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

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March 11, 1998

TO: File

THRU: Joe Helfrich, Permit Supervisor *JH*

THRU: Daron Haddock, Permit Supervisor *DH*

FROM: Susan M. White, Senior Reclamation Biologist *SMW*

RE: Round IV Permit Application, Canyon Fuel Company, LLC, Dugout Canyon Mine, PRO/007/039-97A, File #2, Carbon County, Utah

**SUMMARY:**

The initial permit was submitted March 15, 1996. Administrative Completeness was issued September 23, 1996. Response to the Round I permit application deficiencies were received by the Division May 21, 1997 and the Division responded August 1, 1997. Round II was submitted by the Permittee September 9, 1997 and the Division responded October 28, 1997. Round III was submitted by the Applicant November 13 and the Division responded to January 5, 1998. Round IV was submitted February 4, 1998 and this memo is a response to this current submittal. Numerous deficiencies remain and a permit should not be issued.

This reviewer had insufficient time to provide an adequate and thorough review of this permit. Only the very obvious deficiencies were identified because of this time constraint. Further review will likely produce additional deficiencies. The winter season and time constraints did not allow for adequate field verification of maps or stated resource information.

**TECHNICAL ANALYSIS:**

**ENVIRONMENTAL RESOURCE INFORMATION**

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

**HISTORIC AND ARCHEOLOGICAL RESOURCE INFORMATION**

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

**Analysis:**

Appendix 4-1 of the permit provides a Cultural Resource Evaluation of the Dugout Canyon Mine. An intensive archeological surface evaluation of the Dugout Canyon Mine area was conducted in 1980 under the direction of Eureka Energy Company by Archeological-Environmental Research

Corporation (AERC). Four of the sites reported as possible nominations are in the area of the current proposed mine. The four sites include one prehistoric rock art locus (42CB 92) and three historic coal mine loci: The Dugout Creek Mine (42CB 2005/291), the Fish Creek Mine (42CB 204/290) and the Pace Canyon Mine (42CB 206/292/574). The Fish Creek Mine and the Pace Canyon Mine were subsequently determined to not be eligible for nomination to the National Register of Historic Places (NRHP).

Files at the State Historic Preservation Office, Bureau of Land Management Office, and records of the NRHP were consulted. Further field evaluations were conducted by AERC on the prehistoric rock art and the Dugout Creek Mine in November 1995. In this study the Dugout Creek Mine was determined not eligible for inclusion on the NRHP due to the lack of context and cultural integrity.

**Findings:**

Information provided in the plan meets the minimum requirements of this section.

**VEGETATION RESOURCE INFORMATION**

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

**Analysis:**

Numerous vegetative communities are represented within the proposed permit area. The permit area ranges in elevation from 7000 feet to 8600 feet. The permit describes the plant communities as having been heavily impacted from man's activities throughout the years. Baseline sampling were done on several of the vegetative communities within the permit area. A Dr. Steve Richardson and Steven Viert conducted vegetation inventories in 1980, Dr. Patrick Collins conducted studies in 1996, and Patricia Johnston in 1997. The current disturbed area has been changed throughout the various studies. The permit area vegetation map (Plate 3-1) delineates broad vegetative communities within and surrounding the permit area. The permit describes vegetative cover, production and shrub density of the Douglas fir, mixed conifer, pinyon juniper, deciduous streambank, and shrub/grass/juniper within the general area of the permit.

The disturbed area vegetation map is shown on Plate 3-1A. Plate 3-1 and Plate 3-1A contradict. The south and east facing slopes above the disturbed area should be pinyon Utah juniper instead of mixed conifer. The NRCS soils map (Plate 2-1) and Plate 3-1A show the area to be pinyon Utah juniper. This is important since Appendix 7-9 uses this information to calculate the culvert and reclamation channel for Dugout Creek and this is the stated range site. Plate 3-1 must be changed.

The pinyon Utah juniper community had a total vegetative cover of 66 percent when sampled in 1997. Big sagebrush, pinyon and juniper were the dominant species by cover in the community. Shrub density was 2300 stems per acre.

The riparian (deciduous streambank) community occurs within the proposed area to be disturbed. Generally, this community consists of deciduous trees and shrubs such as narrowleaf cottonwood, Rocky Mountain maple and Douglas fir. Dominant shrubs were red-osier dogwood, woods rose and mountain snowberry. In 1998 total vegetative cover, including canopy was 85 percent. Shrub

density was 1625 stems per acre. Productivity of the understory in this community was measured at 912 pounds per acre in 1980. In 1997 the NRCS estimated that the productivity was 1500 pounds per acre and was rated as being in fair range condition. In 1991 this community was described in fair to poor range condition by the Bureau of Land Management. A site visit in 1996 suggested that this area had not been as heavily grazed as reported in the past but still in a somewhat degraded condition. This community type is the most productive in terms of forage availability in the area. Page 3-8 describes several species found in the riparian area of which six species appear to be unrelated to the riparian community sampled this should be modified.

