

# GENWAL MINE 015/032

## MINING AND RECLAMATION PLAN

for the  
CRANDALL CANYON #1 MINE  
and the  
SOUTH CRANDALL MINE

ADDENDUM TO THE RECLAMATION PLAN  
FOR THE

EAST MOUNTAIN EMERGENCY

DRILLPADS

TASK # 2893

TASK # 2970

SUBMITTED: December 21, 2007

SUBMITTED: January 29, 2008

SUBMITTED: May 9, 2008

SUBMITTED: July 10, 2008

File in:

Confidential

Shelf

Expandable

Refer to Record No. 0062, Date 7/16/2008

In 015/032, 2008, Appendix

For additional information



P.O. Box 1077, Price, Utah 84501 794 North "C" Canyon Rd, East Carbon, Utah 84520  
Telephone (435) 888-4000 Fax (435) 888-4002

Daron Haddock  
Permit Supervisor  
Utah Division of Oil, Gas and Mining  
1594 West North Temple, Suite 1210  
Salt Lake City, Utah 84114-5801

May 9, 2008

Re: East Mountain Emergency Drillpad  
Addendum to Reclamation Plan  
Crandall Canyon Mines  
C/015/032

Dear Mr. Haddock:

Enclosed are four hard copies and one electronic copy of the response to deficiencies for the East Mountain Emergency Drillpad Reclamation Plan, Task # 2893. Please note that bonding is presently being secured for all components of the East Mountain Reclamation Project, including for the Forest Service roads. The Forest will issue the Road Use Permits for these roads as soon as the bonds are in place. We request an expedited review and approval of this plan as soon as possible because we would like to start on July 15 in order to complete the reclamation this fall.

If you have any questions or comments please contact me at 435 888-4017.

Sincerely,

David Shaver  
Resident Agent

File in:

- Confidential
- Shelf
- Expandable

Refer to Record No 0062 Date 07/16/2008  
In C/0150032, 2008, In coming  
For additional information



# APPLICATION FOR PERMIT PROCESSING

<input type="checkbox"/> Permit Change	<input type="checkbox"/> New Permit	<input type="checkbox"/> Renewal	<input type="checkbox"/> Transfer	<input type="checkbox"/> Exploration	<input type="checkbox"/> Bond Release	Permit Number: 015/032
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Title of Proposal: <b>Reclamation Plan for the East Mountain Emergency Drillpads</b> <b>Response to deficiencies, Task # 2893</b>	Mine: <b>Crandall Canyon Mines</b> Permittee: <b>GENWAL Resources, Inc.</b>
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Description, include reason for application and timing required to implement.

**Instructions:** If you answer yes to any of the first 8 questions (gray), submit the application to the Salt Lake Office. Otherwise, you may submit it to your reclamation specialist.

<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	1. Change in the size of the Permit Area? _____ acres Disturbed Area? <b>8</b> acres <input checked="" type="checkbox"/> increase <input type="checkbox"/> decrease.
<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	2. Is the application submitted as a result of a Division Order?
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<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	23. Does the application affect permits issued by other agencies or permits issued to other entities?

**Attach 3 complete copies of the application.**

I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein. (R645-301-123)

\_\_\_\_\_  
Signed - Name - Position - Date

Subscribed and sworn to before me this \_\_\_\_ day of \_\_\_\_\_.

\_\_\_\_\_  
Notary Public

My Commission Expires: \_\_\_\_\_  
 Attest: STATE OF \_\_\_\_\_ )  
 COUNTY OF \_\_\_\_\_ ) ss:

Received by Oil, Gas & Mining

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ASSIGNED TRACKING NUMBER

Utah Division of Oil, Gas & Mining  
Utah Coal Program  
1594 West North Temple, Suite 1210  
P.O. Box 145801  
Salt Lake City, Utah 84114-5801

January 29, 2008

Attn: Pamela Grubaugh-Littig  
Permit Supervisor

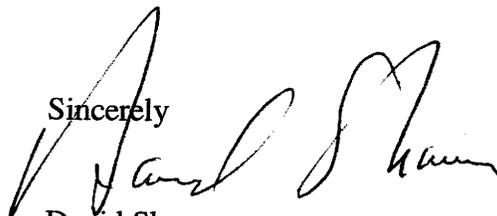
Re: Change to the Mining and Reclamation Plan  
Addendum to the Reclamation Plan for the East Mountain Emergency Drillpads  
Genwal Resources, Inc., Crandall Canyon Mines, MRP C/015/032  
Attachment 12

Dear Ms. Grubaugh-Littig

Enclosed please find seven (7) copies of Attachment 12, which is a computer generated cut/fill representation of the remaining drillpad reclamation. This information should be added to the East Mountain Emergency Drillpad Reclamation Plan. This additional information was requested by Priscilla Burton. C1/C2 forms are included.

If you have any questions or comments regarding this submittal please contact me at 435-888-4017

Sincerely



David Shaver  
Agent/Project Engineer





Utah Division of Oil, Gas & Mining  
Utah Coal Program  
1594 West North Temple, Suite 1210  
P.O. Box 145801  
Salt Lake City, Utah 84114-5801

December 21, 2007

Attn: Pamela Grubaugh-Littig  
Permit Supervisor

Re: Change to the Mining and Reclamation Plan  
Addendum to the Reclamation Plan for the East Mountain Emergency Drillpads  
Genwal Resources, Inc., Crandall Canyon Mines, MRP C/015/032

Dear Ms. Grubaugh-Littig

Enclosed please find seven (7) copies of the addendum to the Reclamation Plan for the emergency drillpads and access roads that were constructed as part of the Crandall Canyon Mine rescue efforts.

As you are aware, much of the reclamation at this site has already been completed, and the remainder is scheduled to be completed next summer as soon as weather allows. We have been working in co-operation with the Division, as well as the BLM, Forest Service, and SITLA not only in the reclamation efforts thus far, but also in discussions involving bonding liability for the remaining work to be done. The issue is complicated by the fact that SITLA wants the road on its land left in place, while Forest Service wants its road segment reclaimed. This issue may take some time to resolve. In the meantime we have been asked by the Division to provide information on which to help base the posting of a reclamation bond for the remaining work.

Prior to establishing the requirements for future reclamation bonding we ask you to consider the following items;

- 1) Construction of the drillpads and access roads was done under the duress of an emergency rescue effort in an attempt to save the lives of six miners trapped below. Under these extraordinary conditions the normal requirements for permitting and bonding were bypassed. Only after the rescue efforts were formally called off by MSHA did the various land management agencies get together to try to figure out not only how to reclaim the mountain, but how to retrofit the process in an after-the-fact fashion into the regulations that are normally involved. There is still no clearcut consensus on how to proceed.

Pam Grubaugh-Littig  
December 21, 2007  
page 2

- 2) SITLA does not want its segment of road reclaimed, but to the extent that reclamation bonding is required SITLA is agreeable to using the existing performance bond on coal lease ML-21568 to cover any future reclamation liabilities for the road.
- 3) The Forest Service wants its road segment reclaimed but has (informally) indicated that the present bond on the existing Forest Service road in Crandall Canyon (leading to the Crandall Canyon Mine) may be applicable to the road reclamation liabilities for the East Mountain road.
- 4) SITLA has indicated that it would seek legal action to restrain the Forest Service from reclaiming its (Forest Service) segment because this would effectively block access to the SITLA section.
- 5) SITLA has informed us that it does not see the need to change the Post-Mining Land Use in the approved MRP and feels that leaving the road in place is in accordance with the presently approved land use of rangeland maintenance.
- 6) The Forest Service road segment lies outside of our existing SMCRA permit area. We cannot legally add it to our permit without authorized right-of-entry from the Forest Service. Since this road is presently without a legal basis of existence the Forest Service cannot give us right-of-entry at this time. Without being in the permit area, the legal question of a SMCRA bonding requirement for this road becomes unclear.
- 7) The question of whether emergency rescue efforts constitutes SMCRA criteria for surface effects of underground coal mining is still being debated among some of the agencies.

We have demonstrated a good faith effort to perform as much reclamation as possible in a timely manner. In fact on two separate occasions we were run off the mountain by snow storms, but went back in with snow-cats and four-wheelers to get as much done as possible. Had the winter season not closed in on us we would have the job finished by now. In light of the good faith effort we have shown so far, and the complicated road issue we wish to ask the Division to postpone the requirement for posting a reclamation bond until we have had a chance to get back on the mountain early next summer to complete to remaining work. This would also allow time for some of the legal issues involving the roads to be ironed out

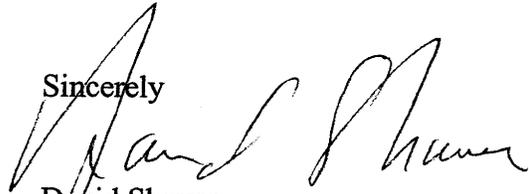
We find ourselves caught in the middle of conflicting requirements on all sides. We have every intention of finishing the reclamation as soon as possible but obviously can't until the snows melt off. I believe our actions thus far reflect our sincerity. In your assessment of risk liability please keep in mind that the Intermountain Power Agency (IPA), which is a political subdivision of the State of Utah, owns half of the Crandall Canyon Mines and is paying its share of all reclamation costs. Please also keep in mind the extraordinary conditions that precipitated this most unusual

Pam Grubaugh-Littig  
December 21, 2007  
page 3

situation. What we are asking for is a grace period for the imposition of any reclamation bonding requirements for the drillpads/access roads until the summer of 2008, at which time we can demonstrate our commitment to continue with final reclamation.

Your consideration of this request is greatly appreciated. If you have any questions or comments regarding this request or the reclamation plan as submitted please contact me at 435-888-4017

Sincerely

A handwritten signature in black ink, appearing to read "David Shaver". The signature is fluid and cursive, with the first name "David" being more prominent than the last name "Shaver".

David Shaver  
Agent/Project Engineer

# APPLICATION FOR PERMIT PROCESSING

Permit Change <input type="checkbox"/>	New Permit <input type="checkbox"/>	Renewal <input type="checkbox"/>	Transfer <input type="checkbox"/>	Exploration <input type="checkbox"/>	Bond Release <input type="checkbox"/>	Permit Number: 015/032
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Title of Proposal: **Addendum to the Reclamation Plan for the East Mountain emergency rescue drillpads and access roads**

Mine: **Crandall Canyon Mines**

Permittee: **GENWAL Resources, Inc.**

Description, include reason for application and timing required to implement.

Instructions: If you answer yes to any of the first 8 questions (gray), submit the application to the Salt Lake Office. Otherwise, you may submit it to your reclamation specialist.

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Attach 3 complete copies of the application.

I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein. (R645-301-128)

Signed - Name - Position - Date  
*Tami L Wardle* agent 12/17/07

Subscribed and sworn to before me this 17 day of December 2007

*Tami L Wardle*  
 Notary Public



**TAMI L WARDLE**  
 NOTARY PUBLIC • STATE OF UTAH  
 1323 SOUTH 600 WEST  
 PRICE UT 84501  
 MY COMMISSION EXPIRES: 03-07-2010

My Commission Expires: \_\_\_\_\_  
 Attest: STATE OF UTAH  
 COUNTY OF CARBOU

Received by Oil, Gas & Mining

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ASSIGNED TRACKING NUMBER



Copies of the Assignments are included in Appendix 1-1.

### **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 for construction of the Sediment Pond. (See Appendix 1-3)

Special Use Permit, .10 acres located in Section 6, SW quarter NE quarter T16S R7E SLBM for the Trailhead parking and snow storage. (See Appendix 1-3).

Special Use Permit, 1.4 acres for stockpiles 1, 2, 3 and 4 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).

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.

### **Emergency Drillholes and Access Roads**

On August 6, 2007, the active mine workings in Main West barrier pillar section collapsed trapping six miners underground. In an emergency attempt to rescue these men a number of boreholes were drilled from the surface of East Mountain down to the underground workings (see Plate 1-1). Due to the emergency nature of this rescue operation all surface construction for the drillpads and access roads was done under the emergency provisions of the various surface management regulations. The Forest Service, BLM, SITLA and the Division all granted verbal authority to proceed in a cooperative effort to not hinder the rescue attempts. Due to the emergency nature of the operation no formal rights-of-entry were granted for the areas of surface disturbance. On August 30, MSHA officially called off the rescue effort. Reclamation of drill pads and access roads began shortly thereafter. Refer to Appendix 5-22(A) for the addendum to the reclamation plan for the East Mountain drillpads and access roads. This plan includes a more complete description of activities and land management issues involving this rescue attempt.

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	LOCATION	ACRES	PARCEL
Minesite	NW1/4 of Sec 5 (1)	7.778*	Federal Lease UTU-54762
Minesite	SW1/4 of Sec 5 (1)	6.086	Dellenbach Fee
Topsoil Pile #1	NW1/4 of Sec 5 (1)	0.2	FS Special Use Permit
Topsoil Pile #2	NE1/4 of Sec 5 (1)	0.2	FS Special Use Permit
Topsoil Pile #3	NW1/4 of Sec 4 (1)	0.5	FS Special Use Permit
Topsoil Pile #4	NE1/4 of Sec 4 (1)	0.5	FS Special Use Permit
Rescue Drillholes	SE1/4 of Sec 35 (2)	2.27	Federal Lease UTU-68082
Rescue Drillholes	NE1/4 of Sec 2 (3)	5.64	State Lease ML-21568
SITLA Rescue Road	E1/2 of Sec 2 (3)	3.98	State Lease ML-21568
<u>TOTAL</u>		<u>27.15</u>	

Notes: (1) T16S, R7E

(2) T15S, R6E

(3) T16S, R6E

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

#### **4.11.240 Dates of Past Mining**

Approximate dates of past mining: November, 1939, to September, 1955, as per USGS records.

#### **4.11.250 Land Use Preceding Mining**

The land was historically used for wildlife and domestic grazing.

### **4.12 Reclamation Plan**

NOTE: See Appendix 5-22(A) for the stand-alone reclamation plan for the East Mountain Emergency Drillpads and Access Roads. See Plate 1-1 for location of these drillpads and access roads.

#### **4.12.1 Postmining Land Use Plan**

In areas where surface disturbances resulted from mining operations, soil reclamation and revegetation will restore the areas to their premining usefulness as range land, wildlife habitat and recreational use. The reclamation plans are presented in chapters 2, 3, 5, and 7.

Land uses are solely at the discretion of the USFS. No alternative land uses have been proposed.

#### **4.12.2 Landowner Or Surface Manager Comments**

The citations from the Manti La Sal National Forest Land and Resource Management Plan can be considered as comments from the Forest Service for most of the disturbed area. The plan states that the road will be left in place pursuant to the wishes of the Forest Service and the surface landowner. Correspondence from the Forest Service indicating the above and outlining attendant reclamation requirements is included in Appendix 1-2.

### **4.13 Performance Standards**

#### **4.13.1 Postmining Land Use**

All disturbed areas will be restored in a timely manner to conditions that are capable of supporting the uses they were capable of supporting prior to mining.

#### **4.13.3 Criteria for Alternative Postmining Land Use**

No alternative postmining land use is planned or proposed.

## CHAPTER 5

### LIST OF APPENDICES (continued)

<u>APPENDIX NUMBER</u>	<u>DESCRIPTION</u>
5-16	Storage Pad Stability Analysis
5-17	Road Expansion (within permit area) Safety Factor, Drawings
5-18	Fire Prevention Plan
5-19	Slope Stability Investigation Portal Pad
5-20	Bond Estimate (DOGM determination)
5-21	Reclamation Fill Stability Analysis At The Crandall Canyon Mine Emery County, Utah
5-22	Crandall Canyon Mine Site Reclamation Plan
5-22(A)	East Mountain Emergency Drillpads and Access Roads Reclamation Plan
5-23	Air Quality Permit Amendment, South Portals
5-24	R2P2 (Resource Recovery and Protection Plan) Approval Letter (South Crandall Federal Lease UTU-78953)
5-24A	R2P2 (Resource Recovery and Protection Plan) Approval Letter (120 Acre Modification, Federal Lease UTU-68082)
5-25	Subsidence Survey Letters of Notification

The roads are used to access the portal and substation areas and operations area as shown on Plate 5-3. Cut slopes of 0.25h:1v for competent bedrock, 0.5h:1v for fractured bedrock and 1h:1v for shallow surficial deposits less than four feet deep overlying bedrock are proposed for the portal access roads.

A slope stability investigation was submitted by Delta Geotechnical Consultants and is included as Appendix 5-19 with a safety factor of 0.72 for the shallow surficial deposits of the proposed 1:1 cut slopes. Since the safety factor does not comply with UMC 817.162 (c) requirements, cut slopes with 1:1 slopes will be rounded to 1.5:1 in the shallow superficial material. Appendix 5-16 is a stability analysis of the storage pad (upper pad) at the Crandall Canyon Mine prepared by EarthFax Engineering, Inc. A reclamation slope stability analysis has been prepared by JME Consultants and is included in Appendix 5-21. This analysis shows that the minimum static safety factor of 1.3 for the reclamation fill slopes will be met.

#### **5.40 Reclamation Plan**

NOTE: See Appendix 5-22(A) for the stand-alone reclamation plan for the East Mountain Emergency Drillpads and Access Roads. See Plate 1-1 for location of these drillpads and access roads.

#### **5.41 General**

When no longer needed for mining operations, all entry ways or other openings to the surface from the underground mine will be sealed and backfilled. The permanent closures will be constructed to prevent access to the mine workings by people, livestock, and wildlife. Potential surface drainage will also be kept from entering the sealed entries.

Prior to final sealing of any openings, the BLM will require an on site inspection and a submission of formal sealing methods for approval of the BLM. The formal sealing methods will be presented as a plan including cross sections demonstrating the measures taken to seal or manage mine openings will comply with R645-301-529.100. At the time that the mine closure plan is submitted to the BLM, a copy will be forwarded to the Division for concurrence and approval and for addition to the mine plan on file. A copy will also be placed at the Emery County Recorder's office.

A formal plan will be submitted to the BLM for approval prior to final sealing of any openings. As per their on site inspection and plan approval, the openings will be sealed. All surface equipment, as well as structures, including all concrete foundations, will be removed by the applicant after the permanent cessation of operations.

#### **MW-1 Supply Well Abandonment**

Upon permanent cessation of mining operations, the water supply well, MW-1, will be permanently abandoned in accordance with regulations promulgated by the Utah Division of Water

APPENDIX 5-22(A)

ADDENDUM TO THE RECLAMATION PLAN

FOR THE EAST MOUNTAIN  
EMERGENCY DRILLPADS AND ACCESS ROADS

**APPENDIX 5-22(A)**

**ADDENDUM TO THE RECLAMATION PLAN  
FOR THE EAST MOUNTAIN  
EMERGENCY DRILLPADS AND ACCESS ROADS**

**APPENDIX 5-22(A)**  
**CONTENTS**

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RECLAMATION COMPLETED AS OF DECEMBER 10, 2007.....Page 4

RECLAMATION REMAINING TO BE COMPLETED AS OF DECEMBER 10, 2007....Page 8

**ATTACHMENTS**

- 1) General Location Map (provided by Forest Service)
- 2) Vicinity Photo/Map (provided by SITLA)
- 3) Drill Hole Map (provided by Forest Service)
- 4) Drillsite Aerial Photo (Olympus Aerial Survey)
- 5) Drillsite Contour Map (Olympus Aerial Survey)
- 6) Inter-agency Reclamation Plan Memo (Priscilla Burton, DOGM)
- 7) Interim and Final Seed Mix
- 8) Wood Straw Information (Forest Concepts, LLC)  
Sediment Control Log Information (Western Excelsior Corporation)
- 9) East Mountain Emergency Drilling, Slope Stabilization (Blackhawk Engineering)
- 10) Reclamation Cost Estimates (Scamp Excavation)
- 11) Digital Photos (courtesy of Priscilla Burton)
- 12) Forest Service Road Use Permit PRI-108
- 13) Computer Generated Cut/Fill Representation and Reclamation Cross-Sections
- 14) Forest Service Road Use Permit #0410-03-46
- 15) "Evaluation of the Potential for Adverse Impacts to Hydrologic Resources in the Vicinity of the Crandall Canyon Mine Emergency Mine-Rescue Drillholes"  
Petersen Hydrologic, LLC
- 16) Typical Seep Collection System (SITLA Road)
- 17) Slope Stability Analysis (Blackhawk Engineering)

## **HISTORICAL OVERVIEW**

On August 6, 2007, the active mining area of the Crandall Canyon Mine collapsed, trapping six miners underground. As part of the emergency efforts to rescue the trapped miners a total of seven boreholes were drilled from the surface to the underground workings below. This required constructing approximately two miles of access road to the drill sites. Because of the emergency nature of the rescue operation no permits were obtained prior to constructing the access road, the drill pads, or the drillholes. The drillsites were located on both U. S. Forest Service and School & Institutional Trust Lands Administration (SITLA) lands, on both Bureau of Land Management (BLM) and SITLA coal leases, and were within the Division of Oil, Gas & Mining (DOG M) permit area. Normally, any surface disturbance in this area would have required the full gamut of environmental permit approvals from all of the various State and Federal agencies prior to initiating any actions on the surface. However, since this was a rescue effort done in hopes of saving the lives of the miners trapped below, all work was done under the emergency provisions of the various laws. As such there were no reclamation plans in place. Indeed, reclamation considerations were not a priority at the time of construction.

The seven drillholes were drilled over a span of August 7 through August 30, 2007. In physical terms, the drilling project involved constructing about a half mile of access road on Forest Service land (in a designated roadless area), and continued construction of an additional mile of road across SITLA land. This access road basically followed the top of the ridgeline of East Mountain. At that point, in order to get the drill rigs directly overtop the area where the miners were trapped the road made a series of very steep switchbacks down the face of East Mountain on what is essentially the escarpment of the Joes Valley fault. The area is extremely steep and rugged. Six separate drill pads were constructed at various locations down along the escarpment. In the process of switchbacking down the mountain the road crossed back and forth the property boundary between the Forest Service and SITLA. As a result, some of the drill sites are located on Forest Service land, some on SITLA land, and some on both. Refer to Attachment 1 for an overall location map of the affected area, and to Attachments 2 and 3 for more detailed maps of the immediate area around the drillpads. Attachment 4 is an aerial photograph of the site taken soon after the drilling was completed. Attachment 5 is a contour map of the site as well. Also refer to Attachment 11, which is a collection of digital photos taken before, during, and after reclamation. These maps and photos are labeled to coincide with the written description that follows.

On August 30, nearly a month after the mine collapse, the Mine Safety and Health Administration (MSHA) announced that rescue efforts were being called off. This determination by MSHA effectively ended the emergency status of the effort, and soon thereafter the company engaged in discussions with the appropriate State and Federal agencies concerning the most appropriate means of falling back into a more normal mode of compliance with the existing land management regulations. Shortly thereafter, on September 5, a meeting was held involving representatives from DOGM, SITLA, BLM, Forest Service, and Genwal Resources. At that time it was decided that DOGM would be the lead agency for coordinating the reclamation efforts as required by the various agencies pertaining to their specific areas of responsibility. It was also determined at that time that reclamation would begin as soon as possible. Since autumn was approaching and the drillsites sat at an elevation of over 10,000' the available time for reclamation was closing rapidly. Heavy snows can move into these mountainous areas quickly at this time of year. DOGM decided that posting a reclamation bond would be delayed until

after as much of the reclamation as possible could be completed. It was, in essence, a grace period to allow the company to demonstrate a commitment to reclaim as much of the disturbance as possible in the limited working season remaining.

On September 7, another meeting was held on-site to address the specifics of reclamation. Involved were reclamation specialists from all the agencies, representatives from Genwal Resources, and from Scamp Excavation, the company that initially constructed the drillpads and roads and who would perform the final reclamation work. Coming out of this meeting was a well-defined plan to reclaim the various pads, the access road between them, and the 1.5 mile primary access road leading to the area. This plan was agreed to by all parties involved, and was written up in memo form by Priscilla Burton of DOGM who had been assigned the responsibility of being the agency co-ordinator. This memo is included herein as Attachment 6. This reclamation plan is essentially an after-the-fact plan designed to do the best job of reclaiming an area which had been disturbed under the duress of an attempted rescue effort.

The essential elements of the agreed-upon plan consisted of the following:

- 1) Plug the existing drillholes
- 2) perform as much final reclamation as possible prior to winter, starting at the lower pads and working up
- 3) establish approximate original contour by pulling material up from the slopes and backfilling the cutslopes to the extent possible
- 4) roughen and pock the reclaimed surface
- 5) apply final seed mix to reclaimed slopes, and interim seed to unreclaimed slopes
- 6) apply wood straw to all reclaimed surface areas (see Attachment 8)
- 7) provide interim drainage control on unreclaimed areas to help stabilize until next summer, including drainage ditches, water bars and erosion control logs, aka excelsior logs (see Attachment 8). The regulatory agencies all agreed that these excelsior logs represent the best technology currently available to prevent, to the extent possible, additional contributions of sediment to stream flow or to runoff outside the permit area, and would provide the best assurance of complying with all applicable State and Federal water quality laws and regulations.

From the very beginning it was understood by all parties involved that under the impending weather conditions there was a real possibility that no reclamation could be completed in the remaining fall season before the snows moved in, and under even the best weather conditions not all the reclamation activities could be completed. Given the uncertainty of the weather in this mountain environment the biggest question was how much work could be completed in the remaining fall season (of 2007) and how much would have to be delayed until the following summer season of 2008. Everyone involved hoped to see as much reclamation completed as soon as possible.

Before any reclamation activities could begin at the sites it was necessary to first plug the drillholes. Boart Longyear Drilling Co., the same company that initially drilled the rescue holes, was hired to do the plugging. From October 10 through October 15 they worked to plug the holes to the extent possible. Unfortunately, most of the holes were obstructed and could not be plugged for the entire length of the hole from the mine workings to the surface. This resulted from deteriorating conditions in the hole from the fact that most holes were not cased (in the

interest of drilling to the mine as quickly as possible), and the fact that the mountain continued to move violently for weeks after the initial collapse. Plugging operations were inspected and verified by designated representatives of DOGM (acting on behalf of SITLA) and BLM..

Even though, under these unusual circumstances, a formal reclamation plan had not yet been approved, much of the reclamation has already been completed. Obviously, there is still much that remains to be done. Therefore, the remainder of this plan amendment will describe the following:

- 1) What has been reclaimed, and how it was reclaimed, and
- 2) What remains to be reclaimed, and how it is proposed to be done.

## **RECLAMATION COMPLETED AS OF DECEMBER 10, 2007**

*(Refer also to Attachment 11 for post-reclamation photos)*

Immediately after the holes were plugged and the drilling company had moved off the site reclamation of the pads began. All work was done by Scamp Excavation (the same company that put the sites in initially) under the direct oversight of DOGM, SITLA and Forest Service, and in accordance with the consensus plan agreed upon earlier. Even though the pads and connecting roads were partially located on Forest Service land, mostly it involved SITLA land, therefore the Forest Service agreed to let SITLA take the lead in implementing the on-the-ground reclamation activities in this area. In the meantime, SITLA had determined that a portion of their primary access road should be realigned to provide safer access in the future and to eliminate a section that would be more susceptible to failure from heavy snow accumulations over the winter.

No reclamation work could be done on the pads and connector roads until the drillholes had been plugged as required by BLM and SITLA.. The drilling company was contacted about the plugging work in early September. By the time the company prepared the bid, was issued the purchase order, finished a pre-existing job and mobilized onto the East Mountain site a full month had elapsed. On October 4 the drilling company moved in. Due to weather delays and equipment problems plugging operations did not actually commence until October 12. Plugging proceeded apace after that, although downhole obstructions did prevent complete plugging as mentioned previously.

In the meantime, Scamp Excavation did as much reclamation as possible in other areas that did not require waiting for the plugging operations to finish. At the top of the mountain, immediately before dropping down the escarpment to the drill sites, two road segments were reclaimed. One road lead to a higher site that had been used to stage the water trucks during the rescue attempt, the second segment was an abandoned section of the original road that was dozed in during the darkness of the first night and missed the surveyors mark in heading for the initial drillsite. Since both of the sections were on the relatively flat area of the crest of the mountain ridgetop there was not a lot of disturbance associated with their rehabilitation. Reclamation consisted of pulling material from the sides of the road, which was primarily topsoil, and re-grading the sites to approximate original contour. The areas were the roughened and reseeded with a final seed mix approved by the agencies (refer to Attachment 7). Similar reclamation was also done in the shot area. During the rescue attempt MSHA had sent off a number of explosive shots in hopes of communicating with the trapped miners. The area where these shots had been set off had a number of small craters associated with the explosive activities. These areas were reclaimed by regrading and reseeding.

A more substantial reclamation effort involved the SITLA road.. It was decided that one particular stretch of this road was dangerous for future use (such as continued access to the drillhole reclamation sites) because of obstructed visibility where it topped over the crest. This same stretch, measuring about 1100' long, was also felt to be unstable since it would hold the large snowdrifts in the winter which would then saturate the uncompacted outslopes of the road in the spring melt. It was felt that this would most likely result in a failure of the slopes at that time. The consensus was to realign this stretch to eliminate the hazards and provide for a more permanent roadway for future use. Therefore, Scamp Excavation proceeded to construct the new

segment on the opposite (western) side of the ridgetop under the direction of SITLA representatives. After the new segment had been completed the old segment was completely reclaimed. Using backhoes, the outslopes were pulled back up into the roadcut and approximate original contour was re-established. The area was roughened and reseeded with a final seed mix. This area was reclaimed before any wood straw had been delivered to the site, but SITLA representatives agreed that applying the straw later could involve safety issues (workers packing in the bales by hand over steep terrain) and determined to forgo the requirement of the protective cover.

Work also proceeded on the remainder of the access road, involving both the SITLA and Forest Service sections. This included pulling some of the material up from the outslopes and placing it against the bank of the inslopes. In this manner, the outslopes and inslopes were both made less steep and therefore more stable. Waterbars were installed to direct runoff, and excelsior logs (made from bundled wood straw) were installed at the outlet sections of the waterbars. The recontoured slopes were then re-seeded. Overall, an attempt was made to dress up the previous construction, which as has been noted earlier, was done under extreme duress conditions when the only priority was to get to the trapped miners absolutely as soon as possible. All work on the SITLA segment of the road was done under the direction of SITLA personnel, while the Forest Service oversaw work on their portion

Prior to finishing the drillhole plugging, there was a limited amount of reclamation work that could be done at the drillpads. The mudpits left over from the previous drilling were backfilled at each pad. Pads #2 and #6 involve the largest cuts and sidecasts, and will take the longest to reclaim. Therefore it was decided that due to the magnitude of work required final reclamation of these pads should be delayed until the summer of 2008 when the threat of snowstorms would no longer be a factor. To provide interim erosion protection for these areas the pads were smoothed off and drainage ditches were installed which were designed to take any water off the pads, away from the fill, and off onto stable native ground. Each of these ditches was fitted with erosion control excelsior logs where they discharged onto the native ground. Also, the outslopes of pads #6 and #2 were then seeded with an interim seed mix to help stabilize it until final reclamation next summer (see Attachment 7).

Once the drilling (plugging) operations began, the reclamation of the drillsites could begin in earnest as well. Because of the urgency of staying ahead of the weather the reclamation crews were poised to begin reclaiming the drillpads just as soon as the drilling company finished each hole and pulled off. The first pad to be reclaimed was Pad #3 which is the lowermost site. Using two trackhoes and a dozer material was pulled from the outslopes, with the lower hoe casting material to the upper hoe which, in turn cast it to the upper part of the cutslope. The dozer also worked to help spread the material. The site was restored to approximate original contour and was then roughened (pocked) in preparation for applying a final seed mix.

Work then progressed up the to the next pad up the hill, namely pad #4. Following immediately behind the plugging crews, reclamation followed similar to pad #3, that is, regrading to approximate original contour, pocking, and re-seeding with a final seed mix. Reclamation also included the road segment from pad #4 to #3 up to a very steep area know as "the ledge" for obvious reasons. Reclamation then began on pad # 5, which is the uppermost pad, using the same techniques as on the lower pads. The crews then moved to pad # 7, which was an extension of pad #2, and reclaimed it as well. Finally the spur road leading into pad #5

was reclaimed. All permanently reclaimed areas were reseeded with a final seed mix, and a matting of wood straw was applied. As part of the interim reclamation water bars were also installed along the access road down the mountain from the top down to the ledge to help control erosion during next spring's melt-off. Each waterbar was fitted with a staked excelsior erosion log at the discharge end.

On November 8, 2007, an on-site meeting was held involving representatives from DOGM, SITLA, BLM, Forest Service, Scamp Excavation, and Genwal Resources. The purpose of this meeting was to determine if the interim and final reclamation efforts accomplished to date were satisfactory to all the various state and federal agencies according to their individual management responsibilities. After a number of small issues were addressed the final outcome was an agreement among all parties that the following areas have been adequately reclaimed, subject to determining revegetation success in the future:

- Pad #3 and its access road
- Pad #4 and its access road up to the ledge
- Pad #5 and its access road
- Pad #7
- The rerouted (reclaimed) segment of the SITLA road

Based on aerial surveys prepared by Olympus Aerial Survey approximately 7.91 acres were originally disturbed by the drillpads and roads on the side of the mountain. This figure does not include the SITLA or Forest Service access roads. To date, 3.99 acres have been reclaimed, pending revegetation success, leaving 3.92 acres to be reclaimed next summer (see Attachment 5). Upon wrapping up the reclamation efforts for the winter and de-mobilizing the equipment off the mountain, on the way out Scamp re-established the waterbars along the SITLA and Forest Service road sections, tightened up some of the erosion logs and removed all trash from the site. Lastly, the main staging area at the Flat Canyon road junction (which had seen heavy usage during the rescue attempt) was regraded and reseeded.

It should be noted that, under the emergency nature of the road and drillsite construction, there was no opportunity to assess possible effects on archeological resources in the area. However, immediately after the rescue efforts were called off Genwal Resources hired the archeological firm of Senco-Phenix to perform an on-site evaluation. The results of this evaluation have been submitted under the confidential file.

**RECLAMATION REMAINING TO BE COMPLETED AS OF DECEMBER 10, 2007**

*(Refer also to Attachment 11 for pre-reclamation photos)*

As discussed above, much of the East Mountain rescue drilling area has already been reclaimed. Due to the unprecedented circumstances under which the drilling was done no formal reclamation plan was in place at the time. Therefore, reclamation done to date has been through a consensus agreement among the responsible state and federal land management agencies. The purpose of the following part of this plan amendment is to establish an approved written reclamation plan to be used for the remainder of the work. The proposed reclamation plan for the remainder of work to be done is essentially a continuation of the work that has already been done, using the techniques that have already been verbally agreed to, and which have meet with approval of all the agencies in terms of what has already been accomplished. The following areas remain to be reclaimed and/or stabilized, and will be discussed in detail individually

- 1) Drillpad #2 and its access road
- 2) Drillpad #6 and its access road
- 3) The "oops road"
- 4) The remainder of the access road from the ledge to the top of the mountain
- 5) The SITLA road
- 6) The Forest Service road

The primary focus of the 2008 construction season will be full reclamation of the drillpads and interconnecting roadworks (items 1 through 4 listed above). Upon consultation with the respective regulatory agencies, it was agreed that both the Forest Service and SITLA access road segments would not be reclaimed during the 2008 construction season. The road segments will remain open to: (1) access the reclaimed drill pad areas in order to evaluate/monitor the success of the reclamation effort and (2) based on the findings of the evaluation, provide access for machinery that may be required for additional earth work.

The Special Use permit for the Forest Service road segment (See Attachment 12 of Appendix 5-22A) states in Exhibit B, "*Conditions of Approval (Operating Plan)*", "Reclamation of the Forest Service road shall be completed immediately after it is evident that on-lease pad reclamation is determined to be stable and no earth moving equipment is needed".

At the onset of the 2009 construction season, a site visit will be conducted by the appropriate regulatory agencies as soon as weather/road conditions permit. The purpose of the site visit will be to evaluate the success of the reclamation efforts on the drill pads and associated road segments.

If it is determined during the site visit that the reclamation work has stabilized to a degree where additional work requiring earth moving equipment is no longer warranted, full reclamation of the remaining SITLA and Forest Service access road segments will be completed during the 2009 construction season.

## 1) Drillpad #2, Drillpad #6, and the "Oops Road"

These areas are listed together because they will be reclaimed as a unit. These two pads combined involve the biggest disturbance on the site in terms of quantity of earth material to be relocated. The outslope of pad #2 extends to the cut of pad #6 below. In turn, the outslope of pad #6 extends to the "oops road". The "oops road" is an abandoned segment of the primary access road. It was constructed in the middle of the night in an effort to gain access to the new drillsite at pad #3. The dozer operators were unable to see the surveyors ribbon marking the proposed route down the mountainside. As a result, they reached an impassable ledge and were forced to abandon this road segment. They then backed up and constructed a new road below, which is the present alignment. While the oops road goes nowhere, it did serve a useful purpose because it subsequently became an effective landing area which caught boulders and other debris from rolling down the hill from the construction above. This allowed construction work to be done on pad #6 while drilling continued safely down below on pads #3 and #4. This was most important in the frenzied attempts to move the drill rig from location to location attempting to find the trapped miners below.

Because of the magnitude of the effort required to reclaim combined pad #2/6 this work was always planned for the summer of 2008 when the threat of snowstorms would no longer be a factor. The plan to reclaim this site consists of using three trackhoes, two rock trucks, and several dozers. Much of the outslope from pad #2 will be pulled down and be used as backfill for pad #6. Some of the outslope material below pad #6 can be pulled back up to the pad, but most of this outslope material will be loaded by backhoes into rock trucks and hauled back up the hill to be used as backfill for both pads #2 and #6. By carrying the material back up to the top of the padsites the trackhoes can do much of their work with gravity rather than against it. The oops road will be cleaned off and will serve as the bottom-side access for the rock trucks to get loaded. The existing access road (located below the oops road) has been reclaimed up to the ledge. The remaining extent of this road will act as a catchment for any material which may roll down from the final reclamation of the pad #2/6/oops combined area. This will help ensure that no extraneous material rolls down onto undisturbed areas. Indeed, the reason that reclamation of this road stopped at the ledge was to allow it to serve as a catchpoint for subsequent reclamation above. Reclamation of the pad #2/6/oops area will be done to re-establish approximate original contour as much as possible. Prior reclamation of pads #3, 4, 5 and 7 are good indicators of the ability to achieve approximate original contour at this site.

Stability of the reclaimed pads will be achieved by compacting the backfill in 18"-24" lifts or layers, using a sheeps-foot mechanical compactor and/or wheel-roll compaction, to the extent practicable considering the tight operating constraints at the site, and the large boulders which may be present in the backfill. Because the reclamation will be done in early summer the backfilled material should contain sufficient moisture to optimize compaction. The backfill material is the original native material which contains a large proportion of boulder sized material which will help promote a high factor of stability to the compacted slopes. Because of the nature of the rocky hillside and the shallow depth of weathered material, much of the cuts were in bedrock, which allowed the drillholes to start on solid competent footing. The surface area of the remaining pads are estimated to be 75%-80% on the solid bedrock, with the fill and weathered zone located only along the very outer edge of the pads. Therefore, most of the compacted fill will be relocated directly on top of the bedrock. Based on aerial surveys (2' accuracy) the angle of repose of the native material is 37 degrees. The natural slope of the pad

area to be reclaimed is less than 30 degrees. (See Attachment 13). Therefore, even in an uncompacted state, the backfill slope angle is much less than the angle of repose. Because of the emergency nature of the pad construction no soils samples were taken prior to disturbance, and no geotechnical analysis was performed to demonstrate that a 1.3 safety factor can be achieved. However, Blackhawk Engineering has run a slope stability analysis using parameter values typical of the east Mountain area and has demonstrated that a safety factor of 1.3 should be easily obtainable (see Attachment 17).

Therefore, stability of the reclaimed slopes should be satisfactory for the reasons listed above, namely:

- a) the rocky nature of the cutlope material
- b) the compaction of the material in lifts, where practicable
- c) the extensive amount of bedrock within the cutslopes to anchor the backfill
- d) the reclaimed slopes being less than the angle of repose (30 deg vs 37 deg)
- e) engineering analysis using similar parameter values shows a safety factor much greater than 1.3

Attachment 13 is a computer-generated cut/fill representation of the remaining drillpad reclamation. Attachment 13 also shows the cross-sections of the pre- and post-reclamation construction, as well as the pre-emergency construction topography. The profiles within the attachment 13 (particularly, G-G' through M-M') show the approximate height, length, and angle of each cutslope remnant. After the pads have been reclaimed the slopes will be surveyed and an "as-built" map and cross-sections will be prepared and submitted to the Division.

After the backfilling and grading operations are complete the site will be roughened with pocks similar in size and spacing as those placed in the previously reclaimed pad areas. A permanent seed mix will then be applied, followed by putting down a layer of a wood straw. Density of seed application and wood straw application will be similar to that of the previously reclaimed pads, which in all cases exceeded pre-determined recommended application rates.

Also, after the slopes have been reclaimed, excelsior logs will be placed as needed in areas of concern, such as steep depressional areas which may be subject to increased surface runoff. The location of these contour log placement will be determined by the Division based upon onsite conditions. The Division may also seek recommendations from the other appropriate land management agencies. Installation of the excelsior logs will be according to the manufacturers instructions. Attachment 9 includes the calculations for the runoff potential from the reclaimed slopes. These engineering calculations show that excelsior logs will not normally be needed to control stability and sediment runoff on the typical stabilized/reclaimed slopes, but Genwal commits to placing these logs in any and all locations as determined by the Division based upon onsite conditions.

## **2) Remaining access road from ledge to top of mountain**

As described above, reclamation work on the access road started at the bottom (pad #3) and continued up past pad #4 to the ledge, where work was halted for the winter. Work was stopped here for two reasons. First, the segment of road immediately above the ledge will serve

as a catchment for construction work to be done next summer on pads #2/6 as described above. Second, there is an active in the roadcut at this location (see Attachment 5) which will need to be dressed up permanently for final reclamation. This work could not be done this fall because of the need to keep the road open for access to pads #3 and 4 which were being reclaimed below. Next summer when work resumes (and after pads #2/6 have been totally reclaimed) a small seep, located along the road near the ledge (see Attachment 13), will be contained by laying a course of drainrock from the seep across the road, daylighting on the downhill side as close to native ground as possible. The drainrock courseway will then be covered with geotextile fabric. Based on flow conditions, a perforated-drain pipe may also be installed within the drainrock as determined by the Division field representative. The road will then be reclaimed from there to the top of the mountain by pulling as much sidecast material as possible back up from the outslope onto the roadcut and backfilling to approximate original contour. Seed mix (final) and wood straw will be staged ahead of time along the remaining length of roadside so that seeding and application of wood straw can be done by hand as the earthwork progresses up to the top. Once this road has been reclaimed there will no longer be any vehicular access to any part of the mountainside.

It should be noted that the area where the access road broke through the ledge is the steepest terrain encountered in during the emergency construction. Much of the sidecast material rolled down the hillside for a considerable distance, and is now intermingled among the large trees growing in the area. In this area it will be impossible to retrieve all of this material and replace it within the road cut without doing more disturbance that already exists. However, the contractors will utilize the largest trackhoe available with the maximum extended reach so that as much of the material as possible will be retrieved from the outslope and placed back within the cut.

After the slopes have been reclaimed, excelsior logs will be placed as needed in areas of concern, such as steep depressional areas that may be subject to increased surface runoff. The location of these contour log placement will be determined by the Division based upon onsite conditions. The Division may also seek recommendations from the other appropriate land management agencies. Attachment 9 includes the calculations for the runoff potential from the reclaimed slopes. These engineering calculations show that excelsior logs will not normally be needed to control stability and sediment runoff on the typical stabilized/reclaimed slopes, but Genwal commits to placing these logs in any and all locations as determined by the Division based upon onsite conditions.

Genwal Resources, Inc. has posted a reclamation bond in the amount of \$268,196, as determined by the Division, to cover reclamation liabilities for the remaining drillpads and the access road between the pads.

### **3) The SITLA road**

The SILTA road is defined as that portion of the in-coming access road located on SILTA land, namely Section 2, T16S, R6E. As shown on Attachment 2, it is approximately 4959' long, and lies within the DOGM permit area. This road was constructed under emergency conditions as part of the rescue attempt, and is a continuation of the road which comes off Forest Service property from the south in Section 11. The width of disturbance varies, being greater in

those steeper hillside areas (approximately 45' total disturbance), and less on the flatter areas where no cuts or sidecasts were involved (approximately 25' wide). Assuming an average width of 35' the SITLA road involves approximately 3.98 acres.

The primary focus of the 2008 construction season will be full reclamation of the drillpads and interconnecting roadworks.. Upon consultation with the respective regulatory agencies, it was agreed that the SITLA access road segment would not be reclaimed during the 2008 construction season. This road segment will remain open to: (1) access the reclaimed drill pad areas in order to evaluate/monitor the success of the reclamation effort and (2) based on the findings of the evaluation, provide access for machinery that may be required for additional earth work.

At the onset of the 2009 construction season, a site visit will be conducted by the appropriate regulatory agencies as soon as weather/road conditions permit. The purpose of the site visit will be to evaluate the success of the reclamation efforts on the drill pads and associated road segments. If it is determined during the site visit that the reclamation work has stabilized to a degree where additional work requiring earth moving equipment is no longer warranted, full reclamation of the remaining SITLA access road segment will be completed during the 2009 construction season.

*a) Stabilization*

Before beginning any reclamation and/or stabilization work the first priority will be to dress up the existing waterbars along the road.. The existing waterbars were installed last fall (2007) as equipment was being demobilized off the mountain at the close of the construction season. They were constructed primarily for runoff control and not for passage of vehicles. All waterbar locations were approved by the regulatory agencies. Prior to reclamation work during the summer of 2008 the waterbars will be deepened and extended to make them more easily traveled by the construction equipment and vehicles. The excelsior logs will be cleaned out and repaired as needed. Most waterbars now have at least one row of logs at the discharge to the outslope. Prior to any stabilization or reclamation, an additional row of logs will be placed at midslope, and a third row will be placed at the toe of the slope. This three-tier installation of excelsior logs will be done at all waterbar locations. This work will be done as soon as possible to make certain the sediment control devices are in place and functional prior to the late-summer rain season.

During the construction season the waterbars and excelsior log systems will be inspected on a regular basis and will be maintained and repaired as needed to provide maximum sediment control

The outslopes of the road will be stabilized through a combination of compaction and re-vegetation. The slopes will initially be compacted using a sheepsfoot rolling compactor affixed to the boom of a track-hoe. After compaction, the slopes will then be re-seeded with a permanent seed mix. A layer of wood straw will then be spread over the re-seeded slopes. The seed and straw will then be crimped into the soil using the same sheepsfoot attachment, but using a single upslope stroke of the back-hoe boom. As an added measure, near the end of the construction season, a second application of seeding will be done on all road outslopes.

The road will be graded to a slight outslope along most of the alignment. However, in certain areas as determined by the contractor, the road will be insloped for safety reasons, and a berm will be constructed along the outer edge. After the drillpad reclamation construction project is completed this fall (2008), as the equipment is being de-mobilized from the mountain, the berms will be removed by pulling the material back to the inslope. Outslope drainage and/or waterbars will be re-established in these areas for final stabilization for the winter. This work will be performed under the direction of the Division based on on-site conditions.

Also, there is a seep area along the road (see Attachment 3) that will require containment as soon as possible. Excess slump material will be removed from the inslope and a linear drain system will be installed. This system will consist of collection boxes utilizing 2" drain rock and perforated drainpipe, as depicted in Attachment 16. After the drain system is in place, the inslope bank will be replaced at a 2:1 slope and will be compacted for stability.

After the road has been stabilized, Genwal Resources commits to performing "as-built" surveys and mapping, including cross-sections at critical areas such as steep slopes and drainage intercepts. This mapping will then be provided to the Division and will be utilized in future final reclamation activities.

*b) Final Reclamation*

At the time the SITLA road is to be reclaimed it will be reclaimed in the standard manner. Reclamation will begin on the far end (north end) and work out toward the Forest Service road. Prior to final reclamation work the existing sediment control system (waterbars, excelsior log placements, etc.) will be repaired as needed. Reclamation work will then begin, starting at the northern (inby) end and working out toward the Forest Service road.

After the temporary sediment control structures have been put in place, the outslopes will be pulled up using a trackhoe, and placed into the cutslope to achieve approximate original contour. Since the road will not be reclaimed in the summer of 2008, Genwal Resources will be able to perform the necessary geotechnical analysis to insure that the reclaimed slopes meet a safety factor of 1.3. Genwal commits to providing the Division with this stability analysis. If for some reason the safety factor cannot be demonstrated, then the backfilled slopes will be put back at a minimum of 2.5 to 1. (The angle of repose of this material is 37 degrees, based on digital mapping done after the initial construction.)

The surface would be roughened (pocked) and re-seeded with a final seed mix. A layer of wood straw matting will then be spread over the reclaimed surface. An example of this reclamation method (less the wood straw) can be seen at the existing segment of SITLA road that has already been reclaimed where the road was realigned to the other side of the ridge.

After the reclaimed slopes have been stabilized, rows of excelsior logs will be placed at intervals along the contour of the slopes, especially in long, steep areas, to help prevent erosion and help stabilize the reclaimed slopes until vegetation has been re-established. The location of these contour log placement will be determined by the Division based upon onsite conditions. recommendations from the other appropriate land management agencies. Genwal will prepare a

map and/or provide GPS co-ordinates to the Division showing the location of the excelsior log placement after a final determination has been made in the field. Attachment 9 includes the calculations for the runoff potential from the reclaimed slopes. These engineering calculations show that excelsior logs will not normally be needed to control stability and sediment runoff on the typical stabilized/reclaimed slopes, but Genwal commits to placing these logs in any and all locations as determined by the Division based upon onsite conditions.

The SITLA road lies within the existing permit area of the Crandall Canyon Mining and Reclamation Plan, 015/032. Therefore, to cover the potential for full reclamation of this road segment, Genwal Resources, Inc. has posted a reclamation bond in the amount of \$95,279, as determined by the Division.

#### **4) Forest Service road**

A short segment of emergency access road was constructed on Forest Service land, measuring about 2573' long (see Attachment 2). Because most of this segment was constructed on a steep hillside the total disturbed width, counting cutslopes and sidecasts is about 45'-50'. This road segment lies outside the DOGM permit area. (Actually, this road segment lies within Energy West's Deer Creek Mine permit.) At the request of the Forest Service, Genwal Resources has recently signed Road Use Permit PRI-108 for this road (see Attachment 12). This permit spells out the reclamation responsibilities that Genwal Resources now has on this segment of road. Genwal Resources proposes to stabilize this segment of road next summer (2008) in accordance with the terms of the Road Use Permit, and to reclaim the road in the future at such time as required by the Forest Service. Genwal has posted a \$38,000 reclamation bond with the Forest Service for this road.

The primary focus of the 2008 construction season will be full reclamation of the drillpads and interconnecting roadworks. Upon consultation with the respective regulatory agencies, it was agreed that the Forest Service access road segment would not be reclaimed during the 2008 construction season. This road segment will remain open to: (1) access the reclaimed drill pad areas in order to evaluate/monitor the success of the reclamation effort and (2) based on the findings of the evaluation, provide access for machinery that may be required for additional earth work.

