March 25, 2008

Manti - La Sal National Forest
Price District Office
599 W Price River Dr.
Price, UT 84501

Subject: Energy West - 2008 Coal Exploration - Cultural Resource Assessment

On behalf of Energy West Mining Company, EarthTouch, Inc. has conducted a Class I review of four proposed exploratory drilling locations for the 2008 Coal Exploration program. The project area is situated along the top of the Wasatch Plateau, in the East Mountain area, on the Manti-La Sal National Forest. The four drill locations include 2008-3, 2008-4, 2008-5 and 2008-6, situated in Section 12 of T16S R6E. The project is part of an on-going drilling program for the development of Energy West coal mining.

The overall project area is west of Huntington, Utah, situated between Mill Creek and Crandall canyons, east of Upper Joes Valley. All of the proposed drill locations are situated between 9,500 to 10,000 feet, primarily within the dense aspen and pine tree environment. Most of the drill locations are situated on relatively steep slopes, along the eastern slopes of East Mountain. The Class I indicated that at least five cultural resource inventories have been conducted since 1980, in the immediate and surrounding areas of the identified drill locations. These projects primarily consisted of drilling programs, timber sales, Class II inventories, and other smaller surveys. In addition, no known cultural resource sites have been documented within the general or immediate area of the drilling areas.

During the spring/summer of 2008, portable helicopter supported drilling rigs would be flown into the four identified drill locations to conduct the drilling. As in past years, Forest Service representatives had determined that due to the low site potential, low impacts, and steep topography of the project area, a Class III inventory would not be necessary. Energy West Company will voluntarily continue to have an archaeologist conduct Class III pedestrian inventories of the drill locations immediately prior to drilling.

Sincerely,

Scott Billat

Scott Billat
Senior Archaeologist
EarthTouch, Inc.
801-423-1014 (direct line)
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File in:
❑ Confidential
❑ Shelf
☒ Expandable
Refer to Record No 0020 Date 04032008
In C/015/0018, 2008, Incoming
For additional information

County Lists of Utah's Federally Listed Threatened(T), Endangered(E), and Candidate(C) Species

Beaver County

Common Name	Scientific Name	Status
California Condor - Historically	*Gymnogypes californianus*	E Experimental
Yellow-billed Cuckoo - Possibly	*Coccyzus americanus*	C
Utah Prairie-dog	*Cynomys parvidens*	T

Box Elder County

Common Name	Scientific Name	Status
Fat-whorled Pondsnail	*Stagnicola bonnevillensis*	C
Lahontan Cutthroat Trout - Introduced	*Oncorhynchus clarkii henshawii*	T
June Sucker - Introduced	*Chasmistes liorus*	E
Yellow-billed Cuckoo - Possibly	*Coccyzus americanus*	C
Gray Wolf - Historically	*Canis lupus*	E Extirpated

Cache County

Common Name	Scientific Name	Status
Maguire Primrose	*Primula maguirei*	T
Yellow-billed Cuckoo - Possibly	*Coccyzus americanus*	C
Brown (Grizzly) Bear - Historically	*Ursus arctos*	T Extirpated
Canada Lynx - Possibly	Lynx canadensis	T

Carbon County

Common Name	Scientific Name	Status
Uinta Basin Hookless Cactus	*Sclerocactus glaucus*	T
Graham Beardtongue	*Penstemon grahamii*	T Proposed
Humpback Chub	*Gila cypha*	E
Bonytail	*Gila elegans*	E
Colorado Pikeminnow	*Ptychocheilus lucius*	E
Razorback Sucker	*Xyrauchen texanus*	E
Yellow-billed Cuckoo - Possibly	*Coccyzus americanus*	C
Mexican Spotted Owl - Possibly	*Strix occidentalis lucida*	T
Black-footed Ferret - Unconfirmed	*Mustela nigripes*	E Extirpated

Daggett County

Common Name	Scientific Name	Status
Ute Ladies'-tresses	*Spiranthes diluvialis*	T
Humpback Chub - Historically	*Gila cypha*	E
Bonytail - Historically	*Gila elegans*	E
Colorado Pikeminnow	*Ptychocheilus lucius*	E
Razorback Sucker - Historically	*Xyrauchen texanus*	E
Yellow-billed Cuckoo - Possibly	*Coccyzus americanus*	C
Black-footed Ferret - Unconfirmed	*Mustela nigripes*	E Extirpated
Brown (Grizzly) Bear - Historically	*Ursus arctos*	T Extirpated
Canada Lynx	*Lynx canadensis*	T

Created by the Utah Division of Wildlife Resources - 08/27/2007

Davis County

Common Name	Scientific Name	Status
Yellow-billed Cuckoo	*Coccyzus americanus*	C
Razorback Sucker	*Xyrauchen texanus*	E
California Condor - Possibly	*Grus americana*	E Experimental
Yellow-billed Cuckoo - Possibly	*Coccyzus americanus*	C
Mexican Spotted Owl	*Strix occidentalis lucida*	T
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	E
Utah Prairie-dog	*Cynomys parvidens*	T

Duchesne County

Common Name	Scientific Name	Status
Ute Ladies'-tresses	*Spiranthes diluvialis*	T
Shrubby Reed-mustard	*Glaucocarpum suffrutescens*	E
Barneby Ridge-cress	*Lepidium barnebyanum*	E
Uinta Basin Hookless Cactus	*Sclerocactus glaucus*	T
Graham Beardtongue	*Penstemon grahamii*	T Proposed
Humpback Chub - Possibly	*Gila cypha*	E
Bonytail - Possibly	*Gila elegans*	E
Colorado Pikeminnow - Possibly	*Ptychocheilus lucius*	E
Razorback Sucker - Possibly	*Xyrauchen texanus*	E
Yellow-billed Cuckoo	*Coccyzus americanus*	C
Black-footed Ferret - Unconfirmed	*Mustela nigripes*	E Experimental
Gray Wolf - Historically	*Canis lupus*	E Extirpated
Brown (Grizzly) Bear - Historically?	*Ursus arctos*	T Extirpated
Canada Lynx	*Lynx canadensis*	T

Emery County

Common Name	Scientific Name	Status
Jones Cycladenia	*Cycladenia humilis var jonesii*	T
Maguire Daisy	*Erigeron maguirei*	T
Last Chance Townsendia	*Townsendia aprica*	T
Barneby Reed-mustard	*Schoenocrambe barnebyi*	E
San Rafael Cactus	*Pediocactus despainii*	E
Winkler Pincushion Cactus	*Pediocactus winkleri*	T
Wright Fishhook Cactus	*Sclerocactus wrightiae*	E
Humpback Chub	*Gila cypha*	E
Bonytail	*Gila elegans*	E
Colorado Pikeminnow	*Ptychocheilus lucius*	E
Razorback Sucker	*Xyrauchen texanus*	E
Yellow-billed Cuckoo - Possibly	*Coccyzus americanus*	C
Mexican Spotted Owl	*Strix occidentalis lucida*	T
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	E
Black-footed Ferret - Unconfirmed	*Mustela nigripes*	E Extirpated

Garfield County

Common Name	Scientific Name	Status
Maguire Daisy	*Erigeron maguirei*	T
Ute Ladies'-tresses	*Spiranthes diluvialis*	T
Jones Cycladenia	*Cycladenia humilis var jonesii*	T
Autumn Buttercup	*Ranunculus aestivalis*	E

Garfield County - continued

Humpback Chub	*Gila cypha*	E
Bonytail	*Gila elegans*	E
Colorado Pikeminnow	*Ptychocheilus lucius*	E
Razorback Sucker	*Xyrauchen texanus*	E
California Condor - Possibly	*Gymnogypes californianus*	E Experimental
Yellow-billed Cuckoo	*Coccyzus americanus*	C
Mexican Spotted Owl	*Strix occidentalis lucida*	T
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	E
Utah Prairie-dog	*Cynomys parvidens*	T
Brown (Grizzly) Bear - Historically?	*Ursus arctos*	T Extirpated

Grand County

Common Name	Scientific Name	Status
Jones Cycladenia	*Cycladenia humilis var jonesii*	T
Humpback Chub	*Gila cypha*	E
Bonytail	*Gila elegans*	E
Colorado Pikeminnow	*Ptychocheilus lucius*	E
Razorback Sucker	*Xyrauchen texanus*	E
California Condor	*Gymnogypes californianus*	E Experimental
Yellow-billed Cuckoo	*Coccyzus americanus*	C
Mexican Spotted Owl - Possibly	*Strix occidentalis lucida*	T
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	E
Black-footed Ferret - Unconfirmed	*Mustela nigripes*	E Extirpated

Iron County

Common Name	Scientific Name	Status
California Condor - Historically	*Gymnogypes californianus*	E Experimental
Yellow-billed Cuckoo	*Coccyzus americanus*	C
Mexican Spotted Owl	*Strix occidentalis lucida*	T
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	E
Utah Prairie-dog	*Cynomys parvidens*	T

Juab County

Common Name	Scientific Name	Status
Ute Ladies'-tresses - Possibly	*Spiranthes diluvialis*	T
Yellow-billed Cuckoo	*Coccyzus americanus*	C

Kane County

Common Name	Scientific Name	Status
Welsh's Milkweed	*Asclepias welshii*	T
Kodachrome Bladderpod	*Lesquerella tumulosa*	E
Siler Pincushion Cactus	*Pediocactus sileri*	T
Jones Cycladenia	*Cycladenia humilis var jonesii*	T
Navajo Sedge	*Carex specuicola*	T
Kanab Ambersnail	*Oxyloma kanabense*	E
Coral Pink Sand Dunes Tiger Beetle	*Cicindela limbata albissima*	C
Humpback Chub - Historically	*Gila cypha*	E

Kane County - continued

Bonytail - Historically	*Gila elegans*	E
Colorado Pikeminnow - Historically	*Ptychocheilus lucius*	E
Razorback Sucker - Historically	*Xyrauchen texanus*	E
California Condor	*Gymnogypes californianus*	E Experimental
Yellow-billed Cuckoo - Possibly	*Coccyzus americanus*	C
Mexican Spotted Owl	*Strix occidentalis lucida*	T
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	E
Utah Prairie-dog	*Cynomys parvidens*	T

Millard County

Common Name	Scientific Name	Status
Yellow-billed Cuckoo - Possibly	*Coccyzus americanus*	C
Utah Prairie-dog	*Cynomys parvidens*	T

Morgan County

Common Name	Scientific Name	Status
Yellow-billed Cuckoo - Possibly	*Coccyzus americanus*	C
Canada Lynx - Possibly	*Lynx canadensis*	T

Piute County

Common Name	Scientific Name	Status
Yellow-billed Cuckoo - Possibly	*Coccyzus americanus*	C
Utah Prairie-dog	*Cynomys parvidens*	T

Rich County

Common Name	Scientific Name	Status
Black-footed Ferret - Unconfirmed	*Mustela nigripes*	E Extirpated
Canada Lynx - Possibly	*Lynx canadensis*	T

Salt Lake County

Common Name	Scientific Name	Status
Ute Ladies'-tresses - Historically	*Spiranthes diluvialis*	T
Slender Moonwort	*Botrychium lineare*	C
June Sucker - Introduced	*Chasmistes liorus*	E
Yellow-billed Cuckoo	*Coccyzus americanus*	C
Canada Lynx - Possibly	*Lynx canadensis*	T

San Juan County

Common Name	Scientific Name	Status
Navajo Sedge	*Carex specuicola*	T
Humpback Chub	*Gila cypha*	E
Bonytail	*Gila elegans*	E
Colorado Pikeminnow	*Ptychocheilus lucius*	E
Razorback Sucker	*Xyrauchen texanus*	E
California Condor - Possibly	*Gymnogypes californianus*	E Experimental
Yellow-billed Cuckoo - Possibly	*Coccyzus americanus*	C

San Juan County - continued

Mexican Spotted Owl	*Strix occidentalis lucida*	T
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	E
Black-footed Ferret - Historically	*Mustela nigripes*	E Extirpated
Gray Wolf - Historically	*Canis lupus*	E Extirpated
Brown (Grizzly) Bear - Historically?	*Ursus arctos*	T Extirpated

Sanpete County

Common Name	Scientific Name	Status
Heliotrope Milkvetch	*Astragalus montii*	T
Yellow-billed Cuckoo - Possibly	*Coccyzus americanus*	C
Utah Prairie-dog	*Cynomys parvidens*	T
Brown (Grizzly) Bear - Historically	*Ursus arctos*	T Extirpated
Canada Lynx - Historically	*Lynx canadensis*	T

Sevier County

Common Name	Scientific Name	Status
Last Chance Townsendia	*Townsendia aprica*	T
Wright Fishhook Cactus	*Sclerocactus wrightiae*	E
Heliotrope Milkvetch	*Astragalus montii*	T
Yellow-billed Cuckoo - Possibly	*Coccyzus americanus*	C
Utah Prairie-dog	*Cynomys parvidens*	T
Brown (Grizzly) Bear - Historically	*Ursus arctos*	T Extirpated

Summit County

Common Name	Scientific Name	Status
Yellow-billed Cuckoo - Possibly	*Coccyzus americanus*	C
Black-footed Ferret - Unconfirmed	*Mustela nigripes*	E Extirpated
Brown (Grizzly) Bear - Historically?	*Ursus arctos*	T Extirpated
Canada Lynx	*Lynx canadensis*	T

Tooele County

Common Name	Scientific Name	Status
Ute Ladies'-tresses	*Spiranthes diluvialis*	T
Yellow-billed Cuckoo - Possibly	*Coccyzus americanus*	C

Uintah County

Common Name	Scientific Name	Status
Ute Ladies'-tresses	*Spiranthes diluvialis*	T
Shrubby Reed-mustard	*Glaucocarpum suffrutescens*	E
Clay Reed-mustard	*Schoenocrambe argillacea*	T
Uinta Basin Hookless Cactus	*Sclerocactus glaucus*	T
Graham Beardtongue	*Penstemon grahamii*	T Proposed
White River Beardtongue	*Penstemon scariosus var albifluvis*	C
Humpback Chub	*Gila cypha*	E
Bonytail	*Gila elegans*	E
Colorado Pikeminnow	*Ptychocheilus lucius*	E

Uintah County - continued

Razorback Sucker	*Xyrauchen texanus*	E
Yellow-billed Cuckoo	*Coccyzus americanus*	C
Mexican Spotted Owl	*Strix occidentalis lucida*	T
Black-footed Ferret	*Mustela nigripes*	E Experimental
Brown (Grizzly) Bear - Historically?	*Ursus arctos*	T Extirpated
Canada Lynx	*Lynx canadensis*	T

Utah County

Common Name	Scientific Name	Status
Ute Ladies'-tresses	*Spiranthes diluvialis*	T
Deseret Milkvetch	*Astragalus desereticus*	T
Clay Phacelia	*Phacelia argillacea*	E
Utah Valvata Snail - Historically	*Valvata utahensis*	E Extirpated
June Sucker	*Chasmistes liorus*	E
Yellow-billed Cuckoo	*Coccyzus americanus*	C
Brown (Grizzly) Bear - Historically	*Ursus arctos*	T Extirpated
Canada Lynx - Possibly	*Lynx canadensis*	T

Wasatch County

Common Name	Scientific Name	Status
Ute Ladies'-tresses	*Spiranthes diluvialis*	T
Yellow-billed Cuckoo	*Coccyzus americanus*	C
Brown (Grizzly) Bear - Historically?	*Ursus arctos*	T Extirpated
Canada Lynx	*Lynx canadensis*	T

Washington County

Common Name	Scientific Name	Status
Siler Pincushion Cactus	*Pediocactus sileri*	T
Shivwits or Shem Milkvetch	*Astragalus ampullarioides*	E
Holmgren Milkvetch	*Astragalus holmgreniorum*	E
Dwarf Bearclaw-poppy	*Arctomecon humilis*	E
Virgin Chub	*Gila seminuda*	E
Woundfin	*Plagopterus argentissimus*	E
Relict Leopard Frog - Historically	*Rana onca*	C Extirpated
Desert Tortoise	*Gopherus agassizii*	T
California Condor	*Gymnogypes californianus*	E Experimental
Yellow-billed Cuckoo	*Coccyzus americanus*	C
Mexican Spotted Owl	*Strix occidentalis lucida*	T
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	E
Gray Wolf - Historically	*Canis lupus*	E Extirpated
Brown (Grizzly) Bear - Historically	*Ursus arctos*	T Extirpated

Wayne County

Common Name	Scientific Name	Status
Ute Ladies'-tresses	*Spiranthes diluvialis*	T
Maguire Daisy	*Erigeron maguirei*	T
Barneby Reed-mustard	*Schoenocrambe barnebyi*	E

Wayne County - continued

Winkler Pincushion Cactus	*Pediocactus winkleri*	T
Wright Fishhook Cactus	*Sclerocactus wrightiae*	E
Last Chance Townsendia	*Townsendia aprica*	T
San Rafael Cactus	*Pediocactus despainii*	E
Humpback Chub	*Gila cypha*	E
Bonytail	*Gila elegans*	E
Colorado Pikeminnow	*Ptychocheilus lucius*	E

Weber County

Common Name	Scientific Name	Status
Ute Ladies'-tresses	*Spiranthes diluvialis*	T
Ogden Rocky Mountainsnail	*Oreohelix peripherica wasatchensis*	C
June Sucker - Introduced	*Chasmistes liorus*	E
Yellow-billed Cuckoo - Possibly	*Coccyzus americanus*	C
Gray Wolf - Historically	*Canis lupus*	E Extirpated
Canada Lynx - Possibly	*Lynx canadensis*	T

DEFINITIONS

E

A taxon that is listed by the U.S. Fish and Wildlife Service as "endangered" with the probability of worldwide extinction.

E Experimental

An "endangered" taxon that is considered by the U.S. Fish and Wildlife Service to be "experimental and non-essential" in its designated use areas in Utah.

E, T, or C Extirpated

An "endangered," "threatened," or "candidate" taxon that is "extirpated" and considered by the U.S. Fish and Wildlife Service to no longer occur in Utah.

E or T Proposed

A taxon "proposed" to be listed as "endangered" or "threatened" by the U.S. Fish and Wildlife Service.

T

A taxon that is listed by the U.S. Fish and Wildlife Service as "threatened" with becoming endangered.

C

A taxon for which the U.S. Fish and Wildlife Service has on file sufficient information on biological vulnerability and threats to justify it being a "candidate" for listing as endangered or threatened.

Note: Please contact the U.S. Fish and Wildlife Service (801-975-3330) for the purpose of consultation under the Endangered Species Act.

MILL FORK FEDERAL COAL LEASE TRACT UTU-71307
ENVIRONMENTAL ASSESSMENT
LEASE-BY-APPLICATION NO. 11

June 1997

USDA, Forest Service, Region 4
Manti-La Sal National Forest
Ferron/Price Ranger District
Emery County, Utah

USDI, Bureau of Land Management
Utah State Office

Responsible Officials:

Janette S. Kaiser - Forest Supervisor
Manti-La Sal National Forest
599 W. Price River Drive
Price, Utah 84501

Bill Lamb - Utah State Director
Bureau of Land Management
Utah State Office
324 South State St. (Suite 301)
Salt Lake City, Utah 84111-2303

For Further Information Contact:

J. Wade DeFreest- Team Leader
Manti-La Sal National Forest
Ferron-Price Ranger District
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Price, Utah 84501
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CHAPTER I - PURPOSE AND NEED

A. *Proposed Action*

The proposed action is to lease the Mill Fork Coal Lease Tract on federal lands in Emery County, Utah for underground coal mining.

On February 4, 1993, Genwal Resources, Inc. submitted Coal Lease Application UTU-71307 to the Bureau of Land Management (BLM), Utah State Office, to lease Federal Coal Lands in the vicinity of Mill Fork Canyon. This application is for leasing federal coal reserves adjacent to Genwal's active Crandall Canyon Mine, located approximately 15 miles northwest of Huntington, Utah, on the Price/ Ferron Ranger District of the Manti-La Sal National Forest (Figure 1).

The proposed tract lies within the Huntington Canyon-Gentry Mountain and the Ferron Canyon, Cottonwood-Trail Mountain Multiple-Use Evaluation Areas as described in the Manti-La Sal National Forest Land and Resource Management Plan (Forest Plan). The Forest Plan Environmental Impact Statement (EIS) and record of Decision (ROD) makes these areas are available for further consideration for coal leasing. The application will be processed according to the Lease-On-Application (LBA) process contained in the BLM Coal Leasing Regulations (43 CFR 3425).

The first step in the lease evaluation process was to delineate a tract. Tract delineation was completed by the BLM on October 2, 1996. The tract delineation report is available in the project file kept at the Manti-La Sal National Forest Supervisors Office. Figure 2 shows the lease tract boundaries as set by the tract delineation team. Named the Mill Fork Lease Tract, the area encompasses approximately 6,440 acres entirely within the proclamation boundaries of the Manti-La Sal National Forest. After tract delineation, the LBA process calls for a Data Adequacy Review, application of Unsuitability Criteria, and conducting an environmental analysis of the proposed action.

Data Adequacy Standards, as established by the Uinta-Southwestern Utah Coal Region, were met in December 1996, after the company submitted supplemental information requested by the reviewing specialists. Application of the Unsuitability Criteria for Coal Mining found in 43 CFR 3461, determined that the proposed tract is suitable for leasing. The Forest Plan shows that seven of the 20 unsuitability criteria are not applicable because these lands/resources do not exist on the forest. Four more criteria were found not to be applicable after exceptions and exemptions were applied. The remaining nine criteria were evaluated on the site-specific basis, and were either found to be not applicable or are excepted pending completion of consultations with the U.S. Fish and Wildlife Service (FWS) and Utah State Historic Preservation Office (USHPO). A detailed discussion regarding the application of the Unsuitability Criteria is contained in the project file.

This document has been prepared to further evaluate the tract for leasing and fulfill analysis requirements of the National Environmental Policy Act of 1969 (NEPA).

B. *Purpose and Need*

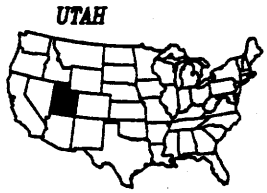
Genwal indicated a need for the additional coal reserves to maintain current production levels, provide a long-term supply of coal and to recover Federally- owned coal deposits that may otherwise be bypassed, and rendered inaccessible. At present production levels and with existing reserves, the mine life is estimated at 5 to 7 years. Addition of coal reserves contained in the Mill Fork Lease Tract

would extend the mine life by about 19 years, and allow the company to be competitive in the current coal market. The BLM, charged with the administration of the mineral estate on these federal lands, is required by law to lease minerals for economic recovery.

C. *Decision to be Made by Responsible Officials/Authority*

The Utah State Director of the BLM is responsible to decide whether or not to offer the tract for leasing under the Mineral Leasing Act of 1920, as amended, and the Federal Regulations 43 CFR 3400. The State Director may also decide to deny the application or conditionally approve one of the alternatives described in Chapter 2. The Forest Supervisor, Manti-La Sal National Forest, must consent to leasing National Forest System Lands before BLM can offer the tract for leasing, according to the Federal Coal Leasing Amendments Act of 1976. The Forest Supervisor must also prescribe terms and/or conditions (through lease stipulations) with respect to use and protection of non-mineral interests. Once a lease is issued, BLM is responsible for lease administration and enforcement of lease terms and conditions.

The proposed action will conform to the overall guidance of the Manti-La Sal National Forest Final EIS and Forest Plan (1986) and the Final EIS for the BLM's San Rafael Proposed Resource Management Plan (1992). This Environmental Assessment (EA) tiers to the decisions of both EISs, which are available for review at the Price Ranger District and the Manti-La Sal National Forest offices and the BLM San Rafael/Price Resource Area and the Moab District offices, respectively. The EA references the Environmental Assessment for Coal Lease Application UTU-68082, LBA No. 9, Crandall Canyon tract (1993).



MILL FORK LEASE TRACT LOCATION MAP

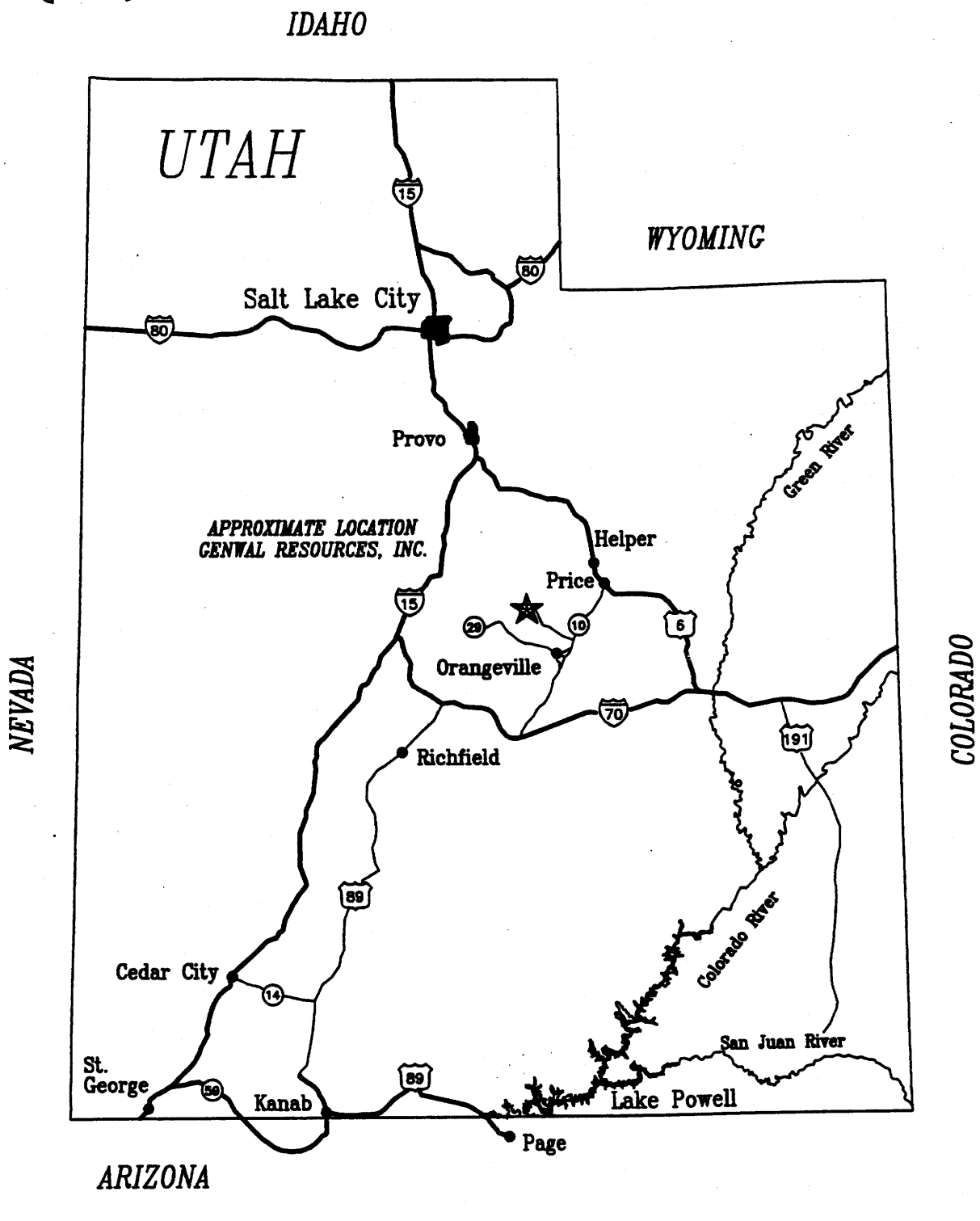


FIGURE 1

D. *Other Authorizing Actions/Authority*

This coal lease application will be processed under the authority of the Mineral Leasing Act of 1920, as amended, and the procedures set forth under Federal Regulations at 43 CFR 3425, Leasing-on-Application. If the tract is leased, granting the lease would give the lessee an exclusive right to mine the coal, but does not authorize mining or surface disturbing activities.

