GENWAL MINE
015/032

MINING AND RECLAMATION PLAN REVISION
FOR THE

SOUTH CRANDALL LEASE AREA
COMPRISING THE

SOUTH CRANDALL LEASE (UTU-78953)
SITLA/PACIFICORP SUB-LEASE
[redacted]

April 12, 2004

SUBMITTED: M[redacted]2004

CHAPTER 1

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Note: Bold number plates and appendices are included with this submittal.

GENWAL Resources, Inc.
P.O. Box 1077
Price, Utah 84501
Telephone (435) 888-4000

Mineral Ownership:

United States Government
Administered by the United States
Dept. of Interior, Bureau of Land Management
Moab District
P.O. Box AB
Price, Utah 84501

Utah School and Institutional Trust Lands Administration (SITLA)
675 East 500 South
Salt Lake City, Utah 84102

Owners of contiguous areas both surface and underground:
See Plate 1-1

1.12.7 Mine Identification: MSHA Numbers

Crandall Canyon Mine 21 Nov, 1991
MSHA No. 42-01715

South Crandall Canyon Mine
MSHA No. 42-02356

I.P.A.
Horse Canyon mine site Unknown
MSHA No. 42-01715

Andalex Resources, Inc. - Tower Division
MSHA No. 42-01474, 42-01750, 42-02028, 42-01864

1.12.8 Pending Interests of Lands Contiguous to Permit Area:

The applicant has no pending interests in lands contiguous to the permit area.

1.13 Violation Information:

The applicant currently operates coal mining operations under ACT/015/032 for the Crandall Canyon Mine in Emery county, Utah. Permit ACT/015/032 was approved and issued May 13, 1993.

The Applicant, nor any subsidiary, affiliate, or persons controlled by or under common control with the applicant, has not had a Federal or State mining permit suspended or revoked in the last five years. Nor have they forfeited a mining bond or similar security deposited in lieu of a bond. There are no unabated cessation orders ~~(Andalex Resources, Inc did receive a Cessation Order (C94-39-1-1) during late December, 1994 which was subsequently terminated in February, 1995)~~ or air and water quality violation notices received prior to the date of the application, by any coal mining and reclamation operation owned or controlled by GENWAL or by any person who owns or controls GENWAL. Refer to Appendix 1-11 for a list of previous violations.

1.14 RIGHT OF ENTRY AND OPERATION

Applicant bases its legal right to enter and begin underground mining activities in the permit area upon the following documents:

Federal Coal Lease U-54762, issued to GENWAL on December 1, 1986, currently owned by Andalex and IPA. IPA and Andalex have undivided 50% interest as tenants in common of all leases previously under GENWAL's sole ownership (Andalex Resources, Inc has now assumed all leases or portions of the leases previously held by NEICO through the purchase and transfer of those rights to GENWAL Resources, Inc. effective 1/11/95). Federal coal lease UTU-78953 (also known as the South Crandall tract) was acquired in June 2003. (Refer to Appendix 1-13) A 40 acre parcel of the SITLA Millfork Lease was subleased from PacifiCorp in February, 2004. (Refer to Appendix 1-14)

It should be noted that throughout this Mining and Reclamation Plan the combined area of Federal Lease UTU-78953 and the SITLA/PacifiCorp sublease are collectively referred to as the South Crandall lease area, the South Crandall tract, the South Crandall mining area, and similar such terms.

Assignment of Federal Lease SL-062648 and SL-050655 from heirs of John F. Sanders to applicant. BLM approval of assignment to applicant from heirs of John F. Sanders.

The Joint Owners will succeed to all the rights and duties held by Permittee by operation of law, including the legal right to enter and continue coal mining and reclamation operations. Permittee will continue to operate the mine under the direction of the Joint Owners.

The present Joint Owners (Andalex and IPA) base their legal right to enter and continue underground mining activities in the permit area upon the following documents and the NEICO/Andalex sales contract:

Federal Coal Lease Assignments

Assignment of Federal Coal Lease U-54762 issued to GENWAL on December 1, 1986 and assigned to the Joint Owners (NEICO and IPA) on July 11, 1991.

Assignment of Federal Coal Lease SL-62648, assigned to the Joint Owners (NEICO and IPA) on July 11, 1991

Assignment of Federal Coal Lease UTU-68082, assigned to the Joint Owners (NEICO and IPA) in March, 1994.

State Coal Lease Assignments

Assignment of Utah State Coal Lease ML-21568, assigned to the Joint Owners (NEICO and IPA) on July 11, 1991

Assignment of Utah State Coal Lease ML-21569, assigned to the Joint Owners (NEICO and IPA) on July 11, 1991

Copies of the Assignments are included in Appendix 1-1. The Assignments are not subject to pending litigation. (However, reassignment of these leases does require BLM approval; reassignment of the leases is currently being processed by the BLM and based on contract documents from NEICO and verbal approval from BLM and State Lands, GENWAL Resources, Inc. has right of entry in the interim.

Special Use Permit Assignments

Special Use Permit, 1.5 acres, 150 x 400 ft adjacent to the eastern boundary of GENWAL's Federal Coal Lease SL-062648 (See Appendix 1-3)

Special Use Permit, .10 acres located in Section 6, SW quarter NE quarter T16S R7E SLBM (See Appendix 1-3).

Special Use Permit, 0.9 acres for stockpiles 1, 2, and 3 dated 8/17/87 (See Appendix 1-3)

Road Use Permit Assignment for F.S. No. 50248 road issued May 21, 1981 by the United States Forest Service (Appendix 1-2).

Permit Legal Description

The permit area is located and described as follows:

PARCEL	ACREAGE	LEGAL DESCRIPTION
FEDERAL LEASE U-68082	2979.49	T 15 S, R 6 E
		Section 25: S ½
		Section 26: S ½
		Section 35: ALL
		T 15 S, R 7 E
		Section 30: Lots 7-12 SE ¼
		Section 31: Lots 1-12 NE ¼ N½SE¼ SW¼SE¼
		T 16 S, R 6 E
		Section 1: Lots 1-12 SW¼
		T 16 S, R 7 E
		Section 6: Lots 2-4 SW¼NE¼
FEDERAL LEASE U-54762	256.49	T 15 S, R 7 E
		Section 31: SE¼SE¼
		Section 32: S½SW¼ SW¼SE¼
		T 16 S, R 7 E

FEDERAL LEASE SL-062648	161.17	T 16 S, R 7 E	
		Section 5:	Lots 5 and 6
		Section 6:	Lot 1 SE¼NE¼
FEDERAL LEASE U-78953	880.00	T 16 S, R 7 E	
		Section 4:	W½SW¼ S½SW¼NW¼
		Section 5:	SE¼ S½SE¼NE¼
		Section 8:	E½ NE¼NW¼ S½NW¼
		Section 9:	NW¼
STATE LEASE ML-21568	997.69	T 16 S, R 6 E	
		Section 2:	ALL
STATE LEASE ML-21569	640.00	T 15 S, R 6 E	
		Section 36:	ALL
FEE SURFACE AND COAL (Dellenbach)	160.00	T 16 S, R 7 E	
		Section 5:	SW¼
BLM RIGHT OF WAY UTU-77975 (underground mining rights)	50.00	T 16 S, R 6 E	
		Section 6:	E½E½SE¼NE¼ E½E½NE¼SE¼ E½SE¼SE¼
		Section 10:	NE¼NE¼NE¼
SITLA/PACIFICORP SUBLEASE:	40.0	T 16 S, R 7 E	
		Section 8:	NW¼NW¼

FOREST SERVICE SPECIAL USE AREAS:
(all in T 16 S, R 7 E)

SEDIMENT POND (7/28/83)	1.5	Section 5: located within SW¼SW¼SE¼NW¼,
TOPSOIL PILE #1 (8/17/87)	0.2	Section 5: located within SE¼SE¼SE¼NW¼,
TOPSOIL PILE #2 (8/17/87)	0.2	Section 5: located within SW¼NW¼SE¼NE¼,
TOPSOIL PILE #3 (8/17/87)	0.5	Section 4: located within NW¼NW¼SE¼NW¼,
TOPSOIL PILE #4	0.5	Section 4: located within SW¼SW¼NE¼NW¼
TOTAL PERMIT AREA	6167.74	

The right to continue underground mining operations will apply to the property attached hereto as Appendix 1-1.

The surface facility area and permit area is not within 300 feet of any occupied dwelling and is not subject to the prohibitions or limitations of the State and/or Federal Regulations.

GENWAL DISTURBED ACREAGE

Area	Section	within	Acres	parcel
minesite	Section 5	NW ¼	7.768*	Fed Lease UTU-54762
		SW¼	6.086*	Dellenbach Fee
Topsoil Pile #1	Section 5	NW¼	0.2	Forest Service Special Use Permit
Topsoil Pile #2	Section 5	NE¼	0.2	Forest Service Special Use Permit
Topsoil Pile #3	Section 4	NW¼	0.5	Forest Service Special Use Permit
Topsoil Pile #4	Section 4	NW¼	0.5	Forest Service Special Use Permit
TOTAL			15.254	

* Includes all areas within "permitted" disturbed area. Not all acreage is presently disturbed. See Figure 8C.

CRANDALL CANYON MINE
PERMIT NUMBER 015/032

DOGM VIOLATIONS 2001 THROUGH FEBRUARY 2004

VIOLATION/ CESSATION NO.	DATE ISSUED	ABATEMENT DATE	VIOLATION DESCRIPTION
NO3-49-2-1	7/30/03	8/20/03	Failure to submit surface blast plan pf more than 5 pounds. Abated with submittal and approval of plan.
NO3-49-1-1	1/8/03	4/15/03	Failure to request permit renewal 120 days prior to permit expiration. Abated with submittal of permit renewal application.

WESTRIDGE MINE
PERMIT NUMBER 007/041

DOGM VIOLATIONS 2001 THROUGH FEBRUARY 2004

VIOLATION/ CESSATION NO.	DATE ISSUED	ABATEMENT DATE	VIOLATION DESCRIPTION
NO2-49-2-1	11/19/02	2/18/02	Diverting mine water through channels and culverts and storing in sediment pond. Abated with submittal of permit change allowing use.
NO2-49-1-1	2/19/02	5/20/02	Failure to maintain or construct diversions according to approved MRP. Abated with the completion of a permit change approval and construction measures.
NO4-49-1-1	1/22/04	1/22/04	Failure to request permit renewal 120 prior to permit expiration. Abated with submittal of permit renewal application.

CENTENNIAL MINES
PERMIT NUMBER 007/019

DOGM VIOLATIONS 2001 THROUGH FEBRUARY 2004

VIOLATION/ CESSATION NO.	DATE ISSUED	ABATEMENT DATE	VIOLATION DESCRIPTION
NO4-49-2-1	1/24/04	3/25/04	Failure to maintain disturbed diversion DD-4 and culvert.