The Special Use permit for the Forest Service road segment (See Attachment 12 of Appendix 5-22A) states in Exhibit B, "*Conditions of Approval (Operating Plan)*", "Reclamation of the Forest Service road shall be completed immediately after it is evident that on-lease pad reclamation is determined to be stable and no earth moving equipment is needed".

At the onset of the 2009 construction season, a site visit will be conducted by the appropriate regulatory agencies as soon as weather/road conditions permit. The purpose of the site visit will be to evaluate the success of the reclamation efforts on the drill pads and associated road segments. If it is determined during the site visit that the reclamation work has stabilized to a degree where additional work requiring earth moving equipment is no longer warranted, full reclamation of the remaining Forest Service access road segment will be completed during the 2009 construction season.

It should be noted that the Forest Service and SITLA have agreed that this segment of road will be left open within the near-term future to provide access to the reclaimed drillpad area in order to monitor the success of the reclamation effort. Therefore, during the 2008 construction season, the primary focus will be on stabilizing the road segment, with the commitment that at some time in the future, after reclamation success of the pad area has been demonstrated, this road segment will then be reclaimed. However, future management decisions by the Forest Service and/or SITLA may affect the long-term status of this road. This plan assumes that stabilization of the Forest Service road will be done initially (i.e., summer of 2008) and full reclamation will be done ultimately, and provides the details for accomplishing both scenarios.

As with all the other roads, Genwal Resources would propose to stabilize and later reclaim the Forest Service road in the standard manner. Before beginning any reclamation and/or stabilization work the first priority will be to dress up the existing waterbars along the road. The existing waterbars were installed last fall (2007) as equipment was being demobilized off the mountain at the close of the construction season. They were constructed primarily for runoff control and not for passage of vehicles. All waterbar locations were approved by the regulatory agencies. Prior to reclamation work during the summer of 2008 the waterbars will be deepened and extended to make them more easily traveled by the construction equipment and vehicles. The excelsior logs will be cleaned out and repaired as needed. Most waterbars now have at least one row of logs at the discharge to the outslope. Prior to any stabilization or reclamation, an additional row of logs will be placed at midslope, and a third row will be placed at the toe of the slope. This three-tier installation of excelsior logs will be done at all waterbar locations. This work will be done as soon as possible to make certain the sediment control devices are in place and functional prior to the late-summer rain season.

During the construction season the waterbars and excelsior log systems will be inspected on a regular basis and will be maintained and repaired as needed to provide maximum sediment control

The outslopes of the road will be stabilized through a combination of compaction and re-vegetation. The slopes will initially be compacted using a sheepsfoot rolling compactor affixed to the boom of a track-hoe. After compaction, the slopes will then be re-seeded with a permanent seed mix. A layer of wood straw will then be spread over the re-seeded slopes. The seed and straw will then be crimped into the soil using the same sheepsfoot attachment, but using a single upslope stroke of the back-hoe boom. As an added measure, near the end of the construction season, a second application of seeding will be done on all road outslopes.

Reclamation of the road would also proceed in the standard manner. That is, pull the outslopes up using a trackhoe, and place the material into the cutslope to achieve approximate original contour. The surface would be roughened (pocked) and re-seeded with a final seed mix. A layer of wood straw matting will then be spread over the reclaimed surface. An example of this reclamation method (less the wood straw) can be seen at the existing segment of SITLA road that has already been reclaimed where the road was realigned to the other side of the ridge. This example is quite pertinent since it involved rough steep countryside in many ways similar to the area of the Forest Service road. All stabilization and reclamation work on this segment

would be conducted with the oversight of Forest Service representatives under the authority of the Road Use Permit PRI-108.

The Forest Service has also issued a Road Use Permit #0410-03-46 to allow the company to utilize the existing Forest Service system roads for the remainder of the reclamation effort. This permit is included in Attachment 14. The company has posted a \$125,500 maintenance bond with the Forest Service for use of this road system during the reclamation process.

**5) Reclamation schedule**

Work on the remaining reclamation is not anticipated to begin until the summer of 2008. Crews will not mobilize onto the mountain until after the snow cover has melted off and the ground has dried out sufficiently. Also, the area is known habitat for Mule Deer, Elk, and Goshawk. Therefore, work will not be started until after the wildlife exclusionary period of July 7, unless an earlier start-date is authorized through consultation with appropriate agencies (Forest Service, DWR, DOGM, SITLA) at the time. Once work has begun the following schedule is anticipated, based on discussions with the contractor:

- a) Pads 2/6/oops road.....4 weeks
- b) Remaining access road from ledge to top.....2 weeks
- c) Forest Service road. (stabilization).....1 week
- d) SITLA road (stabilization).....2 weeks

**6) Revegetation Success**

Due to the emergency nature of the road and pad construction there was no vegetation reference area established to be used as a standard for comparison in determining future revegetation success. The Forest Service standard for success is when 90% of the original ground cover is re-established. Genwal Resources commits to work with Forest Service, SITLA and DOGM to implement an acceptable protocol for determining how and when revegetation success has been met sufficient for final Phase 3 bond release, which under DOGM rules requires a minimum 10 year liability period after initial seeding. This will involve a coordinated effort next summer (2008) with the various agencies to locate a suitable adjacent undisturbed area to be monitored along with the reclaimed site. These concepts can then be incorporated into the reclamation plan. Genwal Resources also commits to doing annual surveys of the reclaimed site to control and eradicate all noxious weeds as identified by the agencies.

**7) Reclamation Cost Estimates**

Scamp Excavation has prepared estimates of the cost to reclaim the remaining disturbed areas as follows (see Attachment 10 for details):

1) Pads and access road	33,800 yd3**	.....\$240,000
2) SITLA road	17,632 yds3	.....\$88,000
3) Forest Service road	7600 yd3	.....\$38,000

It should be noted that these cost estimates have been generated by Scamp Excavation based on their history of experience, and in particular on their first hand knowledge of the details of the work involved to complete the reclamation. This knowledge is well founded since it was Scamp who did the initial work to construct the drillpads and roads during the emergency rescue attempt, and who have done the subsequent reclamation completed to date. Therefore their estimate actually starts more with a total cost and a rougher idea of the total volume and unit costs involve. Therefore the estimates are to some extent "back-calculated", with the total estimated costs (backed up by rough volume estimates from field observation) driving the unit costs, rather than vice versa.

Prior to beginning the reclamation work, Genwal Resources obtained digital mapping of the drillpads (with 2' contour accuracy) based on aerial surveys. Using this contour mapping as a base, and projecting imaginary "as-reclaimed" contours (attempting to replicate the approximate original contours), earthwork volumes were then generated by computer. The results of the computer simulation agreed closely enough with the field volume estimates to validate the projected cost estimates supplied by Scamp Excavation. See Attachment 13 for computer generated cut/fill representation of the remaining drillpad reclamation and reclamation cross sections.

### **8) Bonding**

Based on discussions with the Division and Forest Service, Genwal Resources has presently secured reclamation bonds in the following amounts:

1) Pads and access road	\$286,196	(posted with DOGM)
2) SITLA road	\$95,279	(posted with DOGM)
3) Forest Service road	\$38,000	(posted with Forest Service)

### **9) Hydrologic Impacts**

As explained earlier, not all the drillholes could be plugged for their entire length. This raised concern among the Forest Service and the BLM that there could be some negative impacts to the groundwater hydrology in the area from the unplugged holes. In response to these concerns, Genwal Resources contracted with Peterson Hydrologic to conduct a detailed analysis of the possible affects of the drilling on the hydrologic resources of the area. This report concludes that "the drill holes in their current state of abandonment will not likely result in any significant detriment to groundwater resources in the vicinity of the drill holes". The report of this investigation is included in Attachment 15. (It should also be noted that the seep at the ledge in the pad area and the two wet spots (seeps??) along the SITLA road are different from any of the seeps identified and monitored under the existing Mining & Reclamation Plan and discussed in Mr. Petersen's Attachment 15 report.)

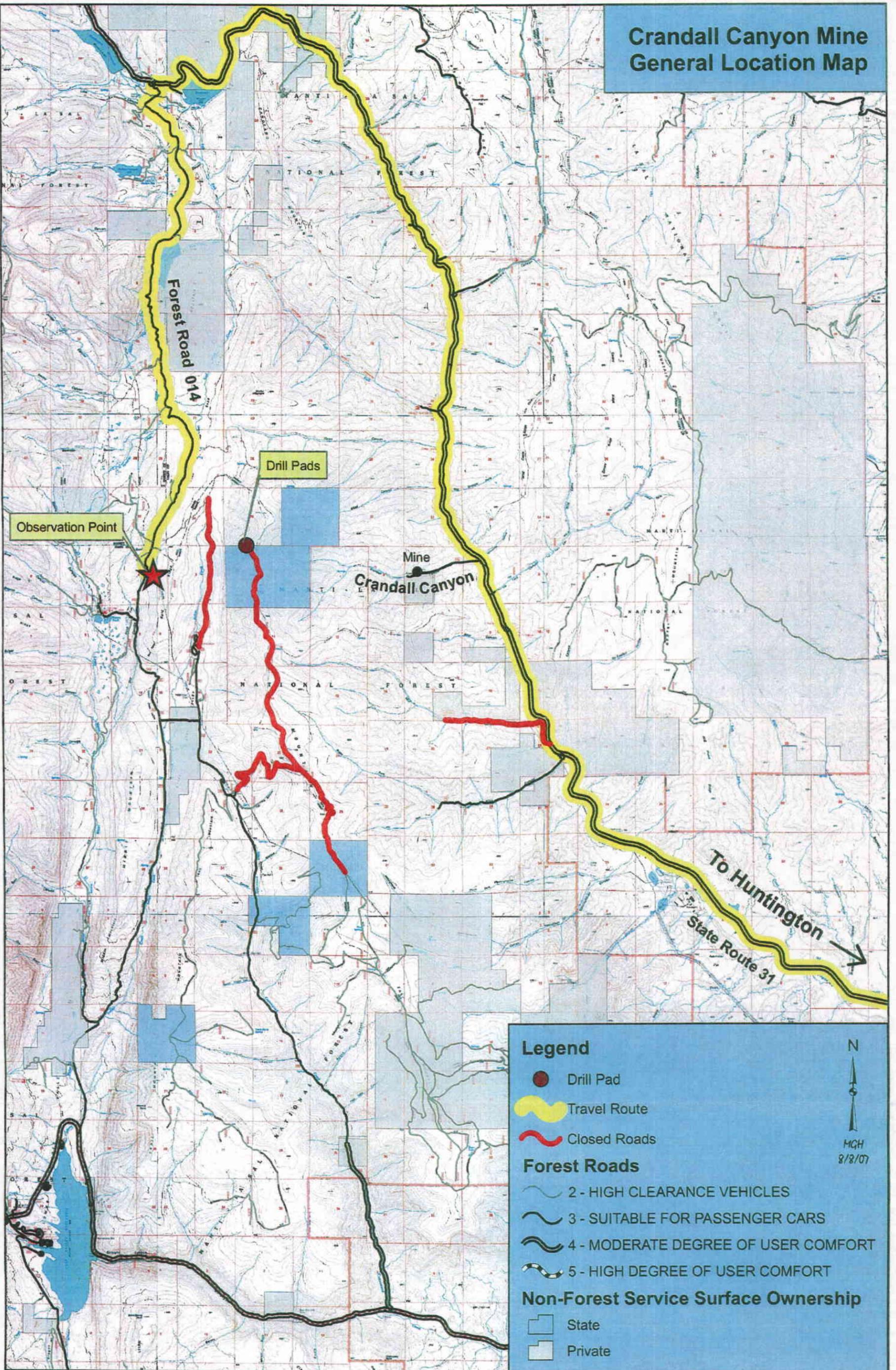
As explained previously, during reclamation all slopes will be pocked, and after reseeding, a layer of wood straw will be applied over the surface. In addition to helping the revegetation effort, the pocking also helps to prevent erosion by providing numerous small catchment basins for rainwater and snowmelt. The wood straw also helps control erosion by providing a degree of energy dissipation for falling raindrops. Also, in steep areas along the

reclaimed roads and pads excelsior logs will be installed along the contour and at the toe of the slope to control erosion. These excelsior logs will be located at specific sites to be determined by the Division at the time of reclamation based on local conditions. These three factors taken together should provide adequate erosion control to prevent, to the extent possible, additional contributions of sediment to stream flow or to runoff outside the permit area, and should provide the best assurance of complying with all applicable State and Federal water quality laws and regulations.

**ATTACHMENT 1**

**GENERAL LOCATION MAP  
(PROVIDED BY FOREST SERVICE)**

# Crandall Canyon Mine General Location Map



## Legend

- Drill Pad
- ▬ Travel Route
- ~ Closed Roads

## Forest Roads

- ~ 2 - HIGH CLEARANCE VEHICLES
- ~ 3 - SUITABLE FOR PASSENGER CARS
- ~ 4 - MODERATE DEGREE OF USER COMFORT
- ~ 5 - HIGH DEGREE OF USER COMFORT

## Non-Forest Service Surface Ownership

- State
- Private



0 1.25 2.5 5 7.5 10 Miles

**ATTACHMENT 2**

**VICINITY PHOTO/MAP  
(PROVIDED BY SITLA)**

1715 ft of roads on Forest Service land north of section boundary

Total length of roads on Trust Land: 11044 ft  
Length of proposed permanent road on Trust Land: 4959 ft

2573 ft of roads on Forest Service land south of section boundary

**Crandall Canyon**

-  Drill Pads
- Road**
-  Realignment Road
-  Proposed Permanent Road
-  100% Reclamation
-  Forest Service Road
-  Trust Land Surface

0 500 1,000 Feet

For Reference Use Only  
Produced: October 16, 2007 SITLA

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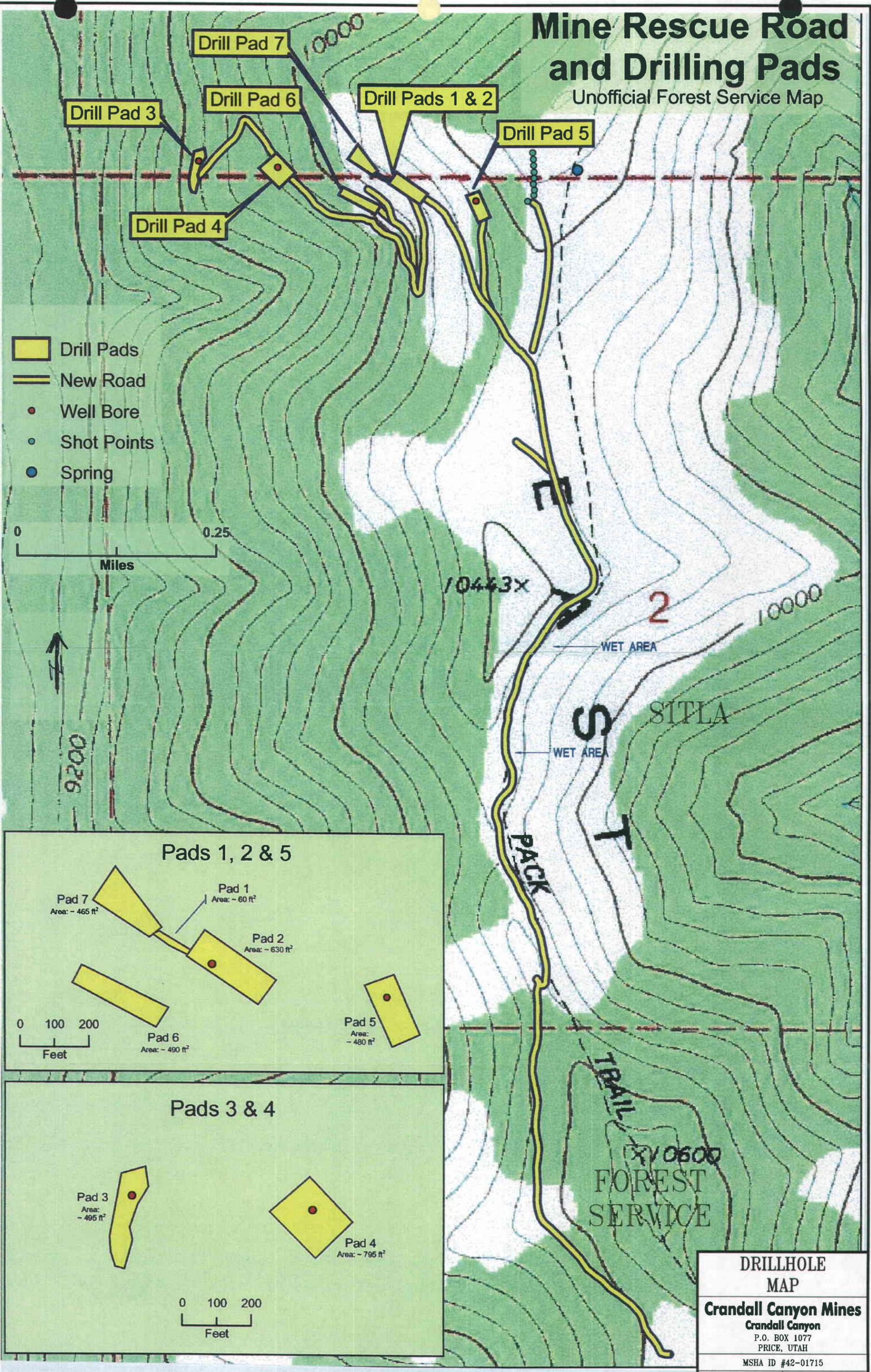
VICINITY	
PHOTO / MAP	
<b>Crandall Canyon Mines</b>	
Crandall Canyon	
P.O. BOX 1077	
PRICE, UTAH	
MSHA ID #42-01715	
DRAWN BY	DATE
SITLA	12 DEC. 2007
SHEET	1 of 1

**ATTACHMENT 3**

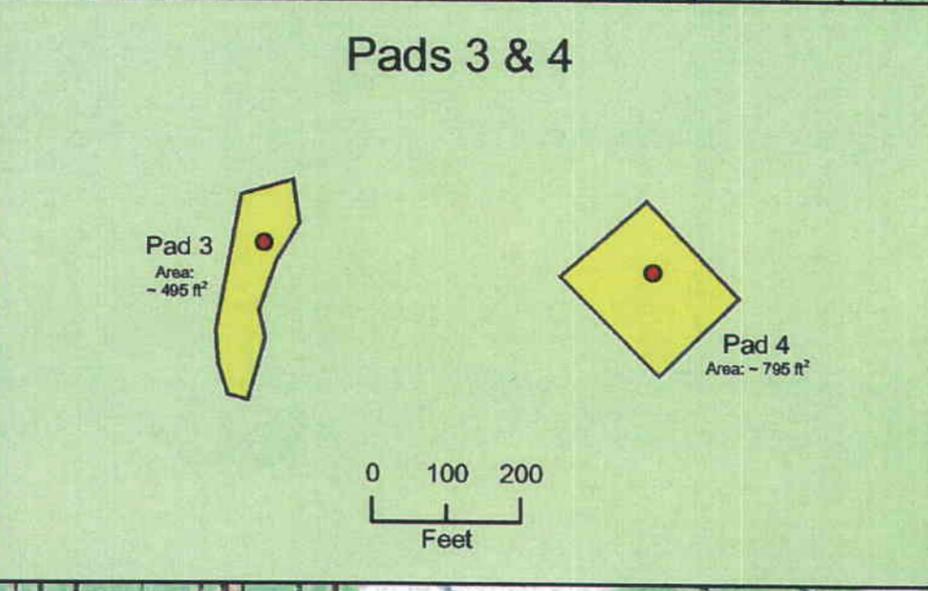
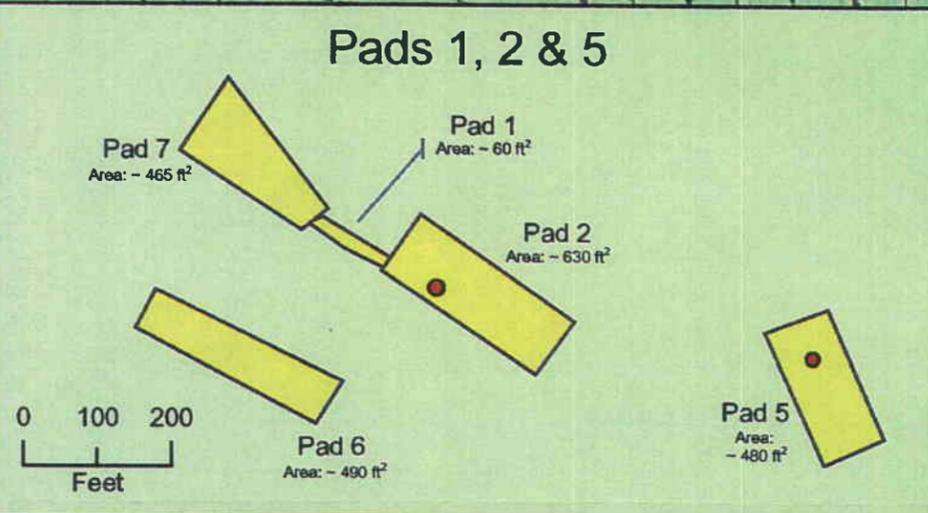
**DRILL HOLE MAP  
(PROVIDED BY FOREST SERVICE)**

# Mine Rescue Road and Drilling Pads

Unofficial Forest Service Map



- Drill Pads
- New Road
- Well Bore
- Shot Points
- Spring



<b>DRILLHOLE MAP</b>	
<b>Crandall Canyon Mines</b>	
Crandall Canyon P.O. BOX 1077 PRICE, UTAH	
MSHA ID #42-01715	
DRAWN BY FOREST SERVICE	DATE 26 JUNE 2008
SHEET	

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**ATTACHMENT 4**

**DRILLSITE AERIAL PHOTO  
(OLYMPUS AERIAL SURVEY)**

SECTION 35  
SECTION 2

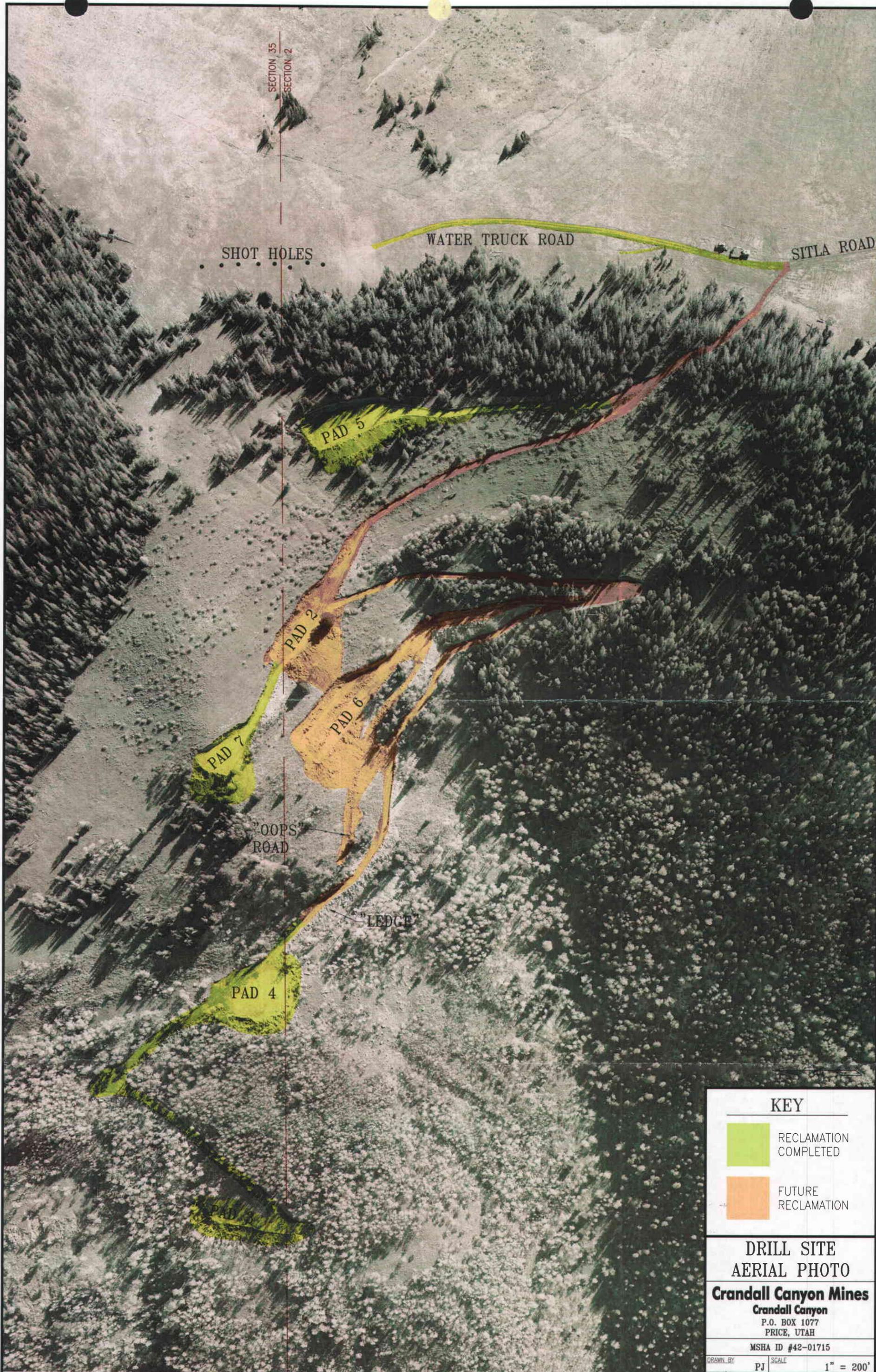
**DRILL SITE  
AERIAL PHOTO**

**Crandall Canyon Mines**  
Crandall Canyon  
P.O. BOX 1077  
PRICE, UTAH

MSHA ID #42-01715

DRAWN BY	PJ	SCALE	1" = 200'
APPROVED BY	DS	DATE	12 Dec. 2007
SHEET			ATTACHMENT #4

ATTACHMENT #4



SECTION 35  
SECTION 2

SHOT HOLES

WATER TRUCK ROAD

SITLA ROAD

PAD 5

PAD 2

PAD 6

PAD 7

"OOPS"  
ROAD

"LEDGE"

PAD 4

**KEY**



RECLAMATION  
COMPLETED



FUTURE  
RECLAMATION

**DRILL SITE  
AERIAL PHOTO**

**Crandall Canyon Mines**

**Crandall Canyon**  
P.O. BOX 1077  
PRICE, UTAH

MSHA ID #42-01715

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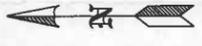
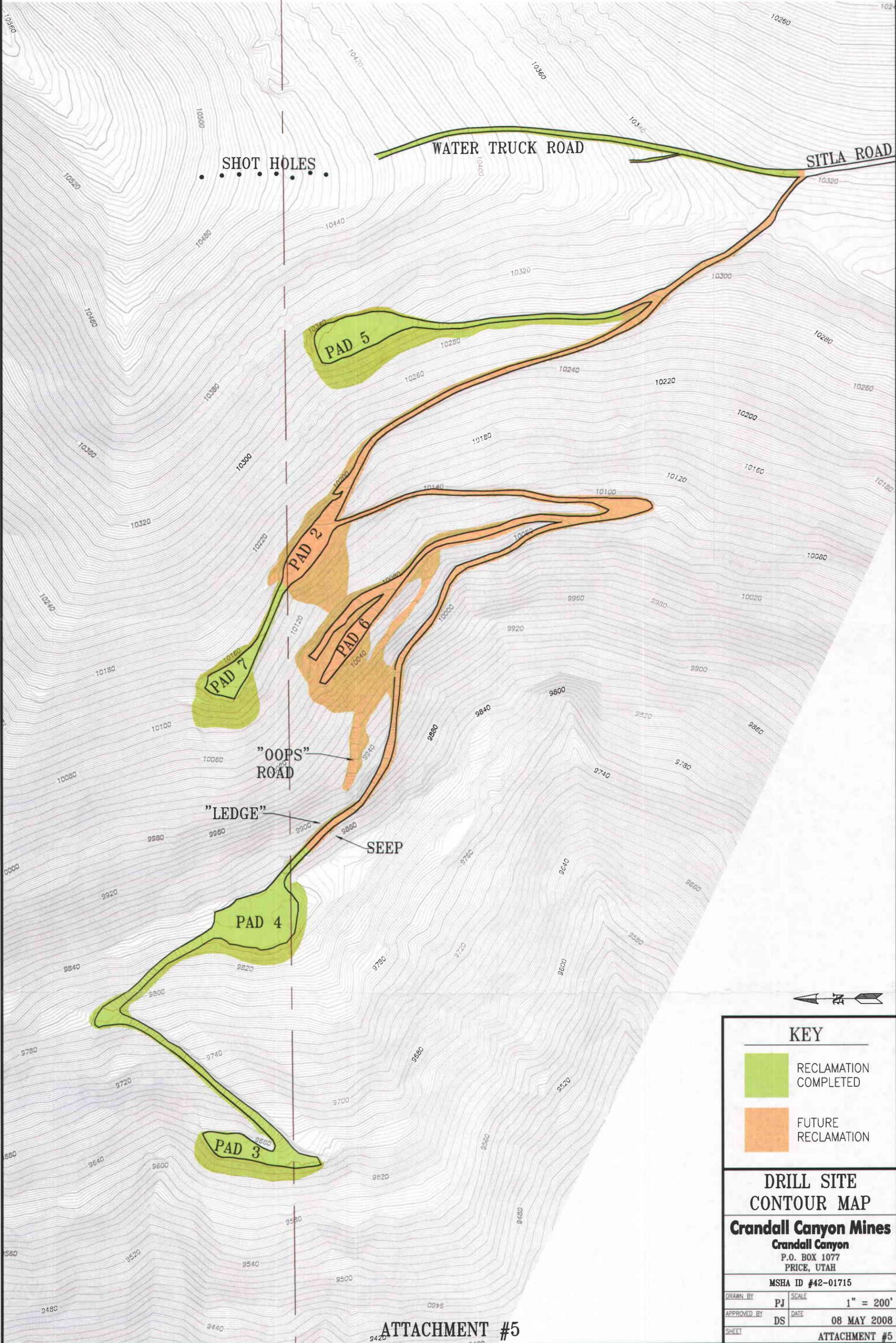
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**ATTACHMENT 5**

**DRILLSITE CONTOUR MAP  
(OLYMPUS AERIAL SURVEY)**

SECTION 35  
SECTION 2



**KEY**

- RECLAMATION COMPLETED
- FUTURE RECLAMATION

**DRILL SITE  
CONTOUR MAP**

**Crandall Canyon Mines**  
Crandall Canyon  
P.O. BOX 1077  
PRICE, UTAH

MSHA ID #42-01715

DRAWN BY	PJ	SCALE	1" = 200'
APPROVED BY	DS	DATE	08 MAY 2008
SHEET			ATTACHMENT #5

**ATTACHMENT 6**

**INTER-AGENCY RECLAMATION PLAN MEMO  
(PRISCILLA BURTON, DOGM)**

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## UTAH OGM COAL PROGRAM MEETING NOTES

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**Date:** September 7, 2007

**Time:** 9:30 am – 4:30 pm

**Location:** East Mountain

**To:** Internal File, Crandall Canyon Mine, C/015/032, Reclamation of Emergency Mine Rescue Drill Holes.

**From:** Priscilla Burton

**Attendees:** Priscilla Burton and Karl Houskeeper, DOGM; Dave Shaver and Mike Glasson, UEI; Tom Lloyd, Manti La Sal National Forest; Adam Robison, SITLA; Shane Campbell, Scamp Excavation Inc.

**Purpose:** To discuss the reclamation work to be achieved in the next month, weather permitting, and the interim reclamation/stabilization of the remainder of the site for winter.

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### MEETING SUMMARY:

UEI has notified MSHA that the 7 drill holes will be plugged. A confirmation letter is expected from MSHA. The drill holes will not be plugged until after a planned family ceremony. Sue Wiley, BLM, requests prior notification of plugging, so that she can document the process at each hole.

Work currently underway by UEI: aerial photography of site, hole plugging requirements requisition; site survey by Kodi Ware

#### **Stabilization work that will be started during the week of September 10, 2007 (prior to family ceremony):**

1. Fill all remaining mud pits
2. Grade pads 6, 7, 1, 2 and 5 towards cut.
3. At pads 6, 7, 1, 2 and 5 create drainage ditch against cut to direct flow to undisturbed slope.
4. At pads 6, 7, 1, 2 and 5, place excelsior logs at outlet of ditch in undisturbed to filter flow and break velocity.
5. Flatten blast holes along water truck road, and seed.
6. Rip on the contour and seed water truck road.

**Following hole plugging, the following reclamation was agreed upon for this season.**  
(Shane plans on using 4 trackhoes, 1 ten wheeler, and a couple of dozers.)

**Drill pad #3**

Ramp down outslope to shuttle side cast material up to pad with track hoe (60 inch bucket). Spread material on pad with dozer. Scatter fertilizer over the site with a hand applicator. Roughen site (gouge or pock) with 2 ft hoe. At this site surface mulch will consist of grubbed vegetation returned to site surface after pocking.

#### **Drill pad #4**

Side cast material will be replaced with a trackhoe on this wide and flat pad. Wood fiber mulch donated by the USFS and fertilizer will be scattered by hand across the site and gouged into the surface with the 2 ft bucket of a hoe.

#### **Drill pads #6, 7, 1, 2, 5**

If, the weather allows work to continue after pads 3 & 4 are reclaimed, then pad #7 followed by pad #5 will be reclaimed. However it is more likely that drill pads # 6, 7, 1, 2 and 5 will be delayed until July 2008, when access will be possible. The stabilization of these pads was previously described above.

#### **Stabilize Access Road from Drill pad #4 east to the East Mountain saddle**

Reclamation of the road will end approximately 0.1 miles east of drill pad #4 at a high cut in solid rock on the road. Rocks will be set against the toe of the cut. Rocks will also be set in the fill and on the surface of the fill to maintain a rough surface.

On the unreclaimed portion of the access road, water ditches ("blow outs") will be used to convey water off the road through excelsior logs to the outslope of the road. Water ditches will be placed according to the Forest Water Quality Guidelines (FWQG) which indicate a ditch every 100 ft for grades less than 15% and a ditch every 50 ft. for grades greater than 15%. Adam Robison will check placement frequently.

There are three "wet spots" on the road. These potential springs will be watched over the next month to determine whether they are due to the mud pits or whether springs were intercepted that will require treatment (French drain construction) during final reclamation. Construction of a drain would entail placement of 2 - 3 inches of gravel at water contact. Geotextile fabric would be placed over the top of the gravel.

#### **Stabilize Access Road from East Mountain saddle south to pre-existing road**

End of season, as exit site, berms will be removed in some locations where heavy snow pack and drifts are expected. i.e. from "hog's back" to the north 0.25 mi. Adam Robison will specify locations to remove berm. Along remaining road, berms will be retained so more soil will not be lost to sidecasting. Water ditches will be placed according to the Forest Water Quality Guidelines (FWQG) mentioned previously.

#### **ACTION ITEMS to be done the week of September 10, 2007:**

##### **Priscilla Burton:**

- Contact Sherriff Guyman and ask the date of the family ceremony.
- Contact Kevin Strickland, MSHA, relate that MSHA trailer is no longer in a secured area.
- Send Tom's .pdf file of disturbance to Dave and Mike.
- Determine fertilizer type, based upon wood fiber material.

**Shane Campbell:**

- Contact Horace Petty to have dead cow removed from USFS access road.
- Put back ATV gates at Indian Campground
- Take "Road Closed" signs down.

**Mike Glasson:**

- Provide MSDS sheets to Priscilla Burton, Tom Lloyd and Adam Robison.
- Contact Sue Wiley, 636-3651, prior to hole plugging so that she can be present to observe the entire process.

**Tom Lloyd:**

- Provide preferred seed mix, alternate mix, and cover crop (if necessary due to seed shortage) to Adam Robison, for coordination with SITLA. Copy to Priscilla Burton @ DOGM
- Provide information sheets on wood fiber mulch.
- Provide .shp files to Adam Robison for site

**Adam Robison:**

- Provide preferred seed mix, alternate mix, and cover crop (if necessary due to seed shortage) to Tom Lloyd, for coordination with USFS. Send copy to Priscilla Burton @ DOGM
- Provide product information and contact information for excelsior logs to Shane Campbell. Send copy to Priscilla Burton @ DOGM
- Create contact sheet for all those present. Contact sheet will include Scamp Excavation Inc. job foreman, and emergency contacts for area.
- Information to Shane for closure sign on gate.

**Dave Shaver:**

- Provide DOGM with copies of correspondence with MSHA concerning hole plugging.
- Contact Sue Wiley, 636-3651, prior to hole plugging so that she can be present to observe the entire process.
- Once consensus is reached between USFS and SITLA, inquire as to availability of seed.

**ADDITIONAL COMMENTS: (This section is intended to provide attendees the opportunity to contribute additional and significant information concerning the meeting content that may not have been mentioned during the meeting.)**

Adam has agreed to have SITLA generate road profiles so that grade can be determined.



ATTACHMENT 7

INTERIM AND FINAL SEED MIX

# Interim Seed Mix

## Seed Mix for Crandall Temporary Seed Mix

Revised September 14, 2007

Species	Variety	Common Name	Pounds/ Acre (PLS)	seeds/lbs	seeds/acre	Seeds/ft^2
<i>Elymus trachycaulus</i> ssp.	Primar	Slender Wheatgrass	2	159,000.00	318000.0	7.3
<i>Dactylis glomerata</i>	Paute	Dryland Orchardgrass	2	654,000.00	1308000.0	30.0
<i>Phleum pratense</i>		Timothy	1	1,300,000.00	1300000	29.84
<i>Secale cereale</i>		<del>#Cereal Rye</del> <del>0</del>		18,000.00	594,000.00	13.64
<i>Triticum aestivum</i> x <i>Secale cereale</i>	QuickGuard Sterile Triticale	Triticale	<del>69</del>	13,000.00	468,000.00	10.74
<i>Lolium Perenne</i> ssp.		Annual Ryegrass	2	227,000.00	454,000.00	10.42
<i>Multiflorum</i>		Westren yarrow	0.25	2,770,000.00	692500.0	15.9
<i>Achillea millefolium</i>	Occidentalis		76.25		5134500.0	117.9
<b>Total</b>						

\* Replace w/ Quick Guard Triticale

Seed Mix for Crandall mine Drill Pads and roads

Final Seed Mix

Revisited September 14, 2007

Species	Variety	Common Name	Pounds/ Acre (PLS)	seeds/lbs	seeds/acre	Seeds/ft^2
<i>Bromus marginatus</i>	var. Garnet	Mountain Brome	2.5	90,000.00	225000.0	5.2
<i>Elymus trachycaulus</i> ssp. <i>Trachycaulus</i>	var. Primar	Slender Wheatgrass	2	159,000.00	318000.0	7.3
<i>Dactylis glomerata</i>	var. Paiute	Dryland Orchardgrass	2	654,000.00	1308000.0	30.0
<i>Poa alpina</i>		Alpine Bluegrass	1	1,000,000.00	1000000.0	23.0
<i>Elymus lanceolatus</i> ssp. <i>Lanceolatus</i>	var. Critana	Thickspike Wheatgrass	2	154,000.00	308000.0	7.1
<i>Phleum pratense</i>		Timothy	1	1,300,000.00	1300000	29.84
<i>Festuca rubra</i>		Red Fescue	1	500,000.00	500,000.00	11.48
<i>Festuca trachyphylla</i>		Hard Fescue	1	565,000.00	565,000.00	12.97
<i>Secale cereale</i>		Cereal Rye	9	18,000.00	162,000.00	3.72
<i>Triticum aestivum</i> x <i>Secale</i> <i>cereale</i>	QuickGuard Sterile Triticale	Triticale	10	13,000.00	130,000.00	2.98
<i>Heliopsis multiflora</i>		Showey Goldeneye	0.25	1,055,000.00	263,750.00	6.05
<i>Vicia americana</i>		American vetch	0.5	33,000.00	16,500.00	0.38
<i>Artemisia ludoviciana</i>		Prairie sage	0.1	4,500,000.00	450,000.00	10.33
<i>Achillea millefolium</i>	var. occidentalis	Westren yarrow	0.2	2,770,000.00	554000.0	12.7
<b>Total</b>			<b>32.55</b>		<b>7100250.0</b>	<b>163.0</b>

**ATTACHMENT 8**

**WOOD STRAW INFORMATION  
(FOREST CONCEPTS, LLC)**

**SEDIMENT CONTROL LOGS  
(WESTERN EXCELSIOR CORP)**

## Model LS64-100

### WoodStraw™ brand engineered erosion control mulch Technical Specification (3-26-07)

#### General Description:

Wood-strand erosion control mulch – An all-wood long-strand material comprised of a blend of loose thin wood pieces, each with a high length-to-width ratio such that the pieces form a protective matrix when distributed on the soil. Model LS64-100 is comprised of wood strands that have the following nominal properties:

- "L" Length: 6.3 inch (160mm)
- "S" Length: 2.5 inch (64mm)
- Width: 3/16 inch (4.7mm)
- Thickness: 1/10 inch (2.5mm)
- Ratio of L:S 50:50 by area (mass)



#### Labeling:

Each pallet is marked with manufacturer's name, model number for blend, lot number, and predominant wood species. The standard wood species is Douglas fir. Cottonwood (Populus sp.) is available on special order.

#### Technical Description:

A manufactured all-wood long-strand soil erosion control mulch that is a blend of geometrically regular wood elements that have a straw-like form and function. The components of the blend shall be as specified in the Manufacturer's technical data for the model number specified. The materials are baled in green or air-dried condition and inherently free of noxious weed seeds and other additives detrimental to plant life.

#### Packaging:

Wood-strand mulch is packaged in bales tied with poly bale twine.

- Regular bales are 14" x 18" x 18"-22" and have a target weight of 50 lbs with a range of 40-60 lbs.
- Large bales are 30" x 40" x 42"-54" and have a target weight of 575 lbs with a range of 500-650 lbs.

#### Application:

- Hand Crews
- Straw Blowers
- Helicopter Aerial Application

#### Estimated Coverage Rate:

Coverage rate per bale is a function of application method and site conditions. Estimates are based on 1/100 acre plots on a smooth surface. We cannot guarantee actual coverage rates per bale under field conditions.

*Note: Bale size was reduced to improve handling at request of USDA Forest Service on May 15, 2006.*

Coverage Objective	Regular Bales		Large Bales	
	Sq Ft per Bale	Bales per Acre	Sq Ft per Bale	Bales per Acre
50% soil cover	290	150	3,351	13
70% soil cover	158	276	1,815	24

\* 70% Coverage recommended for slopes over 33%, highly sensitive areas, wind-blown areas and highly erosive soils.

#### Other:

- WoodStraw™ is a trademark of Forest Concepts, LLC
- This material is protected by US Patent 6,729,068. Other patents may be pending or in preparation.
- Specifications, terms, pricing and design are subject to change without notice and without liability therefore.
- All sales are subject to the General Terms of Sale that are in effect at the time of accepting an order.
- Development was supported in-part by the Small Business Innovation Research program of the U.S. Department of Agriculture, grant number # 2003-33610-13997. Additional scientific research provided by USDA Forest Service Rocky Mountain Research Station, Moscow Idaho.

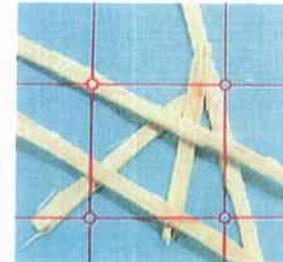
## Measuring Ground Coverage Rate for Erosion Control Mulch

Rev: February 19, 2007

The percent ground cover is an important determinant of the initial effectiveness for long-strand erosion control materials. The percent ground cover is a dominant factor when modeling wind and rainfall erosion using programs such as WEPP.

We know that the variance of percent cover across a treated area is high with hand, machine and aerial spreading methods. A coefficient of variation (CV) of 25% or more is typical for small plots, and higher CVs are common across landscape scale projects. Thus, to obtain a reasonable estimate of the average coverage, many data points need to be collected. We recommend at least eight (8) measurements for areas of less than 1/10 acre and at least twelve (12) measurements per acre for larger areas.

The "point intercept grid" method is among the preferred ways to measure the application rate (expressed as percent ground cover) and uniformity (expressed as CV). The method requires a clear sheet of polycarbonate or similar material that is embossed or perforated with a uniform grid of intersecting lines, small diameter holes or small dots. The size of the grid sheet should be at least 200mm (8 inches) in each direction. The Forest Concepts grid sheet is small enough to carry in the field and has 48 measurement points on a 6 x 8 grid.



Using the grid sheet:

Place the grid sheet randomly on the ground in an area where mulch has been applied. From a sight-line directly above the grid, count the points on the grid that intersect with pieces of mulch. A grid point is counted if more than half of its area is above a piece of erosion-control material. (Do not count non-functional chaff since it will blow away or be incorporated into the soil within the first few minutes of rain). A point is not counted if it is above bare soil or if less than half of its area corresponds with a piece of erosion-control material. Record the number of points counted on a field data sheet.

(When training a new observer, both the grid points that correspond with mulch and the points that do not are counted, tabulated and checked against the total number of points on the grid (48, in our case) to confirm consistency and that all points are being counted.)

Mark the locations of each measurement on a site map. This will allow you to create "contour" plots of the data if that information helps explain sources of variation across the application area.

Calculate the average percent cover, standard deviation and CV (standard deviation expressed as a percentage of the mean). The average percent cover should then be compared to the contract specifications. The contract specifications may also specify allowable variance of cover by including a maximum permissible standard deviation and/or CV. Note that the CV is sensitive to the number of observations made, so a CV specification may also require specification of an appropriate sampling strategy.

*Innovative and Environmentally Friendly Forest Products & Services*

## WoodStraw™ Wood Strand Erosion Control Mulch BLM – Utah – Pilot Peak Fire – February 2007



- Aerial application of 675 tons of Woodstraw™
- Protect Threatened Lahotan Cutthroat
- BLM Contact – Dave Fresques – Civil Engineering Technician
  - [David\\_Fresques@blm.gov](mailto:David_Fresques@blm.gov) – 801-977-4329



# Forest Concepts, LLC

1911 SW Campus Drive, #655  
Federal Way, WA 98023  
Phone: (253) 838-4759  
(253) 838-7229  
FAX: (253) 815-9900  
web: [www.forestconcepts.com](http://www.forestconcepts.com)

Innovative Forest Products and Natural Resource Services

## WoodStraw™ long-strand erosion control Mulch School Fire – October 2005



Area of helimulching with wood-strand erosion control mulch.



CERTIFIED WEED-FREE  
STRAW & FEED REQUIRED  
ON NAT'L FOREST LANDS



Chad Lipscomb, PE, CPESC  
Director, Technical Services  
Western Excelsior Corporation  
PO Box 270308  
Fort Collins, CO 80527-0308  
970-631-8366 office  
chad@westernexcelsior.com

"Blanketing Nature With Nature"

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Effective: 11/01/07

RE: Certificate of Conformance: *Aspen Excelsior Logs*<sup>SM</sup>

To Whom it May Concern:

This letter is to certify that Western Excelsior manufactures the product marketed as Western Excelsior Aspen Excelsior Sediment Control Log. Each log is subjected to Western Excelsior's Quality Assurance Program and is manufactured to the specifications listed in document #WE\_EXCEL\_AEL\_SPEC\_030806. A copy of the specification document is attached. Installation instructions are provided in document # WE\_EXCEL\_LOG\_II\_1205. If you have any questions regarding the installation, use or properties of the sediment control log, please feel free to contact me.

Regards,

A handwritten signature in blue ink, appearing to read "Chad M. Lipscomb".

Chad M. Lipscomb, PE, CPESC  
Director, Technical Services  
Western Excelsior Corporation



# Installation Instructions – Logs and Wattles

## Step 1 – Site Preparation

Prepare site to design profile and grade. Remove debris, rocks, clods, etc. Ground surface should be smooth prior to installation to ensure log remains in contact with slope.

## Step 2 – Stake Selection

At a minimum, 1" long by 1" by 24" stakes are to be used to secure the log to the ground surface. Installation in rocky, sandy or other loose soil may require longer stakes.

## Slope Installation

Place RECP along slope to provide upstream and downstream apron for log. Secure RECP according to standard slope installation instructions including upstream anchor trench. Secure log to blanket, ensuring log remains in intimate contact with the RECP over the length of the installation. A minimum of one foot upstream apron and two feet of downstream apron are required for installation. Subsequent, downslope rows of logs should be spaced appropriately for site conditions to minimize acceleration of flow. Further, log seams are to be offset to ensure continuous filtration. Figure A presents a schematic of a slope installation in profile view.

## Channel Installation

Place RECP along channel to provide upstream and downstream apron for log identically to slope installation. Secure log to blanket, ensuring log remains in intimate contact with the RECP over the length of the installation. Subsequent, downstream rows of logs should be spaced appropriately for site conditions to minimize acceleration of flow. Further, log seams are to be offset to ensure continuous filtration. Figure B presents a schematic of channel installation.

## Drain Filter Installation

Surround drain inlet to be protected with log, ensuring seams are overlapped to minimize flow circumventing log. Secure logs to ground surface ensuring the log remains in intimate contact with the ground surface over the entire installation. Provide RECP apron secured to the ground surface between drain and log.

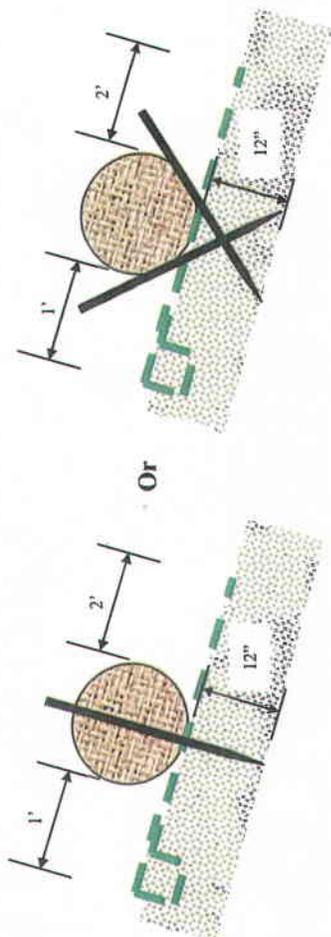


Figure A – Profile View Slope Installation



Do not allow flow to overtop installation.