Before any lease development can occur, the lessee or operator must obtain approval of a comprehensive Mining and Reclamation Plan and a mine permit in accordance with the state and Federal Regulations. Surface management agency (in this case the Forest Service) consent and provisions for protection of non-mineral resources are required prior to issuing a permit. Approval of a Resource Recovery and Protection Plan under 43 CFR 3482 and consent from the BLM are also required.

The Surface Mining, Reclamation and Control Act of 1977 (SMCRA) gives the Department of the Interior, Office of Surface Mining (OSM) primary responsibility to administer programs that regulate surface coal mining operations and the surface effects of underground coal mining operations. In January 1981, pursuant to Section 503 of SMCRA, the Utah Division of Oil, Gas and Mining (DOGM) developed, and the Secretary of the Interior approved, a permanent program authorizing Utah DOGM to regulate surface coal mining operations and surface effects of underground mining on non-Federal lands within the state of Utah. In March 1987, under Section 523(c) of SMCRA, Utah DOGM entered into a cooperative agreement with the Secretary of the Interior authorizing Utah DOGM to regulate surface coal mining operations and surface effects of underground mining on Federal lands within the State.

Under the cooperative agreement, Federal coal lease holders in Utah must submit permit application packages (PAP's) to OSM and Utah DOGM for proposed mining and reclamation operations on Federal lands in the State. Utah DOGM reviews the PAP to ensure that the permit application complies with the permitting requirements and that the coal mining operation will meet the performance standards of the approved permanent program. If it does comply, Utah DOGM issues the applicant a permit to conduct coal mining operations. OSM, the BLM, the Forest Service, and other Federal agencies, review the PAP to ensure that it complies with the terms of the coal lease, the Mineral Leasing Act of 1920, NEPA, and other Federal laws and their attendant regulations. OSM recommends approval, approval with conditions, or disapproval of the mining plan to the Assistant Secretary, Land and Minerals Management.

Utah DOGM enforces the performance standards and permit requirements during the mine's operation and has primary authority in environmental emergencies. OSM retains oversight responsibility for this enforcement. BLM and the Forest Service have authority in those emergency situations where Utah DOGM or OSM inspectors can not act before environmental harm or damage occurs.

E. *History, Background, and Potential Mining Scenarios*

Genwal Resources, Inc., jointly owned by Intermountain Power Agency (IPA) and Andalex Resources, Inc, has been operating the Crandall Canyon Mine since 1984. Genwal holds 5,600 acres of coal leases on federal, state, and fee lands as shown on Figure 2. The company has a permit and approved mine plan for their existing lease holdings. On February 4, 1993, they applied to lease 4,053 acres of unleased Federal coal lands adjacent to the Crandall Canyon Mine. In order to maximize the coal resource recovery, the tract delineation team expanded the boundaries to encompass 6,440 acres.

Current production from the Crandall Canyon Mine is approximately 2.5 million tons per year, using one longwall system and two continuous miner sections. They believe the demand for their coal will increase in the future, and plan to increase production to an average of 3.5 million tons per year.

The only reasonably foreseeable development scenario is for Genwal to acquire the lease, and mine the tract from their Crandall Canyon Mine facilities. According to the BLM, another successful bidder would need to access the tract from a facility constructed in the approximate location of the old Huntington #4 Mine in Mill Fork Canyon, or through Rilda or Little Bear Canyons. Access through Mill Fork or Rilda Canyons is improbable due to thin coal. Access through Little Bear Canyon is also improbable because the canyon contains a culinary water source. Therefore, this analysis will be based on assuming that the tract will be mined from Genwal's existing facilities in Crandall Canyon.

F. *Other Activities Affecting Cumulative Impacts*

The following describe connected and cumulative actions that may affect leasing the Mill Fork Tract. If the Mill Fork tract is leased, some surface impacts are expected to be associated with underground mining. The following list details activities that might be associated with mining the tract, and also include other activities that may occur on lands within or adjacent to the tract. A tabulation of past, present and future actions in the vicinity of the lease tract are supplied in Tables IV-A, B, and C.

Connected Actions:

1. Ten coal exploration holes may be needed to evaluate coal quality and quantity. It is assumed that 5 holes would be accessed by road and require drill pads of approximately 1/2 acre each and approximately 1/4 mile of access road. The other five holes would be accessed from helicopter, requiring drill pads of 1/2 acres each. Effects of drilling will be evaluated on a site-specific basis, and will generate their own NEPA-based decisions.

Cumulative Actions:

1. In order to expand their surface facilities on private land adjacent to the lease tract, Genwal has proposed expanding across Crandall Creek to the south. This involves placing up to 1,500 feet of Crandall Creek in a culvert to facilitate crossing the drainage. This action is completely on private (fee land) inholdings within the Forest boundary.

2. A 135-acre timber sale (Blaze-o-Glory) on the top of East Mountain may be offered in 1997, which would involve cutting approximately 900 thousand board feet of aspen, spruce and fir. The spruce and fir would be harvested by selective cutting, but the aspen might be harvested by patch cutting (clear cuts of less than 10 acres).

3. An active gas field (Flat Canyon/Indian Creek Field or east Mountain Unit) lies within the southwest portion of the Mill Fork coal lease tract. One producing well has already been drilled (East Mountain Unit No. 32-23). Burlington Resources, present operator of the field, intended to expand the field by drilling additional holes within the Mill Fork tract, but plans are currently on hold. The oil and gas industry has expressed interest in leasing more area on and adjacent to the Mill Fork tract. Refer to Chapter III, section A, Geology, Soils and Mineral Resources, for further details on oil and gas activities.

3. Utah Department of Transportation (UDOT) may require upgrading SR 31 (Fairview-Huntington Highway) at the Crandall Canyon (FR 248) intersection as coal haul traffic increases as a result of increased production. Increased traffic on the road could exceed the current design standards, and may prompt the need to upgrade to road to accomodate the expanded use.

In addition, the following activities are planned in the foreseeable future for the vicinity of the Mill Fork Lease tract (see Table IV-C):

1. Energy West Mining operates the Deer Creek mine, located approximately 7 miles south of Genwal's Crandall Canyon facilities. Energy West has plans to extend the underground workings into the North Rilda Canyon area, and will be within 1/2 mile of the southeastern edge of the Mill Fork lease tract. Impacts to water resources are of concern.

2. Azalea Oil Company has proposed to drill an exploratory gas well in either North Hughes or Engineer Canyon. The company's preferred location is in Engineer Canyon, approximately 7 miles north of the lease tract up Huntington Canyon. Drilling is scheduled to begin Fall 1997, and last for about 5 months. Amounts of traffic in Huntington Canyon are of concern.

3. The Forest Service will be undertaking a project to improve or close dispersed recreation sites in Huntington Canyon. The Little Bear campground will be improved as a group use site, and a scenic byway site is planned in the area. The first phase of this project will be implemented in late summer 1997. Most of the work will be completed in 1998 and 1999. This project may increase the recreational use in side canyons including Mill Fork, Rilda and Crandall canyons.

4. A large-scale coalbed methane development project has been proposed by River Gas Corporation that would encompass about 188,000 acres primarily on BLM lands. The boundaries of the project area lie about 7 miles to the east and southeast of the lease tract. Impacts relating to the coalbed methane project should not affect the coal lease tract.

5. Livestock grazing is expected to continue on suitable range although the authorized numbers may fluctuate from year to year.

G. *Negative Declaration*

There are no prime farmlands, rangelands, or alluvial valley floors within the proposed lease area. Leasing of the tract should not result in significant impacts to paleontological resources; threatened or endangered plant or animal species. Protection of these resources is provided under the lease stipulations and Federal and State laws and regulations.

H. *Project Scoping*

Project scoping is an integral part of the environmental analysis process which involves the solicitation of comments from federal, state, and local agencies and interested organizations and individuals. The goal is to assure that the most accurate and current environmental information and public issues are incorporated into planning and decision-making.

Project scoping was initiated on November 19, 1996, and concluded on December 13, 1996, and included notices in local newspapers and letters to individuals who earlier had expressed interest in such proposals. Letters and records of verbal comments are contained in the project file. A total of 31 responses were received concerning the project as of February 1, 1997. The following summarizes the 31 responses received:

Castle Valley Special Services District (CVSSD, via Jeff Appel, counsel for the district), Huntington City and Councilman Ross Gordon, the Mayor of Cleveland, and Emery Water Conservancy District all expressed concerns over the potential impact of mining activity on the Little Bear Spring, a culinary water source for the towns of Huntington, Cleveland and Elmo. Comments also emphasized the need to design a replacement agreement identifying the replacement source in advance of additional mining activity. The attorney for CVSSD urged the Forest Service and BLM to undertake an EIS rather than an EA based on potential cumulative impacts of mining in the area.

North Emery Water Users Association (NEWUA) and Energy West Mining pointed out that the headwaters of Rilda Canyon, in the southern portion of the lease tract, are the recharge area for culinary springs located in lower Rilda Canyon. Energy West has conducted extensive hydrologic investigations relative to their own mining activity in the vicinity.

The Huntington-Cleveland Irrigation Company responded with concerns that mining activity is causing transbasinal diversion of water intercepted underground. Craig Smith, counsel for Huntington-Cleveland Irrigation Company expressed concern for water in the Huntington basin in general.

Other comments received pertaining to the protection of water resources were submitted by the Trail Mountain Livestock Operators, the Utah Wildlife Federation, and the Utah Division of Wildlife Resources (UDWR).

The UDOT identified concerns regarding the potential for rockfall hazards, safety at the intersection of the mine road and SR 31, the condition of SR 31, and it's deterioration due to heavy truck traffic. Mr. Arthur Polani also expressed concern over the potential for increased truck traffic on the Huntington Canyon road.

Emery County Economic Development favors leasing based on economic benefits for Emery County. Mr. Dick Neilson, a private landowner with land adjacent to the tract, expressed concern that all existing coal reserves be recovered, including those on private lands.

Burlington Resources, formerly Meridian Oil Company, has existing oil and gas leases within the Mill Fork lease tract. They identified the need to protect their existing facilities and expressed concern over inhibiting future development of oil and gas reserves.

The U.S. FWS and the UDWR responded with concern for the impacts of coal mining on wildlife habitat, including that for threatened and endangered species, critical elk winter range, and the need for raptor surveys in the area.

I. *Issues*

The issues identified by the interested parties, along with other issues identified by the Interdisciplinary Team (IDT), which will be evaluated in this analysis, are:

HYDROLOGY:

Ground Water: (GW)

GW1 **Mining activities and associated subsidence-induced ground movements could interrupt or degrade springs within or adjacent to the lease tract.**

1. Little Bear Spring is used as a culinary water source for the cities of Huntington, Cleveland and Elmo. Development is administered by the CVSSD. Recharge to the Little Bear Spring could be interrupted or degraded as a result of underground mining. The concern is for diminishing quality and quantity of the ground-water and surface-water resources that feed the spring. Although the mining operations are at a higher elevation than the spring, overburden alteration and subsidence could interrupt the flow patterns.

2. North Emery Water Users Association has springs developed in the lower portions of Rilda Canyon. Ground water occurring in the Right Fork of Rilda Canyon may be intercepted or rerouted as a result of subsidence-induced ground movements and fracturing of the strata. Studies performed by PacifiCorp have indicated that approximately 80% of the recharge to these springs originates in the Right Fork of Rilda Canyon.

3. Other springs occurring within the lease tract, especially those which are important sources of water for stock and wildife watering, and support riparian/wetlands habitat may be interrupted by subsidence-induced ground movements.

Evaluation Criteria:

1) Increases or decreases in flow from springs based on baseline information provided in the Data Adequacy package.

2) Changes in water quality from the springs based on parameters measured for Data Adequacy.

Surface Hydrology: (SW)

SW1 **Riparian areas and wetlands could be diminished or lost if mining operations intercept water from streams, seeps or springs now supporting wetlands.**

Wetlands occur in the Indian Creek drainage and additional smaller wetlands and riparian areas occur throughout the lease tract. The wetlands in Indian Creek are supported in part from flow in ephemeral drainages on East Mountain. Subsidence or other operations could divert water supplying these areas. The wetlands often support diverse communities of amphibians, macroinvertebrates (Forest Management Indicator Species) and other flora and fauna.

Evaluation Criteria:

1) Increases or decreases in spring flows feeding wetlands.

2) Wetlands/riparian areas (acres or individual) that reduce in size or become dry due to subsidence-related changes in subsurface flows.

SW2 **Increased discharge could alter flow and water quality in Crandall Creek.**

Additional discharge to Crandall Creek from the new mine workings could occur. Ground water could be encountered by underground workings if the mine workings extend into the Joes Valley Fault.

A discharge permit is currently in place, and the planned development would use this same discharge point.

Evaluation Criteria:

1) Amount of discharge, in gallons per minute (gpm).

2) Comply with requirements of National Pollution Discharge Elimination System (NPDES) permit to ensure that beneficial use standards are met.

3) Changes in stream channel processes, such as changes in sediment loading.

SW3 **Surface water could be intercepted along the Joes Valley Fault if mining were to alter that structure in local areas.**

Water from ephemeral drainages or springs could be intercepted if subsidence focuses along the Joes Valley Fault, or if ground movements produce fractures at the surface.

Evaluation Criteria:

1) Decreases in flow of drainages crossing the fault trace on the surface.

2) Visual observation of surface cracking and interception of ephemeral waters.

TERRESTRIAL WILDLIFE: (WL)

WL1 **Spotted bat roosting and hibernaculum habitat may be altered due to subsidence.**

Spotted bats (*Euderma maculatum*), a USDA-Forest Service sensitive species, may occur within the lease area. Spotted bats roost and hibernate in cracks on cliffs that could be altered by subsidence caused by mining activity.

Evaluation Criteria:

1) Escarpment and/or cliff failure due to subsidence, in linear feet of failure face.

2) Changes in the density of surface cracking at rock outcrops.

WL2 **Subsidence-induced ground movements (cliff spalling) could alter raptor habitat.**

Raptors (red-tailed hawks and golden eagles) are known to nest in or near the proposed lease area. It is possible that subsidence could cause the loss of nests, both in tree and cliff nesting species.

Evaluation Criterion: 1) Number of raptor nests lost to subsidence.

AQUATIC WILDLIFE: (FI)

FI1 **Aquatic habitat could be altered if the character or quantity of streams and streamflows change as a result of subsidence.**

This concern relates to both perennial and intermittent drainages that could be affected directly, indirectly, or cumulatively by coal mining actions. Intermittent channels that run only in the spring are important because they provide spawning habitats for trout populations in Huntington Creek; an important sport fishery. Spawning habitat (low-gradient riffles) may become inaccessible due to step-like fragmentation of the longitudinal profile of the stream. Studies in Burnout Canyon, although inconclusive, suggest that subsidence may cause fragmentation of riffles into cascades. Drops of twelve inches or more are considered barriers for inland trout species. It is conceivable that subsidence could shift the stream substrate enough to present barriers to the movement of spawning fish.

Evaluation Criteria:

1) Changes in discharge (runoff and baseflow).

2) Changes in fish populations.

FI2 **Water withdrawals within the Colorado River Basin impact the habitats of the four endangered fish species in the Colorado River and its tributaries: the Colorado squawfish, razorback suckers, bonytail chubs, and humpback chubs.**

Water withdrawals, for example water used for coal exploration drilling, could trigger consultation requirements with the US Fish & Wildlife Service, if the useage exceeds 75 acre feet, forest wide, annually.

Evaluation Criterion: 1) Volume (acre-feet) of water withdrawn from the Colorado River Basin.

TRANSPORTATION AND ENGINEERING: (EN)

EN1 **Increased coal production and subsequent haulage needs could cause road damage and conflict with design traffic levels on SR 31.**

The UDOT will continue to recommend improvements to the section of the Fairveiw-Huntington Highway between the eastern Forest Boundary and the Crandall Canyon turn-off if the existing mine traffic continues for an additional extended period or if there is an increase in the daily or hourly traffic volumes. Loss of or disturbance to dispersed picnicking or camping or parking areas, the valley floor, flood plains, riparian areas or flow channels could result if it becomes necessary to increase the roadway width to allow upgrading of the travelway, shoulders, or structural section of the Highway 31.

Evaluation Criteria:

1) Number of vehicles per day.

2) Changes in "Level of Service" (travel time).

EN2 **Increased production and mine related traffic may affect traffic safety at the Crandall Canyon (FR 248) and SR 31 intersection.**

Traffic conflicts at the Crandall Canyon Road and SR 31 intersection could increase and the potential for accidents and traffic delays could increase.

Evaluation Criteria:

1) Number of accidents.

2) Number of complaints and near misses.

ECONOMIC ISSUES (EC)

EC1 **Coal leasing could conflict with oil and gas production.**

An oil and gas company (Burlington Resources) has indicated the need to consider their existing oil and gas interests in the area of the coal tract. These include facilities, well sites, flow lines, access roads along with oil and gas leased acreage. Full recovery mining will likely result in surface subsidence impact on any surface installations. BLM has a multiple mineral development policy that provides for multiple mineral leasing with protection of valid existing rights.

Evaluation Criteria:

1) Tons of coal lost to avoid gas well.

2) Delay in gas production.

EC2 **Coal mining provides economic benefits such as employment, royalties, income, and tax base to local communities.**

Evaluation Criteria:

1) Number and duration of jobs.

2) Royalties generated, in dollars.

3) Taxes generated, in dollars.

EC3 **Recoverability of Federal coal reserves.**

The different alternatives for leasing evaluated in the environmental document will have varying potential coal recovery amounts.

Evaluation Criterion: 1) Recoverable tons of coal, by alternative.

CULTURAL RESOURCES: (CR)

CR1 **Mining related activities permitted under this coal lease could affect significant historical properties.**

Key areas potentially containing significant historic properties potentially at risk from subsidence-induced impacts (ie: escarpment failures and severe surface cracking) in the lease tract have been identified.

Evaluation Criterion: 1) Number of significant sites found to be located in areas of subsidence-induced impacts.

SUBSIDENCE: (SU)

SU1 **Mining-induced subsidence could cause escarpment failure, which may lead to concerns for public safety, visual quality, aquatic habitat and fisheries.**

Potential for escarpment failure exists in Huntington, Mill Fork, Little Bear, and Crandall Canyons. This poses a concern for public safety if subsidence were to trigger rockfalls on roads, trails or into creeks used for recreation (especially fishing). Visual quality may also be degraded in places if escarpment faces are failed. There is also potential for rockfalls to encounter creeks in canyons which may alter the natural flow regime, changing the aquatic habitat.

Evaluation Criteria: 1) Potential for escarpment failure to cause rocks to reach roads, trails or creeks.

2) Size of potential failure.

RECREATION: (RE)

RE1 **Coal mining activities could degrade the recreational experience in Huntington and Crandall Canyons for a longer time.**

Leasing additional lands for coal mining in this area will extend the life of the mine and increase the amount of associated activities. Truck traffic, noise, dust, and existing portal facilities reduce the quality of the users' experience at the Crandall Canyon trailhead, and at dispersed recreation sites along lower Huntington Canyon and Little Bear Campground. Additional leasing will prolong the duration of the current impacts.

Evaluation Criteria:

1) Years of mine life.

2) Increase in traffic (including haul traffic) in hours/day.

J. *Issues Recommended for Alternative Development*

The following significant issues (40 CFR 1500.4 (g), FSH 1909.15 12.3) are recommended to be used to focus the environmental analysis, develop alternatives to the proposed action, and develop measures to mitigate and monitor anticipated environmental effects. An issue is significant if there is a dispute or unresolved conflict associated with potential environmental effects of the proposed action.

Issue GW1	**Mining activities and associated subsidence-induced ground movements may interrupt or degrade springs within or adjacent to the lease tract.**

K. *Issues Carried Forward in the Analysis*

Some issues were identified which will not necessarily drive the alternatives development, but which will be carried forth in the analysis and addressed in mitigation or additional stipulations on the proposed lease.

Issue SW1	**Wetlands could be diminished or lost if mining operations intercept water from streams, seeps or springs now supporting wetlands.**
Issue SW2	**Increased discharge could alter flow and water quality in Crandall Creek.**
Issue SW3	**Surface water could be intercepted along the Joes Valley Fault if mining were to alter that structure in local areas.**
Issue WL1	**Spotted bat roosting and hibernaculum habitat may be altered due to subsidence.**
Issue WL2	**Subsidence-induced ground movements could alter raptor habitat.**
Issue FI1	**Aquatic habitat could be lost or degraded if the character or quantity of streams and streamflows change as a result of subsidence.**
Issue FI2	**Water withdrawals with the Colorado River Basin impact the habitats of the four endangered fish species in the Colorado River and its tributaries: the Colorado squawfish, razorback suckers, bonytail chubs, and humpback chubs.**
Issue EN1	**Increased coal production and subsequent haulage needs could require improvements on State Highway 31.**

Issue EN2	**Coal mining operations may affect traffic safety at the Crandall Canyon (FR 248) and State Highway 31 intersection.**
Issue EC1	**Coal leasing could conflict with oil and gas production.**
Issue EC2	**Coal mining provides economic benefits such as employment, royalties, income, and tax base to local communities.**
Issue EC3	**Recoverability of Federal coal reserves.**
Issue CR1	**Mining related activities permitted under this coal lease could affect significant historical properties.**
Issue SU1	**Mining-induced subsidence could cause escarpment failure, which may lead to concerns for public safety, visual quality, aquatic habitat and fisheries.**
Issue RE1	**Coal mining activities could degrade the recreational experience in Huntington and Crandall Canyons.**

L. *Issues Not Analyzed in Detail*

Some issues were determined to be outside the scope of the proposed action, already decided (by law or Forest Plan, etc.), irrelevant to the decision, or not affected by the proposed action.

Underground mining may cause transbasinal diversions of intercepted (and then discharged) ground water within watersheds and subwatersheds.

Ground water intercepted is either used in the mine underground, or discharged from the workings. There was concern that water intercepted underground may be discharged into a watershed other than the one where the ground water was originally destined.

Ground water encountered in the Crandall Canyon mine was determined to have a mean residence time of over 14,000 years and does not contribute to surface flows in the area. There are no developed wells in the lease tract that use ground water from the area.

Mining related activities, such as drilling, and/or mining-induced subsidence could damage or alter the position of survey monuments and rectangular survey monuments (section corners or 1/4 corners).

Federal and state law requires the repair or replacement of damaged survey monuments. The Forest Surveyor has provided a list of known section corners, and the application of Special Coal Leasing Stipulation 16 (Appendix A) addresses replacement of these monuments.

Mining-induced subsidence may cause surface cracking and loss of vegetation important to support livestock grazing.

Surface cracking due to subsidence has proved to have little if any effect on vegetation and livestock grazing. Small cracks heal quickly, and the mining company is required to repair any larger cracks due to subsidence.

Mining may have impact on Threatened, Endangered and Sensitive (TE&S) plant species listed by the FWS.

None of the following listed T&E plants for Emery County occur on or near the proposed Mill Fork lease area. None are found within 50 miles of the area according to Bob Thompson, Forest Botanist.

FWS Listed T&E Plant Species

Barneby Reed-Mustard	*Schoenocrambe barneby*
Jones Cycladenia	*Clycladenia humillis var Jonesii*
Last Chance Townsendia	*Townsendia aprico*
Maquire Daisy	*Erigeron maquirei*
San Rafael Cactus	*Pediocactus despainii*
Wright Fishhook Cactus	*Selerocactus Wrightiae*

Additional surface disturbance could change the runoff and flood patterns.

No additional surface disturbance is anticipated according to the reasonably foreseeable development scenario prepared by the BLM (Appendix B). Therefore this issue was dropped from further analysis.

Additional surface disturbance could cause the pollution of surface streams.

No additional surface disturbance is anticipated according to the reasonably foreseeable development scenario prepared by the BLM (Appendix B). Therefore this issue was dropped from further analysis.

Coal leasing activities could leave private coal inaccessible.

A private land owner that has fee holdings adjoining the proposed tract has indicated a concern about making sure the coal is mined on adjoining Federal land as well as his fee coal. Assuming the legal description to be correct, the only parcel that adjoins the proposed tract is the SW 1/4 of section 8 (T 16 S, R 7 E, SLM). A preliminary review of the coal resources indicates marginal coal resources in the area. The Government cannot require a private company to mine private coal but would encourage the mining of adjacent mineable reserve if it does exist.

This issue has been determined to be outside of the scope of this analysis. The land owner has been in contact with the mining company to discuss terms.

CHAPTER II. DESCRIPTION OF ALTERNATIVES

A no action alternative and three action alternatives were developed to provide a full range of reasonable alternatives that sharply define the significant issues. Some of the alternatives attempt to examine methods which are less environmentally harmful and still achieve at least part of the purpose and need. Alternatives will include mitigation and monitoring to address the issues and anticipated environmental effects. Figure 2 shows the land surface area considered under each alternative.

A. Alternative 1 - No Action

Alternative 1 addresses the need to provide a "No Action" alternative (40 CFR 1502.14). The Forest Service would not consent to, and the BLM would not approve leasing the Mill Fork Tract as submitted. Subsequently, Alternative 1 would not allow for the mining of the tract, and therefore not provide coal reserves for the mine. No mitigation measures or monitoring would be required as part of this alternative other than meeting Forest Plan direction, standards, and guidelines.

B. Alternative 2 - Offer for lease with standard BLM Lease Terms, Conditions and Stipulations (stated on Form 3400-12)

The purpose and need of the proposed action is to lease the Mill Fork Tract, as delineated by the Tract Delineation Team, to provide coal reserves for the Crandall Canyon Mine so that current production levels are maintained, and to recover Federally owned coal deposits that may otherwise be bypassed. The Forest Service would consent to, and the BLM would approve, offering the tract of 6,440 acres, as delineated for competitive leasing. It could be leased to Genwal Resources for mining through their Crandall Canyon Mine. Because it is a competitive bid process, another company may also be able to bid on the lease, but this has been deemed unlikely by the BLM mining and economics specialists on the team. The lease would only have the standard BLM terms, conditions and stipulations that are included on the BLM coal lease Form 3400-12 (April 1986) attached. This alternative would not include Special Coal Lease Stipulations for the protection of non-coal resources.

