



Canyon Fuel Company, LLC  
Dugout Canyon Mine  
P.O. Box 1029  
Wellington, Utah 84542

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November 29, 2004

Ms. Pamela Grubaugh-Littig  
Utah Division of Oil, Gas and Mining  
1594 West North Temple, Suite 1210  
Salt Lake City, UT 84114-5801

*August SITLA Lease  
Response  
C/007/0039  
Task ID #2008*

RE: SITLA Lease Amendment, Dugout Canyon Mine, Canyon Fuel Company, LLC,  
C/007/039, Carbon County, Utah, Task ID #1915

Dear Ms. Grubaugh-Littig:

Attached please find four copies of an amendment to address the deficiencies associated with Task ID # 1915. The ownership and control information requested in this TA have been submitted separately. The permittee's hope is that both amendments will be approved at or near the same time. The ownership and control information applied to multiple operations therefore it was submitted separate from the SITLA Lease amendment.

The mexican spotted owl survey and TES species list requested in this TA were submitted September 23, 2004 and have been approved and added to the M&RP under Task ID #2039 (October 4, 2004). In addition a copy of the affidavit of publication for the SITLA lease was submitted and approved under the Task ID number identified above.

The missing pages of the wildlife report do not exist, the information available mimics what was submitted. We are assuming that the missing pages are merely blank and therefore were omitted in the original copying of the report, since all the pertinent information appears to be in the copied report.

The Nickens report covers many areas in the state of Utah however, only the information relative to the SITLA lease area was copied, since the information is not critical to the amendment we will eliminate the report from Appendix 4-3.

Although, reports and studies are incorporated into appendices in the M&RP, commitments made in these reports do not apply to the permittee unless a commitment is made in the body of the chapter text. Many reports and studies are done by parties not related to the current permittee therefore those commitments are not valid, i.e. "The Study to Determine the Effects of Coal Development on Wildlife in Southeastern Utah"; "The Revised Final Fish and Wildlife Plan for the Proposed Sage Point", etc.

File in:

 Confidential Shelf Expandable

Refer to Record No

In C/0070039 2004

Date

11/29/2004

Incoming

**COPY**

Page 2

RE: SITLA Lease Amendment, Dugout Canyon Mine, Canyon Fuel Company, LLC,  
C/007/039, Carbon County, Utah, Task ID #1915

We are sure the Division is not requiring the permittee to do bat surveys of areas not disturbed by mining and thus incurring costs not necessary. Mine plans change daily at a minimum, therefore to make commitments in the M&RP to do surveys two years prior to disturbance is difficult to predict even with coordination of the mine plan with the cliff habitat.

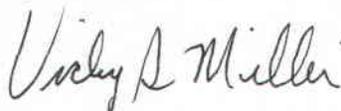
Raptor surveys are completed on an annual basis by the DWR, the DWR chooses the best time frame each year to complete the surveys, however the survey is usually in May of each year. The surveys are conducted by DWR personnel and paid for by individual operators. Operators designate the areas to be surveyed (Section, Township, Range), but leave specific survey site determination to the qualified personnel of the DWR. To commit to do a survey two years or a year before mining an area is difficult due to the survey time frame, for instance if we mine an area in April 2005, we do a survey in May of 2004 and/or May of 2003 we are out of compliance both years and eligible for a violation. Although, the operator could guess when they are going to mine an area and hire a consultant to do the survey, to do a survey not supervised by the DWR seems an ignominy since they are the agency responsible.

During a meeting with Jerriann Ernsten an internal correspondence from David G. Spillman to Vicky Miller was discussed. The correspondence pertained to subsidence considerations in the SITLA Lease, including Pace Creek. Dugout has committed to a "barrier case" mine layout, because of the potential for caving conditions within the mine causing unsafe conditions. "Based on actual mining experience, as well as extensive geotechnical analysis, it was determined that load supporting barriers would be necessary for future longwall panels. These barriers will essentially isolate individual panel extraction areas, while providing long-term support for the subsidence resistant sandstone members (Castlegate, Upper Sunnyside and Lower Sunny side). This mining plan will not allow for fracturing and caving to propagate to the surface, thus minimizing the potential for subsidence (August 11, 2004, David G. Spillman)". For review a single copy of the internal correspondence and a copy of the most recent projected mine plan is included with this submittal.

A copy of this submittal has been delivered to the Price field office.

Thank you for your assistance and if you have any questions, please call me at (435) 636-2869.

Sincerely yours,



Vicky S. Miller

cc: Dave Spillman  
Pete Hess

**APPLICATION FOR COAL PERMIT PROCESSING**

**COPY**

Permit Change  New Permit  Renewal  Exploration  Bond Release  Transfer

**Permittee:** Canyon Fuel Company, LLC

**Mine:** Dugout Canyon Mine

**Permit Number:** C/007/039

**Title:** SITLA Lease Amendment - Revisions to Chapters Task ID # 1915

**Description,** Include reason for application and timing required to implement:

**Instructions:** If you answer yes to any of the first eight (gray) questions, this application may require Public Notice publication.

- Yes  No 1. Change in the size of the Permit Area? Acres: 2,360 Disturbed Area: \_\_\_\_\_  increase  decrease.
- Yes  No 2. Is the application submitted as a result of a Division Order? DO# \_\_\_\_\_
- Yes  No 3. Does the application include operations outside a previously identified Cumulative Hydrologic Impact Area?
- Yes  No 4. Does the application include operations in hydrologic basins other than as currently approved?
- Yes  No 5. Does the application result from cancellation, reduction or increase of insurance or reclamation bond?
- Yes  No 6. Does the application require or include public notice publication?
- Yes  No 7. Does the application require or include ownership, control, right-of-entry, or compliance information?
- Yes  No 8. Is proposed activity within 100 feet of a public road or cemetery or 300 feet of an occupied dwelling?
- Yes  No 9. Is the application submitted as a result of a Violation? NOV # \_\_\_\_\_
- Yes  No 10. Is the application submitted as a result of other laws or regulations or policies?  
*Explain:* \_\_\_\_\_
- Yes  No 11. Does the application affect the surface landowner or change the post mining land use?
- Yes  No 12. Does the application require or include underground design or mine sequence and timing? (Modification of R2P2)
- Yes  No 13. Does the application require or include collection and reporting of any baseline information?
- Yes  No 14. Could the application have any effect on wildlife or vegetation outside the current disturbed area?
- Yes  No 15. Does the application require or include soil removal, storage or placement?
- Yes  No 16. Does the application require or include vegetation monitoring, removal or revegetation activities?
- Yes  No 17. Does the application require or include construction, modification, or removal of surface facilities?
- Yes  No 18. Does the application require or include water monitoring, sediment or drainage control measures?
- Yes  No 19. Does the application require or include certified designs, maps or calculation?
- Yes  No 20. Does the application require or include subsidence control or monitoring?
- Yes  No 21. Have reclamation costs for bonding been provided?
- Yes  No 22. Does the application involve a perennial stream, a stream buffer zone or discharge to a stream?
- Yes  No 23. Does the application affect permits issued by other agencies or permits issued to other entities?

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**Please attach four (4) review copies of the application. If the mine is on or adjacent to Forest Service land please submit five (5) copies, thank you.** (These numbers include a copy for the Price Field Office)

I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein

David Spillman  
Print Name

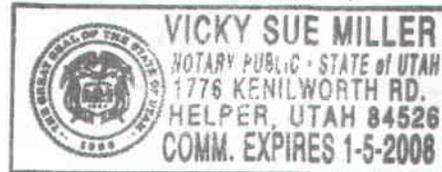
David Spillman, Engineering Manager  
Sign Name, Position, Date  
11/24/04

Subscribed and sworn to before me this 29 day of NOVEMBER, 2004

Vicky Sue Miller  
Notary Public

My commission Expires: 1-5, 2008

Attest: State of UTAH } ss:  
County of CARBON



<p><b>For Office Use Only:</b></p>	<p><b>Assigned Tracking Number:</b></p>	<p><b>Received by Oil, Gas &amp; Mining</b></p>
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# APPLICATION FOR COAL PERMIT PROCESSING

## Detailed Schedule Of Changes to the Mining And Reclamation Plan

COPY

**Permittee:** Canyon Fuel Company, LLC  
**Mine:** Dugout Canyon Mine **Permit Number:** C/007/039  
**Title:** SITLA Lease Amendment, Revisions to Chapter Task ID #1915

Provide a detailed listing of all changes to the Mining and Reclamation Plan, which is required as a result of this proposed permit application. Individually list all maps and drawings that are added, replaced, or removed from the plan. Include changes to the table of contents, section of the plan, or other information as needed to specifically locate, identify and revise the existing Mining and Reclamation Plan. Include page, section and drawing number as part of the description.

### DESCRIPTION OF MAP, TEXT, OR MATERIAL TO BE CHANGED

			DESCRIPTION OF MAP, TEXT, OR MATERIAL TO BE CHANGED
<input type="checkbox"/> Add	<input type="checkbox"/> Replace	<input checked="" type="checkbox"/> Remove	Chapter 7, Plate 7-3
<input type="checkbox"/> Add	<input type="checkbox"/> Replace	<input checked="" type="checkbox"/> Remove	Confidential Folder - Biological Information related to Wildlife - Do not throw away*
<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	Biological Wildlife Information from Confidential File add to Appendix 3-3 of M&RP*
<input type="checkbox"/> Add	<input type="checkbox"/> Replace	<input checked="" type="checkbox"/> Remove	RA Appendix 4-1 from Refuse Pile Amendment Binder - Do not throw away*
<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	RA Appendix 4-1 from Refuse Pile Amendment to Confidential File*
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<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	Appendix 4-3 - Cultural Information associated with SITLA Lease to Confidential File
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<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	RA Appendix 4-1 Cover Sheet to Refuse Pile Amendment designating location of Appendix*
<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Replace	<input type="checkbox"/> Remove	Appendix 4-3 - Cover Sheet to M&RP designating location of Appendix
<input type="checkbox"/> Add	<input type="checkbox"/> Replace	<input checked="" type="checkbox"/> Remove	Chapter 1, a revised Chapter 1 has been submitted as a separate amendment.
<input type="checkbox"/> Add	<input type="checkbox"/> Replace	<input checked="" type="checkbox"/> Remove	Appendix 4-3, the Nickens report entitled "A sample-oriented cultural resource inventory in Carbon, Emery and Sanpete Counties, Utah" needs to be removed.
<input type="checkbox"/> Add	<input type="checkbox"/> Replace	<input checked="" type="checkbox"/> Remove	Chapter 3, Tables 3-1 and 3-2.
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 3, Pages 3-ii, 3-iii, 3-iv, 3-13 thru 3-34, and 3-55
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 5, Page 5-33
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Chapter 7, Pages 7-5, 7-22, 7-23, 7-27 thru 7-32, 7-35, 7-37, 7-62 thru 7-65
<input type="checkbox"/> Add	<input checked="" type="checkbox"/> Replace	<input type="checkbox"/> Remove	Plate 7-1
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<p><b>Any other specific or special instruction required for insertion of this proposal into the Mining and Reclamation Plan.</b></p> <p>11/29/04</p> <p>* All though these documents are associated with different binders the tasks were part of deficiencies associated with SITLA Lease, TASK ID. NO.1915</p>	<p>Received by Oil, Gas &amp; Mining</p>
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CHAPTER 3

BIOLOGY

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Rock Canyon crosses area used by deer as winter range, however traffic is sporadic during the winter months and heavier during the summer and fall months.

### Raptors

Golden eagles are a common year long resident of the area, with suitable nesting habitat spread throughout the permit area. The cooper's hawk is known to nest in the permit area.

A variety of falcons are year long residents of the area, utilizing cliffs for their nests. To date there are no known aerie sites for falcons within or immediately adjacent to the disturbed area.

Raptors were studied during the 1979 - 1980 UDWR transect study, in 1981 by Janet Lee Young and by Hayden-Wing Associates in 1984. These reports are provided in Appendix 3-3.

Raptor nest surveys were done by the UDWR in 1995, 1997, 1998, and 1999. The nest locations identified in 1997 and 1998 are shown on Plate 3-2 in the mine's UDOGM confidential folder (confidentiality required by UDWR). All nests located in the 1997 survey were cliff nests (Ben Morris, UDWR, January 20, 1998). All nests located in the 1998 and 1999 surveys were cliff nests.

Raptor nest surveys will be conducted annually in the Spring prior to mining activities or potential subsidence within the permit area and in proposed expansion areas to the permit to obtain base line data.

### Migratory and Song Birds

Birds were studied during the 1979 - 1980 UDWR transect study. However, a more extensive study was done by Hayden-Wing Associates in 1984. Their report can be found in Appendix 3-3.

### Reptiles and Amphibians

Increasing elevation rapidly reduces the number and kind of reptiles and amphibians. Furthermore, in Utah the effects of the more northern latitude reduces the number of herptiles in much the same way as does the increase in elevation.

These geographical and associated climatic factors have eliminated most desert species, leaving species that are adapted either to mountain habitats or montane type habitats. Based on extensive literature review and limited field work, it was determined that potentially 8 species of amphibians and 18 species of reptiles inhabit the area. Of these species only 5 were recorded by the UDWR in 1980: Eastern fence lizard, Sagebrush lizard, Tree lizard, Short-horned lizard, and the Gopher snake. A WESTECH biologist observed two other species in 1979, the Western whiptail and the Midget faded rattlesnake. All amphibians and reptiles are legally protected, but since the species listed are all widespread throughout the mountains of Utah, none are treated as high-interest species. It is doubtful that the proposed action would seriously impact populations, but localized individuals may be involved in habitat destruction due to subsidence. An exception to this would be if subsidence caused drying of present wet habitats essential to reproduction. **Refer to Section 332 for a discussion of "Possible Short-Term and Long Term Impacts to Species Dependent on Springs, Creeks and Drainages".**

**Threatened and Endangered Plant and Wildlife Species.** Passage of the Endangered Species Act of 1973 (Public Law 23-20S) provided the legal basis for establishment of lists of endangered and threatened plant and wildlife species (Table 3-4 Appendix 3-3).

Although three species (black-footed ferret, bald eagle, and peregrine falcon) on the list could potentially inhabit the area, an inventory of endangered wildlife species performed in 1979 by the UDWR recorded no threatened and endangered species within the proposed permit area. No confirmed sightings of black-footed ferrets have occurred within Carbon County during 1995, 1996, and the first quarter of 1997, however bald eagles have been seen flying in the vicinity of the mine (Bill Bates, UDWR).

A literature review and field studies for both the Soldier Canyon and the Sage Point - Dugout Canyon permit documents were performed to assess the possible presence of any threatened, endangered, or sensitive plant and wildlife species in the respective permit and adjacent areas.

These study areas included the proposed Dugout Canyon disturbed area. The literature review indicated that no species listed (or proposed as candidates) by the U.S. Fish and Wildlife Service (FWS) as threatened or endangered were likely to inhabit the area. In addition, the field investigations which occurred in 1979, 1980, 1983, and 1984 did not identify or locate any threatened or endangered species. No threatened or endangered plant species including Canyon

sweetvetch were found within the disturbed area by Robert Thompson during his 1995 survey (see Robert Thompson letter, Appendix 3-1). Mr. Thompson is qualified and has performed threatened and endangered surveys for the U.S. Forest Service.

As reported in the 1997 bat survey "we noted no suitable habitat, did not record via detectors or capture, or note by indicators presence of *Corynorhinus townsendii*. It is our opinion the bat does not occur in the immediate vicinity of the proposed disturbance area. We also did not note suitable habitat for or encounter *Euderma maculatum* by mist net, via detectors or during audible bat transects".

**Windy Gap Process as it Applies to Existing Coal Mines in the Upper Colorado River Basin**

Per meetings with Division of Water Quality personnel during application for a UPDES permit in 2004, "there is no data supporting the premise that surface waters associated with the area of the mine operations reached the Price River or Colorado River prior to or since mining disturbance".

Mining Consumption:

Culinary Water is purchased from PRWID and hauled by D & D Trucking to the Mine.