Figure B – Cross Section View Channel Installation

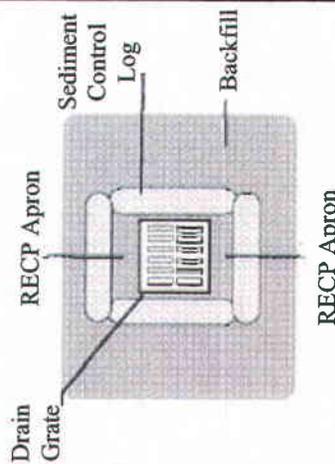
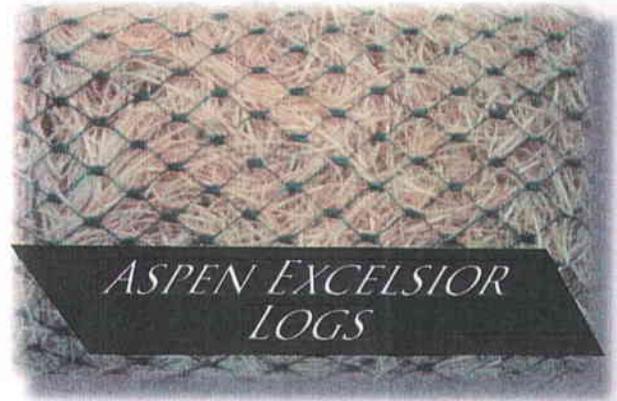


Figure C – Plan View Drain Filter



## EXCEL Product Data and Specifications



### Description

Western Excelsior manufactures Aspen Excelsior Logs in addition to a full line of Rolled Erosion Control Products (RECPs). Aspen Excelsior Sediment Control Logs consist of a machine produced High Altitude Rocky Mountain Aspen Excelsior Matrix confined by a Synthetic Net to form a log of specific length and diameter. Aspen Excelsior Logs are designed to reduce hydraulic energy and filter sediment laden flow in channels and on slopes. The logs are flexible to conform to the soil surface and are secured by staking. Aspen Excelsior Sediment Logs can be ordered in custom lengths to meet specific job conditions.

### Specifications

Each Aspen Excelsior Log is manufactured under Western Excelsior's Quality Assurance Program to ensure a continuous distribution of fibers and consistent dimensions. Log Dimensions are provided in Table 1 and product characteristics are provided in Table 2. Installation instructions and performance data are available from Western Excelsior's Technical Support Division.

Table 1

Log Property	Value
Length	10 ft.
Diameter	9, 12, 18 or 20 in.
Weight*	25 lbs (9 in.) 30 lbs (12 in.) 43 lbs (18 in.) 50 lbs (20 in.)
Density*	5.8 lbs/ft <sup>3</sup> (9 in.) 4.0 lbs/ft <sup>3</sup> (12 in.) 3.5 lbs/ft <sup>3</sup> (18 in.) 2.4 lbs/ft <sup>3</sup> (20 in.)
*Based on Measurements at time of Manufacture	

Table 2

Characteristic	Dimension
Fiber Composition	High Altitude Machine Curled Aspen Excelsior
Fiber Dimensions	80% Greater than 6 in.
Netting	0.50" x 0.50" Heavy Duty Synthetic
Configuration	Cylindrical with Closed Ends
End Closure	Hog Ring or Tied

Document # WE\_EXCEL\_AEL\_SPEC\_030806. This document has been developed to provide the characteristic properties of the product described. This document supersedes all other documentation regarding Aspen Excelsior Logs as of 03/08/06. For questions, to request performance data or installation recommendations, contact Western Excelsior at 800-967-4009 or wexcotech@msn.com.

**ATTACHMENT 9**

**EAST MOUNTAIN EMERGENCY DRILLING  
SLOPE STABILIZATION  
(BLACKHAWK ENGINEERING)**

**EAST MOUNTAIN EMERGENCY DRILLING**  
**SLOPE STABILIZATION**

PREPARED BY: DAN W. GUY, P.E.  
BLACKHAWK ENGINEERING, INC.  
JUNE 2008



## EAST MOUNTAIN EMERGENCY DRILLING SLOPE STABILIZATION

### General:

This report is intended to clarify and summarize the proposed methods for reclaiming and stabilizing the remaining drill pads and access roads constructed for the emergency drilling in 2007. The focus of this report will be on the effectiveness of the stabilization techniques, preventing erosion and downslope soil loss.

The company has committed to complete reclamation of the drill pads and access roads; however the USFS and SITLA roads are to be stabilized and remain in place for at least another year to allow monitoring of the drill pad reclamation..

This report is divided into the following subjects: Runoff Calculation; Pad and Intermediate Road Reclamation/Stabilization; Road Stabilization; Summary.

### Runoff Calculations:

The potential for erosion from the road and pad areas has been calculated based on the maximum watershed area draining to the roads and pads. Calculations are based on the expected runoff from a 10 year-6 hour event of 1.55", taken from Appendix 7-4 in the approved M.R.P. The runoff curve number of 69 was also taken from that appendix. Runoff area, as well as lengths and slopes were taken from the maps in the Addendum to the Reclamation Plan for the East Mountain Emergency Drill Pads (Task #2893).

The following criteria were therefore used for the runoff calculations:

Maximum Contributing Watershed Area	=	10 acres.
Watershed Length	=	1320 ft.
Watershed Elevation Change	=	726 ft.
Watershed Slope	=	0.55
Runoff CN	=	69
10 year-6 hour Precipitation	=	1.55"

Runoff calculations were completed by the computer program "Office of Surface Mining Watershed Model", Storm Version 6.21, by Gary E. McIntosh.

Based on the calculations, the peak runoff to the road or pad areas from the watershed above would be 0.26 cfs. Copies of runoff calculations are included in Attachment 1 of this report.

Although no actual ditches are proposed to be constructed, this flow was routed through a theoretical road ditch at slopes of 5%, 10%, and 15%, to evaluate maximum expected velocities. The flow velocities range from 2.24 fps for the 5% slope, to 2.91 fps for a 10% slope, and 3.39 fps for a 15% road slope. This indicated that water bars can be at intervals determined by field observation rather than using a pre-determined spacing, which could contribute to outslope erosion.

The erosion potential of both pads and road outslopes were then evaluated using the Universal Soil Loss Equation (USLE) to estimate sediment yield from the undisturbed /disturbed/reclaimed area.

Calculations were run to estimate the total sediment production from the undisturbed, disturbed, and reclaimed sites, and to evaluate the effectiveness of the treatments.

The Universal Soil Loss Equation (USLE) was used to estimate sediment yield from all areas.

Erosion rate (A) in tons-per-acre-per-year is determined using the USLE as follows:

$$A = (R) (K) (LS) (CP)$$

where the variables R, K, LS, and CP are defined as follows:

Variable "R" is the rainfall factor which can be estimated from  $R = 27P^{2.2}$ ; where P is the 2-year, 6-hour precipitation value. P for the Crandall Canyon area is estimated at 1.00" based on Figure 5.4, page 315, Barfield, et.al., 1983. Therefore, the estimated value of "R" for this area is 27.00.

Variable "K" is the soil erodibility factor. For all areas, the "K" value is estimated to be 0.37. These values are based on estimates from Table 5.5, page 330, Barfield, et.al., 1983, and assuming the soil type doesn't change appreciably between undisturbed, disturbed & reclaimed.

Variable "LS" is the length-slope factor. This figure was determined by applying the slope length and percentage for the probable worst-case pad/road disturbance as shown on the East Mountain Emergency Drill Pads, Attachment 13 - Plate 2, between cross sections A - A' and B - B'. At this location, the length (L) is approximately 500' and the slope (S) is approximately 0.50.

Variable "CP" is the control practice factor, which can be divided into a cover and a practice factor. For purposes of these calculations, the following "CP" values were used:

**\*Cover Factor - "C"**

Reclaimed Area =  $0.05 \times 0.04 = 0.02$  (Permanent Seed x Roughening)  
Undisturbed Area = 0.15 (Table 5.A.3 - 40% cover)  
Disturbed Area =  $0.40 \times .040 = 0.16$  (Temporary Seed x Roughening)

\*Barfield, et. al., 1983, Appendix 5A.

**Control Practice Factor - "P"**

Assumed equal to 1.0, since the land is not used for crops.

The table on the following page is a summary comparing expected sediment contributions from the proposed disturbed area only, under all three phases of conditions - Undisturbed, Disturbed and Reclaimed.

Note: While this set of calculations assume all sediment production is delivered offsite, this is probably not the case. The deep surface gouging during reclamation will likely trap most, if not all, of the transported sediment prior to leaving the reclaimed area.

The sediment volume is based on a density of 100 pounds per cubic foot of sediment.

**Area**

The projected area is conservatively estimated at 2.0 acres.

**Undisturbed/Disturbed/Reclaimed  
Sediment Yield Calculations - USLE**

(Pad/Road Area)

Drainage	R	K	Acres	Slope Length Feet	Slope (%)	LS	CP	A	Yield
Undisturbed	27.00	0.37	2.00	500	50.00	39.62	0.15	59.371	0.0545
Disturbed	27.00	0.37	2.00	500	50.00	39.62	*0.16	63.329	0.0582
Reclaimed	27.00	0.37	2.00	500	50.00	39.62	**0.02	7.916	0.0073

\* Temporary Reseeded/Roughened

\*\* Permanent Reseeded/Roughened

Total Sediment (Undisturbed State) .....	0.0545
Total Sediment (Disturbed State) .....	0.0582
Total Sediment (Reclaimed State) .....	0.0073

A = tons/acre-year

Yield = acre-ft/year

The above calculations indicate the potential sediment contribution from the undisturbed area would be approximately 0.0545 acre feet per year, while the roughened and seeded disturbed area would contribute only slightly more at 0.0582 acre feet per year. The stabilized and/or reclaimed areas which are deeply roughened and permanently seeded would contribute far less sediment at 0.0073 acre feet per year. Obviously, this is only a theoretical situation, since the deep gouging would likely prevent most if not all of the erosion and sediment transport. Also, on-site observations may indicate areas where additional controls (i.e. excelsior logs) may be required.

### Pad & Intermediate Road Reclamation/Stabilization:

The pads and intermediate roads will be reclaimed as described in the plan, "Addendum to the Reclamation Plan for the East Mountain Emergency Drill Pads (Task #2893)". This plan calls for these areas to be totally reclaimed to approximate original contour, deeply roughened and reseeded with the permanent seed mix.

Previous calculations show that the proposed reclamation techniques will reduce erosion and potential sediment transport even above undisturbed conditions; however, there may be areas where field observations and consultation with the agencies suggest the need for additional sediment controls. The company has committed to install excelsior logs for additional controls at such locations as requested by agencies if on-site conditions warrant.

Note: Excelsior logs will be installed as per manufacturer's guidelines.

### Road Stabilization:

As mentioned previously, the USFS and SITLA roads are to be left in place for at least a year. The present plan, therefore, is to stabilize these roads to minimize erosion and downslope transport of soil. This stabilization will be accomplished by the following methods:

- (1) Roads will be graded to a width of approximately 12' and on cut sections, will be sloped a minimum of 2% toward the cut bank;
- (2) A small berm will be installed on the outer edge of roads on cut sections, to confine runoff to the road section;
- (3) At intervals to be determined in the field, water bars will be installed to convey water from the road section to an appropriate outlet on the outslope;
- (4) At least one row of excelsior logs will be placed at all water bar outlets;
- (5) The outslope of all road cuts will be deeply gouged and reseeded according to the plan;
- (6) Additional excelsior logs will be placed at locations determined by the company and agencies during field observation, since calculations show they may not be necessary after the deep gouging and reseeded.

A typical section of the regraded road section is include in Figure 1 of this report.

Summary:

Calculations indicate that erosion potential and sediment transport offsite can be minimized by the proposed reclamation and stabilization techniques described in this report. These include regrading, deep gouging or pocking of reclaimed or outslope areas, reseeding and the use of excelsior logs on an as-needed basis. The calculations and assumptions in this report are based solely on information provided, without the benefit of an on-site evaluation; therefore, it is likely that certain areas will require additional protection after examination in the field.

**ATTACHMENT 1**

**WATERSHED AND RUNOFF CALCULATIONS**

Project Title = GENWAL DRILL ROADS (10/6)

WATERSHED HYDROGRAPH

Inflow into structure # 1

Structure type: Null

-- Watershed data for watershed # 1

Curve number = 69.0

Area = 10.0 acres

Hydraulic length = 1320.00 Feet

Elevation change = 726.0 feet.

Concentration time = 0.20 hours

Concentration time type = SCS Upland Curves

Unit hydrograph type = Forested

-- Total Area = 10.0 acres

-- Storm data

Total precipitation = 1.5 inches

Storm type = SCS 6 hour design storm

Peak Discharge = 0.26 cfs

Discharge volume = 0.07 acre ft

Title of run: ROAD DITCH

Solving for.....= Depth Normal

Triangle

Flow depth (ft).....=	0.23
First Side slope.....=	1.0
Second Side slope.....=	2.0
Slope of diversion.....=	0.1500
Manning"s n.....=	0.035
CFS.....=	0.26
Cross section area (sqft)..=	0.08
Hydrualic radius.....=	0.09
fps.....=	3.39
Froude number.....=	1.96

Title of run: ROAD DITCH

Solving for.....= Depth Normal

Triangle

Flow depth (ft).....=	0.24
First Side slope.....=	1.0
Second Side slope.....=	2.0
Slope of diversion.....=	0.1000
Manning"s n.....=	0.035
CFS.....=	0.26
Cross section area (sqft)..=	0.09
Hydrualic radius.....=	0.10
fps.....=	2.91
Froude number.....=	1.62

Title of run: ROAD DITCH

Solving for.....= Depth Normal

Triangle

Flow depth (ft).....=	0.28
First Side slope.....=	1.0
Second Side slope.....=	2.0
Slope of diversion.....=	0.0500
Manning"s n.....=	0.035
CFS.....=	0.26
Cross section area (sqft)..=	0.12
Hydrualic radius.....=	0.11
fps.....=	2.24
Froude number.....=	1.17

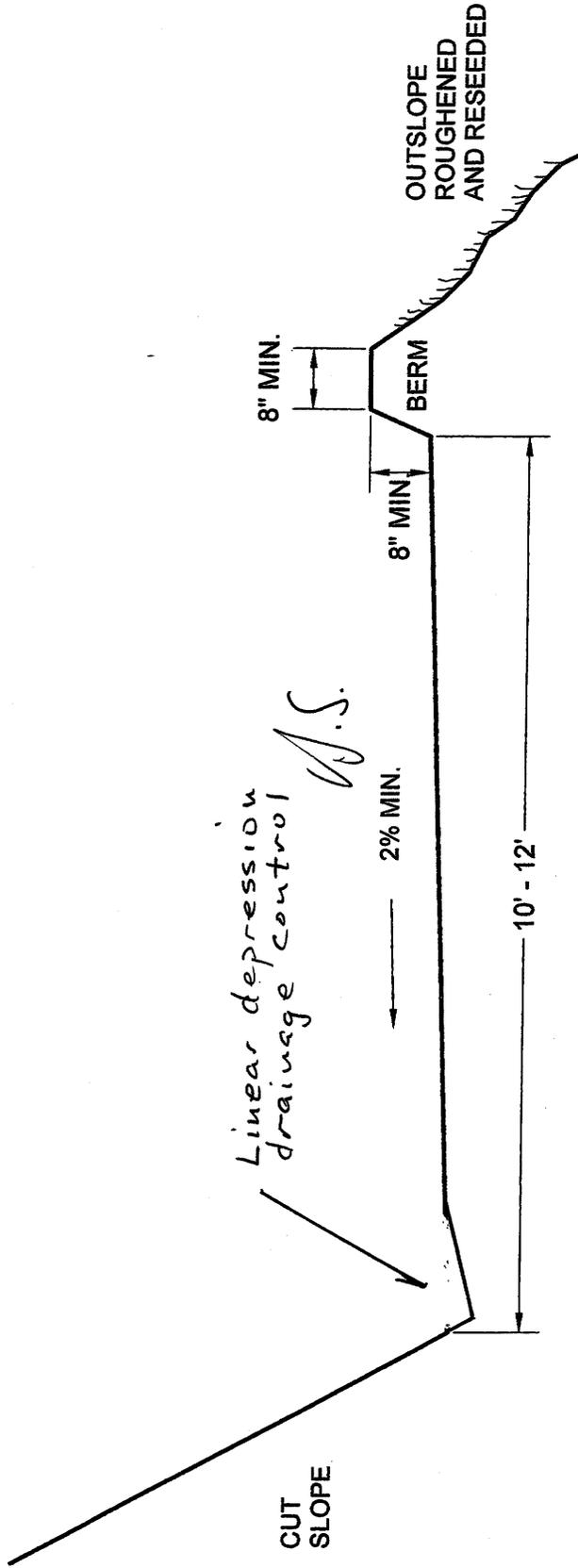
**FIGURE 1**

**ACCESS ROAD STABILIZATION**

**TYPICAL SECTION**

GENWAL MINE  
EAST MOUNTAIN EMERGENCY DRILLING  
ACCESS ROAD STABILIZATION

TYPICAL SECTION



NOTE: SECTION SHOWN IS FOR ROAD CUT SECTIONS ON HILLSIDES.  
WATER BARS WILL BE INSTALLED AT LOCATIONS DETERMINED IN THE FIELD.

**ATTACHMENT 10**

**RECLAMATION COST ESTIMATES  
(SCAMP EXCAVATION)**

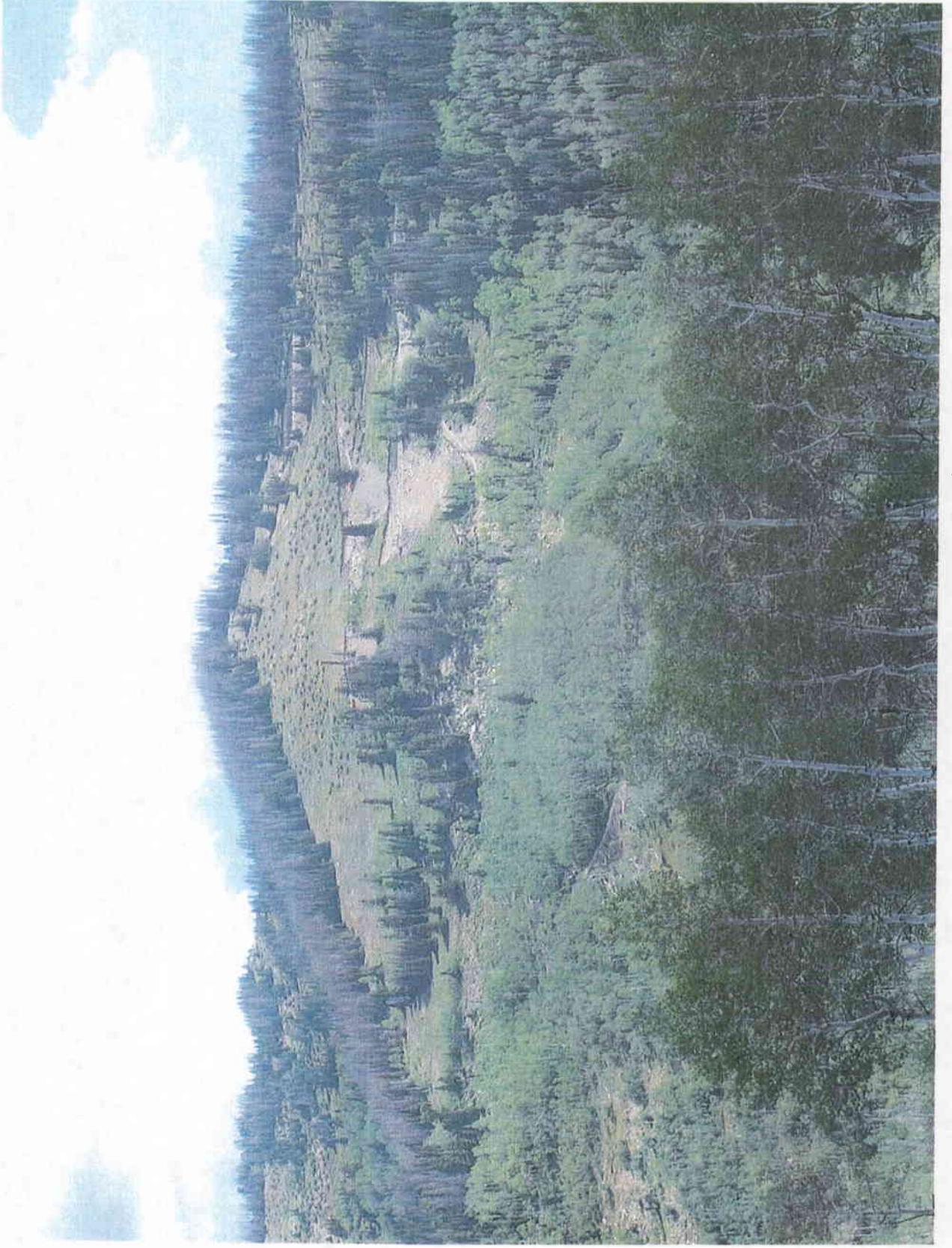


East Mountain Reclamation Costs				Earthworks Costs				Drill Pads, Access Roads						
Equipment Mobilization	Equipment Costs	Hourly Operating Costs	Equipment Overhead	Operator's/Labor Hourly Wage Rate	Hourly Cost	Number of Men or Equip.	Total Eq. & Lab. Cost	Units	Quantity	Production Rate	Units	Equip. + Labor Time/Dis.	Units	Costs
	\$	\$		\$	\$		\$							
350 Trackhoe	\$ 6,240.00	\$ 140.00	1.00	\$ 45.00	\$ 185.00	1	\$159.00	Lump Sum				150	Lump Sum	\$25,000.00
420 Trackhoe	\$ 5,720.00	\$ 140.00	1.00	\$ 45.00	\$ 185.00	1	\$149.00	\$/Hr				150	Hr	\$27,750.00
35 ton Rock Truck	\$ 7,920.00	\$ 220.00	1.00	\$ 45.00	\$ 485.00	2	\$399.00	\$/Hr				174.5	Hr	\$84,632.50
D9 Dozer	\$ 6,160.00	\$ 240.00	1.00	\$ 45.00	\$ 285.00	1	\$259.00	\$/Hr				139.5	Hr	\$39,757.50
Reclaim Drill Pads/Access Rd												33800	CY	
Wood Mulch & Seed Laborers			1.00	\$ 35.00	\$ 35.00	6	\$35.00	\$/Hr		Lump Sum		314	Hr	\$24,000.00
														\$10,990.00
<b>Total</b>														<b>\$739,880.00</b>

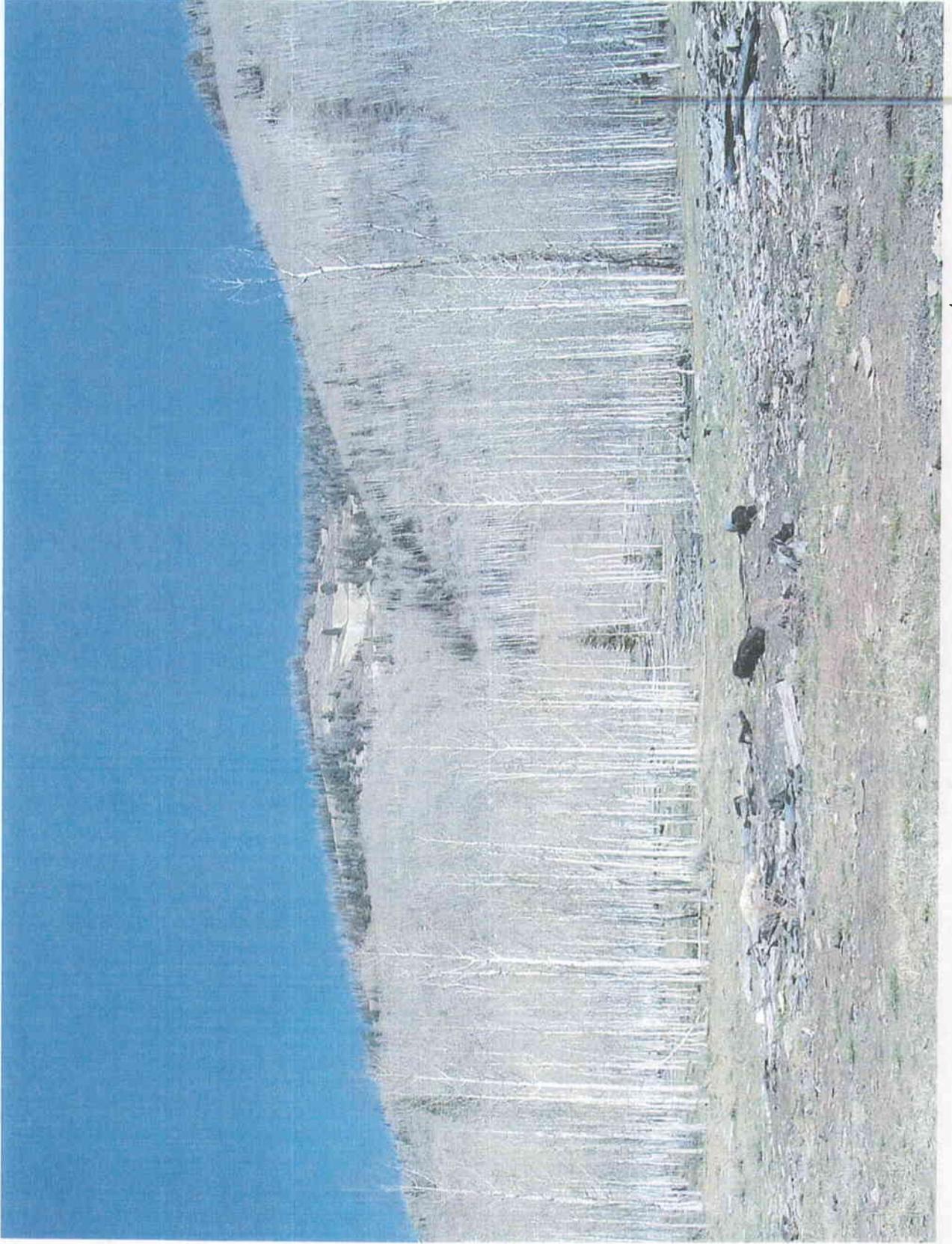


**ATTACHMENT 11**

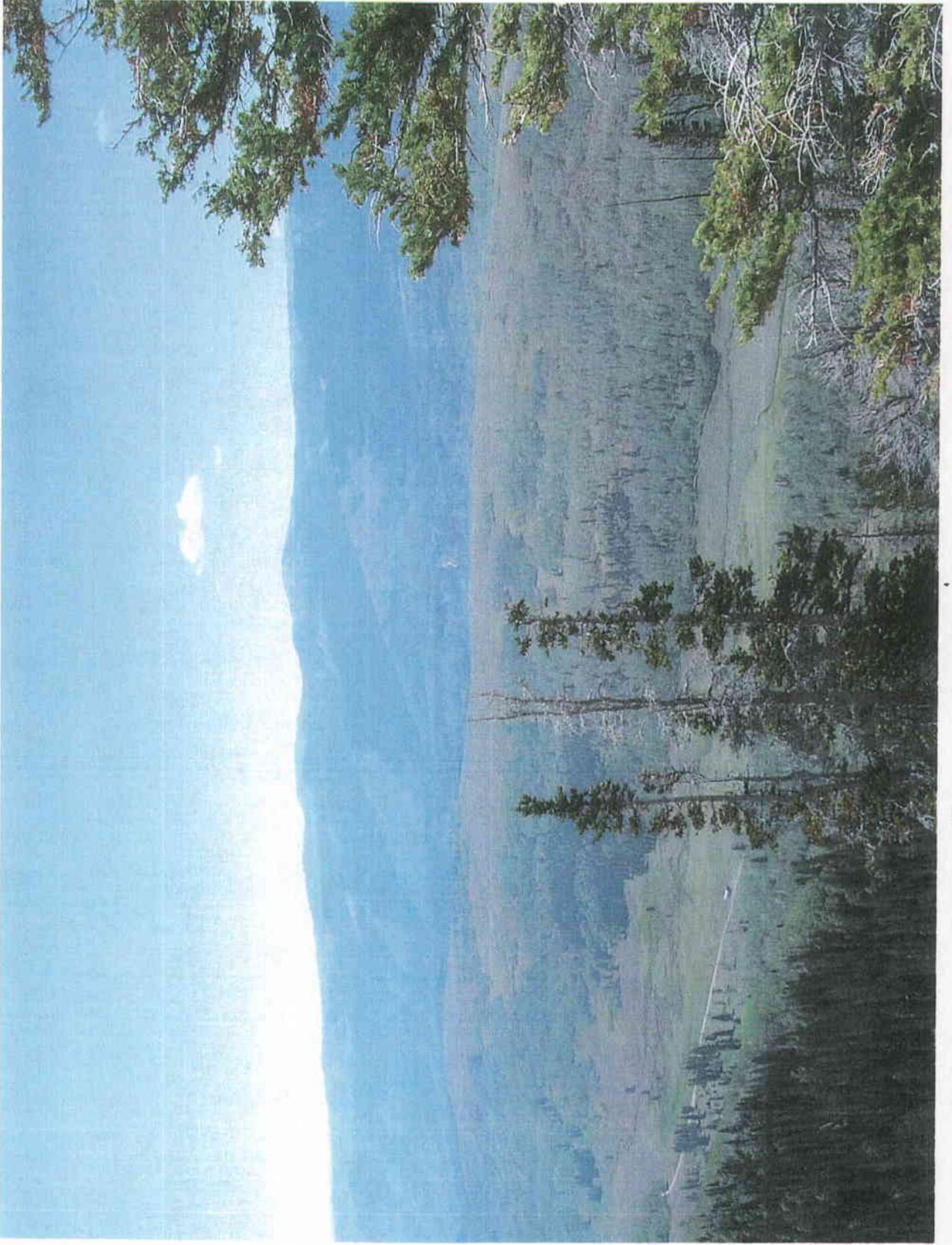
**DIGITAL PHOTOS  
(COURTESY OF PRISCILLA BURTON)**



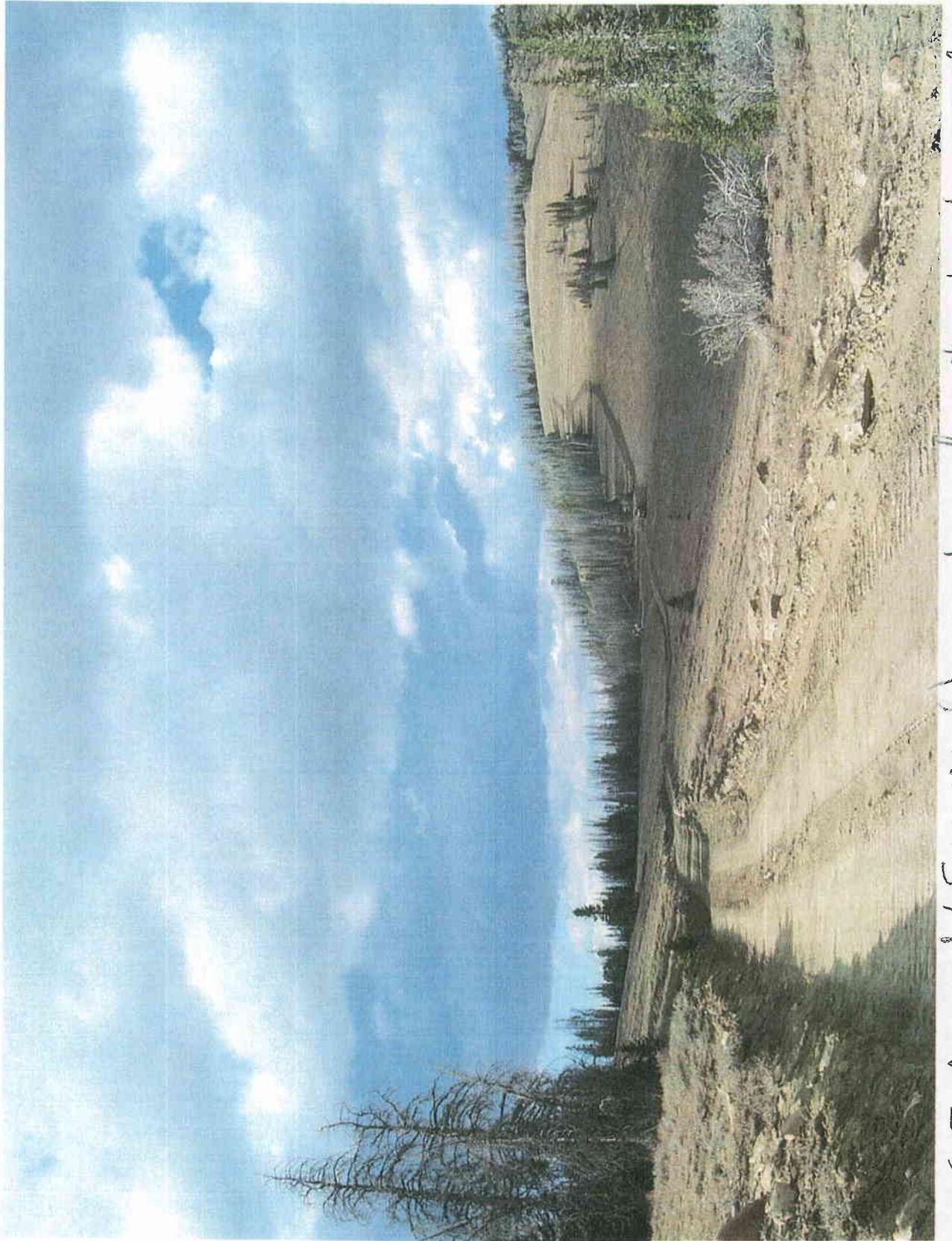
Drill Sites, East Mt.



Drill sites, viewed from Joes Valley



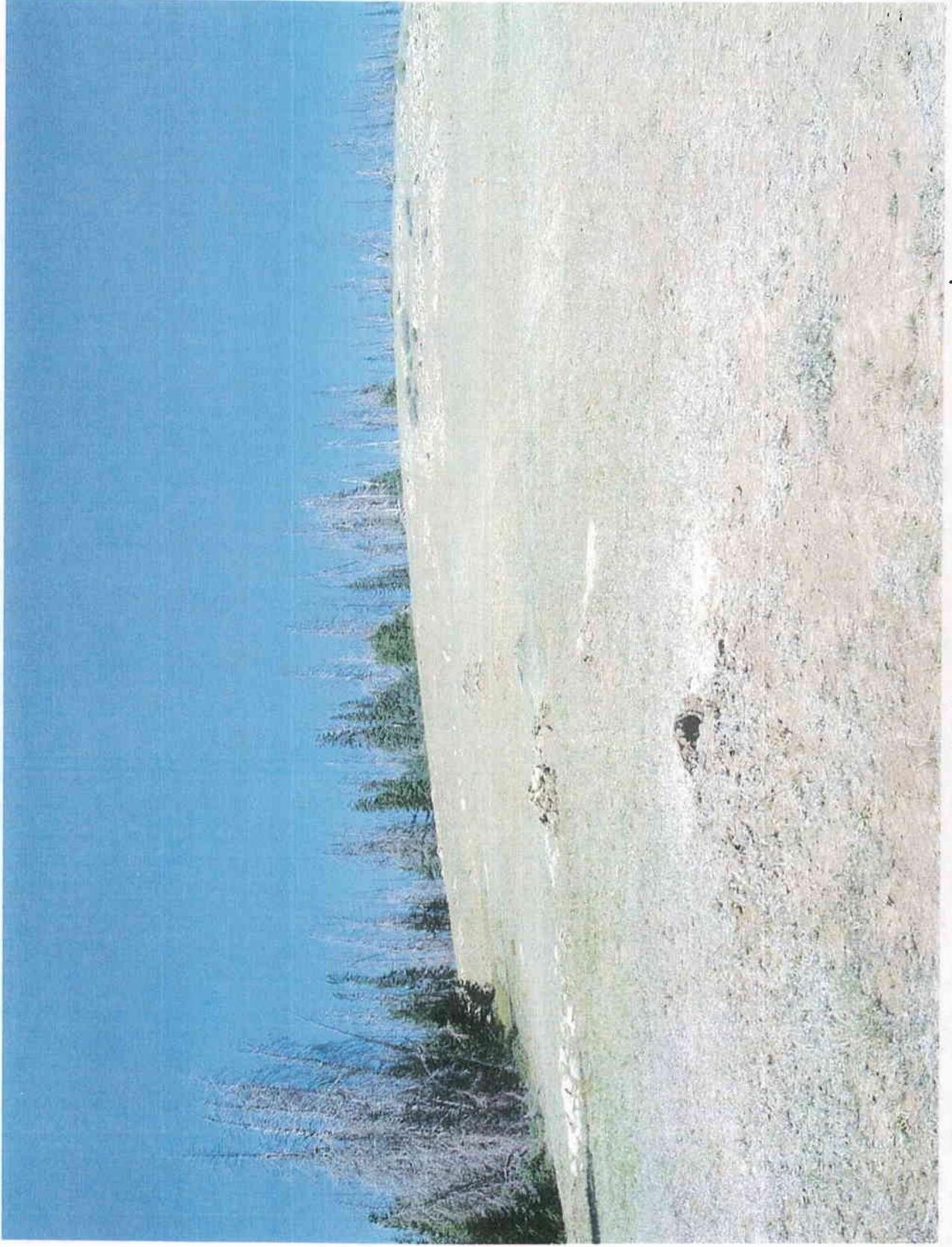
View from drill sites



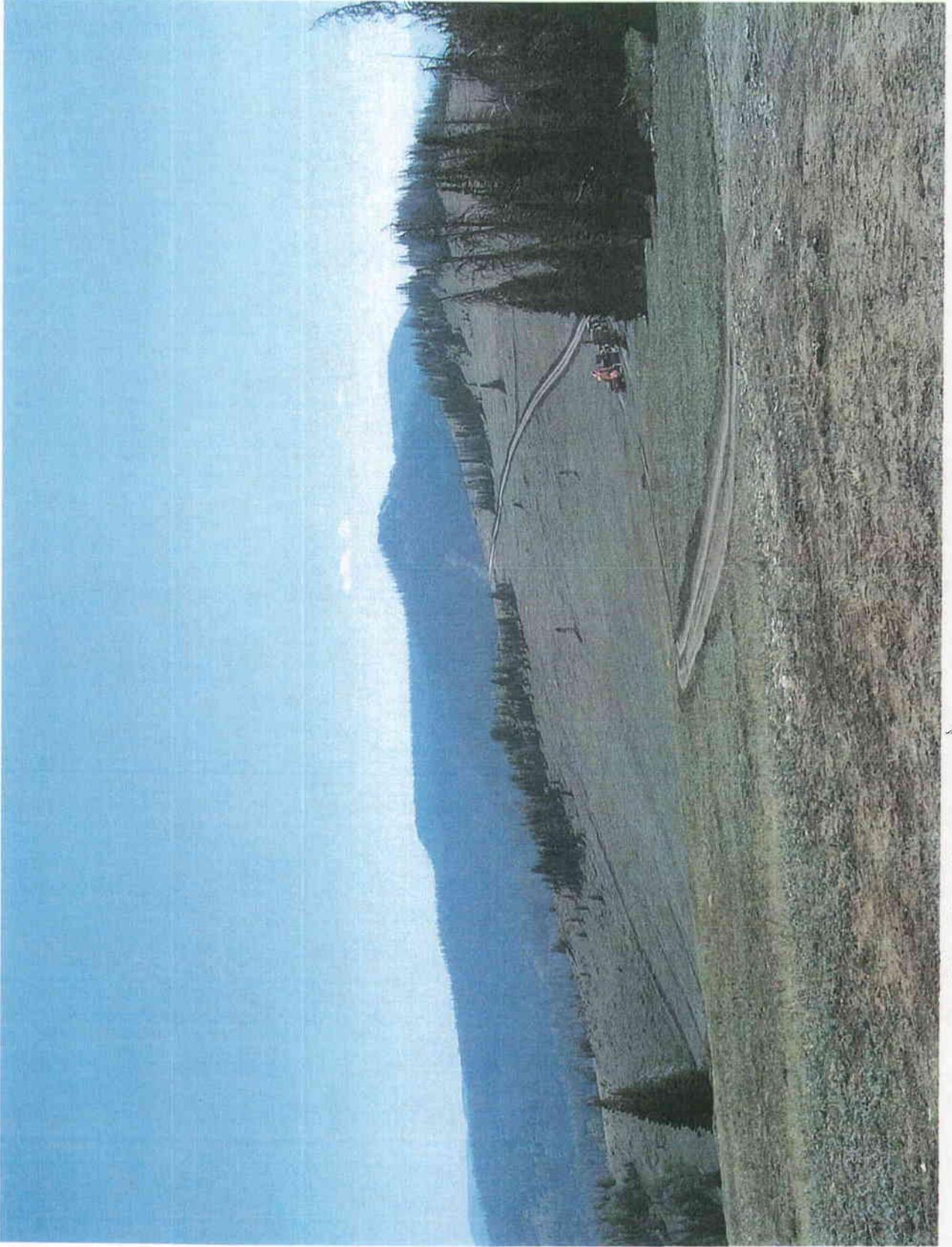
SITUA road (foreground), reclaimed water truck road (background)