The applicant has been asked to identify areas of extensive rock outcrops as part of the baseline information. This has not been provided. This reviewer will provide the information as site conditions allow but prior to site disturbing activities.

The area of past disturbance is described as once dominated by pinyon juniper and has a potential forage production of 800 pounds per acre. The proposed disturbed area was sampled in 1996 (excluding the riparian area). This area had been disturbed by past mining and coal exploration activities. The area was seeded after the exploration activities. The dominant shrub species by cover was big-toothed maple while rubber rabbitbrush had the greatest number of individuals present. The area is dominated by species which indicate the site has been disturbed. Yellow sweetclover contributed the most vegetative cover to the total cover of 37 percent (Appendix 3-1).

A review of literature and field studies for the area indicate no threatened or endangered plant species are present in the area or likely to be present (Section 322.200). Field studies were conducted 1979 through 1984. A letter from Robert Thompson (Forest Service Botanist), 1995, is found in Appendix 3-1 stating a negative finding of threatened and endangered plant species. The inventory conducted June 24, 1995 found Canyon Sweetvetch along Dugout Creek approximately a half mile below the gate.

#### **Findings:**

Information provided in the application does not meet the minimum requirements of this section. Prior to approval, the applicant must provide the following in accordance with:

**R645-301-321.200.** The plant list on page 3-8 must be modified to reflect actual riparian species.

**R645-301-323.400 and R645-301-742.320.** Plate 3-1 and Plate 3-1A must not contradict. The south and east facing slopes above the disturbed area show that the vegetation type according to the NRCS and Plate 3-1A should be pinyon Utah juniper. This information is used in Appendix 7-9 to calculate required designs for the culvert and reclamation channel in Dugout Creek. and is part of the range site success standard. This map must be corrected.

#### **FISH AND WILDLIFE RESOURCE INFORMATION**

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

**Analysis:**

A Fish and wildlife resource survey was conducted December 1979 through November 1981 for the proposed Sage Point - Dugout Canyon coal mining project (Appendix 3-3). Wildlife count data were collected along eight experimental and four control transects through four different vegetation types: riparian, desert shrub, pinyon-juniper and conifer-bush. Each transect monitored reptiles, non-game birds, big game, medium sized mammals and small mammals. Upland and migratory game birds were not documented in this study due to their low frequency of occurrence in the survey area. A limited number of species of macroinvertebrates were found in 1979 and since the creek is not a fishery resource further studies were not conducted.

Detailed information such as numbers and species presence was collected in these studies within the then proposed permit area in 1979 through 1981. All though this study has provided valuable site species information these data should not be considered as baseline information for the current mine plan. The current designated permit area and facilities area is much smaller then the earlier proposed design. The study was designed to monitor the effects of coal mine development on wildlife and not a baseline description.

Appendix 3-3 contains two maps which show Carbon County deer and elk habitat. Portions of the permit area contain critical winter and summer deer habitat. Elk habitat is classified as high value winter and yearlong habitat. DWR states (letter dated April, 1996) that much of the area is classified as critical deer winter range and is heavily used by deer and occasionally by elk and antelope. Mule deer in the area are considered part of Herd Unit 11b and the elk as part of Herd Unit 11b. Designated critical range and/or any riparian areas are considered high value habitats for wildlife.

Section 322.200, Site-specific Resource Information, states that no threatened or endangered plant and wildlife species were discovered in recent inventories by DWR, Forest Service and qualified personnel. Three listed species (black-footed ferret, bald eagle, and peregrine falcon) could potentially inhabit the area. The peregrine falcon has been observed in several recent surveys of the Carbon County area. No confirmed sitings of black-footed ferrets have occurred within Carbon County during 1995, 1996, and the first quarter of 1997 (Bill Bates, UDWR, Section 322.200).

A raptor nest survey was conducted by the DWR in 1995 and 1997. The nest locations identified in that survey are shown on Plate 3-2 (confidential file). Plate 3-2 shows that the permit area contains the following nests:

- Section 20 1 prairie falcon nest (scrape?), old dilapidated
- Section 22 1 active golden eagle nest
- Section 16 1 golden eagle nest, old dilapidated
- 2 buteo or red tail hawk nests
- Section 23 2 golden eagle nest; old dilapidated

Numerous active and tended golden eagle nests and prairie falcon scrapes are located outside the permit area but immediately adjacent to the permit area. No known raptor nests are within the area to be disturbed by facility construction, although a pair of golden eagles are frequently sited soaring at the cliff edge in full view of the proposed facilities. (the other nests associated with the eagle pair using the active nest in Section 22 have not been observed.) Since bird nest surveys can change from year to year, the permit should be stipulated with the condition that prior to any site disturbing activities an on the

ground nest survey must be conducted for all raptors and bird species of special interest.

