation, and soil substitutes will be used only if their chemical and physical properties are determined to be adequate through appropriate analyses. [04212005]

Degas Well Sites [07/08/2004]

The typical degasification well design is shown on Figure 5-16. The well will be drilled to a depth twenty feet above the coal seam. Fragments of various rock strata will be brought to the surface with the air drill along with any water encountered. After drilling is completed, the mud pit will be allowed to dry and the drilling fragments will be mixed with the excavated subsoil from the mud pit. This practice will alleviate compaction, prevent the formation of a capillary barrier from the drilling mud, and reduce any potential concentrations of salinity or acidity.

Previous investigations have not found acid or toxic materials in the strata (Sec. 623 and App. 6-1 and 6-2). The Division requires that if a degasification well intercepts any ground water flow having a volume of fifteen gallons per minute or more, that the Permittee document that flow and depth as well as notify the Division. The Division does not expect there to be a problem with acid/toxic materials.

Transfer of Wells

Before final release of bond, exploration or monitoring wells will be sealed in a safe and environmentally sound manner. Ownership of wells will be transferred only with prior approval of the Division, and conditions of such a transfer will comply with State and local laws. Canyon Fuel Company will remain responsible for the management of transferred wells until bond release (p. 7-60).

Discharges Into An Underground Mine

In Sec. 513.600 of the MRP, the Permittee states that no discharges will occur from the surface to mine workings underground.

Gravity Discharges From Underground Mines

No gravity discharges will be made from an underground mine in the permit and adjacent areas (p. 7-60).

Water-Quality Standards And Effluent Limitations

Water quality standards and effluent limitations are being met through a variety of runoff treatment controls, which include a sediment trap and sedimentation pond and diversion structures to separate disturbed area runoff from disturbed areas. The Permittee has obtained a Utah Pollution Discharge Elimination System (UPDES) permit UT0025593, permitted by the Utah Division of Water Quality. Three discharge sites are located at the Dugout Canyon Mine facilities, two are for the mine discharges, outfall numbers 001 and 003. They are located on the upper end of the disturbed area, where they both discharge directly into the creek. The third site is located at the sedimentation pond discharge (outfall numbers 002). Mine water is discharged at an average rate of about 190 gpm. Mine water is not continuous, it is mechanically controlled and a function of the amount of water encountered in the mine and amount of water used or evaporated.

Effluent limitations and monitoring requirements are identified in the UPDES Permit in Appendix 7-6 of the MRP. Canyon Fuel Company is submitting all UPDES information to the DOGM Water Quality Database.

A series of sediment control structures control and contain sediment at the Dugout and Pace Canyon Mine's surface facilities to prevent off site impacts. Undisturbed runoff is kept from entering the disturbed area of the surface facilities via diversion ditches and culverts.

Contaminated runoff from the disturbed areas is captured and directed to the sediment pond or the sediment trap to be treated before it leaves the mine site. The sediment trap removes a high percentage of coal fines and sediment from the loadout area prior to discharging to the sedimentation pond. The calculations and design of sediment control structures presented in Appendices 7-8 through 7-12, these sediment control measures are designed using industry standards and what is generally considered the best technology currently available (BTCA).

Discharges of water from disturbed areas will be in compliance with all Utah and federal water quality laws and regulations and with effluent limitations for coal mining contained in 40 CFR Part 434 (p. 7-90). [09/06/2006]

Diversions: General

Dugout Creek and its eastern tributary is routed under the entire disturbed area in a 60-inch corrugated metal culvert. The culvert has been sized giving due consideration to the watershed runoff characteristics, including vegetation types, soil types, and the harvesting of timber above the mine site. The Division's calculations indicate the culvert is conservatively designed using minimum slopes resulting in a capacity 25.3% greater than the design event. There is a hydraulic jump energy dissipater at the downstream end of the culvert, which is designed to have a water exit velocity slightly less than the natural stream channel velocity. This should result in minimum erosion problems to the stream channel below the disturbed area.

Plate 7-5, and some of the other plates, showed a culvert at the extreme lower end of the disturbed area. Originally this culvert was shown as within the disturbed area, however, the disturbed area boundary was redrawn to exclude the culvert. This is logical since this culvert has already been installed and is part of the county road constructed by Carbon County.

A site visit by a Division Hydrologist showed that no significant impacts should result from the configuration of the energy dissipater installed as part of the disturbed area construction, the culvert under the county road, and the side canyon entering Dugout Creek between them. A field report, with photos, detailing this situation is filed in Folder two of the MRP.

The Permittee has developed designs to implement several diversion structures (culverts and a berm) on the surface facilities to direct and control runoff. Plate PC5-2 identifies the culverts and berms. The designs for the diversion ditches are in App. 7-12.

The fan portal facilities will be constructed adjacent to Pace Creek. The main channel will not be obstructed or lined with a culvert. Three culverts, PCUC-1 PCUC-2, and PCUC-3, will direct undisturbed runoff around or under the fan portal pad. Culvert PCDC-1 will be used to direct decanted flows and overflows from the catch basin to the stream channel.

Another culvert will direct mine water (UPDES) flows to the creek. The Permittee has labeled the culverts on Plate PC7-5.

Plate PC7-5 shows a berm that will run the length of the disturbed area above the canyon road. It should prevent disturbed area runoff from running onto the road or leaving the disturbed area. A berm circles the topsoil pile and contains its runoff. Any flow from fan portal area will be collected by the berm, then directed to catch basin. The Permittee submitted designs and calculations for the berm on March 30, 2005. Design calculations have been provided for the berm in App. 7-12.

The Permittee has provided plans to show containment of sediment for degasification well pads. The operator will construct a designed berm to control and contain sediment on the well pad site. A silt fence will be installed at the lower end of the pad to filter sediment prior to any flow leaving the site. The Permittee has provided designs for a containment berm. The designs are shown in Attachment 7-1. In addition, the Permittee has provided the hydrologic calculations for the design and sizing of the berms and silt fences to be utilized at the methane degasification well sites (See Attachment 7-1).

Degasification drill holes

Degasification drill holes are being constructed above the mine to access and release methane gas within the coal seam, so dangerous explosive gasses can be pumped out of the mine. During initial drilling, the sites will be graded to ensure that storm runoff will flow towards the berms surrounding the drilling pad area. The berm will direct runoff to the lowest point within the pad area where a silt fence and/or straw bales will be used to treat runoff. The silt fence and/or straw bales will be inspected periodically to maintain functionality. Berms will be used around the topsoil stockpile to contain runoff on site. The Permittee has provided designs for a containment berm around the topsoil stockpiles. The designs are shown in Attachment 7-1. The Permittee has provided the hydrologic design calculations for the sizing and construction of the silt fences and berms to be utilized at each of the methane degasification well sites.

A culvert will be installed above drill pad G-12 to direct flows from an adjacent drainage under the canyon road to Pace Canyon creek. The Permittee has provided calculations for the culvert. The calculations appear to be complete. [09/06/2006]

Stream Buffer Zones

Stream buffer zones are designated and markers will be placed adjacent to Dugout and Pace Canyon Creeks within the disturbed area noted on Plate 5-2A. Each buffer zone marker will be a design that can be easily seen and read, will be made of durable material, will conform to local regulations, and will be maintained until after the release of all bonds for the permit area. Page 5-21 further delineates stream buffer zone marker locations and inter-visibility between signs.

Stream buffer zone markers are not needed for site G-7; there are no stream channels near the site.

Stream buffer zones were implemented at well sites G-11, G-12 and G-17. [09/06/2006]

Sediment Control Measures

Dugout Canyon

Measures to control sediment include the main sedimentation pond, containment berms, silt fences, and straw bales. The runoff and sediment control plan has been designed to ensure the operations within the disturbed area should not cause or contribute to degradation of water-quality or the stream channel quality.

Pace Canyon Fan Portal

Sediment control at this site is being achieved using alternate sediment control measures, which include contemporaneous reclamation, using clean gravel on pads and roads, silt fences and a sedimentation pond (the Permittee likes to call it a sedimentation trap. The sediment pond has a containment capacity of 5000 cu-ft (0.115 ac-ft). The Permittee discharges from the same UPDES permit UT0025593, site 005. Other measures to control sediment include the main containment berms, silt fences, straw bales and gravel/riprap protection. The runoff and sediment control plan has been designed to ensure that the operations within the disturbed area should not cause or contribute to degradation of water-quality outside the disturbed area. Riprap calculations have been submitted along with a cross-section for PCUD-2 showing a filter and graded riprap to a depth of 1 foot. Plates PC5-2, PC7-4, and PC7-5 show the locations where riprap will be placed.

Plate 5-2 shows the location of three water bars on the dirt road bisecting the fan portal site. The water bars will divert water off the road. There will be a minimum amount of traffic on the road. It is used occasionally by ranchers and some mine personnel accessing the upper elevations for degasification well work. The low traffic frequency will result in minimal disturbance and less erosion of the road surface. One water bar will be placed above the site and will divert undisturbed runoff coming down the road into Pace Creek. Two other water bars will be placed at about 200' intervals below the upper water bar. The runoff generated on the road could be diverted to the silt fences. [09/06/2006]

Methane Degasification Wells

The MRP meets the requirements for the Operational Plan Sediment Control Measures to be utilized during the installation and construction of the methane degasification wells per R645-301-742. The Permittee has committed to installing water bars as needed in order to direct flow

off of access roads. Once the flow is directed off the roads, silt fences or straw bales will be utilized to treat the runoff.

The Permittee has committed to minimizing the amount of generated sediment, runoff and suspended solids from the well site area and access roads with the utilization of silt fences, berms and straw bale dikes. In addition, the Permittee commits to not performing construction activities during major precipitation events.

The application discusses the sediment control measures to be used for the drilling pads on pages 7-9 and 7-10. The Permittee proposes to retain sediment within the disturbed area of the drilling pad by utilizing silt fences and/or straw bales dikes. During initial drilling, the sites will be graded to ensure that the generated runoff will flow towards the berms surrounding the pad. The berms will direct the runoff to the lowest point(s) within the pad area where a silt fence and/or straw bale dike will then treat the runoff. A berm will be placed at the top of the pad's cut slopes to divert runoff around the disturbed area. In addition, a berm and silt fence will be installed at the toe of the fill slope.

After drilling operations are completed, the pad will be re-graded to cause the runoff to flow towards a silt fence and/or straw bale dike. (See Attachment 5-1 for pad layout designs). The Permittee has committed to inspecting the silt fences and/or bale dikes periodically and removing accumulated sediment as needed to maintain functionality. The sediment removed from the structures will be piled on the pad and be used for fill during final reclamation of the well site.

The mud pits will be dismantled and filled following the completion of drilling.

Siltation Structures: General

The sedimentation ponds are the main siltation structures for the mine site. They are discussed below under sedimentation pond.