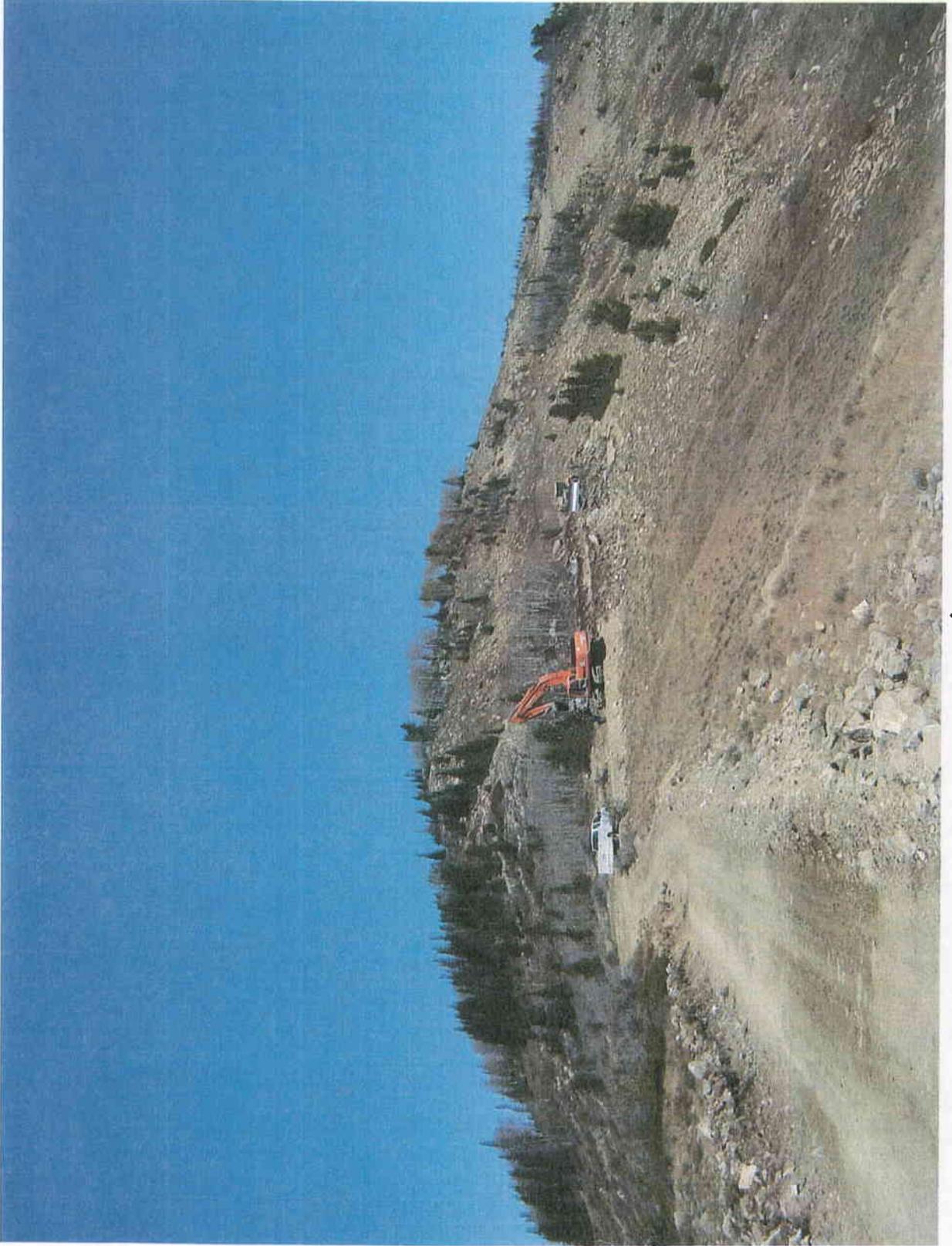
Reclaimed water truck road



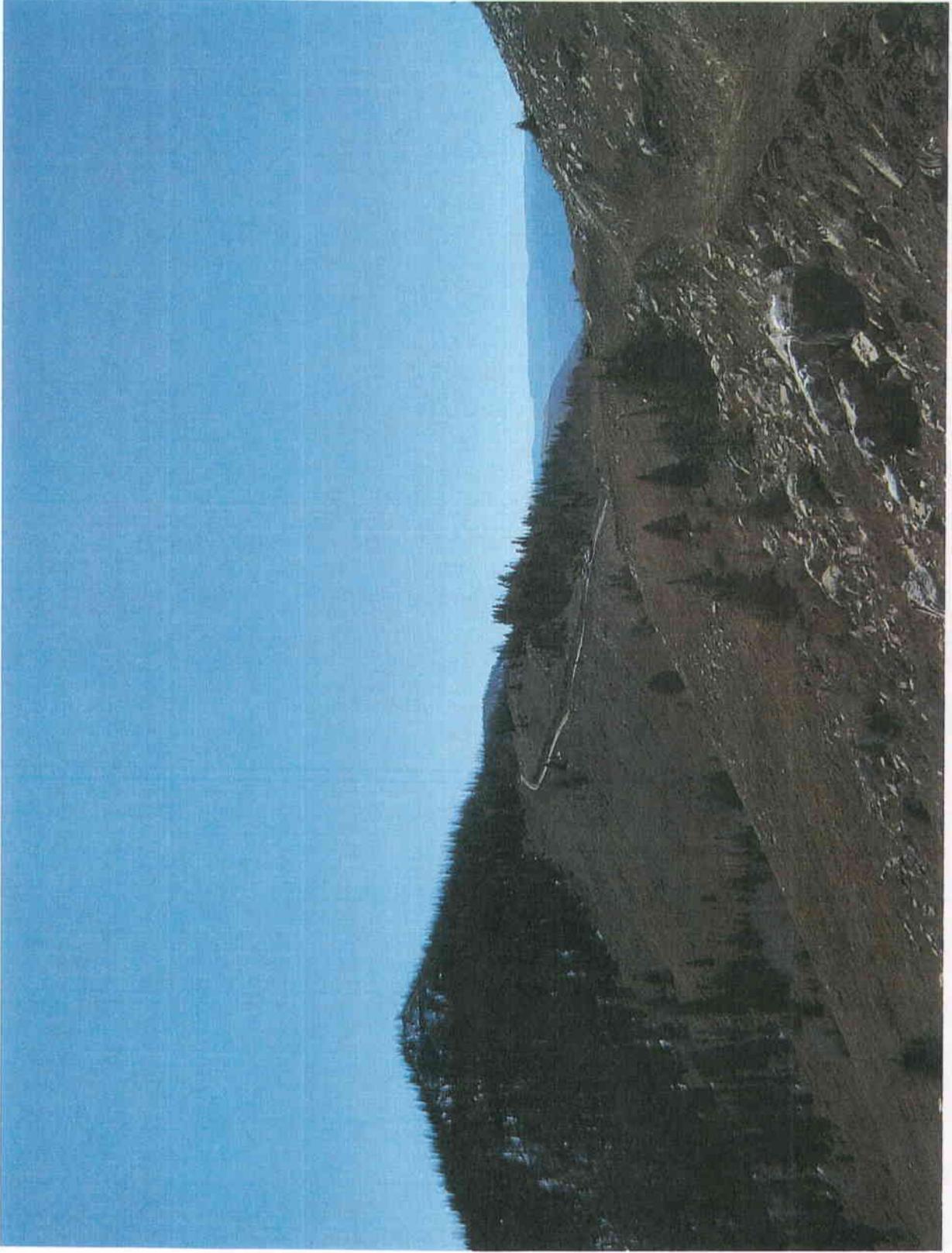
Shot holes, pre reclamation



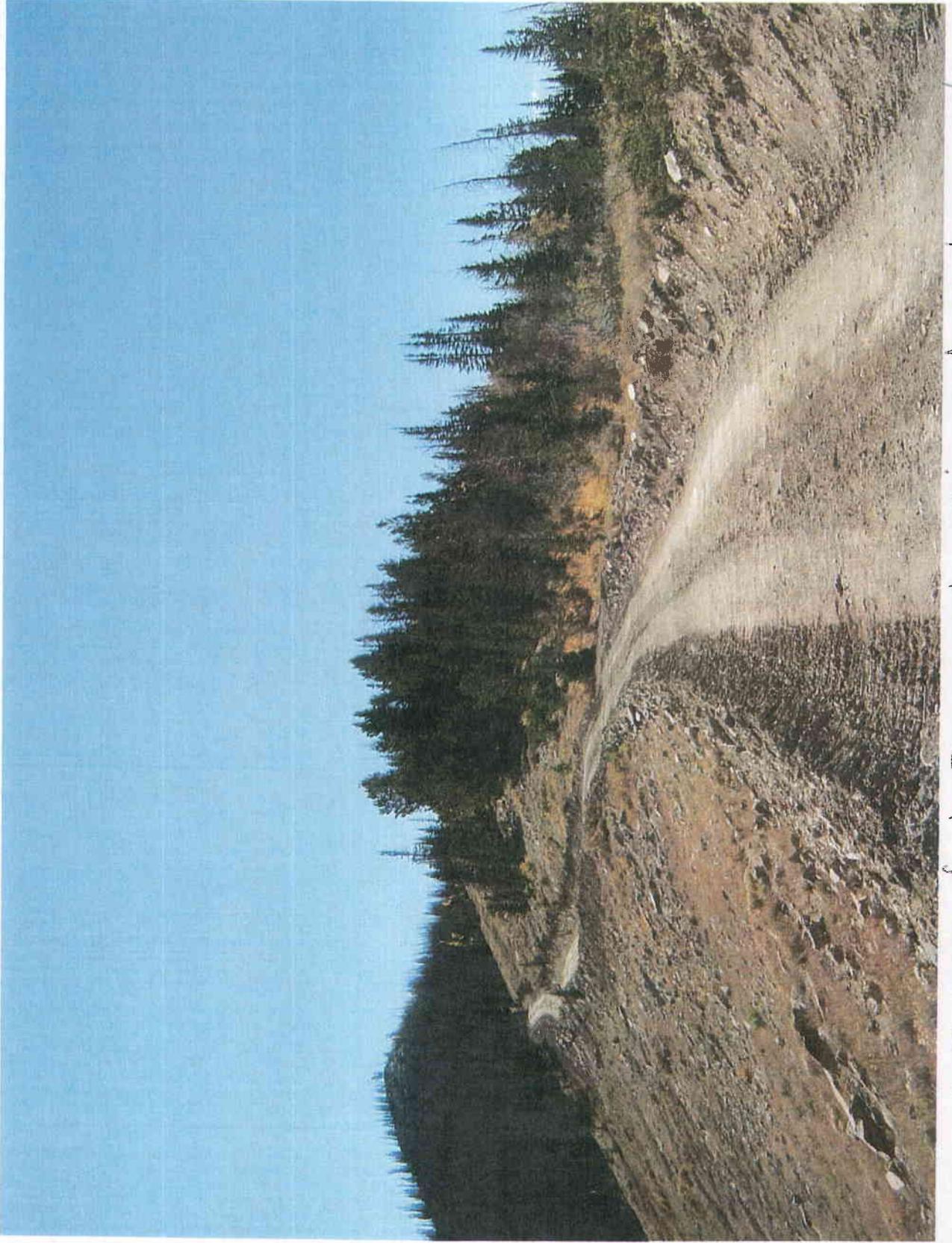
SITLA road



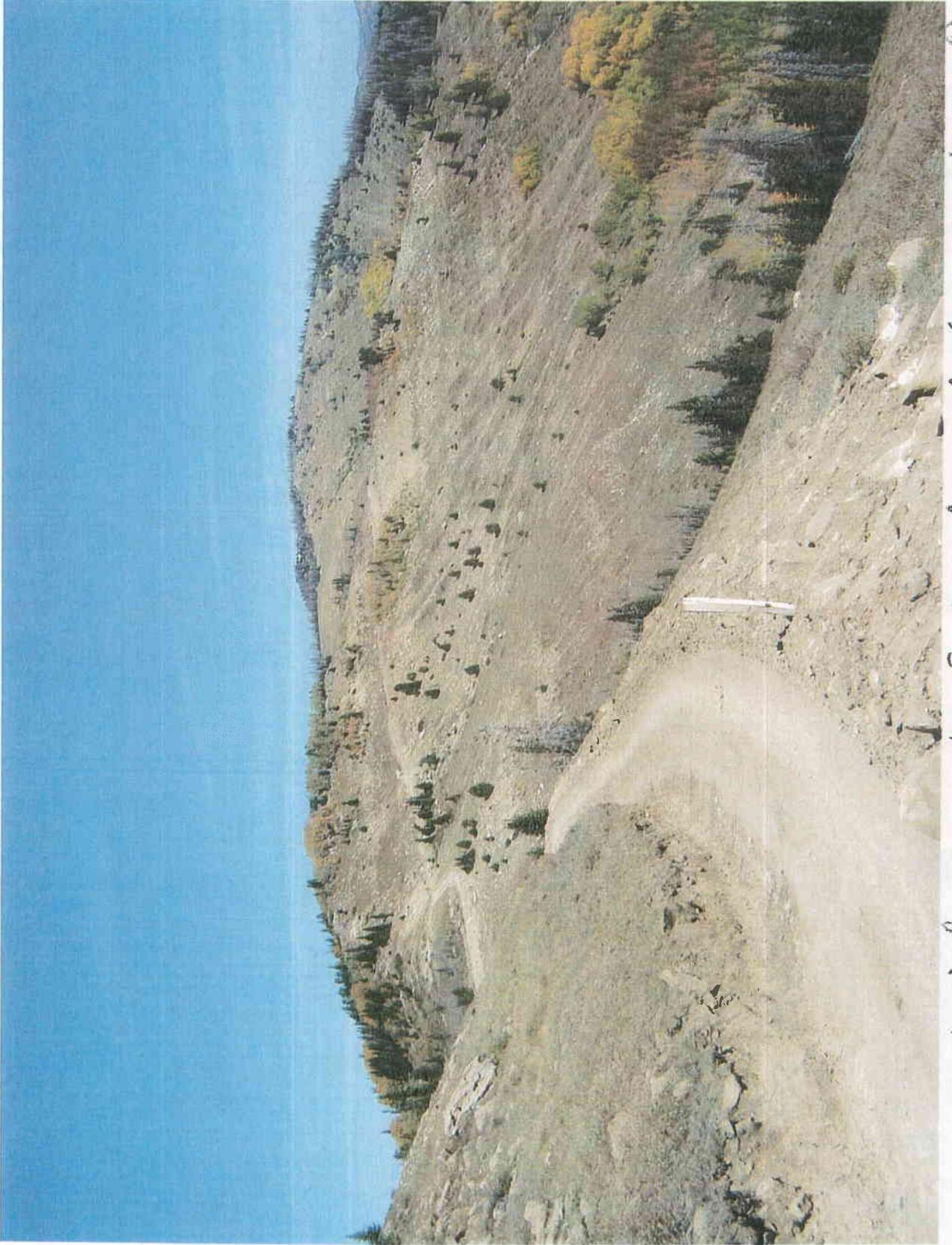
SITLA road



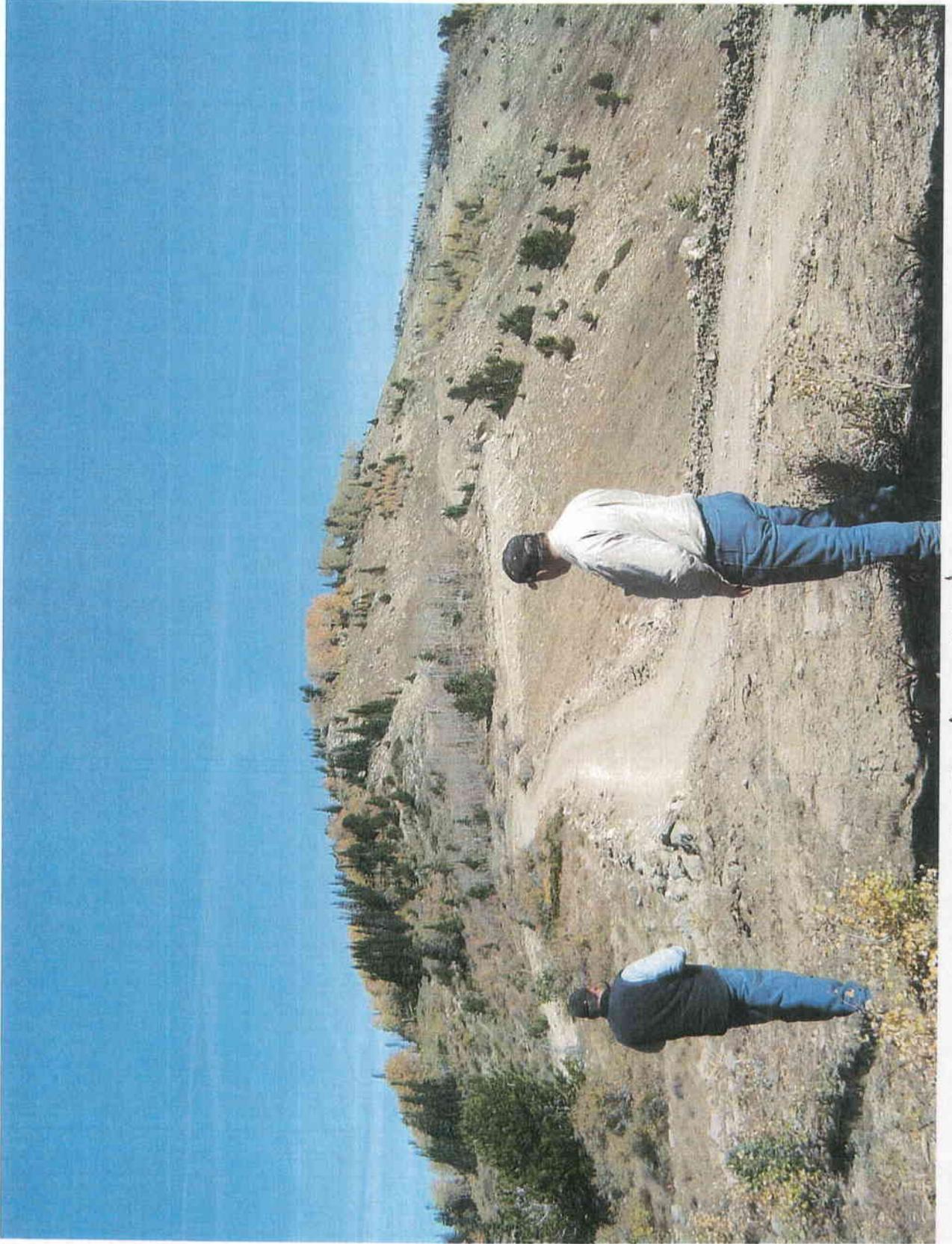
SITLA road before reclamation (background)



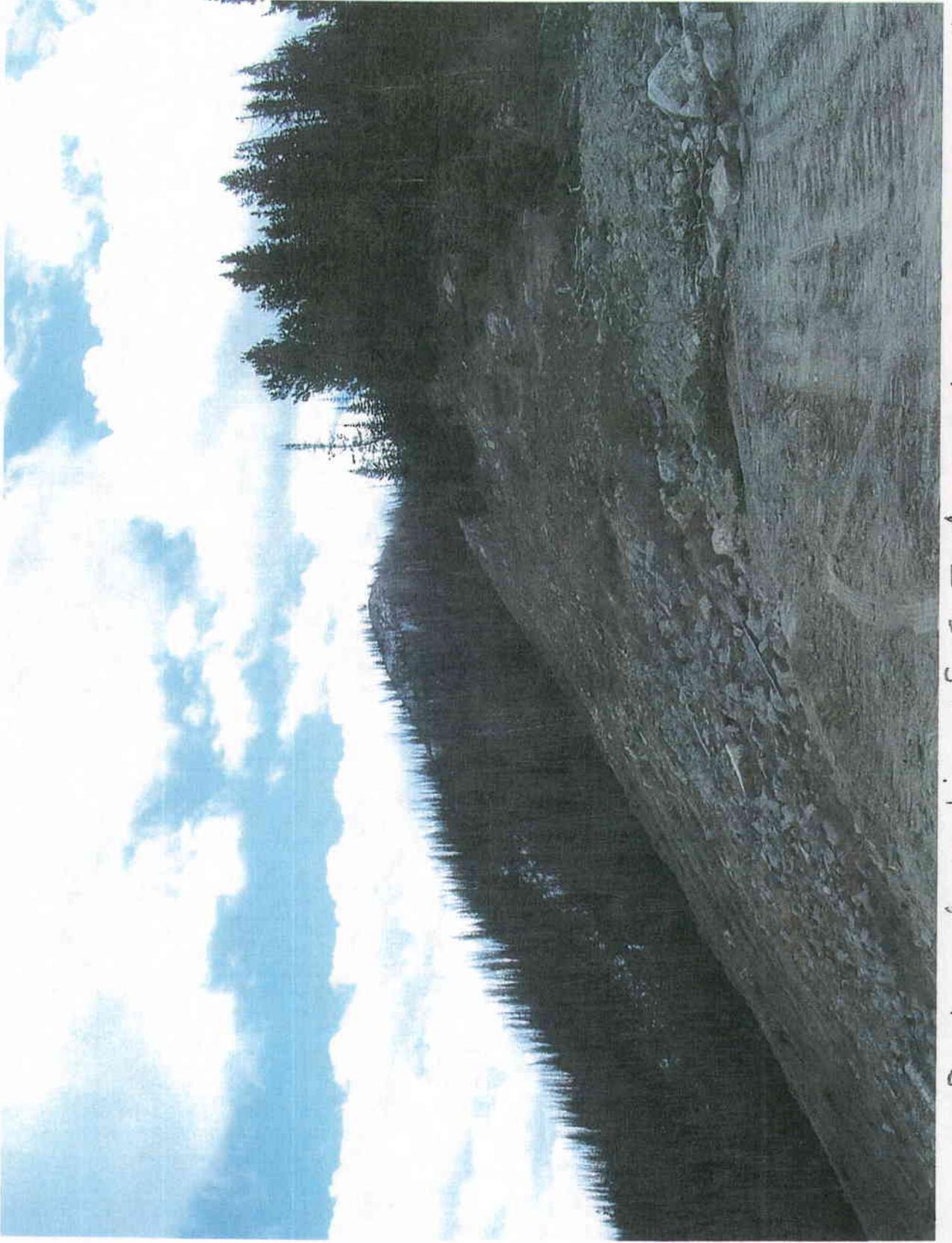
SITLA road before reclamation and readjustment



Unreclaimed segment of SITA road (now reclaimed)



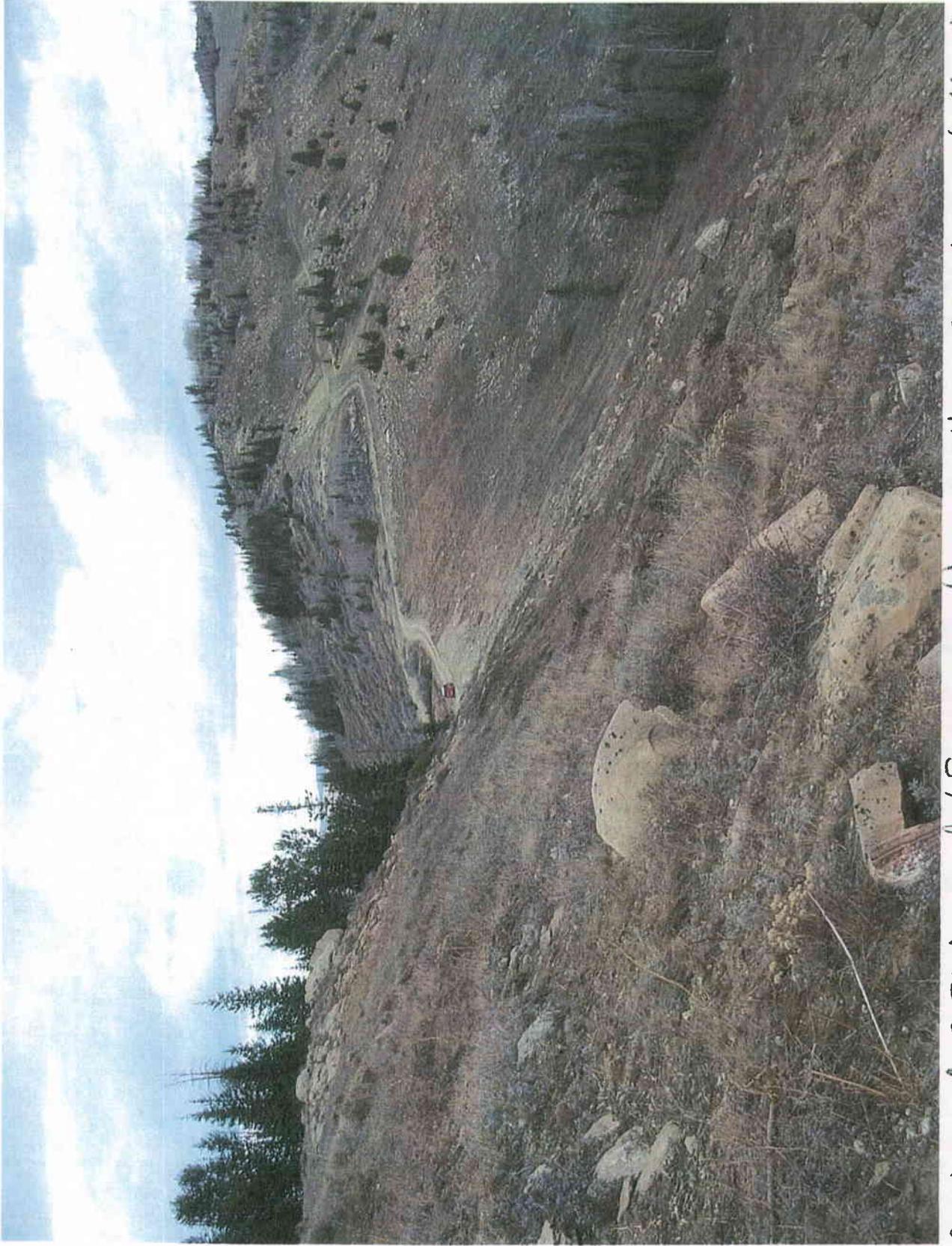
SITLA road



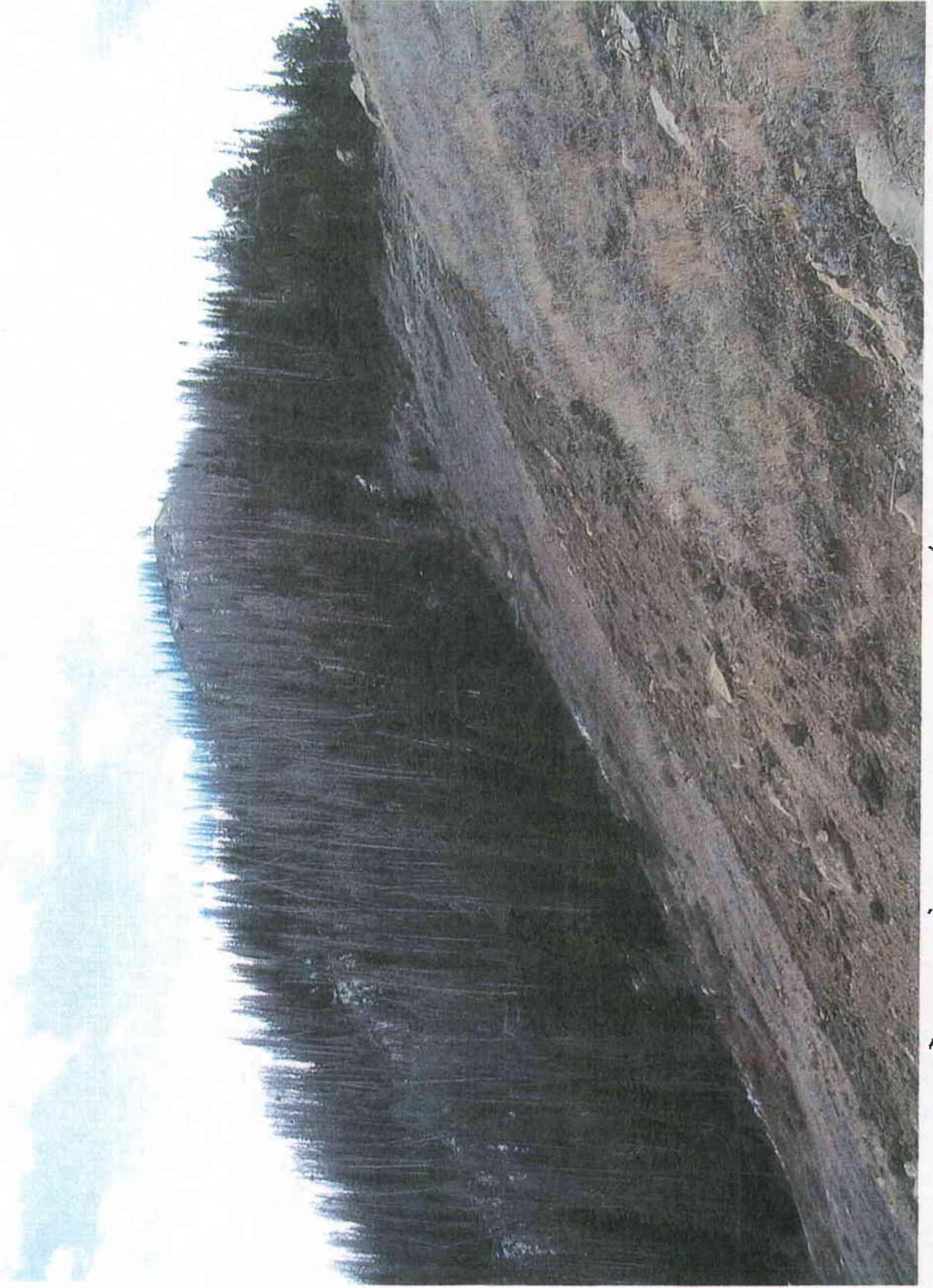
Reclaimed section of SITLA road



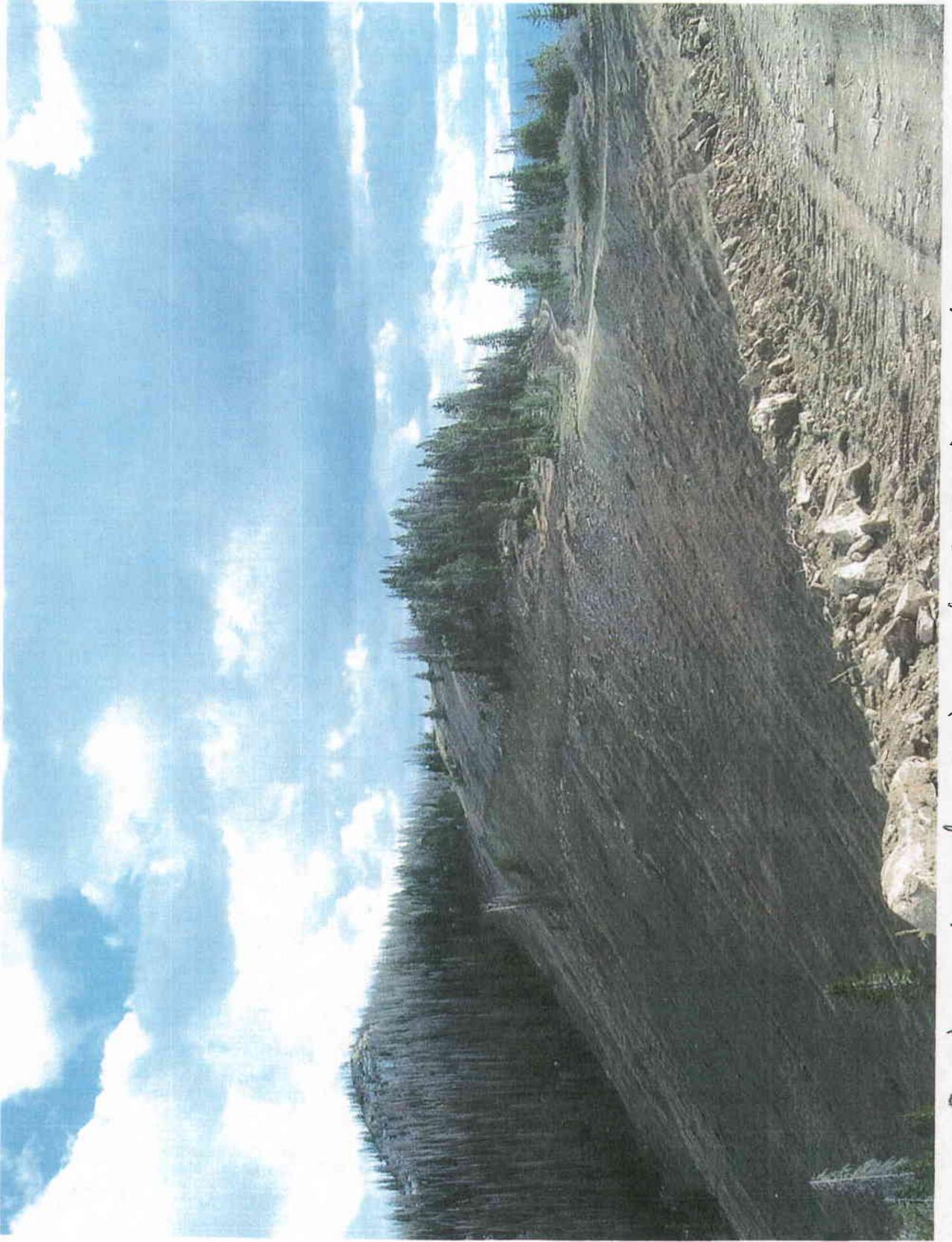
Reclaimed SITLA road (left), newly constructed segment (right)



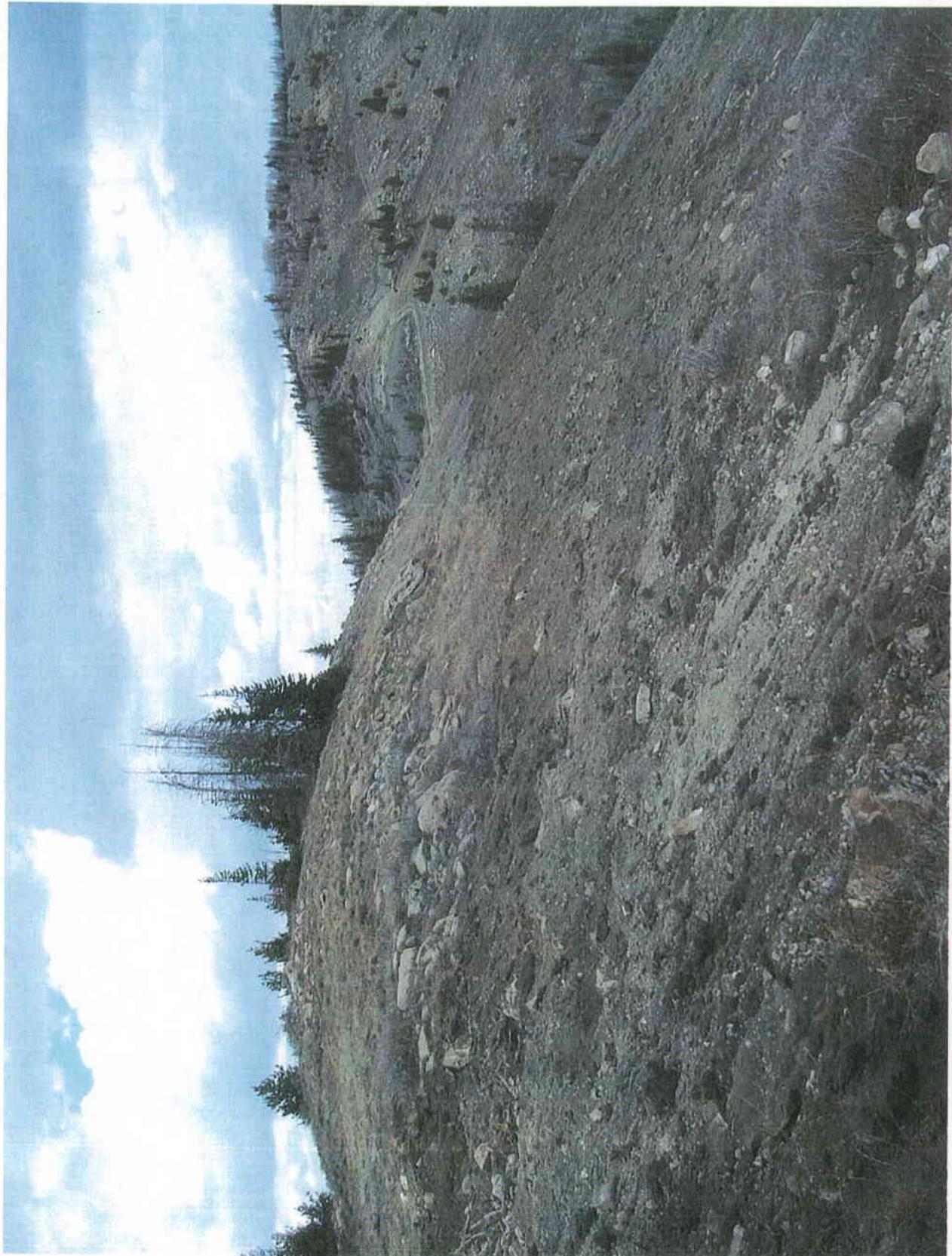
Reclaimed SITLA road (foreground), existing SITLA road (background)



Reclaimed SITLA road



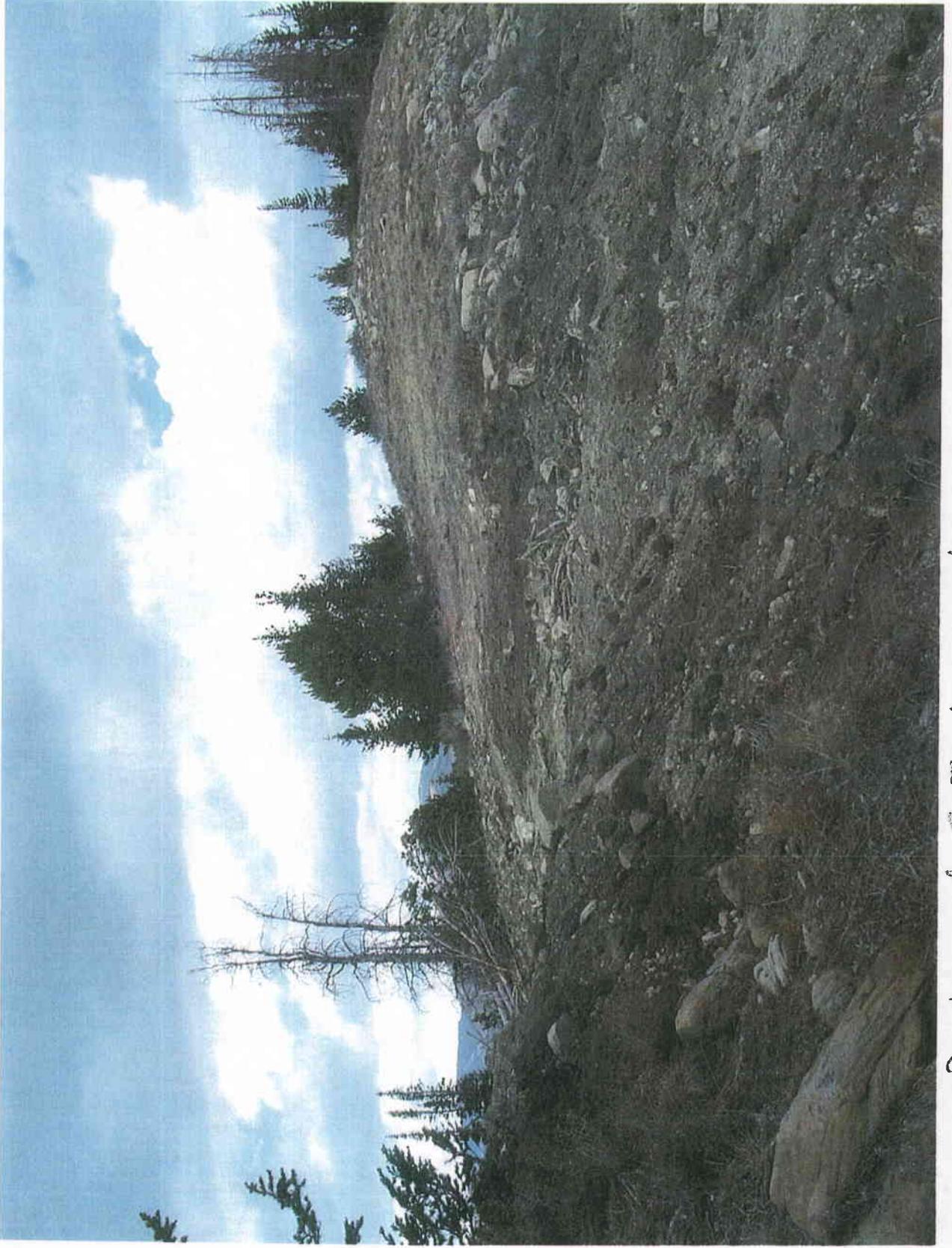
Reclaimed and realigned S/TLA road



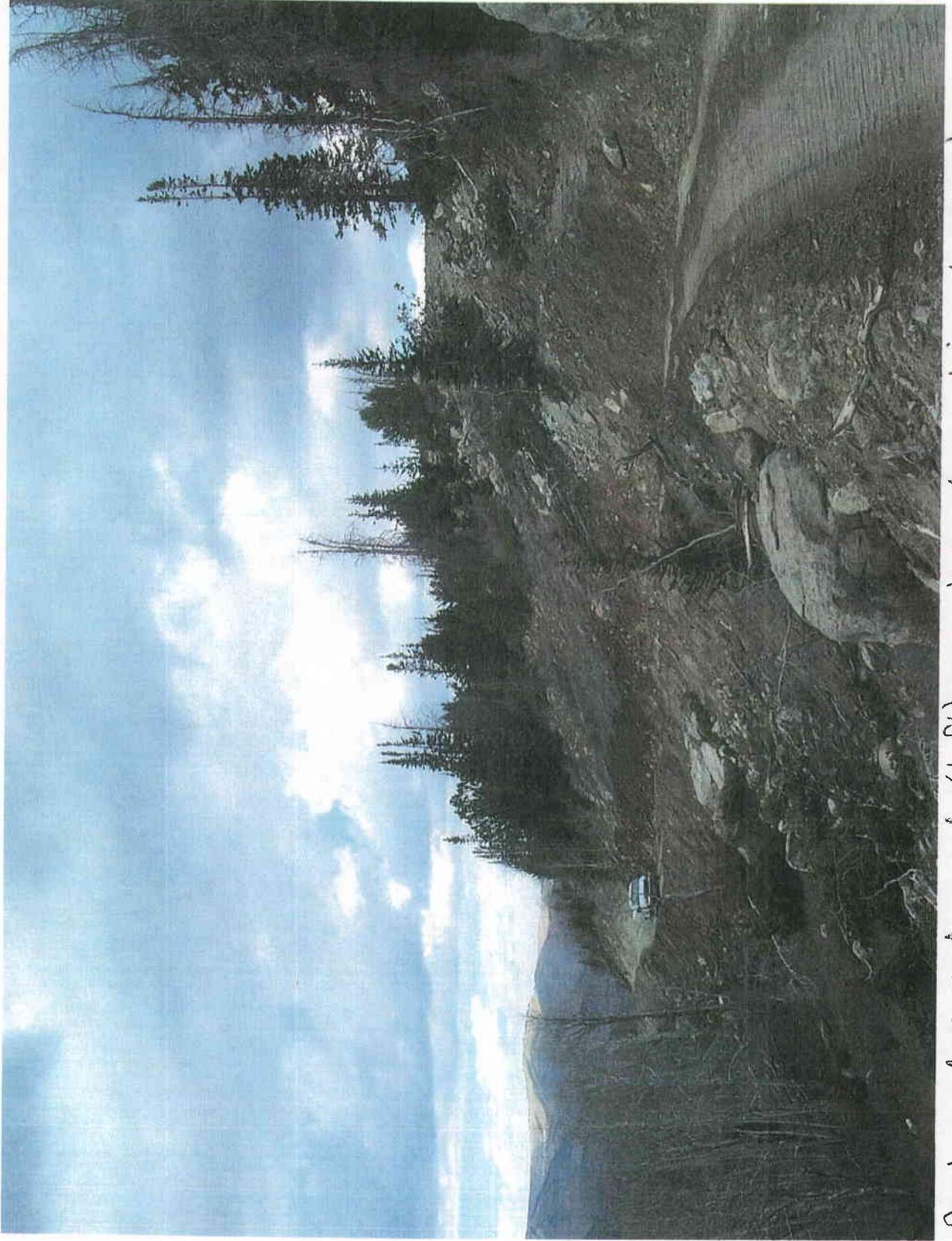
Reclaimed SITLA road



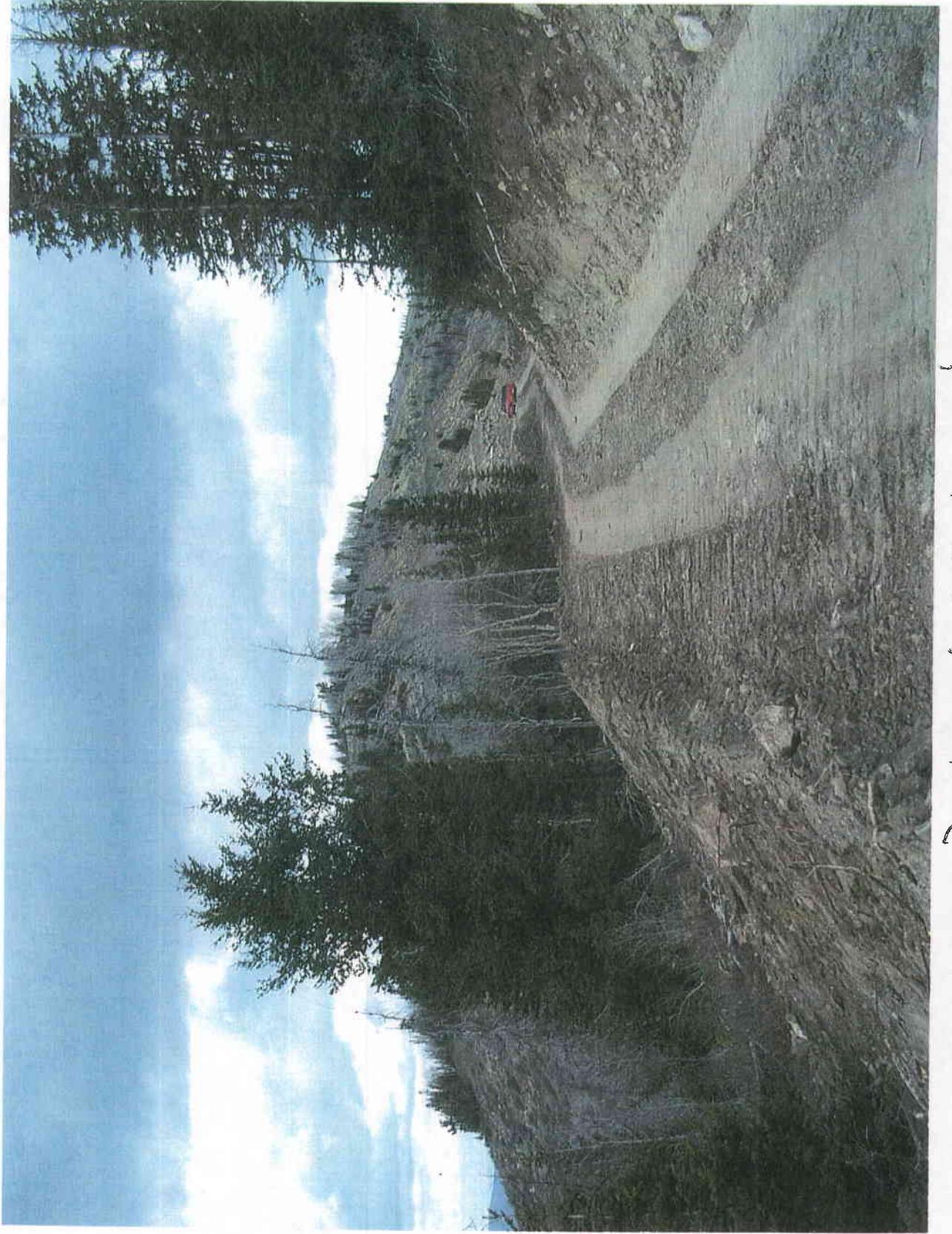
Realigned SITHA road



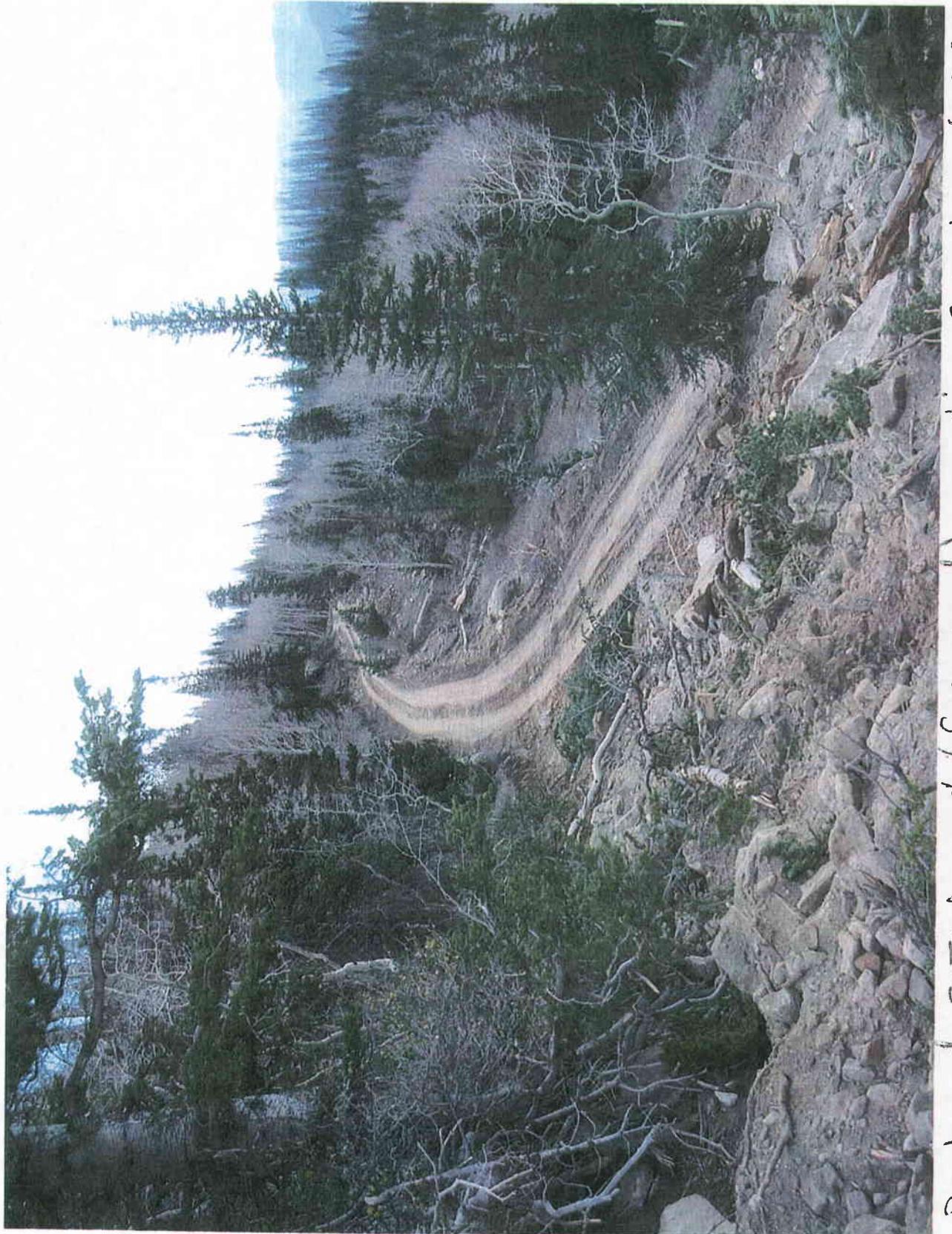
Reclaimed SITLA road



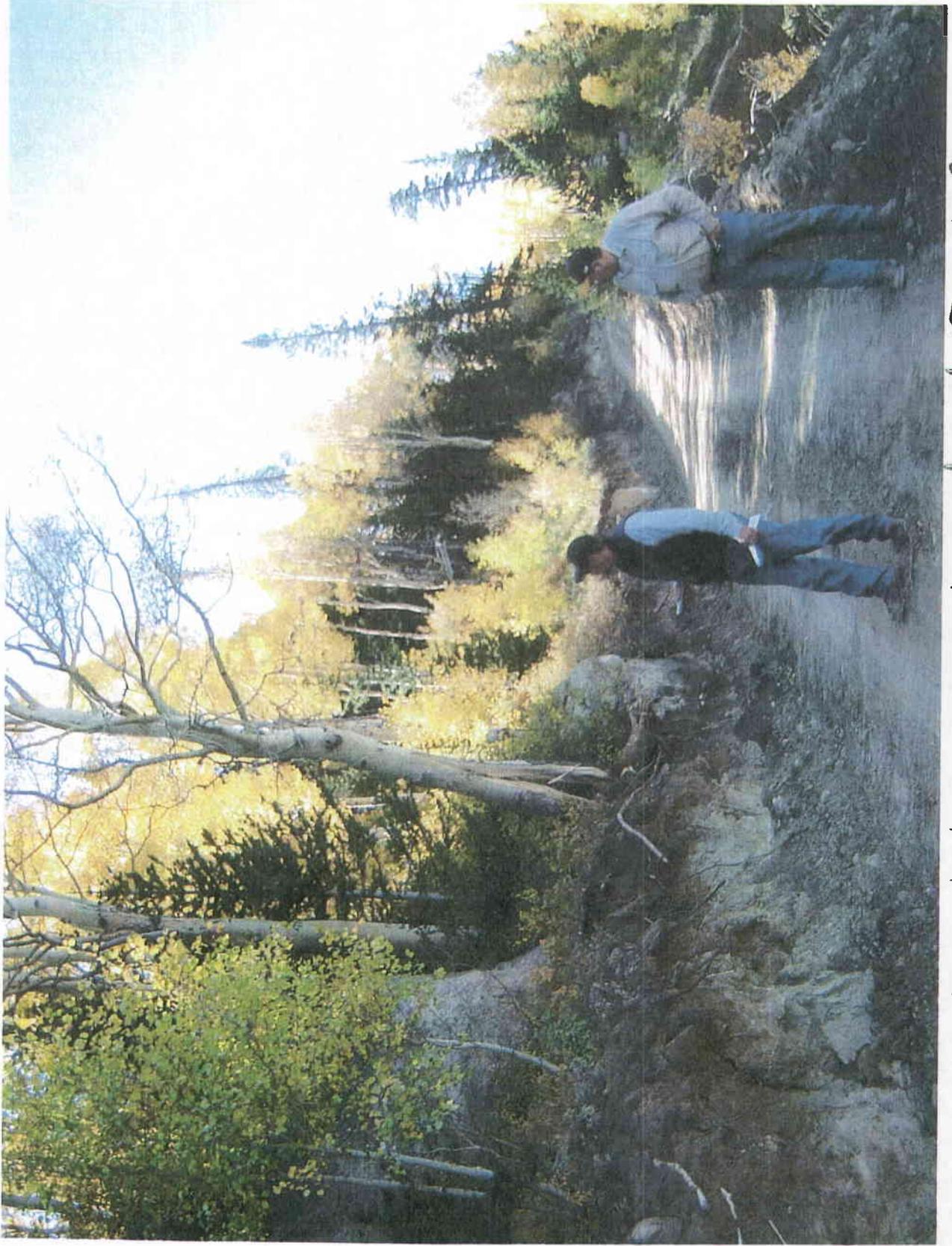
Realigned SITLA road (left), reclaimed section (right)



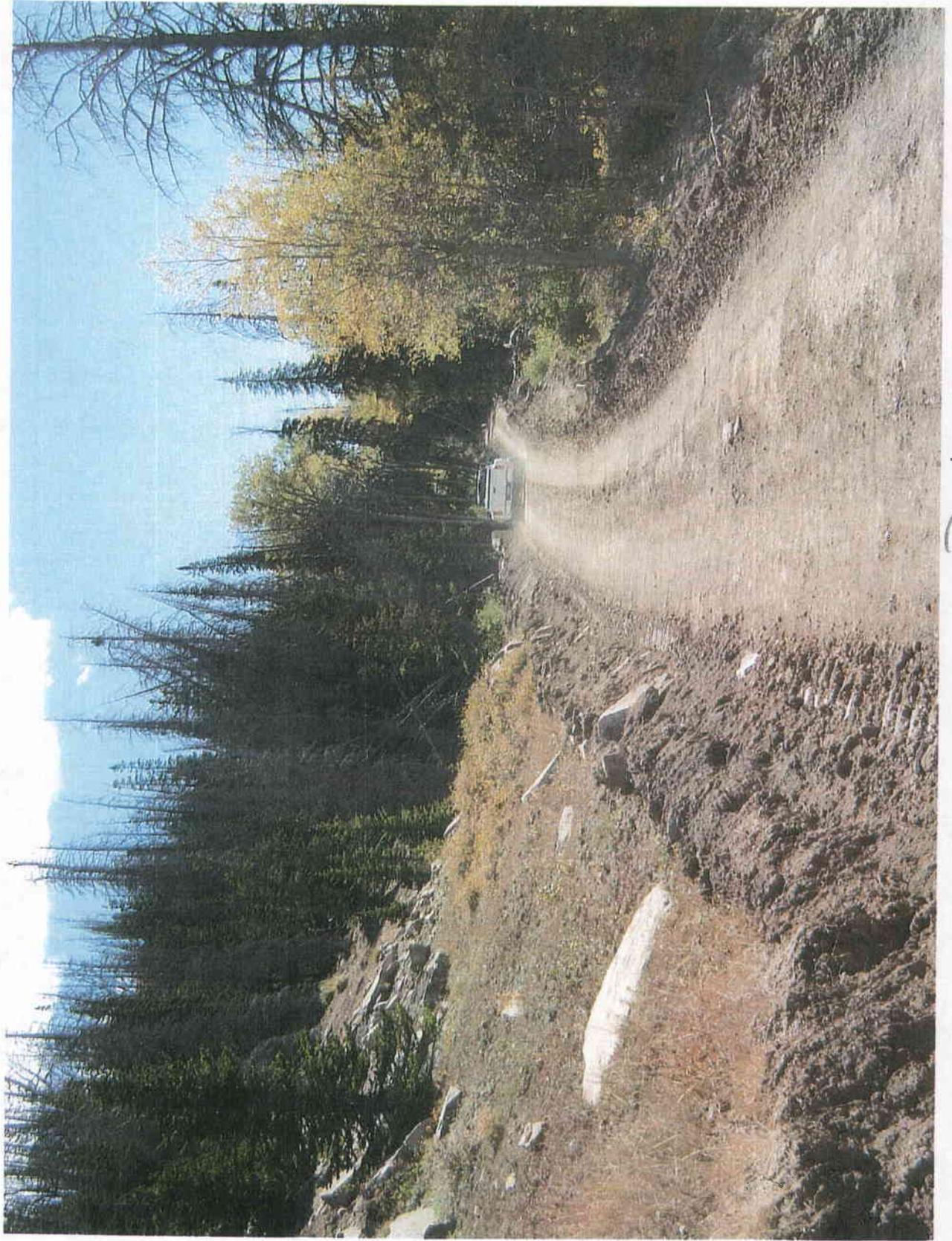
Realigned SITLA road



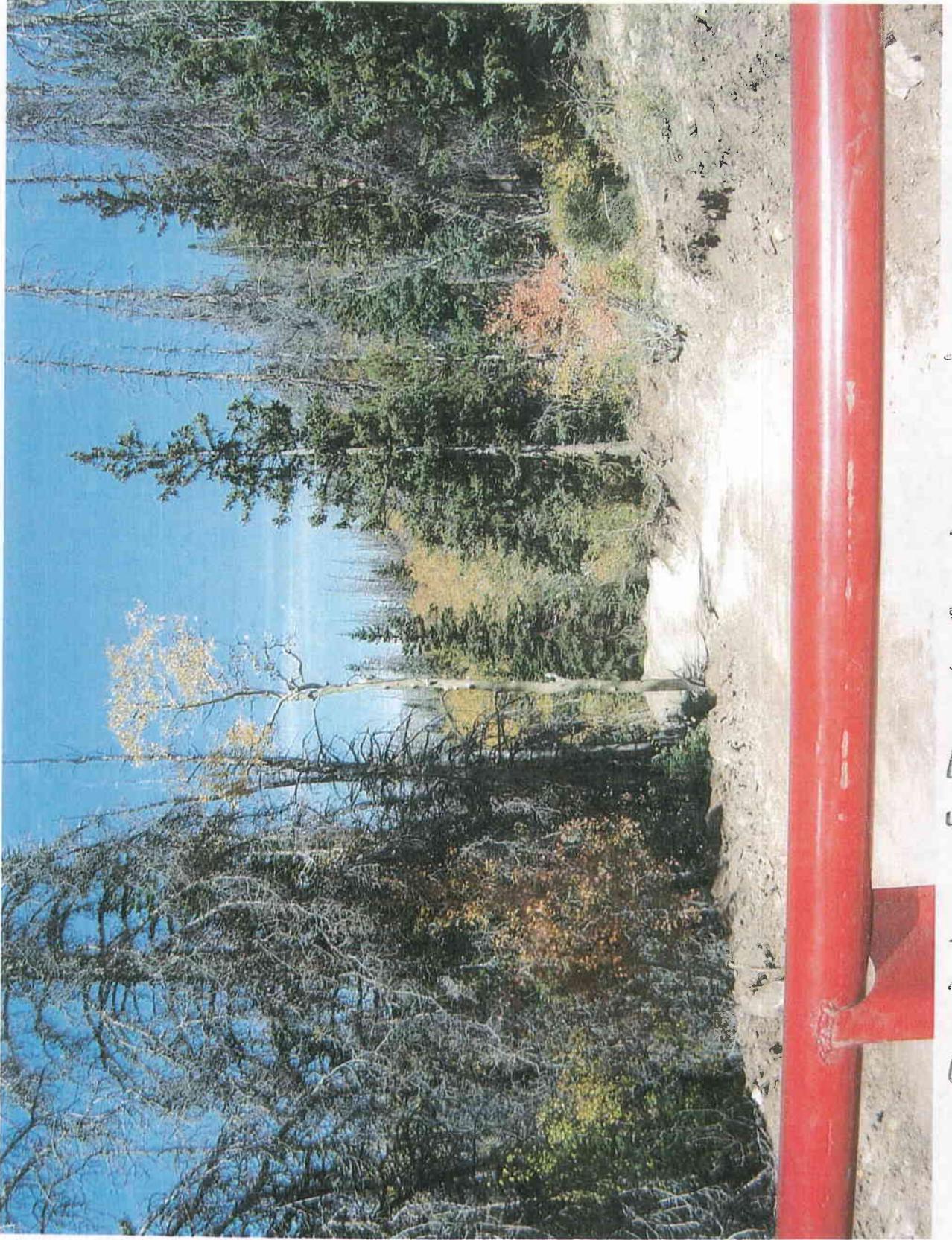
Reclaimed SITLA road (foreground), existing SITLA and FS road  
(background)