A bat survey of the proposed disturbed area was conducted September 1997. Several bats were found in the area, however the Spotted Bat (Category 2) and Townsend's big eared Bat (UDWR, Category 2) were not found nor potential habitat. Additional surveys will be conducted in the zone of potential subsidence. Plate 3-3 shows the locations of cliff escarpments within the permit area. The permit states "no data or definition was available to determine the criteria for an area to be classified as of "unusually high value" for bats." High value habitat is considered as habitat critical to the existence of the animal. Cliff escarpments are considered unusually high value for bats and raptors.

Numerous references in Chapter 3 refer to Dugout Creek as intermittent, however in the Hydrology section Dugout Creek is referred to as perennial. The reference to intermittent must be changed to perennial.

**Findings:**

Information regarding the requirements of this section is not considered to be complete at this time. Additional information must be provided by the permittee in order for the Division to approve all the requirements of this section.

**R645-301-121.200**, the reference to Dugout Creek as intermittent must be changed to perennial.

**R645-301-322.220**, the plan fails to adequately identify habitats of unusually high value for fish and wildlife such as cliff escarpments and important riparian habitat.

**LAND-USE RESOURCE INFORMATION**

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

**Analysis:**

Land use resource information is given in Chapter 4 of the plan. The stated premining landuse for the permit area is rangeland for cattle and sheep grazing and wildlife habitat. The land has not been developed nor 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 (Section 4.11.120). A logging operation was conducted within the permit area in 1996 as shown on a map in Exhibit B, Appendix 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. Mr. Payne, CFR, revealed that another logging contract had been arrange for 1998.

Current productivity of the land surrounding the proposed disturbed area was estimated by George Cook, National Resources Conservation Service, on August 6, 1996 to be 1400 pounds per acre air dry herbage and in low good condition. On December 3, 1997 Mr. Cook reported the Dugout Canyon Mine to have 800 and 1500 pounds per acre air dry herbage in the Pinyon Juniper Sage and Riparian area respectively. (A phone conversation with Mr. Cook, 3/5/98, revealed that there was no

snow on site at the December 3 visit.) Previous productivity statements about the Dugout Canyon showed the area to be severely overgrazed and degraded in the late 1970's and early 1980's. The proposed disturbed area is still grazed but is in somewhat better condition.

A drive through of the permit area above the disturbed area where logging operation had been conducted revealed a degraded condition in summer 1997. Steep slopes along Dugout Creek had been logged, roads cut with material side cast, and limited visible revegetation had occurred at that point. Timber slash was in the stream, a culvert plugged and several small slides had deposited sediment into Dugout Creek. Flatter riparian areas were over grazed with streambanks sluffing and grass approximately an inch high. DWR stated that areas logged had little ground cover and numerous roads which concentrate water flows. Appendix 7-9, page 2, states that the Douglas fir logged area was rated in fair condition. The description of the Douglas fir logged area did not accurately reflect on the ground conditions. Mike Suflita, Division Hydrologist, stated that the culvert sizing was conservative and adequate to account for the increased runoff and sedimentation from logging activities within the water shed.

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 in that period. No coal has been extracted since 1964, although the portals have been opened and explored several times since then.

Fish Creek and Pace Canyon Mines which operated in the early 1900's are also located within the permit area.

**Findings:**

Information in this section meets the minimum regulatory requirements.

## **OPERATION PLAN**

### **MINING OPERATIONS AND FACILITIES**

### **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.**

Although the permit states that wildlife protection and enhancement for the mine will include keeping the disturbed area to a minimum. Approximately 600 feet (500 feet at the southwest end and 100 feet at the northeast end) of high value riparian area is proposed to be culverted that the

applicant has not demonstrated the need to be disturbed. The application justifies the length of the culvert primarily on future expansion of the surface facilities and the following:

1. Adequate turning angle for facilities loop;
2. Equipment, materials and snow storage;
3. Parking;
4. Safety;
5. Preexisting coal fines within the riparian area washing into the water; and
6. Wind blown fines

Items 1 thru 4 are certainly a concern for the mine. Specific safety problems have not been disclosed and items 2 thru 3 are really based on future expansion needs. Item 1 is justified at the beginning of the turning loop. Above items 2 thru 4 could be resolved if the mine was committed to avoidance. Items 5 and 6 should not be items of concern to the mine. Wind blown fines will be controlled by the Operator (Appendix 4-2). The plan further states that the steam side is in such poor current condition that the reclamation will be an enhancement to the area. (This reviewer does not agree with this assessment nor does the NRCS who rated the area as in fair condition.) However, a mature riparian area is not easily restored or replaced. Mitigation upstream will help reduce sedimentation but the steep gradient will not be conducive to developing the wide band of deciduous steambank community found on this lower reach. The surface facilities must not disturb the lower 500 feet and upper 100 feet of riparian habitat.