Estimated **Purchased** Gallons/yr: 1,003,200

Ventilation Consumption/Evaporation:

29,354 gallons/day (3/05/04 ventilation survey)

44,000 gallons/day (9/13/04 ventilation survey)

$73,354 \times 0.5 = 36,677$  gallons/day (survey average)

$36,677 \times 365 = 13,387,105$  gallons/yr

Coal Producing Consumption/Coal Moisture Loss:

Water added to coal produced - 4.03% inherent moisture - source Dugout Geologist  
5.80% run-of-mine moisture - year to date average  
1.77% moisture added to coal by cutting operation

Projected Tonnage 2004 4,245,737 tons

Projected Tonnage 6 year average 4,369,084 tons

Tons water/yr 77,333

Pounds water/yr 154,665,562

Gallons water/yr 18,522,822

Sediment Pond Evaporation:

Mine Site Pond 0.107 acres (surface area)

18.1 in/yr (high estimate based on HCI Technical Memo, August 22, 2002)

0.16 ac/ft

7030 gallons/yr



**TABLE 3-1**  
**Federal Listed and Proposed Endangered Species in Utah**  
**March 1999**

<u>Plants</u>		<u>Status</u>
Autumn Buttercup	<u>Ranunculus acriformis var. aestivalis</u>	E
Barneby Reed-Mustard	<u>Schoenocrambe barnebyi</u>	E
Barneby Ridge-Cress	<u>Lepidium barnebyanum</u>	E
Clay Phacelia	<u>Phacelia argillacea</u>	E
Clay Reed-Mustard	<u>Schoenocrambe argillacea</u>	E
Dwarf Bear-Poppy	<u>Arctomecon bumilis</u>	T
Heliotrope Milk-Vetch	<u>Astragalus montii</u>	T
Jones Cycladenia	<u>Cycladenia humilis var. jonesii</u>	T
Kodachrome Bladderpod	<u>Lesquerella tumulosa</u>	E
Last Chance Townsendia	<u>Townsendia aprica</u>	T
Maguire Daisy	<u>Erigeron maguirei</u>	T
Maguire Primrose	<u>Primula maguirei</u>	E
Novajo Sedge <sup>5</sup>	<u>Carex specuicola</u>	E
San Rafael Cactus	<u>Pediocactus despainii</u>	E
Shrubby Reed-Mustard	<u>Schoenocrambe suffrutescens</u>	E
Siler Pincushion Cactus	<u>Pediocactus sileri</u>	T
Uinta Basin Hookless Cactus	<u>Sclerocactus glaucus</u>	T
Ute Ladies'-Tresses	<u>Spiranthes diluvialis var. maguirei</u>	T
Welsh's Milkweed	<u>Asclepias welshii</u>	T
Wright Fishhook Cactus	<u>Sclerocactus wrightiae</u>	E
Winkler Cactus	<u>Pediocactus winkleri</u>	T

**TABLE 3-1 (Continued)**  
**Federal Listed and Proposed Endangered Species in Utah**  
**March 1999**

<u>Mammals</u>		
Black-Footed Ferret <sup>†</sup>	<u>Mustela nigripes</u>	E
Utah Prairie Dog	<u>Cynomys parvidens</u>	T
<u>Birds</u>		
American Peregrine Falcon <sup>2</sup>	<u>Falco peregrinus anatum</u>	E
Bald Eagle <sup>*</sup>	<u>Haliaeetus leucocephalus</u>	T
Mexican Spotted Owl	<u>Strix occidentalis lucida</u>	T
Southwest Willow Flycatcher	<u>Empidonas traillii extimus</u>	E
Whopping Crane <sup>3</sup>	<u>Grus americanus</u>	E
Mountain Plover	<u>Charadrius montanus</u>	PE
<u>Fish</u>		
Bonytail Chub	<u>Gila elegans</u>	E

Colorado Squawfish	<u>Ptychocheilus lucius</u>	E
Humpback Chub	<u>Gila cypha</u>	E
June Sucker <sup>5</sup>	<u>Chasmistes liorus</u>	E
Lahontan Cutthroat Trout	<u>Oncorhynchus (Salmo)</u>	E
	<u>Clarki henshawi</u>	
Razorback Sucker	<u>Xyrauchen texanus</u>	E
Virgin River Chub <sup>6</sup>	<u>Gila robusta seminuda</u>	E
Woundfin	<u>Plagopterus argentissimus</u>	E

**Reptiles**

Desert Tortoise <sup>5</sup> (Mojave population)	<u>Gopherus agassizi</u>	E
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**TABLE 3-1 (Continued)**  
**Federal Listed and Proposed Endangered Species in Utah**  
**March 1999**

**Snails**

Kanab Ambersnail <sup>7</sup>	<u>Osyloma haydeni kanabensis</u>	E
Utah Valvata Snail	<u>Valvata utahensis</u>	E

<sup>1</sup>Two confirmed sightings were made in Utah in 1982.

<sup>2</sup>Nests in Utah.

<sup>3</sup>Migrates through Utah, no resident population.

<sup>4</sup>(Wintering populations) only two known nesting pairs in southeastern Utah).

<sup>5</sup>Critical habitat designated.

<sup>6</sup>Critical habitat proposed.

<sup>7</sup>Emergency listing.

E - Endangered PE - Proposed Endangered T - Threatened PT - Proposed Threatened

For additional information contact: U. S. Fish and Wildlife Service, 2078 Administration Building,  
1745 West 1700 South, Salt Lake City, Utah 84204-5110  
Telephone: Commercial (801) 524-5001

A survey for bats was performed by Mark Perkins in September of 1997. A report of this survey is included in Appendix 3-3 with a figure showing the bat survey locations. Future surveys for bats will be done concurrent with raptor surveys within the permit boundary prior to cliff disturbing planned subsidence. Pertinent data gathered in these surveys will be included in this M&RP.

No data or definition was available to determine the criteria for an area to be classified as of "unusually high value" for bats. However, since extensive rock faces, cliffs, and escarpments are present throughout the Book Cliffs Region, the land within the permit boundary is not unusual or unique to the area. The Castlegate Sandstone, Blackhawk, and Price River are the cliff forming formations present in the Dugout Canyon area. Refer to Chapter 6 for descriptions of these formations and Plate 3-3 for their locations.

In the Perkins-Dugout Mine Bat Survey the following statement was made "development plans for the proposed disturbance area contains some mitigation for resident bat species. A proposed runoff pond will likely provide accessible year round water and an associated bio-mass. Presently Dugout Creek is not classified as a perennial stream. In addition, plans include several outdoor flood lights which may act as an attractant for phototropic insects and provide a concentrated and stable food resource for local bat populations. Due to no cliff subsidence and mitigating actions noted above, it is our opinion that excepting the disturbance to and removal of 2,000 ft. of riparian zone, impact (either positive or negative) on local bat populations is minimal".

A bat survey is planned for the Spring of 2005, this survey will cover the cliff areas adjacent to a proposed fan breakout in Pace Canyon. Future surveys for bats will be done concurrent with raptor surveys within the permit boundary prior to mining in areas within cliff areas with the potential to subside. Raptors will be monitored on an annual basis by the permittee and DWR in areas proposed for mining during a given year.

Since water and its corresponding vegetation are important throughout the state of Utah, regulatory agencies have been requiring mitigation for disturbance and eventual replacement from the coal industry. SCM will comply with the requirements of mitigation and eventual replacement of the

resources which may be lost or disturbed during this mining operation, refer to Sections 331, 340, 350, and 762.100.

As a mitigation effort SCM replanted 7,500 feet of disturbed riparian streambank above the northern disturbed area boundary with a modified version of Seed Mix No. 1 (mitigation seed mix), to assist in restoring vegetation which has been disturbed by the logging industry.

**Mitigation Seed Mix (Hydroseed/Broadcast Quantities)**

<u>SPECIES</u>	<u># pls/acre</u>
Bluebunch wheatgrass	5.0
Intermediate wheatgrass	5.0
Slender wheatgrass	5.0
Smooth brome	5.0
Indian ricegrass	3.0
Blueleaf aster	1.0
Blue flax	1.5
Northern sweetvetch	1.5
Mountain big sagebrush	1.0
TOTAL	<hr/> 28.0

Willows ~~will be~~ **were** transplanted along the edges of the stream channel **above the mine site disturbed area**, with the mitigation seed mix being planted from the east edge of the stream channel to the outside edge of the logging road cut. The area between the edge of the stream channel and road cut varies from 10 to 45 feet as it travels the 7,500 feet planned for replanting. The west side of the channel was not disturbed by logging. For clarification the stream channel changes to the west side of the road upstream from the disturbed area boundary.

Due to the steepness and roughness of the slope the area was hydroseeded. The mitigation seed mix (listed above) was sprayed using hydroseeding equipment over the mitigation area. A second pass of the hydroseeding equipment sprayed the mulch/tackifier on top of the previously sprayed seed mix. Two thousand pounds per acre of the Division approved (Appendix 3-1) wood fiber

mulch (Ecofiber, trade name) were used on the mitigation area. The seeding and planting was completed during 1998.

Additional mitigation for disturbance is being done to comply with the requirements of the UDWR. The mitigation ~~may included~~ the cutting of grown pinyon and juniper trees to improve the growth of the understory ~~adjacent to the Nine Mile Canyon Road~~, ~~replanting of seedlings on a previously chained area and the chaining of an additional pinyon-juniper forest~~. These mitigation efforts are being coordinated directly with the UDWR.

SCM will plant approximately 4,000 willows ~~including both the mitigation described previously and during final reclamation~~. ~~wherever the channel affords sufficient space, since the channel is covered with rocks and soil periodically~~. A portion of the willows were planted during the spring of 1998 to satisfy the mitigation commitment. ~~Willows were planted wherever the channel afforded sufficient space. The channel above the mine site is covered with rock slides in several stretches of approximately 100 feet each~~. Additional willows will be planted to complete the commitment, however the numbers being planted may decrease since it was discovered during the Spring planting that the channel affords a limited environment for willows. CFC has discussed this matter with Paul Baker of UDOGM and a commitment made by CFC to continue to keep UDOGM involved in the mitigation process. ~~Paul Baker was contacted in 2001 concerning the progression of the willows planted, photographs were taken and forwarded to Mr. Baker for his review. Survival rate for the willows planted was estimated at 75%.~~

During a site visit in December of 1997, Bill Bates of the UDWR requested that the riparian mitigation include the installation of habitat/stability enhancement structures within Dugout Creek upstream from the proposed disturbed area. SCM commits to the installation of structures similar to those identified in Figure 7-12 should all regulatory agencies and SCM be in agreement. The location and type of structure will be correlated with UDWR, U.S. Fish and Wildlife Service, and the Division.

### 322.300 Fish and Wildlife Service Review

If requested, SCM authorizes the release of information pertaining to Section 322 and 333 to the U.S. Fish and Wildlife Service Regional and Field office for their review.

### **323 Maps and Aerial Photographs**

The permit area was mapped by use of a mosaic of aerial photographs and assured by ground inspection in some areas. Maps are contained within the reports provided in Appendices 3-1, 3-2 and 3-3.

During a meeting with the UDWR on January 20, 1998 Ben Morris requested that "the nest locations and related data gathered in the 1997 raptor survey of the Dugout Canyon Mine area be kept confidential". Therefore this survey will not be discussed or presented in this permit document, but can be reviewed by Division personnel within the Dugout Canyon Mine "confidential binder". The confidential binder contains Plate 3-2 which shows the location of nests found during the raptor surveys conducted by UDWR. **In a Technical Analysis (Task ID #1915) for the inclusion of the SITLA Lease into the permitted area, instructions were given by UDOGM personnel to remove this information from the confidential folder and include it in the M&RP. This information is currently contained in Appendix 3-3.**

**Vegetation drawings and appendices within the permit area not included in the M&RP are included in the following amendments:**

#### Refuse Pile Amendment

- RA Figure 3-1 Surrounding Representative Vegetation Communities
- RA Figure 3-2 Vegetation at Site Prior to Mining Disturbance
- RA Attachment 3-1 Vegetation Data

#### Methane Degassification Amendment

- Figure 3-1 Vegetation Reference Areas
- Figure 3-2 Adjacent Vegetation

### Attachment 3-1 Vegetation Inventory

#### **323.100 Location and Boundary of Proposed Reference Area**

SCM will use range sites as described and designated by the NRCS Range Handbook and the UDOGM Vegetation Guidelines. Further description can be found in Section 356.100.

Mt. Nebo Scientific did sample a reference area during its 1996 vegetation survey, however SCM does not currently plan to use this data. Reference area(s) are not designated on any plate or figure within this M&RP, **except as noted in Section 323.**

#### **323.200 Elevations and Locations of Monitoring Stations**

Raptor nest locations and elk and deer range are shown on Plate 3-2. The permit area contains no fish monitoring stations.

#### **323.300 Facilities for Protection and Enhancement**

Sections 333.300 and 358.500 contain additional discussion pertaining to protective measures to be taken by SCM in behalf of wildlife.

#### **323.400 Vegetation Type and Plant Communities**

Vegetative types and plant communities are outlined on Plate 3-1 and 3-1A of this application.

Vegetation types and plant communities on Plate 3-1 were interpreted directly from aerial photographs except for selected areas. The inclusion of small vegetation units was limited and included the exclusion of small, long or narrow units of vegetation within other units.

Vegetation depicted on Plate 3-1A represents vegetation ground surveyed and identified in the field.

### **330 OPERATION PLAN**

#### **331 Measures Taken to Disturb the Smallest Practicable Area**

No vegetative disturbance is anticipated beyond that encountered during construction of the surface facilities. The area to be disturbed by operational facilities will be kept to a minimum. Only facilities required to maintain the coal operation or satisfy environmental or safety requirements will be built.

Disturbed areas will be seeded with a mixture which will meet the requirements necessary to stabilize and provide cover; and with sufficient production and diversity characteristic to satisfy regulatory requirements.

Sections 341 describes the seed mixes to be used in both interim and final reclamation of the disturbed areas. For both the interim and final reclamation mixes, the vegetation data were evaluated to determine seed mixture constituents in light of production, cover, and diversity requirements. The soils report was reviewed to select species adapted to the soil's physical and chemical condition. Plant species were selected on the basis of wildlife needs and requirements. In addition, the operations plan was reviewed to determine the need for species with quick establishment, rapid spreading, and high erosion control potentials.

#### **332 Description of Anticipated Impacts of Subsidence**

Subsidence and its anticipated impacts are discussed in Sections 333 and 525 of this M&RP.

The potential effects of subsidence on nests could be one or several of the following:

- Displacement and relocation of nesting raptor(s)/birds,
- Injury to or death of nest inhabitants,
- Nest destruction.

Subterranean changes caused by subsidence to wildlife habitat is not currently understood. Subsidence could disrupt burrow systems destroying the home and habitat of burrowing mammals, reptiles, and amphibians and possibly cause death to some species in the

immediate area. Since subsidence occurs systematically and in small areas at a given time, only localized populations will be impacted and only for a short period of time. Reproductive potential coupled with dispersal will facilitate recovery and negate the temporary population reduction.

#### Possible Short-Term and Long Term Impacts to Species Dependent on Springs, Creeks and Drainages

Impact to species dependent on springs, creeks and drainages could include disturbance of shelter, food, increased evaporation, rise and/or decrease in water temperature, water flow, and bank stability. Most species of wildlife are highly adaptable, while others with limited mobility are not. These species (mollusk (*Physella virgata*) and tiger salamander, mentioned in the TA on Task ID #1915) have likely been impacted by the drought conditions in Utah since 1999. These species have either died or have moved to locations where water and habitat are more abundant. If they have moved, then should their habitat change again, they will likely move to a more suitable area. Subsidence could in the future impact these species, however to the best of the permittee's knowledge neither the listed species or other species dependent on springs, creeks and drainages have been identified as being impacted by subsidence within the permitted area.

It is anticipated that streams within the permit area will not be significantly impacted as discussed in Chapter 5, Section 525.100. Interruptions of flow within perennial, intermittent, and ephemeral streams is not anticipated. Therefore, flows sustaining riparian and stream bank vegetation should continue during and after subsidence. Refer to Section 731.200 for a proposed monitoring and mitigation plan.

### **333 Plan to Minimize Disturbances and Adverse Impacts**

General control and mitigation measures addressing potential operational related biological impacts will include the following:

- Minimizing the total area of disturbance,
- Design, construction, and operation of facilities to minimize biological impacts including barriers to wildlife movements,
- Design and installation of electrical equipment to minimize electrocution hazards,
- Establishment of stream buffer zones,
- Control and monitoring of surface discharges and water quality,
- Exclusion of wildlife from potentially hazardous areas, and
- Reclamation of disturbed areas when they are no longer needed.

The raptor survey by the UDWR in 1997 lists the three nests within Section 16, T13S, R12E, as being two inactive hawk nests and an old dilapidated golden eagle nest. The dilapidated nest and an inactive hawk nest are located over a area planned for mining during 2001 to 2005 (comparison of Plates 3-2 and 5-7). The second inactive hawk nest is within the area of potential subsidence but not over mining. Since the condition of these nests may change by the time mining reaches their location a plan for their protection or taking will not be determined at this time.

The nests in Section 16 will be monitored in the annual raptor survey. Nine months or the summer prior to the period of potential subsidence a determination by SCM, UDWR (Fish and Wildlife) and UDOGM will be made as to the method(s) to be used for the protection of the nest(s).

Section 22, T13S, R12E contains a raven nest and an active golden eagle nest. Bill Bates and Ben Morris concurred that "the raven nest in Section 22 was not of particular concern, but that the golden eagle nest should be monitored." See Sections 322.200, 333.300 and 358.100 for the raptor monitoring commitments. The golden eagle nest is located over a area planned for mining during 2000 to 2001 (comparison of Plates 3-2 and 5-7). This nest will most likely continue to be active. The plan to protect the nesting birds will include a survey of the nest location the year prior to second mining to determine activity. In addition, the potential for laying, incubation or existence of young will be evaluated. The spring prior to the period of

potential subsidence a determination by SCM, UDWR (Fish and Wildlife) and UDOGM will be made as to the method(s) to be used for the protection of the nest(s) (see Section 333.300).

Only one of the old dilapidated golden eagle nests surveyed in Section 23 during 1997 was surveyed during the 1998 raptor survey. The UDWR in Price and Salt Lake and the Fish and Wildlife Service both in Salt Lake and Denver have been contacted to determine the need for a "take permit" for this nest.

According to a comparison of the raptor surveys performed in 1995 and 1997, the nest inhabitants, conditions and existence may change. Therefore each nest should be evaluated separately and not as a collective. Methods of protection will be determined on a case by case basis using the "best technology available".

The raptor nests located in the survey taken in 1998 are plotted on Plate 3-2 (~~Confidential Folder~~).

### **333.100 Minimized Disturbance to Endangered or Threatened Species**

SCM will apply all methods necessary to minimize disturbances or any adverse effects to ~~species listed~~ **endangered and threatened species listed on the tables in Appendix 3-3.**  
~~Tables 3-1 and 3-2.~~

### **333.200 Species and Habitats**

All species and habitats within the permit area will be protected to the best of SCM ability. Wildlife habitat protection will be considered in the construction of facilities. For additional information, see Section 333.300.

### **333.300 Protective Measures**

Upon notification or suspicion of raptor nests within the permit boundary **cliff escarpment subsidence zone** the following inventory will be taken to determine the potential actions to be taken by SCM.