Pace Canyon Fan Portal

As mentioned, the Fan Portal is still under construction. Plans provide in the MRP, Appendix 7-12 show the disturbed contained within a berm to keep it contained and away from the road. The road is a county road. The outslope of the road is riprapped and reinforced with a rock wall. The Permittee has placed a silt fence below those structures to trap sediment. The silt fences will remain throughout mining. [09/06/2006]

Methane Degasification Wells

The MRP the Operational Plan requirements for Siltation Structures: General for the methane degasification wells as provided in R645-301-742.212. The Permittee commits to

utilizing berms, silt fences and straw bale dikes to treat runoff. The Permittee has committed to installing siltation structures prior to beginning construction.

The Methane Degasification Amendment provides calculations and design considerations for the relative berm heights and silt fence dimensions for three areas of the pad: the pad stockpile, the upper road stockpile and the lower road stockpile. The berms were designed by utilizing the Soil Conservation Service (SCS) method for calculating peak flows. The SCS method incorporates generalized loss-rate and runoff relationships developed from watershed studies in the United States. A total runoff volume was calculated for the pad area utilizing a 10-year, 24-hour rainfall event as required by state regulations (Other Treatment Facilities--R645-301-742.230). Berm dimensions were then calculated to contain the design storm event for each of the three areas outlined above.

The Permittee provides the calculations utilized in determining the proper silt fence and berm sizing to handle the 10-year, 24-hour storm event in Attachment 7-1 of the Methane Degasification Well amendment.

Siltation Structures: Sedimentation Ponds

Dugout Canyon Mine

Although the disturbed area has been made larger, the surface hydrology aspects of the area remain basically the same. That is, the sediment pond is at the lowest end of the site and the ditches and culverts are in the same locations. The disturbed drainage areas and undisturbed drainage areas changed somewhat, generally becoming larger. The runoff curve numbers remained the same as previously approved.

The pond was designed using the appropriate 10-year, 24-hour design event. The primary spillway was designed using the appropriate 25-year, 6-hour event. Water exit velocity is below that of the natural stream flow. There is a separate emergency spillway which discharges into Dugout Creek with appropriate riprap protection. The emergency spillway was designed using the appropriate 25year, 6-hour event. The pond has a decant with valve control and the pond has adequate sediment storage and storm event volume. The Permittee has committed to pond construction.

Siltation structures in the main facilities area consist of a concrete sediment trap and a sediment pond. The concrete sediment trap is designed to remove in excess of 65% of all solids from the disturbed area runoff before the water enters the main sedimentation pond. The sediment trap, constructed in series with the main pond, was implemented in order to reduce the sediment load to the sedimentation pond as well as reduce the cleaning. The sedimentation pond will fully contain the runoff from the 10-year/24-hour storm event and will adequately pass the 25-year/6-hour precipitation event through the emergency spillway. During the midterm site visit the sedimentation pond was observed. The pond appeared intact and sound.

Pace Canyon Fan Portal

Canyon Fuel Company plans to use alternate sediment control measures to control sediment control at the Pace Canyon Fan Portal. It will achieve this by using contemporaneous reclamation, clean gravel placed on pads and roads, silt fences and a sediment trap (which is just a small sedimentation pond). The sediment trap is intended as an extra measure of protection for sediment control. Hydrology calculations and sedimentation pond sizing calculations are provided in Appendix 7-12 of the Pace Canyon Fan Portal Amendment. The sediment trap is designed to hold all of the 10-yr, 24-hr storm event or 0.71 inches. The sediment trap's spillway is designed to pass the 25-yr, 6-hr storm event. The spillway consists of an 18 inch CMP for a maximum outlet velocity of 7.2 fps.
Refuse Pile

The sedimentation pond located at the refuse pile has an open channel spillway that will discharge to an un-named channel reporting to Clarks Valley. Undisturbed runoff is diverted around the refuse pile site. Plate RA7-1 shows the diversions on the refuse pile site. Pond sizing calculations are provided Appendix 7-12. Total containment berms encircle the two topsoil piles and will hold all of the runoff from a 10-yr, 24 hr precipitation event. [09/06/2006]

Siltation Structures: Other Treatment Facilities

Measures to control sediment include the use of berms, water bars, a culvert(s), and silt fences.

Siltation Structures: Exemptions

ASCA's are disturbed areas which cannot use retention time / settling as a means of sediment concentration reduction (i.e., use of a pond or sediment trap is not possible). Other methods such as vegetation, silt fences or straw bales, berms, roughening, gravel or other accepted measures are used to control sediment pickup and transportation from small areas. ASCA's include outslopes of ditches and ponds, outcast slopes of roads and other small disturbed areas.

ASCA areas are discussed on pages 7-69 to 7-71 and are shown on Plate 7-8. ASCA-1 is a small paved road surface below the sediment pond. ASCAs 2 and 3 are sections of the road above the main disturbed area, which cannot drain to the sedimentation pond. These are appropriately handled using silt fences and straw bales in the ditches and riprapped outlets for the culverts. ASCA-4 is a small area at the uppermost end of the road above the disturbed area and it is handled using gravel surfacing.

The fan portal area has an outslope area below the road that does not drain to the catch basin. The permittee has committed to control runoff from this area with vegetation and silt fences / straw bales. [09/06/2006]

Discharge Structures

There are discharge structures to accommodate flows from the sediment pond primary spillway and emergency spillway as well as discharges from the mine itself. All of these discharges have been designed using the appropriate design event, to have water velocities below that of the natural stream, and to be protected from erosion.

There is a large hydraulic jump energy dissipater at the downstream end of the Dugout Creek culvert, which is designed to have a water exit velocity slightly less than the natural stream channel velocity. The energy dissipater is over 56 feet long and nine feet wide with two- to three-foot thick rock lining. This should result in minimum erosion problems to the stream channel below the disturbed area.

Culvert PCDC-1 will convey runoff from the sediment trap to Pace Creek. This culvert is the sediment trap spillway.

The degasification well sites will not have any discharge structures. Runoff from the degasification well sites will be treated by silt fences or straw bales.

Impoundments

- In Sec. 533.600 of the MRP the Permittee states that the sediment pond does not meet the size criteria of 30 CFR 216(a).
- Richard White a registered professional engineer certified the designs for the sediment pond.
- The embankment stability study for the sediment pond is in App. 5-4.

In Sec. 533.200 of the MRP the Permittee states:

The Permittee has conducted soil investigations at the site of the surface facilities. Results of these investigations are presented in Chapter 2 and App. 5-4 of this MRP. During these investigations, the Permittee evaluated foundation conditions for the sedimentation pond. Based on these investigations, the Permittee encountered no conditions, which suggested that the pond's foundations would be unstable. The slope-stability analysis presented in App. 5-4 shows that the pond foundations will also be stable under operating conditions.

Prior to construction of the sedimentation pond, all vegetative matter and topsoil will be removed from the foundation area. Detailed cross sections of the sedimentation pond are presented on Plate 74 of this MRP.

In Sec. 533.300 of the MRP the Permittee states:

The outslopes and inslopes of the sedimentation pond will be revegetated following construction to minimize surface erosion and protect the embankments against sudden draw down.

The analysis presented in App. 5-4 indicates that the upstream slope of the embankment will be stable under conditions of rapid draw down (minimum safety factor of 2.0).

In Sec. 533.500 of the MRP the Permittee states that no highwalls are below the water lines of the sediment pond. The Division agreed with that statement and concluded that the Permittee has met the minimum requirements of R645-301- 533.500.

In Sec. 514.300 of the MRP the Permittee states that:

Regular inspections will be made during construction of the sedimentation pond as well as upon completion of construction. These inspections will be made by or under the direction of a registered professional engineer experienced in the construction of similar earth and water structures.

Annual inspections of the sedimentation pond will continue until removal of the structure or release of the performance bond. A certified report of inspection will be prepared by a qualified registered professional engineer and submitted to the Division within two weeks after each inspection. The report will discuss any appearances of instability, structural weakness or other hazardous conditions, depth and elevation of any impounded waters, existing storage capacity, and existing or required monitoring procedures and instrumentation, and any other aspects of the structure affecting stability. A copy of this report will also be maintained at the mine site.

No impoundments within the permit area are subject to 30 CFR 77.216.

The Permittee has committed to meet the requirements of R645-301-514.311 to 8645-301514.313. Inspections will be done during the critical phases of construction and copies of the reports will be available on site. A qualified registered professional engineer will inspect the pond annually.

Casing and sealing of wells

Procedures for casing and sealing, capping, backfilling or otherwise properly managing drilled holes, exploration holes and boreholes, and wells are discussed on pages 5-68, 6-18, 7-69, 7-90, and 7-91.

The Permittee committed to plugging degasification wells G-11, G-12, G-13, G-14, G-15 G-16,G-17 and G-19 using the requirements mandated under 43 CFR 3484.1, (3). Wells G-3, G-4 and G-6 were plugged using standard plugging cement. The Division recommended to the Permittee that Type V, sulfate resistant cement be utilized for sealing the annulus of the well

upon its completion, and for bore plugging during reclamation activities for the first fifty feet above the placed well plug.

Hydrologic Balance Protection

Information provided by the Permittee indicates no water will be consumed for this operation. Mine water discharge has been addressed in the MRP for the Dugout Mine.

The Permittee has addressed this section by submitting plans to route and control undisturbed and disturbed runoff over the fan portal site.

Several places in the MRP reference a mine water discharge to Dugout Creek. These include pages 7-49, 7-52, 7-69, and the UPDES Permit Appendix. Commitment is made to provide erosion protection if the discharge is outside of a culvert. In order to meet the coal regulatory program monitoring requirements, the Permittee will have to define where and how the samples will be taken. The Permittee is cautioned that this needs to take into account the MSHA and related safety issues attendant to the sampling. Four silt fences were placed across Dugout Creek before installation of the culvert was begun. As described on p. 5-44, these are to remain in place until after all initial construction is completed. The same protection is provided at reclamation.

Several places in the MRP reference the use of straw bales as shown in Figure 5-4 for sediment control. The method the operator will use to orient and place the straw bales will conform to the more current technology.

Plate 7-5 shows the appropriate riprap protection for the outlets of Culverts DC-8 and DC-9.

Appendix 7-9, p. 20 shows most of the ditches in the disturbed area are concrete lined which is optimal for erosion protection. Some less-steep sections do not need concrete and are riprap lined.

The Probable Hydrologic Consequences were evaluated, on March 6, 1998. The B LM sent a letter to the Utah Division of Water Rights identifying several concerns with the Dugout Mine stream alteration permit. While most of the concerns were administrative in nature, one of the issues raised was the possible interruption of groundwater recharge due to culverting the stream over a 1970-foot length. This has been determined not to be significant problem for the following reasons.

Examination of the Geologic Map of Pine Canyon Quadrangle shows the formation in the mine disturbed area is the Blackhawk Fm., which is made up of sandstone, siltstone, and shale. It is underlain by the Mancos Shale. All of these formations have low rates of transmissivities and specific conductivity.

There are two faults on the entire quadrangle. One is 300 feet long and the result of cliff face slumping while the other is located two miles northeast of the disturbed area on the outer edge of the Dugout Creek drainage. There are no faults in the disturbed area where the culvert will be placed. There are two vertical joints in the disturbed area, but since there is no displacement, they are not believed to contribute to water infiltration.