The operator commits to reseed with an interim seed mixture (Section 341.200, Interim Seed Mix (Drill Quantities), broadcast quantities to be doubled). The Permittee commits to a wildlife awareness and protection training in it's annual training curriculums for all employees and haulage contractors. A culvert will contain Dugout Creek throughout the length of the disturbed area. This will significantly impact wildlife within the area. Habitat loss due to the culvert and subsequent loss of riparian habitat will be off set with a mitigation and enhancement plan up stream, within the permit area from the culvert (Section 322.200). This mitigation should occur prior to placement of the culvert and will involve a length of 7500 feet. Mitigation will include replanting and may include in stream structures.

The permit states that all power lines within the disturbed area will be raptor safe. The Applicant has committed to construct in accordance with "Power Line Contacts by Eagles and Other Large Birds".

The Permittee further proposes to minimize impacts by controlling and monitoring the surface water discharge and water quality.

During construction activities all mining, supplier personnel and their corresponding equipment will be required to stay within the disturbed area boundary. Loading, unloading, and staging of materials and equipment designated for the construction of the Dugout Canyon Mine facilities will be done within the disturbed area. DWR suggests limiting the construction period between December 1 and April 15 (dates are approximate depending on actual snow conditions).

### **Endangered and threatened species**

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 the operator becomes aware. Seasonal or migrating Bald Eagles are expected and a wintering Bald eagle would not need to be reported. Dugout Creek is within the drainage of the Green JRiver which is habitat for the endangered Colorado River fish.

### **Bald and golden eagles.**

Nests within the permit area are identified in the resource section of this technical analysis. Plate 5-5, Proposed Mine Sequence and Planned Subsidence Boundary show the following nests to be within the subsidence zone boundary.

- Section 20 1 prairie falcon nest (scrape?), old dilapidated
- Section 22 1 active golden eagle nest
- Section 16 1 golden eagle nest, old dilapidated  
2 buteo or red tail hawk nests
- Section 23 1 golden eagle nest, old dilapidated

Section 332 describe potential effects as displacement of birds, injury or death of birds, and/or nest destruction. The application states six months prior to planned subsidence the mine will discuss with the Division and UDWR protection of the nests in Section 16. The nest in Section 22 will be monitored. The Applicant is pursuing a letter of authorization for the two old dilapidated nests in Section 23.

Discussion of nest protection six months prior subsidence in not acceptable. No discussion has been provided which discusses nest avoidance. Initial discussion must center around nest avoidance. If nest avoidance is not possible protection is the second priority. A protection plan must be approved for all nests which may be affected prior to approval of the five year mining plan and permit. The Division will consult with the USFWS and DWR if avoidance is not possible and after specific effects have been identified.

A commitment is made to continue monitoring of the permit area by helicopter for any new or previously undisturbed raptor nests. Annual monitoring will concentrate in the areas which will be mined in the next two years. If any nests are found, the Permit must be updated, immediately, with this information and an assessment will be made at that time if the mining will affect the nest.

Raptor breeding and nesting territories must be avoided February to early July. Raptor nests are legally protected year long whether active or not.

### **Wetlands and habitats of unusually high value for fish and wildlife.**

A letter from Robert Thompson (USDA, Forest Service Botanist, 1995) states that a site inventory was conducted and no wetlands were found within the then proposed disturbed area. Although Mr. Thompson is not certified by the Army Corp of Engineers to make this statement, he is a respected professional and his statement is enough not to require a wetlands survey.

The statement is made in the text that habitats within the proposed disturbed area are not considered to be of unusually high value. However, it does state habitats of high value include the riparian area and cliff escarpments. This reviewer would state that the riparian area and cliff escarpment is considered unusually high value habitat. Most all water areas and associated stream side vegetation in Utah are considered high value habitat. Additionally, the Appendix 3-3 identifies critical summer and winter range within the permit area.

### **Findings:**

Information found in the plan does not meet the minimum regulatory requirements of this section. Information must be provided by the permittee in order for the Division to approve this section. High value habitat designation has been address in a deficiency found in **Fish and Wildlife Resource Information**.