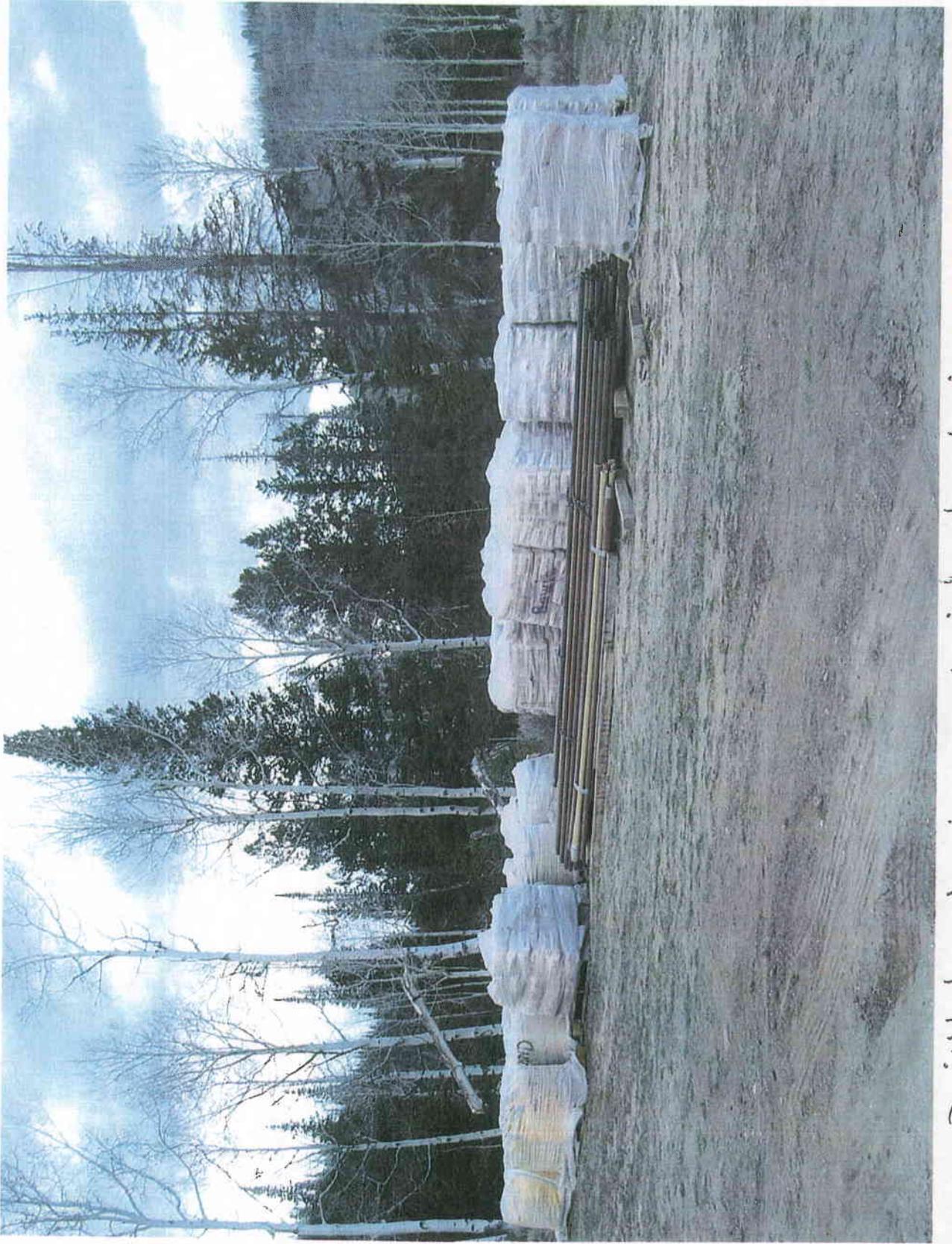
Property line between SITLA road and Forest Service road



Forest Service Road



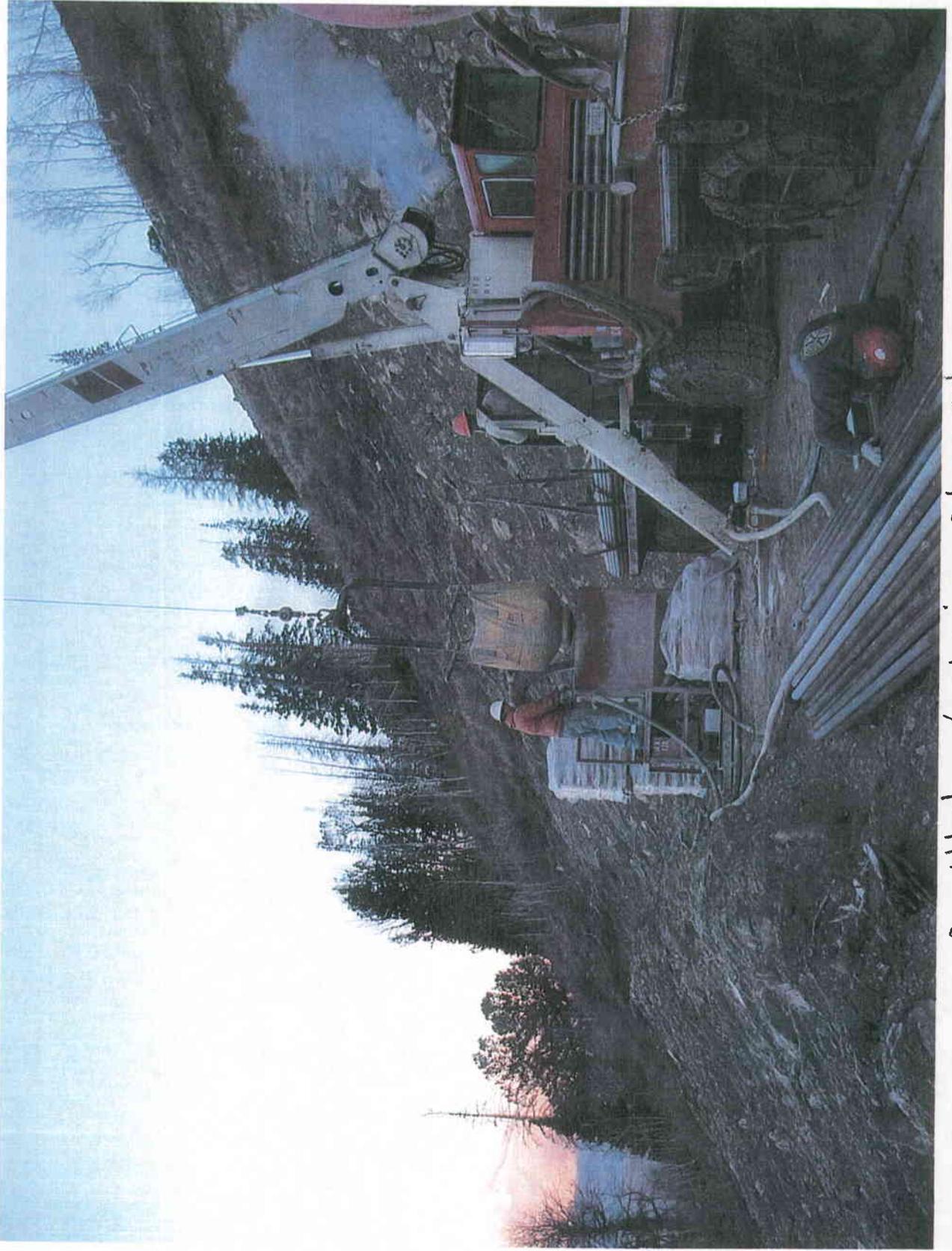
Beginning of Forest Service road



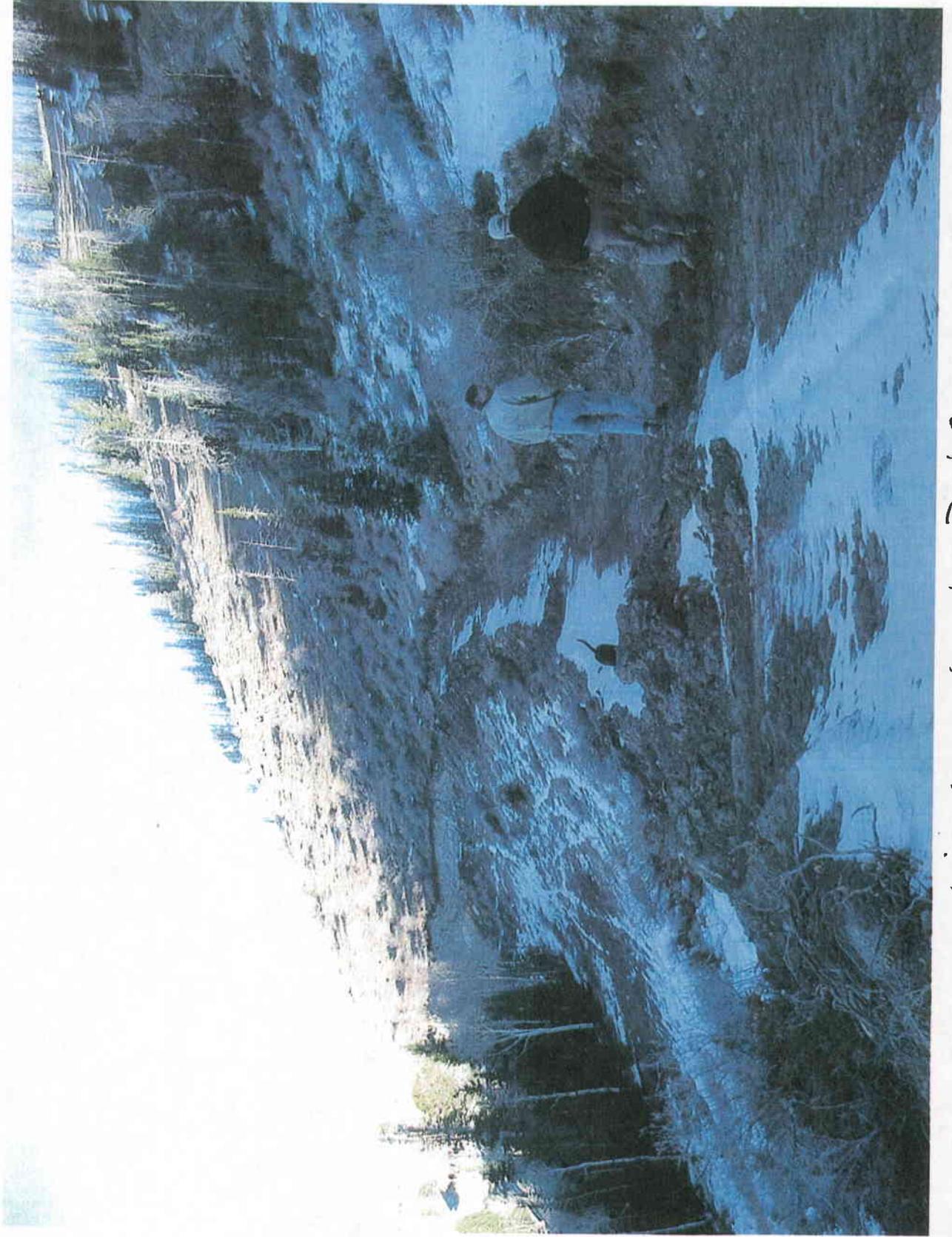
Drillhole plugging material at staging area



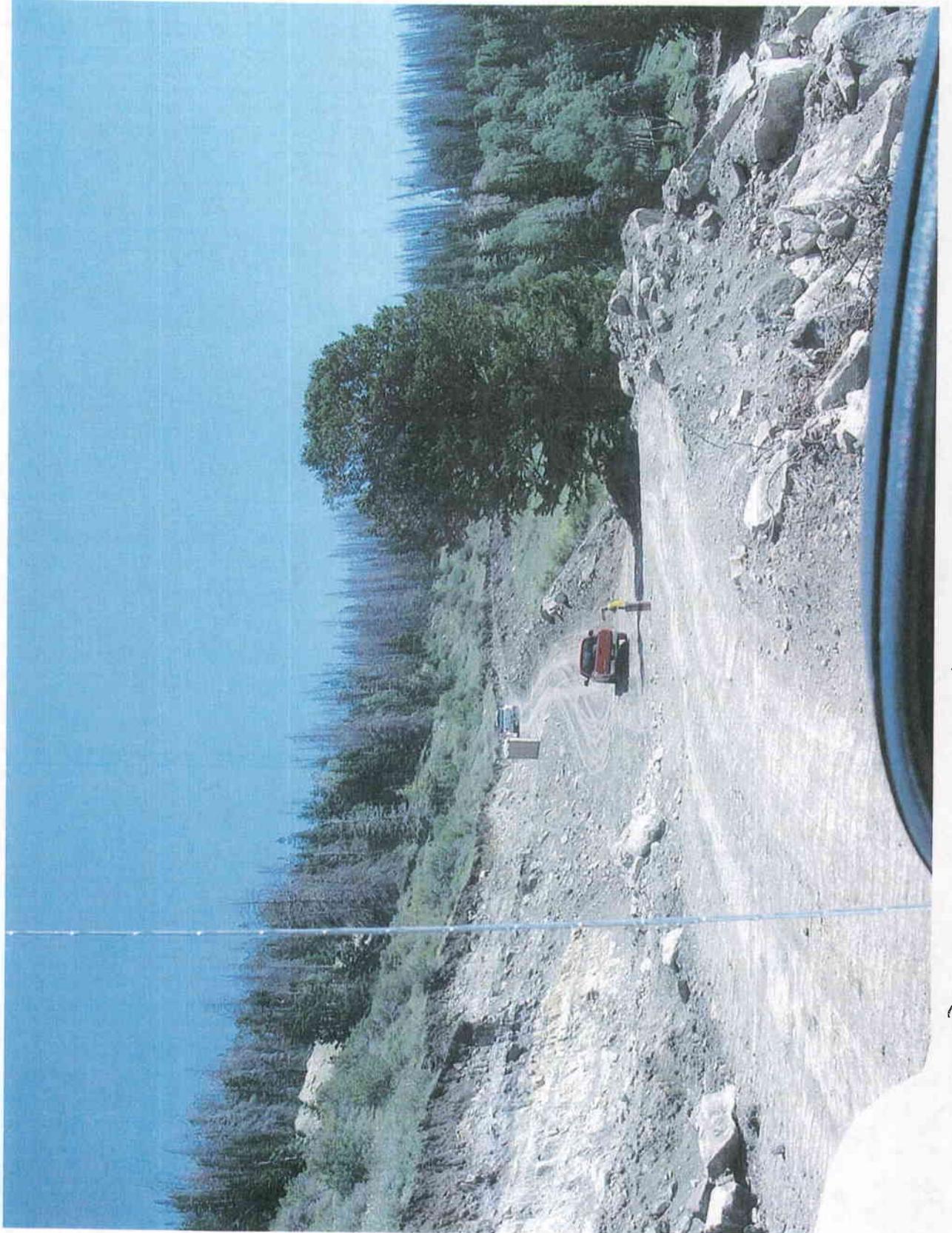
Drillhole 5 being plugged



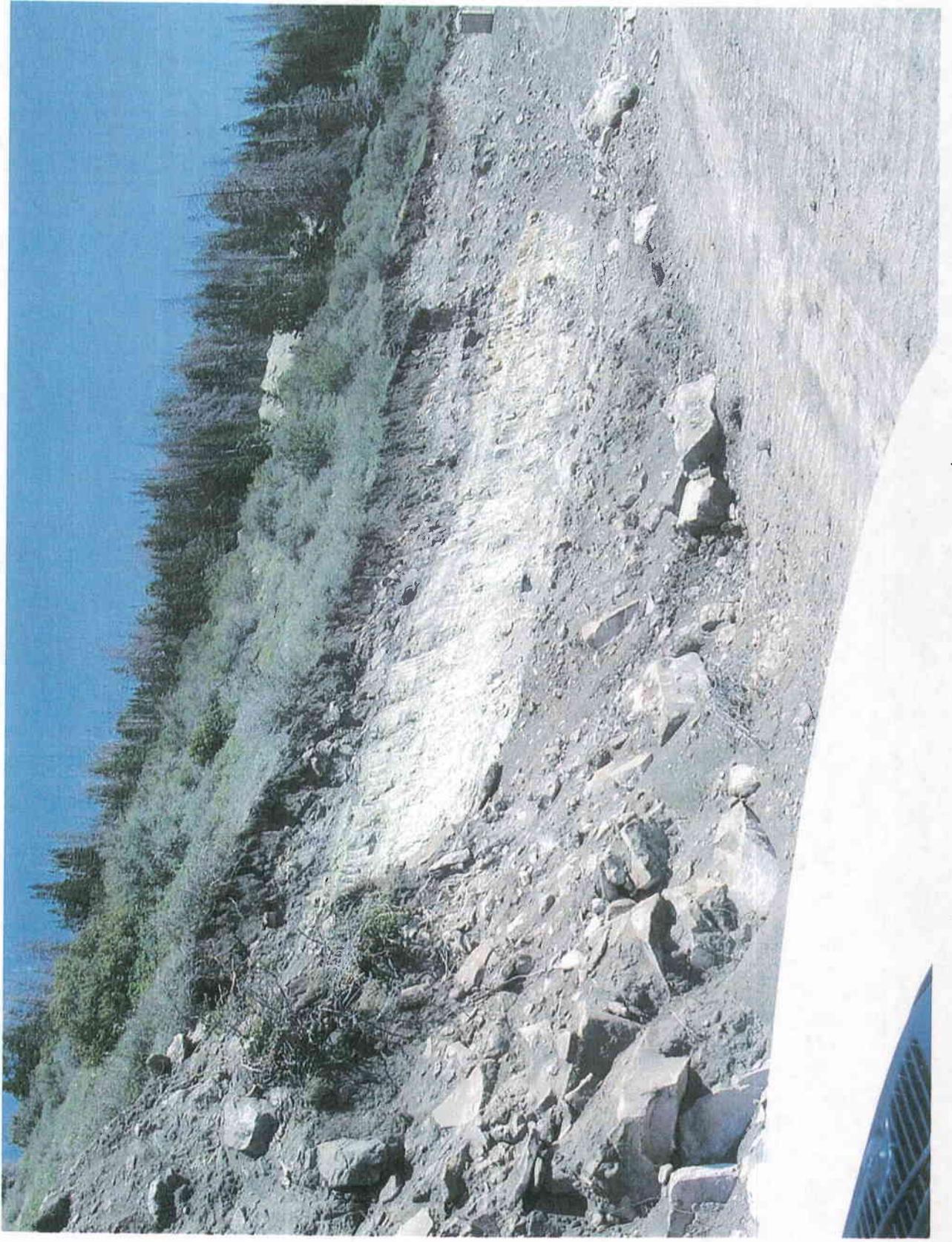
Drillhole to be plugged



Unreclaimed road into Pad 2



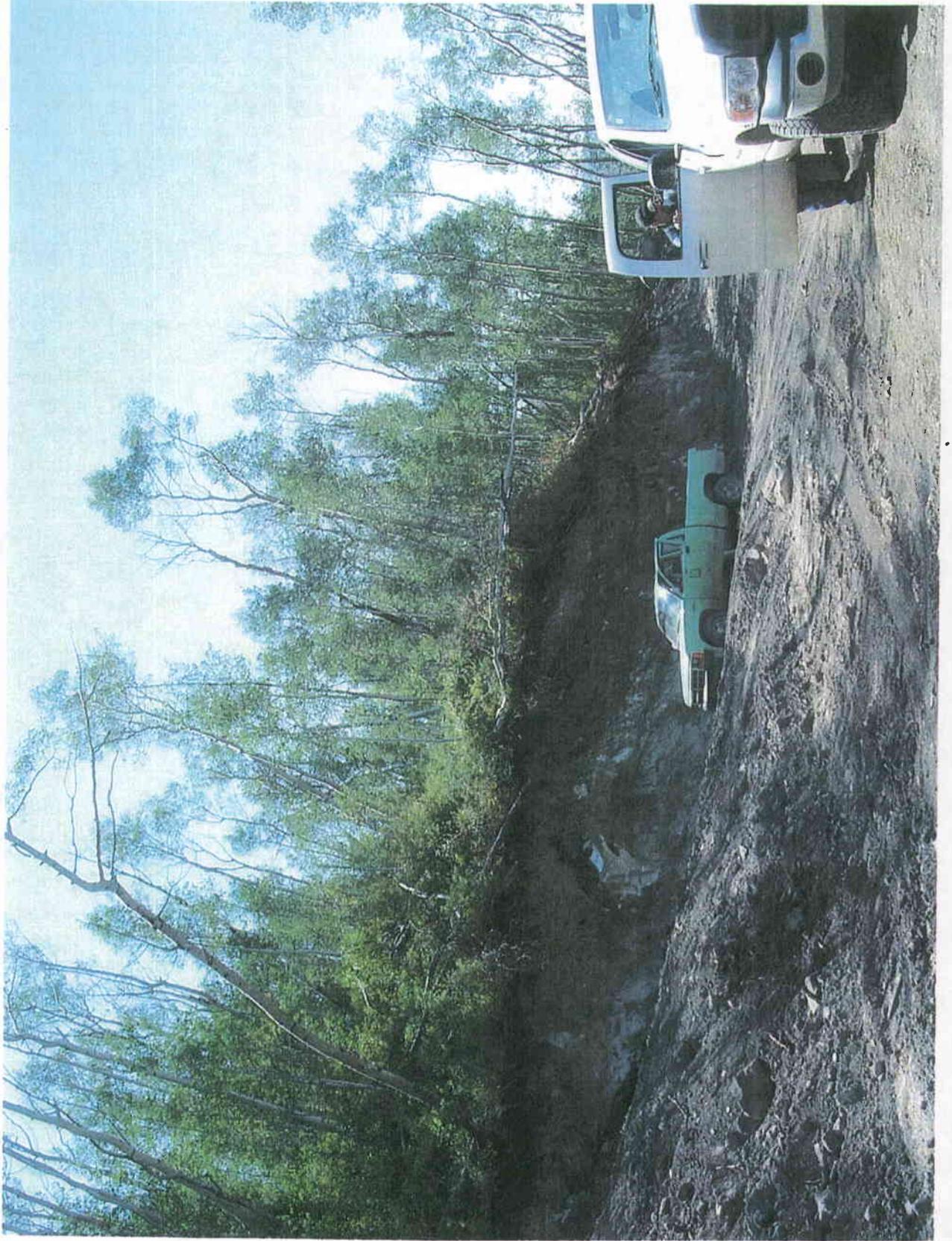
Pad 2 pre-reclamation



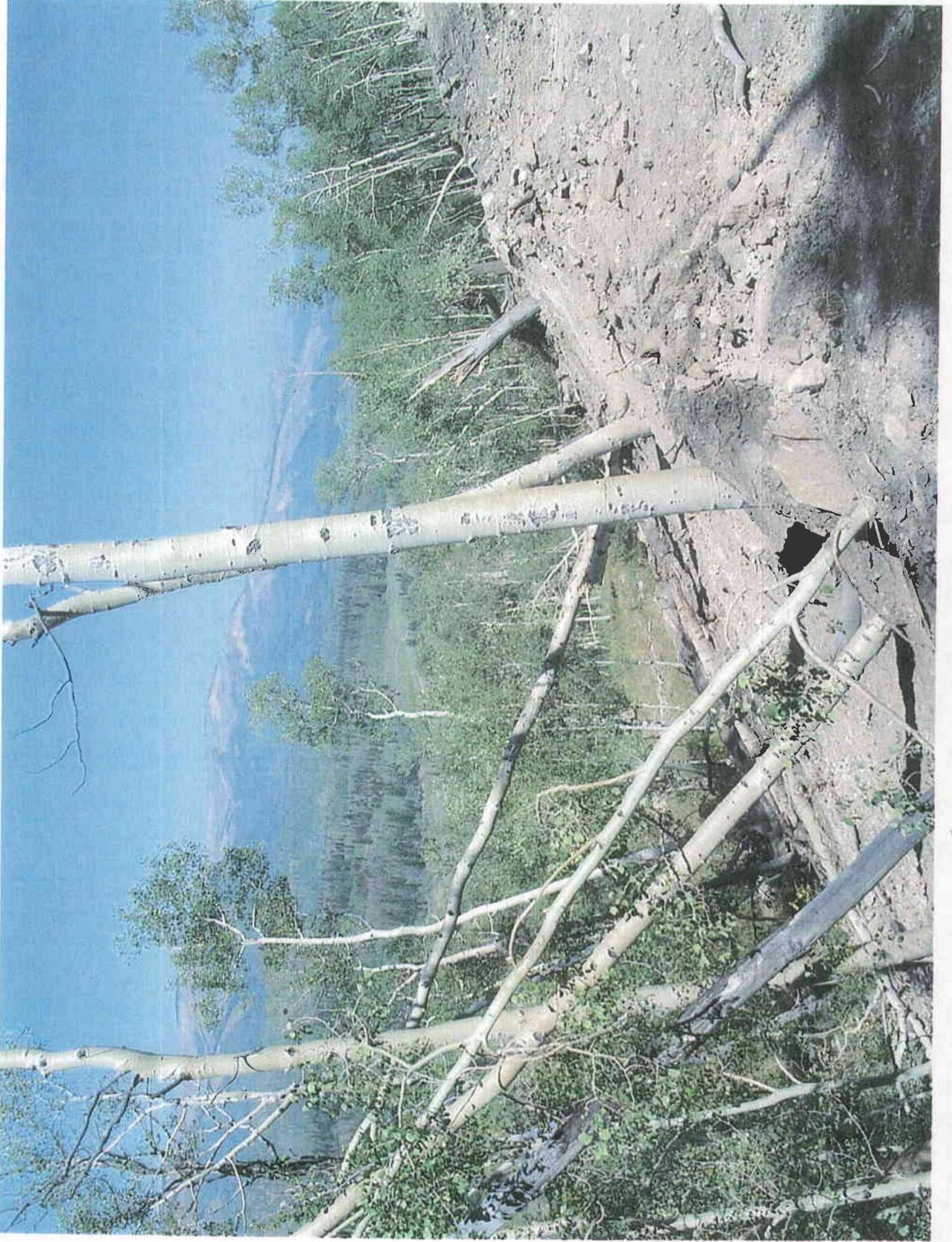
Pad 2, pre-reclamation



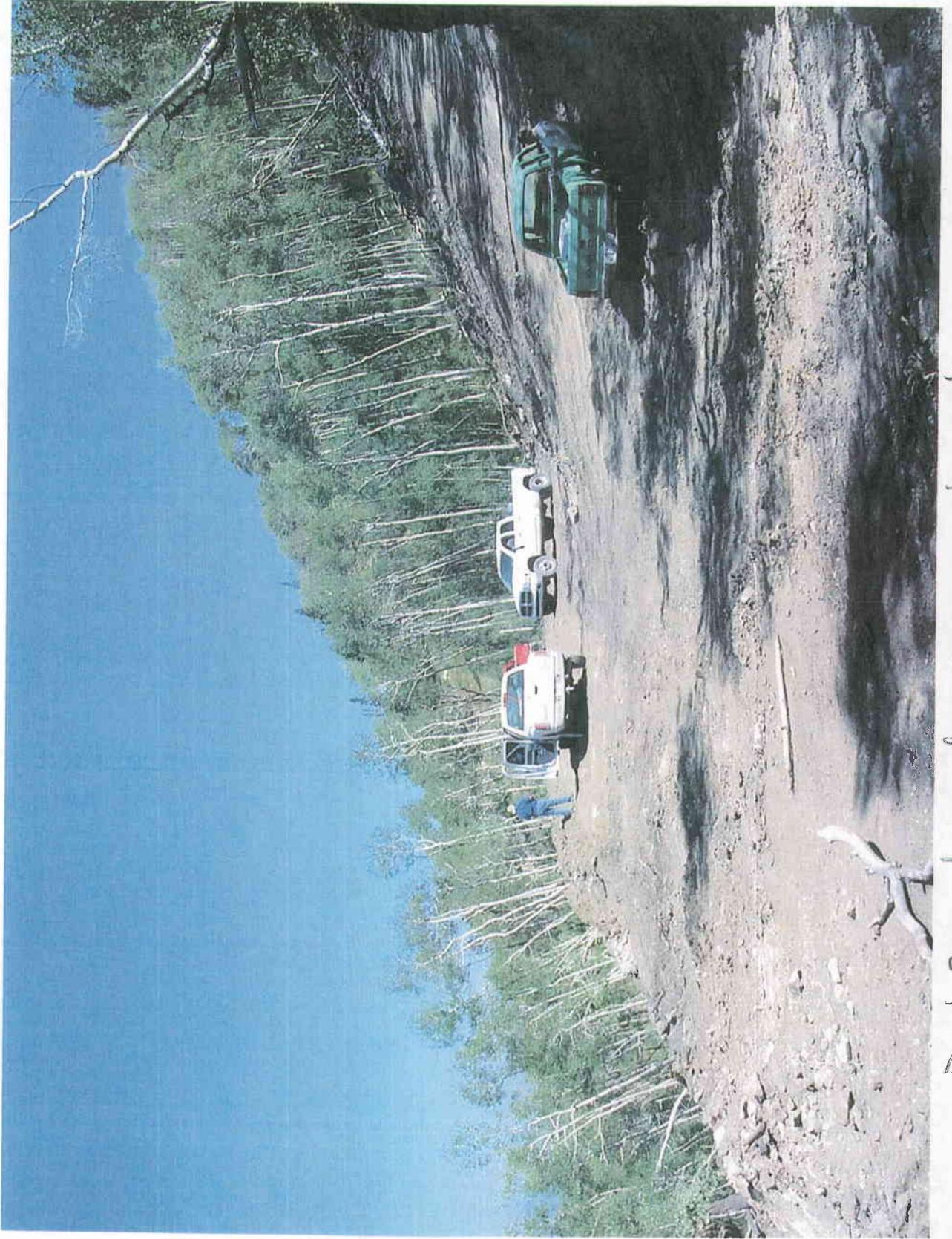
Pad 3 pre-reclamation



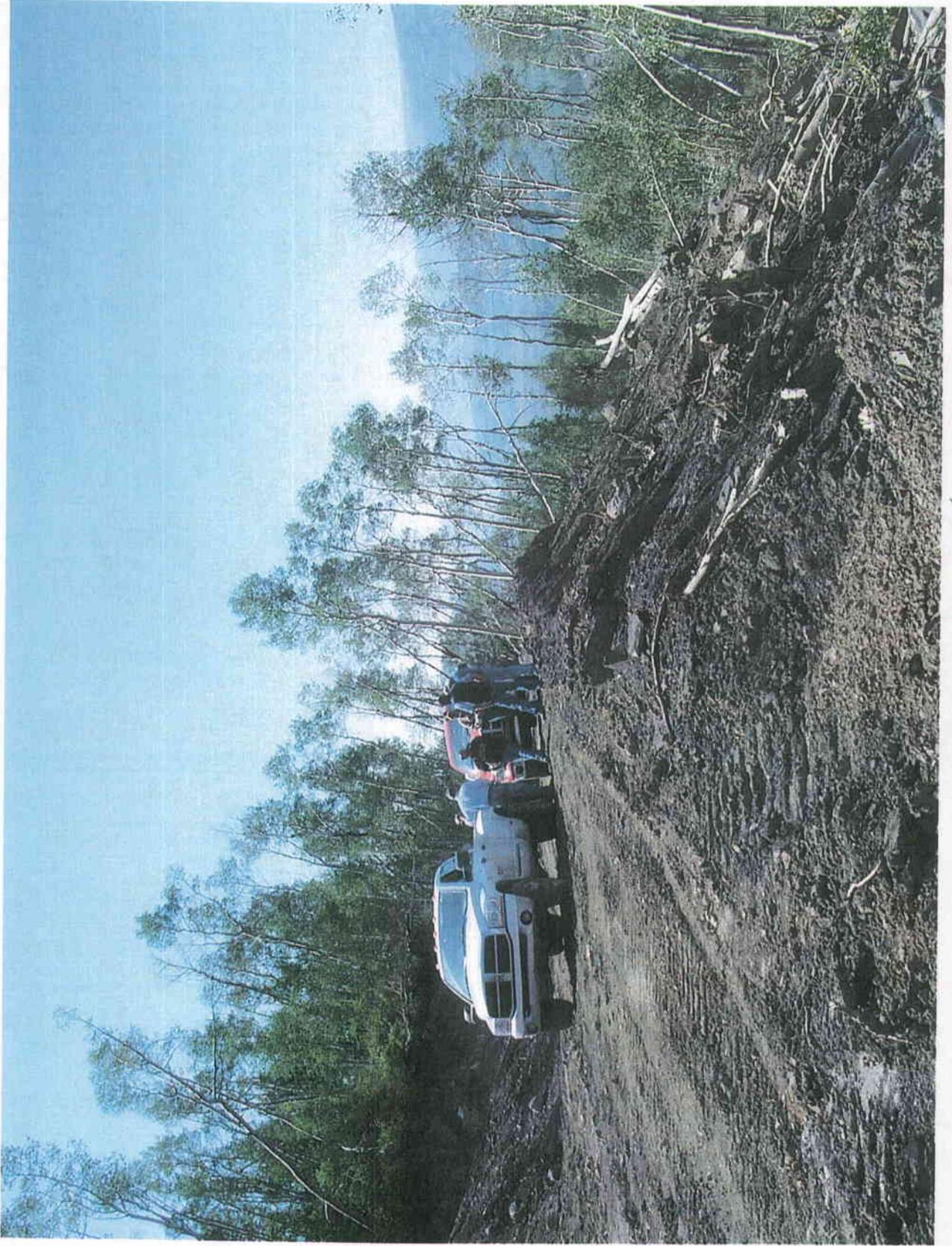
Pad 3 pre reclamation



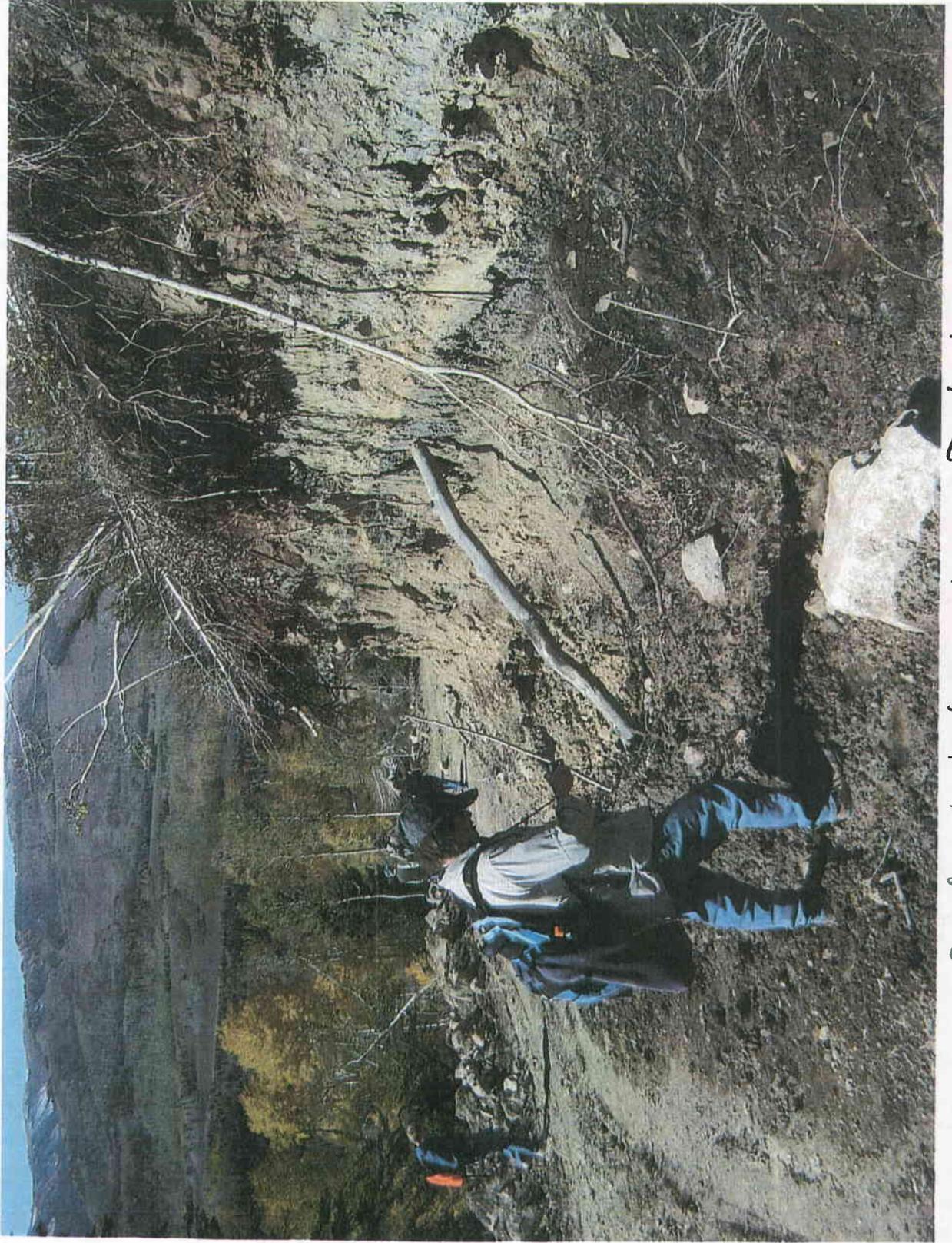
Pod 3 outslope, pre-reclamation



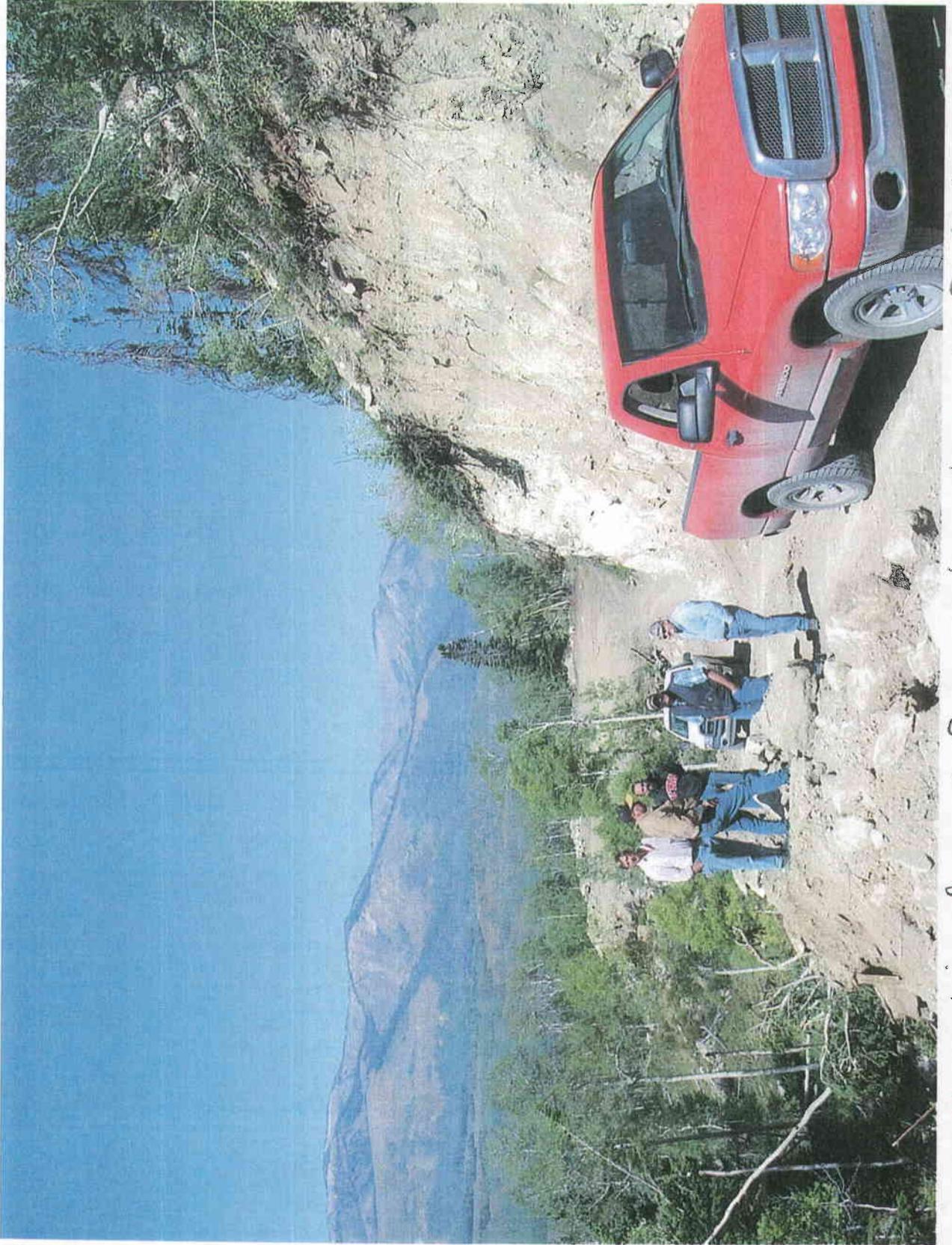
Pad 3 and road, pre-reclamation



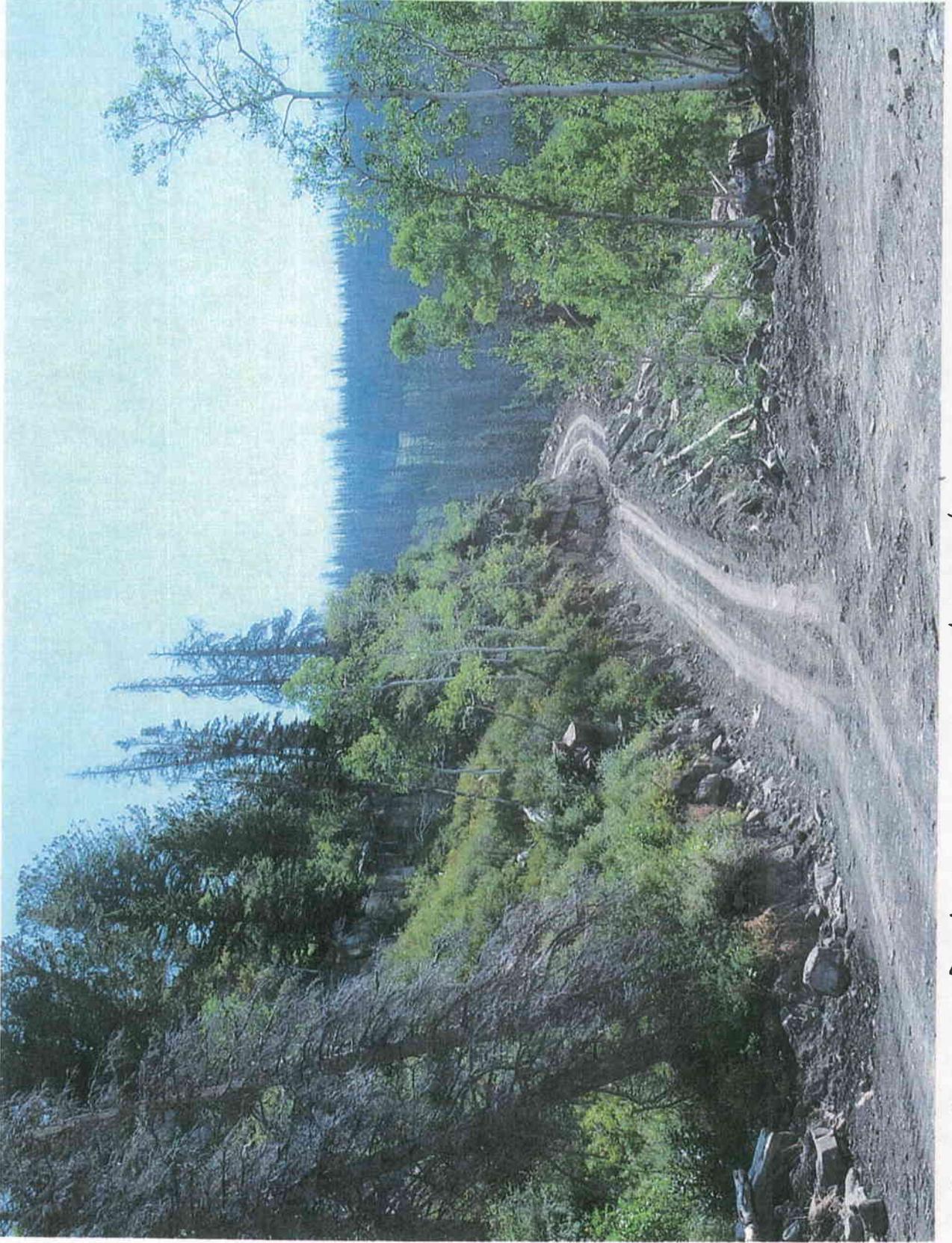
Pad 3 pre-reclamation



Road at ledge above Pad 4



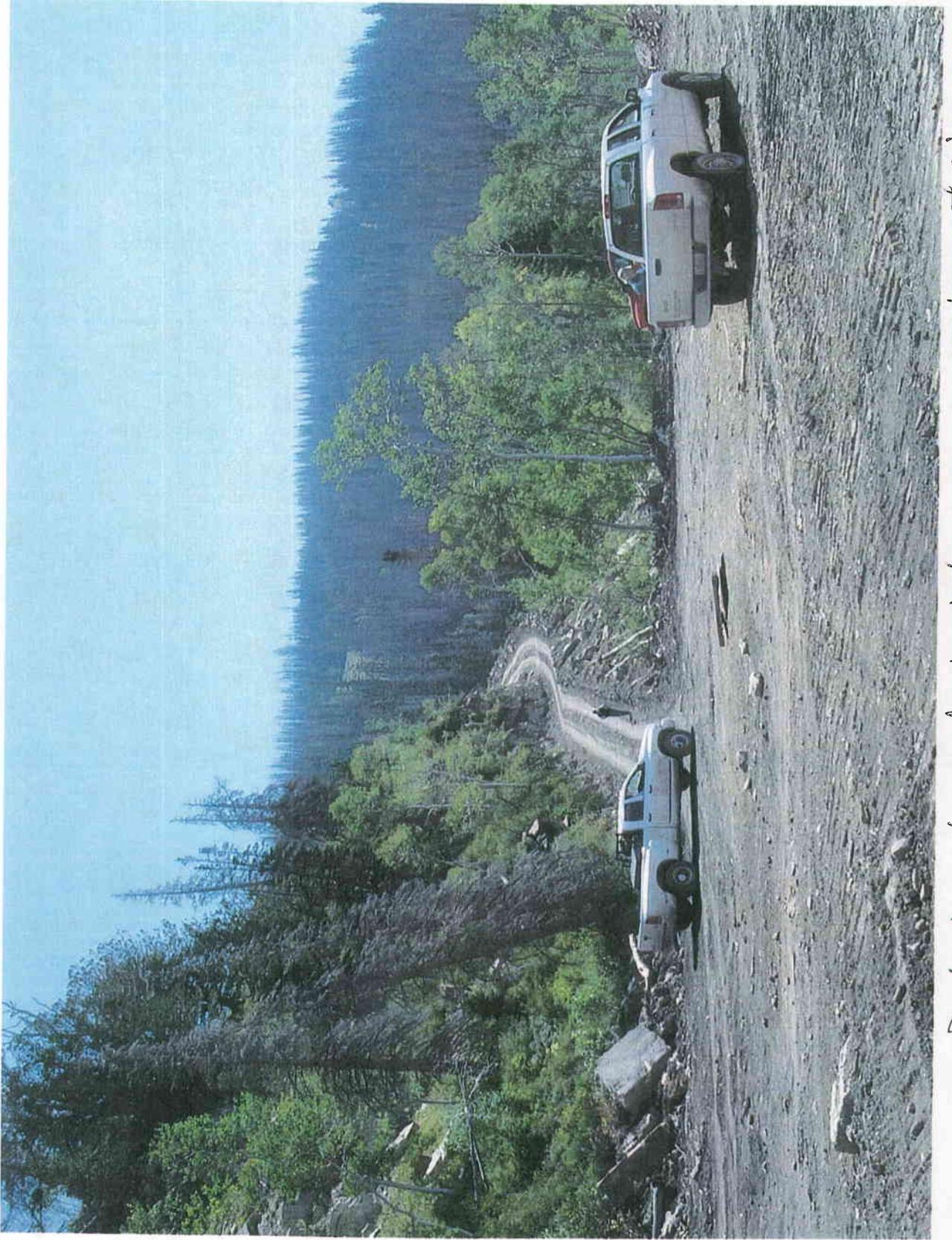
Unreclaimed road from ledge down to Pad 4