The dip of the strata is 6 degrees to the north, while the stream flow is to the southwest. This is consistent with the Castle Gate potentiometric surface as shown on Plate 7-3 of the mine plan, which shows the gradient of the surface sloping to the north-northwest. The Castle Gate formation is above the Blackhawk. There are no known regional aquifers in the area.

There is alluvium in the stream channel at the mine site; it is thin and not shown on the geologic map. Quaternary alluvium and pediment gravels are noticeable at 1500 feet downstream from the disturbed area. The Dugout Creek drainage area above the confluence with Grassy Trail Creek (near Utah Highway 6) is over 43 square miles or 27,520 acres, as compared to the mine disturbed area of 10.4 acres. Similarly, the culvert will occupy 1,970 feet of the over 9.5 miles, or 50,160 feet, of stream channel between the mine and Grassy Trail Creek.

Water will not be lost as it passes through the culvert. The water will be returned to the natural stream channel at the outlet where it will continue to recharge the groundwater in the area. There is no evidence to suggest that the reach of stream occupied by the culvert is of special significance to such recharge. Interestingly, other studies, such as Wadell, and Price and Plantz show considerable variation in streams gaining and losing flow with water stage as they cross the Blackhawk formation. Similar variation is found with the base flows contributed to the stream by springs above the mine site.

USGS has monitored a site at the lower end of the disturbed area for several years. Unfortunately, no monitoring was done above the site to define whether the disturbed area is a gaining or losing section. From the initial submission, the Mining and Reclamation Plan has in it, plans to monitor above and below the site to determine a gain-loss hydrograph. One set of observations was made on August 27, 1997 (the driest time of year), which showed the flows above and below the disturbed area to be exactly the same.

The overall view is that the culverted reach of stream is of very minor consequence when compared to the recharge mechanism for any springs that may issue from the Mancos shale downstream of the mine disturbed area. Similarly, the streamflow in Dugout Creek is not expected to suffer any significant impacts. The Permittee has provided calculations and maps to establish design flows for the fan portal site. Plate PC7-6 identifies the undisturbed watersheds (PCWS-1, PCWS-2, PCWS-3and PCWS-4) where runoff will accumulate and flow through culverts (PCUC-1, PCUC-2 and PCUC3) shown on Plate PC7-5.

Ponds, Impoundments, Banks, Dams, and Embankments

- Plate 7-4 shows the sediment pond design. The plan was certified by Richard White, a registered professional engineer.
- The Permittee gave the Division certified maps, and cross section of the sediment pond. Plate 7-4 shows detailed information about the sediment pond.
- Plate 5-7 shows the areas where the Permittee anticipate subsidence. On that plate the sediment pond is outside the area of potential subsidence.

Findings:

Information provided in the application is considered adequate to meet the requirements of this section of the regulations.

SUPPORT FACILITIES AND UTILITY INSTALLATIONS

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

Analysis:

Support Facilities

The Permittee committed to construct, operate, maintain and reclaim all support facilities as required by the SMCRA and the Utah coal program.

Water Pollution Control Facilities

The Permittee committed to construct, operate maintain and reclaim all water pollution control facilities as required by SMCRA and the Utah coal program.

Findings:

The Permittee met the minimum requirements of R645-301-526 with regard to support facilities.

SIGNS AND MARKERS

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

Analysis:

Mine and Permit Identification Signs

A mine and permit identification sign will be displayed at the point where the county road ends and the private road forks into the surface-facilities area. This sign will be a design

that can be easily seen and read, will be made of durable material, will conform to local regulations, and will be maintained until after the release of all bonds for the permit area. The sign will contain the following information:

- Mine name,
- Company name,
- Company address and telephone number,
- MSHA identification number, and
- Permanent program permit identification number as obtained from the Division.

The Permittee committed to place the mine and permit identification signs at all entrances that are accessible from a public road.

Perimeter Markers

The perimeter of all areas affected by surface operations or facilities will be clearly marked before beginning mining activities. The markers will be a design that can be easily seen and read, will be made of durable material, will conform to local regulations, and will be maintained until after the release of all bonds for the permit area. Figure 5-2.

Buffer Zone Markers

Stream buffer zone markers will be placed adjacent to Dugout and Pace Canyon Creeks within the disturbed area noted on Plate 5-2. The buffer zones will be located at eh upstream and downstream ends of the Dugout culverts. Each buffer zone marker will be a design that can be easily seen and read, will be made of durable material, will conform to local regulations, and will be maintained until after the release of all bonds for the permit area. Buffer zones are also established at degasification well sites, when those sites are in close proximity to perennial or intermittent streams.

The Permittee states in Section 731.600 that stream buffer zone markers will be placed at sites G-11, G-12, G-15 and G-19. In Section 731.600, the Permittee indicates that buffer zone markers will be established adjacent to a perennial stream. The stream channel adjacent to boreholes G-11 and G-12 is intermittent, which require the same standards for perennial streams. Stream buffer zone markers should be placed along channels if the channel is defined as intermittent. The definition of intermittent stream is as follows: the stream is intermittent if the area above the pad site is greater than one square mile (under R645-301-100). The size of the water shed adjacent to the drainage by degasification well G-12 is less than a square mile so the drainage is not intermittent (by definition). However, since the drill pads are adjacent to Pace Canyon Creek, whose drainage area is greater than a square mile (making it an intermittent stream channel, by definition). A buffer zone is required unless waived by the Division. The Division will allow surface disturbance within less than 100 feet to the tributary to Pace Creek located adjacent to methane degasification well G-19. Due to the steep topography in the area, it is not possible for the Permittee to place the degas well further upslope away from the stream. In addition, tributary does not appear to have a watershed greater than one square mile and thus not

'intermittent' by definition. Furthermore, the Permittee has provided the design layout and hydrologic calculations that call for containment berms and silt fences to be installed and maintained at the site, thus minimizing the potential for sediment to enter the drainage.

The Division hereby grants a waiver to allow the Permittee to establish a buffer zone less than 100 ft. once buffer zone markers are established. The Permittee will have to place buffer zone markers adjacent to the roadway identifying a protected area so disturbance, after construction is controlled. The Permittee has shown in Chapter 5, figures in Attachment 5-1, that sedimentation structures will be used to minimize impacts to the stream. The Permittee will be required to keep equipment out of the creek and place some markers adjacent to the roadway to identify the area as a buffer zone. [09/06/2006]

Topsoil Markers

Markers will be placed on all topsoil stockpiles. These markers will be a design that can be easily seen and read, will be made of durable material, will conform to local regulations, and will be maintained until after the release of all bonds for the permit area.

Findings:

The Permittee has met the minimum regulatory requirements.

USE OF EXPLOSIVES

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

Analysis:

General Requirements

In Sec. 524 of the MRP the Permittee states:

Mining and reclamation activities at the Dugout Canyon Mine may require the use of blasting or explosives on the surface during construction of the surface facilities. Permittee will comply with all local, State, and Federal laws in the use of explosives during construction of the site and at any other times when blasting is required at the Dugout Canyon Mine. A certified blaster will direct all blasting operations with the help of at least one other person. The Permittee will ensure that all appropriate contractors working on any project at the site are made aware of proper blasting procedures. All blasting records will be kept on file at the mine for the required period of time.

All explosives containers used at the mine will be constructed to meet or exceed the requirements of the Mine Safety and Health Administration. The surface storage containers (one for caps and one for powder) will be place in a location that will ensure the protection of the environment and personnel (Plate 5-2). The containers, which will rest on skids, will be constructed of 1/4 to ½-inch steel plate with a lining of ½-inch plywood. Each storage container will be secured with a five-tumbler padlock and will contain two vents measuring approximately 3 inches by 3 inches.

A small metal utility trailer will be used for transportation of explosives underground. This trailer will be lined with plywood, with separate compartments for caps and powder. No metal parts will be exposed to the caps or powder. All underground blasting activities at the mine will be conducted under the direction of a MSHA certified blaster.

The Permittee indicates in Chapter 5, Sec. 524, Blasting and Explosives, p. 5-28 that it may be necessary to use explosives during the construction phase of the Pace Canyon facilities. An airshaft approximately seventy feet in depth and twenty feet in diameter was developed to connect the underground mine workings with the ventilation fan ducting located on the surface. This was developed using explosives.

Page 5-28, Blasting and Explosives of the application indicate that the mining and reclamation plan contains two blasting plans. These are located in Appendixes 5-8 and 5-9 of the MRP. Neither of the plans is for airshaft development.

R645-301-524 indicates that "for the purposes of underground coal mining activities, R645-301-524.100 through 524.700 apply to surface blasting activities incident to underground coal mining, including, but not limited to, initial rounds of slopes and shafts." The Pace Canyon Air Shaft will be developed in native sandstone of the Blackhawk formation. The total depth of the shaft will be approximately seventy feet; the hole will be developed by drilling and blasting. The top twelve feet of material to be removed (initial rounds) is under the jurisdiction of the Division, specifically R645-301-524.

The Permittee's anticipated blast design for the Pace Canyon fan shaft development is located in App. 5-9.

Findings:

The Permittee met the minimum 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 Permittee has met the requirements of R645-301-521.141 by giving the Division Plate 5-7 that clearly shows the boundaries of all affected areas over the estimated total life of the coal mining and reclamation operations. The Permittee has supplied several maps and figures that depict the boundaries of the well site.

In Sec. 523 of the MRP the Permittee states that mining will begin in 1998. The dates on Plate 5-7 show that the Permittee plans to mine from 1998 until 2020.

Before permitting the life-of-mine affected area the Permittee wants to learn more about the mining conditions in the permit area. If mining conditions are favorable, the Permittee will apply for expanding the permit boundary.

The Permittee has supplied several maps that show the disturbed area boundary of the fan portal site.

Mining Facilities Maps

Plate 5-2 shows the location of the surface facilities. The Division considers this map adequate for describing the surface structures. Plate PC5-2 shows the location of the surface facilities in Pace Canyon.

Mine Workings Maps

The maps that show the mine workings are considered adequate.

Monitoring and Sampling Location Maps

Locations and approximate elevations of boreholes are shown on Plate 6-1. Collar elevations, some estimated from topographic maps, and elevations of cored sections are given in App. 6-1.

Elevations and locations of monitoring stations used to gather operational water quality and quantity data are depicted on Plate 7-1.

There is no permanent wildlife monitoring sites. Habitat enhancement, the riparian area along Dugout Creek, is shown on reclamation maps.

No map of air quality monitoring sites has been required by the Division.

Certification Requirements

Cross sections, maps, and plans have been prepared by, or under the direction of, and certified by a qualified, registered, professional engineer.

Findings:

The information submitted by the Permittee meets the minimum regulatory requirements of the regulations.

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.