**TABLE 3-2**  
**Native Utah Wildlife Species of Special Interest**  
**February 1999 (Revised)**

<b>Mammals</b>		<b>Status</b>
Grizzly Bear	<u>Ursus horribilis</u>	EX
Fisher	<u>Martes pennanti</u>	EX
Gray Wolf	<u>Canis lupus</u>	EX
Black-footed Ferret	<u>Mustela nigripes</u> <sup>4</sup>	EN
Utah Prairie Dog	<u>Gynomys parvidens</u> <sup>2</sup>	T
Wolverine	<u>Gulo gulo</u>	T
Spotted Bat	<u>Euderma maculatum</u>	SP
Allen's Big-eared Bat	<u>Idionycteris phyllotis</u>	SD
Fringer Myotis	<u>Myotis thysanodes</u>	SD
Dwarf Shrew	<u>Sorex nanus</u>	SD
Desert Shrew	<u>Notiosorex crawfordi</u>	SD
Abert's Squirrel	<u>Sciurus aberti navajo</u>	SD
Belding Ground Squirrel	<u>Spermophilus beldingi</u>	SD
Thirteen-lined Ground Squirrel	<u>Spermophilus tridecemlineatus</u>	SD
Spotted Ground Squirrel	<u>Spermophilus spilosoma</u>	SD
Yellow Pine Chipmunk	<u>Tamias amoenus</u>	SD
Wyoming Ground Squirrel	<u>Spermophilus elegans</u>	SD
Rock Pocket Mouse	<u>Chaetodipus intermedius</u>	SD
Olive-backed Pocket Mouse	<u>Perognathus fasciatus</u>	SD
Merriam's Kangaroo Rat	<u>Dipodomys merriami</u>	SD
Chisel-toothed Kangaroo Rat	<u>Dipodomys microps celsus</u>	SD
Cactus Mouse	<u>Peromyscus eremicus</u>	SD
Southern Grasshopper Mouse	<u>Onychomys torridus</u>	SD
Marten	<u>Martes americana</u>	SD
Pika	<u>Ochotona princeps</u>	SD
Ringtail	<u>Bassariscus astutus</u>	SD
Northern Flying Squirrel	<u>Glaucomys sabrinus</u>	SD
Western Red Bat	<u>Lasiurus blossevillii</u>	SP/SD
Big Free-tailed Bat	<u>Nyctinomops macrotis</u>	SP/SD

**TABLE 3-2 (Continued)**  
**Native Utah Wildlife Species of Special Interest**  
**February 1999 (Revised)**

Brazilian Free-tailed Bat	<u>Tadarida brasiliensis mexicana</u>	SP/SD
Townsend's Big-eared Bat	<u>Plecotus townsendii</u>	SP/SD
Desert Kangaroo Rat	<u>Dipodomys deserti</u>	SP/SD
Northern Rock Mouse	<u>Peromyscus nasutus</u>	SP/SD
Stephen's Woodrat	<u>Neotoma stephensi</u>	SP/SD
Virgin River Montane Vole	<u>Microtus ontanus rivularis</u>	SP/SD
Mexican Vole	<u>Microtus mexicanus</u>	SP/SD
Northern River Otter	<u>Lutra canadensis</u>	SP/SD
North American Lynx	<u>Felis lynx canadensis</u>	SP/SD

**Birds**

Passenger Pigeon	<u>Ectopistes migratorius</u>	E
American Peregrine Falcon	<u>Falco peregrinus anatum</u> <sup>4</sup>	EN
Southern Willow Flycatcher	<u>Empidonax traillii extimus</u> <sup>4</sup>	EN
Bald Eagle	<u>Haliaeetus leucocephalus</u> <sup>2</sup>	T
Ferruginous Hawk	<u>Buteo regalis</u>	T
Yellow-billed Cuckoo	<u>Coccyzus americanus occidentalis</u>	T
Mexican Spotted Owl	<u>Strix occidentalis lucida</u> <sup>2</sup>	T
Northern Goshawk	<u>Accipiter gentilis</u>	SP
Swainson's Hawk	<u>Buteo swainsoni</u>	SP
Caspian Tern	<u>Sterna caspia</u>	SP
Black Tern	<u>Chlidonias niger</u>	SP
Burrowing Owl	<u>Athene cunicularia</u>	SP
Common Yellowthroat	<u>Geothlypis trichas</u>	SP
Short-eared Owl	<u>Asio flammeus</u>	SP
American White Pelican	<u>Pelecanus erythrorhynchos</u>	SD
California Condor	<u>Gymnogyps californianus</u>	SD
Osprey	<u>Pandion haliaetur</u>	SD
Sharp-tailed Grouse	<u>Tympanuchus phasianellus columbianus</u>	SD
Williamson's Sapsucker	<u>Sphyrapicus thyroideus</u>	SD

**TABLE 3-2 (Continued)**  
**Native Utah Wildlife Species of Special Interest**  
**February 1999 (Revised)**

Three-toed Woodpecker	<u>Picoides tridactylus</u>	SD
Sage Grouse	<u>Centrocercus urophasianus</u>	SP/SD
Mountain Plover	<u>Charadrius montanus</u> <sup>3</sup>	SP/SD
Long-bill Curlew	<u>Numenius americanus</u>	SP/SD
Black Swift	<u>Cypseloides niger</u>	SP/SD
Lewis' Woodpecker	<u>Melanerpes lewis</u>	SP/SD
Crissal Thrasher	<u>Toxostoma crissale</u>	SP/SD
Bell's Vireo	<u>Vireo bellii</u>	SP/SD
Blue Grosbeak	<u>Guiraca caerulea</u>	SP/SD

Grasshopper Sparrow	<u>Ammodramus savannarum</u>	SP/SD
Bobolink	<u>Dolichonyx oryzivorus</u>	SP/SD

**Fish**

Utah Lake Sculpin	<u>Cottus echinatus</u>	E
Bonytail	<u>Gila elegans</u> <sup>+</sup>	EN
Colorado Squawfish	<u>Ptychocheilus lucius</u> <sup>+</sup>	EN
Humpback Chub	<u>Gila cypha</u> <sup>+</sup>	EN
Razorback Sucker	<u>Xyrauchen texanus</u> <sup>+</sup>	EN
Woundfin	<u>Plagopterus argentissimus</u> <sup>+</sup>	EN
Virgin River Chub	<u>Gila seminuda</u> <sup>+</sup>	EN
June Sucker	<u>Chasmistes liorus</u> <sup>+</sup>	EN
Lahontan Cutthroat Trout	<u>Oncorhynchus clarki henshawi</u> <sup>a</sup>	T
Roundtail Chub	<u>Gila robusta</u>	T
Leatherside Chub	<u>Gila copei</u>	SP
Flannelmouth Sucker	<u>Catostomus latipinnis</u>	SP
Bluehead Sucker	<u>Catostomus discobolus</u>	SP
Bonneville Cisco	<u>Prosopium gemmiferum</u>	SD
Bonneville Whitefish	<u>Prosopium spilonotus</u>	SD
Bear Lake Whitefish	<u>Prosopium abyssicola</u>	SD

TABLE 3-2 (Continued)

**Native Utah Wildlife species of special interest  
February 1999 (Revised)**

Bear Lake Sculpin	<u>Cottus extensus</u>	SD
Desert Sucker	<u>Catostomus clarki</u>	SD
Colorado River Cutthroat Trout	<u>Oncorhynchus clarki pleuriticus</u>	C
Bonneville Cutthroat Trout	<u>Oncorhynchus clarki utah</u>	C
Virgin Spinedace	<u>Lepidomeda mollispinis mollispinis</u>	C
Least Chub	<u>lotichthys phlegethontis</u> <sup>9</sup>	C

**Reptiles and Amphibians**

Banded Gila Monster	<u>Heloderma suspectus cinctum</u>	EN
Desert Tortoise	<u>Gopherus agassizii</u> <sup>2</sup>	EN
Utah Mountain Kingsnake	<u>Lampropeltis pyromelana infralabialis</u>	SP
Utah Milk Snake	<u>Lampropeltis tringulum taylori</u>	SP
Desert Iguana	<u>Dipsosaurus dorsalis</u>	SD
Utah Banded Gecko	<u>Coleonyx variegatus utahensis</u>	SD
Utah Night Lizard	<u>Xantusia vigilis utahensis</u>	SD
Desert Night Lizard	<u>Xantusia vigilis vigilis</u>	SD
Mojave Zebra-tailed Lizard	<u>Callisaurus draconoides rhodostictus</u>	SD
California Kingsnake	<u>Lampropeltis getula californiae</u>	SD
Southwestern Black-headed Snake	<u>Tantilla hobartsmithi</u>	SD
Desert Glossy Snake	<u>Arizona elegans eburnata</u>	SD
Painted Desert Glossy Snake	<u>Arizona elegans philipi</u>	SD
Sonora Lyre Snake	<u>Trimorodon biscutatus lambda</u>	SD
Utah Blind Snake	<u>Leptotyphlops humilis utahensis</u>	SD
Mojave Patch-nosed Snake	<u>Salvadora hexalepis mojavensis</u>	SD

Southwestern Speckled Rattlesnake	<u>Crotalus mitchellii pyrrhus</u>	SD
Mojave Rattlesnake	<u>Crotalus scutulatus scutulatus</u>	SD
Mojave Desert Sidewinder	<u>Crotalus cerastes cerastes</u>	SD
Western Chuckwalla	<u>Sauromalus obesus obesus</u>	SP/SD

**TABLE 3-2 (Continued)**  
**Native Utah Wildlife species of special interest**  
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Glen Canyon Chuckwalla	<u>Sauromalus obesus multiforaminatus</u>	SP/SD
Many-lined Skink	<u>Eumeces multivirgatus gageae</u>	SP/SD
Plateau Striped Whiptail	<u>Gnemidophorus velox</u>	SP/SD
Great Plains Rat Snake	<u>Elaphe guttata emoryi</u>	SP/SD
Smooth Green Snake	<u>Opheodrys vernalis</u>	SP/SD
Relict Leopard Frog	<u>Rana onca</u>	E
Boreal Toad	<u>Bufo boreas boreas</u> <sup>a</sup>	SP
Arizona Toad	<u>Bufo microscaphus microscaphus</u>	SP
Lowland Leopard Frog	<u>Rana yavapaiensis</u>	SP
Pacific Chorus Frog	<u>Pseudacris regilla</u>	SD
Spotted Frog	<u>Rana pretiosa</u> <sup>a</sup>	C

**Mollusk**

Kanab Amber Snail	<u>Oxyloma haydeni kanabensis</u> <sup>1</sup>	E
Fish Spring Pond Snail	<u>Stagnicola pilsbryi</u>	E
Utah Valvata Snail	<u>valvata utahensis</u> <sup>1</sup>	E
California Floater	<u>Anodota californiensis</u>	T
Thickshell Pondsnailed		
[Utah Band Snail]	<u>Stanicola utahensis</u>	T
Round Mouth valvata	<u>Valvata humeralis</u>	SP
Clinton Cave Snail	<u>Pristiloma subrupicola</u>	SD
Eureka Mountainsnail	<u>Oreohelix eurekaensis eurekaensis</u>	SD
Lyrate Mountainsnail	<u>Oreohelix haydeni haydeni</u>	SD
Edgen Rocky Mountainsnail	<u>Oreohelix perpherica wasatchensis</u> <sup>a</sup>	SD

**TABLE 3-2 (Continued)**  
**Native Utah Wildlife species of special interest**  
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Wet-rock Physa		
[Zion Canyon Snail]	<u>Physella sionis</u>	SD
Yavapai Mountainsnail	<u>Oreohelix yavapai</u>	SD
Brian Head Mountainsnail	<u>Oreohelix parowanensis</u>	SD
Fat-whorled Pondsnailed	<u>Stagnicola bonnevillensis</u> <sup>3</sup>	SP/SD
Utah Physa		
[Utah Bubble Snail]	<u>Physella utahensis</u>	SP/SD

<del>Uinta Mountainsnail</del>	<del><u>Oreohelix eurekaensis uinta</u></del>	<del>SP/SD</del>
<del>Desert Spring Snail</del>	<del><u>Pyrgulopsis deserta</u></del>	<del>SP/SD</del>
<del>Fish Lake Physa Snail</del>	<del><u>Physella microstriata</u></del>	<del>SP/SD</del>

<sup>1</sup>Species is federally listed as Endangered

<sup>2</sup>Species is federally listed as Threatened

<sup>3</sup>Species is federally listed as Candidate

**TABLE 3-2 (Continued)**  
**Native Utah Wildlife Species of Special Interest**  
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- ~~E - Extinct: Any wildlife species that has disappeared in the world.~~  
~~EX - Extirpated: Any wildlife species that has disappeared from Utah since 1800.~~  
~~EN - Endangered: Any wildlife species or subspecies which is threatened with extirpation from Utah or extinction resulting from very low or declining numbers, alteration and/or reduction of habitat, detrimental environmental changes, or any combination of the above. Continued long-term survival is unlikely without implementation of special measures.~~  
~~T - Threatened: Any wildlife species or subspecies which is likely to an endangered species within the foreseeable future throughout all or a significant part of its range in Utah or the world.~~  
~~SP - Special Concern: Any wildlife species or subspecies which has experienced a substantial decrease in population, distribution and/or habitat availability.~~  
~~SD - Special Concern: Any wildfire species or subspecies which occurs in limited areas and/or numbers due to a restricted or specialized habitat.~~  
~~SP/SD - Special Concern: Any wildlife species or subspecies which has both a declining population and a limited range.~~  
~~C - Conservation: Any wildlife species or subspecies, except those species currently listed under the Endangered Species Act as Threatened or Endangered, that meets the state criteria of Endangered, Threatened or of Special Concern, but is currently receiving sufficient special management under a Conservation Agreement developed and/or implemented by the state to preclude its listing above. In the event that the conservation agreement is not implemented, the species will be elevated to appropriate category.~~

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- Verify the existence of a nest or nests,
- Verify occupation by birds/raptors, eggs or young,
- Determine the condition of nest or nests,
- Location of nest in relationship to recoverable resource (creation of table with nest location number and planned year for undermining).

The information collected in the inventory will be discussed with various agency personnel (i.e., UDOGM, USFWS, DWR, etc.). SCM and the various agencies will determine:

- a method of avoidance when possible,
- determine seasons/months for nests to be covered/uncovered,
- explore alternative methods of protection or removal, and

- develop a mitigation plan when needed.

The method(s) to be used will be determined prior to the period of potential subsidence.

SCM does not currently know the exact locations or thicknesses of recoverable resource, therefore to determine the potential loss of revenues is premature in relation to the avoidance of a raptor nest or nests. Each nest(s) and its corresponding occupant(s) and circumstances will be evaluated by a qualified person nine months or the summer prior to the period of potential subsidence. A determination by SCM, UDWR (Fish and Wildlife) and UDOGM will be made as to the method(s) to be used for the protection/avoidance/removal of the nest(s) (refer above to inventory listing in this section).

SCM commits to include wildlife awareness and protection training in its annual training curriculum for all employees and request requiring the haulage contractors to provide the same training for its employees. ~~When possible, the training will include participation by a representative of UDWR.~~

Wildlife accustomed to their current sources of food may be endangered with a change or enhancement of plant species. The improvement or addition of water developments can act to concentrate wildlife in a specific area, thus causing compaction to soils and over grazing of vegetation in an area. Areas which may be fenced to exclude livestock from an area, may also exclude wildlife, thus causing increased competition for food and territory in another area. Since SCM is unaware of the possible advantages or disadvantages to change in an area of habitat, we commit to use the best technology currently available to handle specific concerns, and which will benefit the greatest range of wildlife. Should the enhancement of habitat outside the disturbed area become necessary to attract wildlife away from the mining facilities, efforts will be coordinated with the UDWR.

Revegetation of disturbed areas, as part of the reclamation effort, will include a mixture of grasses, forbs, shrubs and trees which are beneficial to wildlife.

### 358 Protection of Fish, Wildlife and Related Environmental Values

SCM will minimize disturbances and adverse impacts on fish, wildlife, and their related environments as outlined in Section 333.

The intermittent flow of streams within the lease area does not support a population of game fish; therefore, there are no fisheries within the disturbed area to protect. In addition, the streams in Pace and Rock Canyons have intermittent flow and do not support a population of game fish. See Chapter 7 of this M&RP for methods to protect water sources in the area.

Proposed surface disturbance associated with mining activities will be reviewed by the DWR and UDOGM in reference to wildlife exclusionary periods, see letter in Appendix 3-3 concerning mitigation for disturbance in 2004 - 2006.

#### 358.100 Existence of Endangered or Threatened Species

Coal mining will not be conducted where it's operation might jeopardize the existence of any endangered or threatened species. The mining of coal will not result in the **planned** destruction or adverse modification of these species critical habitat, **unless approved by appropriate agency(ies)**.

Any state or federally listed endangered or threatened specie will be reported to the Division upon its discovery. A ground nest survey for raptors and bird species of special interest was performed prior to site disturbance by a qualified person. A letter report of the ground nest survey is included in Appendix 3-3. Mining operations will proceed in accordance with Division stipulations. These stipulations also apply to reclamation operations at the Dugout Canyon Mine.

Lists of threatened, endangered, and sensitive species are included in ~~this chapter as Tables 3-1 and 3-2~~. **Appendix 3-3. In addition, Appendix 3-3 contains 2003 and 2004 survey data for Mexican Spotted Owls and a letter from the DWR concerning installation of nesting boxes to satisfy mitigation requirements.**

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Rock Canyon crosses area used by deer as winter range, however traffic is sporadic during the winter months and heavier during the summer and fall months.

### Raptors

Golden eagles are a common year long resident of the area, with suitable nesting habitat spread throughout the permit area. The cooper's hawk is known to nest in the permit area.

A variety of falcons are year long residents of the area, utilizing cliffs for their nests. To date there are no known aerie sites for falcons within or immediately adjacent to the disturbed area.

Raptors were studied during the 1979 - 1980 UDWR transect study, in 1981 by Janet Lee Young and by Hayden-Wing Associates in 1984. These reports are provided in Appendix 3-3.

Raptor nest surveys were done by the UDWR in 1995, 1997, 1998, and 1999. The nest locations identified in 1997 and 1998 are shown on Plate 3-2 in the mine's UDOGM confidential folder (confidentiality required by UDWR). All nests located in the 1997 survey were cliff nests (Ben Morris, UDWR, January 20, 1998). All nests located in the 1998 and 1999 surveys were cliff nests.

Raptor nest surveys will be conducted annually in the Spring prior to mining activities or potential subsidence within the permit area and in proposed expansion areas to the permit to obtain base line data.