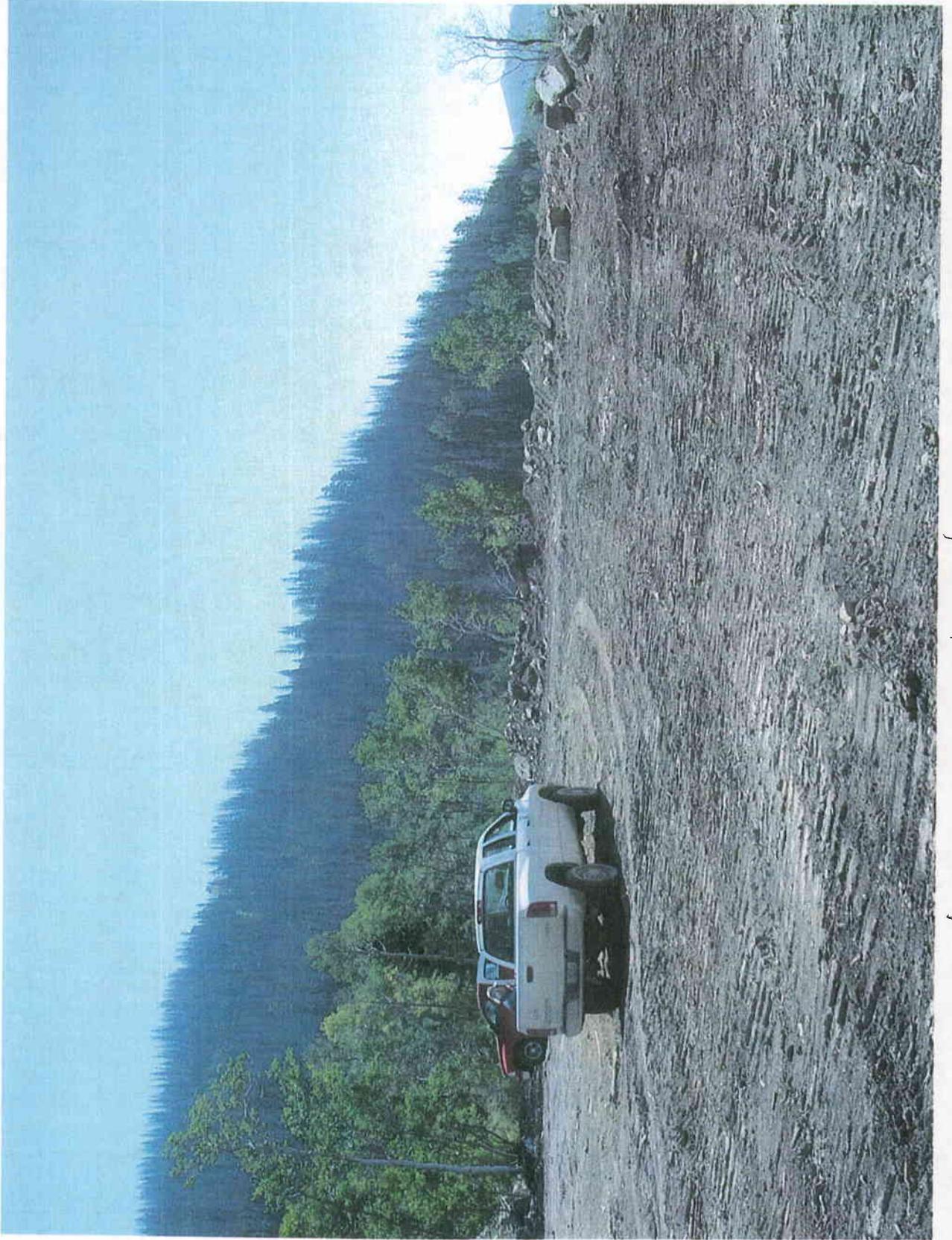
Road to Pad 4, pre reclamation



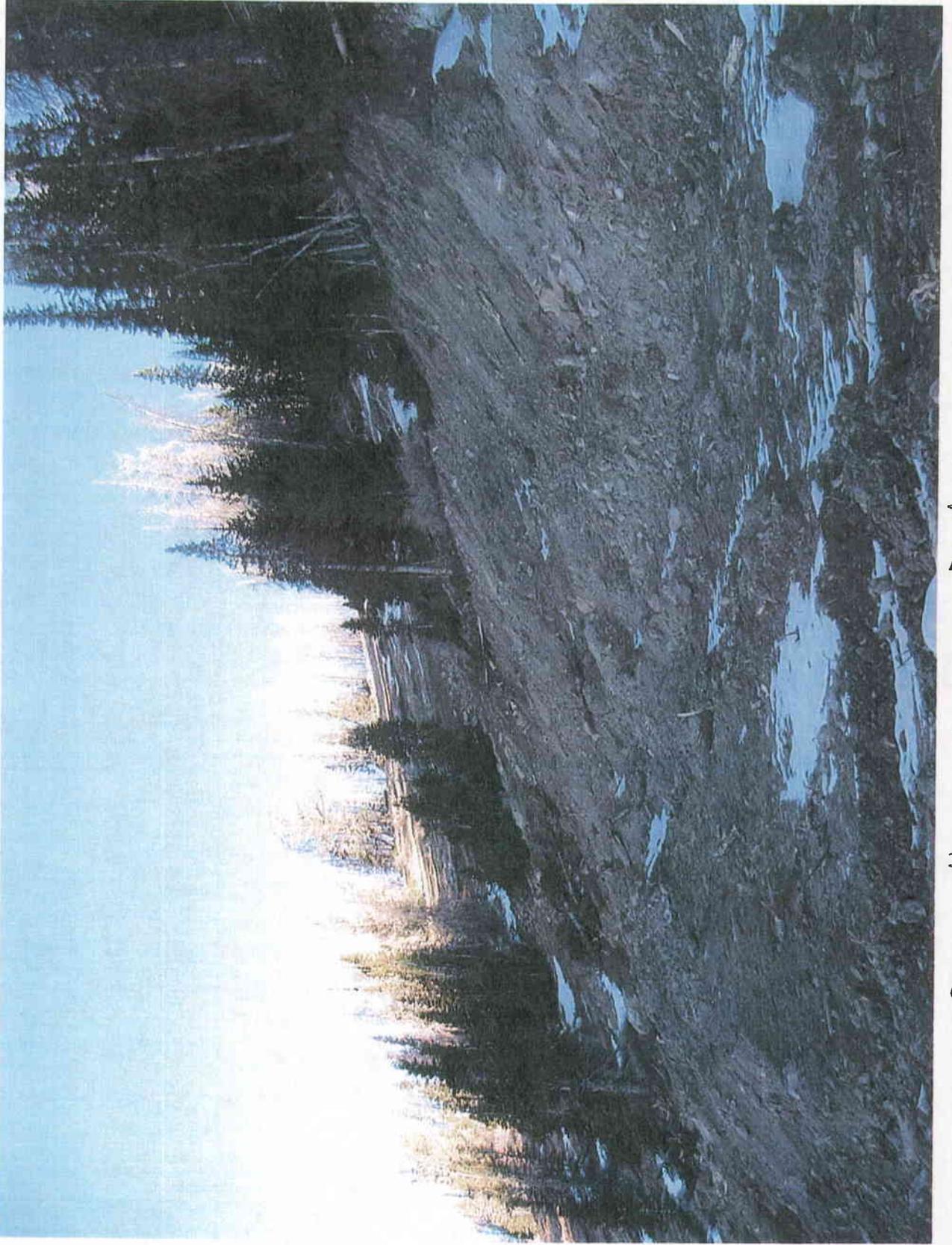
Unreclaimed road between Pad 6 and Pad 4



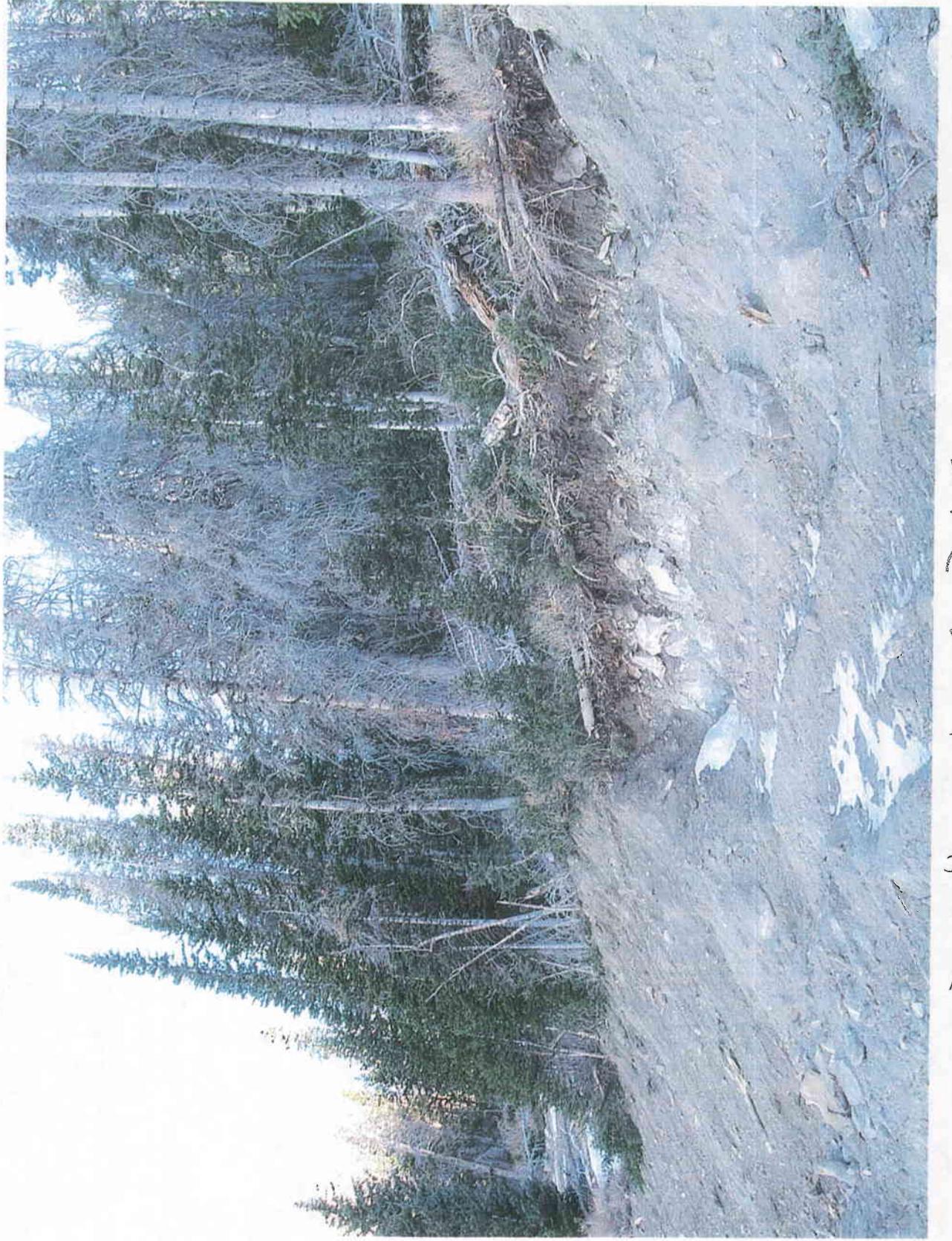
Pad 4 and road to lodge, pre-reclamation