This is not a viable alternative, it is included for analysis purposes only. It is intended to provide the basis for developing Special Coal Lease Stipulations for protection of non-coal resources to be added to alternatives 3 and 4 to mitigate impacts. The reasonably forseeable development scenario for this alternative assumes that all mineable coal would be recovered to the fullest extent using accepted industry practices. This alternative is not selectable because it is inconsistent with the Forest Plan, and would require a Forest Plan amendment. Environmental impacts resulting from this alternative could cause material damage (functional impairment) of resources. This could be in violation of SMCRA.

C. Alternative 3 - Offer for lease with application of Special Coal Lease Stipulations for Protection of Non-Coal Resources

Alternative 3 addresses the issues identified through the application of the 18 Special Coal Lease Stipulations from Appendix B of the Forest Plan (attached as Appendix A). Two additional tract-specific stipulations were included, and are also in Appendix A. Alternative 3 emphasizes application of additional mitigation measures designed to lessen anticipated environmental effects. This alternative may require a Forest Plan amendment, because leasing the portion of land containing the Little Bear Canyon watershed would not be consistent with management unit direction. On Municipal Water Supply (MWS) management units, maximizing herbaceous ground cover and minimizing surface disturbing activities is the overall direction. Specific to leasable minerals management in MWS units, the forest plan states " allow mineral leasing where it has been determined that stipulated methods of mining will not affect the watershed values to any significant degree".

D. Alternative 4 - Offer a modified tract for lease with application of Special Coal Lease Stipulations for Protection of Non-Coal Resources

In addition to those activities addressed in Alternative 3, Alternative 4 specifically focuses on concerns identified as water issues. The portion of the lease tract east of the northeast quarter of section 7 is removed from the lease offering, to protect the water quality and quantity of Little Bear watershed and spring, reducing the overall tract by 880 acres. This alternative would not require a Forest Plan amendment, and would be wholly consistent with Forest Plan management direction.

E. Design Features Common to Alternatives 3 and 4

These two action alternatives evaluated include direction provided by the Forest Plan. All applicable forest-wide and management area goals, direction, and standards and guidelines described in the Forest Plan are incorporated into Alternatives 3 and 4, with the possible exception of fully meeting the MWS management unit objectives in alternative 3. Both these alternatives will have special coal lease stipulations applied to lessen environmental impacts. Effects analyzed under both alternatives are based on a conceptual mine scenario that could change by the time the actual mine plan is submitted. The mine plan could be amended at any time through modifications but could not be inconsistent with with the Special Coal Lease Stipulations.

F. Comparison of Alternatives

The following chart has been generated to display a comparison of alternatives relative to the identified issues. The issues are listed as resource elements. Refer to Section IV for a discussion of impacts for each alternative.

TABLE II - 1
Comparison of Alternatives

RESOURCE ELEMENT	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Geology, Soils and Mineral Resources	No coal mined	75 million tons could be mined	68 million tons could be mined	63 million tons could be mined
Hydrology				
Surface Water				
Riparian areas, wetlands, streams, seeps and spring	No effect	Potential for change in water quality and quantity	Same as alternative 2 however water replacement would be required	Redued potential for change in water quality and quantity
Crandall Creek				
Beneficial Use Standards Flow	No effect	Potential for change in quality and quantity from mine discharge	Same as alternative 2 however water replacement would be required	Same as alternative 3
Interception of water at Joes Valley Fault	No effect	Potential to divert water into fractures or fault zone if subsided	Stipulation would prevent subsidence focusing on the fault	Same as alternative 3
Ground Water				
Interrupt springs	No effect	Potential to effect culinary water sources and other springs but would require replacement of water under state law.	Same as alternative 2 but water replacement required at present spring location	Reduced potential due to protecting the Little Bear watershed
Wildlife				
Terrestrial - Spotted Bats & Raptors	No Effect	Potential change to spotted bat and/or raptor habitat	Reduced potential due to involving less escarpment and special stipulation 20 requires mitigation, if bats are found	Same as alternative 3 but with further reduced potential for impact by excluding the northeast portion of the lease tract
Aquatic	No effect	Potential to alter trout habitat and/ or Colorado River fish species	Same as alternative 2	Same as alternative 2

RESOURCE ELEMENT	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Transportation				
Traffic on SR 31	Planned increase in production from 2.5 to 3.5 million tons/year (mt/y) would increase traffic from 72 vehicles per hour (vph) to about 90 vph.	Same as alternative 1	Same as alternative 1	Same as alternative 1
Traffic safety on SR31 and FDR 248	No effect	Increase in traffic conflicts at the intersection	Same as alternative 2	Same as alternative 2
Socioeconomics				
Coal reserves for the Crandall Canyon Mine	5-7 year mine life. Producton increase from 2.5 to 3.5 mt/y.	Add 21 years to mine life	Add 19 years to mine life	Add 17 years to mine life
Oil & Gas Production	No oil and gas development delays	1.7 million tons of coal left in place to protect gas well and related facilities. Oil and Gas development delayed indefinitely.	Same as alternative 2	Same as alternative 2
Employment	Continue employment until 2002	Continue employment until 2023	Continue employment until 2021	Continue employment until 2019
Royalties	No royalty generated from the proposed lease	$141 million in royalties to federal, state and local governments	$130 million in royalties to federal, state and local governments	$120 million in royalties to federal, state and local governments
Cultural Resources				
Subsidence impacts to historical resources	No effect	Potential to disturb historical sites	Same as alternative 2	Reduced potential for disturbance relative to alternatives 2 and 3

RESOURCE ELEMENT	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Subsidence				
Escarpment failure	No effect	Potential for small failures along about 12,800 ft of Castlegate Ss. outcrop	Potential for small failures along about 10,000 ft of Castlegate Ss. outcrop	Potential for small failures along 5,700 ft of Castlegate Ss. outcrop
Recreation				
Recreational experience	Current mining activity would affect recreation quality until mining ceases in 5-7 years and reclamation would begin	Mine life and activity would be extended by 21 years	Mine life and activity would be extended by 19 years	Mine life extended by 17 years

CHAPTER III. DESCRIPTION OF AFFECTED ENVIRONMENT

The lease application area is located in central Utah in the Wasatch Plateau coalfield. The tract is south and adjacent to Genwal Resources Inc.'s Crandall Canyon mine. The Wasatch Plateau is a north-south trending high plateau bounded by the Castle Valley to the east and the Sanpete Valley to the west. The tract is approximately 15 miles northwest of Huntington, Utah. The area is accessed by SR 31 which connects to State Highway 10 that runs between Price and Emery. U.S. Highway 6 accesses Spanish Fork, Price and Green River.

Forest Plan Direction

The following is a description of the affected environment, which will be presented by individual resource elements for clarity. The management prescriptions for the areas designated in the Forest Plan, are for Forage Production (RNG), Wood-Fiber Production and Harvest (TBR), Riparian Area Management (RPN), and Little Bear Canyon is designated as a Municipal Water Supply (MWS). Management requirements for these areas are found on pages III-64 to III-76 of the Forest Plan.

Under the RNG designation, the Forest Plan management emphasis is on production of forage and cover for domestic livestock and wildlife. When coupled with mineral development, the management prescription calls to "provide appropriate mitigation measures to assure continued livestock access and use", and for "those authorized to conduct developments will be required to replace losses through appropriate mitigations, where site-specific development adversely affects long-term production or management."

Under the TBR management unit, the emphasis is for production and use of wood-fiber for a variety of wood products.

The RPN unit is not delineated in the Forest Plan but management direction requires analysis of RPN units on site-specific project basis. The RPN unit emphasizes management of riparian areas and component ecosystems, including aquatic and riparian communities that occur within 100 feet of perennial streams, springs, seeps, bogs and wet meadows. The goals of management are to "1) maintain water flows to provide free and unbound water within the soil needed to create the distinct vegetative community, 2)provide healthy self-perpetuating plant communities, 3) meet water quality standards, 4) provide habitats for for viable populations of wildlife and fish, 5) provide stable stream channels and still water body shorelines, and 6) restore riparian habitats that have been lost through the downcutting of stream channels and wet meadows. With specific regard to mineral management activities in an RPN area, the Forest Plan calls to "avoid and mitigate detrimental disturbance to the riparian area, and initiate timely and effective rehabilitation of disturbed sites, and where possible, to locate mineral activities outside the riparian unit, and to design and locate settling ponds to prevent washout in high water."

Little Bear Canyon to the topographic divide is designated as a MWS (Municipal Water Supply) Management Unit. The General Direction for MWS units is to, "Allow mineral leasing where it has been determined that the stipulated methods of mining will not affect the watershed values to any significant degree." The General direction for geologic resources management is to, "Design activities to minimize negative or emphasize positive effects on

geologic features concerning recharge areas, depth and extent of the waters resource, and surface use in the management of municipal water supplies."

The Forest Plan also designates a select group of species which can indicate habitat changes resulting from activities on the forest. Called Management Indicator Species (MIS), the list for the Manti-La Sal National Forest includes elk, mule deer, macroinvertebrates, blue grouse, golden eagles, and Abert squirrels. Species that exist in the lease tract will be discussed in the wildlife section.

A. *Geology, Soils and Mineral Resources*

The Mill Fork Lease tract encompasses an area within the Wasatch Plateau coal field on the northern portion of East Mountain. The tract is bounded by Crandall Creek to the north, the Right Fork of Rilda Canyon to the southeast, Huntington Canyon on the east, and the Joes Valley fault to the west.

The northern portion of East Mountain is a north-south trending elongated ridge. The ridgeline lies along the western portion of the lease tract and reaches an elevation of 10,730 feet. The west flank of East Mountain rises over 1,600 feet above Upper Joes Valley and Indian Creek. On the eastern flank of the mountain, the topography is typified by stream-incised canyons with elevations ranging from 9,800 feet along the ridgelines to 7,600 feet in the canyon bottoms.

Geology

The exposed stratigraphy consists of a Tertiary to Cretaceous-aged sedimentary sequence. From youngest to oldest, the stratigraphic units exposed within the lease tract consist of the Flagstaff Limestone, the North Horn Formation (shales, sandstones, conglomerates and limestone), the Price River Formation (sandstone interbedded with shales and conglomerate), the Castlegate Sandstone, the Blackhawk Formation (siltstone and sandstone interbedded with shale, also the coal-bearing formation), and the Star Point Sandstone. The Flagstaff Limestone caps higher points on East Mountain. The North Horn Formation forms the upper slopes of the mountain, and the bedrock surface in Upper Joes Valley. The Price River formation forms the intermediate slopes of East Mountain. The Castlegate sandstone creates prominent cliffs and escarpments on the western flank of the mountain, and in the major drainages on the eastern side. The Blackhawk formation outcrops and forms the slopes within the major drainages to the east. In lower sections of the major drainages, the Star Point sandstone forms a series of near-vertical cliffs that intertongue and overlie the slope-forming Mancos shale. The Star Point consists of three separate layers, named the Spring Canyon, Storrs and the Panther tongues (in descending order).

Economic coal beds occur at the base of the Blackhawk Formation. Drilling in this area of the Wasatch Plateau coalfield has shown that both the Blind Canyon (the upper seam) and the Hiawatha (the lower seam) are mineable within the lease tract. Separation between the coal beds is estimated to be 80 to 120 feet. Only the Hiawatha bed is being mined in the Crandall Canyon mine. Overburden on the Hiawatha bed is zero where it outcrops on canyon walls in the eastern portion of the tract, and reaches to 2,400 feet under East Mountain. On the western tract boundary, overburden ranges from 800 to 1,500 feet along the trace of the Joes Valley fault.

Local geologic structure in the lease tract shows that the the strata dip to the east in the eastern portion of the lease tract, to the west in the extreme western portion, and to the northeast in the southeasternmost corner. The Flat Canyon anticline, in the western portion of the tract, trends to the north with the axis underlying sections 11, 14, and 23. A small syncline has been mapped in Little Bear Canyon (in the northeast portion of the tract), that has the axis roughly parallel to Little Bear Creek. Both are gentle folds that have low dips on the flanks.

The western edge of the tract is bounded by the Joes Valley fault, a major north-south trending normal fault that marks the eastern side of the Joes Valley graben. A graben is a block of rock that is displaced downward between two normal faults. Displacement along the Joes Valley Fault ranges from 2,000 to 3,000 feet. Numerous other sympathetic faults have been mapped within the graben. Upper Joes Valley is in the northern end of the graben and contains thick colluvial and alluvial deposits that overlie the North Horn Formation in the valley bottom. According to the Utah Geological Survey, along the east, upthrown side of the Joes Valley fault, the Hiawatha coalbed lies approximately 800 feet below the surface (Kitzmiller 1982).

A series of northeast-southwest trending faults were mapped in the Huntington #4 mine adjacent to the southeast corner of the tract. These faults may indicate an extension of the Mill Canyon graben which was encountered in the Deer Creek mine to the south. A geophysical study performed by PacifiCorp in the Rilda Canyon area also indicates presence of faults along the same trend (Fry and Lloyd, 1991). These faults appear to have 20 to 30 feet of displacement, and dip steeply to the west. Evidence of faulting has also been documented in Little Bear Canyon, and occurs along the same trend of the faults forming the Mill Canyon graben (Nielson, 1996).

The midslope of East Mountain displays extensive land instability characterized by failure of the colluvium. More severely disrupted terrain suggests that deeper slumps may also have occurred. Springs on the western face of East Mountain may be contributing to the instability.

Soils

The soils on the lease tract have developed primarily from sandstone and shale parent materials of the North Horn, Price River, Castlegate, and Blackhawk formations. Along the ridge top of East Mountain a few spots have soils developed in Flagstaff limestone. The regolith consists of both residual and colluvial materials, yielding soils that range from shallow to very deep. Most soils are well drained with potentially rapid runoff owing to the steepness of the slopes.

The elevational range of about 7,600 to 10,700 feet and the steep slopes with contrasting aspects account for large soil temperature and moisture differences. The soils on the lower elevation south facing slopes are hot and dry, and those at the higher elevations and north facing slopes are cool and moist. Soil temperature regimes include cryic (cold) and frigid, and the soil moisture regimes are udic (moist) and ustic (semiarid). The aspen and spruce-fir vegetation types are characteristic of the cryic/udic environment and the lower elevation mountain brush with some pinyon-juniper is characteristic of the frigid/ustic situation.

Soils on sandstone are typically cobbly or stony with textures of loamy sand, sandy loam, or loam. Rock outcrops are common, especially with the Castlegate formation. These soils are most common along the east side of the lease tract.

Most of the area at the higher elevation have clayey soils derived from North Horn formation materials. Textures of clay loam, silty clay loam, and clay are common. The subsoils often have a higher clay content than the surface. They have high water holding capacities and are prone to slope failures. These clayey soils typically have high self-healing capabilities, and tend to buffer the effects of tension cracks in the soil zone that sometimes form due to subsidence.

Topsoil development is most pronounced under aspen vegetation types. It is commonly 10 to 20 inches thick and has a relatively high organic matter and nutrient content. On the steep, north facing slopes that support a spruce-fir type the topsoil thickness may vary from about three to ten inches.

Major soil limitations in the lease area include high soil erosion potentials, slope instability, cold temperatures (short growing season), stoniness, and some droughty soils (lower elevations, south slopes).

The lease area has been mapped as part of the Soil Survey of the Manti Division, Manti-La Sal National Forest (D.Larsen, in progress). Nine soil map units have been identified. Map unit descriptions are available.

Mineral Resources

The northern portion of the Wasatch Plateau (Manti North Oil and Gas Potential Area), including the Mill Fork Tract, has high potential for the occurrence and development of oil and gas, especially for expansion of the Flat Canyon/Indian Creek Gas Field (USDA-FS, Intermountain Region, 1992). The area is available for oil and gas leasing and development (Forest Plan as amended), with specified stipulations for the protection of non-mineral resources. Any future proposals for drilling and production would require an environmental analysis and specific approvals by the BLM and Forest Service. BLM is the responsible agency for the administration of leases and wells on Federal lands (including National Forest System lands) under the Mineral Leasing Act of 1920, as amended.

The southwestern portion of the Mill Fork Tract (E 1/2, E 1/2, SE 1/4, Section 10; N 1/2, Section 13; Lots 1-12, N 1/2, SE 1/4, NE 1/4, Section 14; E 1/2, Section 15; N 1/2, N 1/2, N 1/2, Section 23, T 16 S, R 6 E, SLM) is currently leased for oil and gas. The leases date back to the 1970's and are included within the Flat Canyon/Indian Creek Gas Field (East Mountain Unit) operated by Burlington Resources. They will remain in effect for as long as the gas field is producing gas in economic quantities. The field currently contains 6 producing gas wells and several old plugged and abandoned wells. Only the northernmost production well (East Mountain No. 32-23, SW 1/4 NE 1/4 Section 23, T 16 S, R 6 E, SLM) lies within the Mill Fork Tract. A 4-inch diameter aluminum gas pipeline runs from the well south along FR 245 and down Flat Canyon. Sections of the pipeline are buried.

Burlington Resources does not have immediate plans for expanding the existing field, but has not abandoned future options. Other companies have expressed interest in the area. The potential for occurrence of oil and gas reserves and development within and adjacent

to the proposed lease tract is rated as "high" based on existing production, geologic conditions, and industry interest in leasing available areas. BLM has postponed offering additional oil and gas leases in the tract pending completion of the Mill Fork Tract EA, and/or completion of mine activities within a resultant lease.

B. *Hydrology*

Surface Water

Surface drainages within or adjacent to the lease tract include portions of Crandall Creek, Little Bear Creek, Mill Fork Creek, Right Fork of Rilda Creek, and tributaries of Indian Creek. Crandall, Little Bear, Mill Fork and Rilda Creeks drain the east slope of East Mountain and generally flow west to east into Huntington Creek. Huntington Creek flows south and is tributary to the San Rafael River. Several small tributaries of Indian Creek drain the west slope of East Mountain within the lease tract, along with a fragment of Cottonwood Creek in the extreme southwest corner of the tract. Indian Creek flows south to Lowry Water and then to Joes Valley Reservoir. Joes Valley Reservoir drains into Cottonwood Creek (Straight Canyon), also a tributary of the San Rafael River. The San Rafael River is part of the Colorado River Basin. The State of Utah designated standards for water in the Huntington Canyon drainage and Indian Creeks are 1C, 2B, 3A and 4, corresponding to domestic, recreation, cold water fisheries and irrigation beneficial uses. Drainages in the lease tract have been compared to the State of Utah 303(d) list and none of the waters within the lease tract appear on the list.

The portions of Crandall Creek within the lease tract are perennial, and one intermittent tributary is present in section 6, T 16 S, R 7 E. For this environmental analysis, the following criterion defines the perennial nature of streams: flowing 2 of 3 years on or near October 1. The portions of Little Bear, Mill Fork, and the Right Fork of Rilda Creeks are intermittent, and the tributaries of Indian Creek are ephemeral within the tract. The intermittent drainages flow during runoff and and when they receive flow from springs, but are usually dry by late summer or early fall. The ephemeral drainages carry water only immediately after storms.

Crandall Canyon

According to the USGS, discharge from Crandall Creek ranged from a minimum of 0.24 cubic feet per second (cfs) to 97 cfs from 1979 to 1984. Spencer and Kelly (1984) estimated the 2-year recurrence interval flow at about 48 cfs at the confluence with Huntington Creek using a unit hydrograph model. Flow in Crandall Creek immediately above at the mine portal using the proportionate area of the watershed above the mine would be about 41 cfs. About 80 percent of streamflow in Crandall Creek occurs between April and July as a result of snowmelt. Suspended sediment loads in Crandall Creek were measured in 1978 and 1979 and were found to range between 0.08 to 0.41 tons/day based on flow variations (Danielson 1981). Crandall Creek immediately below the mine was designated as a class A1 channel type (steeper than 4% with boulder or bedrock channel) by Raleigh Consultants in a 1992 survey of drainages in the Huntington watershed.

Little Bear Canyon

Little Bear Canyon is a small watershed on the eastern edge of the lease tract. A large spring occurring in lower portions of the canyon is developed by Castle Valley Special Services District (CVSSD) and provides culinary water to nearly 2,500 residents in the towns of Huntington, Cleveland and Elmo. Flow in Little Bear creek was measured at 0.24 cfs in October 1978 and 1979 (Danielson 1981).

In 1964 there was a fire that burned 830 acres of Little Bear Canyon, and was followed by a flood in 1965. In September 1966, a hydrologic analysis found that the burn area was healing poorly, but by 1969 all areas were healing.

Mill Fork Canyon

Upper portions of Mill Fork Canyon are within the lease tract, the drainage is intermittent in these reaches. In the seep and spring inventory, 49 springs in the head of Mill Fork Canyon were identified. Flows range from seeps to 50 gpm, with typical flows ranging from 1 to 5 gpm. The occurrences are classed as follows:

Flow	# of Springs
>25 gpm	4
20-25 gpm	0
15-19 gpm	4
10-14 gpm	5
5- 9 gpm	7
0- 4 gpm	29

Field observations by Forest Service personnel in August 1996 (Dufour and Mattson) showed that Mill Fork Creek was dry at the lower forks in section 17, T 16 S, R 7 E. Flow was observed emanating from a spring in the creek bottom approximately 0.5 mile downstream from the forks.

Rilda Canyon

Rilda Canyon is on the southeast boundary of the lease tract, and the upper portions of the Right Fork of Rilda Canyon lie within the tract boundaries. The Right Fork of Rilda Canyon is intermittent and drains about 2,114 acres. It is a third order canyon, according to Strahler's classification. Genwal's spring and seep inventory finds 41 springs and seeps within the Right Fork of Rilda drainage and reports that 25 of them reach the stream. The flow is classed as follows:

Flow	# of Springs
>25 gpm	4
20-25 gpm	3
15-19 gpm	4
10-14 gpm	7
5- 9 gpm	4
0- 4 gpm	19

A fire occurred in the upper portions of Rilda Canyon in 1992. Observations by Forest Service personnel in July 1996 (Mattson and Reed) showed that a large amount of sediment entered the Right Fork from the burn area during intense precipitation events.

North Emery Water Users Association (NEWUA) has a developed water system in the lower portions of Rilda Canyon on the main stem just below the confluence of the right and left forks. Referred to as springs, the system consists of a series of collection lines and galleries extending westward up Rilda Canyon and southward up a small side drainage. This system serves over 400 connections in the communities of Cleveland, Lawrence and Elmo.

Flows in the Right Fork of Rilda Creek have ranged from approximately 0.5 to 10 cfs during peakflows, and from approximately 0 to 0.5 cfs during baseflow in the years from 1989-1995 (PacifiCorp, 1996).

Tributaries to Indian Creek

The tributaries to Indian Creek on the west slope of East Mountain are ephemeral. Indian Creek itself is outside the lease tract boundaries. Indian Creek becomes perennial in the SE 1/4, Sec 34, T 15 S, R 6 E, approximately one mile north of the lease tract. Most of the flow likely originates in canyons on East Mountain as either surface flow, or from springs at the base of the colluvial/alluvial toe in the valley floor. Indian Creek progressively gains flow as it picks up water from various springs and stream sources. The Indian Creek valley also supports a large wetland area. Flow records collected by the Forest Service from 1972 to 1975 showed a range of flows for the period of record between 1 cfs and 30 cfs. The seven ephemeral drainages flow from the proposed lease into Upper Joes Valley. From the *Utah Hydrologic Atlas*, the mean annual runoff from the proposed lease is 7 to 8 inches per year on the Joes Valley side of the divide, representing about 1,200 acre-feet (Jeppson et al, 1968). The mean annual runoff from the Upper Joes Valley area is about 9 inches, computing to 4,150 acre-feet. Therefore, the proposed lease area provides about 29% of the water to Indian Creek at the lower lease boundary.

Cottonwood Creek

A small fragment of Cottonwood Creek watershed lies within the lease tract in section 22, T 16 S, R 6 E. Several springs were identified in the spring and seep inventory, but are outside the lease tract. Draft mine plans do not show that mining will occur within any portion of the Cottonwood drainage, therefore there will be no further discussion regarding the creek in this document.

Wetland Areas

Additional small wetland and riparian areas associated with local springs are also common within the lease tract. For analysis purposes, an average size of 0.25 acres of wetlands occur per spring is assumed based on local experience. 135 springs were identified in the spring and seep inventory, which would compute to nearly 34 acres of wetlands scattered throughout the lease tract. From aerial photo interpretation, in the Upper Joes Valley area and immediately below the proposed lease, about 270 acres of wetlands are privately owned and 100 acres of wetlands are on National Forest System Lands.

Surface Water Quality

Water quality is good in the drainages. Dissolved solids concentrations are generally less than 500 mg/l. Total dissolved solids increase near Huntington Canyon where the saline Mancos Shale is exposed along the stream reach. Predominant dissolved chemical constituents in surface waters are calcium, magnesium and bicarbonate. Sediment yields in the Upper Huntington Creek drainage were estimated at 0.1 acre-feet per square mile by Wadell, et al, 1981.

Mine Water Discharge

Water currently encountered in the Crandall Canyon mine workings is either used underground or discharged through an approved National Pollution Discharge Elimination System (NPDES) location into Crandall Creek. Water quality standards that must be met are described in the NPDES permit, a copy of which is in the project file. An estimated 350,000 gallons/day (0.5 cfs) is presently being discharged. Because Crandall Creek has a boulder/bedrock channel, changes to the channel morphology have not been observed. Quality of the water discharged must meet beneficial use standards as described by the State of Utah. Water encountered in workings within the Mill Fork lease tract will also be discharged from this approved location.

Ground Water

Ground water in the lease tract has several modes of occurrence; the first consists of laterally discontinuous perched water-bearing zones that issue water to springs locally where permeable layers of sandstone overlie less permeable layers of shale, mudstone or clay. Another system present is a more continuous saturated zone in the Star Point Sandstone. Alluvial materials present in stream canyons, and faults and fractures in the local strata may also contain ground water. Ground water occurs in all of the exposed strata, but the units are not saturated uniformly.

Perched Water-Bearing Zones

The perched water-bearing zones are typically associated with the North Horn and Price River Formations. The majority of the springs identified within the lease tract occur in the southern half (sections 8, 13 and 23), at the heads of Mill Fork and the Right Fork of Rilda Canyons. Most of these springs issue from the North Horn Formation, and some occur at the contact between the North Horn and the Price River, or at the base of the Castlegate sandstone where it overlies the Blackhawk formation. Flows measured in these springs range from 0.5 to 50 gpm, with most springs flowing approximately 1 to 2 gpm. Typically these springs flow during the spring and summer, but cease by late summer or fall (Genwal, 1996). Another cluster of springs occurs in the head of Little Bear Canyon (in the north east portion of the lease tract). These springs issue from the base of the Castlegate sandstone, or are associated with landslides, and flow from 0.25 to 2 gpm. Numerous other springs were identified on the west flank of East Mountain, and drain towards Indian Creek. Most of these springs issue from the Price River formation or the Castlegate Sandstone, and range from seeps to 10 gpm, with typical flows ranging from 1-2 gpm. A linear alignment of springs in the Indian Creek drainage (in sections 15 and 22, outside the lease tract boundaries) have also been identified and are likely associated with colluvial/alluvial deposits from East Mountain. These occur in the North Horn formation and contribute flow to Indian Creek.