Analysis:

There are discussions throughout the MRP on ripping, gouging, incorporating hay during gouging, or mulching. Areas recommended for fertilizer application will receive fertilizer by cyclone spreader, hydroseeder, or other equipment. The reclamation plan does not include irrigation. The Division does not anticipate the necessity to irrigate as long as the Permittee uses water-harvesting methods, such as gouging. [05052005]

The Permittee did not have any general comments about the engineering requirements in the reclamation section of the TA. All engineering comments about the reclamation plan were given in other sections of the TA. All engineering topics of the reclamation plan were addressed by the Permittee.

During reclamation of the Pace Canyon fan portal site two drainages will be affected. The access road that traverses the disturbed area will cross both of these. The Permittee will place culverts in the road during mining operations, but remove them at reclamation, since they are considered a temporary structure. The channels will be reconstructed so that a swale will provide access and direct flow through the channel. Designs and cross-sections are shown in App. 7-12.

The Permittee will reclaim the refuse pile area and associated sediment pond. All engineering maps related to the reclamation of the refuse pile are P.E. certified. The refuse pile will have a 3H:1V outslope. The final controls can be seen on Figure 5-3. The Permittee has submitted a timetable to reclaim the refuse pile area. This is on RA Figure 5-1. The table is labeled "Months From Start of Reclamation". The project from start to finish of this project would take almost 24 months. This would be an extremely long time to complete this project. Page 5-21 explains in detail for having the 24 months reclamation period for the refuse pile area. [02242003]

A detailed reclamation plan for the well sites is presented in Sec. 540. Upon the permanent cessation of methane venting the operator will seal the wells and permanently reclaim all affected areas in accordance with the regulations. No structures will remain. A timetable for reclamation is presented in Figures 5-15.

Findings:

The Permittee has met the minimum regulatory requirements of this section.

POSTMINING LAND USES

Regulatory Reference: 30 CFR Sec. 784.15, 784.200, 785.16, 817.133; R645-301-412, -301-413, -301-414, -302-270, -302-271, -302-272, -302-273, -302-274, -302-275.

Analysis:

The postmining land use will be livestock grazing and wildlife habitat. The plan says final reclamation activities, such as grading and seeding, will be completed in a manner to provide lands able to support the post lining land use. Slopes in Pace Canyon will be returned to 2h:1v with small sections of slopes as steep as 1.6h:1 (Sec. 553.100). Plates 5-3 and 5-4 show numerous cross sections where slopes are steeper than 50% in Dugout Canyon. Many of the slopes are considered too steep for livestock grazing. In developing a grazing management plan for the Randolph unit, the Bureau of Land Management produced suitability tables based on slope percent and slope length. They found any slopes steeper than 50% (2h:lv) were unsuitable for grazing. Plates 5-3 and 54 show numerous cross sections where slopes are steeper than 50%. The Permittee justifies the slope lengths and steepness by saying they are similar to the surrounding area. The Division recognizes the premining area has steep slopes; however, given the land use and the unstable condition of the area until vegetation establishment, steep slopes should be confined to upland areas and should not be in the riparian zone (riparian zone as defined in Plate 3-lA and subsequent Division field measurements).

Much of the disturbed area was previously mined and not reclaimed to the current standards.

Using current definitions, previous mining activities can be classified as having disturbed or just affected the land. Exploration activities occurred on the site in the 1980's and then again in the 1990's. No topsoil was saved in initial development. However, adequate substitute material should be available to make up the difference as growth medium.

Roads exist (prior to current mining) through the permit and disturbed areas. These roads will remain for the postmining land use. The plan says the Dugout Canyon road has a width of 16 to 25 feet within the disturbed area. The reclaimed road will also have a width of about 16 feet. The Pace Canyon road will be returned to its original location and have a width of 15 feet.

The Bureau of Land Management, State of Utah and the Thayn Trust own lands in the disturbed areas. Appendix 4-2 contains letters from the State and the BLM concurring with the postmining land use and the Surface Agreement with the Thayn Trust. [04212005]

Findings:

Information provided in the proposal is considered adequate to meet the requirements of this section of the regulations.

PROTECTION OF FISH, WILDLIFE, AND RELATED ENVIRONMENTAL VALUES

Regulatory Reference: 30 CFR Sec. 817.97; R645-301-333, -301-342, -301-358.

Analysis:

The MRP meets the requirements of R645-301-342 and R645-301-358 because the Permittee provides adequate enhancement and protection measures for fish, wildlife, and habitat during the reclamation or post-mine phases. The Permittee will adhere to the regulations aimed to protect TES, eagles, and raptors from mining impacts (in reference to R645-301-358). [05052005]

Findings:

The Permittee has supplied information to meet the minimum requirements for the Protection of Fish, Wildlife and Related Environmental Values section of the regulations.

APPROXIMATE ORIGINAL CONTOUR RESTORATION

Regulatory Reference: 30 CFR Sec. 784.15, 785.16, 817.102, 817.107, 817.133; R645-301-234, -301-412, -301-413, -301-512, -301-531, -301-533, -301-553, -301-536, -301-542, -301-731, -301-732, -301-733, -301-764.

Analysis:

The site was disturbed before the passage of SMCRA. There are no detailed topographic maps of the pre-disturbed site. The Permittee will not try to restore the site to the pre-mining topography. Instead the Permittee plans the reclaimed site so it will blend into the surrounding area. The Division has determined that the topography of the reclaimed site will be similar to the surrounding area. Therefore, the reclamation plan meets the approximate original contour requirements of Sec. R645-301-531, R645-301-533, R645-301-536, and R645-301-542.

The fan portal area is relatively small at 2.7 acres. At mine closure the fan portal area will be reclaimed back to approximate original contour. Channels will be recontoured and protected from erosion. Plate PC5-5 identifies the configuration of channel PCRD-1. Plate PC7-5A shows the different areas that will be stabilized via the following methods; gouging / reseeding, mulching, and riprapping. The Permittee has provided riprap calculations for the

reclaimed channel PCRW5-2. Plates PC5-2, PC7-4 and PC7-5 show the locations where riprap will be placed.

The natural drainage pattern at the degasification well sites will be restored to approximate original contour.

Due to a request by the surface landowner (the heirs of the Milton Thayn Trust), the well pads associated with degasification wells G-11 and G-12 were not reclaimed to AOC, but were left flat to facilitate the construction of facilities for the Thayn's cattle business. One pad was to be used as a turnaround area; the other pad was used for the construction of a corral. The Division required the Permittee to apply for a post-mining land use change for these two small areas, in order to be able to relinquish them prior to meeting the Phase III bond release requirements. The remaining methane degasification wells will be reclaimed to approximate original contour after degasification activities are completed.

Findings:

The Permittee has supplied sufficient information to meet the minimum regulatory requirements of the regulations.

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:

General

The engineering requirements for the backfilling and grading requirements of the reclamation plan are stated in R645-301-537, R645-301-552, and R645-301-553.

- R645-30 1-537 deals with regraded slopes that need special Division approval for alternative specification of if steep cut slopes are to be retained.

In Sec. 537 of the MRP the states:

No mining or reclamation activities will be conducted in the permit area that require approval of the Division for alternative specifications of for steep cut slopes due to the inability of the Permittee to meet the regulatory requirement of R645-537.100.

R645-301-537.100 deals with steep cut slopes. Usually retained steep cut slopes are associated with road cuts. All roads in the disturbed area will either be retained or be fully reclaimed. The designs for all retained roads have been certified by a professional engineer to

meet the performance standards. The Division has determined that the designs for the retained roads are adequate. No cut slopes will be associated with the reclaimed roads. The Permittee did not request for that alternative specifications be used for steep cut slopes. Therefore, the Division has not granted any variances from standard backfilling and grading requirements due to the retention of steep cut slopes. The Permittee has met the minimum requirements of this section.

R645-301-537.200 applies to settled and revegetated fill. Under certain condition settled and revegetated fills do not have to be regraded during reclamation to achieve AOC. The Permittee states that they will grade all settled and revegetated fills at the site. The Permittee has not applied for a waiver from the AOC requirements based on the settled and revegetated fills exemption. Therefore, the Division has not granted any variances from the standard backfilling and grading requirements due to settled and revegetated fill. The Permittee has met the minimum requirements of R645-301-537.200.

- Sec. 552 deals with small depression and permanent impoundments.

R645-301-552 deals with permanent features such as small depression and permanent impoundments. The Permittee will leave small depression to retain moisture, minimize erosion, create and enhance wildlife habitat, or assist revegetation. No permanent impoundments will be left after reclamation. The Division encourages the Permittee to leave small depression on the regrade slopes to aid in revegetation and slope stability. The Permittee has met the minimum requirements of 8645-301-552.

- In Sec. 553 of the MRP the Permittee states that the backfilling and grading plan are presented in Sec. 542.200.

In Sec. 542.200 of the MRP the Permittee states:

The Dugout Canyon regrading plan was designed to meet the objectives of balancing cut and fill quantities, maintaining a geotechnically stable base. The primary features of this plan are:

- Removal of the pad upon which surface activities will be constructed at the mine, thereby creating a slope, which will adequately drain while minimizing long-term erosion concerns
- Backfilling to remove highwalls within the objectives noted above (cut and fill balance, site stability, and erosion control)
- Construction of stable channels across regraded areas
- Placement of topsoil
- Revegetation and mulching of the topsoiled site
- Removal of the sedimentation pond (together with accompanying regrading, topsoil, revegetation, and mulching of the sedimentation pond area) and implementation of interim sediment-control measures

Plates 5-5 and 5-6 show the reclaimed surface and cross sections in Dugout Canyon. The plates show that the pad area will be removed. The adequacy of the slopes to control erosion will be discussed in the hydrology section of the backfilling and grading plan.

Preexisting highwalls exist at the site. In Section 553.100 of the MRP, the Permittee states that the backfilling and grading plans have been designed to eliminate highwalls at the site. In Section 553.500 of the MRP, the Permittee restates his commitment to reclaim all preexisting highwalls. In Section 553.600, the Permittee states that the reclamation plan has been designed to eliminate all preexisting highwalls.

Chapter 5, Sec. 553.100 Disturbed Area Backfilling and Grading, p. 5-75, paragraph five discusses the general backfilling and grading criteria that will be implemented in the reclamation of the Pace Canyon fan portal area. "In Pace Canyon reclaimed slopes will be at a 2H:1V slope or less over most of the site. However, there will be some small areas where the slope may be up to 1.6H: 1V. This will only occur in areas where the reclaimed surface ties into an undisturbed area with a slope greater than 2H: 1V."

In Sec. 553.600, the Permittee states that if during reclamation field conditions show that all available materials are not sufficient to eliminate the existing highwalls without exceeding the performance criteria outlined in the MRP small section of highwalls may be retained. The Permittee states that before any highwall retention the Division approval will be obtained. The Division realizes that field conditions may require the Permittee to modify the approved reclamation plan. Should the Permittee request to leave part of the preexisting highwalls during reclamation the Division will evaluate that request. The Permittee met the minimum requirements of R645-301-553.120.

The channel stability will be discussed in the hydrologic section of the backfilling and grading plan.

The Division reviewed the slope stability analysis in App. 5-4. The results of the Permittee's slope stability analysis show that reclaimed slopes as steep as 1:1.5 is stable under all likely circumstances. The Division conducted a slope stability analysis based on the Permittee's data and assumptions. The results of the Division's stability analysis were consistent with the Permittee's analysis.