APPENDIX 1-14

SITLA/PACIFICORP SUBLEASE

SUBLEASE FOR UTAH STATE LEASE FOR COAL
ML 48258

This Sublease of Utah State Lease for Coal, ML-48258, ("Sublease") is dated as of October 1, 2003 and becomes effective upon receipt of written consent from the School and Institutional Trust Lands Administration. The Sublease is by and between PACIFICORP, an Oregon corporation, having an address at One Utah Center, 201 South Main Street, Suite 2300, Salt Lake City, Utah 84111 as "Sublessor" and ANDALEX Resources, Inc., ("ANDALEX") a Delaware corporation, with offices at 45 West 10000 South, Suite 401, Sandy, Utah 84070, and Intermountain Power Agency, ("IPA"), a political subdivision of the State of Utah, with offices at 10653 South River Front Parkway, Suite 120, South Jordan, Utah 84095 (each as to an undivided fifty percent (50%) interest), with ANDALEX and IPA being collectively hereinafter referred to as "Sublessee."

RECITALS

A. Utah State Lease for Coal ML 48258 (the "Mill Fork Lease") was issued to PacifiCorp effective as of April 1, 1999 by the State of Utah acting by and through the School and Institutional Trust Land Administration. A copy of the Mill Fork Lease is attached to this Sublease as Exhibit "A".

B. The United States of America, acting through the Bureau of Land Management, issued to the Sublessee United States Coal Lease UTU-78953 effective as of August 1, 2003, on lands identified as the South Crandall Canyon Tract. A copy of Lease UTU-78953 is attached as Exhibit "B."

C. The Mill Fork Lease contains a 40 acre parcel that is surrounded on three sides by lands under lease to the Sublessee and is readily accessible for mining operations from these lands.

D. Extraction of the coal resource from this 40 acre parcel appears to be most logical from the South Crandall Canyon Tract.

E. It is in the mutual best interest of Sublessor, Sublessee, and the School and Institutional Trust Lands Administration for Sublessor to Sublease to Sublessee the 40 acre parcel as described herein and to allow it to be mined in due course through the operations of Sublessee.

AGREEMENT

In consideration of the premises and the rights and obligations and mutual covenants and conditions set forth herein and for other good and valuable consideration, Sublessor and Sublessee agree as follows:

1. Sublease Lands. The "Sublease Lands" consist of a 40 acre parcel located in Emery County, Utah more particularly described as follows:

Township 16 South, Range 7 East, SLB&M:
Section 8: NW1/4NW1/4
Containing 40 acres more or less.

2. Granting Clause. Sublessor hereby subleases the Sublease Lands to Sublessee, subject to the terms and conditions of the Mill Fork Lease. Sublessee will have the rights hereunder to exercise all operating rights held by Sublessor as the Lessee under the Mill Fork Lease.

3. Term. This Sublease shall become effective upon approval by the School and Institutional Trust Lands Administration. The initial term under this Sublease shall, unless terminated earlier as provided herein, terminate at 11:59 p.m. December 31, 2013. If Sublessee has not given Sublessor not less than 6 months prior written notice of Sublessee's intent to terminate this Sublease at the conclusion of the initial term then this Sublease shall automatically be extended for an additional term of 10 years.

4. Bonus. Sublessee shall pay to Sublessor as consideration for the execution of this Sublease a one time "Bonus" in the amount of [redacted], which shall be payable within 15 days following the effective date of this Sublease. Payment from Sublessee to Sublessor may be made by check or by wire transfer in accordance with instructions received by Sublessee from Sublessor.

5. Conduct of Operations. Sublessee shall conduct, and shall cause its operators and contractors to conduct, all operations under this Sublease in a lawful, prudent, good, efficient and workmanlike manner and in compliance with all applicable federal, state and local laws and regulations, including the Utah Coal Mining and Reclamation Act.

6. Compliance with Mill Fork Lease. On the Sublease Lands, Sublessee shall perform and satisfy all of the Sublessor's obligations under the Mill Fork Lease to maintain the Mill Fork Lease in good standing and free of breeches. Sublessor agrees to make payment of all fees, rentals, and royalties becoming due under the Mill Fork Lease save and except the payment of royalties on production from the Sublease Lands which Sublessee agrees to make directly to the School and Institutional Trust Lands Administration. Upon receipt of an invoice from Sublessor, Sublessee will reimburse Sublessor for the proportionate share of any such fees and rentals attributable to the Subleased Lands.

7. Termination or Partial Surrender or Relinquishment by Sublessee. Sublessee may surrender and terminate this Sublease at any time by giving 90 days prior written notice to Sublessor. Sublessee may surrender and terminate this Sublease as to a portion of the Sublease Lands only with the prior consent of Sublessor, which shall not be unreasonably withheld.

8. Default. In the event of failure of Sublessee to make the payment of the Bonus to Sublessor, or a failure of Sublessee to make a payment of the royalty due to the School and Institutional Trust Lands Administration hereunder within the time herein fixed for such payments, Sublessor may give written notice to Sublessee of such default and Sublessee shall have a period of 10 days after its receipt of such notice of payment default to correct such payment default. In the event of failure of Sublessee to comply with provisions hereunder other than those requiring payments, Sublessor may give written notice to Sublessee of such default and Sublessee shall have a period of 30 days after its receipt of said notice to correct such default. If Sublessee does not correct such payment default within 10 days after its receipt of such notice, or such other defaults within 30 days after its receipt of such notice, Sublessor may, at its option and without waiver or limitation of any other remedies, terminate this Sublease without further notice.

9. Assignment. Sublessee shall not assign this Sublease or any interest held hereunder without the prior written consent of Sublessor, which consent shall not be unreasonably withheld. Subject to the foregoing, this Sublease shall inure to the benefit of and be binding upon the parties hereto and their respective successors and assigns down the line.

10. Exchange Agreement. This Sublease is executed in accordance with the terms and conditions of that certain Exchange Agreement executed among the parties concurrently with the execution of this Sublease. In the event of conflict, the terms and conditions of the Exchange Agreement shall prevail.

IN WITNESS WHEREOF, Sublessee and Sublessor have executed this Sublease effective as of the date stated above.

SUBLESSOR:

PACIFICORP, an Oregon corporation

By: _____

Title: President Wheeler Mining Co.

SUBLESSEE:

INTERMOUNTAIN POWER AGENCY

By: Reed T. Searle
Reed T. Searle
Title: General Manager

ANDALEX RESOURCES, INC.

By: Douglas H. Smith
Douglas H. Smith
Title: Douglas H. Smith, President

State of Utah)
) ss.
County of Salt Lake)

On this 17 day of February, 2004, before me Krista R. Paull, personally appeared Reed T. Searle
Known to me to be the General Manager of the corporation that executed the within instrument and acknowledged to me that such corporation executed the same.

KRISTA R PAULL
NOTARY PUBLIC • STATE of UTAH
10653 SOUTH RIVER FRONT PARKWAY #120
SOUTH JORDAN UT 84095
COMMISSION EXPIRES: 09-01-2007

Krista R. Paull
Notary Public
Residing at: 6796 Masonly Cir SLC Ut. 84121
My Commission Expires: 9/1/07

State of UTAH)
) ss.
County of SALT LAKE)

On this 20TH day of FEBRUARY, 2004, before me SCOTT M. CHILD, personally appeared DEE W. JENSE
Known to me to be the PRES. INTERWEST MINING Co of the corporation that executed the within instrument and acknowledged to me that such corporation executed the same.

NOTARY PUBLIC
SCOTT M. CHILD
201 So. Main St., Ste. 2000
Salt Lake City, Utah 84140
My Commission Expires
June 6, 2004
STATE OF UTAH

Notary Public
Residing at: 201 So. MAIN ST. SLC, UT.
My Commission Expires: 6-8-2004

State of Utah)
) ss.
County of SaltLake)

On this 10th day of February, 2004, before me Wayne L Crouch, personally appeared Douglas H. Smith
Known to me to be the President of the corporation that executed the within instrument and acknowledged to me that such corporation executed the same.

NOTARY PUBLIC
WAYNE L. CROUCH
45 West 10000 South #401
Sandy, Utah 84070
Commission Expires
July 10, 2006
STATE OF UTAH

Wayne L Crouch
Notary Public
Residing at: State of Utah
My Commission Expires: 10 July 2006

CHAPTER 2

SOILS

2.10 Introduction

This chapter presents soil resource data and soil mapping for the Crandall Canyon Mine. This information has been compiled from the previously approved Mine Reclamation Plan ACT/015/032 and newly gathered data associated with the approved culvert expansion. Additional soil information from the proposed south portals is also included. Soil studies were conducted in accordance with guidelines issued by the Utah Division of Oil, Gas, and Mining. All surveys fulfilled the requirements established by the Soil Conservation Service (SCS).

The permit area and coal leases are delineated on Plate 1-1. The disturbed area is presented on Plate 5-3. There will be no surface disturbance within the Incidental Boundary Change area. The area is being added to facilitate the extention of underground main entries and will not affect the ground surface or vegetation. There will be no surface disturbance within the South Crandall Lease area as a result of mining within the lease.

This chapter presents a description of the premining soil resources, feasible use of substitute soils, topsoil and subsoil to be saved, stockpiling of soils, and surveys of the soils.

2.20 Environmental Description

The mine and existing area of disturbance is at an elevation of approximately 7500-7800 feet on a southern exposure with slopes ranging from 5% to 70%. The disturbance associated with the culvert expansionl include the canyon floor and the associated toeslopes. The mean annual soil temperature is 40 to 44 degrees F and the average annual precipitation is 20 to 23 inches.

The soils are classified as Entisols and Mollisols. The Entisols are shallow, found on the steeper slopes and have a moderate to high erosion hazard. The Entisols are classified as poor for the recoverability of topsoil due to the steepness of slope (50-70 percent) and the high percent of large rocks on and in the surface layer (35-60 percent). Recovery of topsoil from these areas is difficult.

The Mollisols are found on more moderate slopes and are deep, well drained soils which have a moderate to low erosion hazard. The Mollisols generally have a deep, well formed A horizon. These soils in general can produce large amounts of topsoil and subsoil that can be removed, stockpiled, and used as good growth medium for reclamation.

Revised 4/05/2003

2.21 Prime Farmland Investigation

The land within the permit area has not been historically used as cropland nor is the area conducive to intensive agricultural uses. GENWAL contacted SCS in Salt Lake City and obtained a letter of negative determination enclosed as Appendix 2-1 from Mr. T.B. Hutchings Ph.D., SCS State Soil Scientist. There is no prime farmland within the South Crandall lease area. (Refer to Appendix 2-10)

Also, information from the field survey completed by Valley Engineering was sent to SCS and a letter was received by GENWAL indicating a negative determination for the presence of an alluvial floor. The SCS letter is included with this application as Appendix 2-2. Both of these negative determinations are supported by the findings of Mr. Dean Larson, Soil Scientist with the Price Office of the U.S. Forest Service (Appendix 2-3A).

2.22 Soil Survey

The initial soil survey was conducted by Valley Engineering. Refer to Plate 2-1 for the existing surface disturbance. Accurate soil survey information and productivity data were obtained and are representative of the entire disturbed area (see Appendix 2-3 and Plate 2-1).

A supplemental soil survey was conducted by GENWAL personnel, Chris Hansen of Earthfax and David Steed of EIS in the summer of 1995 and 1996 to assess the undisturbed soils in the area of the culvert expansion project (Plate 2-4). These data have close correlation with and support the findings of the previous soil surveys.