Springs associated with perched water-bearing units are recharged annually by precipitation. Generally, the springs exhibit high flows after snowmelt that receed rapidly to a baseflow condition, or cease flowing by late summer or fall. Most of the precipitation occurs as snow, and because of the high clay contents of the local strata, most water runs off. Only an estimated 5-12% goes to ground-water recharge and most of this resurfaces as springs in the perched water-bearing zones. The rapid response indicates that the springs in the area occur close to their recharge sources. Snowmelt percolates into permeable rocks, and flows vertically until it hits an impermeable layer, then flows laterally. Impermeable layers present in the local strata tend to impede downward migration of flow, except locally through fractures or faults (Danielson, 1981).

In the upper Right Fork of Rilda Canyon, springs high in the drainage basin contribute flow to the creek and likely support shallow ground-water flow in alluvial deposits. The alluvial materials are one source of water that support a culinary water source in the lower portions of Rilda Canyon. North Emery Water Users Association has developed springs and collection galleries in the alluvial materials.

Ground water in the Star Point Sandstone

According to the USGS, an extensive ground-water system in the Wasatch Plateau is present in the Blackhawk formation and the Star Point Sandstone. In the area of the lease tract, it does not appear that the Blackhawk contains large quantities of water, based on few springs, lack of inflows in the active Crandall Canyon mine workings (except for inflows from intercepted sand channels), and the fact that faults in the Huntington #4 mine south of the lease tract were dry at the mine level (Vaughn Hansen, 1977). It is also unlikely that large amounts of recharge infiltrates from the surface through the Blackhawk and overlying units due to low permeability materials that impede downward migration of water.

Data from drill holes suggests that the base of the Hiawatha coal seam and the top of the Spring Canyon member of the Star Point sandstone are separated by a variable amount of shale and sandstone layers ranging from 5-13 feet within the lease tract. Water levels in monitoring wells in the active mine workings, and new wells completed in the southernmost portion of the active mine (adjacent to the northern border of the lease tract) supported an east-southeast flow direction in the Spring Canyon member. In the area of the lease tract, local geologic structure, such as the Little Bear Canyon syncline or the Flat Canyon anticline likely influence flow directions in the Star Point, assuming flow generally follows the dip of the strata. In the active mine workings, there is evidence that the strata dip to the west in the extreme western part of the workings, likely related to the Flat Canyon anticline and/or drag folding along the Joes Valley Fault. Reports from Genwal personnel indicate that water is seeping from the floor, and flowing to the west in this area. A monitoring well completed in the Spring Canyon member in the western portions of the mine flowed on the surface, showing that the formation is under some confining pressure in places. This may indicate presence of a ground-water high along the Joes Valley fault. These conditions could also be present in the proposed lease tract.

Lines (1985) reported that the Star Point Sandstone has very low permeabilities in the vicinity of Trail Mountain, two miles southwest of the lease tract. Age dating of ground water in the Crandall Canyon mine has indicated that water from wells completed in the Star Point Sandstone has a mean residence time of about 18,000 years (Mayo and Associates, 1997). This supports that flow rates through the sandstone are very slow. In general the Star Point is not a good aquifer, and exhibits aquifer characteristics only locally where fracturing causes secondary permeability which typically occurs at outcrop faces. The exact recharge mechanism for the Star Point sandstone is not known but it has been suggested that recharge reached the sandstone through faults and fractures, and that recharge is coming from the west and northwest (Christenson, 1984, and Nielson, 1996).

Faults

Hydraulic function of faults in the area is not well defined. The series of faults encountered in the Huntington #4 mine were reported to be dry at the mine level, whereas a fault associated with the Joes Valley fault zone intercepted in the active Crandall Canyon mine workings yielded water at a rate of 30 gpm, that subsequently reduced to approximately 10 gpm. Water samples collected from this fault were age dated, and the water was found to have a mean residence time of 2,000 years. Faults in this area, as elsewhere on the Wasatch Plateau, are generally thought to act as barriers to horizontal ground-water flow (Mayo and Associates, 1997). In the area of the lease tract along the Joes Valley fault, the strata dip to the west along the downthrown side of the fault. This being the case, the Joes Valley fault could be contributing to the spring system supporting flow in Indian Creek (Hansen, Allen and Luce, 1997).

Little Bear Spring

An anomalously large spring for the area emits from the Star Point sandstone near the mouth of Little Bear Canyon (outside the lease tract in section 9). Little Bear spring is developed and maintained by the CVSSD, and provides 65% of the culinary water for the cities of Huntington, Cleveland and Elmo. According to Danielson (1981), Little Bear spring is associated with fracturing and folding in the Star Point sandstone. The spring

emerges from a fracture in the lower portions of the Star Point sandstone, where it is in contact with the low permeability Mancos shale. In the Little Bear Tract Delineation Report (Alvord, 1979), the elevation of the spring is reported to be 7,650 feet, approximately 100 to 150 feet below the Hiawatha coal bed.

Little Bear spring flows continuously, with average monthly discharge ranging from 200 to 440 gpm (CVSSD, 1997). Flow varies seasonally, with a typical increase of 20-40 % in response to spring runoff. The lowest average monthly baseflow recently measured was 198 gpm in April 1995. Isotopic anlyses performed to evaluate the age of water indicate that the spring discharges modern water, and has very similar composition to water in both Crandall and Huntington Creeks (Mayo and Associates, 1997). Further chemical analyses show that water from Little Bear spring is very similar to surface water in both Little Bear and Huntington Creeks. Water quality in the spring is good, requiring only chlorine treatment before it is suitable for consumptive use.

The mechanism controlling flow to Little Bear spring is not fully understood. Several studies have focused on the occurrence of the spring, and varying theories have been developed. It is known that the spring issues from a fracture in the lower portions of the Star Point sandstone, and the chemical composition is similar to surface water in the area. The theories are as follows:

1. Water flowing through the Star Point Sandstone emerges at the spring location. Recharge for the spring is coming from the north and west, possibly supported by the Joes Valley Fault (Nielson, 1996).

2. Recharge to the spring comes from flow through the Star Point sandstone from the north and northwest, and surfaces through fractures in the formation (Vaughn Hansen and Associates, 1977).

3. The trend of Huntington Creek follows a series of straight segments that are evident on topographic maps. The portion of Huntington Creek approximately 2 miles north of the lease tract follows a north-south lineation. It has been suggested the trend of the creek in this area is controlled by a north-south anomaly (possibly an unmapped fault) that runs south, through the northeast portion of the lease area in Little Bear Canyon. Water from Huntington, Crandall Creeks and maybe Little Bear creeks enters this anomaly, and travels through it until it is intercepted by the Mill Canyon graben, where it is redirected to the northeast and emerges where the Mill Canyon Graben fault zone intersects Little Bear Canyon . Comparison of the flow hydrographs for the spring and Huntington Creek show a strong correlation, suggesting that water from the spring is derived from surface water sources (Hansen, Allen and Luce, 1997). Spring flow has an apparent time lag of 2 to 4 years against flow in Huntington Creek. Additional flow may reach the spring by surface water seeping into the exposed outcrop of the Star Point sandstone at nearby upgradient locations, or through direct infiltration of precipitation close to the spring source.

Given the most recent studies that indicate water from Little Bear spring is modern, chemically similar to surface water in the area, and given the high discharge rates, it appears that the spring is supported by a system of faults and/or fractures that transmit surface waters from the north. The hydraulic conductivity of the Star Point sandstone is low, and give rise to slow ground-water movement. As demonstrated by Hansen,

Allen and Luce, assuming a 5,000 foot capture zone along the Mill Canyon graben, a velocity of 0.013 ft/day through the Star Point, and an aquifer height of 45 feet, the potential discharge amount through the Star Point for the spring would only be 15.2 gpm. This demonstrates that flow through the Star Point sandstone itself cannot support the flow emanating from Little Bear spring.

North Emery Water Users Association Springs

The springs developed by NEWUA are believed to be supported by subsurface flow through the shallow alluvial ground-water system. Flow through the alluvium is forced to the surface either when it contacts low-permeability units of the Blackhawk Formation, or at the location of a presumed north-south anomaly creating the springs. Hansen, Allen and Luce estimate that the ground-water yield from the Rilda Canyon basin would be on the order of 700 gpm. Based on investigations done by PacifiCorp, approximately 80% of the recharge to the springs originates in the alluvium in the Right Fork. Discharge from the system averaged 167 gpm from 1990-95, and ranged from average lows of 74 gpm to average highs of 264 gpm (PacifiCorp, 1996). Water quality from the spring system is good, with major constituents being calcium, bicarbonate and magnesium. Water in the spring system is of recent age.

Ground Water Intercepted by Mining

Water intercepted in mines on the Wasatch Plateau typically comes from stored water contained in sandstone channel scours in the top of the coal seam. As mining progresses, the channel scours drain for a few weeks and cease, indicating very limited, not laterally extensive sources. Water may also be encountered in saturated fractures or faults intercepted at the mine level. Available information supports that most of the water intercepted at the mine level is not in direct communication with surface or near-surface ground water. Isotopic analyses taken from water coming from the Crandall Canyon mine roof showed the water has a mean residence time of over 14,000 years. The Crandall Canyon mine has only started discharging water from the workings in the past year. Inflows in the current workings originate from a channel scour in the coal seam, or from faults.

C. *Wildlife*

Terrestrial Species

The area surrounding the proposed coal lease contains habitat for a variety of wildlife including a potential of 84 mammals, 140 birds, and 25 reptiles and amphibians. Species of interest that may potentially occur on the area include: spotted bats, mule deer, elk, golden eagles, and goshawks.

Mammals

Three bat species of special interest to Utah are the Red bat (*Lasiurus borealis*, UT DWR Sensitive Species), which roost in wooded areas, the Western Big-eared Bat (*Plecotus townsendii*), which roosts in caves, rock overhangs, tunnels, or abandoned buildings, and the Spotted Bat (*Euderma maculatum*, UT DWR and USDA - Forest Service, Region

4 Sensitive Species)* which depends on cliffs for roost/hibernation areas. The spotted bat was a candidate mammal for federal listing. The bat is crepuscular/nocturnal and insectivorous. It does not migrate and uses a hibernaculum that maintains a constant above freezing temperature from September to May.

Mule deer (*Odocoileus hemionus*) and elk (*Cervus elaphus*) are common in the region and are Forest Management Indicator species. Summer ranges generally are occupied by deer and elk from middle May through late October, although the exact timing may vary from year to year depending on temperature, snowfall, and range condition. While not a limiting factor to ungulate populations, summer range is important in providing energy reserves to meet deficiencies in winter energy supplies.

Winter range for deer and elk include a variety of slope and vegetation types. Lower slopes throughout much of the study area are mapped by UDWR as critical elk winter range, based on vegetation types, the Forest Plan maps big game winter range at the mouths of Mill Fork and Crandall Canyons. Elk winter range in the region occurs primarily in snow-free open areas, such as meadows and wind-swept ridge tops, interspersed with conifers and aspen for cover.

For deer, south and east facing slopes along portions of Mill Fork, Little Bear Creek, and Crandall Canyons provide relatively warm and snow-free sites, which are especially important during severe winters.

Habitats in the vicinity of the Crandall Canyon Mine are mapped by the UT DWR as including high priority summer range and critical winter range for both deer and elk. Summer range for these species is the mosaic of conifers, aspen, and meadows atop the plateau. Although some summer range does occur at higher elevations within the permit area, it is more prevalent on East Mountain to the west and southwest, and Gentry Mountain to east of Huntington Canyon. The summer range was determined by the UDWR to be in generally fair to good condition.

* Sensitive species are defined as those species which have been identified by the Regional Forester as "those... for which population viability is a concern as evidenced by... significant current or predicted downward trends in population numbers or density..." or "significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution" (FSM 2670.5). The 1976 National Forest Management Act (NFMA) directs the Forest Service to provide for the maintenance of viable populations of native and desired non-native vertebrate species and the recovery of listed species.

Birds

Approximately 140 species of birds are potentially present in the study area. This number included a number of raptors. Resident raptors in the area include the Golden Eagle (*Aquila chrysaetos*), Goshawk (*Accipiter gentilis*), Red-tailed Hawk (*Buteo jamaicensis*), Sharp-shinned Hawk (*A. striatus*), American Kestrel (*Falco sparverius*), and Great Horned Owl (*Bubo virginiana*). Golden Eagles have been seen above the mine in spring and summer. Golden Eagles prefer nest sites on cliffs, such as the sites available along Huntington Canyon. Goshawks have been observed only in higher

elevation conifer-meadow mosaics west of the permit area. They generally nest in large aspen or conifers.

Adult sharp-shinned hawks are routinely encountered in the riparian zone and adjacent north-facing conifers in the lower canyons. Adult kestrels were generally seen in the same area, except across the stream in more open south-facing habitats. Typical nesting habitat for the sharp-shinned hawks consists of deciduous or coniferous trees and brush, while kestrels more often prefer cliff sites. Both of these habitats occur along Crandall Canyon, and it therefore seems likely that these two species breed in the proposed lease area.

Great Horned Owls are fairly common, and it's presence in appropriate habitats (riparian forest) in the breeding season (late April) suggests that the Great Horned Owl is a breeding resident.

Threatened and Endangered Species

No threatened or endangered wildlife species are known to inhabit the proposed lease area. A Bald Eagles (*Haliaeetus leucocephalus*) nest near the Hunter Power Plan is approximately 26 miles southeast of the coal lease. The coal lease area is outside of the foraging area for the Bald Eagles. Two peregrine falcons (*Falco peregrinus*) were observed approximately 13 miles north in 1996. The falcons were observed during nesting season but no nest site was ever confirmed. It is generally accepted that peregrine falcons will forage up to 15 miles from their eyrie, however given the prey base available it is doubtful that the falcons would forage over the coal lease area. No roost sites have been found in the lease area. The Biological Evaluation and Assessment (BE/BA) will address the Federally listed and State Sensitive Species that potentially occur in the area in greater detail, and upon completion will be in the project file.

Aquatic Species

The proposed project area contains portions of Crandall Creek, Little Bear Creek, Mill Fork, and the Right Fork of Rilda Creek; all of which are tributaries to Huntington Creek. Tributaries of Indian Creek and a small portion of Cottonwood Creek are also within the lease tract. Only Crandall and Indian Creek itself are considered perennial. The intermittent channels run water in the spring and early summer, and occasionally during the fall "monsoons" that are typical in the region.

All of these stream channels support naturally-reproducing trout fisheries and aquatic communities typical of coldwater, mountain environments. These communities include trout, aquatic plants, insect populations, periphyton, and zooplankton. Intermittent channels provide aquatic habitat when water is present; including spring spawning habitats for cutthroat trout and sculpins.

The following table summarizes the streams within or immediately adjacent to the proposed lease tract and the game species that are present (if known):

TABLE III-A. Summary of streams within the proposed project area and game fish species (Species abbreviations are explained below).

STREAM	*SPECIES PRESENT **	*DATA SOURCE*
Crandall Creek	CCT (1), RBT, YCT	UT DWR/USU Genetic Analysis
Little Bear Creek	YCT, RBT	Inferred from maps and UT DWR Surveys
Mill Fork Creek	YCT, RBT	Inferred from maps and UT DWR Surveys
Right Fork Rilda Ck.	YCT, RBT	Inferred from maps and UT DWR Surveys
Indian Creek	BKT	Dufour, field observations

* Species abbreviations in the above table correspond to the following:
YCT = Yellowstone cutthroat (*Oncorhynchus clarki*)
RBT = rainbow trout (*Salmo gairdneri*)
BRT = brown trout (*Salmo trutta*)
BCT = Bonneville cutthroat trout (*Oncorhynchus clarki* utah)
BKT = brook trout
CCT = Colorado River cutthroat (*Oncorhynchus clarki* pleuriticus)

(1) There is a suspected, but yet unconfirmed population of Colorado cutthroats in Crandall Creek.

In addition to the salmonid species listed above, these drainages likely support populations of the following non-game species: speckled dace (*Rhinichthys osculus*), mottled sculpin (*Cottus bairdi*), bluehead suckers (*Pantosteus delphinus*), and mountain suckers (*Catostomus platyrhynchus*) (Christopherson, UT DWR, personal communication).

Reservoir and Lake Fisheries

There are no reservoirs or lakes fisheries that could be directly or indirectly affected by land management activities within the proposal area.

Sensitive Species

Colorado River cutthroat trout, currently classified as a Sensitive Species in the Intermountain Region (USFS), may be present in the Crandall Creek drainage. Genetic testing is on-going to confirm if these fish are pure-strain Colorado cutthroats, no definitive data is currently available.

Aquatic Amphibians

Species distribution maps for aquatic amphibians (Stebbins, 1985) and the UT DWR (Christopherson, personal communication) indicate that tiger salamanders and western toads probably inhabit the project area. The Manti-La Sal National Forest Fisheries Biologist (Dufour) has collected several Great Basin spadefoot toad egg clusters in small pothole habitats at similar elevations in other areas of the Forest (Jordan and Seely drainages) during the 1995 field season; indicating that the toads may be present in wetland habitats within the project area.

The Forest Plan directs that aquatic macroinvertebrates be used as management indicator species to assess impacts of projects and management activities on aquatic communities and water quality. There are no Forest macroinvertebrate monitoring stations located within the proposed project area nor are there any downstream stations that are close enough to be indicative of "baseline" water quality for the landscape.

The proposal area lies within the headwaters of the drainages listed in Table III-A. The perennial portions of these basins are small and largely runoff-fed. Since the flows in these small streams tend to decrease in the late summer and early fall, they are used primarily as spawning and rearing streams by trout species (Dufour, 1996). The Crandall, Mill Fork, Little Bear, and Right Fork channels are high-gradient streams characterized by rock and wood-created step pools, deeply incised channels, occasional beaver ponds, and riparian zones composed of spruce-fir/aspen communities and thick willows. Spawning gravels are patchy and distributed in lower-gradient reaches.

Adult fish are likely present in headwater areas only during the spring reproductive period. In Crandall Creek, the UT DWR has identified a suspected year-round population of adult Colorado River cutthroat only in the beaver ponds immediately adjacent to the mine portal (Boyer, 1997). There have been no basin-wide inventories of Little Bear, Crandall Creek, Mill Fork, or the Right Fork of Rilda Creek that would describe the distribution of spawning adults in these drainages; therefore these conclusions are inferred from general knowledge of cutthroat behavior (Dufour, 1996, Meehan, 1991, Sigler and Miller, 1963). Successful spawning requires the presence of clean, well-oxygenated spawning gravels. It is therefore a high priority to protect these channels from excessive erosion and sedimentation.

Stream channels throughout the proposal area are recovering from historic livestock grazing impacts and the high runoff events that occurred in 1983-84. During the floods, erosion was prevalent and there is evidence of this erosion throughout the project area. Vegetation and vegetated bank undercuts are slowly recovering along channels. Since undercuts provide important hiding and resting cover to aquatic organisms of all life history stages; protection of bank stability in all of these drainages is a priority.

Small seep or pothole-type wetlands within the project area act as water reserves and provide base flows that can support aquatic communities during low water periods. Potholes, small ponds and marshy areas provide subsurface flow that supplements direct water sources like springs and run-off. These wet areas also provide important habitat for invertebrate and amphibian populations. Wet areas need to be protected from soil compaction, disturbance, and the removal of woody material to maintain existing habitat quality and quantity for aquatic organisms.

Genwal Resources Inc. currently owns and operates mining facilities on a 160-acre private parcel of land within the Crandall Creek drainage adjacent to the project area. These facilities include a mine portal and load-out facility, warehouse, storage building, sediment settling pond, and parking area. Development within these private lands has removed the riparian vegetation along 1000 feet of the north bank of Crandall Creek. The paved road that leads to the mine contributes sediment and coal dust to the stream channel when runoff occurs from sidecast snow (Dufour, personal observation 1997).

D. *Vegetation*

Lands within the lease tract area contain very steep and narrow east-west trending canyons with rounded narrow ridge tops. Vegetative cover and species composition is very diversified. It is mostly regulated by the various habitat created by the broken steep terrain, the variety of slope aspects and exposure. The project area landscapes support a mosaic of sagebrush grasslands, conifer timber, aspen, mountain brush, and riparian vegetation complexes.

Sagebrush Grasslands - This vegetative type is found on most of the steep south slopes and high elevation ridge tops. Less than 10% of the lease area occur in the type. Salina wild rye grass is the dominant grass at the lower elevations and Letterman needle grass dominates the high elevation ridge top sites. Few forbs are present in this type. The sagebrush species common in this vegetative type are black sagebrush and big mountain sagebrush. Deer and elk use some of this type during the winter months and sheep graze the ridge tops during the summer.

Conifer Timber - It is estimated that about half the lease area is covered with conifer timber vegetative type. These types are mostly found on the northerly exposed slopes of the canyon. Douglas fir make up about 85% of the conifer cover with alpine fir and spruce trees present only at the higher elevation ridge and in the upper basin. The dense forest growth on the steep canyon slopes provide a good scenic view, a good watershed cover and wildlife habitat. Few wood products are accessible in this type within the lease area.

Aspen - Aspen type occur on an estimated 20-25% of the lease areas. They occur mostly on mid and higher elevation sites and on the lower canyon slopes. Most of the aspen types within the lease area are in either early or mid-Seral condition. Only a few stands at high elevation and some isolated sites are in late seral condition. Stands of aspen mostly at higher elevations are being invaded by alpine fir trees, and some sites on the north slopes and canyon bottoms are being invaded by Douglas fir trees. The Aspen ecosystem provide a very important habitat component for many wildlife species, both animal and birds. It also has a high value for livestock grazing and watershed values. It provides some scenic beauty, especially in the fall.

Riparian - Riparian areas within the lease are very limited occurring in the canyon bottoms and lower drainages. Less than 1% of the lease area has riparian vegetation on it. Although they represent a very small proportion of the total vegetative cover within the project area, and they provide a very important habitat for wildlife. The potential for any livestock grazing in the riparian areas in the lease area, is low because of the limited access and very small sites available.

Mountain Brush - Mountain brush vegetative types occur mostly on the mid-elevation south slopes, high elevation ridges and in the upper basins within the lease areas. This type is present on about 15% of the lease area. The lower elevation sites are heavily used by wintering elk and deer and the higher elevation ridges & basins are used by sheep during the summer. Most of the vegetative type is classed as unsuitable for use by livestock, because of steep inaccessible slopes.

Noxious Weeds - Populations of Musk thistle and Canada thistle are known to occur within the proposed lease area.

Sensitive Species - There may be habitat for three sensitive plant species within the proposed lease area. These species are as follows:

Maguire Campion (*Silene petersonii*) - This plant grows at high elevations about 10,500 feet, on rocky sites. No plants have been documented within the project area. The Flagstaff Rock outcroppings on top of East Mountain have not been surveyed.

Carrington Daisy (*Erigeron carringtoniae*) - Plant occurs within Emery and Sanpete Counties on the top of the Wasatch Plateau. Plants occur at all aspects, but are generally found on the west facing slopes on Flagstaff escarpments. The Flagstaff Rock outcroppings on top of East Mountain within the lease tract have not been surveyed. The nearest known population is located about 2 miles south of the project area.

Canyon sweetvetch (*Hedysarium occidentale*) - To date this plant has only been collected in Carbon & Emery Counties at elevations between 5,000 to 8,000 feet. Tends to grow in alluvium derived from the North Horn and Blackhawk formations; usually on south and west exposures. Usually occurring on sites that have an underground water source at 2 to 6 feet below the surface. Often grows on toe slopes below ledges and cliffs in Huntington Canyon and Lower Mill Fork.

The canyon sweetvetch grows at elevations between 6,500 to 7,500 feet, and in sites not anticipated to be affected by mining activities. There should be no effects to this species and no further discussion regarding *H. occidentale* in this document.

The Maguire campion and Carringtonae daisy occur on Flagstaff outcrops. Since failure is not expected to be occurring on the Flagstaff formation, there would be no effects on these species and there will be no further discussion regarding *E. carringtonae* or *S. petersonii* in this document.

E. *Transportation*

The transportation analysis area is bounded by the Fairview-Huntington Highway on the east, the Crandall/Blind Canyon Divide on the north, the Cottonwood Road on the west, and the Rilda/Meetinghouse Divide on the South. The area within the transportation analysis area contains 32.45 square miles and has a road density of 0.55 miles per square mile.

The Fairview-Huntington Highway (SR 31) is the only arterial road and the Cottonwood Road is the only collector road with the area. The remaining roads are all classified as local and make up 71% of the mileage. Over 60% of the roads are surfaced, with asphalt on 22% and gravel on 40%. Between 50% to 60% of the mileage is operated at a traffic service level

'b' or 'c' * and maintenance level 3 or 4 to encourage passenger car traffic, the remaining 40% to 50% is operated at traffic service level 'd' and maintenance level 2 where public traffic (generally high clearance vehicles) are accepted.

* Level-of-service A describes primarily free-flow operations at average travel speeds, usually about 90 % of the free-flow speed for the arterial classification. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream.

Level-of-service B characterizes the region of traffic flow wherein speeds of 55 mph are expected on level terrain. Passing demands approximately equals the passing capacity at the lower boundary of level-of-service B which is where flow rate are presently on this section of road. Drivers are delayed up to 45% of the time and the number of platoons forming increases dramatically.

Level-of-service C characterizes the region of traffic flow wherein speeds are between 50 and 55 mph on level terrain. Passing is frequently impeded, there are noticeable platoons of vehicles and platoon size increases. Drivers are delayed up to 60% of the time. While flow is stable, it is susceptible to congestion due to turning traffic and slow moving vehicles.

Level-of-service D characterizes a region of traffic flow where speeds are about 40 % of of the free-flow speed. Small increases in flow may cause substantial increases in delays.

SR 31 is the major west-east route across the Wasatch Plateau, and provides access for the recreation uses within Huntington Canyon and on the mountain tops. The highway is located in Huntington Canyon bottom that is to be managed with emphasis on "Undeveloped Motorized Recreation". Range, timber, and mineral resources activities and use should not permanently exceed threshold levels for noise and air quality, or seriously impair recreation uses. SR 31 provides access for removal of Forest products, including timber, minerals, and livestock. Access for recreational uses includes fishing, hiking, picnicking, camping, big game hunting, wood gathering, snowmobile riding and cross-country skiing. SR 31 intersects roads in the adjacent side canyons of Rilda, Mill Fork, and Crandall. All these routes have hardened surfaces.

SR 31 is 48.1 miles long with 33.4 miles within the Forest Boundaries. Three and six tenths miles of the highway are within the transportation analysis area. The road has two 12-foot lanes and 3-foot shoulders, with an asphalt pavement structure. The pavement structure is showing signs of fatigue from the coal-haulage traffic. The annual average daily traffic was 1,400 vehicles per day below the east forest boundary, 1,255 vehicles per day between the boundary and Crandall Canyon, and 715 vehicles per day above Crandall Canyon in 1995. Coal-haulage made up 6.2% of the traffic.

The volume of traffic on the SR 31 with the high number of coal-hauling vehicles in the mix is an important consideration. UDOT has upgraded SR 31 from Huntington to the Forest Boundary because of the traffic volume and mix on the road. They have expressed interest in upgrading the segment within the Forest to the Crandall Canyon intersection to accommodate the coal-haul traffic on this segment. A review of traffic capacity indicates the traffic service levels are acceptable at this time, however, the high volume of traffic and mix of vehicles affects the safety of travel on the road and the traffic entering onto the road. The

noise of the coal-hauling vehicle also affects the recreational uses directly adjacent to the Highway.