### Migratory and Song Birds

Birds were studied during the 1979 - 1980 UDWR transect study. However, a more extensive study was done by Hayden-Wing Associates in 1984. Their report can be found in Appendix 3-3.

### Reptiles and Amphibians

Increasing elevation rapidly reduces the number and kind of reptiles and amphibians. Furthermore, in Utah the effects of the more northern latitude reduces the number of herptiles in much the same way as does the increase in elevation.

These geographical and associated climatic factors have eliminated most desert species, leaving species that are adapted either to mountain habitats or montane type habitats. Based on extensive literature review and limited field work, it was determined that potentially 8 species of amphibians and 18 species of reptiles inhabit the area. Of these species only 5 were recorded by the UDWR in 1980: Eastern fence lizard, Sagebrush lizard, Tree lizard, Short-horned lizard, and the Gopher snake. A WESTECH biologist observed two other species in 1979, the Western whiptail and the Midget faded rattlesnake. All amphibians and reptiles are legally protected, but since the species listed are all widespread throughout the mountains of Utah, none are treated as high-interest species. It is doubtful that the proposed action would seriously impact populations, but localized individuals may be involved in habitat destruction due to subsidence. An exception to this would be if subsidence caused drying of present wet habitats essential to reproduction. Refer to Section 332 for a discussion of "Possible Short-Term and Long Term Impacts to Species Dependent on Springs, Creeks and Drainages".

**Threatened and Endangered Plant and Wildlife Species.** Passage of the Endangered Species Act of 1973 (Public Law 23-20S) provided the legal basis for establishment of lists of endangered and threatened plant and wildlife species (Appendix 3-3).

Although three species (black-footed ferret, bald eagle, and peregrine falcon) on the list could potentially inhabit the area, an inventory of endangered wildlife species performed in 1979 by the UDWR recorded no threatened and endangered species within the proposed permit area. No confirmed sightings of black-footed ferrets have occurred within Carbon County during 1995, 1996, and the first quarter of 1997, however bald eagles have been seen flying in the vicinity of the mine (Bill Bates, UDWR).

A literature review and field studies for both the Soldier Canyon and the Sage Point - Dugout Canyon permit documents were performed to assess the possible presence of any threatened, endangered, or sensitive plant and wildlife species in the respective permit and adjacent areas.

These study areas included the proposed Dugout Canyon disturbed area. The literature review indicated that no species listed (or proposed as candidates) by the U.S. Fish and Wildlife Service (FWS) as threatened or endangered were likely to inhabit the area. In addition, the field

investigations which occurred in 1979, 1980, 1983, and 1984 did not identify or locate any threatened or endangered species. No threatened or endangered plant species including Canyon sweetvetch were found within the disturbed area by Robert Thompson during his 1995 survey (see Robert Thompson letter, Appendix 3-1). Mr. Thompson is qualified and has performed threatened and endangered surveys for the U.S. Forest Service.

As reported in the 1997 bat survey "we noted no suitable habitat, did not record via detectors or capture, or note by indicators presence of *Corynorhinus townsendii*. It is our opinion the bat does not occur in the immediate vicinity of the proposed disturbance area. We also did not note suitable habitat for or encounter *Euderma maculatum* by mist net, via detectors or during audible bat transects".

#### **Windy Gap Process as it Applies to Existing Coal Mines in the Upper Colorado River Basin**

Per meetings with Division of Water Quality personnel during application for a UPDES permit in 2004, "there is no data supporting the premise that surface waters associated with the area of the mine operations reached the Price River or Colorado River prior to or since mining disturbance".

#### Mining Consumption:

Culinary Water is purchased from PRWID and hauled by D & D Trucking to the Mine.

Estimated **Purchased** Gallons/yr: 1,003,200

#### Ventilation Consumption/Evaporation:

29,354 gallons/day (3/05/04 ventilation survey)

44,000 gallons/day (9/13/04 ventilation survey)

$73,354 \times 0.5 = 36,677$  gallons/day (survey average)

$36,677 \times 365 = 13,387,105$  gallons/yr

#### Coal Producing Consumption/Coal Moisture Loss:

Water added to coal produced - 4.03% inherent moisture - source Dugout Geologist  
5.80% run-of-mine moisture - year to date average  
1.77% moisture added to coal by cutting operation

Projected Tonnage 2004 4,245,737 tons

Projected Tonnage 6 year average 4,369,084 tons

Tons water/yr 77,333

Pounds water/yr 154,665,562

Gallons water/yr 18,522,822

#### Sediment Pond Evaporation:

Mine Site Pond 0.107 acres (surface area)

18.1 in/yr (high estimate based on HCI Technical Memo, August 22, 2002)

	0.16 ac/ft
	7030 gallons/yr
Refuse Pile Pond	0.41 acres (surface area)
	9 in/yr
	0.31 ac/ft
	5612 gallons/yr (five month period, high estimate)

Spring and Seeps Effects From Subsidence - Not Applicable

Alluvial Aquifer Abstractions into Mines - Not Applicable

Alluvial Well Pumpage - Not Applicable

Deep Aquifer Pumpage - Not Applicable

Postmining Inflow to Workings - Not Applicable

Direct Diversions: - Not Applicable

Dust Suppression - 3,500 gallons per truck load, 3 loads per day, for 30 days = 315,000 gallons plus 3,000 per truck load, 1.25 loads per day, for 45 days = 168,750. Total: 483,750 gallons per year.

Mine Discharge: 6 Month Average 362,118 gpd = 132,172,948 gal/yr

Calculation estimates for water use in 2004 were necessary since we are using 2004 purchases and usage and the year is 2 months short.

**Habitats of Unusually High Value.** High value habitats in Dugout Canyon include the riparian area and the cliff escarpments. Major portions of established habitat will not be disturbed, but the restricted access by wildlife to the water source within the area of disturbance could displace wildlife. The cliff areas adjacent to the disturbed area could harbor mountain lion, bobcat and bear; and with increased activity and noise they may avoid the area. Elk and deer who may frequent Dugout Canyon will likely avoid the area during the heaviest of activity, but resume their normal patterns once they become accustomed to it.

In a letter dated April 22, 1996 to James W. Carter the director of UDOGM, Robert G. Valentine director of the UDWR makes the following comment "much of the area is classified as critical deer winter range and is heavily used by deer and occasionally by elk and antelope". Use classification drawings of the Dugout Canyon area for large mammals (deer, elk, antelope, etc.) were requested from the UDWR in January of 1996 by SCM. The cover letter dated January 30, 1996 from the UDWR and the drawings are included in Appendix 3-3 for interpretation by UDOGM. SCM has interpreted and transferred the information (provided by UDWR) to Plate 3-2. The use classifications were extended on Plate 3-2 with the incorporation of Federal Lease U-07064-027821.

A survey for bats was performed by Mark Perkins in September of 1997. A report of this survey is included in Appendix 3-3 with a figure showing the bat survey locations. Future surveys for bats will be done concurrent with raptor surveys within the permit boundary prior to cliff disturbing planned subsidence. Pertinent data gathered in these surveys will be included in this M&RP.

No data or definition was available to determine the criteria for an area to be classified as of "unusually high value" for bats. However, since extensive rock faces, cliffs, and escarpments are present throughout the Book Cliffs Region, the land within the permit boundary is not unusual or unique to the area. The Castlegate Sandstone, Blackhawk, and Price River are the cliff forming formations present in the Dugout Canyon area. Refer to Chapter 6 for descriptions of these formations and Plate 3-3 for their locations.

In the Perkins-Dugout Mine Bat Survey the following statement was made "development plans for the proposed disturbance area contains some mitigation for resident bat species. A proposed runoff pond will likely provide accessible year round water and an associated bio-mass. Presently Dugout Creek is not classified as a perennial stream. In addition, plans include several outdoor flood lights which may act as an attractant for phototropic insects and provide a concentrated and stable food resource for local bat populations. Due to no cliff subsidence and mitigating actions noted above, it is our opinion that excepting the disturbance to and removal of 2,000 ft. of riparian zone, impact (either positive or negative) on local bat populations is minimal".

A bat survey is planned for the Spring of 2005, this survey will cover the cliff areas adjacent to a proposed fan breakout in Pace Canyon. Future surveys for bats will be done concurrent with raptor surveys within the permit boundary prior to mining in areas within cliff areas with the potential to subside. Raptors will be monitored on an annual basis by the permittee and DWR in areas proposed for mining during a given year.

Since water and its corresponding vegetation are important throughout the state of Utah, regulatory agencies have been requiring mitigation for disturbance and eventual replacement from the coal industry. SCM will comply with the requirements of mitigation and eventual replacement of the resources which may be lost or disturbed during this mining operation, refer to Sections 331, 340, 350, and 762.100.

As a mitigation effort SCM replanted 7,500 feet of disturbed riparian streambank above the northern disturbed area boundary with a modified version of Seed Mix No. 1 (mitigation seed mix), to assist in restoring vegetation which has been disturbed by the logging industry.

**Mitigation Seed Mix (Hydroseed/Broadcast Quantities)**

<u>SPECIES</u>	<u># pls/acre</u>
Bluebunch wheatgrass	5.0
Intermediate wheatgrass	5.0
Slender wheatgrass	5.0
Smooth brome	5.0
Indian ricegrass	3.0
Blueleaf aster	1.0
Blue flax	1.5
Northern sweetvetch	1.5
Mountain big sagebrush	1.0
TOTAL	<hr/> 28.0

Willows were transplanted along the edges of the stream channel above the mine site disturbed area, with the mitigation seed mix being planted from the east edge of the stream channel to the outside edge of the logging road cut. The area between the edge of the stream channel and road cut varies from 10 to 45 feet as it travels the 7,500 feet planned for replanting. The west side of the channel was not disturbed by logging. For clarification the stream channel changes to the west side of the road upstream from the disturbed area boundary.

Due to the steepness and roughness of the slope the area was hydroseeded. The mitigation seed mix (listed above) was sprayed using hydroseeding equipment over the mitigation area. A second pass of the hydroseeding equipment sprayed the mulch/tackifier on top of the previously sprayed seed mix. Two thousand pounds per acre of the Division approved (Appendix 3-1) wood fiber mulch (Ecofiber, trade name) were used on the mitigation area. The seeding and planting was completed during 1998.

Additional mitigation for disturbance is being done to comply with the requirements of the UDWR. The mitigation included the cutting of grown pinyon and juniper trees to improve the growth of the understory adjacent to the Nine Mile Canyon Road. These mitigation efforts are being coordinated directly with the UDWR.

SCM will plant approximately 4,000 willows including both the mitigation described previously and during final reclamation. A portion of the willows were planted during the spring of 1998 to satisfy the mitigation commitment. Willows were planted wherever the channel afforded sufficient space. The channel above the mine site is covered with rock slides in several stretches of approximately 100 feet each. Additional willows will be planted to complete the commitment, however the numbers being planted may decrease since it was discovered during the Spring planting that the channel affords a limited environment for willows. CFC has discussed this matter with Paul Baker of UDOGM and a commitment made by CFC to continue to keep UDOGM involved in the mitigation process. Paul Baker was contacted in 2001 concerning the progression of the willows planted, photographs were taken and forwarded to Mr. Baker for his review. Survival rate for the willows planted was estimated at 75%.

During a site visit in December of 1997, Bill Bates of the UDWR requested that the riparian mitigation include the installation of habitat/stability enhancement structures within Dugout Creek upstream from the proposed disturbed area. SCM commits to the installation of structures similar to those identified in Figure 7-12 should all regulatory agencies and SCM be in agreement. The location and type of structure will be correlated with UDWR, U.S. Fish and Wildlife Service, and the Division.

### **322.300 Fish and Wildlife Service Review**

If requested, SCM authorizes the release of information pertaining to Section 322 and 333 to the U.S. Fish and Wildlife Service Regional and Field office for their review.

### **323 Maps and Aerial Photographs**

The permit area was mapped by use of a mosaic of aerial photographs and assured by ground inspection in some areas. Maps are contained within the reports provided in Appendices 3-1, 3-2 and 3-3.

During a meeting with the UDWR on January 20, 1998 Ben Morris requested that "the nest locations and related data gathered in the 1997 raptor survey of the Dugout Canyon Mine area be kept confidential". Therefore this survey will not be discussed or presented in this permit document, but can be reviewed by Division personnel within the Dugout Canyon Mine "confidential binder". The confidential binder contains Plate 3-2 which shows the location of nests found during the raptor surveys conducted by UDWR. In a Technical Analysis (Task ID #1915) for the inclusion of the SITLA Lease into the permitted area, instructions were given by UDOGM personnel to remove this information from the confidential folder and include it in the M&RP. This information is currently contained in Appendix 3-3.

Vegetation drawings and appendices within the permit area not included in the M&RP are included in the following amendments:

#### Refuse Pile Amendment

- RA Figure 3-1 Surrounding Representative Vegetation Communities
- RA Figure 3-2 Vegetation at Site Prior to Mining Disturbance
- RA Attachment 3-1 Vegetation Data

#### Methane Degassification Amendment

- Figure 3-1 Vegetation Reference Areas
- Figure 3-2 Adjacent Vegetation
- Attachment 3-1 Vegetation Inventory

### **323.100 Location and Boundary of Proposed Reference Area**

SCM will use range sites as described and designated by the NRCS Range Handbook and the UDOGM Vegetation Guidelines. Further description can be found in Section 356.100.

Mt. Nebo Scientific did sample a reference area during its 1996 vegetation survey, however SCM does not currently plan to use this data. Reference area(s) are not designated on any plate or figure within this M&RP, except as noted in Section 323.

### **323.200 Elevations and Locations of Monitoring Stations**

Raptor nest locations and elk and deer range are shown on Plate 3-2. The permit area contains no fish monitoring stations.

### **323.300 Facilities for Protection and Enhancement**

Sections 333.300 and 358.500 contain additional discussion pertaining to protective measures to be taken by SCM in behalf of wildlife.

### **323.400 Vegetation Type and Plant Communities**

Vegetative types and plant communities are outlined on Plate 3-1 and 3-1A of this application.

Vegetation types and plant communities on Plate 3-1 were interpreted directly from aerial photographs except for selected areas. The inclusion of small vegetation units was limited and included the exclusion of small, long or narrow units of vegetation within other units. Vegetation depicted on Plate 3-1A represents vegetation ground surveyed and identified in the field.

### **330 OPERATION PLAN**

#### **331 Measures Taken to Disturb the Smallest Practicable Area**

No vegetative disturbance is anticipated beyond that encountered during construction of the surface facilities. The area to be disturbed by operational facilities will be kept to a minimum. Only facilities required to maintain the coal operation or satisfy environmental or safety requirements will be built.

Disturbed areas will be seeded with a mixture which will meet the requirements necessary to stabilize and provide cover; and with sufficient production and diversity characteristic to satisfy regulatory requirements.

Sections 341 describes the seed mixes to be used in both interim and final reclamation of the disturbed areas. For both the interim and final reclamation mixes, the vegetation data were evaluated to determine seed mixture constituents in light of production, cover, and diversity requirements. The soils report was reviewed to select species adapted to the soil's physical and chemical condition. Plant species were selected on the basis of wildlife needs and requirements. In addition, the operations plan was reviewed to determine the need for species with quick establishment, rapid spreading, and high erosion control potentials.

#### **332 Description of Anticipated Impacts of Subsidence**

Subsidence and its anticipated impacts are discussed in Sections 333 and 525 of this M&RP.

The potential effects of subsidence on nests could be one or several of the following:

- Displacement and relocation of nesting raptor(s)/birds,
- Injury to or death of nest inhabitants,
- Nest destruction.

Subterranean changes caused by subsidence to wildlife habitat is not currently understood. Subsidence could disrupt burrow systems destroying the home and habitat of burrowing mammals, reptiles, and amphibians and possibly cause death to some species in the immediate area. Since subsidence occurs systematically and in small areas at a given time, only localized populations will be impacted and only for a short period of time. Reproductive potential coupled with dispersal will facilitate recovery and negate the temporary population reduction.

#### Possible Short-Term and Long Term Impacts to Species Dependent on Springs, Creeks and Drainages

Impact to species dependent on springs, creeks and drainages could include disturbance of shelter, food, increased evaporation, rise and/or decrease in water temperature, water flow, and bank stability. Most species of wildlife are highly adaptable, while others with limited mobility are not. These species (mollusk (*Physella virgata*) and tiger salamander, mentioned in the TA on Task ID #1915) have likely been impacted by the drought conditions in Utah since 1999. These species have either died or have moved to locations where water and habitat are more abundant. If they have moved, then should their habitat change again, they will likely move to a more suitable area. Subsidence could in the future impact these species, however to the best of the permittee's knowledge neither the listed species or other species dependent on springs, creeks and drainages have been identified as being impacted by subsidence within the permitted area.

It is anticipated that streams within the permit area will not be significantly impacted as discussed in Chapter 5, Section 525.100. Interruptions of flow within perennial, intermittent, and ephemeral streams is not anticipated. Therefore, flows sustaining riparian and stream bank vegetation should continue during and after subsidence. Refer to Section 731.200 for a proposed monitoring and mitigation plan.

### **333 Plan to Minimize Disturbances and Adverse Impacts**

General control and mitigation measures addressing potential operational related biological impacts will include the following:

- Minimizing the total area of disturbance,
- Design, construction, and operation of facilities to minimize biological impacts including barriers to wildlife movements,
- Design and installation of electrical equipment to minimize electrocution hazards,
- Establishment of stream buffer zones,
- Control and monitoring of surface discharges and water quality,
- Exclusion of wildlife from potentially hazardous areas, and
- Reclamation of disturbed areas when they are no longer needed.

The raptor survey by the UDWR in 1997 lists the three nests within Section 16, T13S, R12E, as being two inactive hawk nests and an old dilapidated golden eagle nest. The dilapidated nest and an inactive hawk nest are located over a area planned for mining during 2001 to 2005 (comparison of Plates 3-2 and 5-7). The second inactive hawk nest is within the area of potential subsidence but not over mining. Since the condition of these nests may change by the time mining reaches their location a plan for their protection or taking will not be determined at this time.