Findings:

The Permittee met the minimum requirements of this section.

MINE OPENINGS

Regulatory Reference: 30 CFR Sec. 817.13, 817.14, 817.15; R645-301-513, -301-529, -301-551, -301-631, -301-748, -301-765, -301-748.

Analysis:

A detailed description plan for sealing underground openings is given in Sec. 542.700 of the MRP. In Sec. 542.700 the Permittee states:

All mine openings will be sealed at least 25 feet inside the mine opening. Prior to installation of the seal, all loose material will be removed from the roof, floor, and rib of the mine within 3 feet of the seal area. The seal will then be constructed using solid concrete blocks (average minimum compressive strength of 1,800 psi) with nominal dimensions of 6 inches high, 8 inches wide, and 16 inches long. Mortar will consist of one part cement, three parts sand, and no more than 7 gallons of water per sack of cement.

The two openings in Pace Canyon will be sealed and backfilled according to Chapter 5, p. 5-49. "Material such as subsoil and rock generated during construction of the shaft and portal at the Pace Canyon Fan Portal site will be used to construct the site. This material will be used to backfill the portal and shaft during reclamation."

The seal will be recessed at least 16 inches deep into each rib and 12 inches deep into the floor. No recess will be made into the roof. In the bottom course, each block will be laid with its long axis parallel to the rib. The long axis in succeedingly higher courses will be perpendicular to the long axis of the blocks in the preceding course. An interlaced pilaster will be constructed in the center.

The seals will have a thickness of approximately 16 inches. Following seal construction, the entries will be backfilled from the seal to the outside surface with soil that is sloped at the surface to match the final slope at the entry. The soil will then be raked and revegetated with the approved seed mixture.

Alternatively, a cast-in-place MSHA approved, seals will be installed with a minimum thickness of 3 feet and a minimum compressive strength of 200 psi.

Under R645-301-551 the Permittee is required to seal and backfill all mine openings. The seals and backfilling requirements must be consistent with MSHA, 30 CFR 75.1771. The backfilling and seal plan meets those requirements.

Reclamation of the methane degasification wells is addressed in Chapter 5; Sec. 540 RECLAMATION PLAN, Sec. 550, RECLAMATION DESIGN CRITERIA AND PLANS, and Sec. 560, PERFORMANCE STANDARDS.

The sealing of wells involves meeting the minimum regulatory requirements associated with R645-301-765. Page 7-13, **Chapter 7, HYDROLOGY**, section **748, Casing and Sealing Wells,** refers one to **Chapter 5, ENGINEERING**, section **542.700**, **Final Abandonment of Mine Openings and Disposal Areas.** Page 5-13 states, "Degas drill holes G-9 thru G-12 will be sealed in accordance with Federal Regulations 43 CFR Chapter 11, Subpart 3484, (3) per a decision by the BLM and UDOGM. The casings on degas well sites G-2 thru G-7 will be

plugged at the bottom to hold concrete. A lean concrete mixture will be poured into the casing until the concrete is within five (5) feet of the surface. At that time, the casing will be cut off at ground level and the rest of the casing will be filled with lean concrete. The concrete will be allowed to harden before the final reclamation is completed."

The Task ID #2455 application received on March 17, 2006 indicates that the Permittee feels that it is necessary to leave one degasification well bore open after that section of the Mine is sealed to be able to vent pressurized methane gas from the sealed area. If this well bore is not allowed to remain open, excessive combustible gas pressures may cause in the mine seals to exhale, allowing increased percentages of methane gas to further raise the combustible gas content of the ventilating currents in the mine. This increases the hazard potential for the underground workers. The Division agrees that one degasification well bore shall be left open, in order to reduce the levels of pressurized methane gas which may build within a gob area. The Division also feels that if a well bore begins to pull air into the casing and the sealed mine area, action should be taken to plug the well bore as quickly as conditions permit.

Findings:

The Permittee met the minimum regulatory requirements of this section.

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-240.

Analysis:

Chapter 2, Soils, Sections 240 through 250, discusses the soil's reclamation plan for the Dugout Canyon Mine. Appendix 2-6 provides information on topsoil volumes. Chapter 5, Sec. 542.200, and Chapter 3, Sec. 341.200, address slope stability and erosion control, respectively. Reclamation Topography is shown on Plate 5-5 and Reclamation Cross- Sections are shown on six sheets of Plates 5-6. This Analysis section discusses reclamation information as follows:

- Soil Redistribution
- Soil Nutrients and Amendments
- Soil Stabilization

Soil Redistribution

Dugout Mine Facilities Canyon

Cut and fill calculations for the site is found on p. 5-61 and App. 5-5. An estimated 99,630 CY are needed for fill and an estimated cut quantity is 97,575 CY. This leaves a difference of 2,055 C Y of fill.

Topsoil will be replaced on all areas with slopes less than 2:1 (p. 2-38). Based on the 28, 455 CY of salvaged soil (App. 2-6) and 14.7 acres or 640,332 sq ft to receive topsoil, the average soil redistribution will be a depth of 14.4 inches as stated on p. 2-39 of the MRP. However, the soils salvaged from the culvert expansion, 1,568 CY, were included in the soil redistribution depths, but should not have been, since these soils will be returned to the reclaimed channel area. This reduces the reclamation topsoil depth to 13.6 inches. (26,887 CY x 27 CF/CY = 725,949 CF. 725,949 CF x 640, 332 SF = 1.13 ft or 13.6 inches.) If the underlying material is suitable, these soil depths will allow for the implementation of surface roughening reclamation techniques, such as deep pocking, or gouging of the soil surface without penetrating the subsurface fills. Should the additional 6,504 CY of topsoil substitute material become available during reclamation, the topsoil depth would increase to approximately 16 inches. If excess soil is available after channel reclamation, then these excess soils may be used else where in the disturbance area.

Where dictated by the reclamation channel design, riparian soils (1,568 CY salvaged and stored separately) will be placed within the interstitial spaces of the riprap to promote riparian vegetation establishment. Soils placed outside the riprap areas will be reseeded following soil preparation and surface.

As noted in the backfilling and grading section of the engineering review within this Technical Analysis, all slopes should receive topsoil (R645-301-553.100). Any areas that will not receive topsoil should be identified on the Reclamation Topography Map, Plate 5-5.

Soil will be replaced in all disturbed areas (except the road) in Pace Canyon (Plate PC5-6). In Pace Canyon 1.5 acres will be revegetated. Soil stockpiled at the Pace portal site will be moved using a Cat D8 dozer. Soil Stockpiled at Soldier Canyon storage site will be loaded with the Cat 325 excavator and hauled using 12 CY dump trucks (App. 5-6 Reclamation Bond Estimate). [04212005]

Refuse Site [02/24/2003]

Section 242.100 and RA Attachment 2-2 outlines four feet of cover (3.5' of subsoil and 0.5' of topsoil) over the refuse pile. This will require approximately 32,073 cu yds of subsoil and 4,582 cu yds of substitute topsoil (total of 36,700 cu yds of soil). The remainder of the site (9.92 acres) will be covered with six inches of substitute topsoil (7,610 cu yds). In fact, approximately 1.5 acres of the refuse pile will receive greater than six inches of topsoil under this plan, as the plan for recovery of 13,775 cu yds will satisfy the requirement for 12,583 cu yds of substitute topsoil with excess.

Prior to redistribution, the substitute topsoil will be sampled and analyzed for pH, EC, total Carbon, SAR, Phosphorus, Nitrate-nitrogen and water holding capacity (Sec. 243).

Where operations have created compaction, the ground will be ripped to a depth of 1.5 to 2.0 feet (Sec. 242.200). The plan indicates on p. 2-14 (Sec. 242.200) that the surface of the reclaimed refuse pile will be ripped prior to placement of soil and again after placement of the

first lift of subsoil. The second ripping will be to a depth of twelve inches and will serve to eliminate an abrupt boundary between the two layers, promoting rooting into the refuse.

The substitute topsoil will be spread using track-mounted equipment only. Erosion will be controlled with gouging (Sec. 242.200) and 1 Ton/acre hay incorporation as described in Sec. 341.200 (p. 3-11).

Pace Canyon Site [05/25/2005]

Soil will be replaced in all disturbed areas (except the road and beneath the topsoil stockpiles) in Pace Canyon (Plate PC5-6). In Pace Canyon, 1.5 acres will be revegetated. Soil stockpiled at the Pace portal site will be moved using a Cat D8 dozer.

Topsoil will be removed from the stockpile locations down to the fabric markers. The native soil will be gouged, mulched, and seeded (Plate 5-6C). Removal of the culvert during reclamation of the ephemeral channel (PCRD-1) beneath the south stockpile will result in portions of the channel being reconstructed with rock (D_{50} = 3 inch). Reconstructed portions of the channel will be tied into the undisturbed pre-existing ground, as the re-established channel will follow the pre-existing course. Reconstruction of PCRD1 is described in Sec. 762.100 of the MRP.

Degas Well Sites [07312007]

The reclamation timetable is shown on Figures 5-15 and 5-26. Unless otherwise specified, sites will be reclaimed in one phase after methane venting ceases. The well sites will be graded, topsoiled, roughened, seeded, and mulched (see Figures 5-4, 5-8, and 5-12). Topsoil replacement depth for each site is listed in Table 2-3. Delays in well plugging will occur as described in Sec.242.100.

The plan describes the reclamation of the drilling mud pits in Section 242.100. The mud pit will be allowed to dry and will be filled with soil that will be compacted to minimize settling. There will be mixing of the cover material with the rock fragments and sediments of the mud pit to avoid creating an abrupt boundary between the layers.

The plan indicates the sites will be ripped to a depth of eighteen to twenty four inches (Section 242.100 and 341.200) to reduce compaction.

Topsoil will be re-spread using a trackhoe. The soils will be handled when loose and friable (not too wet, not too dry), see Section 242.100. Redistribution thickness is shown in Table 2-3.

Reclamation of the AMV road will not take place until final reclamation of sites G-18 and G-31. Section 542.100 suggests that the timeframe for "each major step in the reclamation plan" could be found in figure 5-12 (should be 5-15 or 5-26). Figure 5-26 indicates the weeks to completion from the start of reclamation activities. The Table in Attachment 5-2 indicates the planned year for contemporaneous reclamation work to begin for all but two sites, which will be

retained indefinitely. Final reclamation dates for three wells (G-3, G-4, G-6) have been documented.

Soil Nutrients and Amendments

Soil nutrients and amendments will be applied to the redistributed soils based on analyses of samples collected from the stockpiled topsoil as compared with baseline information.

Soil Stabilization

Soil may be replaced at grades of up to 1.5h:lv (p. 5-70). The steepness of these slopes will be reduced at their base, providing a concave slope. Soil stabilization techniques also include ripping the subsoils (p. 2-39), gouging all slopes 3H:1V or greater after topsoil application (2-40 and 576) and hydro mulching the seeded surface (p. 2-41 and 3-44 and 3-50). Slopes that are 3h:lv or steeper will be gouged using a trackhoe (p. 5-70).