Access to the mine portal in Crandall Canyon is a major traffic producer on the SR 31. Traffic consists of personnel (miners and overhead) using private vehicles and buses, mine service and supply trucks, and coal-haulage trucks. Coal exploration and developmental drilling have been staged out of the canyon bottoms producing minor amounts of traffic for short periods. Coal is presently removed from the mine 6 days a week and 10 hours a day except for the annual miner vacation. Coal haulage requires 396 trips per each of the 300 hauling days per year. This adds 40 vehicles per hour to the design hourly volume and 326 vehicles per day to the annual average daily traffic.

Present annual average daily traffic (AADT) is estimated at 437 vehicles per day and 72 vehicles per hour (VPH). With a current reserve of mineable coal of 20,000,000 tons and a desired production rate of 2.5 to 3.5 million tons per year, these are the minimum volumes of Genwal Mine relate traffic expected for the next 5 to 7 years.

The 'T' intersection onto the Crandall Canyon Road (FR 248) has the potential for 63 conflicts during peak flow periods that normally occur at shift changes. Average delays to forest traffic is approximately 4 seconds per vehicle. This level of delay provides a level of service at the intersection of 'A'. The average total delay as a result of coal production traffic on this segment of road approaches 24 seconds per vehicle.

Oil and gas exploration and development drilling has occurred adjacent to the SR 31 resulting in peak traffic of 50 vehicles per day and average traffic of 16 vehicles per day during the length of the operations. Oil and gas operation can run for as little as 90 days to over 2 years. A drilling project slated for 1997 in the Huntington Canyon area is planned to last 5 months. Service traffic to operation wells generally is under two vehicles per day.

Other forest traffic on this segment of SR 31 is expected to increase from 715 vehicle per day in 1995 at a rate between 3.5% and 6.25% to between 1,400 to 2,400 vehicles per day by 2115. The hourly rate would exceed 200 vehicle per hour for over 30 hours per year during this 20 year planning period. Highway design standards used by UDOT indicates that a travelway of 40 feet should be provided for design hourly volumes exceeding 200 vehicle per hour. A change in design standards would be desirable based on future forest traffic alone without consideration of Genwal Coal Mining activities.

Crandall Canyon Road

This is a high use local route that provides access to the Crandall Canyon Mine and the Crandall Canyon trailhead. The primary traffic is personnel (miners and support), service traffic, and coal-haulage vehicles. Some recreation use and range access is supported by the trail-head parking area at the end of the road. Approximately 2.6 MM ton of coal was removed from the portal in 1996. Traffic is estimated to be between 600 and 800 trips per day. Car and light truck traffic would range between 65 to 155 trips per day, supply trucks between 20 to 25 trips per day and coal-hauling between 500 to 580 trips per day. The road has 2-11 foot lanes and 2 foot shoulders. The support structure is asphalt. Drainage is inslope with culverts and outslope with curbs and downspouts. The grade is a sustained 8% with pitches to 11%.

Mill Fork Canyon Road

This is a local route that served the Huntington #4 Mine. The road has been reclaimed from a two lane gravel surfaces road to a single lane gravel surfaces road to provide additional buffer between the travelway and the stream course. Traffic is estimated under 5 vehicles per day seasonally adjusted daily traffic. Dispersed recreation and range management are the primary generators of traffic in the canyon.

Rilda Canyon Road

This is a local route that has recently been upgraded to provide access to a fan portal serving the Deer Creek Mine. Access to spring developments between Sections 28 and 29 is another important user of the road. There is a stock-trail head near the Right Fork that also generate range traffic. The road is a double lane gravel surfaced with inslope and culverts to the spring development. The road is a single lane gravel surfaced with inslope and culverts to the turnaround near the Forks. The road is a single use gated single lane with inslope and outslope section between the forks and fan portal. The public can use the last segment of this road for trail travel. Traffic should remain at less than 10 vehicles seasonally adjusted daily traffic.

Flat Canyon Road

This is a local route that provides access to the East Mountain Top. The road was recently improved to provide access for drilling a exploration gas well in Section 23. The road has provided access for coal exploration and developmental drilling in the past. Additional access for staging and drilling operation is likely until all coal is leased and removed. The road was upgraded to a single lane gravel surface road with drainage for the gas drill operations. The traffic should remain between 5 and 10 vehicles seasonally adjusted daily traffic. Use should be about 40% dispersed recreation during big game fall seasons, 40% firewood gathering on the timber sale areas, 10% range access and 10% mineral access.

Cottonwood Road

This is the only collector road within the transportation analysis area. The road provides access to the facilities at Trail Mountain Portal below the analysis area, and access to the existing gas wells in Cottonwood Canyon and on the East Mountain Top. The primary use on the segment within the transportation analysis area is recreation access to the developed Indian Creek Campground and dispersed camping and hunting areas in the surrounding area. This road in an important access for the movement and management of livestock on the Forest during the grazing season. Traffic approaches 20 vehicles per day seasonally adjusted on the segment under study.

The East Mountain top has traffic primarily related to range management, dispersed big game hunting, some fire-wood gathering, and mineral exploration or production operations. Some timber related traffic can be expected over short periods to manage the timber emphasis area on or near the East Mountain top. Most of the coal exploration drilling has been completed in the area. Additional coal developmental drilling may be desired as coal mining proceeds.

Stock is transported by truck through the canyons to the top. Range rides use the trails out of the bottoms in Crandall, Mill Fork and Rilda to access the allotments and push stock away from the Huntington Canyon bottom. In the fall some stock is gathered in the bottom and removed by truck. Stragglers are also picked up and removed in the fall from these trailheads and the bottom in general.

F. *Socioeconomics*

The Crandall Canyon Mine has produced coal since 1984 and has grown from a relatively small coal mine producing 300,000 tons in 1990 to 2.5 million tons in 1996. The mine is undergoing extensive improvement of production facilities to reach 3.5 million tons average production rate in the 1998-1999 time frame. Figure 3 illustrates Genwal Mine's production history.

The mine and related facilities employ about 120 people from Emery (75%) and Carbon (25%) Counties. The coal is hauled by double coal haulers in 41-43 ton loads to marketing points at Wildcat Siding northwest of Price or to one of two loadouts near Wellington (CV Spur or RAILCO) depending on the customer. The company has another loadout at Mohrland which is not modern and is currently not being used. Direct shipments are being made to the Carbon Plant and to a cement plant in Juab County.

Trucking employs an estimated 60 drivers from Emery and Carbon Counties. The trucking company maintenance facilities (Cox Trucking) are located near Huntington, Utah.

The market value of the 2.5 million tons of coal produced annually at the Crandall Canyon mine is $46,000,000. Royalty generation to the government is estimated at $3,125,000. Payroll at the mine and trucking jobs is estimated at $8,000,000.

The coal mining and related industries in Utah have a large contribution to the socioeconomic structure of Emery, Carbon, and Sevier Counties, and to a lesser extent in Sanpete County. Coal production has increased steadily, reaching an estimated 27.6 million tons on 1996. Figure 4 illustrates Utah coal production history. An estimated 95% of Utah's coal production is from Federal lands. Seven companies operate 13 active mines directly employing 2013 workers. At an average price of $18.75 per ton for Utah coal in 1996, the coal from Utah is valued at $517,500,000. Federal revenues from this coal are estimated at $39,000,000, which is equally shared between State and Federal government. Utah mines on average, are the most productive (tons per man-hour) underground coal mines in the United States. Direct employment provides an estimated $130,000,000 in earnings. Other industries that benefit directly from Utah's coal industry include trucking, rail transportation, and electric power generation. Genwal's Crandall Canyon Mine currently produces about 9% of Utah's production.

The primary area of influence from the Mill Fork Coal Lease Tract and the Genwal Mine is Emery County, although Carbon County also receives some socioeconomic impact. For analysis purposes, Emery County will be utilized. The county population in 1995 was estimated at 10,700. The population peaked in 1983 at 12,700 due to the construction phase of the power plants, then declined steadily to 10,200 in 1991, and has begun slow growth in the 1990's. The 20 percent population decline from 1984 to 1991 returned Emery County's population to levels experienced in the 1970's, and was a time of considerable outmigration. The last 5 years has seen an increase of about 5 percent or 500 people.

Nonagricultural employment in the county in 1995 was 3,800 and had been growing modestly. Employment peaked in 1982 at 5,890 and has declined 2,090 jobs or about 36 percent. The major industry payroll categories in Emery County were:

Mining	$38,500,000	(36%)
Transportation/Public Utilities	$35,400,000	(33%)
Services	$15,400,000	(14%)
Public Administration	$ 7,000,000	(6.5%)
Construction	$ 6,100,000	(5.5%)
Other	$ 5,000,000	(5 %)
Total 1995 Payroll for Emery County	$107,400,000	

Mining, primarily for coal in Emery County, along with related industries, like shipping of the coal and producing electricity in two coal fired generating stations likely contributes over 60% of the earnings of the county. Indications are that much of the growth of coal production in Utah will be in Emery County in the foreseeable future.

G. *Land Uses*

A power transmission line is located in the W 1/2, section 22, T 16 S, R 6 E, in the extreme southwestern portion of the lease tract. Based on draft mine plans submitted, mining will not occur under the powerline and the line is outside the estimated area of surface influence of the closest longwall panel. There will not be further discussion on the powerline in the document.

Two grazing allotments are present on the lands within the lease tract. Presently, 961 sheep graze for three months of the year on the northern end of the tract, and 912 cattle graze at the southern end for about one month per year. Several springs have been developed to enhance livestock distribution.

Land survey monuments and section corners may also be present within the lease tract.

H. *Cultural Resources*

Approximately 650 acres or 10% of the area has been examined for cultural resources. Two archaeological sites are known within the lease area. Another three sites have been located outside of the lease area. Sites located within the lease area consist of lithic scatter sites 42Em856 and 42Em2430. The Forest and the USHPO has concurred that neither of these sites meet the criteria for listing in the National Register of Historic Places.

Other sites known on the periphery, but outside of the lease area include 42Em2310 and 42Em722; both are rockshelter sites containing rock art. Both are believed to be eligible for the National Register. While these sites lie outside of the lease area, they do provide useful information on site types in the general area.

Both of these sites occur within the Star Point sandstone, which appears to provide the most likely areas for rockshelter and rock art sites in this general area. In contrast, the Castlegate

Sandstone formation which outcrops in the area appears to have low potential for containing significant cultural resources, based on available data.

I. *Recreation and Visual Quality*

Recreation

Dispersed recreation sites are present along the eastern boundary of the lease tract in Huntington Canyon. Sites near the lease tract are located in Tie Fork Canyon, and Little Bear Canyon. Indian Creek Campground lies to the west of the western edge of the lease tract in Upper Joes Valley.

There are eight trails totaling 14 miles within the area. Most of the trails are on the East Mountain top and act as extension of the road system for access. Trails include the Mill Fork Trail # 171, Mill Fork Ridge Trail #086, and the East Mountain Trail # 085. The trails were created to access timber, mines or for firefighting. Today they are used for recreation by hikers, horseback riders, bicyclists and by hunters. The Crandall Canyon trailhead is located adjacent to the mine facilities. It is an unmaintained, low-use trail.

Visual Quality

Forest plan management direction for visual resource management located on page III-17 of the Forest Plan states that "Forest resource uses should meet the adopted VQO as displayed on the Planned Visual Quality Objective Map."

The Forest Plan has assigned a Visual Quality Objective (VQO) to each area of the Forest reflecting the desired management emphasis of the specific area. Some of those objectives allow a noticeable degree of change from the existing condition as determined during the visual assessment conducted in 1986 in order to facilitate subsequent use in reaching comprehensive Forest management goals.

The characteristic landform of the area of primary visual concern is steep narrow canyons more or less rimmed by sandstone escarpments or outcrops. Huntington Creek, which has entrenched the main canyon, flows parallel to a major portion of SR 31 that has been designated a Scenic Byway. (Utah's Scenic Byways are major paved highways that are regularly traveled, but may contain sharp curves and steep grades which require generally less than the standard 55-mile-per-hour speed limit. The byways are well marked, easily accessible roads that allow viewing of some of the State's most spectacular, but lesser known scenic beauty.) Huntington Creek is relatively large perennial stream is bordered by a narrow riparian corridor interspersed with cottonwoods and bounded by mature conifers which become more dense as one travels up the canyon.

Scenery is an important natural resource and recreational element in this part of the forest. In addition to a portion of Scenic Byway which serves as a gateway to the forest for many recreationists, there are trails which travel through the proposed lease area. Although the escarpments which could fail are located in less stringent areas of modification, hikers/riders could notice these human-caused changes. It is primarily through their visual sense that most visitors perceive the Forest and its interrelated components. The potential lease area, although mostly designated in the Forest Plan as Modification, still has high scenic

value. Part of the public appeal of the landscape found in this area stems from the viewing opportunities associated with the Castlegate Sandstone escarpments.

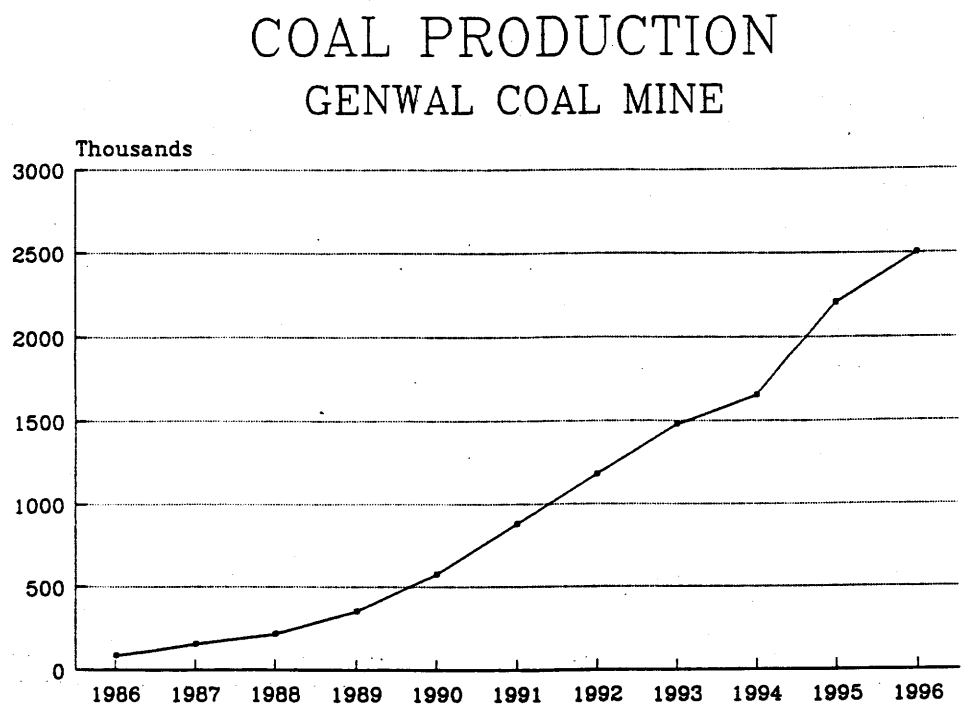


FIGURE 3

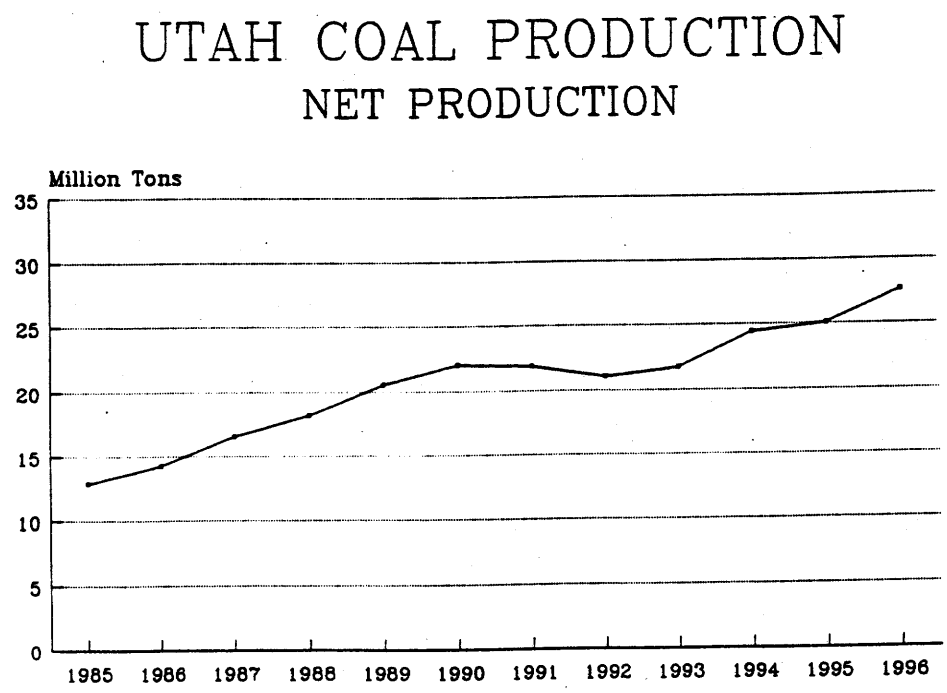


FIGURE 4

CHAPTER IV. DIRECT AND INDIRECT EFFECTS OF IMPLEMENTATION

1. Alternative 1 - No Action

Under this alternative the tract would not be offered for lease, therefore the tract would not be mined.

There would be no additional mining-related environmental consequences to the tract area and surrounding vicinity. There would be no additional economic benefits for federal, state, and local governments from coal lease fees and coal royalties. Neither would there be input to local economies from employees salaries or from payments to local businesses for support of the mine. The existing Crandall Canyon mine would close after coal in the existing leases is mined-out unless other reserves in areas adjoining the permit area are identified and leased. Without additional reserves, the mine would probably close around the year 2005, resulting in the loss of 122 jobs. The current reserve base is about 20 million tons of coal, representing $ 3.1 million in royalties to the federal government.

With the planned increase in average production to 3.5 million tons, traffic will increase from 437 vehicles per day to 609 vehicles per day with hourly volumes going from 72 to 90 vehicles per hour, with 75% being coal haulage vehicles. This traffic would continue until the year 2005 when the coal reserves will be depleted. Potential for conflicts resulting in accidents will increase. Potential conflicts resulting in time delay will result in level of service decrease from 'B' to 'C'. Maintenance cost will increase as a result of the increased truck traffic requiring replacement or capping of the travelway surface at least once during the use period.

2. Alternative 2 - Offer for Lease with Standard BLM Lease Terms, Conditions and Stipulations

Under this alternative the tract would be offered for competitive leasing as recommended by the Coal Tract Delineation Team (see figure 2). The standard BLM lease terms, conditions and stipulations would be included.

A. *Geology, Soils and Mineral Resources*

If Genwal Resources, Inc. acquires the lease, underground coal extraction from the tract would likely involve extending workings of the Crandall Canyon mine to the south using standard industry mining practices. More specific details of the mining are discussed in the Reasonably Forseeable Development Scenario contained in Appendix B. Approximately 75 million tons of coal could be mined under this alternative. This alternative would extend mine life by an additional 21 years.

Both room-and-pillar development mining and longwall mining would take place. Subsidence is expected only over the longwall panels and room-and-pillar areas where secondary recovery occurs. The area of ground surface subsided would include full-extraction mine area and the additional area on the ground surface calculated by projecting a line from the mined area to the ground surface at the expected angle-of-draw (22 degrees). For example, considering overburden thickness of 100 feet and a 22 degree angle-of-draw, the additional subsidence area beyond the vertical projection of the full-extraction area to the surface would be approximately 400 feet. Subsidence could extend 400 feet beyond the lease

boundary into adjacent unleased lands where full extraction mining extends to the lease boundaries.

Subsidence due to mining in the Blind Canyon seam is expected to be similar to that which has been experienced at other mines in the East Mountain area. Within the active permit area, subsidence from mining in the Hiawatha seam, has been less than expected due to the presence of an overlying competent 30 foot thick sandstone layer and the limited extent of longwall mining that has taken place to date (have not reached supercritical width which causes maximum subsidence). The sandstone layer has acted as a structural beam that bridges the voids left by underground mining, thus limiting the amount rubbelization and subsidence. Subsidence in the lease tract due to mining the Hiawatha seam is anticipated to be like other mines on East Mountain since the planned mining scenario will allow for panel to be taken adjacent to one another, and should reach critical width.

Subsidence of the ground surface on East Mountain (PacifiCorp, 1996) can reach as much as 70% of the extracted height of the coal. Assuming that the worse-case subsidence would be the same as in other areas for both seams, using a subsidence factor of 70% and an average of 9 feet of extraction for each seam, the maximum subsidence could be as much as 12.6 feet. Actual subsidence expected in the tract would be less because of the influence of the sandstone layer above the Hiawatha seam.

To date, no mining-induced surface cracks have been discovered within the permit area for the Crandall Canyon Mine. However, surface cracks are common above other mines on East Mountain, especially along faults and in shallow overburden areas. The greatest potential for cracks in the proposed tract would be along the Joes Valley Fault trace, if full-extraction mining occurs within the 22 degree angle-of-draw. In this scenario, it is expected that the fault would tend to focus subsidence at the surface expression of the fault, causing surface cracks. Due to the presence of the existing fractures associated with the fault, the cracks could connect with cracks in the rock layers immediately above the mine workings. Only limited and isolated surface cracks are reasonably foreseeable in other areas; most likely where the rigid Castlegate Sandstone crops out and along the edges of full-extraction areas (extensional forces zones) under shallow overburden on canyon slopes. With the exception of cracks in the Castlegate Sandstone, cracks are expected to heal naturally over a period of 2 to 5 years.

Subsidence of Crandall Creek or other perennial drainages is not planned under the Reasonably Foreseeable Development Scenario (Appendix B). Longwall or room-and-pillar second mining within a 22 degree angle-of-draw protection or buffer zone would not occur. However, understanding that mine plans can change, a possibility exists that panel orientation could change and shift subsidence zones closer to the creek. Specific impacts are discussed in the surface water section.

Small failures of the scattered Castlegate Sandstone escarpments could be caused by subsidence. The outcrop areas are similar in extent, slope, fracture systems, and dip to the south slope of Rilda Canyon which lies approximately 5 miles to the south. In the Rilda Canyon area, extensive longwall panels and subsidence caused only one minor failure of a small expanse of the outcrop (less than 100 feet). Several large rock boulders in an extensively fractured area became dislodged and tumbled down the canyon slope destroying several trees. Additional vegetation damage occurred along a 20-foot wide runout zone down to the Starpoint Sandstone outcrop (approximately 1,000 feet).

The worst-case scenario for the Mill Fork Tract could involve similar failures along portions of the exposed outcrops. Potential failure zones include outcrop areas along the north slope of the South Fork of Mill Fork Canyon (approx. 3,000 ft), the north slope of the North Fork of Mill Fork Canyon (approx. 4,000 feet); the north slope of Little Bear Canyon (approx. 3,500 ft.); and 3 small non-connected outcrops totalling approximately 2,000 feet in length along the south slope of Crandall Canyon, south of the Crandall Canyon Mine surface facilities.

Other escarpments exist where longwall mining is not proposed, due to marginal coal thicknesses and irregular coal configuration. It is hoped that some room-and-pillar mining would occur, but limited data makes mining projections difficult. A few additional cliff areas could be affected if room-and-pillar mining (with pillar extraction) occurs. The ridge point between Crandall and Little Bear canyons (sections 5 and 8, T 16 S, R 7 E) could fail and create a debris fan of about 30 acres. Another location that might be room-and-pillar mined is under a point in section 18, T 16 S, R 7 E. Cliff failure here could create a debris fan of about 10 acres. These acreages are estimations only, and err on the high side as historically, mines in the area have shown little subsidence effects from room-and-pillar mining in comparison to longwall mining. It is not likely that dislodged rock would reach perennial drainages, roads, or mine surface facilities because of the heavy timber on the slopes and presence of small tributary drainages that would channel and retard the downward movement of rock material.

Shallow and isolated mining-induced seismic events, generally less than 3.5 in magnitude (Richter Scale), are common (University of Utah Seismic Monitoring Program). Similar mining-induced seismic events are reasonably foreseeable in the Mill Fork Lease tract. These events are thought to be induced by the subsidence-induced cracking of overburden materials (especially rigid rock layers such and sandstone) above the mine workings. No damage to resources or overlying structures has been attributed to these events. There are no dams or buildings in the immediate vicinity of the tract that could be damaged, with the possible exception of the mine surface facilities. It is not likely that these low energy events would cause damage to the gas pipeline. Damage to the producing bore hole for the existing gas well (East Mountain #32-23) could occur but is not likely due to steel well casing and 800-foot radius coal buffer zone.

Mineral Resources

No new oil and gas leases would be offered within the proposed coal lease tract for the life of the lease (at least 20 years), however development on existing leases could occur. BLM might not approve any additional wells on existing leases until the coal lease tract is mined-out and subsidence is determined to be substantially complete. Additional oil and gas drilling would be located in areas where the coal would not be mined. There would be a loss of associated oil and gas lease competitive bids, annual lease payments, and potential gas production royalties (not possible to estimate due to extreme variability). This would be more than offset by the coal lease bonus bid, annual lease fees, and coal royalties associated with a potential coal lease.

If BLM approves additional wells on existing leases, it is reasonably foreseeable that 2 additional production wells could be drilled and several thousand feet of new gas transmission pipeline could be constructed. This would result in increased gas production and associated royalties. This would result in decreased coal recovery to protect the gas wells and pipelines from subsidence.

If additional leasing and/or drilling occurs after the coal reserves are mined-out, it is likely that drilling and development costs for oil and gas would be increased by the need to seal the subsided/rubbelized mine workings to maintain circulation of drilling fluids and seal the well bore for possible production. It is not possible to estimate these costs because the methods needed to assure sealing are not known at this time.

The existing gas well (East Mountain #32-23) and related gas pipeline will be protected from subsidence by limiting coal recovery as needed. If additional wells are approved prior to mining, they would also be protected. Assuming full extraction mining would occur up to an 800-foot radius of the well and pipeline, this would cause 1.7 million tons of coal to be left in place. Mining in closer proximity to the gas well and the pipeline might occur if the gas company and the mining company came to an agreement for replacement of any damages.

Coal exploration drilling associated with developing the lease would disturb about 6.25 acres of surface lands. Reclamation and revegetation of access roads and drill pads would be required under the drilling permit. Containment of drilling fluids would also be required.