**R645-301-330**, the application must identify specific impacts to raptor nests, and discuss avoidance of the nests when mining. If nest avoidance is not possible then the Division will consult with USFWS as to specific protection and mitigation required. The applicant in conjunction with USFWS, DWR, and the Division will develop a raptor protection and mitigation plan.

**R645-301-358.400**, the application has not justified the need to disturb 600 feet of riparian habitat. The application must be modified to not disturbed this area.

## **RECLAMATION PLAN**

### **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 stated postmining land use is livestock grazing and wildlife habitat (Section 412.100). Final reclamation activities such as grading and seeding are stated to be completed in a manner to provide lands able to support the postmining land use. Many of the slopes are considered to steep for livestock grazing. The BLM in developing an a grazing management plan for the Randolph unit developed suitability tables based on slope percent and slope length. They found any slopes steeper than 50 percent (2h:1v) were considered unsuitable for grazing. Plates 5-3 and 5-4 (Sheets 1 of 3 thru Sheets 3 of 3) show numerous cross sections where slopes are steeper than 50 percent. The cross section Y-Y' indicate that slopes into Dugout Creek will be 75 feet long and have slopes steeper than 2h:1v. Cross section X-X' have slopes ranging from 2h:1v to steeper than 1.5h:1v into Dugout Creek. These slope lengths and steepness are not conducive to the stated postmining land use and riparian vegetation restoration. The applicant justifies the slope lengths and steepness by stating that they are similar to the surrounding area. The Division recognizes that 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 an upland area and not thru the riparian zone (riparian zone as defined in Plate 3-1A and subsequent Division field measurements). A finding cannot be made that the land will be useable to wildlife and livestock and the riparian zone restored following the proposed reclamation plan.

Much of the disturbed area was previously mined and not reclaimed to the current standards. Previous mining activities vary in the impacts from disturbed to affected. 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.

A road exists (prior to current mining) thought the permit and disturbed area. This road will remain in the postmining land use. The road is stated to have a current road width of 16 to 25 feet within the disturbed area. The postmining road will remain the same, 16 foot width. This current road width should be verified in the field.

The surface of the lands which will be reclaimed is owned by The State of Utah and Canyon Fuel Company. A letter from the State of Utah concurring with the stated postmining land use is found in Appendix 4-3.

#### **Findings:**

Information found in the plan does not meet the minimum regulatory requirements of this section. Prior to approval, the applicant must provide the following in accordance with:

**R645-301-413 and R645-301-358.400**, the reclamation plan must be revised to reduce the slope gradient and/or length within the riparian zone. Some type of structural controls (i.e. rock, logs, wattles) may help to reduce the slope length where slope gradients cannot be reduced.

## **PROTECTION OF FISH, WILDLIFE, AND RELATED ENVIRONMENTAL VALUES**

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

#### **Analysis:**

The plan identifies the two seed mixtures to be used in revegetation of the previously mined disturbance, pinyon juniper, and riparian communities. Since the postmining land use includes wildlife habitat, this mixture must be desirable for wildlife species of interest. The seed mixture provides for a variety of grass, forb and shrub species which have a high value as big game forage use. Transplants have been proposed for both the riparian and pinyon juniper communities. The trees and shrubs are desirable as both a food source and as cover.

#### **Riparian Restoration**

The applicant proposes to restore the Dugout Creek using a concept of macro and mirco channels. The macro channel will be a riprapped (size D<sub>50</sub>-12") channel 8 to 12 feet wide. The mirco

channel within the macro channel is approximately 3 feet wide and 1 foot deep. The formation of a micro channel will be developed by establishment of 3 types of in stream structures spaced every 60 feet. The structures are thought to backup sediment which in turn will allow vegetation establishment. These structures are low stage check dams, bank placed boulder, and rock or log spurs. Figure 7-12 show typical drawings of these structures and Plate 7-9 illustrates where these structures will be placed. The dimensions of rocks and logs shown in the typical in Figure 7-12 don't appear to be designed for this stream channel. For example, the bank placed boulders are specified to be 24 to 36 inches and buried 12 inches. These boulders will be no different in height than the proposed riprap diameter. Mr. White, Earth Fax Engineering also stated in the stream structures were randomly placed on Plate 7-9. These structures have specific function within the channel. The application states that the exact location and type of obstruction at any individual point may vary from that indicated on Plate 7-9, depending on local conditions encountered at the time of reclamation. This is acceptable, however, the application must provide the specific criteria for the selection of the obstruction at the time of reclamation.