2.22.2 Soil Identification

The "Soil Study" report prepared by Valley Engineering is included as Appendix 2-3 and the "Soil Types Study Map" is included as Plate 2-1. An additional soils study, prepared by the U.S. Forest Service, is included under Appendix 2-3A. The data collected for the approved culvert expansion project are contained in Appendix 2-3B. An additional soil study was prepared by James Nyenhuis for the south portal expansion (see Appendix 2-6). A map is included with this report.

2.22.3 Soil Description

Soil descriptions are found in the "Soil Study" report prepared by Valley Engineering included as Appendix 2-3 and on the "Soils Types Study Map" included as Plate 2-1. Refer to Plate 2-6 for the regional soil classification, including the soils within the South Crandall lease area.

Also, additional soil survey information can be found in Addendum to Appendix 3-2, Synopsis of Riparian Baseline Inventory of Crandall Creek and Review of Baseline Riparian Inventory of Crandall Creek Proposed Crandall Mine Expansion for a more thorough discussion on hydric soils.
Revised 4/05/2003

CHAPTER 3

LIST OF APPENDICES (continued)

APPENDIX NUMBER	DESCRIPTION
APPENDIX 3-13	Wetland Delineation Crandall Creek Mine Expansion Area
APPENDIX 3-14	Woody Plant Species Density Measurements of the Proposed Disturbed Riparian Areas of Crandall Creek
APPENDIX 3-15	Productivity Estimate (NRCS) - Expansion Area
APPENDIX 3-16	DWR Raptor Survey (2003)
~~APPENDIX 3-17~~	(Removed)
APPENDIX 3-18	Water Depletion

Note: Bold number plates and appendices are included with this submittal.

CHAPTER 3

BIOLOGY

3.10 Introduction

This chapter presents a description of the biological resources found within the life of mine permit area. The sections addressed in this chapter are:

- o the vegetative, fish and wildlife resources;
- o the potential impacts to vegetative, fish and wildlife resulting from the proposed operations,
- o the mitigation plans and measures to minimize the impacts;
- o and the reclamation plan to restore the vegetative, fish and wildlife resources to a condition suitable to the postmining land use.

3.11 Vegetation, Fish and Wildlife Resources

Vegetation, fish and wildlife resources of the permit area and adjacent area are described under 3.20.

The proposed Incidental Boundary Change will not create any surface disturbance or affect any vegetation resources. Regional vegetation information for the Incidental Boundary Change area can be found on Plate 3-2. Regional wildlife information for the IBC are is shown on Plate 3-1. Mining within the South Crandall lease will not create any surface disturbance or affect any vegetation or wildlife resources. Regional wildlife information for the South Crandall lease area is shown on Plate 3-1. Regional vegetation information for the South Crandall lease area is shown on Plate 3-2.

3.12 Potential Impacts to Vegetation, Fish, and Wildlife Resources

Potential impacts and methods to minimize these impacts are described under 3.30.

3.13 Restoration and Enhancement

Reclamation procedure to restore and or enhance resources are addressed under 3.40.

3.22.21 Listed or Proposed Endangered or Threatened Species of Plants and Animals, and Critical Habitat

FEDERALLY LISTED AND PROPOSED ENDANGERED (E) AND THREATENED (T) SPECIES AND THEIR HABITAT IN EMERY COUNTY

In a 2004 listing the following T and E Species were identified for Emery County. They are:

Bonytail	*Gila elegans*	E
Colorado Pikeminnow	*Ptychocheilus lucius*	E
Humpback Chub	*Gila cypha*	E
Razorback Sucker	*Xyrauchen texanus*	E
Bald Eagle	*Haliaeetus leucocephalus*	T
Mexican Spotted Owl	*Strix occidentalis lucida*	T
Western Yellow-billed Cuckoo	*Coccyzus americanus occidentalis*	C
Black-footer Ferret	*Mustela nigripes*	E
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	E

Listed threatened and endangered species potentially present in the permit area are the ~~American Peregrine Falcon (Falco peregrinus anatum) (E), which nests in Utah~~; and the Bald Eagle (Haliaeetus leucocephalus) (E). (Source: U.S. Fish and Wildlife Service, July, 1994)

None of the species are likely to occur within the mine permit area, (including the South Crandall lease area) because habitats for these species in the permit area are marginal. Areas of potential occurrence include riparian forests along Huntington Canyon for the Bald Eagle, ~~and cliff areas in the region for the American Peregrine Falcon.~~ (Note letters from UDWR and USF&W Service Appendix 3-3).

A revised (2004) list of wildlife and vegetation T & E species within Emery County is provided in the second addendum to Appendix 3-3.

Migratory Birds of High Federal Interest

This group of especially significant species is comprised of 22 bird species identified by FWS as occurring in the Uintah-Southwestern Utah Coal Production Region. Of the 22 species 7 species have the potential of migrating within the region where the mine is permitted.

1. Bald Eagle
2. Golden Eagle
3. Ferruginous Hawk
4. Cooper's Hawk
5. Prairie Falcon
6. Western Bluebird
7. Flammulated Owl
8. Black Swifts
9. Williamson's Sapsuckers

3.33.100 Compliance with R645-301-358

The GENWAL will comply with the requirements of R645-301-358 using BTCA to protect fish, wildlife and related environmental values.

3.33.200 Designated Species

GENWAL agrees to (at a minimum) protect and enhance species and habitats identified under R645-301-322.

3.33.300 Project Impact of Mining on Fish and Wildlife

Operation will unavoidably impact small vertebrate species, temporarily eliminate approximately 1,500 feet of fisheries habitat, and increase hunting pressure on big game species. Impact to the fishery in Crandall Creek which is adjacent to the permit area will be kept to a minimum. Approximately 1,500 feet of fisheries habitat will be temporarily lost when the stream is culverted. This area of the stream will be reclaimed and the habitat re-established during reclamation of the site.

GENWAL will protect wildlife habitat on the permit area by careful design and construction of mining facilities and transportation corridors, and by keeping surface disturbance to a minimum. GENWAL has committed to report to the regulatory authority the presence of any threatened or endangered species in the area.

The substation and transformer located within the permit area supplies all the power for the mine site. The power lines from the substation are in underground conduit, providing no threat to raptors.

Water depletion by mining consists of water evaporation caused by the ventilation current and water used in the mining process and removed within the coal shipments. Water evaporation by the ventilation current varies with the volume of air and is estimated to be less than 5 acre feet per year at the maximum air flow of the mines. The amount of water depleted by the mining process varies with the tonnage of coal produced per year. At the maximum annual production the amount of water depleted is estimated to be 40 acre feet. Refer to calculations in Appendix 3-18.

Mitigating Measures to be Employed to Protect Fish and Wildlife

Impacts on the lower 2 km of the canyon will remove approximately 0.5 acre of moose habitat, winter habitat in particular. This represents only a minute portion of the moose winter habitat which encompasses all of the Huntington drainage. Of the 0.5 acre winter range to be disturbed, the riparian habitat portion is of critical value, with only approximately 3000 square feet

APPENDIX 3-18

WATER DEPLETION

WATER DEPLETION

1. Mining Process Water

   Water lost due to use in mining process - measured as percentage moisture of coal hauled to customer as increased from natural coal moisture.

2. Ventilation Evaporation

   Water lost due to ventilation currents drying out mine water.

   Estimated at 2.5 gallons per million cfm annually.

   Estimated maximum 1,000,000 million cfm at 2.5 gallons = 40 acre feet.

3. Sediment Pond Evaporation

   Water lost to evaporation in sediment pond.

   Estimated to be one acre foot per year.

4. Subsidence Effect on Springs

   Estimated at zero because of no known effects of spring disruption.

5. Direct Use

   Pumped from creek for crusher building use - goes into sediment pond.

   Estimated at 2 acre feet per year in use but is not actually lost. Assume no loss.

6. Alluvial Loss

   None

7. Deep Aquifer Pumpage

   None

8. Mine Discharge

   Genwal has discharged approximately 800 acre feet per year for the past 6 years. This is all old water and would not have made a significant reduction to the flow into the watershed.

CHAPTER 4

LIST OF PLATES

PLATE NUMBER	DESCRIPTION
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LIST OF APPENDICES

APPENDIX NUMBER	DESCRIPTION
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APPENDIX 4-1A	Archeological Study- East Mountain Locality
APPENDIX 4-2	Cultural Resource, Determination of Effect
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APPENDIX 4-7	Approval Order, Air Quality
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APPENDIX 4-9	Letter from SHPO (South Crandall Lease Area)

Note: Bold number plates and appendices are included with this submittal.

CHAPTER 4

LAND USE

4.10 Regional Land Use

The majority of the land use in the Wasatch Plateau is administered by the United States Forest Service and is managed as a multiple use forest area.

4.10.1 Land Use In Mine Plan Area

Prior to 1939, the permit area was used for non-developed recreation, grazing by native big game species and habitat for small game and non-game animals. From 1939 until 1955, the area was mined by traditional room and pillar methods. Approximately 35,000 tons were removed from the Hiawatha Seam. When mining operations were terminated in 1955, the land reverted to its original uses. In 1983, mining activities were resumed. At present, cattle are moved through the canyon to grazing areas at higher elevations. Riparian areas are grazed during the movement through the canyon. A land use map has been prepared and is included as Plate 4-2.

Mining in the South Crandall lease area will not affect the present land use of the area. The area is classified as rangeland. The existing landuse will continue during, as well as following, mining in this area. Refer to Plate 4-2.

After mining operations cease, the mine site surface area will be restored to its approximate original contours. The access road will be left in place, pursuant to the wishes of the U.S. Forest Service (USFS) the surface landowner.

4.11 Premining

The premining use of the land was for dispersed non-developed recreation, native wildlife habitats and dispersed cattle grazing. The wildlife habitats within the mine area are described in Appendix 3.2 and 3.3.

The area was used for a previous mining operation. The previous operation prepared level areas to allow access to the coal seam and for coal loading operations. This made the area more accessible to the general public and to the present mining operation.

The previous operation left lumber, deteriorating buildings, fuel and oil cans, and various other trash in the area. A portion of the existing vegetation was also disturbed with no evidence of revegetation.

4.11.113 Surface Managing Authorities

The United States Department of Agriculture, Forest Service, Intermountain Region is the surface managing authority.

4.11.114 Utility Corridors and Other Right-Of-Ways

No utility corridors or other rights-of-way exist on the surface within the existing permit area. A utility corridor exists within the permit area in the South Crandall lease area. See Plate 4-2. There are no surface or subsurface mad-made features within or passing over the permit or Incidental Boundary Change areas.

There has been no change in the premining use of the land within the last five years.

4.11.115 Affect Of Operation On Land Use

GENWAL feels that greater portion of permit area will not be affected by mining operations and that premining land use will be applicable except for the disturbed area surrounding the portals and the access road.