B. *Hydrology*

Surface Water

Subsidence could affect the character of drainages within the lease tract by altering the natural slope of the channel. Large-scale impacts are unlikely because of the thick overburden lying between the mine level and the drainages, which typically ranges from 600 to over 2,400 feet. Portions of the Right Fork of Mill Fork Canyon in section 12 have overburden ranging from 600 to 1,300 feet where multiple-seam longwall extraction is projected. Longwall panels in both seams are planned under the Right Fork of Rilda Canyon where the overburden ranges from 1,300 to 2,400 feet. Possible room-and-pillar extraction could occur in section 13 under the Right Fork of Rilda Creek. Based on previous experience in the Wasatch Plateau, single-seam longwall mining under drainages where 600 or more feet of overburden is present has not manifested noticeable effects on the surface (Sidle, 1995). Another study in the Wasatch Plateau coalfield showed that a creek was diverted underground where longwall mining occurred in two seams and the overburden was less than 500 feet (Slaughter, etal, 1995). Surface cracks are possible above the extension zones in the subsidence profile, but because the thickness of overburden present, conductivity between surface cracks and the rubbelized zone is not likely. It is assumed that full-extraction room-and-pillar subsidence will have similar surface expression as longwall subsidence. In addition, the presence of clays and shales in the North Horn formation will probably buffer impacts to the drainage and the springs feeding the alluvial system downstream. More detailed explanation on anticipated subsidence can be found in Appendix B.

One longwall panel on the northern edge of the tract in section 6 could be extracted under a perennial portion of Crandall Creek. The overburden between the mine level and the creek in this area is estimated to range between 200 and 700 feet. Given the overburden thickness, and results from previous studies (Slaughter, etal, 1995), impacts could include diverting water underground through surface cracks if Crandall Creek were subsided. Water loss from the creek could damage fish and macroinvertebrate habitat, deplete riparian vegetation and decrease the amount of water available for downstream uses.

The tributaries of Indian Creek on the west side of the tract may be influenced by surface subsidence. Under the planned mining scenario, active workings would extend within approximately 500 feet of the Joes Valley Fault at the mine level. If longwall panels are extracted in this area, the angle-of-draw for subsidence may include the fault, and could focus subsidence along the fault to the surface. Cracks that could appear on the surface along the fault trace might divert water from the drainages. Loss of water from these drainages could reduce the water flow that supports the wetlands in the Indian Creek drainage.

Under this alternative, full extraction room-and-pillar mining in both seams could occur in the northeast portion of the lease tract, including the Little Bear Canyon drainage. Subsidence in this area could cause localized cracking of the surface that could cause water diversions within the watershed, from both springs and Little Bear creek. Overburden in the area ranges from 200 to 1,700 feet. Subsidence could also alter the fracture and/or fault systems present in the drainage that are thought to transmit water to the Little Bear Spring lower in the canyon. Because the management unit direction stated in the Forest Plan for Little Bear Canyon calls for preserving the watershed value, surface disturbance, including water diversions, that could result from mining-related subsidence would not be consistent with the management unit direction. Loss of water could deplete riparian vegetation and/or habitat.

Room-and-pillar extraction is also planned under small portions of the upper southern forks of Mill Fork Canyon. Overburden in this area ranges from 1,100 to 1,500 feet. Because of the thick overburden present, impacts to the intermittent drainage are not anticipated.

Mine water would be discharged at the approved NPDES point already in existence on Crandall Creek. Water discharged would have to meet quality standards described in the current NPDES permit before reaching Crandall Creek. The mine first discharged water at the NPDES point in 1996, the first time since operations began in 1984. Although mine water will be discharged at an approved location, mining would extend the need for mine discharge for 21 years. Effects on the channel character would not be anticipated unless total discharge from the mine increased the creek flows by 10 percent of maximum discharge (Rosgen, no date). Using a maximum instantaneous flow and the proportionate area of the watershed above the mine, a 10 % increase would be 4 cfs (Spencer and Kelly, 1984). Current discharge is 0.5 cfs. Because Crandall Creek has been identified as a steep bedrock channel immediately below the mine, impacts related to increased flow are not anticipated.

Riparian areas and small wetlands associated with seeps and springs within the lease tract could be affected by subsidence. However, most of the springs and seeps occur at locations over 800 feet above the mine level. As has been previously discussed, subsidence effects are not anticipated at locations where the overburden exceeds 600 feet.

A new Utah state law was passed regarding water affected by underground coal mining. The law states that the permitee (mine operator) "shall promptly replace any state-appropriated water in existence prior to the application for a surface coal mining and reclamation permit which has been affected by contamination, diminution, or interruption resulting from underground coal mining operations."

Ground Water

It is anticipated that ground water encountered during mining will be associated with interception of isolated channel sandstones scoured into the tops of the coal seams, from sandstone lenses, or from interception of fractures or faults that contain water. Available information indicates that water levels in the Star Point sandstone are below the level of the coal seams throughout most of the tract, but are higher within the Star Point on western edge of the tract due to a ground-water high associated with the Flat Canyon anticline and the Joes Valley Fault. Therefore, there may be some seepage from the mine floor during mining of the Hiawatha (the lower) seam on the extreme western edge of the lease tract. Based on available information, it is not likely that water intercepted at the mine level is associated with surface and near-surface ground water, and should not have extended impacts to those resources. Water encountered at the mine level will either be used underground, or discharged at the NPDES permit point in Crandall Canyon.

Subsidence-induced ground movements could affect the flow of overlying springs in the tract, but this is unlikely given the thickness of overburden and the presence of rock units with high clay contents. The overburden separating springs that overlie areas to be mined from the mine level generally exceeds 800 feet. High clay contents in the North Horn and Price River formations tend to buffer the effects of fracturing associated with subsidence. Springs occurring at the heads of Mill Fork Canyon, the Right Fork of Rilda Canyon, on the top and the western flank of East Mountain are typically separated from the mining horizon by 1,400 to 2,400 feet of overburden strata. An analysis of 13 springs not related to faults on East Mountain with similar mining and geologic conditions indicates that little or no impacts are discernible after undermining by either longwall or room-and-pillar methods (Kadnuck, 1994).

Springs occurring in the head of Little Bear Canyon are associated with landslides or issue from the base of the Castlegate Sandstone. The springs are separated from the coal seams by 400 to 1,200 feet of overburden strata. The springs associated with landslide deposits may change location as a result of subsidence, if the landslides are activated because of surface movements. Subsidence-induced movements could intercept spring flow and divert it, although this is not considered likely.

The occurrence of Little Bear Spring is associated with fracturing and faulting. Distinct flow pathways and exact recharge mechanisms are not specifically understood, but as discussed in Chapter III, it is thought that the spring is fed through a fault system from the north. This system transports water through the northeast portion of the lease tract in the subsurface of the Little Bear Canyon watershed. Mining-induced subsidence in the watershed up-canyon from the spring could disrupt this fault system, or alter fracture pathways by which surface infiltration reaches the subsurface. Mining could also introduce a pathway by which contaminants derived from underground mining could reach the spring recharge system. Disruption to this system could result in changes in the water quantity and/or quality. Currently available information does not allow for assessing the magnitude of changes. Interruption of the recharge source could cause reduced flows at the spring, and thus reduced water available for culinary uses. Variations in water quality, especially degradation, could cause a need for additional water treatment before consumptive use.

Springs occurring in the Right Fork of Rilda Canyon may contribute flow to the alluvial system that partially supports the NEWUA springs in lower portions of the canyon. Subsidence-induced loss of water from these springs is not anticipated. The thick overbur-

den present (over 2,000 feet), and layers of impermeable shales and clays in the North Horn and Price River Formations will buffer the effects of mining.

If monitoring during mining shows adverse effects to water flow or quality of a state-appropriated water source (such as Little Bear spring or the Rilda Canyon springs), the mining company would be required to replace the water source under state law. No provisions for requiring replacement water at the original source for non-culinary purposes such as stock watering, wildlife habitat, or ecosystem support are included in this alternative.

C. *Wildlife*

Terrestrial Species

The alternative has limited potential to impact terrestrial wildlife species. Two bat species of special interest to Utah are the Western Big-eared Bat (*Plecotus townsendii*), which roosts in caves, rock overhangs, tunnels, or abandoned buildings, and the Spotted Bat (*Euderma maculatum*) depends on cliffs for roost/hibernation areas. Surveys have indicated that the spotted bat may be present. This alternative may affect the Western Big-eared Bat and Spotted Bat through the loss of roosting habitat in the cliffs. The spotted bat's roosting habitat is located on mountain side slopes in cracks and crevices in rock outcrops and escarpments. The area has not been inventoried for bats and it has some limited rock outcrops and escarpments. The potential of subsidence from mining the coal could remove some roosting habitat, and potentially result in the loss of a few bats. Subsidence-induced cracks could potentially enhance or degrade bat habitat.

The Townsend's big-eared bat uses juniper/pine forests, shrub/steppe grasslands, deciduous forests and mixed coniferous forests from sea level to 10,000 foot elevation. The project area includes mixed coniferous forest from 7,200 to 10,200 feet in elevation. Although two previous surveys did not locate any of these bats in the area there is potential that the bats could occur in Mill Fork Canyon. The bats roost in caves, mines shafts, or rocky outcrops.

Big game including mule deer and elk utilize the area. The proposed coal lease contains some winter and summer range for both species. These species would not impacted as long as no surface disturbance was allowed. Ten coal exploration holes (drilling) may be anticipated, with temporary access roads, which can be timed to offset potential impacts. No permanent roads or other surface disturbances are proposed and there would not be any longterm affect to the big game species.

A number of bird species utilize the area. Potential impacts to the birds would result from the subsidence that could result in a change in the cracks on the rock cliffs and possibility some loss of cliff face. This would impact those birds that would nest on the cliffs such as golden eagles, red-tailed hawks, and American kestrel. Only the red-tailed hawk and the American kestrel are believed to nest within the propose coal lease. Both species will utilize trees for nesting and the loss of the cliff would have little impact on them with the exception of possible loss of young if the failure should occur during nesting season.

Subsidence could potentially result in the of loss surface water in Crandall Creek, Little Bear Canyon drainage, and tributaries supporting Indian Creek. This would result in the loss of riparian vegetation which is important habitat used by a number of species including goshawks, great horned owls, and Sharp-shinned Hawks. The loss of this riparian vegeta-

tion would result in the reduction of suitable habitat for these species and fewer numbers present.

There are no know Federally Listed species present in the proposed coal lease area. The BE/BA to be included in the project file will address the Federally listed and State Sensitive Species that potential occur in the area in greater detail.

Aquatic Species

This alternative has potential to effect aquatic habitat and species in portions of Crandall Canyon, the Little Bear drainage, and the ephemeral tributaries to Indian Creek.

If Crandall Creek were undermined and/or subsided and water is lost, it could cause damage to, or loss of fisheries habitat. This would threaten the fish and other species that reside there.

Longwall panels proposed on the west side of the lease tract may cause subsidence that could intercept the Joes Valley fault; thereby causing surface cracks that divert water from ephemeral drainages within the Indian Creek sub-basin. Although these streams typically dry up in the late summer, they feed wetlands that likely support populations of aquatic amphibians. These populations could die or become displaced if these habitats are lost.

If mining alters discharge within the Little Bear watershed, lethal water temperatures, loss of deeper holding areas, vulnerability to predation and loss or displacement of fish, macroinvertebrates, or amphibians that currently reside in the drainage could occur.

Mining actions and their effects within all other drainages in the lease tract would be subterranean and far-removed from aquatic habitats. The thickness of overburden is sufficient to prevent impacts to the stream channels or springs that feed the downstream alluvial system. There would be no subsidence of perennial stream channels or effects outside of Crandall Creek and therefore there would be no direct or indirect effects to aquatic species of any life history stage or their habitats.

D. *Vegetation*

Mining effects on surface springs could damage vegetation, especially in riparian areas if water is diverted. As discussed in the hydrology sections, effects to springs are not anticipated due to the thick overburden separating springs from the mine level.

E. *Transportation*

Traffic will increase as in alternative 1 but would continue beyond the present planning horizon to 2022. Potential for conflicts resulting in accidents will increase. Potential conflicts resulting in time delay will result in level of service decrease from 'B' to 'C'and the return to level B service will be postponed for 21 years. Maintenance cost will increase as a result of the increased truck traffic requiring replacement or capping of the travelway surface more frequently.

F. *Socioeconomics*

The proposed lease tract as delineated, assuming full extraction contains an estimated 75 million tons of recoverable coal. Because of limited access, it is assumed that the existing mine operator in the area will be the only interested lessee. The applicant currently has 20 million tons of remaining reserve in existing holdings. The mine is anticipated to achieve annual production of 2.75 to 3 million tons in 1997, 3.25 to 3.5 million tons in 1998 and 3.5 million tons thereafter until mineout. Without the tract, the reserves will last about 6 years or until 2002. With the tract, mining would continue for another 21 years until 2023. The additional reserves at current coal prices have a value of $ 1.26 billion. Revenues to the Federal government from the lease tract (lease bonuses, royalties, rentals, etc.) will be from $ 120 to $ 141 million, which would be equally shared with State and County governments.

The likely lessee for the Mill Fork tract (Genwal Resources, Inc.) is in the process of permitting new facilities to increase the mine capacity by an estimated one million tons, bringing annual production to 3.5 million tons. Most of the new facilities will be built on fee land controlled by the mine. The leasing and subsequent development of the Mill Fork tract will essentially allow the mine to continue the planned coal production for 21 additional years. The prolonged mine life would contribute to continued employment and income primarily within Emery County. Using the planned production level of 3.5 million tons per year, employment is perceived to increase to 225 employees at the mine including trucking personnel. Direct revenues to the government per annum are estimated to be $ 5.2 million, computing to $ 141 million over the life of the mine.

In summary, the leasing and subsequent development of the Mill Fork tract would not be expected to have a significant increased socioeconomic impact on Emery or surrounding counties. Mine facilities are being permitted to achieve maximum production without the tract. The tract will enable the mine to maintain maximum production levels and employment and income for the next 25 year period. Emery County will be able to continue slow growth of 1% per year.

G. *Land Uses*

It is not likely that subsidence will affect range lands in the tract. The pre-mining land uses will not be changed. Subsidence may alter the position of land survey monuments, and lessen their viability as solid data points.

H. *Cultural Resources*

Potential impacts from underground coal mining can be isolated to limited surface cracking along plateau tops and isolated escarpment areas. In the southern 1/2 of the tract some portions of escarpments could witness large blocks of Castlegate Sandstone being dislodged and falling downslope. After further assessing the potential for significant sites to be located in these areas through review of existing data and an aerial reconnaissance of impact areas, we believe there should be no effect on significant cultural resources.

On September 11, 1995 the Forest consulted with the USHPO forwarded its finding that there should be no effects to significant cultural resources for the original lease tract. On September 20, 1995, the USHPO concurred with this determination. On March 14, 1997, the Forest forwarded its determination that there should also be no effects to significant cultural

resources within the modified lease tract area as redefined by the coal lease tract delineation team, and USHPO concurred with this finding on April 30, 1997.

I. *Recreation and Visual Quality*

Recreation

The effects to recreation would be that the mine facilities would be present in Crandall Canyon for an additional 21 years. Because the facilities are already there, and the fact that the Crandall Canyon trail is low-use, large-scale effects on the recreation user are not anticipated.

Subsidence that would trigger small-scale failures of escarpments may present a safety hazard if blocks of rock reach trails while users are on them.

Visual Quality

Potential escarpment failure in the southeast quarter of section 5 could affect views from a very limited portion of the Scenic Byway while traveling up Huntington Canyon near the entrance to Tie Fork Canyon.

Given the amount of truck traffic and curves to contend with on this road, travelers would normally not be looking so steeply up towards this specific area of outcrop; this is particularly the case when driving down the canyon, where one would additionally need to look back over their shoulder. In addition to the area being well out of site line or terminal view, the short duration of view (two tenths of a mile) would well preclude any opportunity for dominant effect.

It would be expected that even if more easily viewed, any potential visual effect would be negligible due to the limited scale of this potential escarpment failure and common similarity to other naturally occurring failures viewed throughout this and all other similarly formed canyons.

Due to natural consistency in form, line, color and texture; prevalent topographic and vegetative screening; and considering other aesthetic variables, i.e., distance from the viewer, angle and duration of view, and scale of the potential failure. It is also predicted with a high level of confidence that any potential escarpment failures or human-caused change would not be visually conspicuous or objectionable from other federal, state, private and municipal lands, and transportation corridors.

Potential escarpment failures within view of recreation trails are in areas of Modification and would be well within the context of the surrounding landscape character for reasons described above. In summary, existing VQO's would continue to be met.

3. Alternative 3 - Offer for Lease with Application of Special Coal Lease Stipulations for Protection of Non-Coal Resources

Under this alternative, the tract would be offered for leasing as delineated. In addition to the standard BLM lease terms and conditions, the Forest Service Special Coal Lease Stipulations included in Appendix A would be applied to the lease.

A. *Geology, Soils and Mineral Resources*

If Genwal Resources, Inc. acquires the lease, underground coal extraction from the tract would likely involve extending workings of the Crandall Canyon mine to the south using standard industry mining practices. More specific details of the mining are discussed in the Reasonably Forseeable Development Scenario contained in Appendix B. With the Special Coal Lease Stipulations in place, approximately 68 million tons of coal could be mined under this alternative. This alternative would extend mine life by an additional 19 years.

Subsidence, escarpment failure, and mining-induced seismicity would likely be similar to that described for Alternative 2 with the following exceptions:

With the proposed mine plan submitted by Genwal, only the apparent escarpment on the north slope of the North Fork of Mill Fork canyon is to be undermined by longwall panels. Cliff failure could occur along the length of the escarpment, however, due to limited data on coal thickness, the conceptual mine plan shows longwall panels only under the western half of this escarpment. Much of the eastern portion of the cliff face will not be mined, or will be undermined by only the bleeder entries (no full extraction mining, coal pillars will be left for ventilation courses). It is likely that some cliff failure could occur, but the extent would be limited. If the entire face should fail, it is estimated that about 20-acres of debris fan would form. If only isolated portions of the face failed, then the estimated size of debris fan would be 5 to 10 acres. These acreages are crude estimations taken from aerial photos and topography maps. It is possible that some dislodged rocks could reach the intermittent drainage or the recreational trail in the North Fork of Mill Fork canyon.

Escarpments found with archaeological resources would be protected from subsidence by stipulation 9.

Mining-induced cracks along the surface expression of the Joes Valley Fault would be prevented by a lease stipulation that would prohibit full-extraction mining within the 22 degree angle-of-draw from the fault (Stipulation 19), application of this stipulation might result in the loss of about 120,000 tons of coal, based on the draft mining scenario.

Oil and gas effects will be the same as for Alternative 2.

B. *Hydrology*

Surface Water

The potential impacts from mining are the same as Alternative 2, except that Forest Service Stipulations 9 and 19 would be in effect.

Stipulation 9 precludes subsidence of perennial streams without prior approval. Assuming that approval would not be granted, the stipulation is designed to prevent surface fracturing that could divert surface flows underground. This would ensure that longwall mining would not occur under Crandall Creek, and there would not be water losses that could have adverse effects on riparian areas, wildlife habitat or downstream uses.

Stipulation 19 states that mining will not be allowed within a 22 degree angle of draw from the Joes Valley Fault in order to prevent subsidence focusing along the fault and potentially diverting surface drainage. As discussed in Chapter III, it is believed that the fault supports springs on the western edge of the tract, that in turn provide flow to the wetlands in the Indian Creek drainage. Under this alternative, the likelihood of surface fracturing in that area is reduced to protect the tributary drainages and springs.

Ground Water

Potential impacts of mining on ground water would be the same as for alternative 2, except that stipulation 17 would be in effect.

Stipulation 17 would require replacement of all water needed to maintain ecosystems and downstream uses if adverse impacts occurred. Ground water intercepted at the mine level is not thought to be in direct hydraulic communication with springs within the lease tract, or a major contributor to surface flows in the area. In the event that springs, seeps or flows in surface drainages are affected by mining or subsidence, the operator would be required to replace the water in quality and quantity at the source.

Although impacts to springs in the Right Fork of Rilda Canyon are not anticipated, monitoring of discharge from this portion of the basin will be necessary since flows are thought to contribute to the downstream culinary source. Stipulations 3 and 7 require baseline data and subsequent data collection to assess changes, if any. Flow monitoring on the Right Fork of Rilda Creek at the lease boundary must be planned prior to the Forest Service consenting to the mine plan. Under these stipulations, monitoring on Little Bear Creek will also be required.

Before the Forest Service would consent to the mine plan, the operator must make a commitment for water replacement should any water resources be disrupted due to mining, and prepare a water replacement plan subject to approval by the Forest Service and the regulatory authority.

C. *Wildlife*

Terrestrial Species

The potential impacts to terrestrial wildlife from mining the proposed coal lease are the same as alternative 2, except stipulation 10 (construction of surface breakouts from the inside to avoid surface disturbance), and 14 (seasonal closures of surface activities for wildlife) would be implemented. This would prevent any surface activities that may affect the mule deer and elk that utilize the area for summer and winter range.

Forest Service Stipulations 9 and 19 would be implemented. There would be no subsidence of stream channels nor would there be direct or indirect effects to riparian vegetation. The

riparian habitat sometimes used by species such as goshawks, great horned owls, and Sharp-shinned Hawks would be protected and there would be no direct of indirect effect to the species. Under Forest Service Stipulation 2, the lessee would be required to conduct an intensive field inventory of the area if T&E species or migratory bird species of high Federal interest are believed to occur in the area. Stipulation 20 would require the survey for Spotted Bat to determine if they are present, and further provide for their protection if animals are found.

Aquatic Species

Effects are generally the same as alternative 2, except that under this alternative, with stipulations 9 and 19 in effect, coal mining actions and their effects within all drainages in the lease tract would be subterranean and far-removed from aquatic habitats. The thickness of overburden is sufficient to prevent impacts to the stream channels or springs that feed the downstream alluvial system. Subsidence of stream channels would not occur, nor would there be direct or indirect effects to aquatic species of any life history stage or their habitats. Stipulation 17 would ensure that if water were diverted, it would be replaced to support the local ecosystem.

D. *Vegetation*

Effects under this alternative are the same as Alternative 2, except that stipulations 3 and 7 provide for baseline monitoring to detect changes in vegetation, and stipulations 9 and 17 provide protection for water resources. Therefore, under this alternative there should be no unmitigateable impacts to vegetation and range.

E. *Transportation*

Same as alternative 2, except that the return to level 'b' service would occur in 19 years.

F. *Socioeconomics*

Sixty eight million tons of coal could be mined, representing $ 130 million in royalties. Employment would continue until 2021.

G. *Land Uses*

Same as alternative 2, except that stipulation 19 would require replacement of water sources, including those used to support livestock. Stipulation 16 would require replacement of land survey monuments and section corners disturbed by subsidence.

H. *Cultural Resources*

Effects to cultural resources would be the same as that identified in alternative 2. The stipulations provide additional protection for cultural resources discovered during operations under the lease. If significant cultural resources are discovered during operations, stipulation 1 provides for appropriate inventory, evaluation and mitigation.

I. *Recreation and Visual Quality*

Effects would be as in alternative 2, except with less potential for visually dominant change resulting from escarpment failure in the southeast quarter of section 5. This is because longwall mining under this area would be prohibited by stipulation 9, and another less surface-disturbing method would be employed.

4. Alternative 4 - Offer a Modified Tract for Lease with Application of Special Coal Lease Stipulations for protection of Non-Coal Resources

This alternative excludes the northeastern portion of the lease tract which encompasses the Little Bear Canyon watershed (see figure 2). The portions of the tract in sections 4, 5, 8 and 9, T 16 S, R 7 E would be excluded, except for the NW 1/4, NW 1/4 section 8 which would be kept in the lease tract. This portion of the lease tract would be excluded to address Forest Plan management direction which calls for maintaining the integrity of the watershed values in Little Bear Canyon. The standard BLM lease terms, conditions and stipulations, as well as Special Coal Lease Stipulations would be applied to the lease. Exclusion of these lands from the lease tract results in losing estimated 5 million tons of coal.

A. *Geology, Soils and Mineral Resources*

Subsidence, escarpment failure, and mining-induced seismicity would be the same as Alternative 3, except that there would be no subsidence or escarpment failure in the excluded area. The escarpment on the north slope of Little Bear Canyon and the eastern-most escarpment on the north slope of Crandall Canyon (600 feet) would not be subsided and would probably not fail, unless mining-induced seismicity dislodges balanced rock segments.

Oil and gas impacts will be the same as for alternatives 2 and 3.

B. *Hydrology*

Surface Water

The same impacts and stipulations would apply as in alternative 3. The exclusion of the northeast portion containing Little Bear Canyon watershed reduces the risk of effecting the water resources in that drainage to a negligible level. Forest Plan direction indicates that having the watershed designated MWS requires protection of the watershed values. By not allowing mining in this area, subsidence will not alter the surface of the watershed, thereby preserving the value, and would be consistent with management unit direction. Flow in Little Bear creek that could contribute water to the spring downstream would not be affected.

Ground Water

Potential impacts to ground water would be the same as for alternative 3, with the following exceptions; ground-water resources in the vicinity of Little Bear Canyon would be removed from risk of disruption or degradation. Springs occurring high in the watershed would be protected from possible subsidence impacts including diversion of flow. Subsidence and associated subsurface disruption that would potentially alter the fracture/fault system be-

lieved to transmit flow to Little Bear spring would not occur. The suspected recharge mechanism for the spring would be undisturbed. No changes in water quantity or quality at the spring would be anticipated, and therefore the culinary water source would be protected.

As in alternative 3, monitoring would be implemented, requirements for water replacement would be in effect, and the Forest Service would not consent to the mine plan unless the operator has committed to a water replacement plan.

C. *Wildlife*

Terrestrial Species

Same as alternative 3, except that riparian habitat and escarpments supporting species in the Little Bear drainage would be protected.

Aquatic Species

Effects would be the same as for alternatives 2 and 3. By eliminating the northeast portion of the tract, there would be no effects on the aquatic habitats or populations that are supported by Little Bear Spring or Creek. There would be no affect to the spring or the riparian habitat that it supports.

D. *Vegetation*

Same as for Alternative 3, except that water sources support riparian vegetation in Little Bear watershed would be protected.

E. *Transportation*

With the exclusion of the coal in the northeast portion, mine life is reduced by 2 years, hence reducing the length of time coal haul traffic would be present. The decrease from level B to C service, and subsequent return to B service would be 17 years.

F. *Socioeconomics*

This alternative drops the eastern portion of the tract reducing the recoverable reserves to 63 million tons, a loss of 5 million tons. This is a 7.4 % reduction in recoverable tons that will not affect the annual production of the mine, but will reduce the number of years of production. Due to the small number of tons involved and access limitation to coal outcrop, it is likely that the coal will not be mined in the future as it would not justify an independent operation. The years of mine life would be reduced by about 1.85 years, and the total revenue to the government could be reduced by $ 10 million, to $ 120 million. Employment would continue to 2019.

G. *Land Uses*

Same as for alternative 3.

H. *Cultural Resources*

Effects to cultural resources would be essentially the same as that for alternatives 2 and 3. The potential for significant sites within the Little Bear drainage has been estimated as low.

I. *Recreation and Visual Quality*

Effects would be as in alternative 3 and with even less potential for visual effect because none of the area east of the northeast quarter of section 7 (which also contains the escarpment of concern in section 5) would be mined by any method.

5. Short Term Use of Human Environment vs. Long-Term Productivity

Alternative 1

There would be an unrealized economic gain of at least $ 120 million in royalties and $ 252.5 million in salaries for the 75 million tons of coal not produced. There would not be benefits from heat or electricity generation from the coal. However, the coal would be available for production in the future, but at a higher cost and lower marketability.