#### Riparian Planting

Stream banks will be seeded with the Final Reclamation Seed Mix #2 (Section 341.200). Trees and shrubs will be planted as specified in the mixture. Using the planting specifications provided in the application discussion the following plantings should occur:

- Tree and large shrubs 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, 2 deep (wide), both sides the length of Dugout Creek).
- Immediately adjacent to and into the riprap will be heavily planted (2 foot minimum spacings) with willow cuttings or species resilient to sediment deposition (for example, this zone may be 5 foot wide along both sides of Dugout Creek). This type of spacing requires 4000 plants per acre.
- The mid bank zone is not as heavily planted and so a 4 foot on center spacing is stated at 2500 plants per acre. Species such as the woods rose, current, snowberry, elderberry, and Serviceberry would be planted in this zone to upper bank. This zone varies widely throughout the 2000 foot length of disturbance.

The above planting densities are recommended by Hoag (page 3-42). Seed Mix #2 shrub and tree transplant numbers should be modified to reflect the proposed planting as described. Figure 3-1, illustrates the various planting zones within the riparian area, top of channel, reclaimed slope, and top of riprap. The figure is meaningless as it compares with the actual conditions at Dugout Canyon and the riparian zone delineated on Plate 3-1A. Typically the riparian zone is 50 feet wide (as the crow flies, much wider on the ground) with slope lengths exceeding 30 feet. Figure 3-1 should be clarified or removed. If removed additional information must be provided to clarify specific planting zones. The described planting zones must also incorporated the micro and macro channel concept for plantings of sedges and horsetails.

Cottonwoods are specified as seedlings and should be planted depending on depth to the lowest yearly water table either as pole plantings or large transplants. Seedlings will not provided the cover required in 10 years for bond release nor will seedlings fulfill the regulation which requires

riparian restoration. Chris Hoag (USDA, Plant Materials Center, Aberdeen, ID) suggests that poles can be planted 9 feet deep (Arizona has had some success planting 22 feet deep, although mortality was high). Sufficient above ground pole should be left so that it will be above the surrounding vegetation (grass, in this case, 18 to 36 inches tall). Two to twelve year old wood (non-furrowed, smooth bark) is best. He stated that the most important factor is to place the pole eight to ten inches below the summer (lowest) water table. Therefore, the revegetation plan should not specify cottonwoods as seedlings unless a detailed irrigation plan is provided.

The application gives excuses why the summer water table cannot be specified (page 3-44). This can be removed from the application if the application will commit to planting at the lowest flow period and placing poles 8 to 10 inches into the water table (Hoag stated that summer plantings are successful if poles are put into the water table).

The riparian seed mixture should also include Northern Sweetvetch, Kentucky bluegrass, Louisiana sagebrush for added diversity. Carex and horsetail (equisetum) should also be added as transplants in the sediment deposition zones of the riprap sections.

Seed diversity in the Final Reclamation Seed Mix #1 should be increased by adding Slender wheatgrass, Idaho fescue, Thickspike wheatgrass, Louisiana sagebrush, Fourwing saltbrush, and bitterbrush. Snowberry and Utah Serviceberry should be planted from seedlings or bareroot stock.

Current on site conditions of Dugout Creek show a degraded riparian system. The cause of that condition (over grazing, down stream alterations, etc.) should be determined in order to create a stable system within the reclaimed area at the time of reclamation. In order to determine a postmining reclamation plan adequate premining conditions must be determined. The applicant has been requested to provide the Division with information such as rock exposure and specific information on the creek channel. They have not done that, therefore the Division should get this baseline information prior to site disturbing activities. This may be important for future reclamation needs.

### **Findings:**

Information provided in the plan does not meet the minimum requirements of this section. A finding that Dugout Creek can be restored or replaced to at least pre 1998 mining condition cannot be made. Prior to approval, the permittee must provide the following in accordance with:

**R645-301-342.100**, Seed Mix #2 must be modified to accurately account for all the tree and shrub transplant numbers which are stated in the spacing requirement for the riparian restoration planting design.

**R645-301-342.100**, the application must provide the specific criteria for the selection of the type of in stream obstruction structures to be used in reclamation. For example the rock or log spurs are used to direct flow. The typicals of these structures, Figure 7-12, must also be modified to reflect actual on site conditions.

**R645-301-342.100**, Figure 3-1 must be modified to reflect typical on site conditions or removed from the application. If removed additional information must be provided to clarify specific planting zones.

**R645-301-342.100**, cottonwoods must be specified as pole plantings or at least large enough transplant size to reach the water table. Or the application may describe an irrigation program for the cottonwood transplants. The application must also commit to a low flow planting time for the hydrophytic vegetation or provide a low flow water table level anticipated at the time of reclamation.

**R645-301-353.100**, the riparian seed mixture must provide greater diversity and life form by adding additional species such as northern sweetvetch, Kentucky bluegrass, Louisiana sagebrush, carex spp., and horsetail. Reclamation seed mixture #1 should add slender wheatgrass, Idaho fescue, thickspike wheatgrass, Louisiana sagebrush, fourwing saltbrush, and bitterbrush. Snowberry and Utah serviceberry should be planted from seedlings or bareroot stock instead of seed.