Findings:

The information provided meets the regulatory 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:

All roads in the disturbed area will be retained as part of the Postmining land use or fully reclaimed. The main road will be reclaimed by removing the pavement. All other roads in the disturbed area will be reclaimed according to the backfilling and grading plan. The dirt roads outside the disturbed area will only be used for access to monitoring and data collection sites. The Division determined that since the dirt roads outside the disturbed area existed before the permit was issued and that mining activities will have a small impact that the dirt roads outside the disturbed area do not need to be reclaimed. The only paved road outside the disturbed area is a county road. The Division does not permit public roads. Therefore, the Division will not require the County or Permittee to reclaim the county road.

The dirt road in the disturbed area will be reclaimed. No cut slopes from the dirt road will be left.

The main haul road will be modified and left as part of the postmining land use. The Division determined that the road was needed to support the postmining land use and that the designs for the road are adequate. Therefore, the Permittee met all the requirements of this section.

Access roads constructed for the installation and operation of methane degasification wells will be reclaimed after methane venting has been completed.

Findings:

The Permittee met the minimum requirements of this section.

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

Analysis:

Ground-water monitoring

Reclamation ground-water monitoring protocols are given along with the operational monitoring protocols on pages 7-52 through 7-56. Locations of wells and springs to be monitored are on Plate 7-1. Groundwater monitoring during the post-mining period will continue until bond release p. 7-56. See the discussion of Ground Water Information under Baseline Information in the Environmental Resource Information section. No groundwater monitoring sites exist on the fan portal area. No ground water monitoring sites exist in the vicinity of the degasification well sites.

During the post-mining period field data and water samples will be collected from springs SC-65 (Colton Formation), SP-20 (Flagstaff Formation), and SC-14 and SC-100 (Flagstaff Formation at contact with North Horn Formation) once each year during September or October (low-flow season while the sites are still accessible).

Water levels will be measured in wells GW-10-2, GW-11-2, and GW-24-1 (all completed in the Price River Formation or the underlying Castlegate Sandstone) once each year. Exploration or monitoring wells are planned to be sealed before final bond release, but if ownership of the wells is transferred the Permittee will remain responsible for the management of the wells until bond release (p. 7-60).

Surface-water monitoring

Data will be collected from the sedimentation pond discharge point in accordance with the UPDES permit. Data will be collected under the surface water-monitoring program every year until bond release (p. 7-59). Locations of surface-water monitoring sites are on Plate 7-1.

Acid and toxic-forming materials

Several areas of the MRP text describe the fact that there have never been acid or toxic-forming materials discovered within the permit area. These text references include Chapter 6, Geology, Chapter 5, Engineering, and Chapter 7, Hydrology. Based upon that information, it appears this is not a problem at the G-7 site. If any acid or toxic forming materials are identified, they will be disposed of at the refuse site and covered with a minimum of four feet of soil.

Transfer of wells

Before final release of bond, exploration or monitoring wells will be sealed in a safe and environmentally sound manner. Ownership of wells will be transferred only with prior approval of the Division, and conditions of such a transfer will comply with State and local laws. Canyon Fuel Company will remain responsible for the management of transferred wells until bond release (p. 7-60).

Discharges into an underground mine

No discharges of surface water will be made to an underground mine in the permit and adjacent areas (p. 7-60).

Gravity discharges

No gravity discharges will be made from an underground mine in the permit and adjacent areas (p. 7-60).

Water quality standards and effluent limitations

Discharges of water from disturbed areas will be in compliance with all Utah and federal water-quality laws and regulations and with effluent limitations for coal mining contained in 40 CFR Part 434 (p. 7-86).

Diversions

All corrugated metal culverts are removed during reclamation and the canyon is restored to its approximate original contour. The stream reclamation plan is covered on pages 7-92 through 7-100, and in App. 7-11. The basic plan is to line Dugout Creek and its main eastern tributary reclamation channels with riprap to form a stable "macrochannel". The required 100-year, 6-hour design event was used to size the channels. The channels are eight feet wide and three feet deep resulting in 1.9 feet of freeboard. The riprap is two feet thick

with filter blankets sized to the underlying soil. Filter design will be finalized at reclamation to base the design on soils present at that time since there will be a mixture of soils during reclamation. Estimated riprap and filter quantities are contained in the appendix.

In addition, there will be a series of 29 " Channel Stability Enhancement Structures", to provide a "microchannel" environment to increase sediment deposition above the macrochannel. These are shown in Fig. 7-12 and are spaced about every 60 feet along the channel. Three types are employed: Low-Stage Check Dams, Bank-Placed Boulders, and Rock or Log Spurs. The overall impact of the stream reclamation will be to provide a channel that is significantly improved over that which was left by pre-SMCRA mining and a channel that will promote riparian revegetation. It should be noted that no fish have been found in Dugout Creek.

Page 3-21 presents a mitigation plan for the 7,500 feet of stream bank, above the mine's disturbed area that will be reseeded and planted. This is consistent with the typical 3: 1 mitigation for such projects and will result in immediate and long-term benefit to the stream.

The second phase of the plan extends the length of Dugout Creek to be reclaimed and includes additional side channels, but the methods remain the same.

All corrugated metal culverts in Pace Canyon will be removed during reclamation when the Canyon is restored to its approximate original contour. Disturbed areas along stream channels will be rebuilt. The Permittee has been asked to evaluate the expected velocities where the stream channel has been disturbed to see if they should be riprapped. The required 100-year, 6-hour design event was used to size the channels.

The overall effect of the stream reclamation will be to provide a channel, which is a significant improvement over that which was left by pre-SMCRA mining. The channel design will promote riparian revegetation. It should be noted that no fish have been found in Pace Creek.

Stream buffer zones

The stream buffer zone, which was established by the Permittee prior to the development of the Pace Canyon site will be maintained to keep mining activities out of the stream. The permittee will maintain the stream buffer zone markers through Phase III bond release of this site.

Sediment control measures

The sediment control measures during reclamation include silt fences and straw bales, which are considered adequate when used as described. Removal of the sediment pond is primarily filling in an excavation. However, since reclamation will be every bit as large a project as the construction of the site, the Permittee has committed to similar sediment control

measures. Specifically, the minimum of four silt fences at the lower end of the site will be used.

Siltation structures

The only siltation structure in Dugout Canyon is the sediment trap, silt fences and straw bales, which is described in the next section. The pond will be removed at reclamation.

At reclamation, the Permittee will remove the sediment trap and recontour the site. The Permittee plans to use straw bales, silt fences, mulching and surface roughening to treat / capture any sediment generated during the revegetation process.

Sedimentation ponds

R645-301-542.400 and R645-301-542.500 state the requirements for sediment pond reclamation. Under the requirements in R645-301-542.400 the Permittee is required to remove all temporary sediment structures and ensure that all permanent structures are in good working condition. Under the requirements of R645-301-542.500, the Permittee is required to supply a timetable for the removal of each sediment pond.

Figure 5-3, Reclamation Timetable, shows that the sediment ponds will be removed after most of the reclamation activities have been completed. Most of the reclamation work that will be done after the sediment ponds have been reclaimed involve reclaiming the sediment ponds themselves.

Other treatment facilities

The Permittee will use gouging, mulch and reseeding, to establish vegetation. These will control erosion and minimize the contribution of sediment to the stream channel during and after reclamation.

Exemptions for siltation structures

This does not apply to this project.

Discharge structures

The Permittee does not propose to have surface waters discharge into underground mine openings. The backfilling and grading plans do not show water flowing into the mine openings. The Permittee met the requirements of this section. No discharge structures or impoundments will exist at the fan portal site after it has been reclaimed.

Impoundments

The Dugout Mine has a sediment pond, and two sediment traps located within the main mine facilities, and a sediment trap associated with the Pace Canyon fan portal facilites. See the section on sediment ponds.

Casing and sealing of wells

When no longer needed for monitoring or other use approved by the Division and upon a finding of no adverse environmental or health and safety effects, or unless approved for transfer as a water well, each well will be capped, sealed, backfilled, or otherwise properly managed as required by the Division. Permanent closure measures will be designed to prevent access to the mine workings by people, livestock, fish and wildlife, machinery and to keep acid or other toxic drainage from entering ground or surface waters (p. 7-97). There are no wells associated with the Pace Canyon fan portal.

The Permittee commits to sealing the methane degasification wells and permanently reclaiming all affected areas upon the permanent cessation of methane venting activities (See Page 5-12 of the Methane Degasification Amendment).

Findings:

Reclamation hydrologic information provided in the MRP is considered adequate to meet the requirements of this section.

CONTEMPORANEOUS RECLAMATION

Regulatory Reference: 30 CFR Sec. 785.18, 817.100; R645-301-352, -301-553, -302-280, -302-281, -302-282, -302-283, -302-284.

Analysis:

General

Experience gained from development of Degas Well site G-3 indicates that the lifespan of the vent boreholes may be fairly short (less than one year). Therefore the degas well sites will be fully reclaimed in a single operation upon cessation of methane venting (Sec. 341), rather than a two stage reclamation plan previously described. [07/08/04]

The Permittee plans to reclaim all disturbed areas as contemporaneously as possible within the constraints of seasonal weather.

Findings:

The Permittee has supplied information to meet the minimum requirements for the Contemporaneous Reclamation section of the regulations.

REVEGETATION

Regulatory Reference: 30 CFR Sec. 785.18, 817.111, 817.113, 817.114, 817.116; R645-301-244, -301-353, -301-354, -301-355, -301-356, -302-280, -302-281, -302-282, -302-283, -302-284.

Analysis:

Revegetation: General Requirements

The MRP meets the requirements of R645-301-330, R645-301-331, and R645-301-332 because the Permittee provides an adequate reclamation plan or discussion of how reclamation measures will meet the performance standards. [05052005]

Reclamation for the G1-7 sites includes hydro seeding with slurry that contains a small amount of fiber. The seed mix is in the Vol. Labeled Methane Degasification Amendment, (Table 3-2). The vegetation survey results for G1-6 were positive for *Bromus carinatus* (California brome), but not for *Bromus marginatus* (mountain brome). The Permittee may want to request California brome instead of mountain brome depending on availability and cost.

Revegetation: Timing

Figure 5-3 shows the general reclamation timetable. The earthwork and revegetation practiced will occur nearly simultaneously until completion. The schedules for planting are during normal planting seasons. Traditionally, seeding is done in the fall with planting done in the spring. However, recent experience at another mine has shown that transplanting in the fall can be very successful.

Revegetation: Mulching and Other Soil Stabilizing Practices

Areas being reclaimed will be graded to final contours then ripped to six to twenty-four inches on approximately four-foot centers. Next, topsoil will be spread and left in a roughened state, and fertilizer will be applied. Where possible, a ripper-equipped tractor will be used to incorporate the fertilizer. Where the slope is too steep for this equipment, the fertilizer will be incorporated with the teeth of a trackhoe bucket. Where contour ripping is not possible, the slopes will be pocked with a trackhoe. The Permittee has eliminated the plan to use dozer tracking, and this satisfies condition 21 of the March 16, 1998, permit.