The maximum area of possible subsidence is shown on Plate 5-2 as the area contained within the zero subsidence contours. As explained in Chapters 5 and 7 no adverse effects are expected to occur as a result of the subsidence mechanisms and no mitigation measures are proposed. In the event subsidence damages or alters streams, roads, etc. GENWAL will repair or replace such structures in conjunction with prudent and reasonable environmental designs and in compliance and agreement with USFS lease stipulations.

4.11.12 Land Capability

In the Manti-La Sal National Forest Land and Resource Management Plan (LRMP), 1986, the Forest Service has developed certain management objectives for the area. The permit area includes four separate management units.

The bottom of Crandall Canyon is included in the MMA (Leasable Minerals Area) Management Unit where management emphasis is on leasable minerals development. This unit includes the surface facilities for the mine.

The eastern portion of the permit area lies within the GWR (General Big Game Winter Range) Management Unit where management emphasis is on providing general big game winter range.

The north and west areas of the permit area lies within the RNG (Range Forage Production) Management Unit. Management emphasis is on production of forage and cover for domestic livestock and wildlife. The Incidental Boundary Change area lies within the RNG use classification. Surface land uses and resources will not be affected by underground mining operations. The South Crandall lease area lies within the RNG and MWS use classifications (see Plate 4-2).

The riparian area along Crandall Creek is included in the RPN (Riparian) Management Unit. RPN areas include the aquatic (including fish) ecosystem, the riparian (characterized by distinct vegetation), and adjacent ecosystems that remain within approximately 100 feet measured horizontally from the edge of all perennial streams and springs, and the shores of lakes and other still water bodies, i.e., from seeps, bogs, and wet meadows. Emphasis is on preservation of the riparian areas and component ecosystem.

The historic use of the land has been for recreation, forestry, wildlife habitat, and mining as indicated by previous zoning, historic documentation and visual examination.

4.11.13 Land Use/Zoning

Emery County had previously zoned this area as a recreation forestry and mining area. However, as of November 12, 1979, this area has been rezoned to CE-1 which is a critical environment zone. A county zoning of CE-1 does not prohibit mining. Therefore, the area did not have to be rezoned.

4.11.14 Cultural and Historic Resource Information

A Cultural, Historic and Archeological inventory conducted on June 19 and 20, 1980 on all areas to be disturbed in the proposed permit area. No recorded or unrecorded archeological sites were found in the project area. A copy of the report on the archeological inventory is included as a supplement to this chapter as Appendix 4-1.

All of the areas potentially affected by surface disturbing activities in Genwal's Crandall Canyon Mine Plan were investigated for cultural resources. No prehistoric remains were located in the mine plan area. A single site, however, near a haul road from the mine was recorded in 1975, by the Forest Service. This site (42EM722), a rock shelter, is some 50 meters in length and contains at least one meter of cultural deposits. Remains include stone tools, pottery, lithic debris, abundant charcoal, bone and pictographs on the cliff face above. Extensive vandalism has taken place; however, undisturbed areas in the shelter still remain. The site is eligible for inclusion to the National Register of Historic Places. Therefore, it needs to be protected. The major threats to the site appear to be a direct impact from possible road improvement and present ensuing impacts caused by increased vandalism brought about by the improvement of the road. The site was fenced to be a solution to the vandalism problem.

The archeological site at the mouth of Crandall Creek is not threatened by road improvements and the area is fenced as stated in the plan. The initial road development has progressed along Crandall Canyon past site (42EM722) and Genwal has fenced off the designated site accordingly. A detailed report on the Sherman Shelter was completed by the USFS and is included within this chapter as Appendix 4-4. An additional archaeological survey was conducted for LBA #9 in 1992. Data associated with this report are contained in Appendix 4-1A. Additional survey information for the surface facility expansion area is also contained in Attachment 3 in the Addendum to Appendix 3-2.

Since there will be nor surface disturbance within the South Crandall lease area, no impact to cultural or historic resources will occur.

4.11.141 Cultural and Historic Resource Maps

Cultural and Historic Resource maps are included in Appendix 4-5 and 4-6.

4.11.141.1 Boundaries of Listed Historic Resources

There are no public parks in the permit area. The only site of historical significance is a archeological site listed as "The Sherman Shelter 42EM722".

4.11.141.2 Location of Cemeteries

No cemeteries exist within the permit or IBC area or within any adjacent area subject to potential impacts.

4.11.141.3 National Trails/Scenic Rivers

No trails or the wild and scenic rivers or study area rivers exist within the permit area or areas of potential impact.

4.11.142 State Historic Preservation Officer

The State Historic Preservation Office in a letter dated August 8, 1980, (see Appendix 4-2) granted cultural resource clearance for the GENWAL Crandall Canyon Mine. Conditional clearance from OSM was provided by a letter dated April 17, 1981 (see Appendix 4-3). GENWAL has followed the recommendations contained in Appendix 4-1, the Archeological Reconnaissance Report, and fenced site 42EM722. With the acquisition of lease UTU-68082, an additional Paleo-Arch inventory was conducted in 1992. That report is attached as Appendix 4-1A. A subsidence monitoring plan is included as part of Chapter 5. According to the SHPO there are no significant cultural resources within the South Crandall lease area. (See Appendix 4-9)

GENWAL Resources acquired the SITLA/PacifiCorp sublease in February 2004 (Refer to Appendix 1-14 for right-of-entry information.) This sublease is described as follows:

T. 16 S., R. 7 E.	Section 8	NW¼NW¼	40.00 acres

It should be noted that throughout this Mining and Reclamation Plan the combined area (920 acres) of Federal Lease UTU-78953 and the SITLA/PacifiCorp sublease is collectively referred to as the South Crandall lease area, the South Crandall tract, the South Crandall mining area and other similar terms.

5.21.14 Mine Maps and Permit Area Maps

Plate 1-1 shows leases of the existing permit area (including the South Crandall lease area) and defines the Incidental Boundary Change area. Plate 5-2 shows the boundaries of all areas affected by mining operations, including the proposed underground workings within the IBC area. Plate 5-3 shows the disturbed surface area within the permit area including the culvert expansion. The location and extent of potential subsidence is shown on Plate 6-2.

5.21.15 Land Surface Configuration Maps

Topographic maps used by GENWAL to depict surface contours within the permit area are represented on Plate 5-3.

5.21.16 Maps and Cross-Sections of the Features and Proposed Features

Maps produced by GENWAL show the facilities, disturbed area, disturbed area boundary, (Plate 5-3), explosive storage (there is no explosive storage on the surface), and point source discharges (Plate 7-5). These maps are located within this application.

5.21.17 Transportation Facilities Maps

This application describes each road and conveyor system to be constructed and used by the applicant as required by R645-301-527. Maps supporting this section include Plates 5-3, 5-6, 5-10, 5-19, 7-5, 7-5A, 7-5B and 7-5C.

5.21.18 Support Facilities

Drawings showing support facilities are located on Plates 5-3, 5-6, 5-7, 5-8, 5-18, 7-5, 7-5A, 7-5B, and 7-5C.

5.21.20 Signs and Markers

Signs and Markers are posted, maintained, and removed by the operator; will be of uniform design that can be easily seen and read, be made of durable material, and conform to local laws and regulations, and be maintained during all activities to which they pertain. Identification signs will be placed, maintained, and marked in accordance with R645-301-243.

5.21.24 Mine and Permit Identification Signs

Mine and permit identification signs will be displayed in accordance with R645-301-521.240 through R645-301-521.244.

5.21.25 Perimeter Markers

The perimeter of all areas affected by surface operations or facilities are or will be clearly marked.

5.21.26 Buffer Zone Markers

Signs which have been or will be erected for buffer Zones as required by R645-301-731.600 will be clearly marked.

5.21.27 Topsoil Markers

Markers have been and will be erected to mark where topsoil or other vegetation-supporting material is stockpiled as required under R645-301-234.

5.22 Coal Recovery

The Bureau of Land Management (BLM) and the Utah State Division of Natural Resources govern the conservation and royalty payments of the coal located within GENWAL's proposed permit boundary. Mining plans must be approved by the BLM before mining can occur within the new area. A Resource Recovery Protection Plan (R2P2) is currently on file with the BLM and all federal coal will be mined in accordance with the R2P2 to ensure the diligent development and extraction of all minable coal. (See Appendix 5-24)

The lower Blackhawk Formation of the Wasatch Plateau is known to contain two minable seams in this general area. These two seams are locally referred to as the Hiawatha and Blind Canyon (lower and upper coal respectively) seams. Drilling which began in March of 1985, and has since concluded, revealed that the upper seam is not of minable thickness in previous Lease Area. In the South Crandall lease area both seams are minable.

In the State lease (M-21568) GENWAL has committed to drilling 150 foot "up-holes" every half-mile in the mains prior to second mining. Installation of the 150 foot up-holes will allow for location and evaluation of the overlying seams for coal production. Mine development plans for the upper seam will be developed and submitted for approval if the horizontal extent and mining conditions make mining the upper seam economically feasible. The BLM has determined the upper seam is not minable and during 1985, approval was given by both the BLM and the Division to commence pillaring of the lower seam.

GENWAL will mine from rock to rock in areas where coal is less than 8' thick and geologic conditions allow. However, in areas where the top is poorly consolidated (i.e. shale partings are present with laminae of carboniferous materials with slickensides) and the roof is not self-supporting, coal top may be left. In addition, on development only, in areas where the coal is more

5.23.7 Annual Production of Coal

Annual coal production in 1991, 1992, 1993 and 1994 was 877,500, 1,178,089, 1,474,824 and 1,660,900 raw tons, respectively. During 1993-1995 total production tonnage was approximately 1,750,000 raw tons annually. This production was achieved by the use of continuous mining machines, continuous haulage equipment, and/or diesel driven coal haulers. From 1995 to the end of the century total production coal tonnage is forecasted to be 2,500,000 tons, with the aid of longwall mining.

5.23.8 Access To Future Reserves

Access to future reserves will be maintained by the North Mains entries, Main West entries, 1st North, and 1st Right sections. North Mains will maintain access to the mine as well as Main West. Main West will also maintain access to the west and to the South. 1st North will maintain access to the north and east, while 1st Right will maintain access to the north and west. (See Plate 5-2 and page 5-15A). Access to federal coal south and east of the Dellanback fee parcel (i.e., the South Crandall LBA) will be maintained.

5.23.9 Projected Mining by Future Permit for the Planned Life of the Mine

All coal around the permit area has the potential for future mining by the Crandall Canyon Mine. The projected mining for the Incidental Boundary Change area, the Dellanback fee parcel, and the South Crandall lease area is shown on Plate 5-2.

Operating Schedule and Employment

The mine employees approximately 125 people at present. The mine will operate four eight hour production shifts per day, five days a week. Two maintenance crews will operate 8 hours a day, five days a week, to accommodate rockdusting and general cleanup of the mine. When market or mining conditions dictate, production can be expanded to seven days per week, 52 weeks per year.

5.23.10 Safety Training

The mine is equipped with modern emergency facilities and has an organized safety program. All mine employees are required to meet MSHA first aid and safety training requirements. Visitors are required basic training before entering the mine.

Revised 4/05/2003

case scenario. The subsidence values were reduced according to Figure 5-5 for areas that border a barrier pillar along the perimeter of the lease shown on Plate 5-2.