The nests in Section 16 will be monitored in the annual raptor survey. Nine months or the summer prior to the period of potential subsidence a determination by SCM, UDWR (Fish and Wildlife) and UDOGM will be made as to the method(s) to be used for the protection of the nest(s).

Section 22, T13S, R12E contains a raven nest and an active golden eagle nest. Bill Bates and Ben Morris concurred that "the raven nest in Section 22 was not of particular concern, but that the golden eagle nest should be monitored." See Sections 322.200, 333.300 and 358.100 for the raptor monitoring commitments. The golden eagle nest is located over a area planned for

mining during 2000 to 2001 (comparison of Plates 3-2 and 5-7). This nest will most likely continue to be active. The plan to protect the nesting birds will include a survey of the nest location the year prior to second mining to determine activity. In addition, the potential for laying, incubation or existence of young will be evaluated. The spring prior to the period of potential subsidence a determination by SCM, UDWR (Fish and Wildlife) and UDOGM will be made as to the method(s) to be used for the protection of the nest(s) (see Section 333.300).

Only one of the old dilapidated golden eagle nests surveyed in Section 23 during 1997 was surveyed during the 1998 raptor survey. The UDWR in Price and Salt Lake and the Fish and Wildlife Service both in Salt Lake and Denver have been contacted to determine the need for a "take permit" for this nest.

According to a comparison of the raptor surveys performed in 1995 and 1997, the nest inhabitants, conditions and existence may change. Therefore each nest should be evaluated separately and not as a collective. Methods of protection will be determined on a case by case basis using the "best technology available".

The raptor nests located in the survey taken in 1998 are plotted on Plate 3-2 (~~Confidential Folder~~).

### **333.100 Minimized Disturbance to Endangered or Threatened Species**

SCM will apply all methods necessary to minimize disturbances or any adverse effects to endangered and threatened species listed on the tables in Appendix 3-3.

### **333.200 Species and Habitats**

All species and habitats within the permit area will be protected to the best of SCM ability. Wildlife habitat protection will be considered in the construction of facilities. For additional information, see Section 333.300.

### 333.300 Protective Measures

Upon notification or suspicion of raptor nests within the permit boundary cliff escarpment subsidence zone the following inventory will be taken to determine the potential actions to be taken by SCM.

- Verify the existence of a nest or nests,
- Verify occupation by birds/raptors, eggs or young,
- Determine the condition of nest or nests,
- Location of nest in relationship to recoverable resource (creation of table with nest location number and planned year for undermining).

The information collected in the inventory will be discussed with various agency personnel (i.e., UDOGM, USFWS, DWR, etc.). SCM and the various agencies will determine:

- a method of avoidance when possible,
- determine seasons/months for nests to be covered/uncovered,
- explore alternative methods of protection or removal, and
- develop a mitigation plan when needed.

The method(s) to be used will be determined prior to the period of potential subsidence.

SCM does not currently know the exact locations or thicknesses of recoverable resource, therefore to determine the potential loss of revenues is premature in relation to the avoidance of a raptor nest or nests. Each nest(s) and its corresponding occupant(s) and circumstances will be evaluated by a qualified person nine months or the summer prior to the period of potential subsidence. A determination by SCM, UDWR (Fish and Wildlife) and UDOGM will be made as to the method(s) to be used for the protection/avoidance/removal of the nest(s) (refer above to inventory listing in this section).

SCM commits to include wildlife awareness and protection training in its annual training curriculum for employees and request the haulage contractors to provide the same training for its employees.

Wildlife accustomed to their current sources of food may be endangered with a change or enhancement of plant species. The improvement or addition of water developments can act to concentrate wildlife in a specific area, thus causing compaction to soils and over grazing of vegetation in an area. Areas which may be fenced to exclude livestock from an area, may also exclude wildlife, thus causing increased competition for food and territory in another area. Since SCM is unaware of the possible advantages or disadvantages to change in an area of habitat, we commit to use the best technology currently available to handle specific concerns, and which will benefit the greatest range of wildlife. Should the enhancement of habitat outside the disturbed area become necessary to attract wildlife away from the mining facilities, efforts will be coordinated with the UDWR.

Revegetation of disturbed areas, as part of the reclamation effort, will include a mixture of grasses, forbs, shrubs and trees which are beneficial to wildlife.

As part of the overall surface water monitoring program, SCM will monitor surface water flow to determine its relationship to area subsidence. See Chapter 7 of this M&RP for a discussion of the water monitoring program.

Areas of potential mining will be surveyed for raptor nests prior to the beginning of mining and two seasons after mining has ceased. Pertinent data gathered in these surveys will be included in this M&RP and evaluated by qualified personnel to determine the method(s) to be used to avoid, protect, or take the raptor's nest(s).

Before a pesticide is used, the type and concentration will be approved in conjunction with UDWR or the Division.

During the construction of the Dugout Mine, wildlife in the area will most likely be displaced due to the noise and added human activity. Construction, mining, supplier personnel and their corresponding equipment will be required to stay within the disturbed area boundary during construction activities. 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 boundary. Fluids used to maintain construction equipment will be stored in a safe method, to prevent contamination.

### **340 RECLAMATION PLAN**

The reclamation plan will include the following: seed mix, rate of seedlings per acre, stocking rates for shrub and tree plantings, planting techniques, fertilization methods, and amount and frequency of application. The fish and wildlife plan for the permit area is outlined in Section 342.

Canyon Fuel Company, LLC  
SCM/Dugout Canyon Mine

Mining and Reclamation Plan  
November 2004

**Pages 3-29 through 3-34 are intentionally left blank.**

### **358 Protection of Fish, Wildlife and Related Environmental Values**

SCM will minimize disturbances and adverse impacts on fish, wildlife, and their related environments as outlined in Section 333.

The intermittent flow of streams within the lease area does not support a population of game fish; therefore, there are no fisheries within the disturbed area to protect. In addition, the streams in Pace and Rock Canyons have intermittent flow and do not support a population of game fish. See Chapter 7 of this M&RP for methods to protect water sources in the area.

Proposed surface disturbance associated with mining activities will be reviewed by the DWR and UDOGM in reference to wildlife exclusionary periods, see letter in Appendix 3-3 concerning mitigation for disturbance in 2004 - 2006.

#### **358.100 Existence of Endangered or Threatened Species**

Coal mining will not be conducted where it's operation might jeopardize the existence of any endangered or threatened species. The mining of coal will not result in the planned destruction or adverse modification of these species critical habitat, unless approved by appropriate agency(ies).

Any state or federally listed endangered or threatened specie will be reported to the Division upon its discovery. A ground nest survey for raptors and bird species of special interest was performed prior to site disturbance by a qualified person. A letter report of the ground nest survey is included in Appendix 3-3. Mining operations will proceed in accordance with Division stipulations. These stipulations also apply to reclamation operations at the Dugout Canyon Mine.

Lists of threatened, endangered, and sensitive species are included in Appendix 3-3. In addition, Appendix 3-3 contains 2003 and 2004 survey data for Mexican Spotted Owls and a letter from the DWR concerning installation of nesting boxes to satisfy mitigation requirements.

**APPENDIX 3-3**

Fish and Wildlife Data

Add information from CONFIDENTIAL FOLDER PER REQUEST UNDER TASK ID # 1915

Canyon Fuel Company, LLC  
SCM/Dugout Canyon Mine

Mining and Reclamation Plan  
November 2004

**APPENDIX 4-3**

Cultural and Historical Studies  
SITLA Lease and Adjacent Area

Add information to CONFIDENTIAL FOLDER PER REQUEST UNDER TASK ID # 1915

**APPENDIX 4-3**

Cultural and Historical Studies  
SITLA Lease and Adjacent Area

REFERENCE CONFIDENTIAL FOLDER PER REQUEST UNDER TASK ID # 1915

CHAPTER 5  
ENGINEERING

technologically and economically feasible by restoring the land to a condition capable of maintaining the value and reasonably foreseeable uses which it was capable of supporting before the subsidence. In addition, SCM will notify the Division of any slide, rock fall, or other disturbance known to be caused by subsidence that will have an adverse effect on the environment.

**Protection of Significant Surface Resources.** None of the following exist within the area of potential subsidence associated with the Dugout Canyon Mine:

- Public buildings or facilities,
- Churches, schools, and hospitals,
- Impoundments with a storage capacity of 20 acre-feet or more or bodies of water with a volume of 20 acre-feet or more,
- Aquifers or bodies of water that serve as a significant water source for any public water supply system, or
- Urbanized areas, cities, towns, or communities.

Hence, no special control measures are required to preclude subsidence impacts to these resources.

Raptor nests and other wildlife resources which may be influenced by subsidence are presented on Plate 3-2. A discussion of protective measures associated with wildlife resources in the permit area is presented in Section 333.300 of this M&RP. **Additional information pertaining to monitoring and mitigation for potential impacts due to subsidence is contained in Sections 332, 358, 724.100 and 731.200 of this M&RP.**

#### **525.300 Public Notice of Proposed Mining**

Each owner of property or resident within the area above an underground mining block and adjacent area that may be affected by subsidence will be notified by mail at least 6 months prior to mining or within that period if approved by the Division. The notification will contain:

technologically and economically feasible by restoring the land to a condition capable of maintaining the value and reasonably foreseeable uses which it was capable of supporting before the subsidence. In addition, SCM will notify the Division of any slide, rock fall, or other disturbance known to be caused by subsidence that will have an adverse effect on the environment.

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- Aquifers or bodies of water that serve as a significant water source for any public water supply system, or
- Urbanized areas, cities, towns, or communities.

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**CHAPTER 7**  
**HYDROLOGY**

**TABLE 7-1**  
**OBSERVATION WELL COMPLETION SUMMARY<sup>(a)</sup>**

Well Number	Total Drilled Depth (ft)	Elev. Top of Casing (ft)	Casing ID (in)	Length of Perf. (ft)	Formation Monitored
GW-5-1	1,826	7,186.4	5	22	Blackhawk
GW-6-1	2,180	7,724.7	5	200	Blackhawk
GW-10-2	2,084	7,727.4	5	250	Castlegate
GW-11-2	2,399	8,203.8	5	175	Price River
GW-19-1	2,050	8,258.2	4	364	North Horn, Price River, Castlegate, Blackhawk
GW-24-1*	1,706	8,422.0	4	100	Castlegate
GW-32-1	2,360	7,152.1	2.5	50	Blackhawk
G-58.5	3,177	7,398	8.5	5	Blackhawk

<sup>(a)</sup> See Plate 7-1 for well locations.

\* Monitoring discontinued 4<sup>th</sup> Quarter 2004 due to blockage.

groundwaters in the Flagstaff and North Horn Formations, and 2) the exposed recharge area of the Price River Formation is limited primarily to areas of steep cliff faces.

Wahler Associates (1982) indicate that monitoring well GW-11-2 (Plate 7-1) is completed within the Price River Formation. Data collected from this well (Appendix 7-4) indicate that water levels varied by approximately 8 feet during the period of December 1979 through November 1982, but showed no consistent trend. A measurement collected in September 1995 indicated that the water level was 1.2 feet lower than the last time it was measured nearly 13 years earlier. Hence, although a slight decline in water levels has occurred during the period of record, this decline is not considered significant.

Castlegate Sandstone. The Castlegate Sandstone consists of a fine- to medium-grained sandstone that is cemented with clay and calcium carbonate. The outcrops of this sandstone form prominent cliffs in the area.

Data presented in Table 7-2 and Appendix 7-2 indicate that only two springs (SC-80 and SC-81) have been found issuing from the Castlegate Sandstone within the permit and adjacent areas. Therefore, this formation is not considered to be a significant aquifer. The flow of these springs was 1 gpm or less in September 1995, with no measurable flow being observed in October 1995. Based on specific conductance measurements collected from these springs, the TDS concentration of water issuing from the Castlegate Sandstone varies from about 360 to 430 mg/l. The water is slightly alkaline, with a pH of 7.7 to 8.0.

Wahler Associates (1982) indicate that monitoring wells GW-10-2 and GW-24-1 (Plate 7-1) are completed in the Castlegate Sandstone. With the exception of early measurements which were likely influenced by the presence of drilling fluids prior to perforation of the casing (Waddell et al., 1986), data collected from GW-24-1 indicate that water levels varied by 4.5 feet during the period of March 1980 through November 1982 (Appendix 7-4), but no consistent trend was noted. The cap could not be removed from this well for a water-level measurement in September 1995. **During the Winter of 1999-2000, Monitoring Well 24-1 became blocked. The water level in the well has been inaccessible since that time and was permanently removed from monitoring after the 4<sup>th</sup> Quarter of 2004.**

Data collected from GW-10-2 indicate that water levels have declined approximately 20 feet during the 15-year period of record following an initial stabilization of drilling fluids after casing perforation (January 1980 through September 1995). The rate of this decline has been gradual.

~~Plate 7-3 provides a~~ The potentiometric surface of groundwater flow in the Castlegate Sandstone is to the north-northwest at an average gradient of 0.024 ft/ft based on measurements reported by Wahler Associates (1982) for November 1982. ~~The Also included on this plate is the datum reported for GW-11-2, under the assumption that the Price River Formation is in hydraulic connection with the Castlegate Sandstone~~ **was also used to determine the potentiometric gradient.** This map indicates that the flow of groundwater in the Castlegate Sandstone is to the north-northwest at an average gradient of 0.024 ft/ft.

Groundwater recharge to the Castlegate Sandstone is from precipitation and snowmelt. However, as evidenced by the fact that the surface exposure of the Castlegate within the permit and adjacent areas is generally limited to steep cliffs within minimal horizontal surface area, total recharge is probably low. Recharge to the Castlegate Sandstone is further limited by the lack of significant developed soil resources over the formation to encourage infiltration and the presence of low-permeability shales in the overlying Price River Formation (see Waddell et al., 1981).

Discharge from the Castlegate Sandstone probably occurs mainly as springs along the outcrop and as through-flow to the underlying Blackhawk Formation. As indicated above, spring flow from the unit is limited in flow and in occurrence. Besides the monitoring wells completed in the Castlegate Sandstone, no known wells are completed in the formation.

Blackhawk Formation. The Blackhawk Formation underlies the Castlegate Sandstone and consists of interbedded sandstone, siltstone, shale, and coal. The Rock Canyon coal seam, to be mined by SCM, is located in the lower portion of the Blackhawk Formation.

Only three springs have been identified as issuing from the Blackhawk Formation (SC-61, SC-62, and G-100 - see Table 7-2). Springs SC-61 and SC-62 issue near a stream channel in a tributary of Dugout Canyon. Limited data collected from these springs (Appendix 7-2) indicate

rise in water level elevation between June 3, 1993 and August 24, 1993 which corresponded to mine development in the vicinity of the well. This rise in water level can be explained by the redistribution of vertical stress acting on the nearby coal (see Appendix 7-3). Following completion of the 1993 development, a sustained moist area was identified on the floor of the Soldier Canyon Mine No. 5 entry, adjacent to GW-5-1. Furthermore, subsequent monitoring of the water level in the well indicated that, between August 24, 1993 and November 1, 1995, the average rate of water level decline increased to approximately 0.09 ft/day (an increase of about 4.5 times the previously observed rate). This decline was likely due to dewatering of the Blackhawk Formation in the immediate vicinity of the monitoring well.

Wahler Associates (1982) calculated a transmissivity of 0.009 gpd/ft ( $1.2 \times 10^{-3}$  ft<sup>2</sup>/day) from the falling-head slug test which they performed in GW-5-1. Sergeant, Hauskins & Beckwith (1986) reported transmissivities of  $2.3 \times 10^{-3}$  to  $6.7 \times 10^{-4}$  cm<sup>2</sup>/s ( $2.1 \times 10^{-1}$  to  $6.2 \times 10^{-2}$  ft<sup>2</sup>/day) for slug tests conducted in holes drilled into the Blackhawk Formation from within the Soldier Canyon Mine. Based on monitored thicknesses of 22 feet in GW-5-1 (Table 7-1) and 120.8 feet in each of the in-mine holes (Sergeant, Hauskins & Beckwith, 1986), the hydraulic conductivity of the Blackhawk Formation is calculated to vary from  $5.5 \times 10^{-5}$  to  $1.7 \times 10^{-3}$  ft/day, with a median of  $5.1 \times 10^{-4}$  ft/day.

Well GW-6-1 is perforated over a 200-foot long interval which includes the Sunnyside seam (see Table 7-1). Initial water level measurements collected from this well are believed to be associated with residual water remaining from drilling and casing operations and are, therefore, probably not representative of natural conditions. Water levels declined between November 1989 and August 1991 (Figure 7-7). From August 1991 through August 1993, water levels in GW-6-1 remained relatively stable at a depth of approximately 425 feet. Monitoring on June 3, 1994 found the well to be dry and plugged at a depth of approximately 470 feet. All subsequent attempts to monitor this well have found the plugged/dry condition unchanged.

Monitoring well GW-32-1 is perforated in the Blackhawk Formation immediately above the Sunnyside seam (see Table 7-1) in a location which is down dip of Soldier Canyon Mine workings. Water level monitoring information shows a fairly consistent rise in water elevation.

From November 1994 through August 1995, the water level appears to have stabilized at a depth of approximately 291 feet (Figure 7-7). There is no information at this time that would suggest that underground mining activities in the nearby Soldier Canyon Mine are effecting the water levels observed to date.

Monitoring well G-58.5 was completed by Mountain Fuel Supply Company into the Blackhawk Formation in 1979. Waddell et al. (1986) reported a depth-to-water in March 1980 in this well of 502.8 feet. Waddell et al. (1982) reported depths to water of 501.7 to 502.4 feet in April and September 1980. No additional water-level data are available for this well.