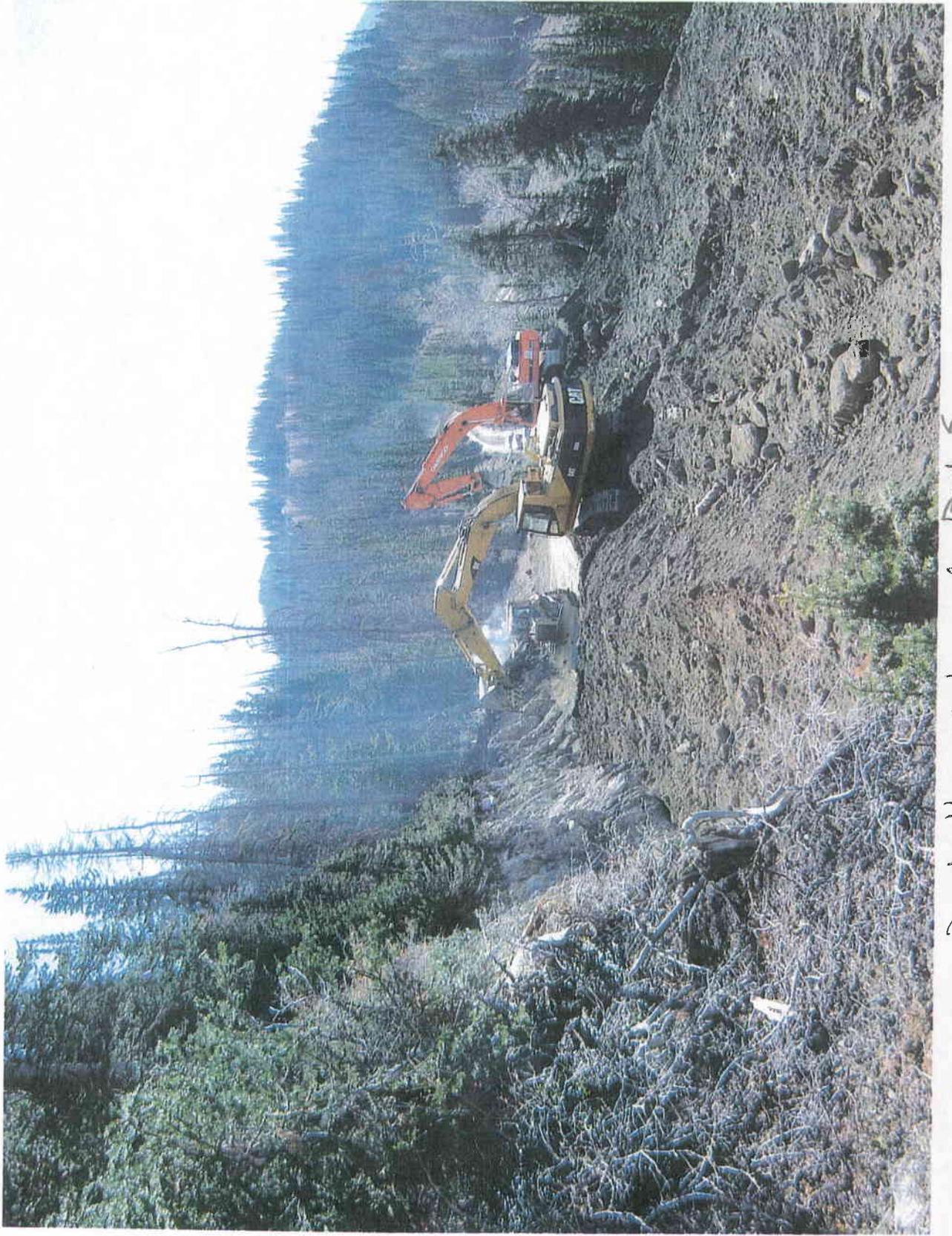
Pool 4, pre reclamation



Partially reclaimed Pad 5



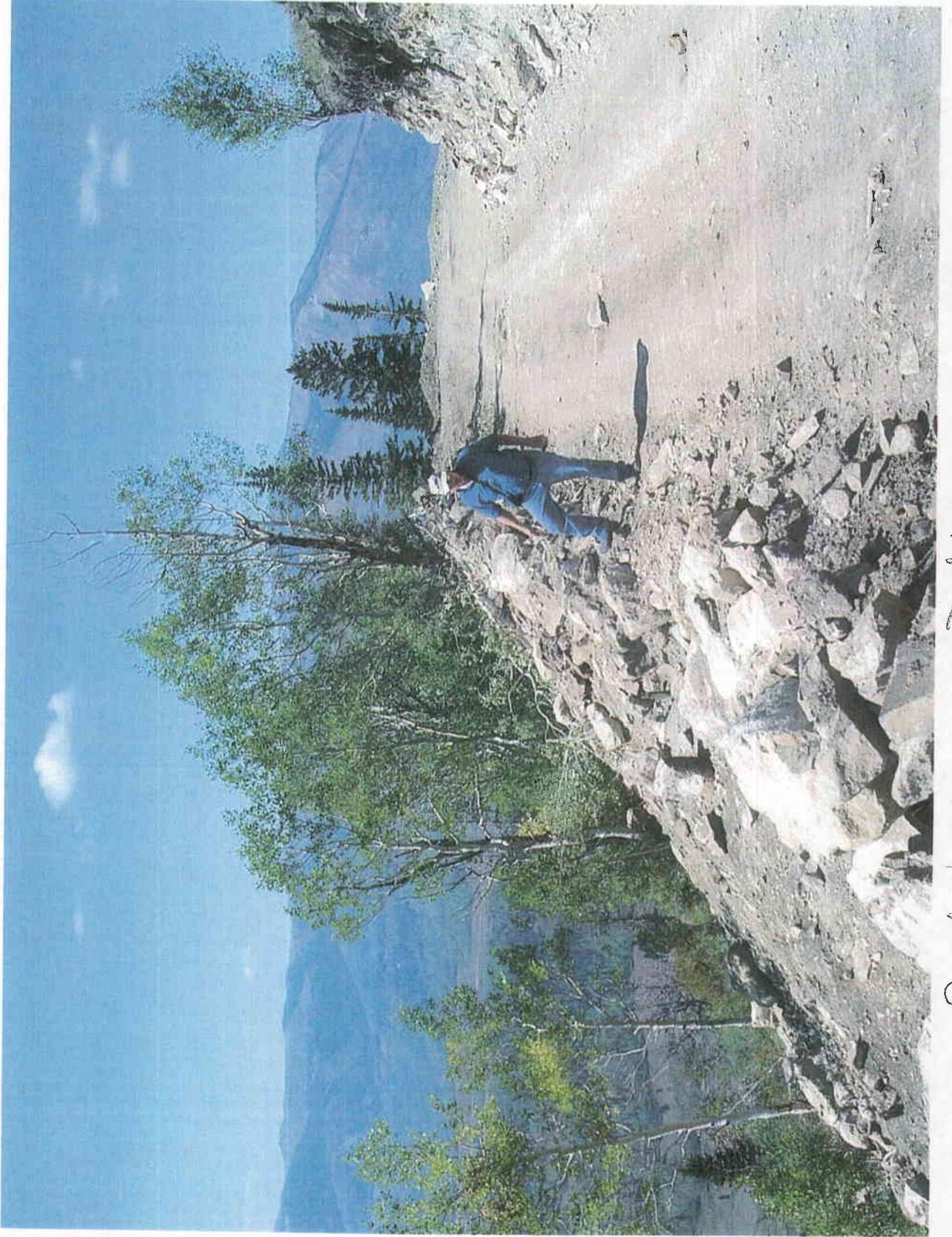
Partially reclaimed Pad 5



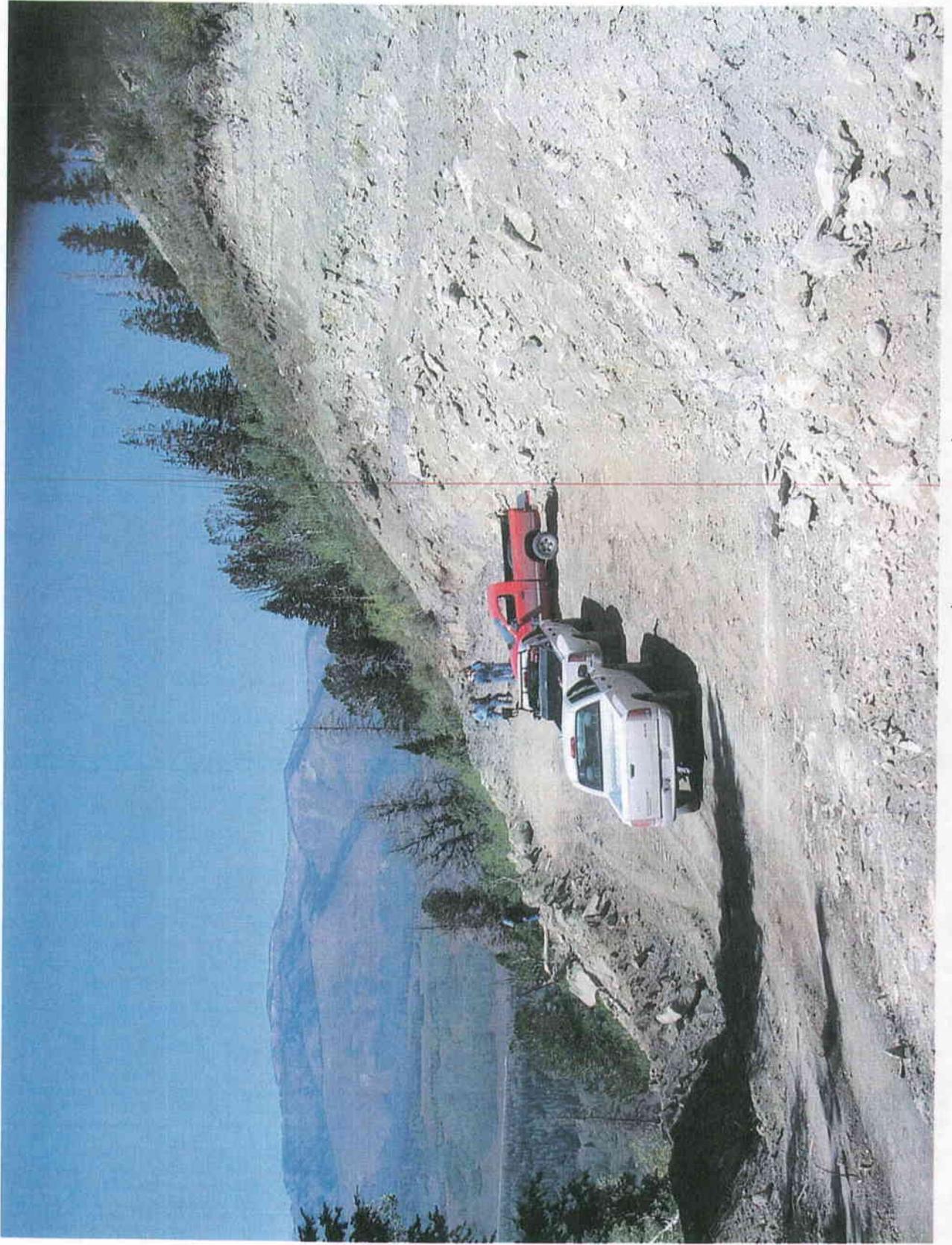
Partially reclaimed Pod 5



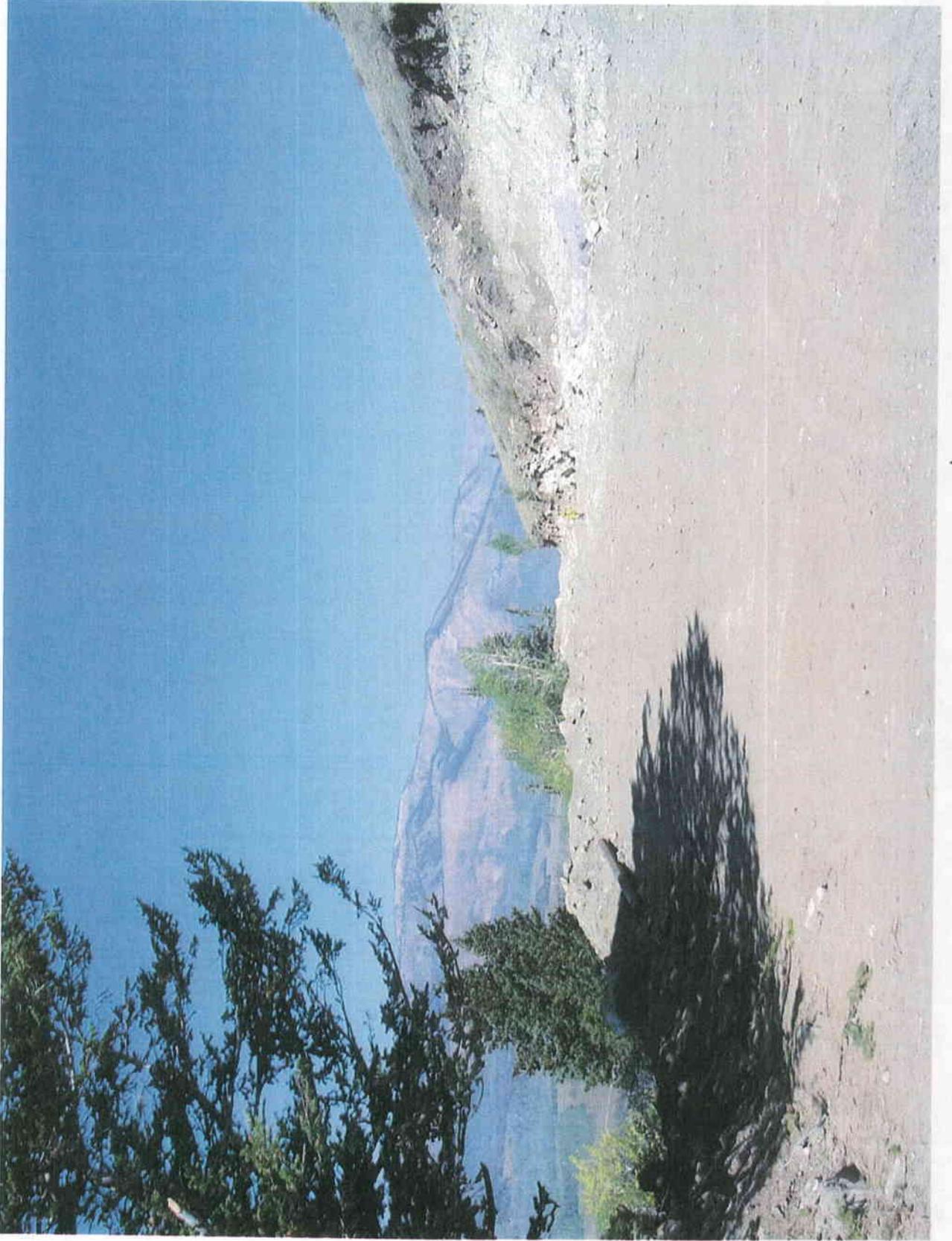
Partially reclaimed Pad 5



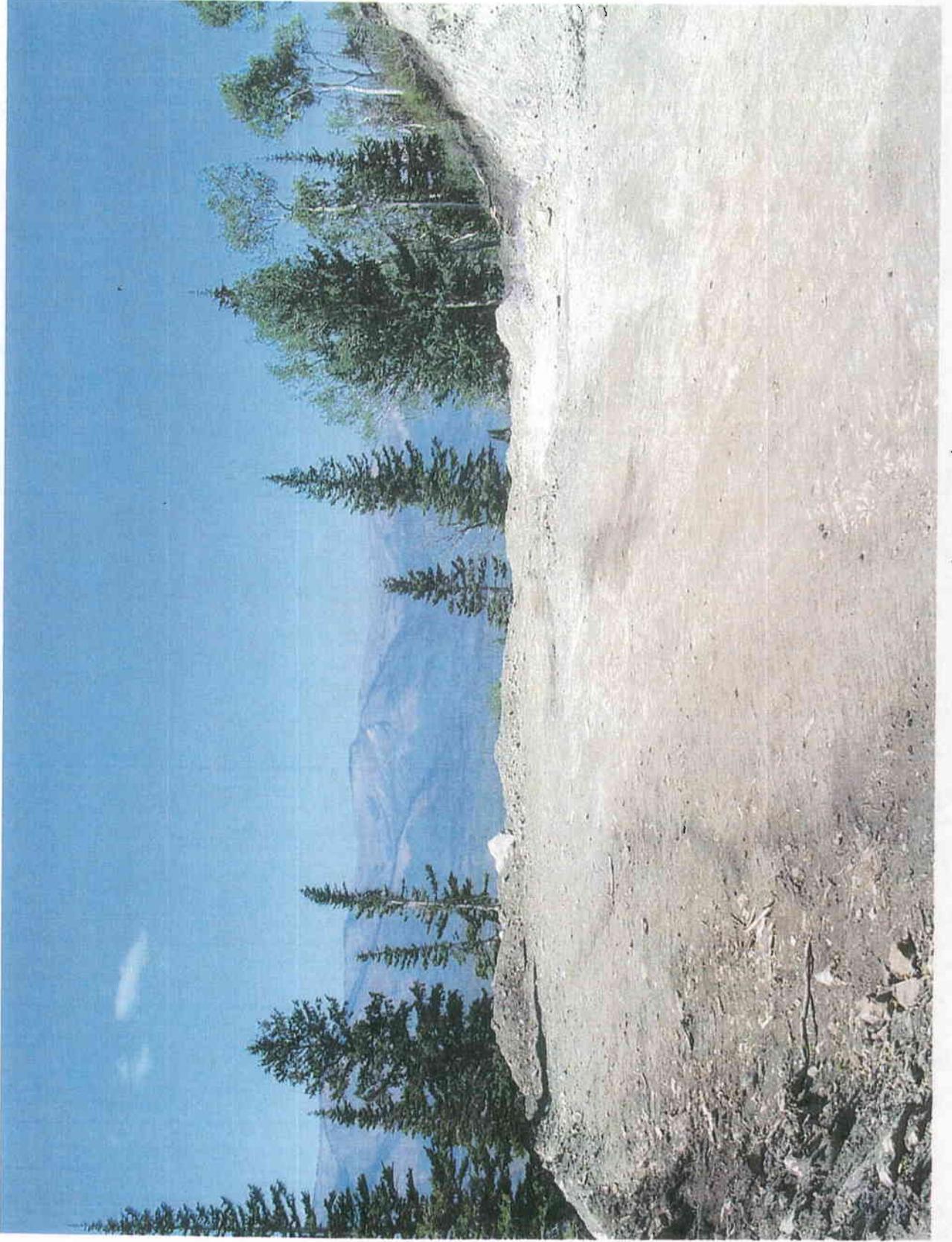
Road leading to Pad6



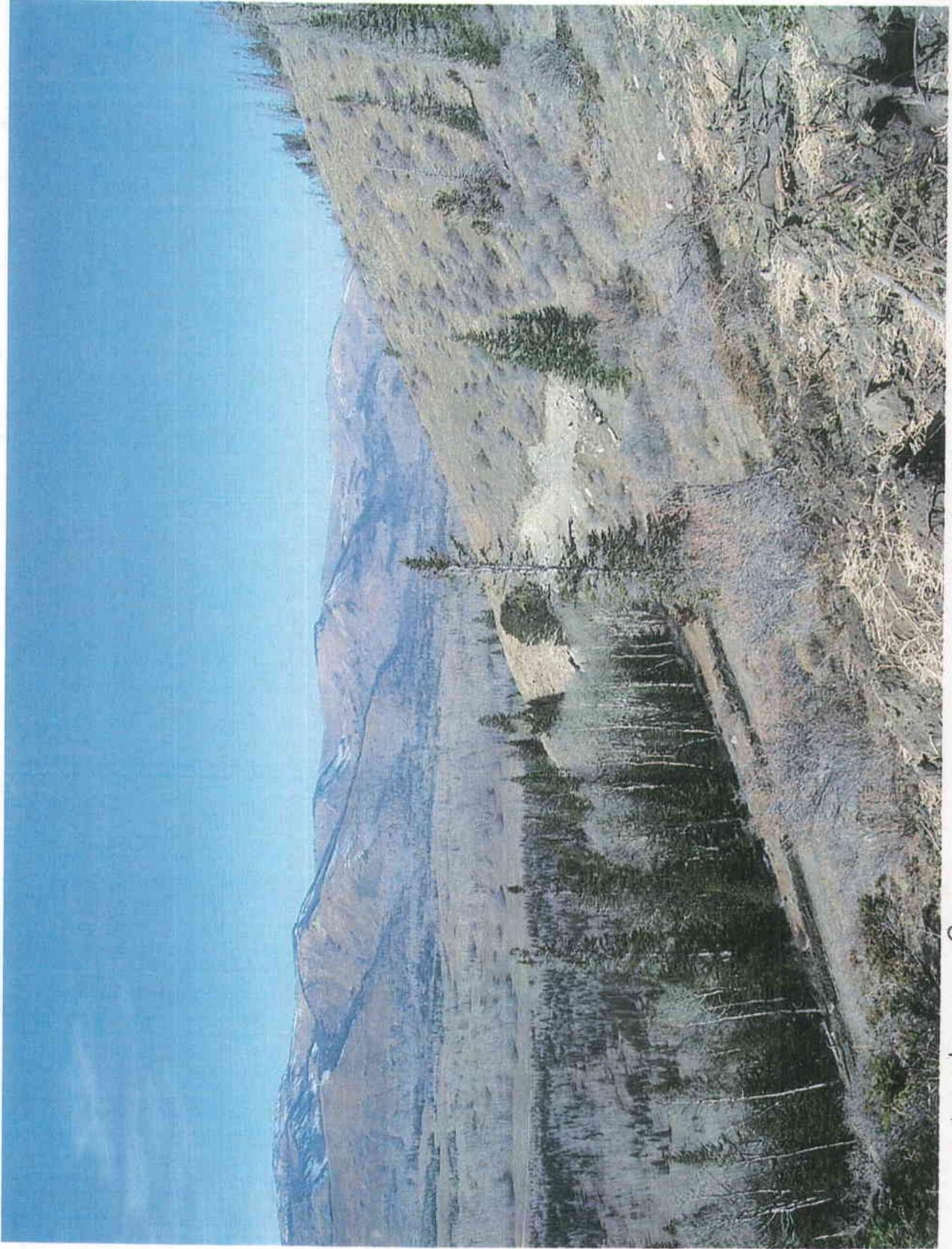
Pad 6 pre reclamation



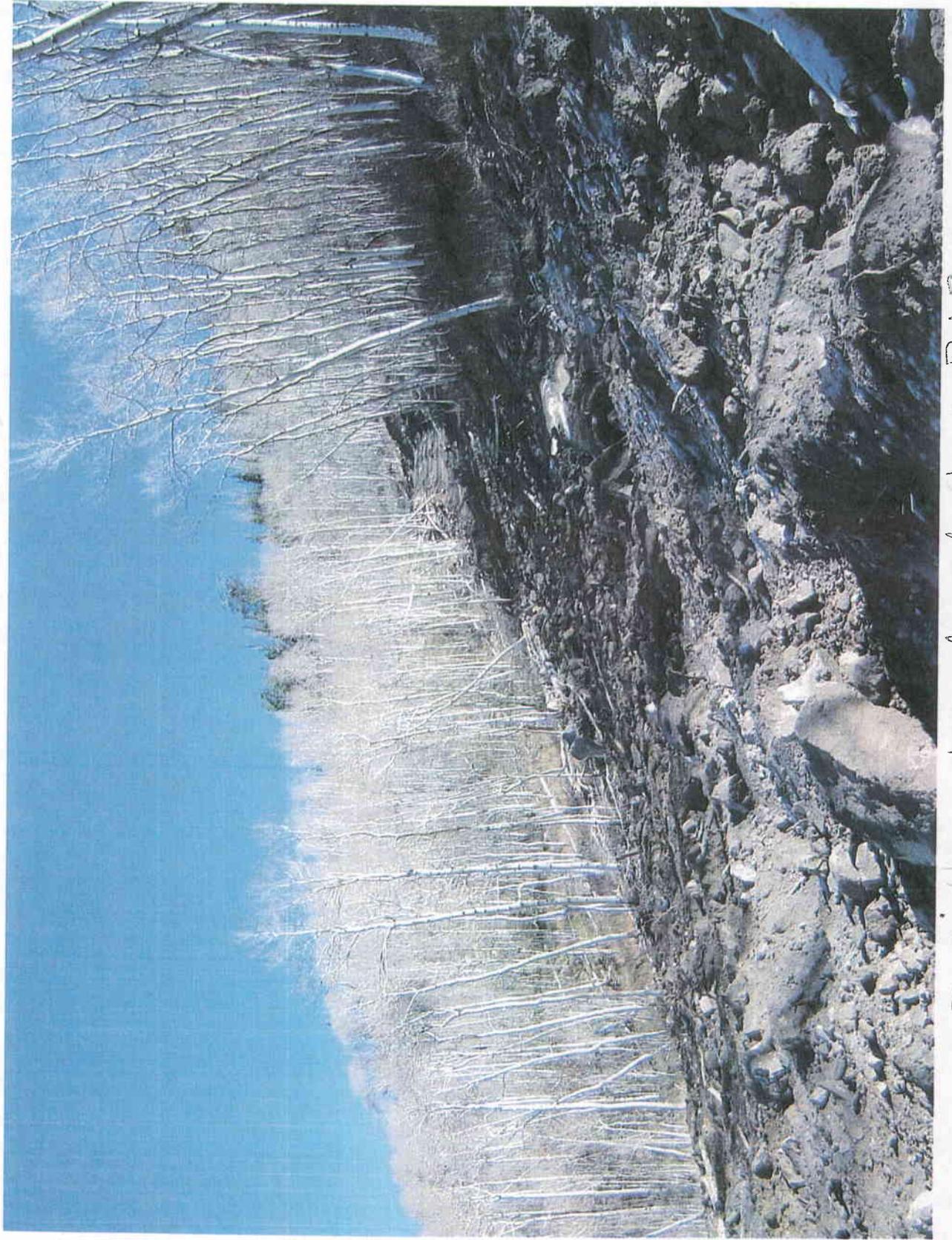
Pad 7 pre reclamation



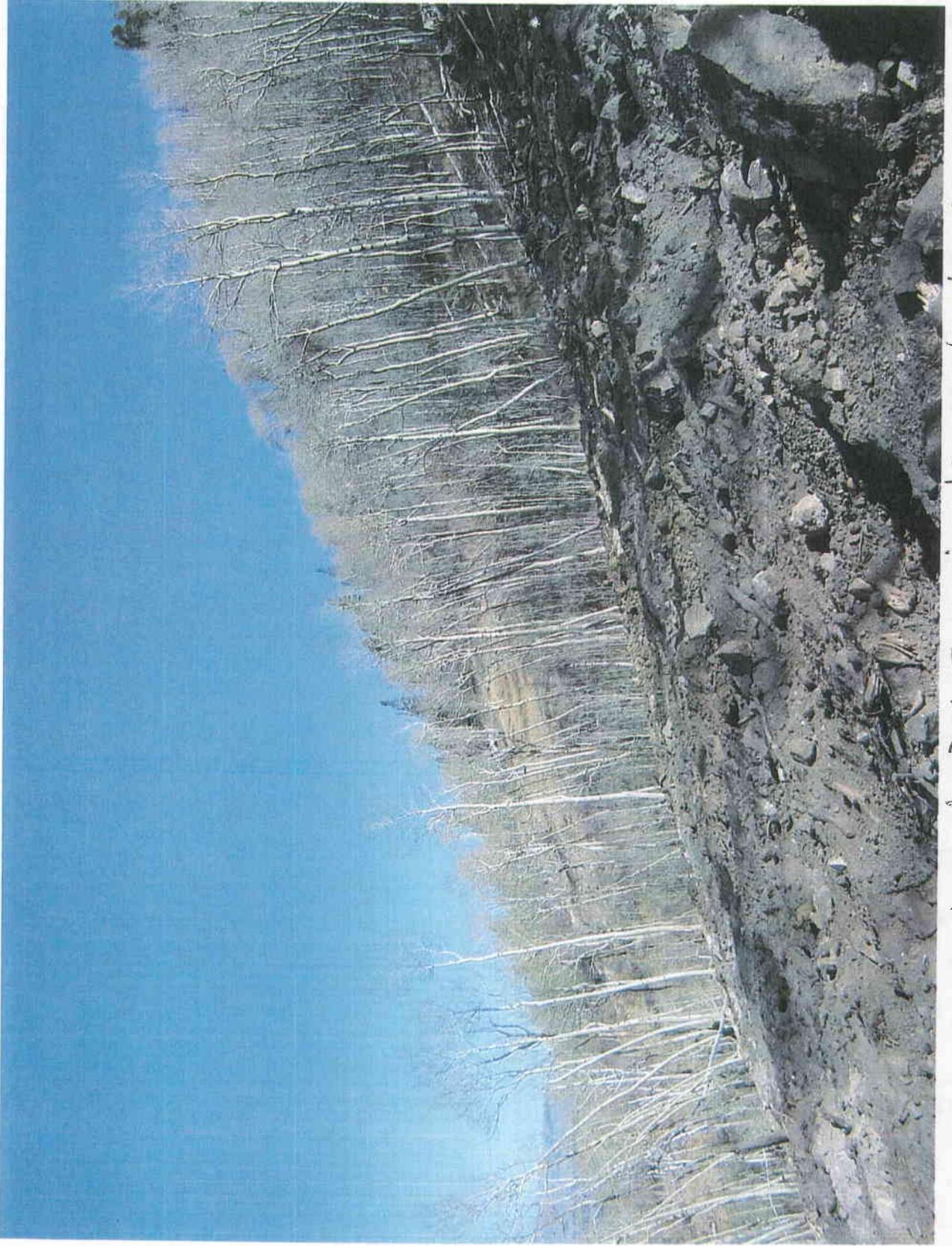
Pad 7, pre reclamation



Looking from reclaimed Pad 5 to reclaimed Pad 7  
and unreclaimed Pad 2



Partially reclaimed road above Pad 3



Reclaimed Pad 3 prior to wood straw



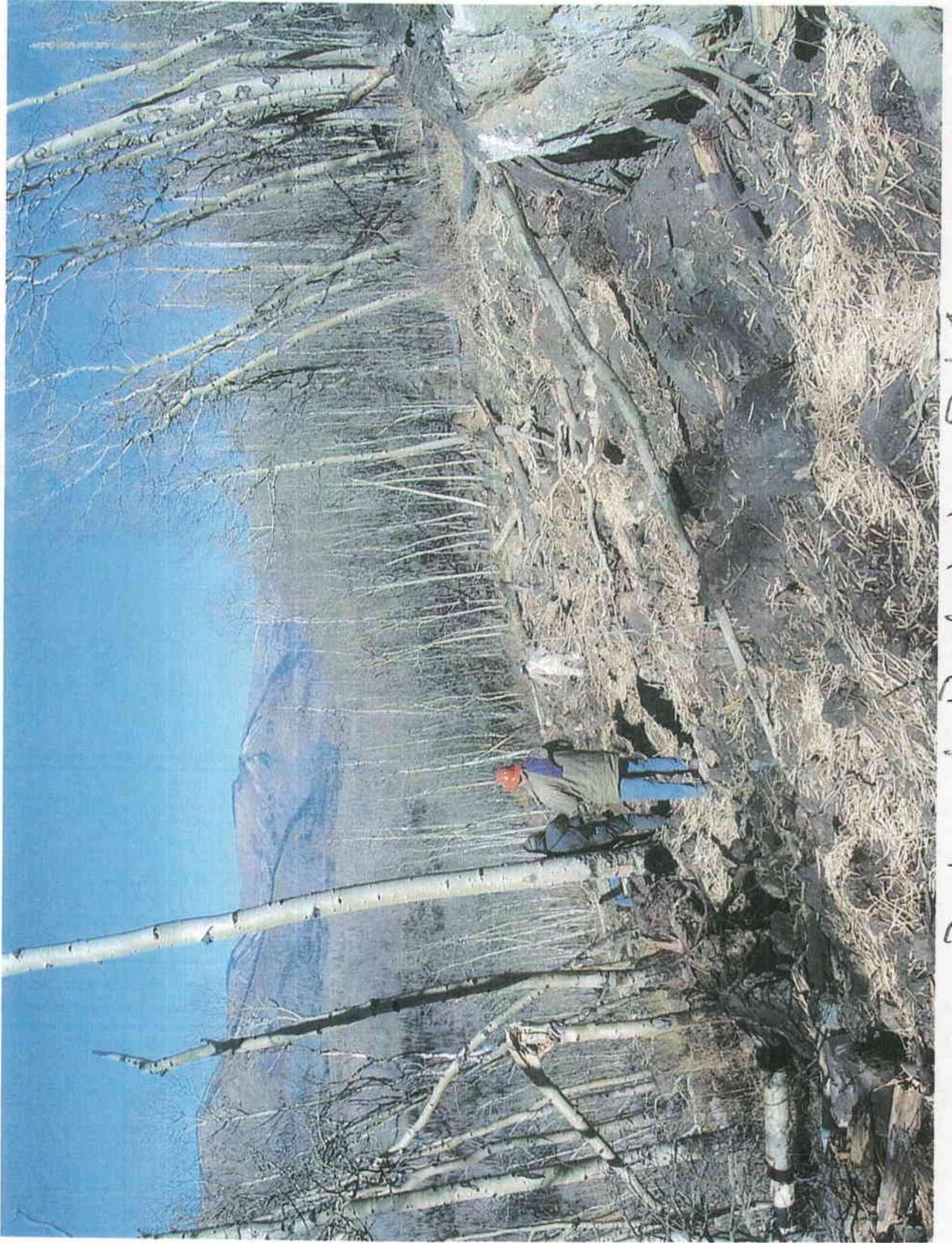
Reclaimed Pad 3 prior to wood straw



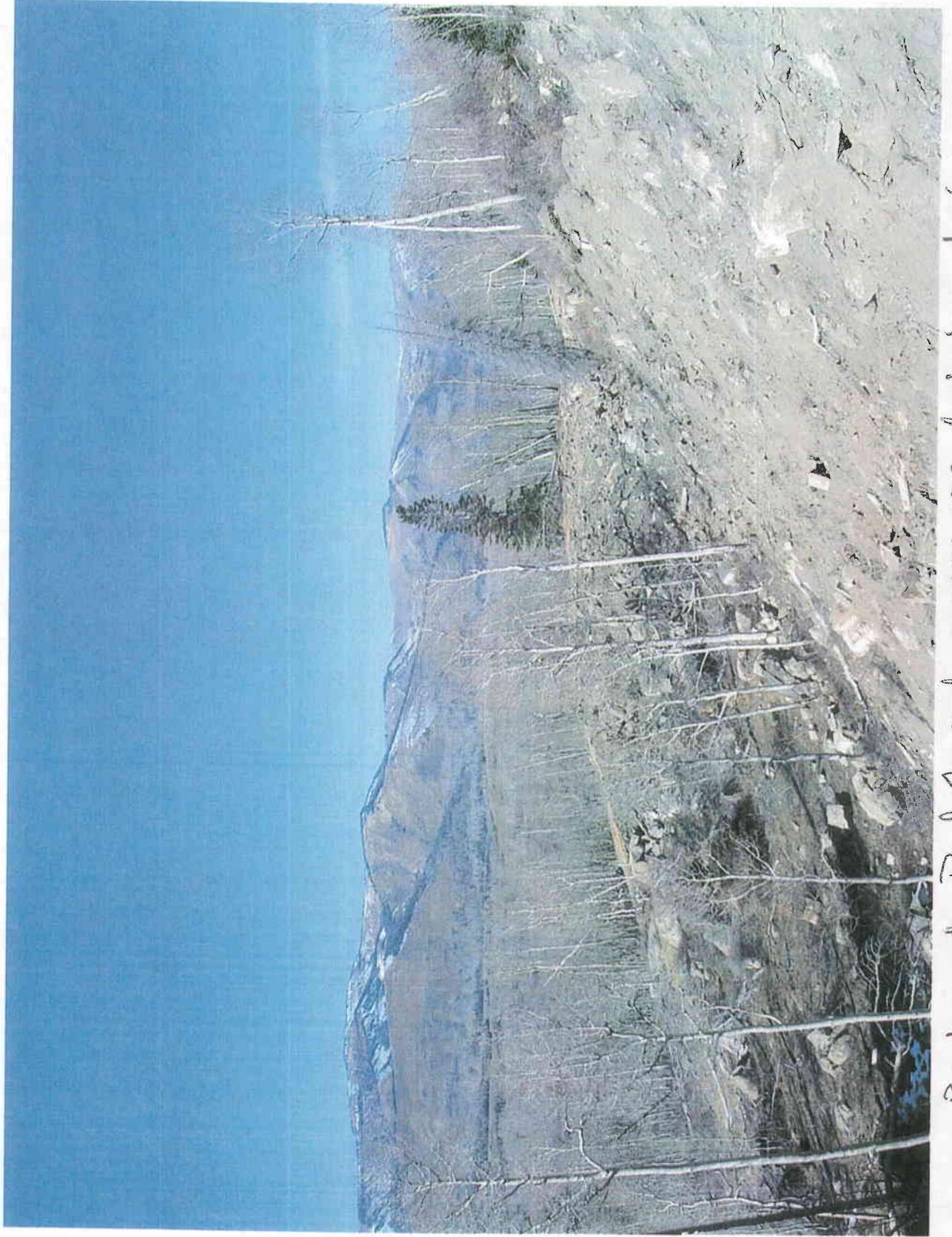
Reclaimed Road above Pad 3



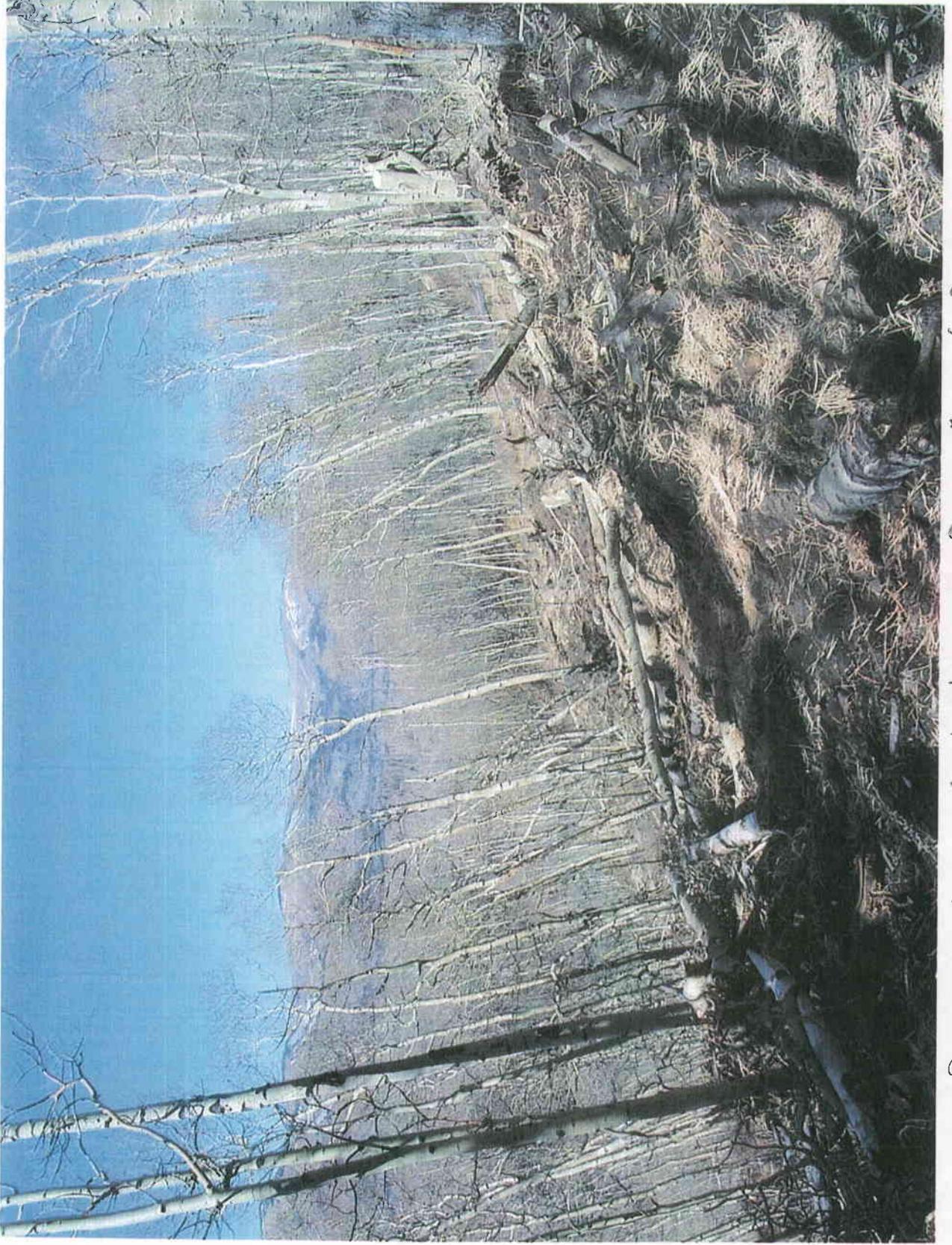
Reclaimed Pool 3



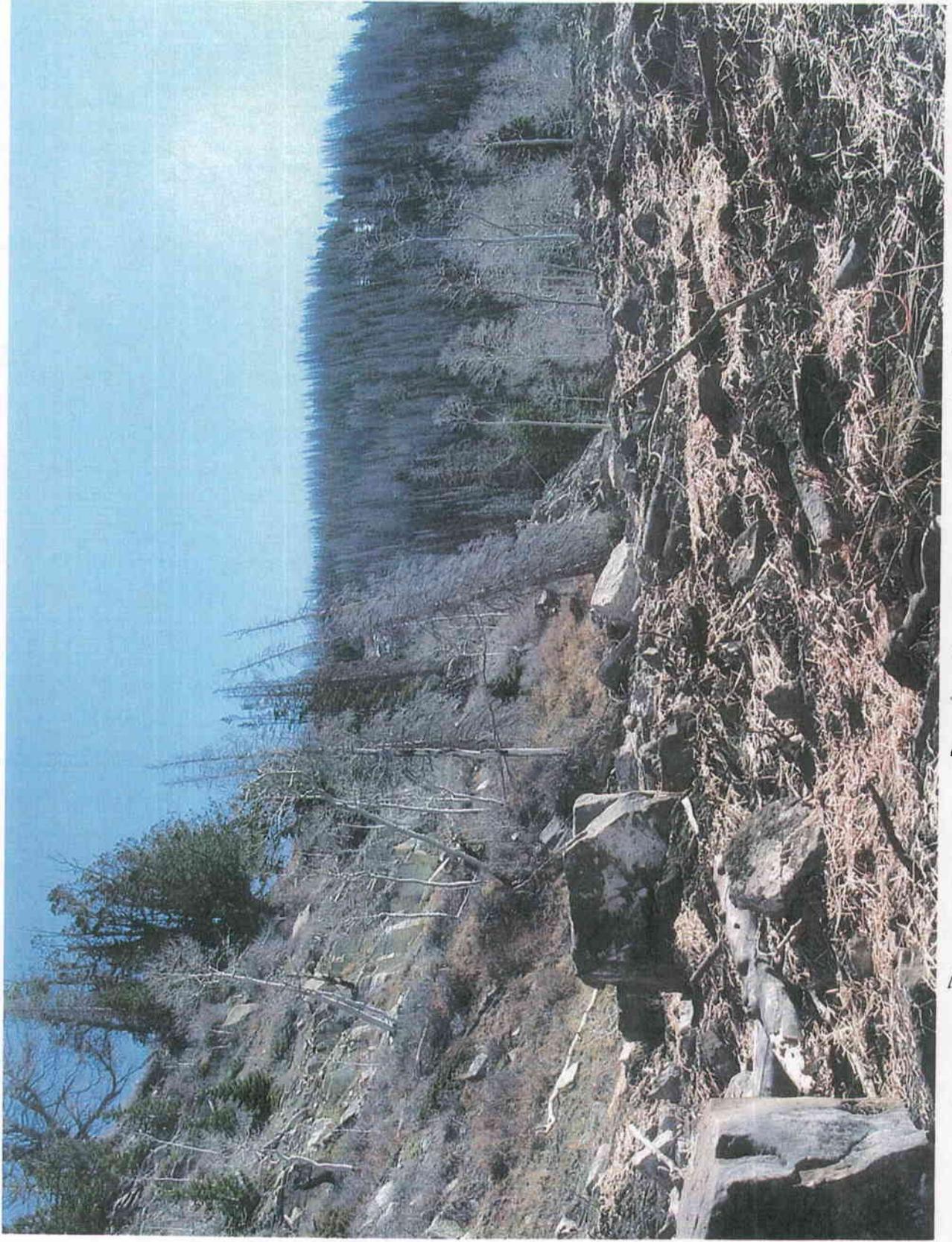
Reclaimed Road below Pad 4



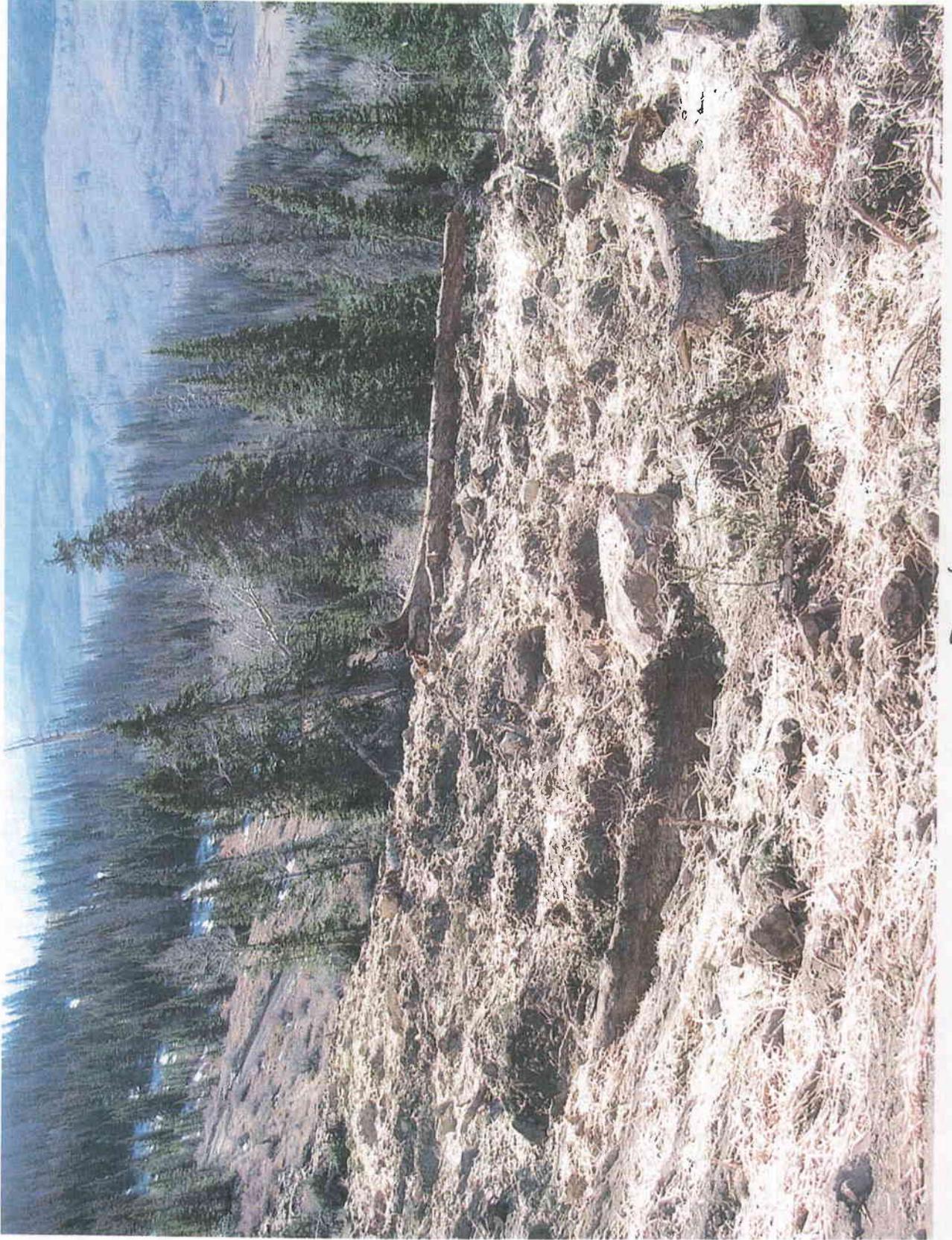
Reclaimed Pad 4 and access road below ledge



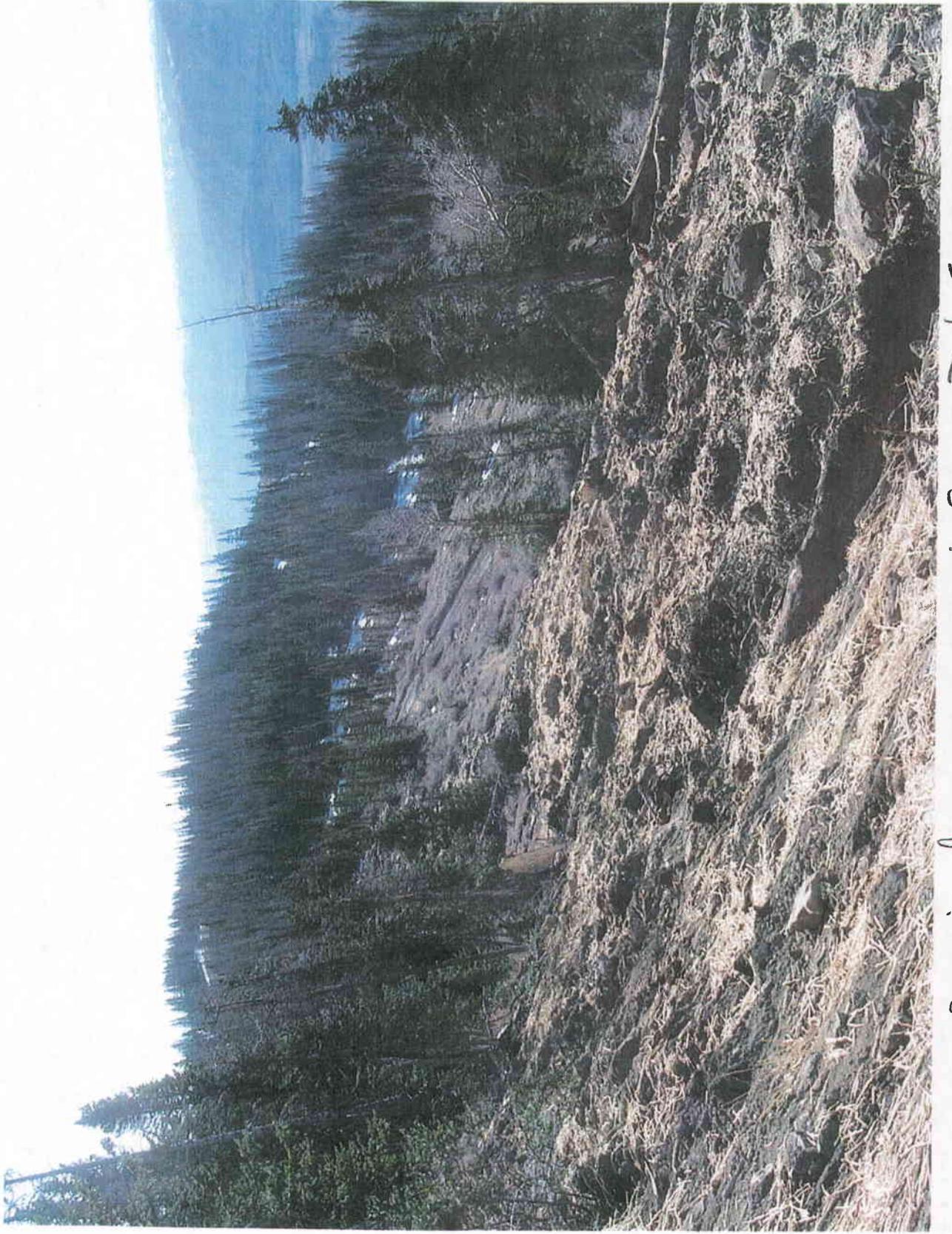
Reclaimed road between Pad 4 and Pad 3



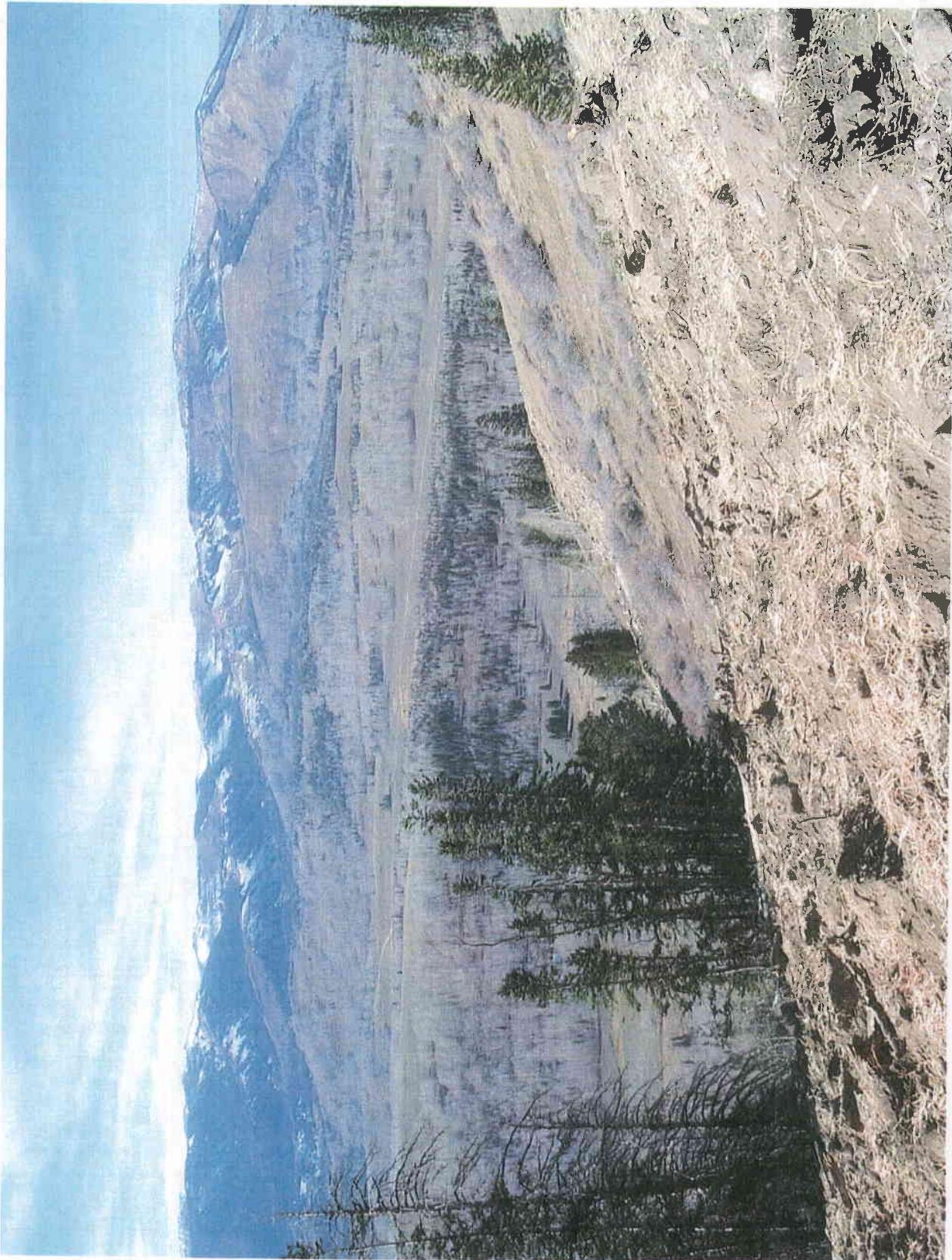
Reclaimed Pad 4, road to ledge in background



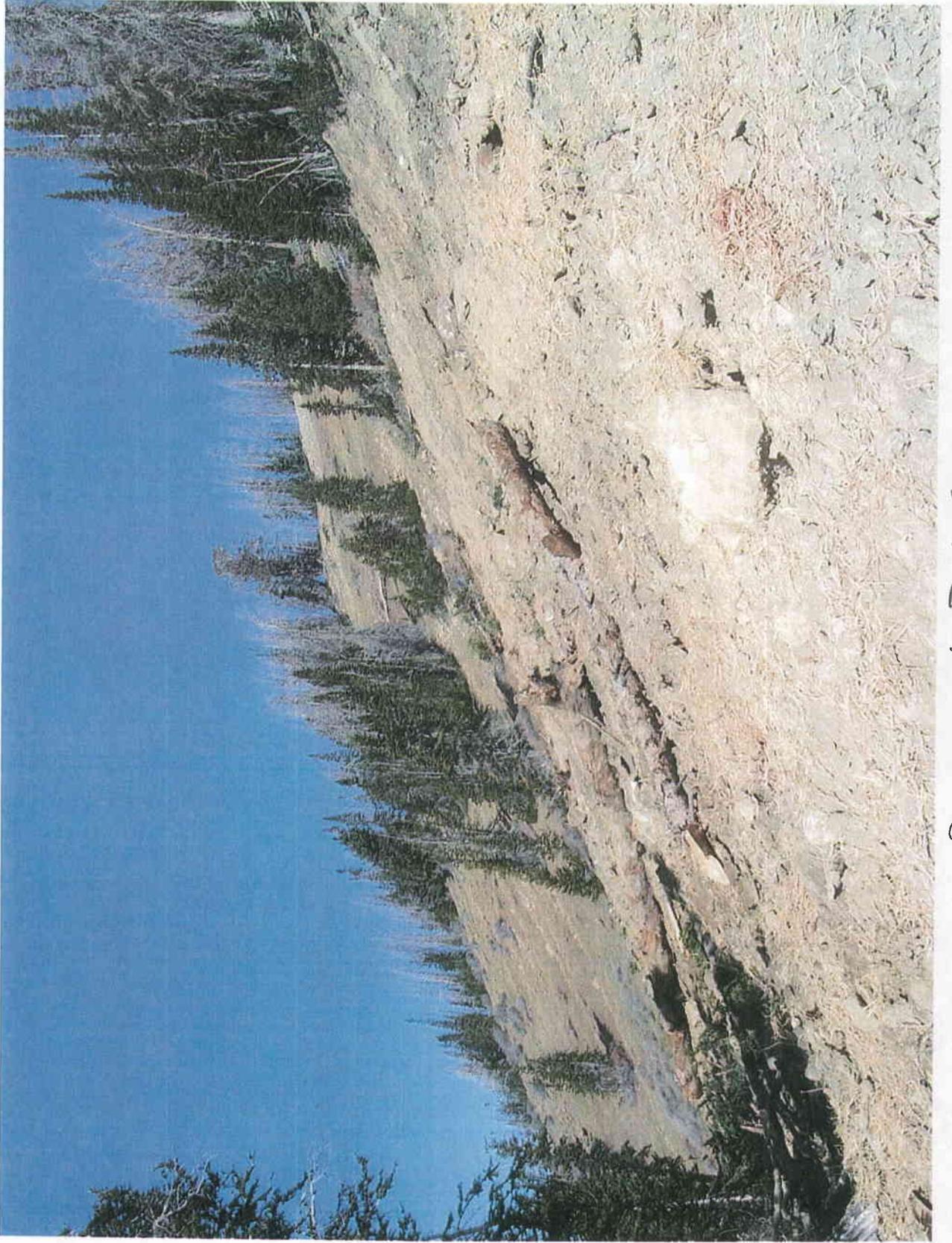
Reclaimed Pad 5



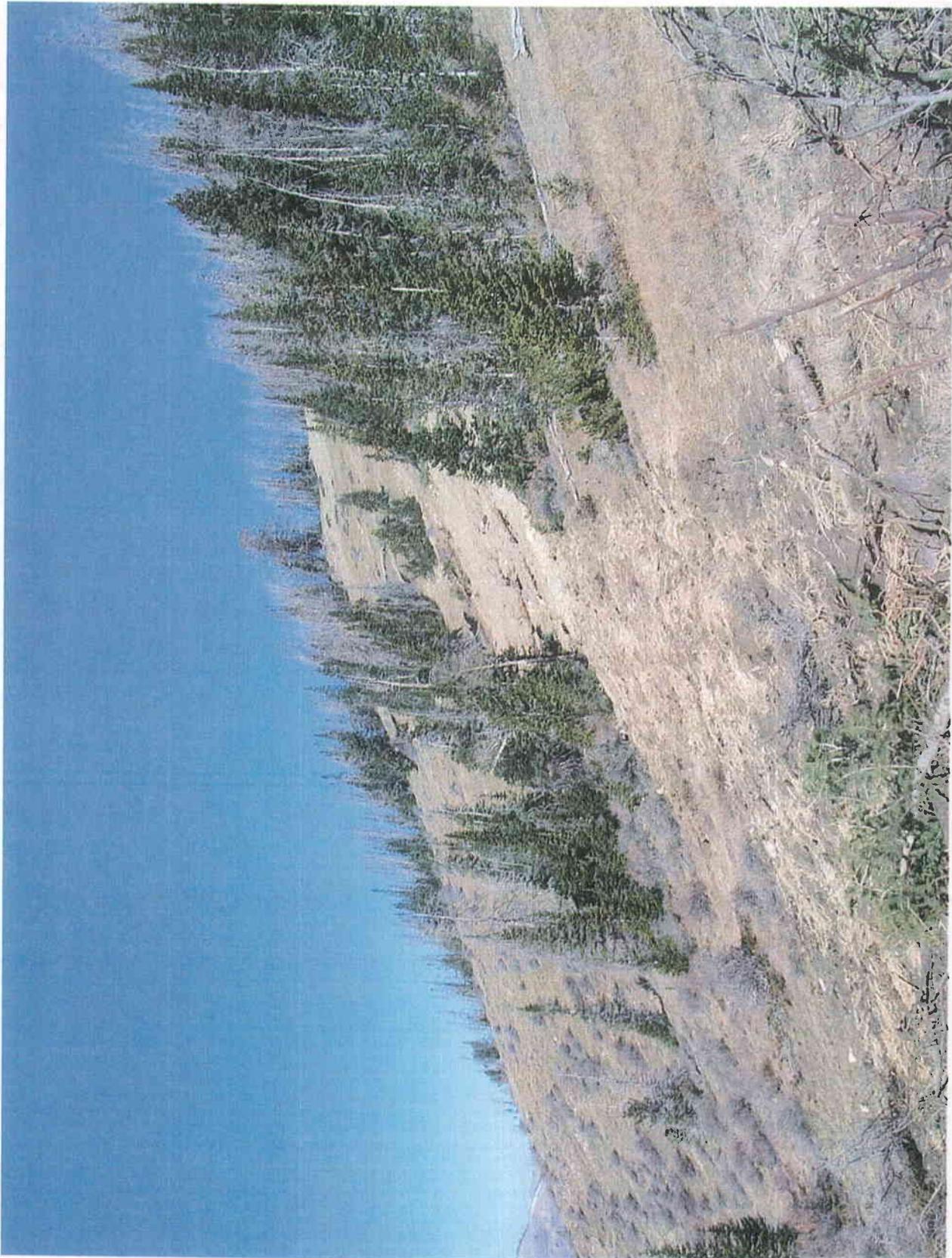
Reclaimed access road from Pad 5



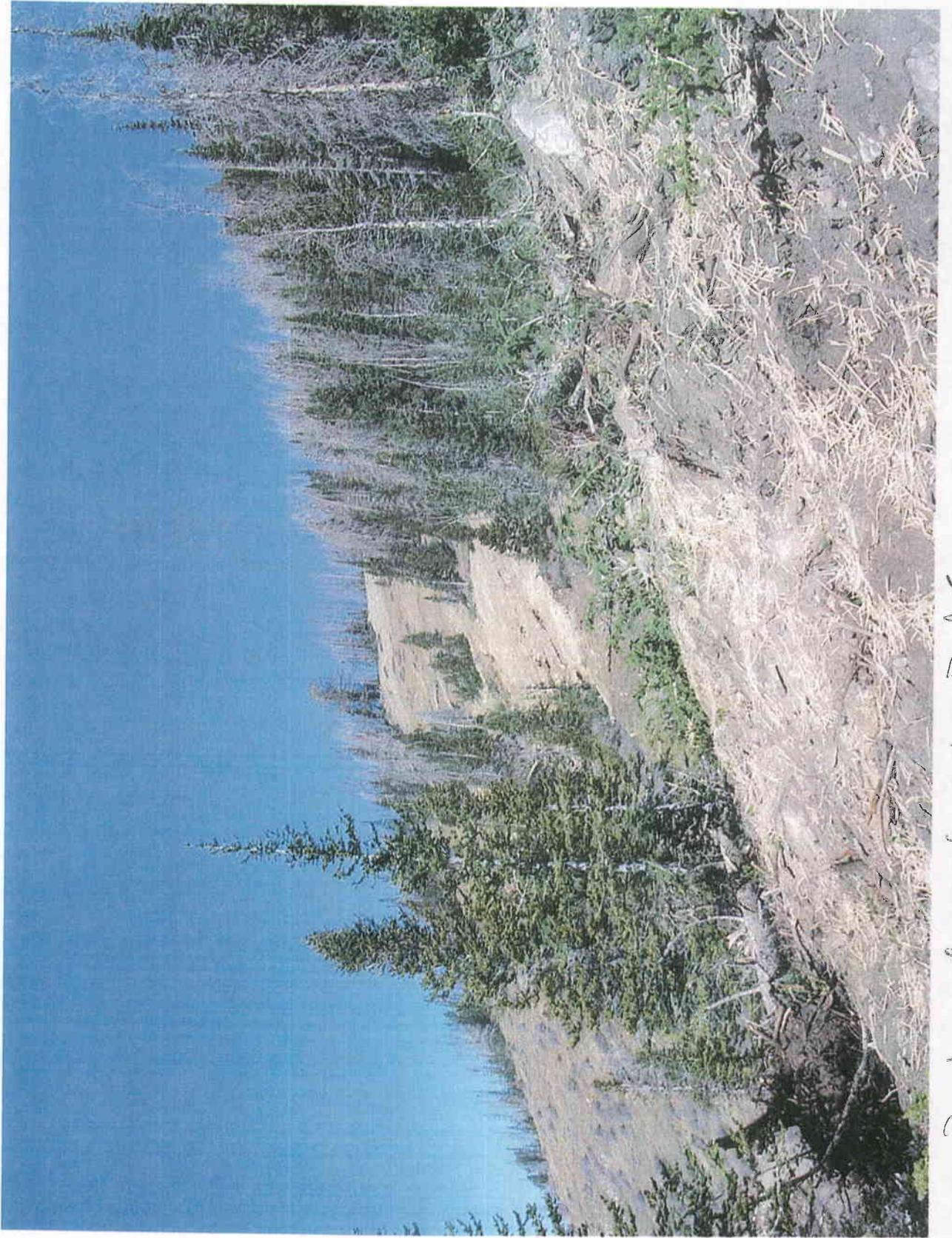
Reclaimed Pad 5 (foreground) and Pad 7 (below)



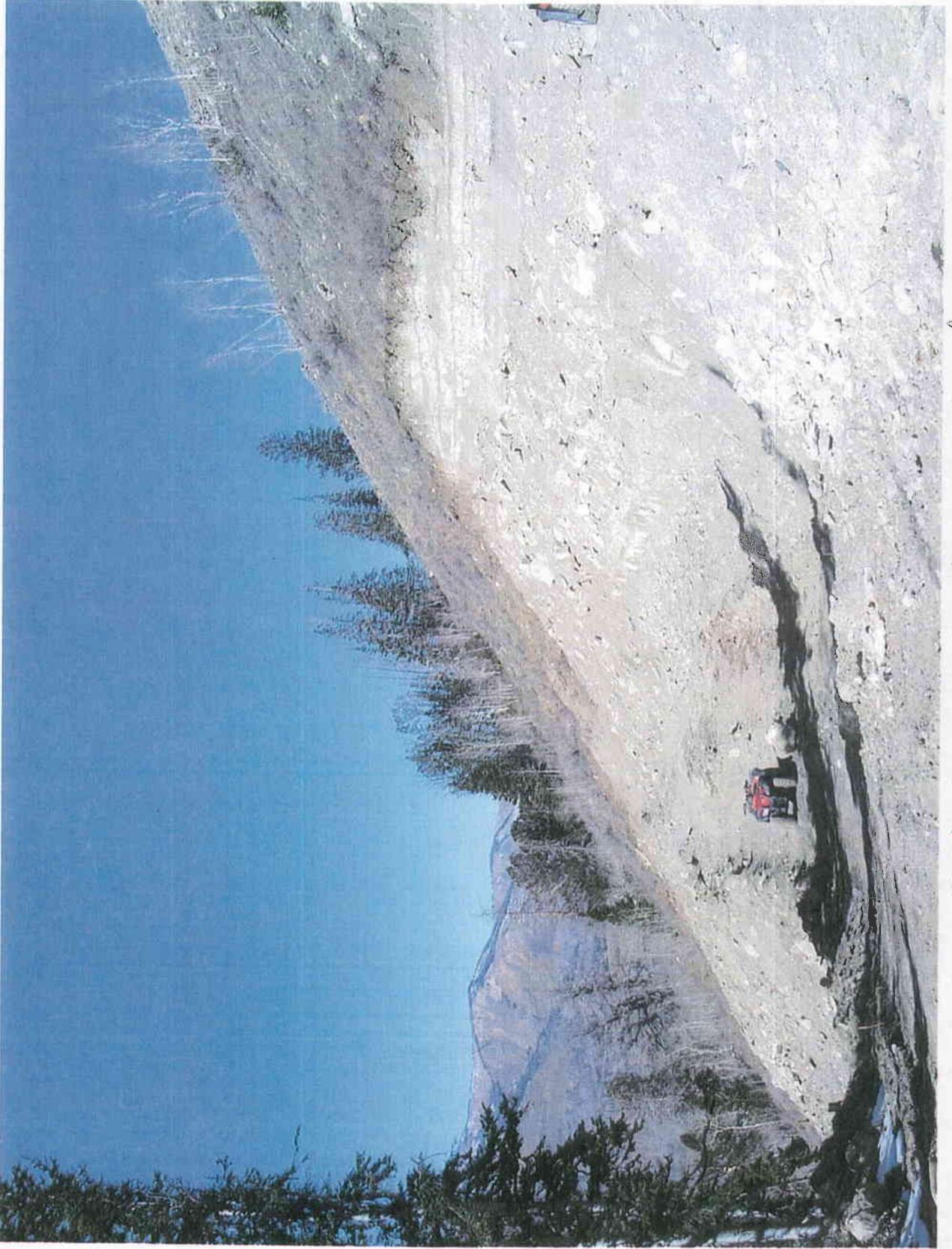
Reclaimed Pad 5



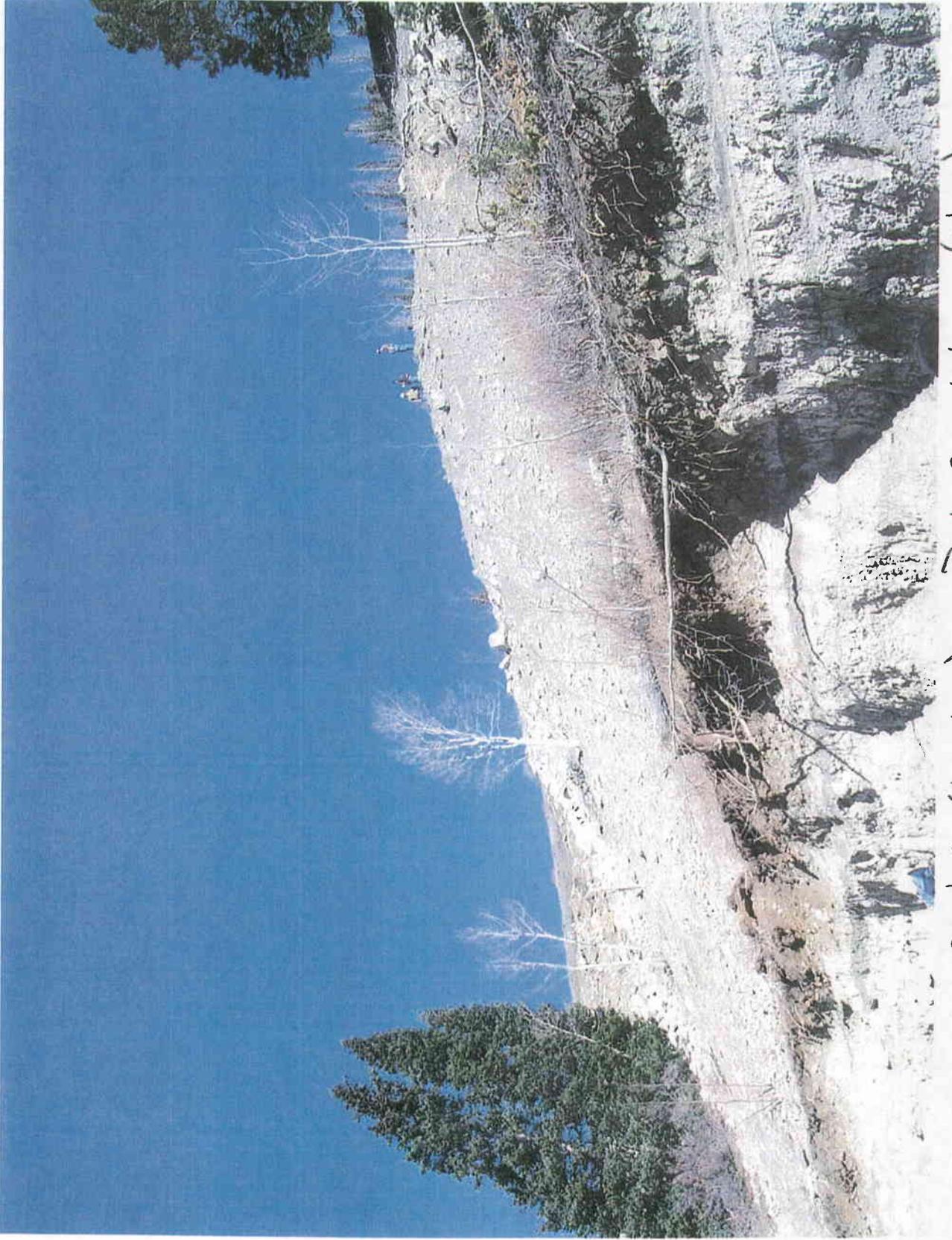
Reclaimed Pad 5 and access road



Reclaimed road into Pad 5



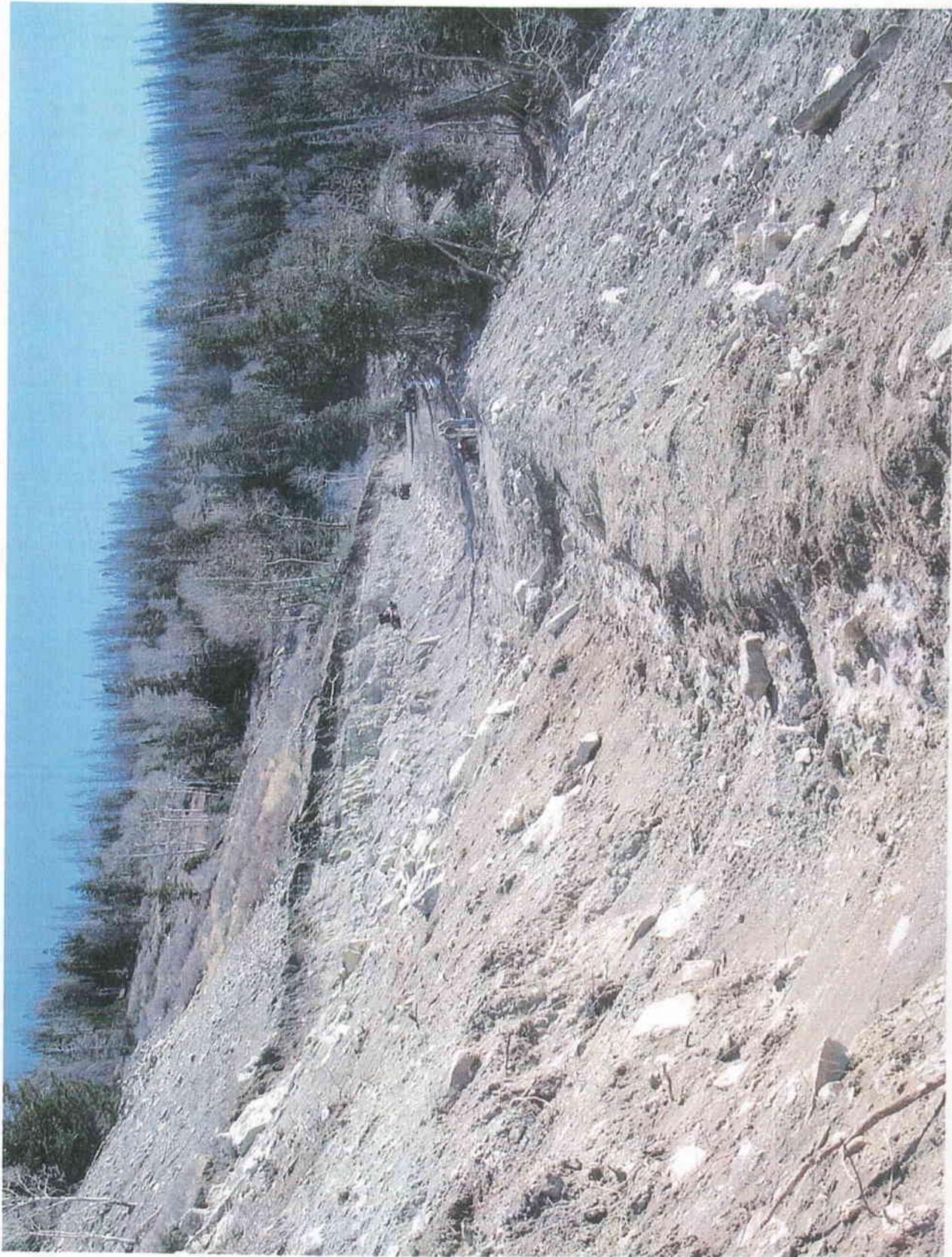
Pad 6, partially reclaimed



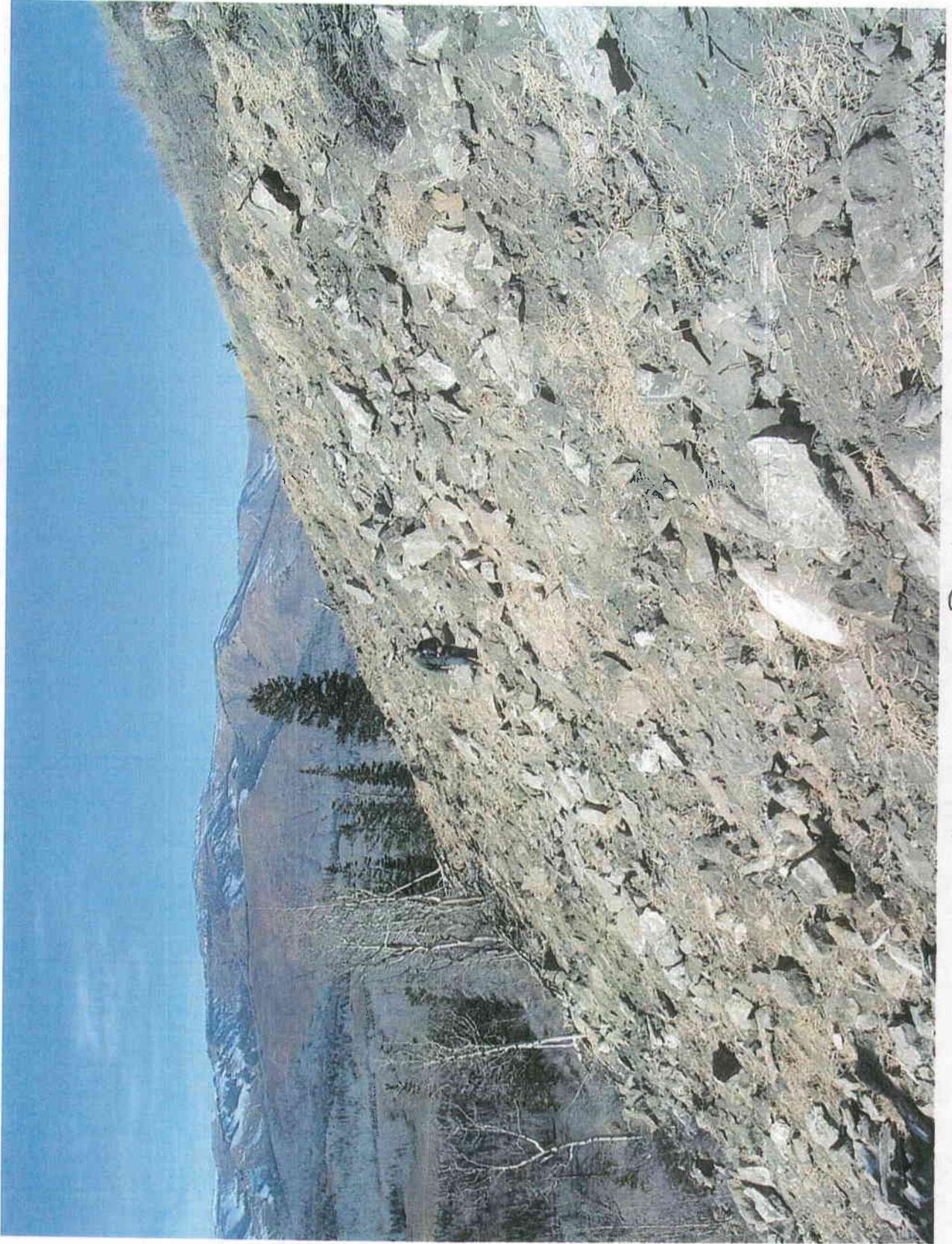
Pad 6 (bottom), Pad 2 outslope (top)



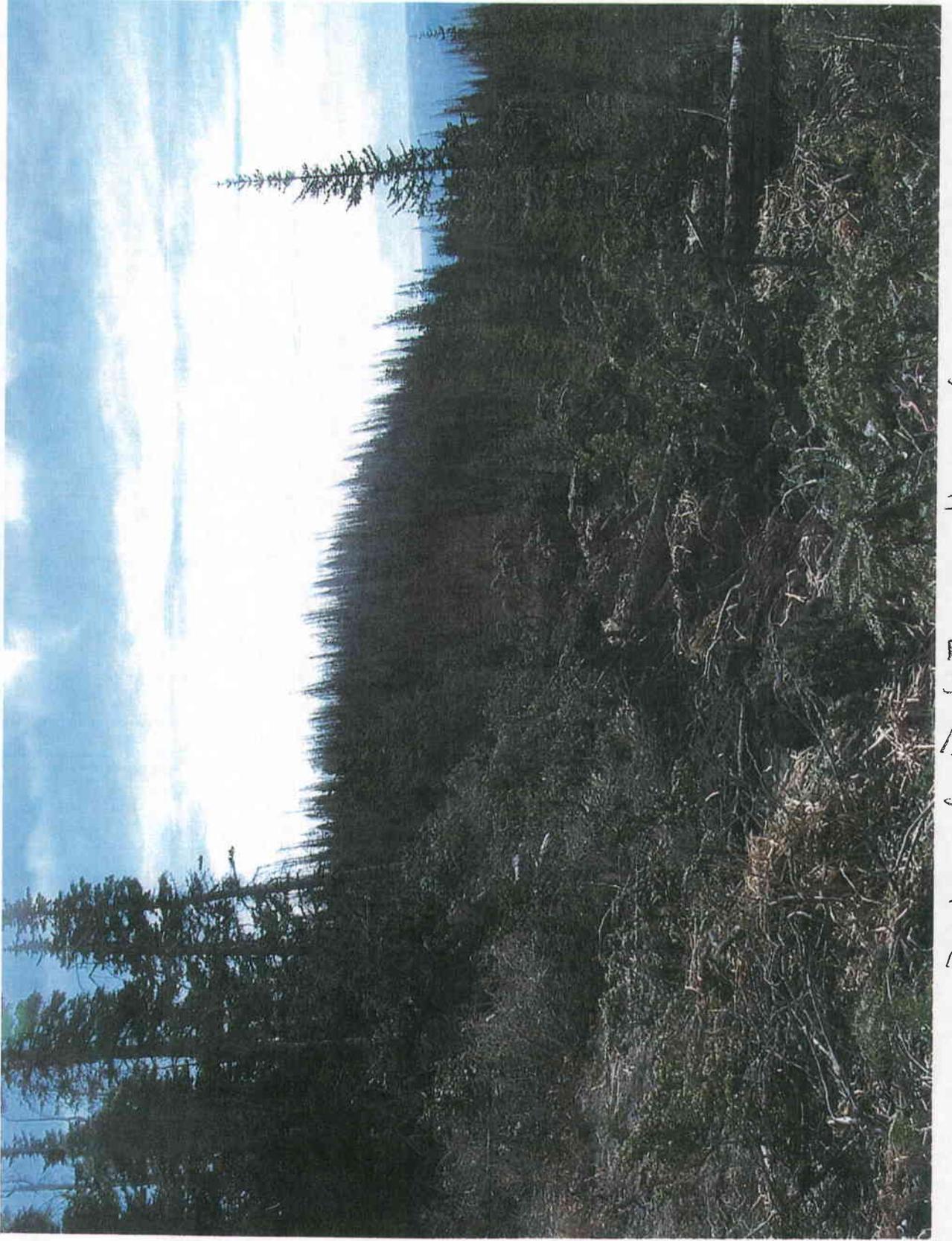
Interior drain ditch, Pad 6



Pad 6, partially reclaimed



Reclaimed Pad 7



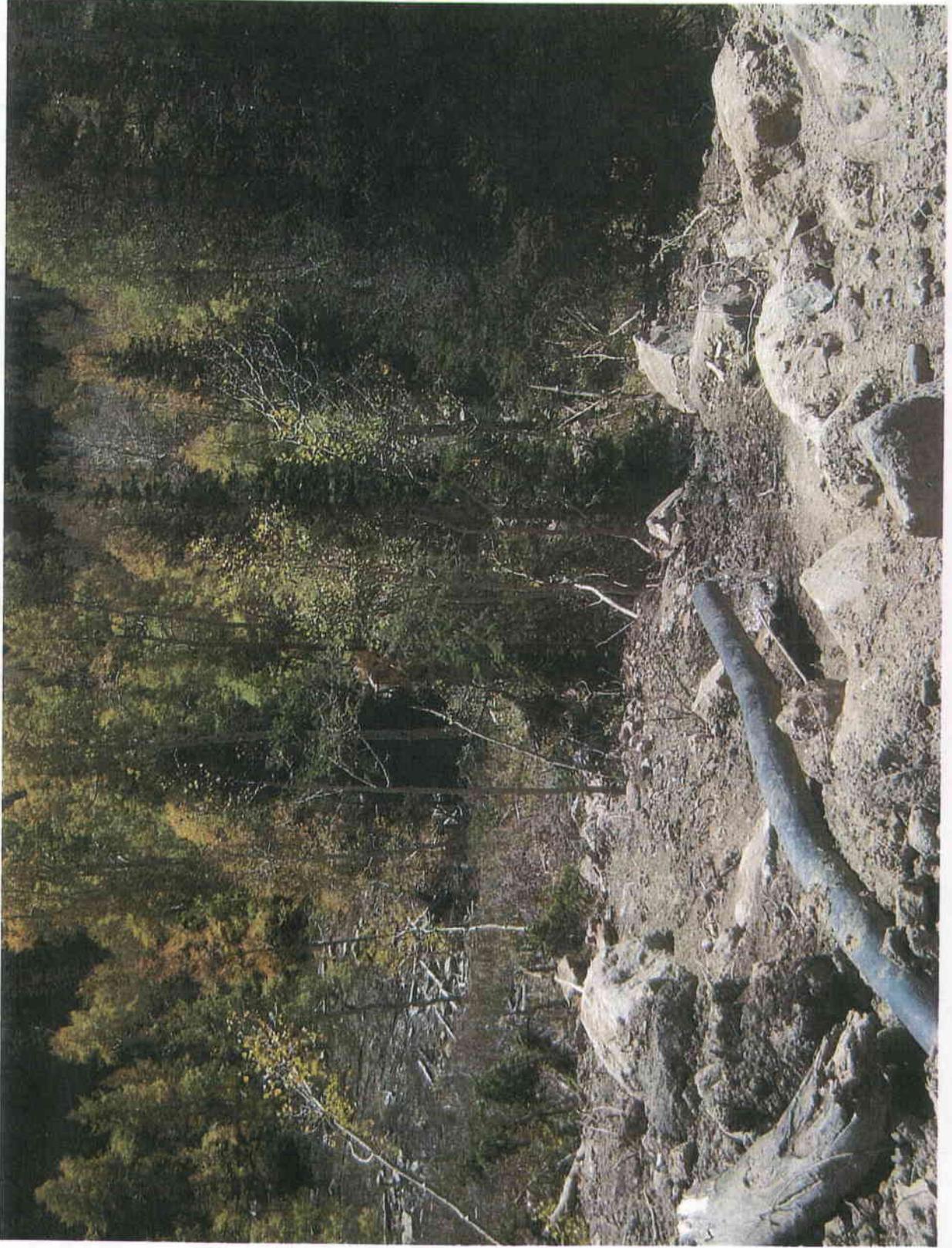
Reclaimed Pad 7, north end



Typical wood straw application



Typical excelsior erosion log



Drain pipe at seep at ledge

**ATTACHMENT 12**

**FOREST SERVICE ROAD PERMIT  
PRI-108**

Authorization ID: PRI108  
Contact ID: GENWAL  
Expiration Date: 12/31/2012  
Use Code: 753

FS-2700-4c (03/06)  
OMB No. 0596-0082

**U. S. DEPARTMENT OF AGRICULTURE**  
**Forest Service**  
**PRIVATE ROAD SPECIAL USE PERMIT**  
**AUTHORITY:**  
**FEDERAL LAND POLICY AND MGMT ACT, AS AMENDED October 21, 1976**

**GENWAL RESOURCES, INCORPORATED** of P.O. Box 1077, , Price, UT, 84501 (hereafter called the Holder) is hereby authorized to use National Forest lands for the construction, reconstruction, maintenance, and use of a road within the Manti –La Sal National Forest for the following purposes:

The use and reclamation of a temporary road segment, 45 feet wide by 2,573 feet long, constructed August 6, 2007 as part of the Crandall Canyon Mine rescue effort. The reclamation of drill pads requires the use of this road segment to transport crews and heavy equipment to the drill pads to complete reclamation work. Following the reclamation of the drill pads, this temporary road will be fully reclaimed as per the attached **Conditions of Approval (Exhibit B)**, and a non-motorized foot path approximately 2 feet wide shall be established along the reclaimed access road.