Horizontal movement which would create slope failure along the escarpment is not expected to occur due to subsidence because only limited coal outcrop occurs within the lease (the east side of the lease area). Within that area of old works no pillar extraction is anticipated.

As with areas in the western part of lease SL-062648 and at the Co-Op's Trail Canyon and Bear Canyon Mines and the Beaver Creek #4 mine, no escarpment failure has occurred. Horizontal movement creating tension or compression cracks can not be projected due to the overburden thickness and lack of jointing density and attitude data along the surface rock exposures.

In addition, GENWAL will mine no closer than 200 feet to any outcrop (with the exception of portals) and, in accordance with Forest Service Stipulation #20, no mining will be done within a zone that might impact the Joes Valley Fault. This area is determined by a 22 degree angle-of-draw (from vertical) eastward from the surface expression of the Joes Valley Fault was used to project the outer limits of subsidence. Thus, subsidence will not intercept the Joes Valley Fault. If subsidence does occur along the western perimeter, all effects of the subsidence will be maintained within the mining permit boundary. No perennial streams will be affected. On the Dellenbach fee tract mining will not extend closer than 200 feet from the outcrop (other than portals) and no closer than 50 feet from the property boundaries. It should be noted that the mine projections and timing for the Dellenbach tract, and the South Crandall lease area are shown on Plate 5-2. ~~, will change if Genwal acquires the South Crandall Federal Lease.~~

It is accepted practice in this area to use two sources of information for subsidence evaluation. The sources are: 1) "Some Engineering Geologic Factors Controlling Coal Mine Subsidence in Utah and Colorado", Geologic Survey Professional Paper 969, by C. Richard Dunrud, 1976, and 2) "SME Mining Engineering Handbook", Volume 1, by Arthur B. Cummins and Ivan A. Given, 1973. The conclusions based upon the above source material are tempered by on site evaluation and actual experience based on similar mining conditions in late Cretaceous overburdens with similar thicknesses and strengths. The surface area topography within the lease is shown on Plate 3-1, 3-1a, 1-1 and others. The topographic map shows the relative steep sloping sides of the canyons which contains Crandall Canyon Creek, Blind Canyon Creek, and Horse Canyon Creek where rock outcrops are abundant. However, there are few, if any, talus slopes.

5.25.10 Subsidence Control Plan

The Subsidence Control Plan contained herein addresses specifically those items that are required by R645-301-525 Pertaining to Subsidence. This plan is an amendment to the original application filed on December 17, 1980, by GENWAL the SUBSIDENCE CONTROL PLAN FOR GENWAL COAL COMPANY, INC., as prepared by David A. Skidmore and L. G. Manwaring of Revised 4/05/2003

Coal Systems Inc., on August 28, 1981; and the Mid-term permit revisions dated 5-30-86. The format of the currently approved COAL SYSTEMS report will be used with the conclusions based upon the results of the drilling of the Blind Canyon seam which was obtained in April, 1985, and the Hiawatha seam data obtained to date during mine development. The original application was submitted pursuant to the following: Title 40, Chapter 10, Utah Code Annotated, 1943, as amended, the "Cooperative Agreement between the United States Department of Interior and the State of Utah"; the Surface Mining Control and Reclamation Act (P. L. 95-87); and all regulations promulgated under those Acts affecting mining operation conducted in the State of Utah.

It should be noted that, according to the stipulations of federal lease UTU-78953, there will be no second mining or subsidence under Little Bear Creek within the South Crandall lease area.

Overburden thicknesses in the upper perennial reaches of Crandall Canyon have been determine to be about 540 feet. Using a pillar size of 70 x 65 and the worst case analytical condition, the factor of safety has been calculated to be 2.2. The coal outcrops within Blind and Horse (both the north and south forks of Horse Canyon) Canyons are above the perennial portions of the stream. Thus, no subsidence will occur under perennial sections of Horse Canyon (the Blind Canyon drainage is ephemeral).

All state appropriated water within the subsidence zone of the South Crandall lease area is shown on Plates 7-14 and 7-15. Plates 5-2(H) and 5-2(BC) show the mine plan for the South Crandall lease area and depicts which areas will be longwalled (full extraction) and which areas will be developed as first-mining only.

5.25.14 Subsidence Monitoring

The applicant commits to implement the proposed subsidence control plan and applicant hereby incorporates the same into this submittal. An aerial monitoring system for the Crandall Canyon Mine which has been accepted for implementation and vertical and horizontal control have been established using ground control stations, shown on Plate 5-5. (The program is included as Appendix 5-8). Baseline flight lines were flown over Sections 31 and 32 of T15S R9E, Sections 5 and 6 T16S R7E, Sections 1 and 2 T16S R6E, and Sections 35 and 36 T15S R6E in October of 1989. Selected portions and/or all of Sections 34, 35, and 36 T15S R6E and Sections 2 and 3 T16S R6E (Plate 5-5) will be included in the 1995 Fall Survey to ensure that all projected mined areas within LBA#9 are included in the subsidence monitoring program. Control points within and adjacent to the leased area (including the South Crandall lease area) have been established and located by surveying practices. Prior to mining the area was photographed and a pin map was generated.

Aerial surveys will be conducted by GENWAL each year for the areas above and within the 20 degree angle of draw of the actual mined area. Based on a written request by the Forest Service, GENWAL is revising the subsidence monitoring plan. Monitoring will now be conducted annually until subsidence of less than one foot has been measured for three consecutive surveys showing that subsidence is substantially complete.

The following information will be forwarded to the Division on an annual basis when it becomes available:

1. A current map of the underground workings with areas delineated as to where the second mining will begin.

2. The approximate dates when second mining will commence and terminate.

3. The date of monitoring.

4. The vertical and horizontal positions of all monitoring points and pins, directly over and within the 20 degree angle of draw to the mined area, surveyed by aerial photography for that specific year.

There was and has been no evidence of escarpment subsidence or failure. There are no further plans to monitor escarpments in the area not visible from Huntington or Crandall Canyons. The subsidence/escarpment survey results were recorded and submitted to the appropriate regulatory authority. No escarpment failure occurred.

5.25.15 Anticipated Effects of Planned Subsidence

If subsidence does occur, surface effects may include minimal ground lowering and temporary tensional fractures at the margins of the subsided area. Any subsidence occurring on the 160 acre Dellenbach fee tract should have minimal effects on the surface. There are no escarpments, raptor nests, archeology site, streams or springs located the Dellenbach tract. This tract (surface and underground) is privately owned by Genwal Resources Inc. The tract is within the presently approved permit area and is included in the current subsidence monitoring plan.

Subsidence monitoring for the South Crandall lease area will be done according to the existing plan approved for the Crandall Canyon mine. Pre-subsidence base-line aerial surveys have been completed and the initial survey control monuments have been installed on the ground. Additional control points (monuments) will be installed as mining progresses. (Refer to Plates 5-2 for the location of the existing and future monuments.)

In much of the area of the South Crandall lease area, both the Hiawatha and the Blind Canyon seams are proposed for full extraction longwall mining. In these areas the combined thickness of both seams ranges upward to about 12 feet. If surface subsidence in these areas is 80% of total mined seam thickness, then it may be possible to see nearly 10 feet of subsidence in some areas of the lease after mining. It should be noted that the Forest Service and BLM have imposed a special stipulation in the South Crandall federal lease specifically to provide additional protection to the Little Bear spring system. These lease stipulations prohibit full-extraction mining in the following areas;

a) area under the Little Bear stream channel with less than 600' of overburden.
b) area within 1000' of the southeast corner of the lease (to protect the Mill Fork graben.)
c) area within 1000' of southern boundary of lease (to protect possible water-bearing fracture system.)

GENWAL personnel will conduct a surface inspection of all areas where subsidence has occurred no sooner than 6 months but no later than 12 months after extraction mining has occurred.

5.25.16 Mitigation of Damages

As previously presented within this chapter, no material damage or diminution of value or foreseeable use of lands is expected to occur. GENWAL has been in consultation with the BLM and received their concurrence with the conclusions presented in this document, a copy of the BLM correspondence may be found in Appendix 5-5. Displacement of wildlife due to subsidence may Revised 1/13/2004

be minimal. However, springs within the potential subsidence limit are a significant resource to the local wildlife and may be impacted.

Seeps and springs within the possible subsidence limit emit water from the North Horn Formation, Price River Formation, Blackhawk Formation, and the Castlegate Sandstone. A limited number of seeps and springs are found to issue from the Blackhawk Formation and Castlegate Sandstone units within the area of possible subsidence limits. These seeps and springs show only limited use by deer and elk. Subsidence from mining in these areas will have minimal impacts on water supplies from seeps and springs in the vicinity of the mine. Water monitoring and the Probable Hydrologic Consequences are discussed in detail in Chapter 7 of this permit.

Seeps and springs within the possible subsidence limit of mining emit water from the North Horn and Price River Formations 100 to 2100 feet (10 to 210 times the coal bed thickness) above the interval to be mined. If repeated subsidence via roof failure occurs, elastic deflation is believed to occur at a distance of nine coal seam thicknesses (90 feet) above the coal. If any tension cracks do develop, they should be sealed by clay migration occurring during elastic deformation. As a result, these seeps and springs should not be affected by subsidence. However, monitoring will be conducted as described in Chapter 7.

GENWAL recognizes the fact that the Division of Wildlife Resources, the Division of Oil, Gas, and Mining and the USFS consider all seeps and springs to be important to wildlife. If, during the monitoring of the springs, non-climatic diminutions of flow from any seep or spring in the area are substantiated, GENWAL will notify the Division of Wildlife Resources, the Division of Oil, Gas, and Mining, the State Engineer and the U. S. Forest Service. If documentation concludes that mining efforts at the Crandall Canyon Mine have reduced or eliminated the flow from the seeps and springs, then acceptable remedial action plans will be submitted for approval and subsequently installed.

In the event subsidence negatively impacts grazing, the applicant will compensate the owner or appropriate the party by paying the fair market value for the loss experienced. Compensation will be made after the grazing loss is proven to have resulted from surface subsidence related to the operation of the Crandall Canyon Mine.

Should any structures such as roads, bridges, etc., be adversely impacted as a direct result of subsidence directly related to the operation of the Crandall Canyon Mine, the operator will repair or replace the structure, whichever is more economical.

Mitigation for potential disruption to the Little Bear Spring will be accomplished through the construction of a water treatment plant which will provide replacement water for the spring if mining activity in the South Crandall lease area affects the quality or quantity of the spring. Construction of this water treatment plant will be done under the provisions of a water replacement agreement between GENWAL Resources, Inc. and the Castle Valley Special Service District who maintain culinary water rights to Little Bear Springs. A copy of this water replacement agreement is included in Appendix 7-51.

It should be noted that neither the Little Bear spring, nor its recharge fault system, is located within the subsidence zone of the proposed South Crandall mine, nor are they even located within the South Crandall lease area.

Subsidence projections for the South Crandall lease area are depicted on Plates 5-2(H) and 5-2 (BC).