Attempts for this M&RP to construct a potentiometric surface for the Blackhawk Formation in the Soldier Canyon area based on data collected from GW-5-1, GW-6-1, and GW-32-1 proved

fruitless. The difficulty in preparing this potentiometric surface may have been due to the influence of outcropping in the adjacent Soldier Canyon, the influence of mining in the nearby Soldier Canyon Mine, and/or varying lengths and stratigraphic locations of the perforated sections of the monitoring wells within the discontinuous strata which comprise most of the Blackhawk Formation. However, based on water-level data collected from one of the existing Dugout Canyon portals and from monitoring wells GW-5-1 and G-58.5, Waddell et al. (1986) concluded that the flow of groundwater in the Blackhawk Formation within the permit and adjacent areas is to the north away from the face of the cliffs (i.e., down dip as generally seen in the Castlegate Sandstone on Plate 7-3). They estimated the hydraulic gradient in the Blackhawk Formation to be 42 feet per mile (0.008 ft/ft). Waddell et al. (1986) indicate that the coal bearing zone to be mined in the Dugout Canyon operations will probably be saturated in most areas and will require dewatering during mining. **However, since mining was initiated at the Dugout Mine, saturated coal zones have not been encountered. The majority of the water encountered during mining both the Rock Canyon and Gilson seams has entered the mine through the roof and discharges from isolated sandstone channels within the Blackhawk Formation.**

Recharge to the Blackhawk Formation is of limited magnitude, due primarily to the limited area of exposure on steep outcrops and the presence of low-permeability units in overlying formations. Data presented in Appendix 7-3 indicate that Blackhawk Formation groundwater which discharges into the Soldier Canyon Mine is of ancient meteoric origin (greater than 20,000 years), thereby supporting the conclusion that the rate of recharge to the formation is minimal. Mayo and Associates (1996) concluded that the old groundwater age and the isotopic compositions of water encountered in the Soldier Canyon Mine are evidence that the groundwaters are not part of actively flowing, shallow groundwater systems. The groundwater ages also demonstrate that the hydraulic connection between these old groundwaters and the overlying active (and younger) groundwater systems in the Flagstaff and North Horn Formations is very limited or does not exist.

The quality of groundwater in the Blackhawk Formation has been evaluated by Mayo and Associates (1996) based on data collected from leakage into the Soldier Canyon Mine (see Appendix 7-3). These data indicate that Blackhawk Formation groundwater has a mean TDS concentration of about 750 mg/l and is of the sodium-bicarbonate type (Figure 7-6). These waters are chemically distinct from groundwater in overlying groundwater systems. The solute compositions of mine groundwaters suggest a complex series of rock-water and gas-water reactions (Mayo and Associates, 1996).

The dissolved iron concentration of groundwater flowing into the Soldier Canyon Mine has historically been less than 0.5 mg/l and is generally less than 0.1 mg/l (see Appendix 7-2). The total iron concentration of this water has historically been less than 2.0 mg/l and generally less than 0.5 mg/l. The total manganese concentration of Blackhawk Formation water (as measured in the Soldier Canyon Mine) has historically been less than 0.5 mg/l and is typically less than 0.1 mg/l (see Appendix 7-2).

Four exploration holes (DUG0104, 0204, 0101, and 0201) were drilled within or immediately adjacent to the SITLA Lease area and completed in the Blackhawk formation. All holes were completed below the Gilson Coal Seam. No water was encountered in any of the exploration holes per personal communication with Mike Stevenson, Project Geologist, Ark Land Company, November 22, 2004.

Exploration Hole Number	Location (approximate)	Year Drilled
DUG0104	T13S, R13E, Section 20, NW1/4SE1/4	2004
DUG0204	T13S, R13E, Section 19, SE1/4NE1/4	2004
DUG0101	T13S, R13E, Section 30, NE1/4NW1/4	2001
DUG0201	T13S, R13E, Section 19, SE1/4SE1/4	2001

Star Point Sandstone. In those locations where the Star Point Sandstone exists within the permit and adjacent areas, it consists of a fine-grained calcareous sandstone with layers of siltstone and mudstone. In keeping with regional practice (see Lines, 1985), the Star Point Sandstone and Blackhawk Formation are considered to be hydraulically connected. However, only one spring (SC-64) has been discovered issuing from the Star Point Sandstone within the permit and adjacent areas. The near absence of springs in this formation suggests that the Star Point does not receive appreciable annual recharge and that it does not support active groundwater systems in the area.

Recharge to the Star Point Sandstone probably occurs via leakage from the overlying Blackhawk Formation. Hence, this water is likely of ancient origin.

Data collected from SC-64 indicated that the discharge of this spring declined from 2 gpm to 0.5 gpm in the period of September 1995 to October 1995 (see Appendix 7-2). The TDS of this water, as estimated from the specific conductance data, is approximately 700 mg/l, with a pH of about 7.5.

Mancos Shale. The Mancos Shale is exposed south of the permit area. This formation is a relatively impermeable marine shale and is not considered to be a regional or local aquifer. Groundwater samples collected from four monitoring wells located approximately 2 miles south of Soldier Canyon Mine have a mean TDS concentration of approximately 10,000 mg/l and is of the sodium-sulfate-chloride type (Appendix 7-3). Chemical compositions are consistent with the dissolution of halite and gypsum as well as cation exchange.

#### Recharge and Discharge Relations

Recharge within the permit area occurs primarily on the exposed upland outcrops of the Flagstaff Formation and the North Horn Formation. Waddell et al. (1986) estimated that the annual recharge

to the Flagstaff Formation is 9 percent of the total annual precipitation. Recharge is probably greatest where surface fractures intersect the topographic highs where the Flagstaff and North Horn Formations outcrop. Recharge to the Blackhawk Formation and the Star Point Sandstone probably occurs primarily from vertical movement of water through the overlying formations. The rate of recharge to the Blackhawk Formation and the Star Point Sandstone is very slow, as evidenced by the ancient age of groundwater within those formations (see Appendix 7-3).

Assuming mass-balance and stable hydrologic conditions, recharge will equal discharge over the long term. The relatively young age of groundwater discharging from the Flagstaff and North Horn Formations as compared with the underlying Blackhawk Formation suggests that the stratigraphically-higher water discharges rapidly and is not hydraulically connected with the Blackhawk Formation. Waddell et al. (1986) conclude that the perched nature of the Flagstaff Formation protects it from the influence of dewatering of the coal-bearing zone unless the upper zone is influenced by subsidence.

Waddell et al. (1986) performed seepage studies in Pine Canyon (located immediately north of the permit area) and found that significant increases in the flow of Pine Canyon occur near the contact of the North Horn Formation and the overlying Flagstaff Formation. They concluded that downward percolation from the Flagstaff Formation is impeded by the claystones and mudstones of the North Horn Formation, forcing the water to move laterally and emerge along the outcrop in the canyon bottom.

#### Mining Impacts to Subsurface Water Resources

As presented previously, exploration drilling in the SITLA tract has not encountered significant volume of water in the Gilson seam or overlying strata. As discussed in previous paragraphs, the formations that overlie the coal seams do not include extensive units of rock that would form large aquifers. The Blackhawk Formation can discharge water from isolated channel sandstones in the roof of the mine. However, very few springs have been found on the surface in the Dugout Canyon Mine area that discharge from Blackhawk units. Springs that do discharge from the Blackhawk Formation typically have very low flows. In-mine flows that are encountered as a result of mining typically discharge from the roof, are initially much less than 100 gpm, and have flow rates that decrease rapidly as mining progresses. The sandstone channels that hold water in the Blackhawk are typically lenticular, have low to moderately low transmissivity rates, of limited areal extent, and contain waters older than 50 years and typically older than a few thousand years. Since the Blackhawk Formation in the Dugout Canyon Mine area, including the SITLA Tract, is very similar throughout, it is unlikely that mining will encounter large volumes of water as coal is removed from the Gilson seam in the permit area as a whole.

The Price River and Castlegate Sandstone formations are also poor aquifers in the mine area as described in the previous sections. Only two springs have been found within the Dugout Mine area, including the SITLA tract, issuing from these formations. These formations do not conduct water readily, do not contain extensive aquifers, and do not appear to be saturated. Subsidence of these

formations will not cause significant changes to subsurface water resources since these resources are apparently not present.

Water bearing strata within the North Horn and Flagstaff Formations (the contact between the two formations is indistinguishable in most of the SITLA tract) should not be significantly affected. Subsiding these formations may result in locally increased hydraulic conductivity within the strata but water loss to the underlying formations will be minimal, if at all. The fine grained units (siltstones and shales) that perch the aquifers within the North Horn/Flagstaff Formations should easily seal subsidence induced fractures and limit downward migration of water from the isolated aquifers. Additionally, the Price River Formation consists of interbedded mudstone, siltstone, and fine-grained sandstones. The finer-grained siltstone and mudstones would seal fractures within the formation and inhibit downward movement or loss of water from the North Horn/Flagstaff aquifers.

## 724.200 Surface Water Information

### Water Quantity

The permit area exists within portions of the Dugout Creek, Soldier Creek, Pace Creek, and Rock Creek watersheds. Major tributaries of Soldier Creek whose watersheds extend into the permit area include Fish Creek and Pine Canyon. Based on observations and flow data obtained during the collection of water-quality samples within the permit and adjacent areas, portions of Dugout, Fish Creek, and Pace Creek are considered perennial within the permit area. Pine Canyon appears to be perennial in its upper reaches near the northern border of the permit area. Rock Creek appears to be perennial in its upper reaches above the Castlegate Sandstone and only intermittent below the formation. Several smaller tributaries of these streams within the permit and adjacent areas, are ephemeral.

Waddell et al. (1981) estimated that the average flow of Dugout Creek is approximately 7 cubic feet per second (5,100 acre-feet per year) and that up to 70 percent of the streamflow occurs during the period of May through July each year. The seasonal record of a stream gaging station which was installed on Dugout Creek during the period of October 1, 1979 through October 2, 1981 suggest that this estimate of the seasonal variation is correct (see Appendix 7-5). The location of this stream gaging station (DC-1) is noted on Plate 7-1.

During the 1980 water year, Waddell et al. (1986) estimated that the total flow of Dugout Creek at station DC-1 (referred by them as station S60) was 1,900 acre-feet. They further estimated that 53 percent of this flow (1,000 acre-feet) was contributed by springs issuing from the Flagstaff Formation, 10 percent (200 acre-feet) was contributed by springs issuing from the Blackhawk and other formations, and 37 percent (700 acre-feet) was contributed as surface runoff.

The average flow of Soldier Creek has been estimated by Waddell et al. (1981) to be approximately 8 cubic feet per second (5,800 acre-feet per year). This flow is expected to vary seasonally in a

manner similar to that reported for Dugout Creek (i.e., the majority of the flow occurring during the late spring and early summer months in response to snowmelt runoff).

During the 1980 water year, Waddell et al. (1986) estimated that the total flow of Soldier Creek at station G-5 was 4,200 acre-feet. The source of this runoff was estimated to be as follows:

- 43 percent (1,800 acre-feet) from springs issuing from the Flagstaff Formation;
- 24 percent (1,000 acre-feet) from springs issuing from the Blackhawk and other formations; and
- 33 percent (1,400 acre-feet) as surface runoff.

Hence, the relative contribution of the Flagstaff Formation to streamflow in Soldier Creek is lower than that in Dugout Creek, while the contribution of the Blackhawk and other formations to Dugout Creek is lower than that to Soldier Creek.

Seasonal fluctuations in the discharge of streams in the area are readily apparent in the hydrographs of Solider Creek (Figure 7-8) and Dugout Creek (Figure 7-9). Locations of these stations are noted on Plate 7-1. As indicated, the discharge of local streams is greatest in the late spring and early summer months when influenced predominantly by snowmelt runoff.

Waddell et al. (1986) performed seepage measurements along Pine Canyon and Soldier Creek in the autumns of 1979 and 1980, in an effort to evaluate the effects of bedrock formations on the baseflow of the creeks. The seepage measurements demonstrated significant inflow to Pine Canyon occurs from the Flagstaff Formation near the contact with the underlying North Horn Formation. In Soldier Creek, the investigation found that 1) base flow more than tripled as Soldier Creek crossed the North Horn Formation, 2) base flow decreased about 20 to 30 percent as the creek crossed the Price River Formation and Castlegate Sandstone, and 3) base flow increased 10 to 25 percent as the creek crossed the Blackhawk Formation.

Equipment, structures and other devices used in conjunction with monitoring the quality and quantity of surface water in the permit and adjacent areas have been or will be installed, maintained, and operated in accordance with accepted procedures. Where feasible, this equipment will be removed or properly abandoned by SCM when no longer needed.

#### Monitoring and Mitigation Plan Pace Creek

Dugout Canyon Mine plans to leave a barrier under the majority of Pace Creek within the permit boundary. The stretches of Pace Creek (10/04 mine map) which are planned for undermining are above entry development, not longwall panels. There is approximately 1000 feet of stream channel having over 500 feet of cover planned for mining in 2007, 400 feet has approximately 900 feet of cover planned for mining in 2008 and approximately 100 feet has 1250 feet of cover planned for mining in 2008-2009. A surface water monitoring and mitigation program will be initiated in this area prior to potential subsidence occurring. This monitoring program will include conducting a pre-mining subsidence video tape survey of the stream channel from surface water monitoring location PC1A to where Pace Creek leaves the SW1/4SW14 Section 22, T13S, R13E. The purpose of the video will be to provide a visual record of the stream channel prior to mining disturbance. Five sites will be identified within the video taped portion of Pace Creek where the monitoring of surface ground water flows, channel width and general geomorphology will occur. The video taping of Pace Creek and the selection of monitoring sites will be done in the Spring of 2006 and submitted as part of the 2006 annual report.

The surface water flows and channel width at these stations will be monitored on a monthly basis, when accessible, while mining is occurring within the 15 degree angle-of-draw of the stream channel. The Division will be notified if the area is inaccessible due to road or climatic conditions and the monitoring could not be accomplished. Once mining has been completed within the angle-of draw, the sites will be monitored annually for up two years following undermining. A report on the subsidence related impacts, if any, to the surface water flows, will be provided monthly to the Division during monthly monitoring and annually during annual monitoring.

Mitigation will implement the Best Technology Currently Available in association with the repair of damage to the Pace Creek stream channel. The repairs may include the use of bentonite/soil mixes to fill persistent cracks that appear to be diverting water. Bentonite may also be used to line portions of the creek floor where leakage appears to be occurring. Other methods or chemicals, if environmentally safe and available, may be employed if bentonite and/or bentonite/soil mixes are ineffectual.

### **731.300 Acid- and Toxic-Forming Materials**

Analyses presented in Chapter 6 of this M&RP indicate that acid- and toxic-forming materials are not present within the permit area. Parameters defining acid- and toxic-forming materials will periodically be monitored as described in Chapter 6 of this M&RP. In the event that acid- or toxic-forming materials are identified, they will be disposed of in appropriate waste-rock disposal facilities as described in Chapter 5 of this M&RP.

### **731.400 Transfer of Wells**

Before final release of bond, exploration or monitoring wells will be sealed in a safe and environmentally sound manner in accordance with R645-301-631, R645-301-738, and R645-301-765. Ownership of wells will be transferred only with prior approval of the Division. The conditions of such a transfer will comply with State and local laws. The permittee will remain responsible for the management of the wells until bond release in accordance with R645-301-529, R645-301-551, R645-301-631, R645-301-738, and R645-301-765.

### **731.500 Discharges**

**Discharges into an Underground Mine.** No discharges of surface water will be made to an underground mine in the permit and adjacent areas.

**Gravity Discharges from an Underground Mine.** No gravity discharges will be made from an underground mine in the permit and adjacent areas.

### **731.600 Stream Buffer Zones**

The surface facilities for the Dugout Canyon Mine will be constructed within 100 feet of Dugout Creek (a perennial stream). However, surface runoff- and sediment-control facilities designed for the site (as discussed in subsequent sections of this chapter) will ensure that coal mining and reclamation operations will not cause or contribute to the violation of applicable Utah or federal water standards and will not adversely affect the water quantity and quality or other environmental resources of the stream.

**Stream Channel Diversions.** Temporary or permanent stream channel diversions will comply with R645-301-742.300.

**Buffer Zone Designation.** The area surrounding the streams that is not to be disturbed will be designated as a buffer zone, and SCM will mark those zones as specified in Section 521.200 of this M&RP.

### **731.700 Cross Sections and Maps**

The locations of water rights for current users of surface water flowing into, out of, and within the permit and adjacent areas is provided on Plate 7-2. The locations of each water diversion, collection, conveyance, treatment, storage, and discharge facility to be used in the Dugout Canyon area is presented on Plate 7-5 or in Addendum A to Appendix 7-9.

Locations and elevations of each station to be used for water monitoring during coal mining and reclamation operations are presented on Plate 7-1. The design details and cross sections for the sedimentation pond are provided on Plate 7-4. Other relevant cross sections or maps are presented and discussed in Chapter 5 of this M&RP.

### **731.800 Water Rights and Replacement**

No surface mining will occur in the Dugout Canyon Mine permit area.

### **732 Sediment Control Measures**

The sediment control measures within the permit area have been designed to prevent additional contributions of sediment to streamflow or to runoff outside the permit area. In addition, they have been designed to meet applicable effluent limitations, and minimize erosion to the extent possible.

The structures to be used for the runoff-control plan for the permit area include disturbed and undisturbed area diversion channels, a sedimentation pond, containment berms, silt fences, and road diversions and culverts.

#### **732.100 Siltation Structures**

The siltation structure within the permit area will be a sedimentation pond as described in Section 732.200.

#### **732.200 Sedimentation Ponds**

There will be a single sedimentation pond operating at the mine facility located at the southwest end of the disturbed area. The sedimentation pond topography and cross sections are presented on Plate 7-4 of this M&RP. Details regarding sedimentation pond design are presented in Appendix 7-8. The staff gauge in the pond will be marked to indicate the 60% clean-out elevation as defined in Section 742. The sedimentation pond is defined as a Class A pond in accordance with TR-60 (U.S. Soil Conservation Service, 1976).

If sediment has accumulated to the 60% clean-out elevation, the pond will be cleaned. The sediment will be transported and either stored at the Banning Loadout or disposed of at the approved waste rock disposal sites as described in Chapter 5 of this M&RP or pumped back into the sealed, abandoned "Gilson West - Old Workings".

The sedimentation pond is within the disturbed area boundary and is subject to final reclamation. The area is included in the calculation of the disturbed area subject to bonding and in the calculation of final reclamation costs.