There would be no mining-related changes to short-term or long-term productivity of other resources.

Alternative 2

Mining of coal as proposed could extend the life of the Crandall Canyon mine a maximum of 21 years, and provide up to 75 million tons of coal. This would be a one-time short-term benefit since coal is a non-renewable resource.

Long-term productivity of resources could be affected, but not to a large degree. Vegetation, wildlife habitat, visual quality and water resources may be altered due to subsidence. If surface cracking from subsidence occurs, there could be some diversion of stream, spring or seep flow which could reduce productivity of fisheries, riparian vegetation and macroinvertebrate populations.

Alternative 3

Mining of coal as proposed could extend the life of the Crandall Canyon mine a maximum of 19 years, and provide up to 68 million tons of coal. This would be a one-time short-term benefit since coal is a non-renewable resource. Application of special coal lease stipulations would further protect the resources in the tract area.

Long-term productivity of the resources would remain essentially the same as in alternative 2.

Alternative 4

Water resources and watershed values are protected, lessening the risk for impacts on riparian and macroinvertebrate productivity in the Little Bear Canyon drainage.

There would be a reduced amount of revenues generated by not mining the coal in the northeast portion of the tract. Approximately $ 10 million in royalties would be lost, along with a reduction of total salaries paid of $ 18.7 million. Mining of the coal under this alternative would extend the life of the Crandall Canyon mine by about 17 years.

6. Cumulative Impacts

CEQ regulations (1508.7) define cumulative impact as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

Past, present, and reasonably foreseeable future actions in the Mill Fork Lease Tract area have been identified in support of this EA. The action, year of occurrence, and an estimate of residual, current, or anticipated effects, if any, are presented below. Actions are grouped by resource. The sum of the effects of these actions in addition to the anticipated direct and indirect effects of the proposed action will form the basis for the cumulative effects analysis. A summary of past, present and future actions are presented on Tables IV-A, B, and C, respectively.

Alternative 1

Under this alternative, there would be no changes to the current situation. No coal would be mined from the proposed lease tract, and no royalty payments would be received by the federal, state, and local governments. Coal mining would continue in the Crandall Canyon Mine adjacent to the proposed lease tract.

The area and ecosystem have been continuously altered by erosion, glacial activity, fires, insect infestations, and other natural processes prior to the appearance of man. The area has been used by man, probably on a seasonal basis, for about the last 9,000 years. European settlement in the 1870's resulted in hunting and trapping of game, timber harvest, livestock grazing, and eventually coal mining.

Livestock grazing on the Wasatch Plateau was extensive in the late 1800's, resulting in extensive watershed damage and erosion. Management of grazing by the Forest Service since 1906 has resulted in improved resource conditions. Today the range conditions are generally fair. The proposed lease tract includes parts of one cow and horse, and one sheep and goat grazing allotments. The present level of grazing will continue unchanged for the foreseeable future.

Coal has been mined in the Mill Fork area since the 1940's. Several mines have operated in the Rilda, Mill Fork and Crandall canyons from between the 1940's and the present. More detailed explanation of mining in the immediate area is given on Table IV-A.

Genwal Corporation has proposed to expand its facilities within a private portion of land adjacent to the Mill Fork Lease Tract. The expansion proposal includes placing up to 1,500 feet of Crandall Creek into a culvert to allow construction of additional coal storage area, office space, parking, and access to the Hiawatha coal seam. The potential effects of this culvert and proposed mitigations are being considered at this time by UT DWR biologists and the Manti-LaSal National Forest Fisheries Biologist. One conclusion that has been reached, however, is that the culvert and resultant mitigations all present a high risk of loss of viability for the suspected Colorado River Cutthroat population which currently resides where the culvert will be placed. The Genwal expansion (if implemented as proposed) has potential to cause the following reasonably foreseeable cumulative effects on Crandall Creek; 1) 0.25 miles of stream would experience habitat loss and be rendered inaccessible due to the culvert, and 2) there would be a possible loss of fish population.

The activities planned for the foreseeable future (a timber sale, and possibly oil and gas drilling) described in Section I.F and Table IV-C, would occur. The timber sale and oil and gas drilling could cause increased vehicle traffic, increased sedimentation in streams, increased dust and noise, and temporary loss or alteration of wildlife habitat. These activities are consistent with direction in the Forest Plan.

Alternative 2

The anticipated impacts to the existing environment were described, by resource category, in the preceeding portion of Section IV. The cumulative impacts of this alternative would be that 75 million tons of coal would be mined, drilling may be required, continued water output to Crandall Creek would occur, and $141 million in royalty payments to federal, state, and local governments would be made.

Other land use practices and natural events have affected aquatic habitats in both the Huntington Canyon and Price River drainages. Livestock grazing has decreased bank stability to some degree, mechanically altered streambank undercuts (important rearing habitat for cutthroat trout), and degraded water quality in the streams and reservoirs. Streams throughout the Manti Division still show the effects of the 1983-84 flood events. Raw banks, downcut channels and gullies are in evidence throughout drainages within and adjacent to the proposal area.

Water intercepted during mining could enter the mine workings and be discharged into Crandall Creek. Flow rates in the permeable units have proved to be very slow, and therefore, it is not deemed likely to change the flow in the Huntington Canyon watersheds or the Colorado River. The water quantity of the discharged water could increase as more mine area is opened.

Mining on the Mill Fork Lease Tract is not anticipated to have far-reaching affects on water resources in the surrounding area. As previously discussed, most of the ground-water resources within the lease tract are springs that issue from perched water-bearing zones in the North Horn and Price River formations. Most of the springs are located where permeable layers of sandstone are intercepted in canyon walls, and given the seasonal variability of flow, indicate that they discharge close to their recharge source. Typically where units have saturated zones, they are drained close to the recharge source. These are localized systems that are not laterally continuous, and are even isolated from one drainage to another within the lease tract. East Mountain is highly dissected by the numerous

drainages which truncate the continuity of the geologic strata. The drainage pattern forms narrow ridges that serve to limit the recharge areas within the lease tract.

More continuous water-bearing zones are contained in stratigraphic units that are exposed only in places at the very bottoms of canyons in the area, and typically these units are not saturated at the outcrop faces. The Star Point sandstone in the Wasatch Plateau has been known to exhibit variability in the degree of saturation, pressurization and depositional characteristics. In places, the unit is confined (meaning that water in the sandstone is under pressure), and other places it is not. The variability of the unit makes it difficult to evaluate continuous flow paths between areas. It is known that flow rates are low.

East Mountain is effectually isolated from other mountains in the vicinity by faults and major drainages. Recent studies have indicated that faults on the Wasatch Plateau tend to behave as barriers to horizontal ground-water flow (Mayo and Associates, 1997), this being the case, the western edge of East Mountain is isolated by the Joes Valley Fault. Faults maybe transporting water along their trends, as is thought the case for occurrence of Little Bear spring. Again Little Bear is an anomaly for the area, and no other springs of this magnitude occur in this area of the Wastatch Plateau. Similarly, major drainages tend to further isolate East Mountain. Huntington Canyon is a major feature in the Wasatch Plateau, and separates the East Mountain from Gentry Mountain to the east. Likewise, Cottonwood Creek drainage to the south separates East Mountain from Trail Mountain.

Some stratigraphic units below the elevation of local drainages may be in hydraulic communication within one another, however all these units are much deeper than the level of proposed mining, and would not be effected by mining in the area.

It is unlikely that the cumulative impacts would cause significant impacts to surface water resources (including associated riparian areas), terrestrial or aquatic wildlife (including threatened, endangered, or sensitive species), vegetation and range, or recreation, although some minor changes could occur. Because of the uncertainty of the hydrologic regime controlling Little Bear spring, although unlikely, there is a possibility that ground water resources could be affected.

Surface disturbance from coal exploration drilling, and possibly oil and gas drilling, are expected to result in removal of a small amount of vegetation, which could affect use by wildlife and livestock. The loss of vegetation would be minor and last only a few years. There would still be sufficient vegetation to maintain current populations and use. The River Gas Coalbed methane project is not anticipated to have effects in the tract area.

The expected traffic growth between Fairview and Huntington, Utah, along with the expected traffic growth onto the National Forest by other users of the National Forest when added to the extended (time period) and increased production (2.5 to 3.5 MM tons/year) will result in the UDOT having to increase maintenance expenditures on SR 31 and recommending that the highway template be upgraded to the current standard for the volume and composition of traffic expected during the planning period.

There could be changes to the transportation system, if the UDOT requires upgrading SR 31 to accomodate haul traffic. Effects on air quality would be limited by the terms of the Utah Air Quality Approval Order, and would be localized and insignificant.

Because significant cultural resources are not predicted to exist within areas which will be susceptible to subsidence or escarpment failure, there should be no cumulative impacts to cultural resources under any of the alternatives.

Changes in recreational use will be associated with the closure of dispersed sites in Huntington Canyon, that may cause increased use in the side canyons. The most noticeable impact will continue to be access to the Crandall Canyon trailhead. Users must pass through the surface facilities to the parking area at the trailhead. This will be the case for the life of the mine operation. However, with the proposed expansion of facilities (on private land), safer movement through the mine portal area will be available for forest visitors.

Regardless of the small potential for obtrusive effect due to escarpment failure, the public's aesthetic expectations concerning this and other project related activity need to be taken into account. Any fencing, barriers, berms, etc. (even if planned for use outside the Forest boundary) may be in conflicting juxtaposition to the strong visual elements which define this landscape. This is particularly true for the Scenic Byway. This important travel corridor is highly scenic and insensitively placed safety improvements can conspicuously advertise human-caused change. Although safety is of paramount concern, care should be taken to effectively screen and later remove these obtrusive structures to the best visual advantage. The visual effect of escarpment failure is anticipated to be negligible when compared to that associated with these structures if they are to be used.

Alternative 3

The impacts would be the same as those described under Alternative 2, except that mitigations are provided by application of the Forest Service Special Coal Lease stipulations. The stipulations will prevent risk of damaging water resources, vegetation, riparian areas, escarpments and wildlife habitat.

Alternative 4

Cumulative impacts would basically be the same as for alternatives 2 and 3 through much of the lease tract. Exclusion of the northeast portion reduces the potential for impacts to the ground-water system, the vegetation, riparian areas, visual quality from escarpment failures, and wildlife habitat alteration due to subsidence.

TABLE IV-A
Summary of Past Actions

PAST ACTIONS	IMPLEMENTATION DATES (Begin and Ending)	RESIDUAL EFFECTS
MINERALS		
Tip Top Mine on the south slope of Crandall Canyon (SE 1/4 NE 1/4, Sec 5, T 16 S, R 7 E, SLM). No residual effects. The Crandall Canyon Road (FDR 50248), now on the Transportation System, was most likely originally constructed for the mine and coal exploration. The Road is now a Forest Development Road from the SR 31 intersection to just above the Crandall Canyon Mine. The old road that continued up the canyon from the mine (now Forest Development Trail 390) was was most likely originally build as a coal exploration/drilling road.	1939 - 1956	Very small mine. Naturally revegetated. Disturbed area not evident.
Crandall Canyon Mine in Crandall Canyon (S 1/2 NW 1/4, Sec 5, T 16 S, R 7 E, SLM) - The mine was constructed in 1980 and is still an active mine. The mine has disturbed approximately 5.4 acres, not including the Crandall Canyon Road. The Crandall Canyon was widened to two lanes and asphalt paved to accommodate coal haul traffic.	1980 - Present	The mine operates 24 hours a day, every day at differing intensities depending on production shifts. 5.4 acres of vegetation/habitat has been removed for operations. The physical activity and operations/haul traffic on the Crandall Canyon and Huntington Canyon roads impacts other resources and uses. Approximately 3,900 acres of NFS, State, and private lands included in permit area. Subsidence of mined lands is likely. No subsidence of Crandall Creek is permitted. No significant amount of subsidence to date and no surface expressions of subsidence have been detected.
Old Leamaster Mine in Mill Fork Canyon (NE 1/4 SE 1/4 SW 1/4, Sec 16, T 16 S, R 7 E, SLM). The original Mill Fork Road, now a Forest Development Road (FDR 50245), was probably constructed prior to 1943 for access to the mine and for coal exploration. The Forest Development Trail that extends several miles up the canyon, beyond the Forest Development Road (171, 391); and Trails 086 and 394 on the north slope of the canyon, were most likely originally constructed prior to 1943 as coal exploration roads. The road and trails are maintained on the Forest Transportation System.	1943 - 1964	The old mine was reopened in 1976 as the Huntington Canyon #4 Mine (see below). Most of the original disturbed area was re-disturbed and expanded for the new surface facilities.
Huntington Canyon #4 Mine (SW 1/4SW 1/4, Sec 16, T 16 S, R 7 E, SLM). The mine was reconstructed at the Old Leamaster Mine in 1976 with a total surface disturbance of approximately 12.5 acres (almost all on pvt. inholdings). A 25KV powerline was constructed from the Huntington Canyon Power Plant in Huntington Canyon over the south Huntington Canyon slope to Mill Fork Canyon. Surface disturbance was minimized by helicopter installation and was designed to minimize impacts to raptors. The powerline remains today under a special-use permit and was extended in 1986 to provide service to the Crandall Canyon Mine. The mine was reclaimed in 1985 (recontoured to approximate original contour) and determined to be successful in 1995. Remnants of the highwalls are still visible. In 1985, the Mill Fork Road was reduced from two lanns to a single-lane (with turnouts). The second lane was recontoured and has been successifully revegetated. The permit area of 1,320 acres (pvt. and NFS lands) were only partially mined. No visible signs of subsidence.	1976 - 1985	Reclaimed area well vegetated and sediment production should be similar to pre-disturbance levels. No visible signs of subsidence and no detectable mining-induced changes in water flow and quality.

PAST ACTIONS	IMPLEMENTATION DATES (Begin and Ending)	RESIDUAL EFFECTS
Rilda Canyon Abandoned/Reclaimed Coal Mines Complex (Johnson, Comfort, Rominger, and Helco Mines, Sec. 28, 29, T 16 S, R 7 E, SLM). The mines were operated from approximately 1939 through 1969. The Rilda Canyon Road (Forest Development Road 50246) was probably constructed for the mines and coal exploration in the 1930s or earlier. The trails presently on the Forest Trail System (Right Fork - 395, and Left Fork - no number) were constructed for coal exploration. The mines were reclaimed in 1986 and 1987 under the Utah Abandoned Mine Land Reclamation Program. Even though adequately recontoured and revegetated, some erosion occurs in the reclaimed areas and sediment/coal dust washes into Rilda Creek (small amounts due to vegetation screening).	1939 - 1986	Small sediment production from reclaimed areas and old coal piles. Generally not visible due to recontouring and revegetation. Low residual impact.
Rilda Canyon Breakout/Deer Creek Mine Subsidence (Left Fork of Rilda Creek and South Slope or Rilda Canyon (Sec 28, 29, 30, T. 16 S., R. 7 E., SLM). The breakout pad and access road (from forks to breakout) have disturbed approximately 2 acres. Underground mining has subsided extensive areas on East Mountain and the south slope/escarpment of Rilda Canyon and the Left Fork of Rilda Canyon. One small rock fall (probably induced by subsidence) on the Castlegate Sandstone cliff along the south slope of Rilda Canyon has been observed in the NE corner of Sec. 33. The Rilda Canyon Road, from the intersection with Hwy. 31 to the forks, was widened to two lanes, improved, and gravelled by Emery County in 1995 and 1996 (See Transportation Section).	1995 - Present	The breakout pad removed approx. 2 acres of overstory riparian vegetation and non-riparian understory vegetation. Approx. 200 feet of the Left Fork creek channel is culverted. Fan noise and limited activity at the pad would affect wildlife until they become accustomed to the disturbance. Subsidence has caused one small failure that damaged some trees and vegetation as described above. This is the only evidence of subsidence on the ground surface and no impacts have been discovered by monitoring.
The Flat Canyon/Indian Creek Gas Field (East Mountain Unit) extends into the southwestern portion of the coal lease tract. Several wells produced gas but have been plugged. Meridian Oil drilled six wells since the early 1980's which are producing natural gas. Only one of the wells (East Mountain No. 32-23) lies within the lease tract (SW 1/4 NE 1/4, Sec 23, T 16 S, R 6 E, SLM).	1950 - 1970	These older wells have been abandoned and have been revegetated. They are visible only from related slope changes.
	1982 - present	Approximately 6 acres (1 acre/well) remains disturbed for gas production. Negligible residual effects are due to drainage and sediment control. The wells are visible from Cottonwood Canyon Road.
SOIL AND WATERSHED No watershed improvement projects have been conducted in the lease tract. In the 1981 Watershed Improvements Needs Inventory, there were no areas in the lease tract identified as potential watershed improvement projects.		
TIMBER Spoon Creek Timber Sale	1995	1 mmbf were cut off approximately 75 acres. Good aspen regeneration is currently occurring.
RANGELAND/WILDLIFE Water Troughs for the Trail Mountain Allotment at Cedar Post, Otteson Hole, and Grant's Hole: T 16 S, R 6 E, Secs 22 & 23.	1924-1966	For distribution of livestock.

PAST ACTIONS	IMPLEMENTATION DATES (Begin and Ending)	RESIDUAL EFFECTS
Water Troughs & Ponds for Crandall Ridge Allotment at Edmonds Bear Hole, Edmonds Willow Spring, Tuttle Mill Ridge, Tuttle Ridge, and a pond T 16 S, R 6 E, Secs 11, 13, 14, 23, & 24.	1982	For distribution of livestock.
TRANSPORTATION Dispersed recreation, rural recreation, cordwood activities, range activities, and timber activities have contributed to the seasonal traffic volumes in and around the project area.		Road surface displacement/contamination of aggregate, user developed roads.
Placement of asphalt surfacing on Forest Development Road #50248 (Crandall Canyon Road) to provide structural support and travel surface for increase coal haulage.	1991	Less road surface displacement and decrease in road maintenance activities and cost.
Reclamation of Forest Development Road #50245 (Mill Fork Road) from two to one lane.	1985	The two-lane chemically stabilized travel-way was reduced to one-lane with turnouts to meet the resource and road management objectives for the area accessed. This provided a larger buffer between the road and stream, and left less road surface exposed for surface dispacment in the future.
Reconstruction of Forest Development Road #50246 (Rilda Canyon Road) to North Emery Water Users spring source, forest trail head, and Rilda Canyon fan portal (Deer Creek Mine).	1994-95	Single-lane native surface road reconstructed to two-lane aggregate surface road with ditches and culverts to North Emery Water Users spring providing more dependable access. Single-lane native surface road reconstructed to single-lane with aggregate surface with ditches, culverts, and turnouts to forest trailhead and fan portal. Access gated at trailhead for emergency use only by motor vehicles. Reduced surface displacement of the aggregate stabilized travel surface and better dispersal of drainage water.
RECREATION Construction of Indian Creek Campground and water development at western edge of the tract	1960's	Twelve campsites including 5 group sites and 7 family sites. General seasonal use from June 1 to September 30.
Dispersed recreation sites along the eastern boundary of the tract in Huntington Canyon.	Since 1900's	Sedimentation/Human waste
Trails in the tract include; Mill Fork Trail (#171), Mill Fork Ridge Trail (#086), and East Mountain Trail (#085)		The trails, respectively, 4 miles, 2 miles, and 2 miles in length have seen use historically for timber, mining, and firefighting access. Additionally, they are used for recreational purposes by hikers, horsemen, bicyclists, and seasonally by hunters and trappers.

TABLE IV-B
Summary of Present Actions

PRESENT ACTIONS		CURRENT EFFECTS
MINERALS See Crandall Canyon Mine and Rilda Canyon Breakout/Deer Creek Mine in Past Actions.		
SOIL AND WATERSHED No soil and watershed improvement projects are being conducted in the project area.		
TIMBER Spoon Creek Timber Sale	1997	Approximately 76 acres of aspen harvest to stimulate regeneration
RANGELAND/WILDLIFE Current Grazing Allotments		961 sheep graze 3 months/year on north end of tract. 912 cattle graze 1 month/year on southern end of tract.
TRANSPORTATION Dispersed recreation, rural recreation, hunting recreation, cordwood activities, range activities, and timber activities continue to contribute to seasonal traffic volumes in and around the project area.		Continued road surface displacement and or contamination of aggregates, continued off-road vehicle damage.
Timber harvest could result in commercial haul easterly on State Route 29 and 31 because of the Cascade Resources Mill near Wellington, Utah	1995-1998	The Baldy Timber Sale could result in 6 MMBF of timber being hauled over Forest Highways, resulting in increased traffic volume and conflicts with existing uses.
RECREATION Closure of Dispersed Sites in Huntington Canyon		Decreased contribution of sediment and human waste along the Huntington Creek.

TABLE IV-C
Summary of Reasonably Foreseeable Future Actions
(within ten years; 1995-2005)

REASONABLY FORESEEABLE	TIMING OF ACTIONS	ANTICIPATED EFFECTS
MINERALS		
Crandall Canyon Mine in Crandall Canyon (S 1/2 NW 1/4, Sec 5, T 16 S, R 7 E, SLM) - Genwal Coal Company has proposed to expand the existing surface facilities on their private inholdings (pvt. surface and coal). The expansion as proposed would culvert approximately 1,500 feet of Crandall Creek to build additional mine surface facilities consisting of a large open coal pile/truck loading facility, truck loading scales, new office, bathhouse, parking lot, etc. In addition, Genwal has proposed to construct new portals on the South slope of the canyon to access the Blind Canyon Seam (upper seam). New disturbance is all on their private lands and would disturb an additional 4 acres. Added to the existing 6 acres disturbed for surface facilities, the disturbed area would be increased to a total of 10 acres. Construction of a merge lane on Hwy. 31 at the Crandall Canyon Road intersection has also been proposed for traffic safety purpoes. This would disturb another 0.5 acres of riparian vegetation along Huntington Creek. The mine will progress into Sec. 2 (State Lease ML-21568, 960 acres). Production will increase from the present rate of 2.5 million tons per year to 3.5 tons per year.	1997 - 2012	Approximately 1,500 feet of Crandall Creek would be in a culvert, removing this stream segment from available habitat for aquatic wildlife. Approximately 4.5 acres of riparian vegetation and habitat will be removed from aquatic and terrestrial wildlife habitat. The present activity, resulting in impacts to wildlife, recreation, traffic conflicts would continue another 5 years (1997 - 2002) over the existing life of the mine. State Lease ML-21568 will be mined and subsided (960 acres). Reclamation of the site would take another 10 years to be completed and fully successful (2000 - 2010). Offsite mitigations have been negotiated between the UDWR, USFS and Genwal Resources, Inc.
Gas Exploration/Development - Burlington Resources (operator of the Flat Canyon/Indian Creek Gas Field) could propose 2 additional gas exploration/production wells on existing oil and gas leases on East Mountain in the Mill Fork Lease Tract. The most likely locations would be the ridge tops located in Sections 13 or 14 on East Mountain at the head of Mill Fork Canyon. It is not likely that new oil and gas leases would be issued within the tract until coal mining in the tract is completed. Approx. 0.5 mile of new road (1.5 acres of dist.) and 2 pads (4 acres) would be required. The wells would be converted to gas production wells.	1999 - 2020	Approximately 5.5 acres would be disturbed for drilling. Assuming that the two wells would be drilled in two successive years, activity disturbances would be for 60 days in two successive years. Production would last for 20 years and physical disturbance would be limited to compressor noise, and weekly visits by field maintenance personnel. After reclamation (last 5 years of 20 year production term), vegetation would be re-established.
Oil and Gas Exploration/Production - Azalea Oil has proposed to drill a 16,000 ft. wildcat well in either North Hughes or Engineer's Canyon. Approximately 3 acres would be disturbed for road and pad construction. Construction and drilling would take place in the same season. If this well produced economic amounts of oil or gas, a second well would be drilled in the other canyon (additional 2.5 acres). A third well could be drilled in Mill Fork or Rilda Canyon if the other two are producers. This would require a pad (2 acres) and reconstruction of the Mill Fork Road (2.5 acres) if located in Mill Fork Canyon. Assume successive season for second and third wells. Drill time for each well would be 150 days. Traffic for 1 week move-in and 1 week move-out of drill rig would be 100 vehicles per day. Average daily traffic would be 16 vehicles per day.	1997 - 2020	10 acres of disturbance for 20 years if production at all 3 wells. If first well not a producer, only one well drilled in 1997 or 1998 and would be reclaimed in the fall after drilling. Would take 5 years to successfully revegetate disturbed area.

REASONABLY FORESEEABLE	TIMING OF ACTIONS	ANTICIPATED EFFECTS
SOIL AND WATERSHED No soil and watershed improvement projects are anticipated in the foreseeable future.		Improvements to soil conditions are expected as a result of range management actions.
TIMBER Spoon Creek Timber Sale; (on-going) planned to sell approximately 100 acres in each of 2 more years.	1998 & 2000	Aspen harvest to stimulate regeneration.
Blaze of Glory Timber Sale	1998	Approximately 135 acres salvage timber sale to improve forest health.
RANGELAND/WILDLIFE Planned and anticiapted troughs, including one in T 16S, R 6E, Sec 10.		Improved livestock distribution
TRANSPORTATION Increase in traffic and changes traffic mix.	1997 - 2007	Increased traffic with higher percentage of heavy trucks on Forest Highways will require additional turning lanes, pavement structure improvements, additional surfacing replacements, and additional maintenance needed. Recreation users along the highway will experience longer duration of heavy truck noise. Travel time will increase.
Road improvement projects. Aggregate placement, road widening, sight distance improvement, additional turnouts, road stabilization, additional culvert placement/culvert replacement.	1997 - 2007	Continued user access, protection of resources and investments. Traffic use on non-highways will increase under 2% per year.
RECREATION Improvement & closure of dispersed sites in Huntington Canyon currently being considered in the Huntington Analysis. Improved group use site is planned for the Little Bear site.	1997-1998	Decreased contribution of sediment and human waste along the Huntington Creek.
Improvement and maintenance activities on the Mill Fork trail (#171)		

V. PERSONNEL AND PUBLIC INVOLVEMENT

A. Interdisciplinary Team and Consultants

The following are the Interdisciplinary Team (IDT) members and consultants who participated in the environmental analysis:

Specialty	*Specialist*	*Role*
NEPA/Geology	Jeff DeFreest	ID Team Leader
Hydrogeology	Liane Mattson	Deputy Team Leader
Engineering	Brent Barney	Core Team
Fisheries/NEPA Consult	Jill Dufour	Core Team
Socioeconomics/NEPA	Max Nielson (BLM)	Core Team
Geology	Carter Reed	Extended IDT
Mining Engineering	Stephen Falk (BLM)	Extended IDT
OSM Representative	Floyd McMullen (OSM)	Extended IDT
Wildlife Biology	Wayne Ludington (BLM)	Extended IDT
Botany/Range	Bob Thompson	Extended IDT
Hydrology	Dennis Kelly	Extended IDT
Cultural Resources	Stan McDonald	Extended IDT
Landscape Arch	Kevin Draper	Extended IDT
Soils	Dan Larsen	Consultant

In addition to the IDT, the following agencies were contacted in regard to application of the Unsuitability Criteria and in compiling resource data:

U.S. Fish and Wildlife Service
Utah Division of Wildlife Resources
Utah State Historic Preservation Office
Genwal Resources, Inc

B. Public Contacts

News releases which notified the general public that the Forest Service and Bureau of Land Management would be evaluating the coal lease application and requesting public comment were published in the *Sun Advocate* and *Emery County Progress* newspapers.