Added 1/13/2004

Chapter 6
(R645-301-600)

GEOLOGY

6.10 Introduction

This Chapter presents discussion of geologic conditions within and adjacent to the Genwal Mine Permit Area, which consists of Lease Areas SL062648 and U054762, State Lease ML-21569, State Lease ML-21568, Federal Lease UTU-68082, Federal Lease UTU-78953 and the SITLA/PacifiCorp sublease . Conclusions herein are based on field reconnaissance, exploratory drilling and previous documentation. Report references are shown at the end of this chapter.

6.11 General Requirements

The geology within and adjacent to the permit area is discussed in Sections 6.21 through 6.27 of this chapter. Plans for casing and sealing of exploration holes and for subsidence monitoring are discussed in Sections 6.30 through 6.32.

6.12 Certification

All required maps, plans and cross-sections presented in this chapter have been certified by a registered professional engineer.

6.20 Environmental Description

This section presents a description of the geologic resources in, and adjacent to the permit area.

6.21 General Requirements

Regional Geology

The Wasatch Plateau consists of Tertiary and Cretaceous strata, mostly limestone, sandstone, and shale that differ in resistance to erosion (Davis and Doelling, 1977). Limestones and sandstones generally form cliffs, whereas the shales form recessive slopes.

Stratigraphic units present in the vicinity of the Crandall Canyon area include from youngest to oldest (1) the North Horn Formation (slope-forming mudstone and sandstone). (2) the Price River Formation which consists of the basal Castlegate Sandstone Member (cliff-forming sandstones, conglomerates and minor amounts of shale, of deltaic origin) and the Upper Price River Member (steep slope-forming sandstone with minor interbeds of pebble conglomerate and shale, of fluvial origin). (3) the Blackhawk Formation (cliff-forming sandstone underlain by slope-forming mudstone, shale and coal, of paludal origin). (4) the Star Point Sandstone (cliff-forming sandstones consisting of deltaic and beach deposits), and (5) the Masuk Shale Member of the Mancos Shale

(slope-forming marine shales), refer to Appendix 6-3 and 6-4 and Plate 6-1. The Star Point Sandstone contains several shale tongues of the underlying Masuk Shale in the Wasatch Plateau region.

The stratigraphic record produced by these units indicates that deposition up through the Blackhawk Formation consisted mostly of fine-grained detritus under conditions of relatively quiet and uniform sedimentation (Davis and Doelling, 1977). An erosional disconformity exists at the top of the Blackhawk Formation, which is overlain by coarse clastics of the Castlegate Sandstone. These coarse continental sediments suggest tectonic movement to the west and probably mark the onset of the Laramide orogeny (Davis and Doelling, 1977).

The Wasatch Plateau lies in a transition zone between the relatively stable Colorado Plateau to the east and the relatively complex and unstable Basin and Range province to the west (Davis and Doelling, 1977). Strata of the western Wasatch Plateau dip into a complexly faulted monocline, whereas strata on the east side have predominantly gentle dips and faults are less numerous (Davis and Doelling, 1977).

Major faults present within the region of the coal fields are north-trending with maximum displacements of up to 2,300 feet (Davis and Doelling, 1977). Many north-trending faults with minor displacements are present and few east-trending faults, most of which have displacements of less than 100 feet, are also present locally.

Most of the strata in the coal field form broad anticlines and synclines that trend northeast or are roughly perpendicular to the principal fault zones (Davis and Doelling, 1977).

Geology of Project Vicinity

The drainage basins of Crandall Blind and Horse Canyons cover approximately 5.7, 2.0 and 7.0 square miles respectively and expose six geologic units which range in age from Cretaceous to Tertiary. Surface lands within the permit area consist entirely of outcrop exposures of sandstones, mudstones and coal of the Castlegate Sandstone, Blackhawk Formation, Star Point Sandstone, Price River Formation, and North Horn Formation and are shown on Plate 6-1.

The Hiawatha and Blind Canyon coal seams, which will be of importance in the permit area are present at or near the base of the Blackhawk Formation (Campanian in age). Several other thin lenticular coal seams are present at the property, but none are of significant thickness or of probable lateral extent to be of economic interest. In much of the permit area, only the Hiawatha seam is of sufficient thickness to be economically recoverable. However, in the South Crandall lease area both seams are mineable.

The Hiawatha coal seam has been mined and is exposed at an approximate elevation of 7,900 feet amsl (Appendix 6-1). Mining overburden above the Hiawatha coal seam in the permit area consists of the Blackhawk Formation, Castlegate Sandstone, and the Upper Price River Member and the North Horn Formation. Surface outcrop of these formations rise from approximately 7,900 feet amsl to approximately 10,700 feet amsl in the center of Section 3.5 in Lease #UTU-68082. This

Geologic inspection of the property indicates that prior mining of the Hiawatha Seam did not encounter subsurface water. The maps submitted in Appendices 6-3 and 6-4 and Plate 6-1 are included to show the relative location of the geologic formations to the mine permit area.

6.22 Cross Sections, Maps and Plans

Stratigraphic sections, best available BLM and Genwal data are shown in Appendices 6-1, 6-4 and 6-5. Drill hole results and cross sections are shown in Appendix 6-5. The Geologic map is on Plate 6-1. Coal seam isopachs for the Hiawatha, Blind Canyon and Bear Canyon Seams are shown on Plates (all applicable data) 6-3, 6-4 and 6-5, respectively. Overburden is shown on Plate 6-6. Structure is shown in Appendix 6-3. A structure contour map of the top of the Hiawatha seam is shown on Plate 6-7. Refer to Plates 5-2(H) and 5-2(BC) for information regarding the South Crandall lease area, including coal seam thickness, seam interval, overburden thickness, and drill hole locations.

6.22.1 Test Borings and Coal Sampling

Genwal has included two lithologic, depth correlated sections to show thicknesses of interburden and coal from the Star Point Sandstone to the surface. These geologic sections are provided in Appendix 6-1 and Appendix 6-5. The lithofacies of the Blackhawk Formation in the vicinity of the mine area are shown in stratigraphic section within Appendix 6-1 and Appendix 6-5. Two additional holes have been drilled, MW-3 and MW-4 in State Section ML-21569. MW-4 was drilled and cored and is a water monitoring source (Appendix 6-5). MW-3 was drilled down but not cored. These sections should provide sufficient technical information to determine the nature, depth and thickness of the coal seams, rider seams, overburden and interburden strata for the permit area. The thickness and extent of all formations in the area adjacent to the mine area are shown on Plates 6-1 through 6-6, with related discussion in Section 6.21. Borehole locations are shown on Plate 5-2. The known locations of proposed in-mine up-drilled borings and surface bore holes are shown on Plate 5-2.

The drilling results obtained during 1985 indicate the presence of the Blind Canyon seam although it is of unminable thickness (Appendices 6-1 and 6-5). The upper seam will be called the Blind Canyon Seam at the request of DOGM to simplify discussion. The same seam has been referred to as the "upper Hiawatha Seam" and the "lower Bear Canyon Seam" at various other locations.

Analysis of coal samples collected from the Hiawatha Seam indicate that it is a high volatile bituminous coal with a BTU content ranging from 12,500 to 13,000 BTU, ash content of 6% to 8%, moisture of 3% to 5%, volatile matter from 40% to 44%, fixed carbon from 43% to 46% and sulfur from 0.44% to 0.55%. Forms of Sulfur average 0.016% pyritic sulfur, 0.09% sulfate sulfur, and 0.30% organic sulfur, Appendix 6-2. Locations of samples are at 1st Right Main West, 9th left 1st East, and 1st North 1st Right.

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6.22.2 Coal Seams, Overburden, Stratum Coal Seams

Additional technical information has been submitted to determine the nature, depth and thickness of the coal seams, rider seams, overburden and interburden strata for the permitted mine area based upon drilling completed to date (Appendices 6-1 and 6-5 and Plates 5-2). There is insufficient evidence to support the presence of the Blind Canyon Seam in Crandall Canyon, but it thickens southward to the Mill Fork area, beyond which it again is of little value (Doelling, 1972, p. 189). The old workings can provide information on the lower seam (Hiawatha) and some ground water information but nothing about the other seams. Additional geologic information was submitted by Mr. Wollen, a former operator of the Genwal property, which contained specific lithologic characterizations of the interburden, and the strata immediately above and below the coal seams (Appendices 6-1 and 6-2).

Coal Reserves Coal-seam data for lease area SL 062648 indicates that approximately 840,000 tons of coal are in place, of which 400,000 tons are recoverable. Lease area U 54762 contains approximately 2.5 million tons of coal in place, of which approximately 1.5 million tons are recoverable. Approximately 0.5 million tons will be left in place for final retreat, leaving approximately one million tons minable during advance.

In-place tonnage for State Leases ML-215688 and ML-21569 is estimated at 18,000,000 tons, of which 8,000,000 tons are considered recoverable. The Lease #UTU-68082 has an estimated in-place tonnage of 36,000,000 tons, of which 12,000,000 tons are considered recoverable. In the South Crandall lease area the estimated recoverable reserves are 7.63 million tons

All mining within the Crandall Canyon #1 Mine is within the Hiawatha seam. The Blind Canyon seam is present above the Crandall Canyon #1 Mine but is not thick enough to mine. (Coal seam isopachs for this area are shown on Plates 6-4 and 6-5) in the area of the South Crandall Mine (i.e., within the South Crandall lease area) both the Hiawatha and the Blind Canyon seams reach minable thickness. The approved R2P2 for the South Crandall Mine include extraction from both seams. The coal seam thickness isoapchs for the seams in the South Crandall lease area are shown on Plates 5-2(H) and 5-2(BC).

Drill hole and geological information for the area around the South Crandall lease area is shown on Plates 5-2(H) and 5-2(BC). There is only one drill hole on the South Crandall lease, DH-4. The driller's log for DH-4 is included in Appendix 6-6. The Bear Canyon seam in this hole is only 2' thick.

The information obtained from underground drill holes 1 and 2 show the Blind Canyon to be approximately 59 and 40 inches thick, respectively, which makes this seam unminable and of no economic value. Surface drill holes 3 and 4 indicate the Blind Canyon seam is 54 and 40 inches thick, respectively, in those areas. The Blind Canyon seam is located approximately 40 to 60 feet above the Hiawatha seam. Refer to Plate 5-2 for locations, DH-2 in Federal lease SL-062648 its location is unknown and is not shown on any Plate. There is approximately 60 acres of Blind Canyon coal at a thickness of 5 feet or more, equivalent to approximately 418,000 tons of coal in place. Although this seam remains fairly continuous across the property, it is not mineable.

Geologic literature and practices are discussed throughout this chapter and in the list of references at the end of the chapter.

Geologic Information Pertaining to Little Bear Spring

The Little Bear Spring is located close to the southern boundary of the South Crandall lease area. This spring is an important source of culinary water for many residents of Emery County. In order to ensure that the spring would be protected from the effects of mining in the South Crandall lease area the Forest Service and the BLM required a number of detailed hydrology studies to ascertain the source of the spring. Based on the result of these studies the federal government has concluded that the potential for mining this lease to alter the flow of Little Bear Spring is low and has issued a Finding of No Significant Impact (FONSI) regarding the proposal to conduct mining operations within the lease. The following studies were required by the Forest Service and BLM prior to leasing action and are included in this MRP as appendices in Chapter 7. Each report includes an extensive discussion of the geology of the South Crandall tract as relates to the occurrence of ground-water, aquifers, and recharge sources of the Little Bear Spring.