The plan contains three seed mixtures. The seed mixes have been changed in accordance with requirements in condition 20 of the March 16, 1998 permit. Every species in these mixtures is native to Utah, and they should provide vegetation that meets the performance standards, including the requirement that they have value for wildlife.

Section 322.200 shows a seed mix to be used in a mitigation area upstream of the mine. While some of the species in this mix are introduced, these aggressive species are needed to stabilize the very steep slopes below the logging road.

A type of hydromulch called Ecofiber was used at the rate of one ton per acre in the mitigation area upstream from the mine. The Permittee received verbal approval to use this mulch based on the plan that says wood fiber was used for bonding.

Grass and forb seeds will be drilled where possible; otherwise, the seed will be broadcast. All slopes steeper than 3h:lv will be broadcast seeded. Although both drilling and broadcast seeding are acceptable, the Division has seen very good results with carefully controlled broadcast seeding and recommends this method. Drilling tends to reduce surface roughness.

Methods for establishing vegetation in the riparian areas are discussed in the "Riparian Restoration and Planting" section below.

Following seeding, disturbed areas will be mulched with a Division-approved mulching material. For bonding calculations, wood fiber mulch applied at the rate of 2000 pounds per acre was assumed. The Permittee has eliminated the plan to use erosion control matting. This fulfills the requirement of condition 24 of the March 16, 1998 permit.

Wood fiber mulch is generally more expensive to apply than some other mulch, so using this for bonding calculations is acceptable. However, before actually applying mulch, the Permittee will need to have the specific mulch approved by the Division. It is expected mulch will be applied during interim revegetation as early as the fall of 1998.

Under "Irrigation, Pest and Disease Control, " the plan says no irrigation is planned and pesticides will not be used unless previously approved by the Division. In the discussion on riparian area planting, it says an irrigation program will be considered if the cottonwoods are planted as transplants. The topsoil storage area at the Soldier Canyon Mine will be treated to attempt to control cheatgrass.

Riparian Restoration and Planting

The Permittee plans to restore Dugout Creek using a concept of macro- and micro-channels.

The macro-channel will be a riprapped (D_{50}=12") channel 8 to 12 feet wide. The micro-channel within the macro-channel is approximately 3 feet wide and 1 foot deep. The micro-channel will be developed by establishment of 3 types of in-stream structures spaced about every 60 feet. The structures are thought to trap sediment, which in turn will allow vegetation establishment. These structures are low stage check dams, bank-placed boulders, and rock or log spurs. Figure 7-12 shows typical drawings of these structures, and Plate 7-9

illustrates where they will be placed. This satisfies the requirements of condition 17 of the March 16, 1998, permit.

Stream banks will be seeded with the Final Reclamation Seed Mix #2 (Sec. 341.200). Trees and shrubs will be planted as specified in the mixture. According to specifications in the plan, the following plantings should occur.

Narrowleaf cottonwoods and Rocky Mountain maples will be planted on the top of the bank at the rate of approximately 500 per acre. This will provide an 8-foot distance between individuals that will be 2 deep (wide).

The Permittee has committed to plant willows at the rate of 4000 per acre. Assuming the area in which they would be planted is about five feet wide on each side of the stream, this would equate to a spacing of about one cutting every two feet. However, the Permittee has qualified this commitment since the entire stream area may not be available for planting. Experience at other mines has shown that only part of the stream channel is available for planting immediately after reclamation and that more areas become available as silt accumulates in the channel. The application indicates the commitment to plant 4000 willows may not be met immediately after reclamation but that the Permittee will consult with the Division about how many willows can be planted. The commitments in the plan, including the sections that area qualified, are acceptable, and this satisfies condition 16 of the March 16, 1998, permit.

Sedge and horsetail plugs will be planted at the rate of 1000 per acre. Species of sedges to be used will need to be determined based on availability and what species are present in the area.

The mid- to upper bank zone will be planted at a rate of 2250 plants per acre, which is the equivalent of 4.4-foot spacing. Species to be used include woods rose, currant, snowberry, elderberry, and serviceberry. The width of this zone varies widely through the length of disturbance.

These planting densities are recommended by the NRCS. Figure 3-1 illustrates the various planting zones within the riparian area, top of channel, reclaimed slope, and top of riprap. This figure has been modified in accordance with the requirement of condition 18 of the March 16, 1998 permit. Because of the use of in-stream structures, most plantings will need to be done in clumps in the most favorable locations along the reclaimed channel rather than at specific intervals along the full length. Nevertheless, it will be necessary to have some plantings even away from the structures.

The plan does not say specifically what type of plant material will be used to establish cottonwoods, but either seedlings or pole plantings could be used. Seedlings should be large enough that they would have an influence on the riparian area after ten years. If poles are used, the Permittee commits to have them be long enough to reach the water table and at least 1-3 inches in diameter. While the level of the water table is not known, the Permittee commits to drill periodic holes to find this level so the poles can be planted deeply enough. These

commitments satisfy the requirements of condition 19 of the March 16, 1998, permit. Enough of the poles should be left above ground so they will be above the surrounding vegetation. Two to twelve year old wood (non-furrowed, smooth bark) is best. The most important factor is to place the pole eight to ten inches below the summer (lowest) water table.

In the designs provided in the application, the Permittee has adequately responded to condition 15 of the March 16, 1998, permit.

Revegetation: Standards For Success

The Permittee will follow the sampling requirements and analysis identified in the Division's "Vegetation Information And Monitoring Guidelines" (Vol. 1, Sec. 356). Table 3-3 shows the reclamation-monitoring schedule. The Permittee will conduct yearly qualitative vegetation evaluations as well as conduct quantitative vegetation surveys throughout the 10-year responsibility period. The Permittee plans to use reference areas and *range sites* for the standards of success. [05052005]

The Permittee will use reference areas for the standards of success for G1-7 well sites.

Revegetation success standards are discussed primarily in Sec. 356. The cover standards are based on range site baseline sampling done in 1997. They are 66% and 85% cover for the pinyon/juniper and riparian areas, respectively. Raw data and statistical information are in App. 3-1.

The woody plant density standard is 2200 stems per acre for both communities. This is a technical standard based on baseline information and professional experience.

The Permittee has included range site descriptions for Upland Very Steep Shallow Loam (pinyon/Utah juniper), Semi-wet Stream bank (narrowleaf cottonwood), and Wet Saline Stream bank (coyote willow) range sites. The descriptions of soils, slopes, vegetation, and precipitation for the Upland Very Steep Shallow Loam site appear to match the pinyon/juniper areas of Dugout Canyon fairly well.

The Wet Saline Stream bank range site definitely does not apply to the Dugout Canyon riparian area. In this range site description, slopes are mostly 0-2% with elevations from 4600 to 4900 feet. The Dugout Creek stream gradient is about 5%, and the elevation is about 7000 feet. Other aspects of the description do not match.

The Semi-wet Stream bank range site more closely describes the Dugout Creek riparian area, but it is not a precise match, either. The slope in the range site description is 04%, the elevation is 4700 to 6400 feet, and the precipitation is 5-12 inches. Also, the range site description mentions a braided stream channel, which does not occur in the stretch of Dugout Creek in the disturbed area. Some of the dominant species in the range site description, such as alkali sacaton, basin big sage, squawbush, and Baltic rush, are either not present or are present in relatively low numbers rather than being dominant.

The Permittee has indicated in conversations with Division personnel that it has not been able to find a described range site that precisely matches the condition of the Dugout Canyon riparian area and that the included range sites are for general information. However, the range site reference areas are acceptable. While the species and the distribution of species in life forms in disturbed areas and range site reference areas do not match precisely, they are similar enough that the Division can accept them as revegetation success standards. If anything, the standards may be difficult to attain.

The plan indicates the productivity estimates given by the NRCS would be used as success standards. These values are 800 and 1500 pounds per acre for the pinyon/juniper and riparian areas. The Permittee commits to sample productivity at corresponding range sites if the NRCS production estimates are insufficient to satisfy regulatory requirements.

The diversity standard will be a technical standard. The success standard for both the pinyon/juniper and riparian areas is that there will be two tree and shrub species, three grasses, and two forbs each with at least five percent cover. It is unknown how the success standard was selected, but with the other success standards, it should ensure a community that meets regulatory requirements for diversity. However, achieving this standard may be difficult.

The Permittee has chosen to not apply the revegetation success standard in R645-301-356.250. Parts of the area to be disturbed have been previously disturbed, others have only been affected, and some are undisturbed. It would be difficult to apply the different standards over the relatively small, disturbed area.

Condition 23 of the March 16, 1998, permit requires the Permittee to either revise Plate 5-2C or to remove a statement about the applicability of R645-200 to certain parts of the disturbed area. The statement has been removed and the plate renumbered as Plate **54.**

The husbandry practices approved by the Division will be applied as needed.

Fish and Wildlife Habitat

Findings:

Information provided in the application is considered adequate to meet the requirements of this section of the regulations.

STABILIZATION OF SURFACE AREAS

Regulatory Reference: 30 CFR Sec. 817.95; R645-301-244.

Analysis:

Final reclamation treatments: topsoil depths, hay, gouged, mulched and seeded areas are described in Chapter 2. Extreme roughening is listed as one possible treatment for final reclamation on p 2-40. Also, it is shown on Plate 7-5A as a main treatment for contemporaneous reclamation of the Pace Canyon site during operations. The extents of the reclaimed area in Pace Canyon are illustrated on Plate 5-6. [04212005]

Refuse Site [02/24/2003]

The soils of the site are Haverdad loam (#50) and the Hernandez family and the Strych series soils. These soils have erosion factors between 0.28 and 0.37 according to the 1988 Carbon County Soil Survey. Even at the relatively mild slope of 3h:1v of the refuse disposal site, these exposed soils will be highly susceptible to erosion from water. Wind erosion is also a concern for these soils once they are disturbed.

The application indicates on p. 3-9 that 1 Ton/ac of hay mulch will be applied to the topsoil. The MRP Sec. 340 indicates 2000 lbs of wood fiber mulch will be applied with a tackifier to the seeded site.

The application indicates the site will be roughened with gouging (Sec. 242.200). This information supersedes information found in the MRP Chapter 3 that indicates that the gouging technique will be limited to slopes to steep to retain a mulch application (p. 3-44).

The site will mulched according to the methods described in Chapter 3 of the approved MRP. Rills and gullies in excess of nine (9) inches will be filled and reseeded (Sec. 244.300).

Section 341.200 indicates that 1 Ton/acre of hay will be gouged into the surface to help reduce wind and water erosion.

Degas Well Sites [07/08/2004]

The well sites will be ripped to a depth of 18 – 24 inches (Sec. 242.100). Erosion control measures will include silt fences and berms (Sec. 231.100), seeding, and mulching of the soils (Sections 244.200 and 341.200.) Disruptive gullies (greater than nine inches) will be reseeded (244.300). Surfaces will be left rough. Mulch will be applied at 2,000 lbs/ac with a tackifier Sec. 341.200).