## **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:**

Contemporaneous reclamation activities should be well documented in the plan and monitored to determine whether or not the reclamation treatments used in the area can be proven successful. These areas can provide invaluable information as well as demonstrating by field trials that reclamation treatments will be successful. However, contemporaneous reclamation at this small site is unlikely due to the space constraints. Additionally, no agreement as to the time and rate of contemporaneous has been established by the Division.

### **Findings:**

No definition of contemporaneous reclamation has been adopted by the Division.

## **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:**

#### **General requirements.**

The details of the revegetation procedures are given in Section 340. The seed mixture is specified in Section 340.200. Additional comment concerning the seed mixture, transplants, and revegetation of the riparian area are detailed in the **PROTECTION OF FISH, WILDLIFE, AND RELATED ENVIRONMENTAL VALUES** section of this Technical Analysis.

When developing the Dugout Canyon site the mine proposes a topsoil borrow area (Plate 2-2, #4B). The application states (page 2-22) that the borrow material will be removed at the time of facilities construction to protect the soils from coal fines and to reduce the steep slope because of safety concerns. Removing the soil now will reduce the revegetation success on site. It is well documented in the literature that a direct haul of topsoil is most beneficial in reclamation. Stockpiled topsoil is biologically dead based on soil microbiology and as a seed bank of site adapted seeds. Deposition of coal fines from coal trucks presents little problems to vegetation as seen in Huntington Canyon which has a large volume of coal trucks. Slope safety concerns have not been demonstrated nor specific area identified through engineering designs, additionally, Plate 5-4 (sheet 1 of 3), section M-M' through P-P' show the slope going back to the same slope after reclamation which doesn't seem to present a safety concern. Regulations require that disturbance be minimized and the application has committed to this in Section 333 Plan to Minimize Disturbances and Adverse Impacts. Therefore, the soil borrow material must remain in an undisturbed condition until the time of reclamation.

Page 2-32 of the Application states that the Dugout Canyon topsoil stockpile area at the Soldier Creek Mine has an infestation of Cheatgrass. The application provides a plan for controlling this infestation. This treatment should begin immediately and specifically prior to any Dugout soil being transported to the site. Establishment of cheatgrass at reclamation very well could prevent successful reclamation since annuals are not counted towards revegetation success. Cheatgrass is an aggressive winter annual and will invade disturbed sites readily.

Seed will be spread by broadcast or drill seeding methods (Section 341.200). Grasses and forbs will be spread by drill seeding on slopes less than 3:1. (Yet, a disc will be used for seedbed preparation on slopes less than 2h:1v.) The shrub and tree seed will be broadcast seeded. All seed will be broadcast seeded on slopes greater than 3:1. When seed is broadcast the seeding rate will be doubled. Slopes steeper than 3:1 will have the soil surface treated by dozer tracking or pocking by a trackhoe. This contradicts the statement on page 5-67 that the area will be deep gouged. The contradicting statements in Section 341.200 must be removed and the commitment to pocking remain. The Division highly recommends the use of any methods which creates the greatest surface roughness.

This roughened state has proven to be very important to the success of the reclamation project. Drill seeding and discing may reduce the surface roughness to an undesirable level. The operator may find at the time of reclamation that broadcast seeding will maintain the desired surface roughness.

#### **Timing.**

The plan commits to seeding late August through early October (Section 341.100). Generally, fall planting has ensured good early spring moisture for seed germination and meets the cold stratification requirements for several of the forb and shrub species. Areas which cannot be seeded during the fall window will be stabilized by seeding with an annual grain until the seeding window has opened.

Chris Hoag (USDA, Plant Material Center) states that fall plantings are acceptable when planting wetland species into a water table.

#### **Mulching and other soil stabilizing practices.**

Mulch will be spread following seeding. The permit states that Division-approved mulch will be used but for bonding purposes assume that 2000 pounds per acre with tackifier wood mulch will be used. This is somewhat confusing but acceptable that the Permittee obtain approval prior to reclamation for the specific mulch to be used. A commitment is made to use a high quality erosion control matting all slopes 3:1 or steeper (page 3-45). Page 3-51 states that a potential measure for the control of erosion on slopes 2:1 or steeper would be the use of a high quality erosion control matting. The statement on page 3-51 should be eliminated since it doesn't specifically commit to erosion control netting use. A high quality erosion control blanket is recommended on all slopes 2:1 and steeper.

The sediment control plan for reclamation is to use a silt fence along the base of the slope or banks to Dugout Creek. Committing to erosion control netting and pocking may help reduce the silt fence failure and sedimentation to the creek. The sediment control plan has not been designed for the slope lengths and gradients proposed.