**Compliance Requirements.** The sedimentation pond will be maintained until removal in accordance with the reclamation plan (see Section 540 of this M&RP). When the pond is removed, the land will be revegetated in accordance with the reclamation plan defined in Section 540.

The sedimentation pond was designed to contain 0.40 acre-foot of sediment accumulation before being cleaned out. The sedimentation pond will fully contain the runoff from the 10-year, 24-hour storm event in addition to sediment accumulation. The primary spillway for the sedimentation pond will adequately pass the peak flow resulting from the 25-year, 6-hour precipitation event. The pond has also been designed with an emergency spillway to release water from the pond in the event that the primary spillway becomes blocked.

Additional design standards for the pond are presented in Section 742.

**MSHA Requirements.** MSHA requirements defined in 30 CFR 77.216 are not applicable since the sedimentation pond will not impound water or sediment to an elevation of 20 feet or more above the upstream toe of the structure. The pond will also store a volume less than 20 acre-feet.

### 732.300 Diversions

The objective of the runoff control plan is to isolate, to the maximum degree possible, runoff from disturbed areas from that of undisturbed areas. This is accomplished by:

- Allowing all upstream runoff in Dugout Creek to bypass the disturbed area through the use of culverts;
- Routing runoff from the adjacent undisturbed areas above the facilities through culverts and diversion ditches where feasible to bypass the disturbed area; and
- Routing any runoff from undisturbed areas which enters the disturbed area into the sediment control system.

**TABLE 7-1**  
**OBSERVATION WELL COMPLETION SUMMARY<sup>(a)</sup>**

Well Number	Total Drilled Depth (ft)	Elev. Top of Casing (ft)	Casing ID (in)	Length of Perf. (ft)	Formation Monitored
GW-5-1	1,826	7,186.4	5	22	Blackhawk
GW-6-1	2,180	7,724.7	5	200	Blackhawk
GW-10-2	2,084	7,727.4	5	250	Castlegate
GW-11-2	2,399	8,203.8	5	175	Price River
GW-19-1	2,050	8,258.2	4	364	North Horn, Price River, Castlegate, Blackhawk
GW-24-1*	1,706	8,422.0	4	100	Castlegate
GW-32-1	2,360	7,152.1	2.5	50	Blackhawk
G-58.5	3,177	7,398	8.5	5	Blackhawk

<sup>(a)</sup> See Plate 7-1 for well locations.

\* Monitoring discontinued 4<sup>th</sup> Quarter 2004 due to blockage.

groundwaters in the Flagstaff and North Horn Formations, and 2) the exposed recharge area of the Price River Formation is limited primarily to areas of steep cliff faces.

Wahler Associates (1982) indicate that monitoring well GW-11-2 (Plate 7-1) is completed within the Price River Formation. Data collected from this well (Appendix 7-4) indicate that water levels varied by approximately 8 feet during the period of December 1979 through November 1982, but showed no consistent trend. A measurement collected in September 1995 indicated that the water level was 1.2 feet lower than the last time it was measured nearly 13 years earlier. Hence, although a slight decline in water levels has occurred during the period of record, this decline is not considered significant.

Castlegate Sandstone. The Castlegate Sandstone consists of a fine- to medium-grained sandstone that is cemented with clay and calcium carbonate. The outcrops of this sandstone form prominent cliffs in the area.

Data presented in Table 7-2 and Appendix 7-2 indicate that only two springs (SC-80 and SC-81) have been found issuing from the Castlegate Sandstone within the permit and adjacent areas. Therefore, this formation is not considered to be a significant aquifer. The flow of these springs was 1 gpm or less in September 1995, with no measurable flow being observed in October 1995. Based on specific conductance measurements collected from these springs, the TDS concentration of water issuing from the Castlegate Sandstone varies from about 360 to 430 mg/l. The water is slightly alkaline, with a pH of 7.7 to 8.0.

Wahler Associates (1982) indicate that monitoring wells GW-10-2 and GW-24-1 (Plate 7-1) are completed in the Castlegate Sandstone. With the exception of early measurements which were likely influenced by the presence of drilling fluids prior to perforation of the casing (Waddell et al., 1986), data collected from GW-24-1 indicate that water levels varied by 4.5 feet during the period of March 1980 through November 1982 (Appendix 7-4), but no consistent trend was noted. The cap could not be removed from this well for a water-level measurement in September 1995. During the Winter of 1999-2000, Monitoring Well 24-1 became blocked. The water level in the well has been inaccessible since that time and was permanently removed from monitoring after the 4<sup>th</sup> Quarter of 2004.

Data collected from GW-10-2 indicate that water levels have declined approximately 20 feet during the 15-year period of record following an initial stabilization of drilling fluids after casing perforation (January 1980 through September 1995). The rate of this decline has been gradual.

The potentiometric surface of groundwater flow in the Castlegate Sandstone is to the north-northwest at an average gradient of 0.024 ft/ft based on measurements reported by Wahler Associates (1982) for November 1982. The datum reported for GW-11-2, under the assumption that the Price River Formation is in hydraulic connection with the Castlegate Sandstone was also used to determine the potentiometric gradient.

Groundwater recharge to the Castlegate Sandstone is from precipitation and snowmelt. However, as evidenced by the fact that the surface exposure of the Castlegate within the permit and adjacent areas is generally limited to steep cliffs within minimal horizontal surface area, total recharge is probably low. Recharge to the Castlegate Sandstone is further limited by the lack of significant developed soil resources over the formation to encourage infiltration and the presence of low-permeability shales in the overlying Price River Formation (see Waddell et al., 1981).

Discharge from the Castlegate Sandstone probably occurs mainly as springs along the outcrop and as through-flow to the underlying Blackhawk Formation. As indicated above, spring flow from the unit is limited in flow and in occurrence. Besides the monitoring wells completed in the Castlegate Sandstone, no known wells are completed in the formation.

Blackhawk Formation. The Blackhawk Formation underlies the Castlegate Sandstone and consists of interbedded sandstone, siltstone, shale, and coal. The Rock Canyon coal seam, to be mined by SCM, is located in the lower portion of the Blackhawk Formation.

Only three springs have been identified as issuing from the Blackhawk Formation (SC-61, SC-62, and G-100 - see Table 7-2). Springs SC-61 and SC-62 issue near a stream channel in a tributary of Dugout Canyon. Limited data collected from these springs (Appendix 7-2) indicate

rise in water level elevation between June 3, 1993 and August 24, 1993 which corresponded to mine development in the vicinity of the well. This rise in water level can be explained by the redistribution of vertical stress acting on the nearby coal (see Appendix 7-3). Following completion of the 1993 development, a sustained moist area was identified on the floor of the Soldier Canyon Mine No. 5 entry, adjacent to GW-5-1. Furthermore, subsequent monitoring of the water level in the well indicated that, between August 24, 1993 and November 1, 1995, the average rate of water level decline increased to approximately 0.09 ft/day (an increase of about 4.5 times the previously observed rate). This decline was likely due to dewatering of the Blackhawk Formation in the immediate vicinity of the monitoring well.

Wahler Associates (1982) calculated a transmissivity of 0.009 gpd/ft ( $1.2 \times 10^{-3}$  ft<sup>2</sup>/day) from the falling-head slug test which they performed in GW-5-1. Sergent, Hauskins & Beckwith (1986) reported transmissivities of  $2.3 \times 10^{-3}$  to  $6.7 \times 10^{-4}$  cm<sup>2</sup>/s ( $2.1 \times 10^{-1}$  to  $6.2 \times 10^{-2}$  ft<sup>2</sup>/day) for slug tests conducted in holes drilled into the Blackhawk Formation from within the Soldier Canyon Mine. Based on monitored thicknesses of 22 feet in GW-5-1 (Table 7-1) and 120.8 feet in each of the in-mine holes (Sergent, Hauskins & Beckwith, 1986), the hydraulic conductivity of the Blackhawk Formation is calculated to vary from  $5.5 \times 10^{-5}$  to  $1.7 \times 10^{-3}$  ft/day, with a median of  $5.1 \times 10^{-4}$  ft/day.

Well GW-6-1 is perforated over a 200-foot long interval which includes the Sunnyside seam (see Table 7-1). Initial water level measurements collected from this well are believed to be associated with residual water remaining from drilling and casing operations and are, therefore, probably not representative of natural conditions. Water levels declined between November 1989 and August 1991 (Figure 7-7). From August 1991 through August 1993, water levels in GW-6-1 remained relatively stable at a depth of approximately 425 feet. Monitoring on June 3, 1994 found the well to be dry and plugged at a depth of approximately 470 feet. All subsequent attempts to monitor this well have found the plugged/dry condition unchanged.

Monitoring well GW-32-1 is perforated in the Blackhawk Formation immediately above the Sunnyside seam (see Table 7-1) in a location which is down dip of Soldier Canyon Mine workings. Water level monitoring information shows a fairly consistent rise in water elevation.

From November 1994 through August 1995, the water level appears to have stabilized at a depth of approximately 291 feet (Figure 7-7). There is no information at this time that would suggest that underground mining activities in the nearby Soldier Canyon Mine are effecting the water levels observed to date.

Monitoring well G-58.5 was completed by Mountain Fuel Supply Company into the Blackhawk Formation in 1979. Waddell et al. (1986) reported a depth-to-water in March 1980 in this well of 502.8 feet. Waddell et al. (1982) reported depths to water of 501.7 to 502.4 feet in April and September 1880. No additional water-level data are available for this well.

Attempts for this M&RP to construct a potentiometric surface for the Blackhawk Formation in the Soldier Canyon area based on data collected from GW-5-1, GW-6-1, and GW-32-1 proved fruitless.

The difficulty in preparing this potentiometric surface may have been due to the influence of outcropping in the adjacent Soldier Canyon, the influence of mining in the nearby Soldier Canyon Mine, and/or varying lengths and stratigraphic locations of the perforated sections of the monitoring wells within the discontinuous strata which comprise most of the Blackhawk Formation. However, based on water-level data collected from one of the existing Dugout Canyon portals and from monitoring wells GW-5-1 and G-58.5, Waddell et al. (1986) concluded that the flow of groundwater in the Blackhawk Formation within the permit and adjacent areas is to the north away from the face of the cliffs (i.e., down dip as generally seen in the Castlegate Sandstone on Plate 7-3). They estimated the hydraulic gradient in the Blackhawk Formation to be 42 feet per mile (0.008 ft/ft). Waddell et al. (1986) indicate that the coal bearing zone to be mined in the Dugout Canyon operations will probably be saturated in most areas and will require dewatering during mining. However, since mining was initiated at the Dugout Mine, saturated coal zones have not been encountered. The majority of the water encountered during mining both the Rock Canyon and Gilson seams has entered the mine through the roof and discharges from isolated sandstone channels within the Blackhawk Formation.

Recharge to the Blackhawk Formation is of limited magnitude, due primarily to the limited area of exposure on steep outcrops and the presence of low-permeability units in overlying formations. Data presented in Appendix 7-3 indicate that Blackhawk Formation groundwater which discharges into the Soldier Canyon Mine is of ancient meteoric origin (greater than 20,000 years), thereby supporting the conclusion that the rate of recharge to the formation is minimal. Mayo and Associates (1996) concluded that the old groundwater age and the isotopic compositions of water encountered in the Soldier Canyon Mine are evidence that the groundwaters are not part of actively flowing, shallow groundwater systems. The groundwater ages also demonstrate that the hydraulic connection between these old groundwaters and the overlying active (and younger) groundwater systems in the Flagstaff and North Horn Formations is very limited or does not exist.

The quality of groundwater in the Blackhawk Formation has been evaluated by Mayo and Associates (1996) based on data collected from leakage into the Soldier Canyon Mine (see Appendix 7-3). These data indicate that Blackhawk Formation groundwater has a mean TDS concentration of about 750 mg/l and is of the sodium-bicarbonate type (Figure 7-6). These waters are chemically distinct from groundwater in overlying groundwater systems. The solute compositions of mine groundwaters suggest a complex series of rock-water and gas-water reactions (Mayo and Associates, 1996).

The dissolved iron concentration of groundwater flowing into the Soldier Canyon Mine has historically been less than 0.5 mg/l and is generally less than 0.1 mg/l (see Appendix 7-2). The total iron concentration of this water has historically been less than 2.0 mg/l and generally less than 0.5 mg/l. The total manganese concentration of Blackhawk Formation water (as measured in the Soldier Canyon Mine) has historically been less than 0.5 mg/l and is typically less than 0.1 mg/l (see Appendix 7-2).

Four exploration holes (DUG0104, 0204, 0101, and 0201) were drilled within or immediately adjacent to the SITLA Lease area and completed in the Blackhawk formation. All holes were completed below the Gilson Coal Seam. No water was encountered in any of the exploration holes per personal communication with Mike Stevenson, Project Geologist, Ark Land Company, November 22, 2004.

Exploration Hole Number	Location (approximate)	Year Drilled
DUG0104	T13S, R13E, Section 20, NW1/4SE1/4	2004
DUG0204	T13S, R13E, Section 19, SE1/4NE1/4	2004
DUG0101	T13S, R13E, Section 30, NE1/4NW1/4	2001
DUG0201	T13S, R13E, Section 19, SE1/4SE1/4	2001

Star Point Sandstone. In those locations where the Star Point Sandstone exists within the permit and adjacent areas, it consists of a fine-grained calcareous sandstone with layers of siltstone and mudstone. In keeping with regional practice (see Lines, 1985), the Star Point Sandstone and Blackhawk Formation are considered to be hydraulically connected. However, only one spring (SC-64) has been discovered issuing from the Star Point Sandstone within the permit and adjacent areas. The near absence of springs in this formation suggests that the Star Point does not receive appreciable annual recharge and that it does not support active groundwater systems in the area.

Recharge to the Star Point Sandstone probably occurs via leakage from the overlying Blackhawk Formation. Hence, this water is likely of ancient origin.

Data collected from SC-64 indicated that the discharge of this spring declined from 2 gpm to 0.5 gpm in the period of September 1995 to October 1995 (see Appendix 7-2). The TDS of this water, as estimated from the specific conductance data, is approximately 700 mg/l, with a pH of about 7.5.

Mancos Shale. The Mancos Shale is exposed south of the permit area. This formation is a relatively impermeable marine shale and is not considered to be a regional or local aquifer. Groundwater samples collected from four monitoring wells located approximately 2 miles south of Soldier Canyon Mine have a mean TDS concentration of approximately 10,000 mg/l and is of the sodium-sulfate-chloride type (Appendix 7-3). Chemical compositions are consistent with the dissolution of halite and gypsum as well as cation exchange.

Recharge and Discharge Relations

Recharge within the permit area occurs primarily on the exposed upland outcrops of the Flagstaff Formation and the North Horn Formation. Waddell et al. (1986) estimated that the annual recharge

to the Flagstaff Formation is 9 percent of the total annual precipitation. Recharge is probably greatest where surface fractures intersect the topographic highs where the Flagstaff and North Horn Formations outcrop. Recharge to the Blackhawk Formation and the Star Point Sandstone probably occurs primarily from vertical movement of water through the overlying formations. The rate of recharge to the Blackhawk Formation and the Star Point Sandstone is very slow, as evidenced by the ancient age of groundwater within those formations (see Appendix 7-3).

Assuming mass-balance and stable hydrologic conditions, recharge will equal discharge over the long term. The relatively young age of groundwater discharging from the Flagstaff and North Horn Formations as compared with the underlying Blackhawk Formation suggests that the stratigraphically-higher water discharges rapidly and is not hydraulically connected with the Blackhawk Formation. Waddell et al. (1986) conclude that the perched nature of the Flagstaff Formation protects it from the influence of dewatering of the coal-bearing zone unless the upper zone is influenced by subsidence.

Waddell et al. (1986) performed seepage studies in Pine Canyon (located immediately north of the permit area) and found that significant increases in the flow of Pine Canyon occur near the contact of the North Horn Formation and the overlying Flagstaff Formation. They concluded that downward percolation from the Flagstaff Formation is impeded by the claystones and mudstones of the North Horn Formation, forcing the water to move laterally and emerge along the outcrop in the canyon bottom.

#### Mining Impacts to Subsurface Water Resources

As presented previously, exploration drilling in the SITLA tract has not encountered significant volume of water in the Gilson seam or overlying strata. As discussed in previous paragraphs, the formations that overlie the coal seams do not include extensive units of rock that would form large aquifers. The Blackhawk Formation can discharge water from isolated channel sandstones in the roof of the mine. However, very few springs have been found on the surface in the Dugout Canyon Mine area that discharge from Blackhawk units. Springs that do discharge from the Blackhawk Formation typically have very low flows. In-mine flows that are encountered as a result of mining typically discharge from the roof, are initially much less than 100 gpm, and have flow rates that decrease rapidly as mining progresses. The sandstone channels that hold water in the Blackhawk are typically lenticular, have low to moderately low transmissivity rates, of limited areal extent, and contain waters older than 50 years and typically older than a few thousand years. Since the Blackhawk Formation in the Dugout Canyon Mine area, including the SITLA Tract, is very similar throughout, it is unlikely that mining will encounter large volumes of water as coal is removed from the Gilson seam in the permit area as a whole.

The Price River and Castlegate Sandstone formations are also poor aquifers in the mine area as described in the previous sections. Only two springs have been found within the Dugout Mine area, including the SITLA tract, issuing from these formations. These formations do not conduct water readily, do not contain extensive aquifers, and do not appear to be saturated. Subsidence of these

formations will not cause significant changes to subsurface water resources since these resources are apparently not present.

Water bearing strata within the North Horn and Flagstaff Formations (the contact between the two formations is indistinguishable in most of the SITLA tract) should not be significantly affected. Subsiding these formations may result in locally increased hydraulic conductivity within the strata but water loss to the underlying formations will be minimal, if at all. The fine grained units (siltstones and shales) that perch the aquifers within the North Horn/Flagstaff Formations should easily seal subsidence induced fractures and limit downward migration of water from the isolated aquifers. Additionally, the Price River Formation consists of interbedded mudstone, siltstone, and fine-grained sandstones. The finer-grained siltstone and mudstones would seal fractures within the formation and inhibit downward movement or loss of water from the North Horn/Flagstaff aquifers.