Mulch generated from the grubbing of vegetation will be pulled back on to the disturbed area for surface protection.

Findings:

The information provided meets the requirements for Soil Stabilization.

CESSATION OF OPERATIONS

Regulatory Reference: 30 CFR Sec. 817.131, 817.132; R645-301-515, -301-541.

Analysis:

In Sec. 515.300, the Permittee discusses temporary cessation. In that section, the Permittee commits to follow the requirements of R645-301-515.300. The Division considers the commitment adequate to meet the minimum regulatory requirements.

Findings:

The Permittee met the minimum regulatory 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 affected area boundaries are similar to the disturbed area boundaries and the subsidence area boundaries. Section R645-100-200 provides definitions of the affected area. Plate 5-7 shows the anticipated subsidence area boundaries. Since the extent of subsidence will not be known until mine has been completed and the only reclamation requirements in the subsidence area are to mitigate unforeseen subsidence damages the Division considers the Plate 5-7 adequate. The Permittee has supplied Plate PC7-5A, identifying the sediment control areas, which will be utilized during reclamation of Pace Canyon. Plate PC5-5 depicts the reclamation topography and cross-section locations in Pace Canyon.

Bonded Area Map

The bonded area maps identify the initial and successive areas or increments for bonding. These maps were intended for surface mines where mining and reclamation are conducted concurrent. Underground mines usually reclaim all disturbed areas at the same time. The Permittee's reclamation plan shows that all disturbed areas will be reclaimed at the same time. Therefore, the Division does not need a map that shows when each area will be reclaimed. The Division considers Plates 5-5 and Plate 5-6, showing the reclaimed surfaces, are adequate bond area maps.

Reclamation Backfilling And Grading Maps

Plates 5-5, 5-6, PC5-5 and PC7-5A show the backfilling and grading plans. The Division considers these maps adequate.

Reclamation Facilities Maps

Plates 5-5 show the facilities that will be left after reclamation. The Division considers that maps adequate.

Final Surface Configuration Maps

Plates 5-5 and Plate 5-6 show the final surface configuration. The Division considers those maps adequate. Plates PC5-5 and Plate PC7-5A show the final surface configuration for Pace Creek fan portal.

Reclamation Monitoring And Sampling Location Maps

Elevations and locations of monitoring stations used to gather reclamation water quality and quantity data are on Plate 7-1.

There are no permanent wildlife monitoring sites. Habitat enhancement and the riparian area along Dugout Creek are shown on reclamation maps.

No map of air quality monitoring sites has been required by the Division.

Reclamation Surface And Subsurface Manmade Features Maps

The maps of the reclaimed disturbed area adequately show that there are no buildings or other structures within 1,000 feet of the permit area except for roads.

Reclamation Treatments Maps

Figure 7-12 and Plate 7-9 show details of structures to be used in the stream to enhance or restore riparian habitat. A 7500-foot section of riparian area upstream from the mine will be enhanced as mitigation, but no other wildlife enhancement or monitoring features are planned. Text descriptions of other reclamation treatments, such as seeding and mulching, are considered adequate.

Certification Requirements

Cross sections, maps, and plans have been prepared by, or under the direction of, and certified by a qualified, registered, professional engineer.

Findings:

Information provided by the Permittee meets the minimum requirements of the regulations.

BONDING AND INSURANCE REQUIREMENTS

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

Analysis:

Form of Bond

The bond is a surety bond and is considered adequate by the Division.

Determination of Bond Amount

The Permittee met the requirements of this section of the TA by posting adequate bond. The current bond amount is $3,300,000. The reclamation cost estimate in 2010 dollars is $2,940,000. Therefore, the bond is adequate to insure that the Division can reclaim the site in the event of bond forfeiture. [09/06/2006]

Terms and Conditions for Liability Insurance

The Permittee has a permit to operate the Dugout Mine. As part of the permit conditions the Permittee must have adequate insurance. The Division determined that the Permittee has adequate insurance.

Findings:

The Permittee met the minimum requirements of this section.

REQUIREMENTS FOR PERMITS FOR SPECIAL CATEGORIES OF MINING

INTRODUCTION

Regulatory Reference: 30 CFR Sec. 785; R645-302, et seq.

Analysis:

There are no special categories of mining at the Dugout Mine.

Findings:

This section is not applicable.

EXPERIMENTAL PRACTICES MINING

Regulatory Reference: 30 CFR Sec. 785.13; R645-302-210, -302-211, -302-212, -302-213, -302-214, -302-215, -302-216, -302-217, -302-218.

Analysis:

There are no experimental practices at the Dugout Mine.

Findings:

This section is not applicable.

MOUNTAINTOP REMOVAL MINING

Regulatory Reference: 30 CFR Sec. 785.14, 824; R645-302-220, et. seq.

Analysis:

There is no mountaintop removal mining at the Dugout Mine.

Findings:

This section is not applicable.

STEEP SLOPE MINING

Regulatory Reference: 30 CFR Sec. 785.15; R645-302-230 et. seq.

Analysis:

There is no steep slope mining at the Dugout Mine.

Findings:

This section is not applicable.

PRIME FARMLAND

Regulatory Reference: 30 CFR Sec. 785.16, 823; R645-301-221, -302-300 et seq.

Findings:

No prime farmland is associated with the Dugout Mine. This section is not applicable.

COAL PREPARATION PLANTS NOT LOCATED WITHIN THE PERMIT AREA OF A MINE

Regulatory Reference: 30 CFR Sec. 785.21, 827; R645-302-260, et seq.

Analysis:

The Dugout Mine is not a coal preparation plant.

Findings:

This section is not applicable.

OPERATIONS IN ALLUVIAL VALLEY FLOORS

Regulatory Reference: 30 CFR Sec. 822; R645-302-324.

Findings:

The Dugout Mine does not operate in an alluvial valley floor. This section is not applicable.

IN SITU PROCESSING

Regulatory Reference: 30 CFR Sec. 828; R645-302-254.

Analysis:

There is not in situ processing at the Dugout Mine.

Findings:

This section is not applicable.

AUGER MINING

Regulatory Reference: 30 CFR Sec. 785.20, 819; R645-302-240 et. seq.

Analysis:

There is no auger mining at the Dugout Mine.

Findings:

This section is not applicable.

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT (CHIA)

Regulatory Reference: 30 CFR Sec. 784.14; R645-301-730.

Analysis:

The Dugout Mine belongs to the Book Cliffs Area II CHIA. Although the CHIA already includes the SITLA Lease area, and the Pace Canyon Portal area, the Division updated the CHIA in June 2005 as a part of the SITLA Lease amendment review, since the last update was in 1998. The Division assessed the probable cumulative hydrologic impacts (CHIA) of the Dugout Mine operation and all anticipated mining upon surface- and ground-water systems in the cumulative impact area. The Division has determined that the Dugout Mine operation is designed to prevent material damage to the hydrologic balance outside the permit area.

Findings:

The Permittee has supplied sufficient information to allow the Division to update the Cumulative Hydrologic Impact Assessment.

SUMMARY OF COMMITMENTS

The summary below presents a list of commitments stated within the mining and reclamation plan (MRP). This list provides the following information for each commitment, when applicable:

- Title.
- Objective.
- Frequency.
- Status.
- Reports.
- Citation.

Commitments for Biology as of 5/05/05:

REPORTING OF TECHNICAL DATA

Title: Confidential. Objective: Submit confidential information in amendments, annual reports, and explorations in a separate folder. Frequency: NA. Status: Starting in June 2005. Reports: NA. Citation: NA.

ENVIRONMENTAL RESOURCES: FISH AND WILDLIFE INFORMATION

Title: Bats. Objective: Conduct a 2005 bat survey for Pace fan project. Frequency: One time event, but may conduct follow-up. Status: Pending as of 4/19/2005. Reports: Provide in Annual Report. Citation: Vol. 1, Sec. 322, p. 3-19.

Title: Vegetation mitigation project for bats. Objective: Permittee planted willows in the stream channel above the mine site in exchange for impacting local bat populations around 1997. Frequency: On going. Status: Will transplant additional willows at time of final reclamation. Reports: NA. Citation: Vol. 1, Sec. 322, pp. 3-19 through 3-20.

Title: Annual over-flight raptor surveys. Objective: Obtain baseline data prior to mining disturbances including subsidence of cliff habitat. Conduct follow-up surveys within one year if nests were observed during the baseline surveys and if operations resulted in subsidence. Frequency: Annually. Status: On going. Reports: Annual Reports. Citation: Vol. 1, Sec. 322, p. 3-13.

Title: Raptor nests and subsidence. Objective: Permittee and agencies will determine, nine months or the summer period prior to potential subsidence, methods of avoidance, protection or removal, and mitigation plans for raptor nests within the subsidence zone. Frequency:

Least/project dependent. Status: On going. Reports: NA, but Annual Reports will provide over-flight results. Citation: Vol.1, Sec. 332; Condition 10 of March 16, 1998 permit.

OPERATIONS: FISH AND WILDLIFE INFORMATION - Protection and Enhancement Plan

Title: Ungulate exclusionary periods. Objective: Protect deer and elk during May 1 - July 1 for calving and November 1 – May 15 for wintering. Frequency: Project dependent. Status: On going. Reports: NA. Citation: *Need to locate.*

Title: OUTDATED METHOD - Raptor nest protection. Objective: Cover nest within the subsidence zone from March 15 through May 31. Frequency: Least/project dependent. Status: On going, but should be removed from MRP (DWR, 12/30/2004). Permittee agrees to consult with agencies prior to any mitigation efforts. Reports: NA
Citation: App. 3-2, Letter from Barry Barnum (1996).

Title: Goshawks. Objective: Conduct ground surveys for goshawks in areas with dense canopy habitat and areas planned for mining facilities. Low probability of occurrence. Frequency: Project dependent. Status: On going. Reports: Annual Report. Citation: *Need to locate.*

Title: Northern saw whet owls. Objective: Conduct ground surveys for Northern saw whet owls in areas with Douglas fir, mixed conifer or aspen habitats at higher elevation and areas planned for mining facilities. Survey one or two nights within a 300-meter perimeter of disturbance. Frequency: Project dependent. Status: On going. Reports: Annual Report. Citation: *Need to locate.*

Title: Northern saw-whet owl nesting box mitigation project. Objective: Twenty-six nesting boxes designed to attract the Northern saw-whet owl and other small-medium sized cavity nesting birds. Mitigation project because degas drilling occurred during the exclusionary period (March 31-August 31). Frequency: One time event. Status: Completed in 2004. Reports: NA. Citation: *Need to locate once Degas G7 is approved in 2005.*

Title: Pace Creek videotape. Objective: Video tape Pace Creek stream channel from surface water monitoring locations - PC1A to where Pace Creek leaves the SW 1/4SW 14 Sec. 22, T13S, R13E. Frequency: One-time event. Status: Pending as of 4/20/2005. Reports: NA, but Permittee will provide one copy for the Division. Citation: *Need to locate.*