Letters were sent to over a hundred identified interested individuals and organizations requesting comments. The initial mailing list is included in the project file.

Appendix C contains a copy of the letter and a list of individuals and organizations who responded. A summation of the responses is in section I.H. of this report.

A contact was also made with the local Native American Tribal counsel and a response received, requesting to be kept on the mailing list, but not identifying any issues at this time.

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APPENDIX A

SPECIAL COAL LEASE STIPULATIONS

Federal Regulations 43 CFR 3400 pertaining to Coal Management make provisions for the Surface Management Agency, the surface of which is under the jurisdiction of any Federal agency other than the Department of Interior, to consent to leasing and to prescribe conditions to insure the use and protection of the lands. All or part of this lease contain lands the surface of which are managed by the United States Department of Agriculture, Forest Service - Manti-La Sal National Forest.

The following stipulations pertain to the Lessee responsibility for mining operations on the lease area and on adjacent areas as may be specifically designated on National Forest System lands.

Forest Service Stipulation #1.

Before undertaking activities that may disturb the surface of previously undisturbed leased lands, the Lessee may be required to conduct a cultural resource inventory and a paleontological appraisal of the areas to be disturbed. These studies shall be conducted by qualified professional cultural resource specialists or qualified paleontologists, as appropriate, and a report prepared itemizing the findings. A plan will then be submitted making recommendations for the protection of, or measures to be taken to mitigate impacts for identified cultural or paleontological resources.

If cultural resources or paleontological remains (fossils) of significant scientific interest are discovered during operations under this lease, the Lessee prior to disturbance shall immediately bring them to the attention of the appropriate authority. Paleontological remains of significant scientific interest do not include leaves, ferns or dinosaur tracks commonly encountered during underground mining operations.

The cost of conducting the inventory, preparing reports, and carrying out mitigating measures shall be borne by the Lessee.

Forest Service Stipulation #2.

If there is reason to believe that Threatened or Endangered (T&E) species of plants or animals, or migratory bird species of high Federal interest occur in the area, the Lessee shall be required to conduct an intensive field inventory of the area to be disturbed and/or impacted. The inventory shall be conducted by a qualified specialist and a report of findings will be prepared. A plan will be prepared making recommendations for the protection of these species or action necessary to mitigate the disturbance.

The cost of conducting the inventory, preparing reports and carrying out mitigating measures shall be borne by the Lessee.

Forest Service Stipulation #3.

The Lessee shall be required to perform a study to secure adequate baseline data to quantify the existing surface resources on and adjacent to the lease area. Existing data may be used if such data are adequate for the intended purposes. The study shall be adequate to locate, quantify, and demonstrate the interrelationship of the geology, topography, surface hydrology, vegetation and wildlife. Baseline data will be established so that future programs of observation can be incorporated at regular intervals for comparison.

Forest Service Stipulation #4.

Powerlines used in conjunction with the mining of coal from this lease shall be constructed so as to provide adequate protection for raptors and other large birds. When feasible, powerlines will be located at least 100 yards from public roads.

Forest Service Stipulation #5.

The limited area available for mine facilities at the coal outcrop, steep topography, adverse winter weather, and physical limitations on the size and design of access roads, are factors which will determine the ultimate size of the surface area utilized for the mine. A site-specific environmental analysis will be prepared for each new mine site development and for major improvements to existing developments to examine alternatives and mitigate conflicts.

Forest Service Stipulation #6.

Consideration will be given to site selection to reduce adverse visual impacts. Where alternative sites are available, and each alternative is technically feasible, the alternative involving the least damage to the scenery and other resources shall be selected. Permanent structures and facilities will be designed, and screening techniques employed to reduce visual impacts and, where possible, achieve a final landscape compatible with the natural surroundings. The creation of unusual, objectionable, or unnatural landforms and vegetative landscape features will be avoided.

Forest Service Stipulation #7.

The Lessee shall be required to establish a monitoring system to locate, measure and quantify the progressive and final effects of underground mining activities on the topographic surface, underground and surface hydrology and vegetation. The monitoring system shall utilize techniques which will provide a continuing record of change over time and an analytical method for location and measurement of a number of points over the lease area. The monitoring shall incorporate and be an extension of the baseline data.

Forest Service Stipulation #8.

The Lessee shall provide for the suppression and control of fugitive dust on haul roads and at coal handling and storage facilities. On Forest Development Roads (FDR), Lessees may perform their share of road maintenance by a commensurate share agreement if a significant degree of traffic is generated that is not related to their activities.

Forest Service Stipulation #9.

Except at specifically approved locations, underground mining operations shall be conducted in such a manner so as to prevent surface subsidence that would: (1) cause the creation of hazardous conditions such as potential escarpment failure and landslides, (2) cause damage to existing surface structures, and (3) damage or alter the flow of perennial streams. The Lessee shall provide specific measures for the protection of escarpments, and determine corrective measures to assure that hazardous conditions are not created.

Forest Service Stipulation #10.

In order to avoid surface disturbance on steep canyon slopes and to preclude the need for surface access, all surface breakouts for ventilation tunnels shall be constructed from inside the mine, except at specific approved locations.

Forest Service Stipulation #11.

If removal of timber is required for clearing of construction sites, etc., such timber shall be removed in accordance with the regulations of the surface management agency.

Forest Service Stipulation #12.

The coal contained within, and authorized for mining under this lease shall be extracted only by underground mining methods.

Forest Service Stipulation #13.

Existing Forest Service owned or permitted surface improvements will need to be protected, restored, or replaced to provide for the continuance of current land uses.

Forest Service Stipulation #14.

In order to protect big-game wintering areas, elk calving and deer fawning areas, sagegrouse strutting areas, and other key wildlife habitat and/or activities, specific surface uses outside the mine development area may be curtailed during specified periods of the year.

Forest Service Stipulation #15.

Support facilities, structures, equipment, and similar developments will be removed from the lease area within two years after the final termination of use of such facilities. This provision shall apply unless the requirement of Section 10 of the lease form is applicable. Disturbed areas and those areas previously occupied by such facilities will be stabilized and rehabilitated, drainages re-established, and the areas returned to a premining land use.

Forest Service Stipulation #16.

The Lessee, at the conclusion of the mining operation, or at other times as surface disturbance related to mining may occur, will replace all damaged, disturbed or displaced corner monuments (section corners, 1/4 corners, etc.), their accessories and appendages (witness trees, bearing trees, etc.), or restore them to their original condition and location, or at other locations that meet the requirements of the rectangular surveying system. This work shall be conducted at the expense of the Lessee, by a professional land surveyor registered in the State of Utah, and to the standards and guidelines found in the Manual of Surveying Instructions, United States Department of the Interior.

Forest Service Stipulation #17.

The Lessees, at their expense, will be responsible to replace any surface water identified for protection, that may be lost or adversely affected by mining operations, with water from an alternate source in sufficient quantity and quality to maintain existing riparian habitat, fishery habitat, livestock and wildlife use, or other land uses.

Forest Service Stipulation #18.

STIPULATION FOR LANDS OF THE NATIONAL FOREST SYSTEM UNDER JURISDICTION OF THE DEPARTMENT OF AGRICULTURE

The licensee/permittee/lessee must comply with all the rules and regulations of the Secretary of Agriculture set forth at Title 36, Chapter II, of the Code of Federal Regulations governing the use and management of the National Forest System (NFS) when not inconsistent with the rights granted by the Secretary of the Interior in the license/permit/lease. The Secretary of Agriculture's rules and regulations must be complied with for (1) all use and occupancy of the NFS prior to approval of a permit/operation plan by the Secretary of Interior, (2) uses of all existing improvements, such as Forest Development Roads, within and outside the area licensed, permitted or leased by the Secretary of Interior, and (3) use and occupancy of the NFS not authorized by a permit/operating plan approved by the Secretary of the Interior.

All matters related to this stipulation are to be addressed to:

Forest Supervisor
Manti-La Sal National Forest
599 West Price River Drive
Price,Utah 84501

Telephone No.: 801-637-2817

who is the authorized representative of the Secretary of Agriculture.

_____
Signature of Licensee/Permittee/Lessee

Forest Service Stipulation #19.

Except at specifically approved locations, mining that would cause subsidence will not be permitted within a zone along the Joes Valley Fault determined by projecting a 22 degree angle-of-draw (from vertical) eastward from the surface expression of the Joes Valley Fault, down to the top of the coal seam to be mined.

Forest Service Stipulation #20.

A survey for spotted bats (USDA-FS Sensitive Species) will be conducted within the lease tract prior to the lease sale. If bats are located, then evaluations will be made for mitigation needs. Mitigations could include avoidance during specific times and/or the prevention of bat occupancy during periods of subsidence, such as by netting or screening. Mitigations will be evaluated on a case-by-case basis.

Appendix B

REASONABLY FORSEEABLE DEVELOPMENT SCENARIO

The conceptual mine plan presented in this Reasonably Forseeable Development Scenario was submitted by the mining company and validated by the BLM as being consistent with the standard lease terms, conditions and special stipulations included in Alternatives 3 and 4.

Longwall mining will be the primary method of coal extraction in the Mill Fork Lease Tract. Two coal seams, the Blind Canyon and the Hiawatha are considered mineable in the tract. The two seams are separated by 80 to 120 feet of sandstone and shale interburden. There will be areas where only the Blind Canyon will be mined, areas where only the Hiawatha will be mined, and areas where extraction will occur in both seams (mutiple-seam mining). Thin coal precludes longwall mining in parts of the southeastern and northeastern portions of the tract. Room-and-pillar mining would then be used in these areas.

Single-seam longwall mining is projected in the Blind Canyon seam under section 7 and will extend under the NW 1/4, NW 1/4 section 8 (T 16 S, R 7 E). Longwall panels are planned for the Hiawatha seam only under the S 1/2, S 1/2 section 14 extending south and east under the N 1/2 section 13, and the NW 1/4 section 24 (T 16 S, R 6 E). Another single panel is projected to straddle the northern lease boundary in section 1, T 16 S, R 6 E, and section 6, T 16 S, R 7 E. The panel has been designed to provide a buffer zone off Crandall Creek by using a 22.5 degree angle-of-draw. This provides that extent of the panel and the associated subsidence would not interfere with the creek or associated riparian areas. However, knowing that mine plans can change due to coal thickness and conditions underground, it is possible that the panel location could shift to underlie Crandall Creek. In Alternatives 3 and 4, the Forest Service Service Special Coal Lease Stipulation 9, that prevents subsidence of perennial streams will be in effect.

Multiple-seam extraction will occur under sections 11, 14, 12, and the N 1/2, N 1/2 section 13 (T 16 S, R 6 E). Longwall panels are projected to run west to east, with a north-trending set of mains separating two blocks of panels. The panels in the two seams will be superimposed. The panels will be extracted in sequence from north to south on the west side of the mains, and from south to north on the east side. The Blind Canyon seam will be extracted first. There will be an estimated 18 panels of varying lengths in the Blind Canyon seam, and an estimated 17 in the Hiawatha seam.

Room-and-pillar mining will be used to develop gateroads and entries for longwall mining, and for extraction of coal in other areas where longwall is not feasible. Extraction by room-and-pillar method will be used in the northeast portion of the lease tract (east of section 7), and in section 13. In the northeast portion of the lease tract, the planned mining scenario is to use room-and-pillar extraction in both seams.

Subsidence is usually coincident with longwall mining and is transmitted rapidly from the workings to the surface. Once subsidence has begun it will progress with the direction of mining and continue until after the last longwall panel in the block is complete. The total subsided area will include the surface area above the extracted longwall blocks, the room-and-pillar areas where pillars are recovered, plus an additional area determined by the angle-of-draw. Final subsidence contours for a large block of longwall and and room-and-pillar recovery panels extracted from a single coal seam would resemble a broad irregularly shaped trough with maximum subsidence occurring towards the center of the block. Maximum subsidence is usually less than the mining height, due to bulking of the overburden strata. The extent and magnitude of subsidence is dependent on the physical properties

of the overburden, coal bed depth, extracted coal bed height and width, seam dip, geologic discontinuities, mining rate, and number of seams mined.

In the current workings of the Crandall Canyon mine where the Hiawatha seam is being extracted, less than one foot of subsidence has been documented to date. However, only 5 longwall panels have been extracted, and they have been short and not adjacent to other panels. A prominent sandstone layer, 30 feet thick, occurs above the coal seam, (between the Blind Canyon and the Hiawatha seams) and is supporting the overburden, so maximum subsidence has not yet occurred. Current information on subsidence at the Crandall Canyon mine is not adequate to calculate and angle of draw for the area. Studies performed at PacifiCorp properties on East Mountain south of the lease tract found that mining in one seam caused surface subsidence equal to 68% of the extracted thickness, within an angle of draw of 30 degrees (Dyni, 1991). Actual measurements taken by the company after mutiple-seam extraction in following years have shown the angle-of-draw to be between 20 and 30 degrees. Surface disruption and associated impacts due to subsidence at other underground coal mines in the region, usually decrease as the overburden thickness increases. The major effect of multiple seam longwall mining is to increase the maximum subsidence but the angle-of-draw is not changed appreciably where longwall blocks in each seam, or coal bed, are superimposed. Where multiple-seam extraction occurred under the southern portions of East Mountain, the maximum subsidence increased to 73 % of the total extracted thickness (Dyni, 1991). Final surface displacement was approximately 13 feet. Where a longwall block in an underlying seam extends beyond a longwall block in an overlying seam, the subsidence area will expand in accordance with the extended mining area. Maximum subsidence should occur toward the center of the largest amount of longwall block overlap. Cracks have been observed to form in the extension zone within the angle-of-draw on other portions of East Mountain.

A broad subsidence trough with a smooth profile minimizes disruption to the surface. It is produced by mining a large block of longwall panels at an even rate which results in uniform gradual subsidence. One potential impact to streams crossing the final subsidence trough is a change in the original surface slope. Depending on the original topography, an increase or decrease in the surface slope could have an affect on the flow of a stream.

Longwall mining on the tract, would cause four subsidence troughs; one over each set of longwall panels. Maximum subsidence should be approximately 13 feet over multiple seam areas, and approximately 6 feet over single seam areas.

Subsidence over room-and-pillar sections would be less predictable because of fenders and stumps left from the coal extraction sequence. Because bleeder systems and barrier pillars would be utilized between panels, subsidence would not be a broad trough. The subsidence in this scenario would be trough, barrier, trough, barrier, etc. A study at a room-and-pillar mine in Colorado with similar geologic conditions found that subsidence was approximately 40 % of the extraction height. Tension cracks were observed to form at the edges of extracted portions (Magers, 1993). Where pillars are not recovered (first mining only), chimney subsidence has been observed where the overburden is about 250 feet or less.

Forest Service Special Stipulation 9, which precludes subsidence of perennial streams without prior approval, would prevent surface fractures that could divert water underground. One case of this type of diversion has been documented on fee lands within the Wasatch Plateau, where the Right Fork of Miller Creek has been diverted into the Star Point Mine. The overburden between the creek and the mine ranged from 300 to 500 feet. Subsidence theory and observations indicate that surface tension cracks in overburden greater than 400-600 feet probably do not extend down into the caved zone directly above the underground workings.

Guidance from the SME Mining Engineering Handbook, 2nd Edition states that suggested vertical distance between mining and water bodies should exceed 60 times the mining height (SME, p. 962). Where the overburden is greater than 600 feet, it is therefore unlikely that there would be direct hydrologic connection between surface flow and underground workings. In another study of under-mining a perennial stream on the Wasatch Plateau where 600 feet of overburden is present, stream flows did not appear to have been affected (Sidle 1995).

The potential for a surface crack to divert water underground prior to healing is further limited by the characteristics of the local formations which consists of interbedded claystone, siltstone, and sandstone. Although material may fracture at the surface, the fractures are prone to heal rapidly because of the expanding nature of the montmorillonite clays. The CHEMPET Research Corp. analyzed drill core material from the Blackhawk Formation through X-ray diffraction and found it to contain 58% montmorillonite clay (Hurst, 1989). Bentonite, which is essentially composed of montmorillonite, is able to absorb water and increase in volume several times (Hurlbut, 1971). The Blackhawk Formation does not readily receive an influx of surface water because the claystone and siltstone have a low permeability and the higher permeability sandstones are lenticular and pinch out in a short distance.

There is an existing natural gas well within the lease tract in section 23, T 16 S, R 6 E. The oil and gas targets in the area are all below the coal seams, requiring drilling and well completion through the coal. A block of coal will be left in place surrounding the well to preserve the integrity. If conflicts arise with this issue, they will be resolved by the BLM.

References:

Dyni, R.C. 1991. Subsidence resulting From Multiple-Seam Longwall Mining in the Western United States- A Characterization Study. U.S. Department of the Interior, Bureau of Mines, Information Circular 9297.

Hurlbut, C. S. 1971. Dana's Manual of Mineralogy, 18th Edition. John Wiley and Sons, Inc., New York.

Hurst. 1989. CHEMPET Research Corporation, Analysis File No. 890028. Moorpark, California.

Magers, J.A. 1993. Surface Subsidence Over a Room-and-Pillar Mine in the Western United States. U.S. Department of the Interior, Bureau of Mines, Information Circular 9347.

Sidle, R.C. 1995. Changes in Stream Channel Characteristics and Hydraulic Parameters Related to Surface Subsidence, Intermin Report No. 2. USDA-Forest Service Intermountain Research Station, Logan, Utah.

Society of Mining Engineers. 1993. Surface Subsidence Engineering.

United States Department of Agriculture | Forest Service | Manti-La Sal National Forest | Ferron/Price Ranger District
Price Work Center
599 West Price River Drive
Price, Utah 84501

File Code: 2820-4

Date: November 19, 1996

Interested Participant:

The Bureau of Land Management (BLM) and the Forest Service will be evaluating an application by Genwal Resources, Inc. to lease federal lands in Emery County for coal development. The proposed Mill Fork Lease Tract (UTU-71307) lies to the south of Genwal's Crandall Canyon Mine facilities, as shown on the attached maps. If they are the successful bidder, the company plans to access the lease tract from the Crandall Canyon facilities.

The application will be processed according to Lease-on-Application procedures described in 43 CFR 3425. The tract encompasses about 6,440 acres of federal coal lands contained within the Manti-La Sal National Forest. The BLM administers the subsurface mineral estate. Under the existing Forest Plan, it was determined that the lands are available for further consideration for coal leasing. The two agencies will jointly conduct an environmental analysis according to 43 CFR 3400 and the National Environmental Policy Act of 1969 (NEPA).

The agencies are inviting Federal, State, and local agencies; permittees; and other individuals or organizations interested in, or potentially affected by the proposal to become involved in the public participation process. Through this public involvement (scoping) process, the agencies seek to provide information to the public on the proposed action and to identify the issues. Your comments will help focus the analysis team on the pertinent issues and result in a concise evaluation and disclosure of effects in the final document.

We are often asked to better define what we are really looking for when we ask the public for input. Project analyses conducted under the guidelines of NEPA are driven by project objectives (purpose and need) and issues. An issue is a clear statement of an effect or outcome the proposal might have on people and/or the environment. To help us identify pertinent issues, it would be helpful if you would respond with information specific to resource, location, and what you think the impact of coal leasing would be on that resource at that location, and why. If specific information related to an issue is provided, the risk of us misinterpreting what you want addressed in the analysis may be reduced.

If you comment during scoping, you will remain on our mailing list and receive further information concerning this project. If you wish to remain on the mailing list for this project but do not wish to comment at this time, please send us a postcard or contact us with your request. Those who do not respond to us, either by submitting comments or by sending a postcard, will not receive additional information.

Submit your comments to the Manti-La Sal National Forest, 599 W. Price River Dr., Price, UT 84501 by December 13, 1996. Should you have questions or require additional information regarding this proposal, please contact Jeff DeFreest or Liane Mattson at (801) 637-2817.

I appreciate your interest and participation.

Sincerely,

CHARLES J. JANKIEWICZ
District Ranger

Enclosures

cc:
Forest Supervisor

TABLE 1

MAILING LIST RESPONDENTS

RESPONSE NUMBER/DATE	COMPANY/ORGANIZATION	NAME	ADDRESS
#1 11/25/96	Emery County	Rosann Fillmore	PO Box 297 Huntington, UT 84513
#2 11/26/96	State of Utah Dept. of Transportation	Kleston Laws	Route # 3 Box 75C5 Price, UT 84501
#3 11/25/96	Trail Mtn Livestock Permitees	Horace Petty Paul Peacock L. Jack Curtis	Address not provided
#4 11/29/96	USDI, Office of Surface Mining	Ranvir Singh, PE	1999 Broadway, Suite 3320 Denver, Co. 80202
#5 11/27/96	State of Utah Div of Oil,Gas & Mining	Mary Ann Wright	355 W. North Temple S.L.C. Utah 84180
#6 12/6/96	Huntington City Council	Ross Gordon	No Return Address
#7 12/4/96	Huntington City	Mayor/Council	No Return Address
#8 12/5/96	Cleveland Town	Ron VanWagoner	P.O. Box 325 Cleveland, Utah 84518
#9 12/4/96	Huntington-Cleveland Irrigation Company	Duane Jensen	55 N. Main Huntington, Utah 84528
#10 12/4/96	Emery Water Conservancy District	Jay M. Humphrey	P.O.Box 998 Castle Dale, Utah 84513
#11 12/8/96	Utah Wildlife Federation	Gerald Gordon	P.O. Box 65636 S.L.C. Utah 84165
#12 12/12/96	North Emery Water Users Association	Menco Copinga	Box 129 Cleveland, Utah 84518
#13 12/12/96	Nielson & Senior	J.Craig Smith	60 E. South Temple S.L.C. Utah 84111
#14 12/12/96		Dick Neilson	P.O. Box 555 Huntington, Utah 84528
#15 12/13/96	Castle Valley Special Services District	Darrel Leamaster	Castle Valley Special Services District Castle Dale, UT 84513
#16 12/12/96	Burlington Resources	Eileen Danni Dey	P.O. Box 51810 Midland, Texas 79710
#17 12/12/96	Appel & Warlaumont L.C.	Jeffrey Appel	1100 Boston Bldg 9 Exchange Place S.L.C. Utah 84111

RESPONSE DATE/NUMBER	COMPANY/ORGANIZATION	NAME	ADDRESS
#18 12/13/96	Energy West Mining Co.	David Lauriski	P.O. Box 310 Huntington, Utah 84528
#19 12/13/96	USDI, Fish & Wildlife Service	Reed Harris	145 East 1300 South S.L.C. Utah 84115
#20 12/11/96		Arthur Polani	650 North 3rd East Price, Utah 84501
#21 12/18/96	State of Utah Div of Wildlife Res.	Miles Moretti	455 W Railroad Ave Price, Utah 84501

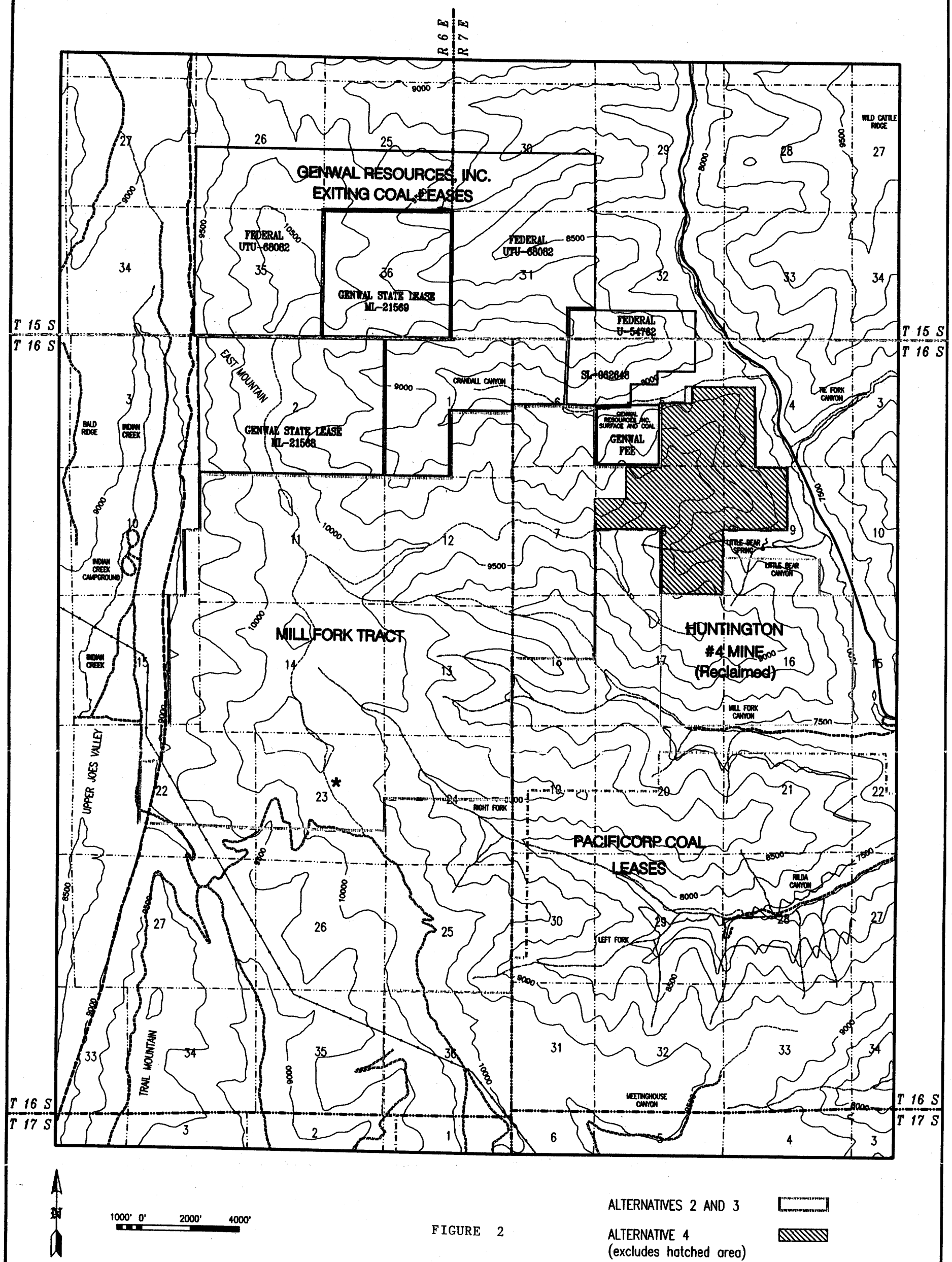

FIGURE 2

MILL FORK LEASE TRACT PROPOSED ACTION	LEGEND: MILL FORK LEASE TRACT BURLINGTON RESOURCES GAS WELL * LITTLE BEAR SPRING JOES VALLEY FAULT	MANTI-LA SAL NATIONAL FOREST