#### **Standards for success.**

Numerous maps showing the vegetation community types within and adjacent to the proposed disturbed area are provided. Plate 3-1A is proposed for use when determining revegetation success standards. This maps shows two communities, one described as a range site and the other as a community type. The range site is an upland very steep shallow loam (Pinyon-Utah Juniper). The vegetative community type is Riparian.

The application remains confusing as to what methods are being used for success however, the following is this reviewers interpretation of those standards.

The exiting community types (disturbed community, pinyon juniper community, and riparian) are supposedly described as range sites (pinyon-Utah juniper and riparian) according to the Vegetation Information Guidelines. However, no description of the riparian area as a range site was provided and specific data for the published pinyon-Utah juniper range site was not provided.

Revegetation success standards for cover will be based on range site baseline sampling performed by Patricia Johnson in 1997. Cover values will be 66 percent vegetative ground cover for the pinyon-juniper and 85 percent vegetative ground cover for the riparian. Associated statistics and raw data are provided in Appendix 3-1.

The standard for shrub density is a technical standard and will use 2200 stems per acre for both the pinyon-Utah juniper and the riparian communities as the success standard..

No productivity data was taken in either the riparian or pinyon juniper communities, however, the NRCS estimated the productivity to be 1500 pounds per acre for the riparian community and 800 pounds per acre in the pinyon juniper community. The application proposes that these values be used as a success standard. However, the Division's Vegetation Information Guidelines only approve the NRCS estimation when using the reference area method after the reference area is approved based on statistical cover similarity of the remined site. The application proposes that if the NRCS estimate is not

sufficient than an adjacent range site will be selected at the time of reclamation and will be used as a reference area. The later method will be accepted except that the range site must be selected now and the range site must be similar (statistically,  $\alpha=.1$ ) to the cover of the premined site. The riparian area has not been described as a range site and either a corresponding reference area can be selected for productivity or the riparian area described as a range site.

A technical standard is proposed for diversity. The applicant proposes that the success standard for both the Pinyon Juniper and Riparian area to have 2 tree/shrub species, 3 grass species, and 2 forb species present and that to count toward the diversity it must exist in the community with at least 5 percent vegetative cover. It is unknown how the success standard was selected. Obtaining this standard at the time of bond release sampling is probably not realistic.

The success standard of R645-301-356.250 (for areas previously disturbed by mining) is not proposed for this site because the applicant felt that it would checker board the site. Sufficient areas have not been disturbed and many areas have only been affected and not disturbed by coal mining are present that they chose not to use the vegetation success standard of R645-301-356.250.

**Findings:**

Information found in the plan does not meet the minimum regulatory requirements of this section. An adequate revegetation plan for the riparian area must be provided as discussed in the **PROTECTION OF FISH, WILDLIFE, AND RELATED ENVIRONMENTAL VALUES** section of this technical analysis. Given the proposed reclamation and revegetation plan a finding of successful reclamation cannot be made. Prior, to approval, the permittee must provide the following in accordance with:

**R645-301-121.200**, Statements regarding final seedbed preparation with dozer tracks must be removed to provide a suitable seedbed and consistency between sections.

**R645-301-142.100**, Plate 5-2C must either show the area subject to the requirements of R645-200 or remove the statement that no areas were subject to the requirements of R645-200 thru R645-203.

**R645-301-356**, the productivity of the riparian are and pinyon juniper area must be sampled or commit to selecting range site reference areas as soon as weather conditions permit. Statements that the application meets the requirements of the Division's Vegetation Information Guidelines must be removed from the application.

**R645-301-333**, the plan must be revised to not disturb the topsoil borrow site until the time of final reclamation. This will reduce disturbance to wildlife habitat and also increase the chance of revegetation success.

**R645-301-355 and R645-301-752**, the plan must commit to the use of a high quality erosion control matting or propose some other type of structural control on steep slopes. The application must also propose a sediment control plan for reclamation which has been

designed.

**RECOMMENDATION:**

Prior to approval the requirements of R645-301-300 and R645-301-400 must be provided as outlined above. The permit should be stipulated with the following:

**R645-301-358**, prior to any site disturbing activities an on the ground nest survey must be conducted for all raptors and bird species of special interest by a qualified person.

**R645-301-330**, no construction nor any other activities may occur within the permit area until April 15.

**R645-301-331**, cheatgrass control must be instigated at the Soldier Canyon topsoil stockpile prior to any growth medium from Dugout Canyon is brought on site. The cheatgrass control must continue until control is obtained.

This reviewer will require approximately one week on site prior to any site disturbing activities to verify and field check maps, vegetation, roads, and creek characteristic.