### **724.200 Surface Water Information**

#### Water Quantity

The permit area exists within portions of the Dugout Creek, Soldier Creek, Pace Creek, and Rock Creek watersheds. Major tributaries of Soldier Creek whose watersheds extend into the permit area include Fish Creek and Pine Canyon. Based on observations and flow data obtained during the collection of water-quality samples within the permit and adjacent areas, portions of Dugout, Fish Creek, and Pace Creek are considered perennial within the permit area. Pine Canyon appears to be perennial in its upper reaches near the northern border of the permit area. Rock Creek appears to be perennial in its upper reaches above the Castlegate Sandstone and only intermittent below the formation. Several smaller tributaries of these streams within the permit and adjacent areas, are ephemeral.

Waddell et al. (1981) estimated that the average flow of Dugout Creek is approximately 7 cubic feet per second (5,100 acre-feet per year) and that up to 70 percent of the streamflow occurs during the period of May through July each year. The seasonal record of a stream gaging station which was installed on Dugout Creek during the period of October 1, 1979 through October 2, 1981 suggest that this estimate of the seasonal variation is correct (see Appendix 7-5). The location of this stream gaging station (DC-1) is noted on Plate 7-1.

During the 1980 water year, Waddell et al. (1986) estimated that the total flow of Dugout Creek at station DC-1 (referred by them as station S60) was 1,900 acre-feet. They further estimated that 53 percent of this flow (1,000 acre-feet) was contributed by springs issuing from the Flagstaff Formation, 10 percent (200 acre-feet) was contributed by springs issuing from the Blackhawk and other formations, and 37 percent (700 acre-feet) was contributed as surface runoff.

The average flow of Soldier Creek has been estimated by Waddell et al. (1981) to be approximately 8 cubic feet per second (5,800 acre-feet per year). This flow is expected to vary seasonally in a

manner similar to that reported for Dugout Creek (i.e., the majority of the flow occurring during the late spring and early summer months in response to snowmelt runoff).

During the 1980 water year, Waddell et al. (1986) estimated that the total flow of Soldier Creek at station G-5 was 4,200 acre-feet. The source of this runoff was estimated to be as follows:

- 43 percent (1,800 acre-feet) from springs issuing from the Flagstaff Formation;
- 24 percent (1,000 acre-feet) from springs issuing from the Blackhawk and other formations; and
- 33 percent (1,400 acre-feet) as surface runoff.

Hence, the relative contribution of the Flagstaff Formation to streamflow in Soldier Creek is lower than that in Dugout Creek, while the contribution of the Blackhawk and other formations to Dugout Creek is lower than that to Soldier Creek.

Seasonal fluctuations in the discharge of streams in the area are readily apparent in the hydrographs of Soldier Creek (Figure 7-8) and Dugout Creek (Figure 7-9). Locations of these stations are noted on Plate 7-1. As indicated, the discharge of local streams is greatest in the late spring and early summer months when influenced predominantly by snowmelt runoff.

Waddell et al. (1986) performed seepage measurements along Pine Canyon and Soldier Creek in the autumns of 1979 and 1980, in an effort to evaluate the effects of bedrock formations on the baseflow of the creeks. The seepage measurements demonstrated significant inflow to Pine Canyon occurs from the Flagstaff Formation near the contact with the underlying North Horn Formation. In Soldier Creek, the investigation found that 1) base flow more than tripled as Soldier Creek crossed the North Horn Formation, 2) base flow decreased about 20 to 30 percent as the creek crossed the Price River Formation and Castlegate Sandstone, and 3) base flow increased 10 to 25 percent as the creek crossed the Blackhawk Formation.

Figure 7-10 presents semilog plots of streamflow in Soldier Creek (station G-5) and Dugout Creek (station DC-1) for the latter portion of 1980, as reported by Waddell et al. (1986). Included in this figure are plots of discharge rates for springs issuing from the Flagstaff Formation and from the underlying Blackhawk Formation, Castlegate Sandstone, and Price River and North Horn Formations (Waddell et al., 1986). At Soldier Creek, the curves are approximately parallel for streamflow and the composite flows issuing from the Flagstaff Formation through August. Thereafter, the recession curve for the streamflow flattens, while that for the Flagstaff Formation continues to decrease. Based on this condition, Waddell et al. (1986) concluded that the discharge of Soldier Creek is controlled predominantly by seepage from the Flagstaff Formation during the spring and early summer and by seepage from the underlying formations (Blackhawk, Castlegate, Price River, and North Horn) during the late summer and fall.

The data presented in Figure 7-10 indicate that discharge from the Flagstaff Formation dominates the flow of Dugout Creek throughout the year. Seepage from the underlying formations may slightly influence the flow of Dugout Creek during the autumn months, but this influence appears to be minimal. The lack of seepage from the Blackhawk and immediately-overlying formations to Dugout Creek supports the conclusion presented in Section 724.100 that the flow of groundwater within the permit and adjacent areas is to the north-northwest (i.e., away from Dugout Canyon).

Limited flow data is available from monitoring points within Pace Canyon and Rock Canyon Creeks. However, the data included in Appendix 7-7 suggests that flow within Pace Canyon Creek varies seasonally. Data collected at points PC-1A and PC-2 since June 1999, which are included in the Division's water database and in the updated spreadsheets found in Appendix 7-7, supports this determination. Flows in spring/early summer are typically several times greater than in late summer/fall. Also, it is interesting to note that in 2002 and 2003 there have been periods when there is no flow at station PC-2 and flows measured in late summer/fall at PC-1A have been significantly less than in previous years. The drop in flow is undoubtedly related to the prolonged drought the area has been suffering through since 1999. Base flow within this drainage appears to originate from springs discharging from the Castlegate Sandstone, Price River, Flagstaff/North Horn, and Colton Formations. The majority of the flow appears to originate from springs within the North Horn and Flagstaff Formations. Rock Canyon Creek base flow in its upper reaches appears to originate from springs discharging from the Northhorn Formation. Flow data from monitoring site RC-1 indicates the lower sections of Rock Creek generally flow in response to spring runoff and after summer precipitation events.

Surface flows measured at monitoring point RC-1 near the mouth of Rock Canyon indicate that the stream is intermittent and also fluctuates in flow volume seasonally. In 2002 and 2003, flow was measured at RC-1 only flowed after a significant precipitation event. Again, the lack of flow in this creek is most likely related to the drought conditions that appear to have begun in the area in 1999.

No streamflow data are available for ephemeral drainages in the permit and adjacent areas. When it does occur, ephemeral runoff in the area is expected to occur predominantly in the months of April and May in response to snowmelt runoff and in the months of August and September as a result of thunderstorm activity. Snowmelt may result in flow durations of a few weeks, while thunderstorms are expected to result in runoff with a short duration and high intensity.

Several small impoundments have been constructed in the permit and adjacent areas to capture water for stock watering. Those impoundments where water rights applications have been filed are located as shown on Plate 7-2. The impoundments capture water either from an adjacent spring or from snowmelt.

A UPDES permit application has been issued by the Utah Division of Water Quality as indicated in Appendix 7-6. This application applies to discharge from the sedimentation pond. Discharge from this point occurs only infrequently as a result of pond dewatering or after significant precipitation events. The application also applies to discharges from the underground mine workings.

Surface-water quality samples have been periodically collected in the permit and adjacent areas from stations located on Soldier Creek, Dugout Creek, Pine Canyon, Pace Creek, and Rock Canyon Creek (Plate 7-1). Analytical data from these sources are summarized in Appendix 7-7. These data were obtained from multiple sources, including (but not limited to) the Soldier Creek Coal Company M&RP and annual reports, U.S. Geological Survey publications, the Sage Point-Dugout Canyon permit application filed by Eureka Energy Company in 1980, Appendix 7-3 of this M&RP, and various consultant reports. Since not all monitoring parties were responsible to adhere to UDOGM or SMCRA rules, the laboratory parameters varied between reports. However, the data are still considered valid and appropriate for determining baseline conditions within the permit and adjacent areas. It should be noted that most of the manganese data presented in Appendix 7-3 represent total (as opposed to dissolved) concentrations.

In general, TDS concentrations of surface waters in the permit and adjacent areas vary inversely with the discharge rate. These concentrations also tend to increase in the downstream direction (Waddell et al., 1986). Total suspended solids concentrations in the local surface waters tend to vary directly with the flow rate (Waddell et al., 1986).

The data presented in Appendix 7-7 indicate that the dominant ions in surface water during high-flow periods are calcium and bicarbonate, whereas the dominant ions in the low-flow periods are sodium, magnesium, sulfate, and bicarbonate. During high-flow periods, runoff is rapid and most surface waters only interact chemically with the uppermost regions of the soil zone. Thus, they are dominated by calcium and bicarbonate ions. Furthermore, groundwater contributions from the Flagstaff Formation (where calcium and bicarbonate are the primary ions) dominate the chemical quality of surface water during high-flow periods (see Figure 7-10).

Equipment, structures and other devices used in conjunction with monitoring the quality and quantity of surface water in the permit and adjacent areas have been or will be installed, maintained, and operated in accordance with accepted procedures. Where feasible, this equipment will be removed or properly abandoned by SCM when no longer needed.

#### Monitoring and Mitigation Plan Pace Creek

Dugout Canyon Mine plans to leave a barrier under the majority of Pace Creek within the permit boundary. The stretches of Pace Creek (10/04 mine map) which are planned for undermining are above entry development, not longwall panels. There is approximately 1000 feet of stream channel having over 500 feet of cover planned for mining in 2007, 400 feet has approximately 900 feet of cover planned for mining in 2008 and approximately 100 feet has 1250 feet of cover planned for mining in 2008-2009. A surface water monitoring and mitigation program will be initiated in this area prior to potential subsidence occurring. This monitoring program will include conducting a pre-mining subsidence video tape survey of the stream channel from surface water monitoring location PC1A to where Pace Creek leaves the SW1/4SW14 Section 22, T13S, R13E. The purpose of the video will be to provide a visual record of the stream channel prior to mining disturbance. Five sites will be identified within the video taped portion of Pace Creek where the monitoring of surface ground water flows, channel width and general geomorphology will occur. The video taping of Pace Creek and the selection of monitoring sites will be done in the Spring of 2006 and submitted as part of the 2006 annual report.

The surface water flows and channel width at these stations will be monitored on a monthly basis, when accessible, while mining is occurring within the 15 degree angle-of-draw of the stream channel. The Division will be notified if the area is inaccessible due to road or climatic conditions and the monitoring could not be accomplished. Once mining has been completed within the angle-of-draw, the sites will be monitored annually for up two years following undermining. A report on the subsidence related impacts, if any, to the surface water flows, will be provided monthly to the Division during monthly monitoring and annually during annual monitoring.

Mitigation will implement the Best Technology Currently Available in association with the repair of damage to the Pace Creek stream channel. The repairs may include the use of bentonite/soil mixes to fill persistent cracks that appear to be diverting water. Bentonite may also be used to line portions of the creek floor where leakage appears to be occurring. Other methods or chemicals, if environmentally safe and available, may be employed if bentonite and/or bentonite/soil mixes are ineffectual.

### **731.300 Acid- and Toxic-Forming Materials**

Analyses presented in Chapter 6 of this M&RP indicate that acid- and toxic-forming materials are not present within the permit area. Parameters defining acid- and toxic-forming materials will periodically be monitored as described in Chapter 6 of this M&RP. In the event that acid- or toxic-forming materials are identified, they will be disposed of in appropriate waste-rock disposal facilities as described in Chapter 5 of this M&RP.

### **731.400 Transfer of Wells**

Before final release of bond, exploration or monitoring wells will be sealed in a safe and environmentally sound manner in accordance with R645-301-631, R645-301-738, and R645-301-765. Ownership of wells will be transferred only with prior approval of the Division. The conditions of such a transfer will comply with State and local laws. The permittee will remain responsible for the management of the wells until bond release in accordance with R645-301-529, R645-301-551, R645-301-631, R645-301-738, and R645-301-765.

### **731.500 Discharges**

**Discharges into an Underground Mine.** No discharges of surface water will be made to an underground mine in the permit and adjacent areas.

**Gravity Discharges from an Underground Mine.** No gravity discharges will be made from an underground mine in the permit and adjacent areas.

### **731.600 Stream Buffer Zones**

The surface facilities for the Dugout Canyon Mine will be constructed within 100 feet of Dugout Creek (a perennial stream). However, surface runoff- and sediment-control facilities designed for the site (as discussed in subsequent sections of this chapter) will ensure that coal mining and reclamation operations will not cause or contribute to the violation of applicable Utah or federal water standards and will not adversely affect the water quantity and quality or other environmental resources of the stream.

**Stream Channel Diversions.** Temporary or permanent stream channel diversions will comply with R645-301-742.300.

**Buffer Zone Designation.** The area surrounding the streams that is not to be disturbed will be designated as a buffer zone, and SCM will mark those zones as specified in Section 521.200 of this M&RP.

### **731.700 Cross Sections and Maps**

The locations of water rights for current users of surface water flowing into, out of, and within the permit and adjacent areas is provided on Plate 7-2. The locations of each water diversion, collection, conveyance, treatment, storage, and discharge facility to be used in the Dugout Canyon area is presented on Plate 7-5 or in Addendum A to Appendix 7-9.

Locations and elevations of each station to be used for water monitoring during coal mining and reclamation operations are presented on Plate 7-1. The design details and cross sections for the sedimentation pond are provided on Plate 7-4. Other relevant cross sections or maps are presented and discussed in Chapter 5 of this M&RP.

### **731.800 Water Rights and Replacement**

No surface mining will occur in the Dugout Canyon Mine permit area.

### **732 Sediment Control Measures**

The sediment control measures within the permit area have been designed to prevent additional contributions of sediment to streamflow or to runoff outside the permit area. In addition, they have been designed to meet applicable effluent limitations, and minimize erosion to the extent possible.

The structures to be used for the runoff-control plan for the permit area include disturbed and undisturbed area diversion channels, a sedimentation pond, containment berms, silt fences, and road diversions and culverts.

#### **732.100 Siltation Structures**

The siltation structure within the permit area will be a sedimentation pond as described in Section 732.200.

#### **732.200 Sedimentation Ponds**

There will be a single sedimentation pond operating at the mine facility located at the southwest end of the disturbed area. The sedimentation pond topography and cross sections are presented on Plate 7-4 of this M&RP. Details regarding sedimentation pond design are presented in Appendix 7-8. The staff gauge in the pond will be marked to indicate the 60% clean-out elevation as defined in Section 742. The sedimentation pond is defined as a Class A pond in accordance with TR-60 (U.S. Soil Conservation Service, 1976).

If sediment has accumulated to the 60% clean-out elevation, the pond will be cleaned. The sediment will be transported and either stored at the Banning Loadout or disposed of at the approved waste rock disposal sites as described in Chapter 5 of this M&RP or pumped back into the sealed, abandoned "Gilson West - Old Workings".

The sedimentation pond is within the disturbed area boundary and is subject to final reclamation. The area is included in the calculation of the disturbed area subject to bonding and in the calculation of final reclamation costs.

**Compliance Requirements.** The sedimentation pond will be maintained until removal in accordance with the reclamation plan (see Section 540 of this M&RP). When the pond is removed, the land will be revegetated in accordance with the reclamation plan defined in Section 540.

The sedimentation pond was designed to contain 0.40 acre-foot of sediment accumulation before being cleaned out. The sedimentation pond will fully contain the runoff from the 10-year, 24-hour storm event in addition to sediment accumulation. The primary spillway for the sedimentation pond will adequately pass the peak flow resulting from the 25-year, 6-hour precipitation event. The pond has also been designed with an emergency spillway to release water from the pond in the event that the primary spillway becomes blocked.

Additional design standards for the pond are presented in Section 742.

**MSHA Requirements.** MSHA requirements defined in 30 CFR 77.216 are not applicable since the sedimentation pond will not impound water or sediment to an elevation of 20 feet or more above the upstream toe of the structure. The pond will also store a volume less than 20 acre-feet.

### 732.300 Diversions

The objective of the runoff control plan is to isolate, to the maximum degree possible, runoff from disturbed areas from that of undisturbed areas. This is accomplished by:

- Allowing all upstream runoff in Dugout Creek to bypass the disturbed area through the use of culverts;
- Routing runoff from the adjacent undisturbed areas above the facilities through culverts and diversion ditches where feasible to bypass the disturbed area; and
- Routing any runoff from undisturbed areas which enters the disturbed area into the sediment control system.

REFUSE PILE AMENDMENT  
CHANGES PER TASK ID # 1915

CONFIDENTIAL FOLDER

**RA ATTACHMENT 4-1**

**CULTURAL AND HISTORIC RESOURCES INFORMATION**

REFERENCE CONFIDENTIAL FOLDER PER REQUEST UNDER TASK ID # 1915

Canyon Fuel Company, LLC  
Dugout Canyon Mine

Refuse Pile Amendment  
April 2002

**RA ATTACHMENT 4-1**

**CULTURAL AND HISTORIC RESOURCES INFORMATION**

Add information to CONFIDENTIAL FOLDER PER REQUEST UNDER TASK ID # 1915

METHANE DESGASSIFICATION  
AMENDMENT CHANGES PER  
TASK ID # 1915

CONFIDENTIAL FOLDER

Canyon Fuel Company, LLC  
Dugout Canyon Mine

Methane Degassification Amendment  
November 2004

**ATTACHMENT 4-1**  
**CULTURAL RESOURCE SURVEY AND INVENTORY**

REFERENCE CONFIDENTIAL FOLDER PER REQUEST UNDER TASK ID # 1915

Canyon Fuel Company, LLC  
Dugout Canyon Mine

Methane Degassification Amendment  
September 12, 2003

**ATTACHMENT 4-1**  
**CULTURAL RESOURCE SURVEY AND INVENTORY**

Add information to CONFIDENTIAL FOLDER PER REQUEST UNDER TASK ID # 1915