7-51 Little Bear Spring Water Replacement Agreement

7-52 Supplemental Hydrogeologic Information for LBA 11

7-53 Summary of New Isotopic Information for LBA 11

7-54 Results of In-Mine Slug Tests

7-55 Investigation of Alluvial Ground Water System in Mill Fork Canyon

7-56 Investigation of Potential for Little Bear Spring Recharge

7-57 Determination of Recharge Location of Little Bear Spring (Dye Tracing)

7-58 Summary of Hydro logic Baseline Information, South Crandall Lease

7-59 Little Bear Spring Study (Initial study, 1998) AquaTrack

7-60 Little Bear Spring Study (Expanded Study, 1999) AquaTrack

7-61 Mill Fork Resistivity Study, 2001 AquaTrack

7-62 Little Bear Spring (2nd Expanded Study, 2001) AquaTrack

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7.21 General Requirements

This section presents a description of the hydrologic resources within the Crandall Canyon Mine permit area and the proposed South Crandall Lease area.

7.22 Cross Sections and Maps

Figures 7-1 through 7-12 and Plates 7-1 through 7-17 of this chapter depict existing surface and groundwater occurrences within and adjacent to the Crandall Canyon Mine permit area and the proposed South Crandall Lease area. These figures also illustrate the topography, streams, springs, wells, water monitoring locations, and other hydrologic design information pertinent to the Crandall Canyon Mine and the proposed South Crandall Lease area.

Plates 7-14 and 7-15 have been updated to show the groundwater and surface water rights within and adjacent to the South Crandall lease area. Plates 7-12 (seep and spring) and 7-16 (stream monitoring) have also been updated relative to the South Crandall lease area. Note that Plate 7-13 has been deleted from the MRP.

7.2 Sampling and Analysis

All water samples are collected and analyzed according to methods in either the "Standard Methods for the Examination of Water and Waste Water" or the 40 CFR parts 136 and 434.

7.24 Baseline Information

(It should be noted that the Dellenbach fee tract is included in the currently approved permit area. All current data for hydrologic, geologic, and climatologic information applies to the Dellenbach tract.) Baseline hydro logic information for the proposed South Crandall Lease area is summarized in Appendix 7-58.

7.24.1 Groundwater Information

This section is a comprehensive view of the groundwater hydrology for the Crandall Canyon Mine permit and surrounding area and the proposed South Crandall Lease area.

Scope

This section presents discussions of groundwater conditions within and adjacent to the permit area, which consists of lease areas SL 062648 and U 054762, State leases ML21568 and ML21569, and UTU-68082 and the proposed South Crandall Lease area, and UTU-78953. (Plate 7-12). Conclusions drawn herein are based upon detailed seep and spring surveys of the area, limited exploratory drilling, results of stream monitoring, and the results of groundwater investigations conducted by others in the region of the mine.

Groundwater Development and Mine Dewatering

Water Supply

A few of the seeps or springs inventoried during the spring/seep surveys have been developed for beneficial use. However, this development does not include springs issuing from the Star Point Sandstone. No water wells used for consumption by humans or animals, other than MW-1, are known to exist within the study area of the spring inventory. However, groundwater which reaches the surface water within each watershed does contribute to downstream water users in Huntington Creek who have the water allocated for industry, domestic water supplies, agriculture, and recreation (i.e., cold water fisheries).

Appendix 7-1 contains a listing of groundwater rights (and their associated seeps and springs) in and adjacent to the permit area (within a 1-mile perimeter boundary). This data was obtained from the files of the Utah Division of Water Rights. Locations of these water rights are denoted in Plate 7-14. Appendix 7-1 also shows what groundwater right corresponds to the seeps and springs observed in the field inventories.

Mine Dewatering

An underground water budget (amended August 23, 1994) appears in Appendix 7-21. Based on the water budget, current underground use of water for the mine equipment averages 14.3 gpm throughout the year. Infiltration along the mine floor and sumps totals 10 gpm and evaporation due to mine ventilation equals 50 to 60 gpm. Coal moisture content accounts for 68.5 gpm. The combined approximate total equals 150 gpm. The quantity of mine inflow that is lost to evaporation and infiltration are estimates based on experience at other mines, and the infrequent need to discharge into Crandall Creek. This information is for hydrological analysis only. Water depletion analysis for Fish and Wildlife Service is provided in Chapter 3.

Although worst-case estimates of mine inflow are greater than the present inflow rate, the actual inflow rate to be encountered is unknown. In order to effectively treat mine inflow an additional sump and pump house will be built in the southeastern corner of Lease ML-21569 (Appendix 7-22). This new sump will be equipped with a Worthington pump capable of pumping 150 gpm at 400 psi. This proposed sump will serve as the primary treatment facility for mine inflow, as well as the active water supply for mining operations. The existing sump will be maintained as a secondary water treatment facility. If discharge is required, water to be discharged will be initially treated in the proposed sump in Lease ML-21569, then pumped to the secondary (presently existing) sump, prior to discharge into Crandall Creek.

In the event mine inflow rates exceed the capacity of these treatment facilities to treat the mine inflow to meet the discharge limit criteria outlined in the NPDES Permit (UPDES Permit No. UT0024368, authorizing two discharge points), GENWAL commits to modifying these treatment facilities and/or constructing additional facilities in order to ensure compliance with the UPDES Permit. Treatment facilities to be considered include enlargement and/or construction of additional underground sumps and/or surface settling ponds. If excessive water volumes are encountered the

7.24.6 Survey of Renewable Resource Lands

All renewable resource survey information is included in the Subsidence Control Plan in Section 5.25.

7.24.7 Alluvial Valley Floors

The permit area is located in a narrow V-shaped canyon with upland areas and steep hillslopes. The mine and permit area and the proposed South Crandall Lease area are covered by a thin veneer of colluvial deposits and residual soils. The only alluvial materials are associated with the immediate stream channel which is less than 20 feet wide. These alluvial deposits are discontinuous as many portions of the stream are located directly on bedrock. As a result, the area is not underlain by an alluvial valley floor.

The area occupied by the surface facilities is a steep, narrow canyon hillslope and v-shaped narrow canyon bottom. No agricultural activities have been conducted in the area in the past nor will they be in the future due to the limited width of alluvium along the stream (less than 20 feet), to restrictive climatic conditions, and the limiting physical properties of the alluvial materials. Hence, the Crandall Creek area adjacent to the surface facilities is not an alluvial valley floor. This negative determination was also determined by the U.S. Soil Conservation Service (see Appendix 7-12).

7.25 Baseline Cumulative Impact Area Information

Sufficient information was provided by GENWAL during the initial permitting of the Crandall Canyon Mine for the Division to develop a Cumulative Hydrologic Impact Assessment (CHIA).

Geologic Information pertaining to Little Bear Spring

The Little Bear Spring is located close to the southern boundary of the South Crandall Lease area. This spring is an important source of culinary water for many residents of Emery County. In order to ensure that the spring would be protected from the effects of mining in the South Crandall lease area the Forest Service and the BL< required a number of detailed hydrology studies to ascertain the source of the spring. Based on the result of these studies the federal government has concluded that the potential for mining this lease to alter the flow of Little Bear Spring is low and has issued a Finding of No Significance Impact (FONSI) regarding the proposal to conduct mining operations within the lease. The following studies were required by the Forest Service and BLM prior to leasing action and are included in this MRP as appendices in Chapter 7. Each report includes an extensive discussion of the geology of the South Crandall lease area as relates to the occurrence of ground-water, aquifers, and recharge sources of the Little Bear Spring.

App 7-51 Little Bear Spring Water Replacement Agreement
App 7-52 Supplemental Hydrogeologic information for LBA 11
App 7-53 Summary of New Isotopic Information for LBA11
App 7-54 Results of In-Mine Slug Tests
App 7-55 Investigation of Alluvial Ground Water System in Mill Fork Canyon
App 7-56 Investigation of Potential for Little Bear Spring Recharge

App 7-57 Determination of Recharge Location of Little Bear Spring (Dye Tracing)
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App 7-60 Little Bear Spring Study (Expanded Study, 1999) AquaTrack
App 7-61 Mill Fork Resistivity Study, 2001 AquaTrack
App 7-62 Little Bear Spring (2nd Expanded Study, 2001) AquaTrack

7.26 Modeling

No hydrologic model has been prepared or conducted at this site, nor is any planned.

7.27 Alternative Water Source Information

GENWAL recognizes the fact that the Division of Wildlife Resources, the U.S. Forest Service, the Division of Oil, Gas & Mining, and the State Engineer consider all seeps and springs to be important to wildlife and downstream users. If, during the monitoring of the springs, it is determined that over the course of time a spring has been dewatered, GENWAL will notify the Division of Wildlife Resources, the Division of Oil, Gas and Mining, the U.S. Forest Service, the State Engineer, and any affected downstream users. A determination as to the probable cause of diminished flow will **be** made and if mining activities are found to be the cause, work will begin on an acceptable mitigation plan involving the use of guzzlers or other replacement measures acceptable to GENWAL, DOGM, the U.S. Forest Service, the State Engineer, and affected downstream users. The Utah Division of State Lands and Forestry will also be conferred with in formulating any mitigation plans that will affect the lands in the State Leases.

These replacement measures will be designed in cooperation with the Division of Wildlife Resources, the Division of Oil, Gas and Mining and the U.S. Forest Service and placed in the area of the effected spring. No other sources of water, other than the springs located by the seep and spring survey, are known to exist in the mine plan area. GENWAL owns shares in the Huntington-Cleveland Irrigation Company that can be transferred if required, to meet the demands of an alternate water supply. A copy of the water share certificate which would be used as an alternative water source is included in Appendix 7-14.

Mitigation for potential disruption to the Little Bear Spring will be accomplished through the construction of a water treatment plant which will provide replacement water for the spring if mining activity in the South Crandall lease area affects the quality or quantity of the spring. Construction of this water treatment plant will be done under the provisions of a water replacement agreement between GENWAL Resources, Inc. and the Castle Valley Special Service District who maintain culinary water rights to Little Bear Springs. A copy of this water replacement agreement is included in Appendix 7-51.

7.2 Probable Hydrologic Consequences Determination

The Probable Hydrologic Consequences (PHC) is included as a separate document in Appendix 7-15. Installation of the culvert expansion project does not change the conclusions presented in the current PHC.

7.29 Cumulative Hydrologic Impact Assessment

The Division has prepared a Cumulative Hydrologic Impact Assessment (CHIA) for this operation in the initial permit. A complete PHC is provided in Appendix 7-15 to aid in the determination as to whether a new CHIA is required for this renewal.

7.30 Operation Plan

7.31 General Requirements

This section describes the groundwater and surface water protection plan and water quality monitoring program implemented within the existing permit area and to be implemented for the refuse disposal site. The purpose of the groundwater and surface water protection plan is to minimize the potential for water pollution and changes in water quality and flow for surface and groundwater within and adjacent to disturbed areas. The purpose of the water quality monitoring program is to identify the potential impacts of coal mining operations on the hydrologic balance.

7.31.1 Hydrologic Balance Protection

Surface and Groundwater Protection Plan

GENWAL has included a plan to protect the surface and groundwater in the area of the mine facilities, topsoil storage site and refuse disposal site. The plan will ensure protection of the ground water and surface water resources of the sites by handling earth and refuse materials in a manner that prevents or controls, using the best technology currently available, the discharge of pollutants to the hydrologic system. Additionally, the GENWAL commits to handle acid- and toxic-forming materials, if encountered in the future, in a manner that will minimize acid- and toxic-forming discharge to surface or groundwater. The design details of the water protection plans are presented in Section 7.42 of this application.

In order to prevent material damage to the hydrologic balance and to protect the hydrologic systems possibly associated with the Joes Valley fault system, GENWAL plans to drill ahead before mining in the Incidental Boundary Change area adjacent to the Joes Valley fault in T. 16 S., R. 6 E. Sections 3 and 10.

When mining in the longwall gate entry nears the fault (between 200-300 feet away), an underground drill will be used to drill west toward the fault to determine its location. The drill will drill horizontally toward the fault up to 50 feet ahead of the entry face. If the fault is not encountered, the continuous miner will advance about 30-40 feet toward the fault, leaving at least 10 feet of coal between the entry and the end of the hole. The drill will again drill ahead. This sequence will continue until either water or fault gouge is encountered in the hole or the entry has been developed to its maximum extent (providing no fault was detected). If the fault is encountered prior to reaching

the bleeder entries, then mining will stop and the bleeder entries will be relocated. At least 10 feet of solid coal will be left between the face of the entry and the fault.

Other indicators have been experienced during mining up next to Joe's Valley Fault. Any of these indicators being present will affect the above mining sequence. The indicators, which we have experienced are severe rib rashing in some cases; in others the ribs will stand up showing no rib rash. Severe water pressures have never been encountered. Large flows of water have occurred from cracks in the roof, but these flows have been associated with sand channels rather than the fault.

One horizontal hole will be drilled in the 10, 11 12 13 and 14th west panels. Should water be encountered by the drill hole, entry development would terminate at that point. Although large amounts of water and high pressure have not been previously encountered by mining near the fault, an emergency plan to handle water inundation from the fault has been developed. The plan consists of the following actions:

1. Pull equipment back from face
2. Erect two Kennedy stoppings at least 2 feet apart
3. Place appropriate sized de-water pipe w/valve at bottom of stoppings
4. Pump quick drying cement into the space between the stopping
5. After minimum drying time, close water valve

As a secondary measure of precaution, no longwall mining will take place in the 22 degree angle of draw projected from the Joes Valley fault. Therefore no subsidence from mining operations will intersect the fault or fault zone. Any hydrologic conditions specific to the Joes Valley Fault will not be impacted through mining or subsidence

based on accessibility of the sites. Water monitoring reports will be submitted to the Division on a quarterly basis, and a summary report will be submitted yearly with the Annual Report for the mine.

All test and measurement instruments are operated, maintained and calibrated in accordance with the manufacturers instructions. The results of all field measurements are recorded and initialed by the sampler. When laboratory measurements are required, a specific set of sample bottles are pre-ordered from the laboratory. Bottles received from the laboratory are clean, pre-acidified and color-coded. Once the sample bottles are filled, they are individually labeled with water-proof, smudge-proof labels, placed in ice chests with ice packs and returned to the laboratory as soon as possible to insure proper holding times are met.

7.31.21 Groundwater Monitoring Plan

As noted in Section 7.24.1 only four springs were found during the June 1985 seep and spring survey within the area of potential subsidence with flow rates of one to two gallons per minute (SP-16, SP-17, SP-30, SP-36). By the time of the fall survey, all seeps and springs with the area of potential subsidence except SP-30 and SP-36 had dried up. Spring SP-30 was found to be dry during 1986 and in subsequent years to the present. The flow from SP-30 originally measured in 1985 is most likely attributable to higher than normal precipitation during 1983-1985. SP-30 occurs as diffuse seepage from the Blackhawk Formation above the mine portals and is collected in a diversion pipe to avoid problems at the portal face. Flow at SP-36 issues from a sandstone-shale contact within the Blackhawk Formation and showed evidence of use by elk and deer. All major springs (flows of at least five gallons per minute) found during the June 1985 survey were located outside of the area of potential subsidence at that time.

The Federal Lease #UTU-68082 and State Leases have since been added to the permit area, and the area of potential subsidence has therefore expanded. Additional spring and seep surveys were conducted in 1987, 1989, through 1993. The proposed groundwater monitoring program described below is based on the results of those surveys and is designed to evaluate impacts from the entire permit area, including the State Leases and Lease #UTU-68082 (LBA 9). A table clarifying the groundwater monitoring program is shown in Table 7-10 at the end of Chapter 7 text.

Previous to August 1994, groundwater monitoring for the Crandall Canyon Mine area included collection of water quality and quantity data from eleven springs as well as points of significant inflow to the underground workings. Based on the permit modification to include UTU-68082 (LBA #9), GENWAL conducts the monitoring of fourteen seeps and springs:

SP-30 and SP-36 are monitored to determine potential impacts in the immediate vicinity of the mine. SP-58 is monitored as an indicator of long-term changes in groundwater issuing from the Blackhawk Formation in a area that will not be affected by mining operations. The magnitude of these changes will be useful when interpreting changes at SP-30 and SP-36.

SP2-24, SP2-9, SP-47A, and SP1-3 are monitored since a water right has been filed on the springs by the U.S. Forest Service. Springs SP1-19 and SP1-22 are monitored as indicators of the water supply in the upper reaches of Blind Canyon and the North Fork of Crandall Canyon.

SP1-33, SP1-47, and SP2-1 are monitored as an indicator of changes in groundwater emanating near the western border of East Mountain, contiguous to Joe's Valley Fault.

SP1-9 (also SP1-19 mentioned above is located within this state lease) located in Lease ML-21569 and SP1-24 in lease ML-21568 are monitored to evaluate the effects of potential subsidence in the state leases. Plate 7-12 shows the location of each spring.

Samples were collected from each of the fourteen seeps/springs listed above, plus seeps SP2-14 and SP2-23, during the spring of 1994 and analyzed for both quantity and quality. Based on the information collected during 1994 and the past seep and spring surveys, springs SP-36, SP-58, SP2-9, SP2-24, SP1-33, and SP1-9 are monitored quarterly for quantity and quality. The remaining springs (SP-30, SP2-1, SP1-47, SP1-24, SP1-19, SP-47A, SP1-3, and SP1-22) are monitored for quantity and field chemical parameters only. Springs SP2-14 and SP2-23 have been removed from the list of springs to be monitored due to extremely low or no flow over the past few years and SP2-9, which is contiguous to these two springs, is a good indicator of the water quality and quantity for that area of the mine permit. Monitoring at the fourteen seeps/springs will continue on a quarterly basis.

Following reclamation the samples will be collected semiannually until the surety bond is released. At least one of these samples will be collected during the low-flow period (normally the fourth quarter). These samples are collected as close as possible to the point of issuance of the springs. Samples are analyzed according to the list of parameters in Table 7-4 which includes, flow, pH, conductivity or TDS, total iron, and total manganese as required by R645-301-724.1.

Samples collected during the low-flow period of the year (fourth quarter) will be analyzed according to the list of parameters contained in Table 7-5 (as requested in guidelines from DOGM) in the years 1990, 1995, 2000, and at 5-year intervals thereafter until the surety bond is released.

Even though SP-30 has been dry since the original measurement in 1985, monitoring at SP-30 will continue. By continuing to monitor SP-30, flow trends, as they relate to precipitation patterns, can be observed. Substitution of another spring in the vicinity was considered and dismissed due primarily to the long term monitoring correlation stated above and because there exists a lack of flowing springs in the vicinity of old mine workings. Additionally, when the physiographic location of the mine portal is compared with similar locations in adjacent canyons (ie; Blind Canyon, Horse Canyon, Little Bear, and Mill Fork) there are an apparent absence of springs on these mid to upper south facing hill slopes (Plate 7-12). The apparent absence of seeps and springs in these areas is primarily related to the geologic nature and limiting hydrologic characteristics of the Blackhawk Formation in its upper strata.

In conjunction with the proposed South Crandall Lease (UTU-78953) and the SITLA/PacifiCorp sublease GENWAL will monitor four springs. The monitoring plan for the proposed South Crandall Lease is described below. Monitoring site locations are shown on Plate 7-18. The monitoring protocols for each of the monitored springs are presented in Table 7-10.

The monitoring plan for springs includes springs in the Castlegate Sandstone, Blackhawk Formation, and Star Point Sandstone. As demonstrated in the PHC, it is believed that the potential for diminution of flow or degradation of the water quality of springs discharging from the Price River or North Horn Formation is remote.

is found that stream flows in Blind Canyon and Crandall Canyon have been impacted by mining, then a decision to monitor Horse Canyon on a continuous basis will be made.

In conjunction with the proposed South Crandall Lease (UTU-78953) and the SITLA/PacifiCorp sublease GENWAL will monitor four creeks. The monitoring plan for the proposed South Crandall Lease area is described below. Monitoring site locations are shown on Plate 7-18. The monitoring protocols for each of the monitored creeks are presented in Table 7-10.

Little Bear Canyon Creek will be monitored quarterly for Table 7-8 parameters including flow and field water-quality parameters. The creek will be monitored approximately 100 feet above the confluence with Huntington Creek (Plate 7-18). Based on the range of discharge anticipated at the creek (see Appendix 7-58) discharge measurements at Little Bear Canyon Creek will likely be performed using a 90° v-notch weir or a portable 3-inch Parshall flume.

The ephemeral drainage in SW 1/4 of Section 4 T16S R7E will be monitored quarterly for Table 7-8 parameters including flow and field water-quality parameters. No discharge was observed in this drainage during drought conditions in 2003. If flow occurs in this drainage, the discharge will be measured using appropriate portable discharge measuring devices.

Monitoring station IBC-1 monitors the drainage located along the border of Sections 5 and 6, T16S R7E. This drainage will be monitored quarterly for Table 7-8 parameters including flow and field water-quality parameters. Discharge in this drainage has been meager (Appendix 7-58) and discharge will likely be measured using a stopwatch and a calibrated bucket. The potential for impacts to this drainage are considered remote because only a small region in the extreme northwestern portion of the proposed South Crandall Lease area is drained by this drainage. However, to verify that no impacts to this drainage occur, and to document the effects of climatic variability on stream discharge in the region, this creek will be monitored.

The creek in Section 5 T16S, R7E will be monitored quarterly for Table 7-8 parameters including flow and field water-quality measurements. This creek drains most of the northeastern portion of the proposed South Crandall Lease area, where the initial mining in the proposed lease area will occur. Additionally, the upper forks of this drainage will be monitored for flow and field water-quality measurements will be performed. Flow at each of the monitoring sites on this drainage had been meager. Thus, flow measurements will likely be performed using a stopwatch and a calibrated bucket.