The lands covered by this permit are located in the County of Emery, State of Utah and are described as follows:

Sec. 11, T. 16 S., R. 6 E., SALT LAKE PRINCIPAL MERIDIAN, , This permit covers a right-of-way .49 miles in length, 45 feet in width, containing approximately 2.66 acres, and is located upon the ground according to the survey line, figures, measurements, widths, and other references shown on the map or plat attached hereto as **exhibit(s) A** and made a part hereof.

**This permit is made subject to the following terms, provisions, and conditions:**

1. This permit is subject to all existing easements and valid rights existing on this date.
2. The Holder in exercising the privileges granted by this permit shall comply with all applicable State and Federal laws, Executive Orders, and Federal rules and regulations, and shall comply with all State standards for public health and safety, environmental protection, and siting construction, operation, maintenance of or for rights-of-way for similar purposes if those standards are more stringent than applicable Federal standards.
3. The Holder shall cut no timber except as authorized by construction stipulations or maintenance agreements.
4. The Holder shall provide maintenance so that no damage occurs on adjacent National Forest land. The Holder shall construct and maintain lead-off drainage and water barriers as necessary to prevent erosion.
5. Holder shall pay the United States for all injury, loss, or damage, including fire suppression costs, in accordance with Federal and State laws.
6. Holder shall indemnify the United States for any and all injury, loss, or damage, including fire suppression costs the United States may suffer as a result of claims, demands, losses, or judgments caused by the Holder's use or occupancy under this permit.

7. Holder shall pay annually in advance a sum determined by the Forest Service to be the fair market value of the use authorized by this permit. The initial payment is set at \$ 45.00 or the remainder of the calendar year. Payments for each subsequent calendar year shall be the amount of \$ 45.00 adjusted using the Implicit Price Deflator-Gross National Product index (IPD-GNP), or other factor selected by the Forest Service, to reflect more nearly the current fair market value of the use. At intervals to be determined by certain changes in the indexes used to establish the linear rights-of-way fee schedule, the fee shall be reviewed and adjusted as necessary to assure that it is commensurate with the value of the rights and privileges authorized. Failure of the Holder to pay the annual payment, late charges, or other fees or charges shall cause the permit to terminate.

8. Pursuant to 31 U.S.C. 3717, et seq., interest shall be charged on any fee amount not paid within 30 days from the date the fee or fee calculation financial statement specified in this authorization becomes due. The rate of interest assessed shall be the higher of the rate of the current value of funds to the U.S. Treasury (i.e., Treasury tax and loan account rate), as prescribed and published by the Secretary of the Treasury in the Federal Register and the Treasury Fiscal Requirements Manual Bulletins annually or quarterly or at the Prompt Payment Act rate. Interest on the principal shall accrue from the date the fee or fee calculation financial statement is due.

In the event the account becomes delinquent, administrative costs to cover processing and handling of the delinquency will be assessed.

A penalty of 6 percent per annum shall be assessed on the total amount delinquent in excess of 90 days and shall accrue from the same date on which interest charges begin to accrue.

Payments will be credited on the date received by the designated collection officer or deposit location. If the due date for the fee or fee calculation statement falls on a non-workday, the charges shall not apply until the close of business on the next workday.

Disputed fees are due and payable by the due date. No appeal of fees will be considered by the Forest Service without full payment of the disputed amount. Adjustments, if necessary, will be made in accordance with settlement terms or the appeal decision.

If the fees become delinquent, the Forest Service will:

Liquidate any security or collateral provided by the authorization.

If no security or collateral is provided, the authorization will terminate and the holder will be responsible for delinquent fees as well as any other costs of restoring the site to its original condition including hazardous waste cleanup.

Upon termination or revocation of the authorization, delinquent fees and other charges associated with the authorization will be subject to all rights and remedies afforded the United States pursuant to 31 U.S.C. 3711 et seq. Delinquencies may be subject to any or all of the following conditions:

Administrative offset of payments due the holder from the Forest Service.

Delinquencies in excess of 60 days shall be referred to United States Department of Treasury for appropriate collection action as provided by 31 U.S.C. 3711 (g), (1).

The Secretary of the Treasury may offset an amount due the debtor for any delinquency as provided by 31 U.S.C. 3720, et seq.)

9. All construction or reconstruction of the road shall be in accordance with plans, specifications, and written stipulations approved by the Forest Service prior to beginning such construction or reconstruction.
10. The Holder shall repair fully all damage to National Forest roads and trails caused by the exercise of the privileges granted by this permit.
11. The United States may use the roads without cost for all purposes deemed necessary or desirable in connection with the protection and administration of the lands or resources of the United States, provided that it will use the road for commercial hauling purposes, other than the removal of timber cut in construction or maintenance of the road or other occasional incidental use, only after arranging to pay or perform its pro rata share of road maintenance.
12. The Forest Service alone may extend rights and privileges for use of the road constructed on the premises to other non-Federal users provided that such users shall pay a fair share of the current replacement cost less depreciation of the road to the holder, and reconstruct the road as necessary to accommodate their use.
13. The Forest Service retains the right to occupy and use the right-of-way and to issue or grant rights-of-way for land uses, for other than road purposes, upon, over, under, and through the permit area provided that the occupancy and use do not interfere unreasonably with the rights granted herein.
14. The Forest Service shall have the right to cross and re-cross the premises and road at any place by any reasonable means and for any purpose in such manner as does not interfere unreasonably with use of the road.
15. The Holder shall maintain the right-of-way clearing by means of chemicals only after the Forest Supervisor has given specific written approval. Application for such approval must be in writing and must specify the time, method, chemicals, and the exact portion of the right-of-way to be chemically treated.
16. Unless sooner terminated in accordance with the provisions of the permit, or revoked by the Authorizing Officer, this permit shall expire and terminate on **12/31/2012**. The permit shall not be reissued.
17. This permit may be terminated or suspended upon breach of any of the conditions herein, or revoked at the discretion of the Issuing Officer.
18. Upon termination or revocation of this special-use authorization, the Holder shall remove within a reasonable time the structures and improvements and shall restore the site to a condition satisfactory to the authorized officer, unless otherwise waived in writing or in the authorization. If the Holder fails to remove the structures or improvements within a reasonable period, as determined by the authorized officer, they shall become the property of the United States, but this does not relieve the Holder from liability for the removal and site restoration costs.
19. **Nonexclusive Use and Public Access.** Unless expressly provided for in additional terms, use of the permit area is not exclusive. The Forest Service reserves the right to use or allow others to use any part of the permit area, including roads, for any purpose, provided, such use does not materially interfere with the holder's authorized use. A final determination of conflicting uses is reserved to the Forest Service.
20. **Forest Service Right of Entry and Inspection.** The Forest Service has the right of unrestricted access of the permitted area or facility to ensure compliance with laws, regulations, and ordinances and the terms and conditions of this permit.

21. Liability. For purposes of this section, "holder" includes the holder's heirs, assigns, agents, employees, and contractors.

A. The holder assumes all risk of loss to the authorized improvements.

B. The holder shall indemnify, defend, and hold the United States harmless for any violations incurred under any such laws and regulations or for judgments, claims, or demands assessed against the United States in connection with the holder's use or occupancy of the property. The holder's indemnification of the United States shall include any loss by personal injury, loss of life or damage to property in connection with the occupancy or use of the property during the term of this permit. Indemnification shall include, but is not limited to, the value of resources damaged or destroyed; the costs of restoration, cleanup, or other mitigation; fire suppression or other types of abatement costs; third party claims and judgments; and all administrative, interest, and other legal costs. This paragraph shall survive the termination or revocation of this authorization, regardless of cause.

C. The holder has an affirmative duty to protect from damage the land, property, and interests of the United States.

D. In the event of any breach of the conditions of this authorization by the holder, the Authorized Officer may, on reasonable notice, cure the breach for the account at the expense of the holder. If the Forest Service at any time pays any sum of money or does any act which will require payment of money, or incurs any expense, including reasonable attorney's fees, in instituting, prosecuting, and/or defending any action or proceeding to enforce the United States rights hereunder, the sum or sums so paid by the United States, with all interests, costs and damages shall, at the election of the Forest Service, be deemed to be additional fees hereunder and shall be due from the holder to the Forest Service on the first day of the month following such election.

E. With respect to roads, the holder shall be proportionally liable for damages to all roads and trails of the United States open to public use caused by the holder's use to the same extent as provided above, except that liability shall not include reasonable and ordinary wear and tear.

F. The Forest Service has no duty to inspect the permit area or to warn of hazards and, if the Forest Service does inspect the permit area, it shall incur no additional duty nor liability for identified or non-identified hazards. This covenant may be enforced by the United States in a court of competent jurisdiction.

22. Members of Congress. No Member of or Delegate to Congress or Resident Commissioner shall benefit from this permit either directly or indirectly, except when the authorized use provides a general benefit to a corporation.

23. Appeals and Remedies. Any discretionary decisions or determinations by the authorized officer are subject to the appeal regulations at 36 CFR 251, Subpart C, or revisions thereto.

24. Assignability. This authorization is not assignable or transferable. If Holder, through death, voluntary transfer, enforcement of contract, foreclosure, or other valid legal proceeding shall cease to be owner of the above-described real property accessed by the authorized road, this authorization will terminate.

25. Superior Clauses. In the event of any conflict between any of the preceding printed clauses or any provision thereof and any of the following clauses or any provision thereof, the preceding printed clauses shall control.

26. Operating Plans (R4-X2). The holder shall prepare the following plan(s), in consultation with the Forest Service, and submit said plan(s) for approval by the listed dates:

Conditions of Approval (COA's)

April 16, 2008 (plan approved)

Written approval of said plans by the Forest Service Authorized Officer is prerequisite to commencement of holder's operations or maintenance. Upon reasonable notice to the Forest Service, plans may be revised when necessitated by weather or other unpredictable circumstances. Plan revisions will be subject to written approval by the Forest Service Authorized Officer.

When said plan(s) is(are) submitted, it(they) will be marked as **Exhibit(s) B** and shall be attached hereto and become a part of this permit.

27. Bonding (C3). As a further guarantee of the faithful performance of the provisions of terms and conditions of this authorization, the holder agrees to deliver and maintain a surety bond or other acceptable security in the amount of **\$ 38,000.00**. Should the sureties or the bonds delivered under this authorization become unsatisfactory to the Forest Service, the holder shall, within thirty (30) days of demand, furnish a new bond with surety, solvent and satisfactory to the Forest Service. In lieu of surety bond, the holder may deposit into a Federal depository, as directed by the Forest Service, and maintain therein, cash in the amounts provided for above, or negotiable securities of the United States having a market value at time of deposit of not less than the dollar amounts provided above.

The holder's surety bond shall be released, or deposits in lieu of bond, shall be returned thirty (30) days after certification by the Forest Service that priority installations under the development plan are complete, and upon furnishing by the holder of proof satisfactory to the Forest Service that all claim for labor and material on said installations have been paid or released and satisfied. The holder agrees that all moneys deposited under this authorization may, upon failure on his or her part to fulfill all and singular the requirements herein set forth or made a part hereof, be retained by United States to be applied to satisfy obligations assumed here under, without prejudice whatever to any rights and remedies of the United States.

Prior to undertaking additional construction or alteration work not provided for in the terms and conditions or when the improvements are to be removed and the area restored, the holder shall deliver and maintain a surety bond in an amount set by the Forest Service, which amount shall not be in excess of the estimated loss which the Government would suffer upon default in performance of this work.

28. Revegetation of Ground Cover and Surface Restoration (D9). The holder shall be responsible for prevention and control of soil erosion and gulying on lands covered by this authorization and adjacent thereto, resulting from construction, operation, maintenance, and termination of the authorized use. The holder shall so construct permitted improvements to avoid the accumulation of excessive heads of water and to avoid encroachment on streams. The holder shall revegetate or otherwise stabilize all ground where the soil has been exposed as a result of the holder's construction, maintenance, operation, or termination of the authorized use and shall construct and maintain necessary preventive measures to supplement the vegetation.

29. Noxious Weed/Exotic Plant Prevention and Control (R4-D3). The holder shall be responsible for the prevention and control of noxious weeds and/or exotic plants of concern on the area authorized by this authorization and shall provide prevention and control measures prescribed by the Forest Service in **Exhibit C**. Noxious weeds/exotic plants of concern are defined as those species recognized by (Emery County / State of Utah / Manti La-Sal National forest) in which the authorized use is located.

The holder shall also be responsible for prevention and control of noxious weed/exotic plant infestations which are not within the authorized area, but which are determined by the Forest Service to have originated with the authorized area.

When determined to be necessary by the authorized officer, the holder shall develop a site-specific plan for noxious weed/exotic plant prevention and control. Such plan shall be subject to Forest Service approval. Upon Forest Service approval, the noxious weed/exotic plant prevention and control plan shall become a part of this authorization, and its provisions shall be enforceable under the terms of this authorization.

30. Pesticide Use (D23). Pesticides may not be used to control undesirable woody and herbaceous vegetation, aquatic plants, insects, rodents, trash fish, etc., without the prior written approval of the Forest Service. A request for approval of planned uses of pesticides will be submitted annually by the holder on the due date established by the authorized officer. The report will cover a 12-month period of planned use beginning 3 months after the reporting date. Information essential for review will be provided in the form specified. Exceptions to this schedule may be allowed, subject to emergency request and approval, only when unexpected outbreaks of pests require control measures which were not anticipated at the time an annual report was submitted.

Only those materials registered by the U.S. Environmental Protection Agency for the specific purpose planned will be considered for use on National Forest System lands. Label instructions will be strictly followed in the application of pesticides and disposal of excess materials and containers.

In Witness Whereof, the parties hereto have caused this authorization to be duly executed on this \_\_\_\_\_ day of \_\_\_\_\_, 2008.

Holder - GENWAL RESOURCES, INCORPORATED

USDA - Forest Service

By: P. Bruce Hill

By: \_\_\_\_\_

Name: P Bruce Hill

Name: Mesia Nyman

Title: President, CEO

Title: Ferron/Price District Ranger,  
Manti - La Sal National Forest

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0596-0082. The time required to complete this information collection is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call (800) 975-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

The Privacy Act of 1974 (5 U.S.C. 552a) and the Freedom of Information Act (5 U.S.C. 552) govern the confidentiality to be provided for information received by the Forest Service.

# Appendix A

Location Maps

Total length of roads on Trust Land: 11044 ft  
Length of proposed permanent road on Trust Land: 4959 ft

2573 ft of roads on Forest Service land south of section boundary

**Crandall Canyon**  
Drill Pads

Road

- Realignment Road
- Proposed Permanent Road
- 100% Reclamation
- Forest Service Road
- Trust Land Surface

0 500 1,000 Feet

For Reference Use Only  
Produced: October 16, 2007 SITLA

Special Use Application  
East Mountain Road Segment



# Exhibit B

Conditions of Approval  
(Operating Plan)

# CONDITIONS OF APPROVAL

## Genwal Mine East Mountain Emergency Access Reclamation

### Equipment Transport and Use

1. A Road Use Permit must be obtained from the Forest Service before equipment is transported onto National Forest System lands.
2. Vehicles and equipment shall be cleaned of mud, soil, plant materials, and other debris which could contain noxious weed/exotic plant seeds prior to entering National Forest System lands.
3. Equipment and vehicles shall be in operationally safe condition, free from oil and fuel leaks.
4. The Forest Service responsible official must be notified 48 hours in advance that heavy equipment will be moved onto National Forest System lands and that surface disturbing activities will commence.
5. Equipment shall not be transported over National Forest System roads during (1) the opening weekend of the general elk hunt, (2) the opening weekend of the general deer hunt, or (3) during holiday weekends (reference the Road Use Permit for specific conditions).

### Fire Prevention and Fire Suppression

1. Fire suppression equipment must be available to all personnel working at the project site. Equipment must include at least one hand tool per crew member (consisting of shovels and pulaskis) and one properly rated fire extinguisher per vehicle and/or internal combustion engine.
2. All gasoline, diesel, and steam-powered equipment must be equipped with effective spark arrestors or mufflers. Spark arresters must meet Forest Service specifications discussed in the "General Purpose and Locomotive (GP/L) Spark Arrestor Guide, Volume 1, April, 1988"; and "Multi-position Small Engine (MSE) Spark Arrestor Guide, April, 1989". In addition, all electrical equipment must be properly insulated to prevent sparks.
3. The permittee/licensee will be held responsible for damage and suppression costs for fires started as a result of operations. Fires must be reported to the Forest Service as soon as possible.
4. Operations are subject to Forest Service fire restrictions and the Forest Service reserves the right to suspend operations during periods of high fire potential.

## Reclamation Operations

1. A pre-work meeting including the responsible company representative(s), contractors, and the Forest Service must be conducted at the project location prior to commencement of operations. Conditions of this permit and site-specific Forest Service requirements, listed below, will be discussed at this time.
  - a. Unauthorized off-road vehicular travel is prohibited.
  - b. The temporary gate and associated wire fence shall be maintained and locked at all times to keep unauthorized motorized traffic off the road.
  - c. Section corners or other survey markers, including claim corners, in the project area must be located and flagged for preservation prior to commencement of surface disturbing activities. The removal, displacement, or disturbance of markers must be approved by the proper authority. Replacement will be done by the proper authority at the expense of the permittee/licensee.
  - d. If cultural or paleontological resources are discovered during operations, all operations which may result in disturbance to the resources shall cease and the Forest Service must be notified of the discovery.
  - e. The permittee/licensee will be held responsible for all damage to fences, cattleguards, resource improvements, roads, and other structures on National Forest System lands which result from their operations. The Forest Service must be notified of damages as soon as possible.
  - f. Operations shall be coordinated with grazing permittees to prevent conflicts. Range permittees must be notified of operations at least one week prior to starting operations.
  - g. Harrassment of wildlife and livestock is prohibited. Wildlife timing restrictions are applicable; raptor buffer areas and elk calving timing restrictions must be adhered.
  - h. An acceptable spill containment/spill removal contingency plan shall be submitted to the Forest Service prior to commencement of operations.
  - i. Trash, garbage, and other refuse shall be properly contained on the project area prior to disposal at authorized sites.
  - j. The operator shall remove all equipment, trash, garbage, flagging, vehicles and other materials from National Forest System lands as part of reclamation. Oil and fuel contaminated materials including contaminated soils and gravel must be removed and transported to approved disposal sites.
2. All surface disturbing activities including reclamation must be supervised by a responsible representative of the permittee/licensee who is aware of the terms and conditions of the project's permits/licenses. The representative must be on site daily during operating hours. A copy of the appropriate permits/licenses must be

available for review at the project site and presented upon demand to any Forest Service official.

3. The Forest Service responsible official must be notified of any proposed alterations to the plan of operations. Any changes to the existing plan are subject to Forest Service review and approval.

**Conditions of Acceptance of Reclamation Work**

1. The temporary access road shall be recontoured to the approximate original contour. The surface shall be posted, reseeded with a Forest Service approved seed mix, and stabilized with wood straw. The certified weed-free seed mixture must be 99 percent pure live seed containing a maximum of 1 percent weeds, none of which are noxious.
2. A non-motorized foot path approximately 2 feet wide shall be established along the reclaimed access road concurrent with reclamation.
3. Revegetation of disturbed areas shall be considered successful when (1) ground cover is comparable to adjacent areas as determined by vegetation transects; (2) of the vegetative cover, at least ninety percent (90%) of the living plants must be desirable native plants or seeded species; (3) ground cover (vegetation, rock, litter) is at least sixty percent (60%); (4) there are no signs of active erosion; (5) and the area is consistently free of noxious weeds. Adjacent undisturbed areas will be used as a base for comparison. If the desired ground cover is not established at the end of each three year period, the company will be required to do additional treatment and seeding.
4. The permittee shall be responsible for control and removal of noxious weed infestations found to be a result of reclamation. The permittee shall follow the prevention, detection, and control measures as described in the Noxious Weed/Exotic Plant Prevention and Control Plan attached as Appendix C of this permit.
5. Reclamation of the Forest Service road shall be completed as soon as site conditions allow after it is evident that on-lease pad reclamation is determined to be stable and earth moving equipment is no longer needed. Upon completion of reclamation, a determination by the Forest Service will be made as to whether or not to leave the gate and fence. If it is determined to leave the gate and fence, the permittee shall be responsible for maintenance for the permit duration.

**Stipulation for Lands of the National Forest System Under Jurisdiction of the Department of Agriculture**

The licensee/permittee/lessee must comply with all the rules and regulations of the Secretary of Agriculture set forth at Title 36, Chapter II, of the Code of Federal Regulations governing the use and management of the National Forest System (NFS) when not inconsistent with the rights granted by the Secretary of the Interior in the license/permit/lease. The Secretary of Agriculture's rules and regulations must be complied with for (1) all use and occupancy of the NFS prior to approval of a permit/operation plan by the

Development Roads, within and outside the area licensed, permitted or leased by the Secretary of the Interior, and (3) use and occupancy of the NFS not authorized by a permit/operating plan approved by the Secretary of the Interior.

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

Forest Supervisor  
Manti-La Sal National Forest  
599 West Price River Drive  
Price, Utah 84501  
Telephone No. (435) 636-3500

who is the authorized representative of the Secretary of Agriculture.

# Exhibit C

Noxious Weed/Exotic Plant Prevention and Control Plan

Pesticide Use Policy

Pesticide Use Proposal Form

## NOXIOUS WEED/EXOTIC PLANT PREVENTION AND CONTROL PLAN

Permittees, leasees, contractors etc., i.e. those individuals or entities which hold an authorization, shall reduce the spread of existing noxious weeds/exotic plant species and prevent invasion of new sites or new noxious weeds/exotic plant species by applying the following prevention and control measures where applicable and appropriate:

### General Direction

#### Prevention

For noxious weed/exotic plant prevention, permittees, leasees, contractors etc. shall discuss the following with the designated Forest Service representative prior to the beginning ground disturbing activities:

- (1) The presence of existing noxious weeds/exotic plants within the project site by species and magnitude.
- (2) The susceptibility of the habitat type to noxious weed/exotic plant invasion or spread of existing infestations of noxious weeds/exotic plants.
- (3) The risk for invasion or spread of noxious weeds/exotic plants that could be caused by the project.
- (4) The evaluation of alternative implementation methods where they exist, which would reduce risk of invasion or spread of noxious weeds/exotic plants.
- (5) The inclusion of other mitigation measures (practices) designed to minimize risk of invasion or spread of noxious weeds/exotic plants.
- (6) Identify provisions for monitoring and inspecting for noxious weeds/exotic plants as deemed appropriate.

#### Monitoring and Detection

Sometimes considered the "second line of defense" after prevention, early detection and rapid response is a critical component of an effective noxious weed/invasive plant management program. When new invasive species infestations are detected, a prompt and coordinated containment and eradication response can reduce environmental and economic impacts. This action results in lower cost and less resource damage than implementing a long-term control program after the species is established (National Strategy and Implementation Plan for Invasive Species Management, FS-805 October 2004).

To detect new infestations early:

1. The Manti-La Sal National Forest shall provide permittees, leasees, contractors etc. with a "watch list of species" and identification materials to aid in their monitoring.

2. Permittees, leasees, contractors etc. shall regularly monitor their permit and surrounding area for new infestations of noxious weeds/exotic plants.
3. Permittees, leasees, contractors etc. shall contact Forest Service Representative for recommended control practices for detected species.

### **Control**

- (1) Permittees, leasees, contractors etc. are responsible for noxious weed control on their permit area and also in those areas which are determined by the Forest Service to have originated within the authorized area of their permit.
- (2) Permittees, leasees, contractors etc. shall comply with Forest Service Pesticide Use Policy when biological or chemical pesticides are deemed appropriate for noxious weed/exotic plant species control.

## **Prevention Measures**

### **Ground Disturbing Activities**

Permittees, leasees, contractors etc. shall conduct the following noxious weed/exotic plant prevention measures when undertaking **ground disturbing activities**:

- (1) Treat existing noxious weeds/exotic plant infestations, to the extent practicable, prior to ground disturbing activities to prevent the spread of seeds.
- (2) Clean vehicles and ground disturbing equipment of mud, soil, plant materials, and other debris which could contain noxious weed/exotic plant seeds prior to use on National Forest System lands.
- (3) Select noxious weed/exotic plant - free project or construction staging areas.
- (4) Maintain as much microhabitat for desirable vegetation as feasible in areas that will have ground disturbance to help suppress noxious weeds/exotic plant species. Minimize the removal of trees and other roadside vegetation during construction, reconstruction, and maintenance, particularly on southerly aspects, except when removal is required for public safety.
- (5) Re-establish vegetation (native where practical) on bare ground caused by ground-disturbing activities to minimize noxious weed/exotic plant spread. Guidelines to consider include:
  - (a) Revegetate disturbed soil in a manner that optimizes plant establishment for that specific site, unless ongoing disturbance at the site will prevent noxious weed/exotic plant establishment or spread. Monitor and re-treat as needed until site is successfully revegetated according to project standards.

(b) Weed seed free topsoil should be stockpiled and replaced on disturbed areas such as road embankments, cuts, fills, and shoulders; gravel pits; skid trails; landings; staging areas; and so forth, where practical.

(c) Replant as soon as practical after the disturbance activity to take advantage of the seedbed and to establish desirable species before the arrival of invading noxious weed/exotic plant species. Use local seeding recommendations and time replanting with moisture and seedbed conditions which offer the best chance for success. To avoid weed contaminated seed, each lot shall be tested by a certified seed laboratory against the State Noxious Weed List and documentation of seed inspection test provided for.

(d) Use local seeding guidelines for detailed procedures and appropriate mixes. If the risk for invasion by noxious weeds/exotic plants is high, use aggressive, early season species. If the risk is low, use a more diverse mixture of native species that may take longer to establish. Include natives, pioneer species, and/or nurse crops. Select for low nutrient demanding species to reduce the need for fertilization. Monitor seeded sites. Spot re-seed as needed.

(6) Restoration practices for disturbed areas should be based on local prescriptions.

(7) Use certified weed-seed free straw and mulch on road stabilization and erosion control projects.

(8) Eliminate the movement of existing and new noxious weed/exotic plant species caused by moving infested gravel and fill material.

(a) Consider the potential for moving noxious weed/exotic plants when establishing new material sources on sites where noxious weeds/exotic plants are present, and take necessary corrective action.

(b) Active gravel and borrow sources should be inspected and determined to be noxious weed/exotic plant - free before use. A source supporting noxious weeds/exotic plants should be considered for closure until it is weed free.

### **Roads and Road Work**

Permittees, leasees, contractors etc. shall conduct the following noxious weed/exotic plant prevention measures when undertaking roads and road work. Minimize roadside sources of noxious weed/exotic plant seed that could be transported to other areas, and maximize effectiveness of weed control.

(1) Plan for annual inspection of system roads and rights-of-way for invasion of noxious weeds/exotic plants. If noxious weed/exotic plants become established, inventory and schedule for treatment.

(2) Schedule and coordinate blading or pulling of noxious weed/exotic plant -infested roadsides or ditches with the Forest or District Weed Management Specialist to ensure that appropriate mitigation measures are applied. Coordinate with a weed management

specialist **before** blading or pulling roadsides and ditches infested with noxious weeds/exotic plants.

(3) When necessary to blade noxious weed/exotic plant infested roadsides or ditches, schedule work for spring or early summer prior to the seed-set stage or later in the fall after seeds have fallen. Minimize surface disturbance and isolate bladed material to the infested site. (Also see item b. Ground Disturbing Activities above).

## definitions

**Noxious Weed:** Those plant species designated as noxious weeds by the Secretary of Agriculture or by the responsible State official. Noxious weeds generally possess one or more of the following characteristics: aggressive and difficult to manage, poisonous, toxic, parasitic, a carrier or host of serious insects or disease, and being native or new to or not common to the United States or parts thereof.

A list of State and County identified Noxious Weeds may be found at:  
[http://ag.utah.gov/plantind/noxious\\_weeds.html](http://ag.utah.gov/plantind/noxious_weeds.html)

**Undesirable Plants:** Plant species that are classified as undesirable, noxious, harmful, exotic, injurious, or poisonous pursuant to State or Federal laws. Species listed as threatened or endangered by the Secretary of the Interior according to the Endangered Species Act of 1973 are not classified as undesirable plants.

A list of Invasive Plant Species (aka exotics) may be found at:  
<http://www.fs.fed.us/database/feis/plants/weed/index.html>

## **PESTICIDE USE POLICY**

Biological and chemical pesticides are employed as one component of an integrated approach to managing Forest insect, disease and invasive plant problems. Pesticides are one tool utilized by forest managers to protect and maintain forest health.

**To ensure the proper use of pesticides, it is Forest Service policy to:**

- 1. Base actual and recommended uses of pesticides on analysis of effectiveness, specificity, environmental impacts, economic efficiency and human exposure.**
- 2. Review and approve all proposals for the use and application of pesticides on National Forest System lands\***
- 3. Use pesticides in compliance with all Federal, State and local laws and regulations.**
- 4. Permit only certified personnel or those under the supervision of a certified applicator to use restricted-use pesticides.**

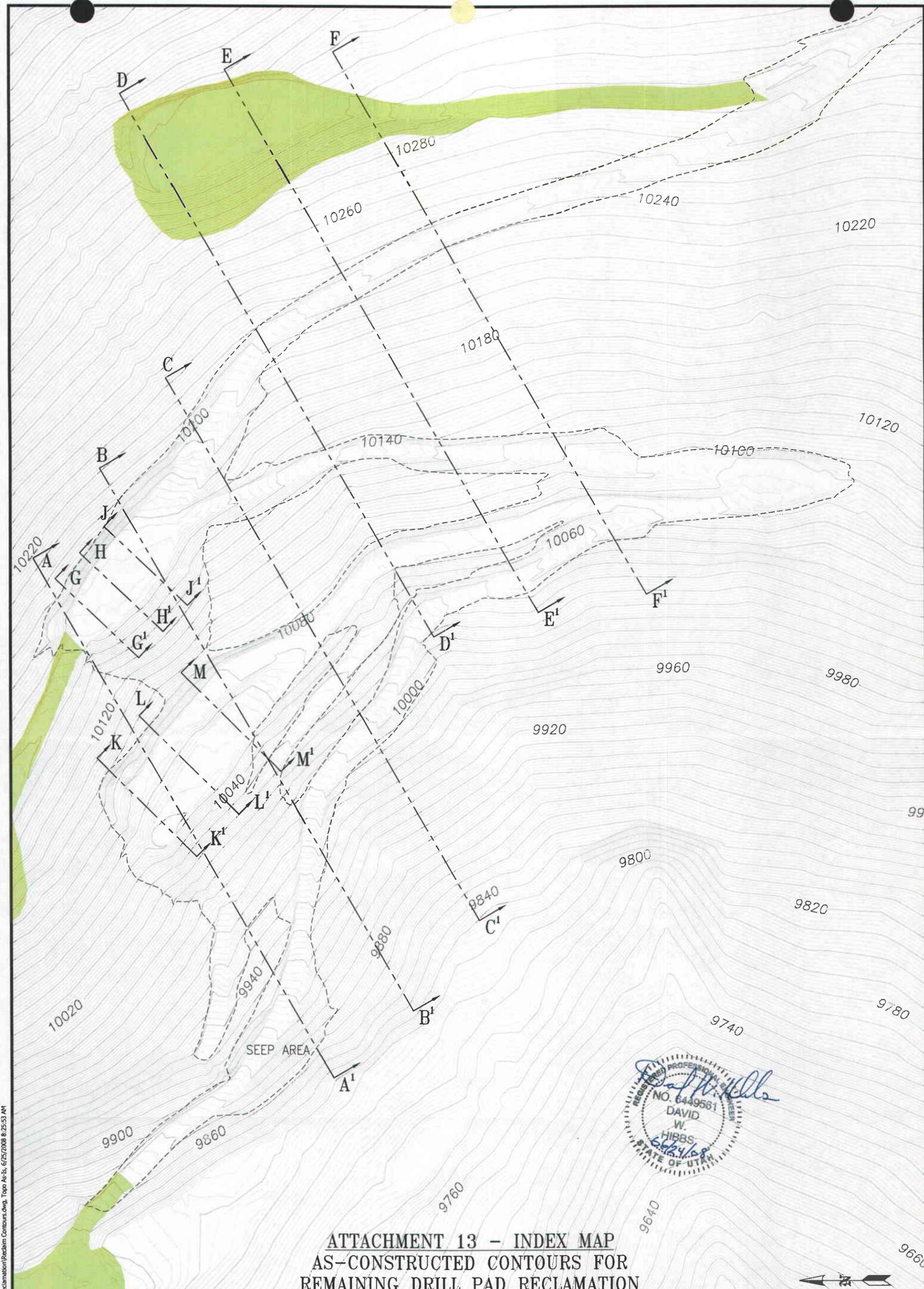
\* Pesticide Use Proposal Form # FS-2100-2, attached, **MUST** be completed and approved by the Forest Service prior to the use of pesticides for noxious weed/exotic plant control.

**ATTACHMENT 13**

**COMPUTER GENERATED CUT/FILL  
REPRESENTATION OF  
REMAINING DRILLPAD RECLAMATION**

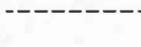
**&**

**RECLAMATION CROSS SECTIONS**



**ATTACHMENT 13 - INDEX MAP  
AS-CONSTRUCTED CONTOURS FOR  
REMAINING DRILL PAD RECLAMATION**

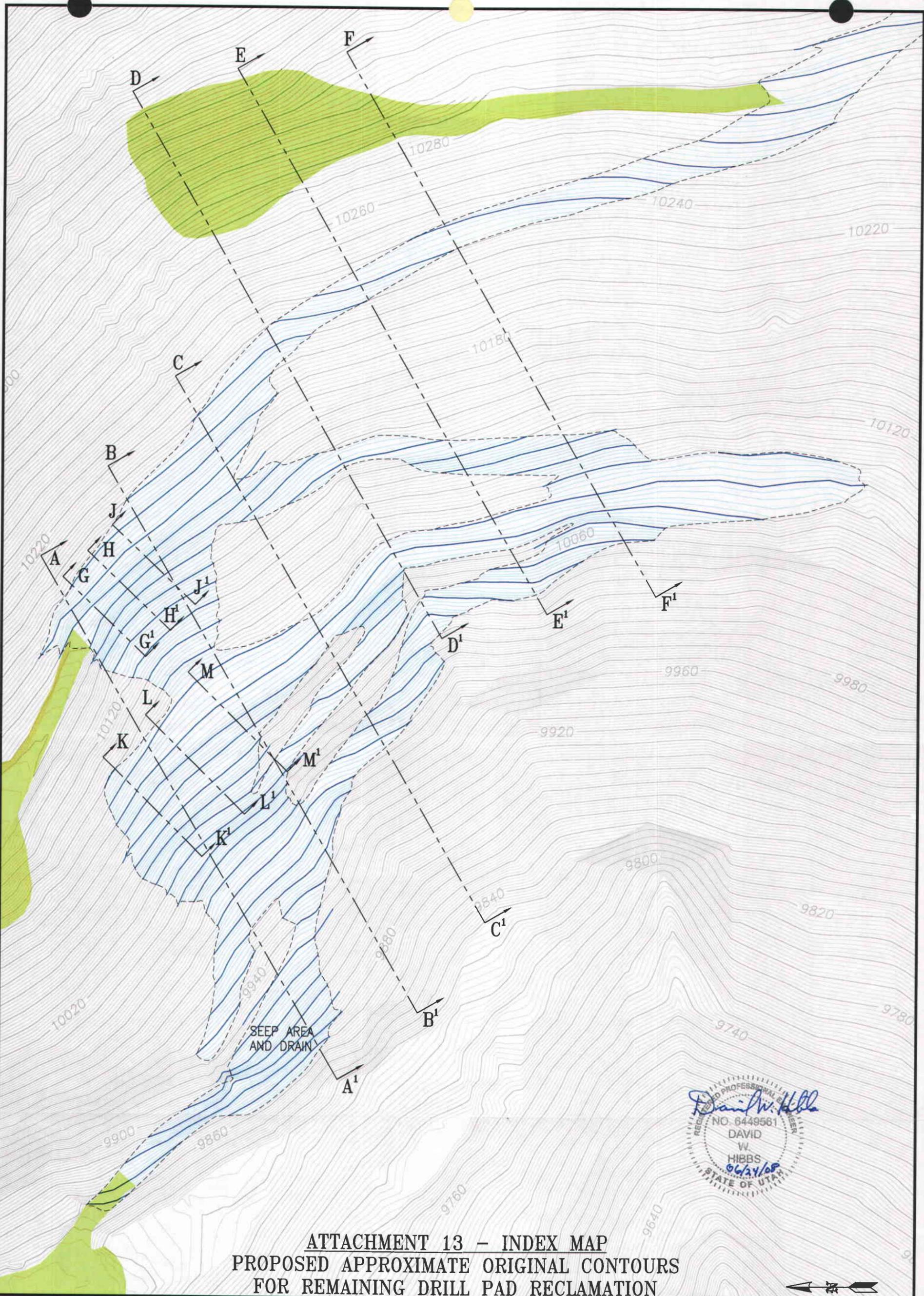


KEY	
	DENOTES AREAS PREVIOUSLY RECLAIMED
	EXTENT OF REMAINING RECLAMATION
	EXISTING INDEX CONTOURS
	EXISTING INTERMEDIATE CONTOURS

**NOTE:** CONTOURS IN PREVIOUSLY RECLAIMED AREAS DEPICT CONTOURS PRIOR TO RECLAMATION AND DO NOT REFLECT RECLAIMED CONTOURS.

REVISION #1

<b>EAST MOUNTAIN EMERGENCY DRILL PADS</b>	
<b>Crandall Canyon Mines</b>	
Crandall Canyon P.O. BOX 1077 PRICE, UTAH	
MSHA ID #42-01715	
DRAWN BY PJ	SCALE 1" = 100'
APPROVED BY DS	DATE 24 JUNE 2008
ATTACHMENT 13 - PLATE 1 of 7	



**ATTACHMENT 13 - INDEX MAP  
PROPOSED APPROXIMATE ORIGINAL CONTOURS  
FOR REMAINING DRILL PAD RECLAMATION**

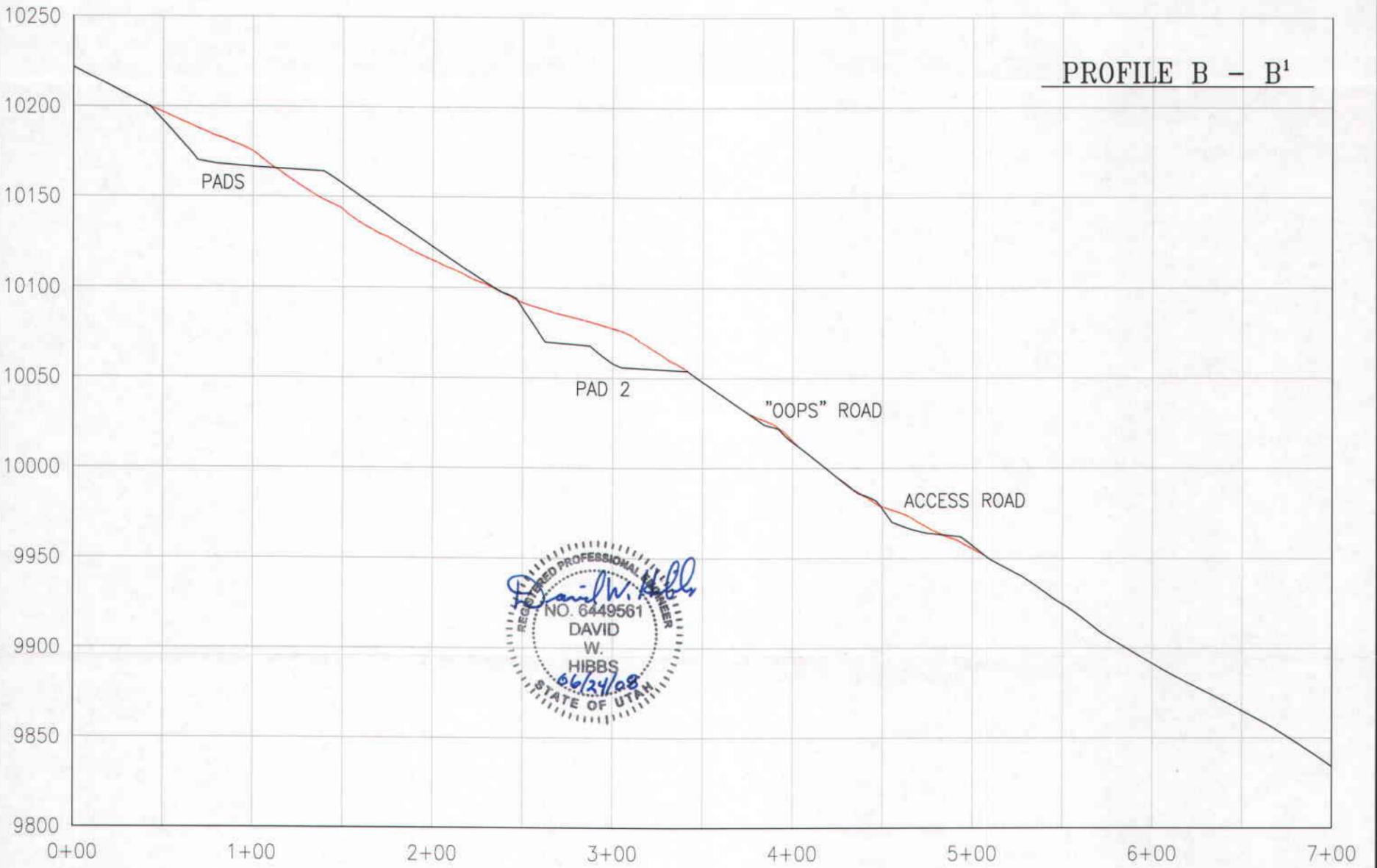
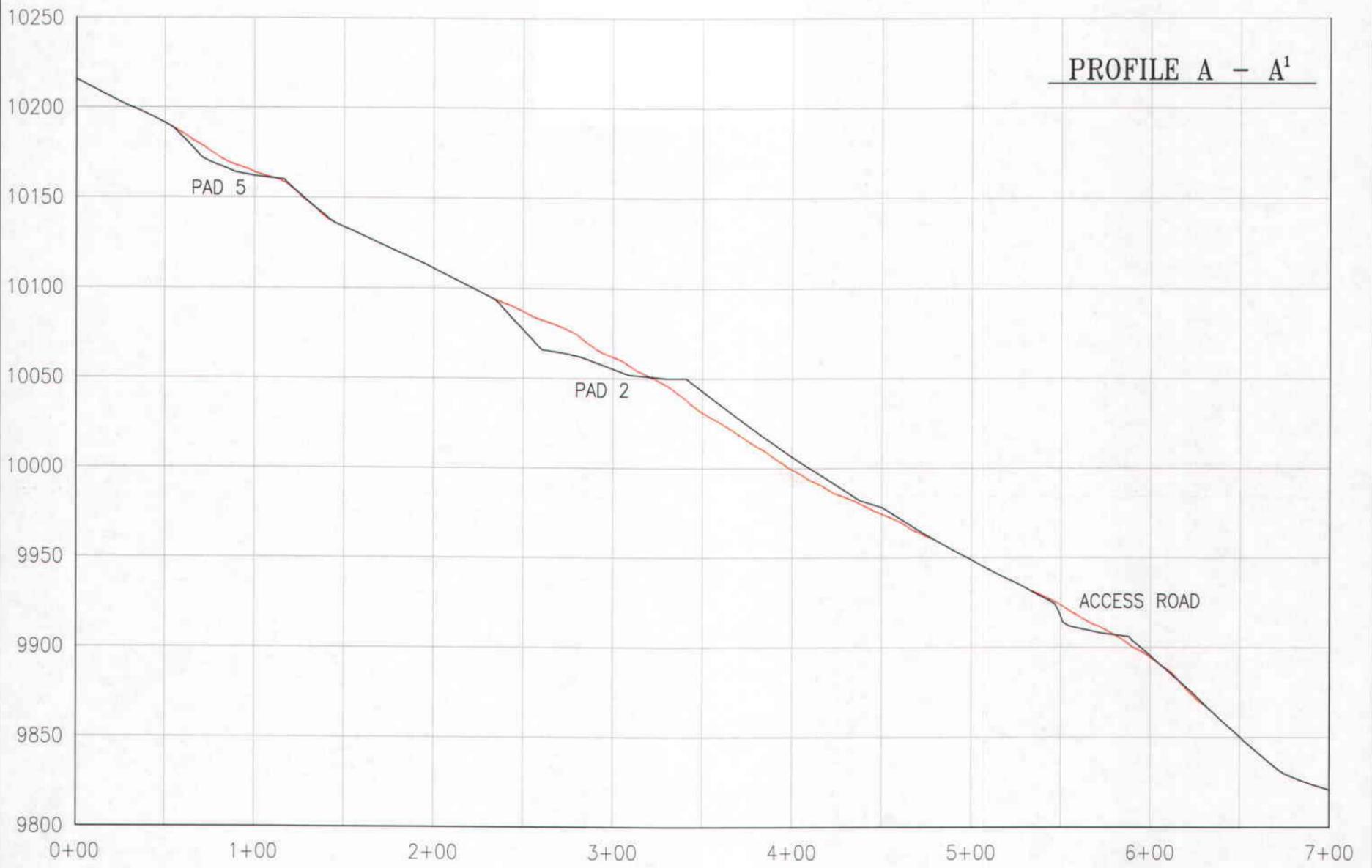
REGISTERED PROFESSIONAL ENGINEER  
 NO. 6449561  
 DAVID  
 W.  
 HIBBS  
 06/24/08  
 STATE OF UTAH

**KEY**

- |  |   |  |                                 |
|--|---|--|---------------------------------|
|  | PROPOSED RECLAMATION INDEX CONTOUR        |  | EXISTING INDEX CONTOURS         |
|  | PROPOSED RECLAMATION INTERMEDIATE CONTOUR |  | EXTENT OF REMAINING RECLAMATION |
|  | DENOTES AREAS PREVIOUSLY RECLAIMED        |  |                                 |

**NOTE:** CONTOURS IN PREVIOUSLY RECLAIMED AREAS DEPICT CONTOURS PRIOR TO RECLAMATION AND DO NOT REFLECT RECLAIMED CONTOURS.

<b>EAST MOUNTAIN EMERGENCY DRILL PADS</b>	
<b>Crandall Canyon Mines</b>	
Crandall Canyon P.O. BOX 1077 PRICE, UTAH	
MSHA ID #42-01715	
DRAWN BY PJ	SCALE 1" = 100'
APPROVED BY DS	DATE 24 JUNE 2008
REVISION #1	
ATTACHMENT 13 - PLATE 2 of 7	



REGISTERED PROFESSIONAL ENGINEER  
 NO. 6449561  
 DAVID  
 W.  
 HIBBS  
 6/24/08  
 STATE OF UTAH

**ATTACHMENT 13**  
**DRILL PAD PROFILES**  
 (SEE PLATES 1 AND 2, ATTACHMENT 13, FOR INDEX MAPS)

**EAST MOUNTAIN**  
**EMERGENCY DRILL PADS**

**Crandall Canyon Mines**  
**Crandall Canyon**  
 P.O. BOX 1077  
 PRICE, UTAH

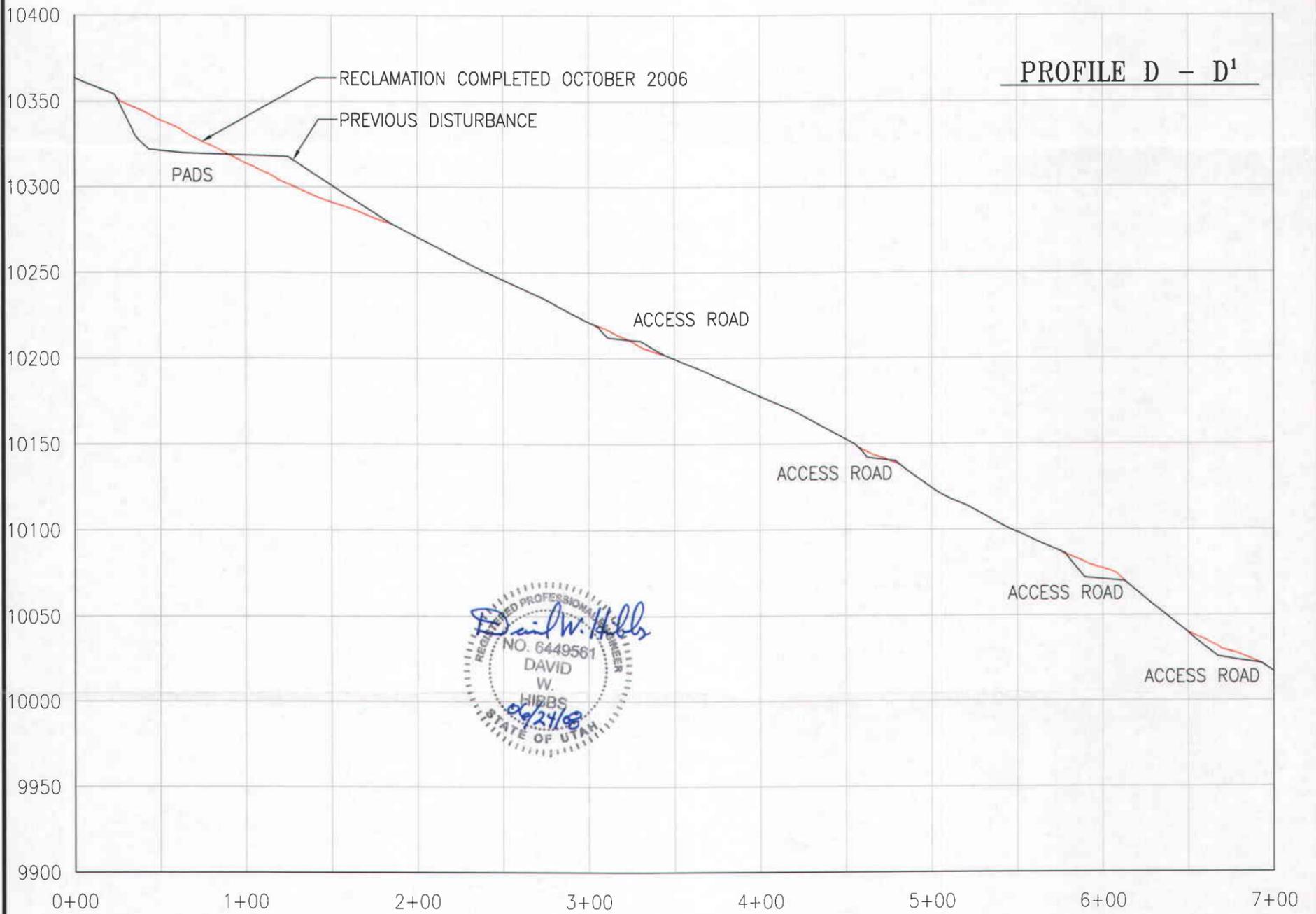
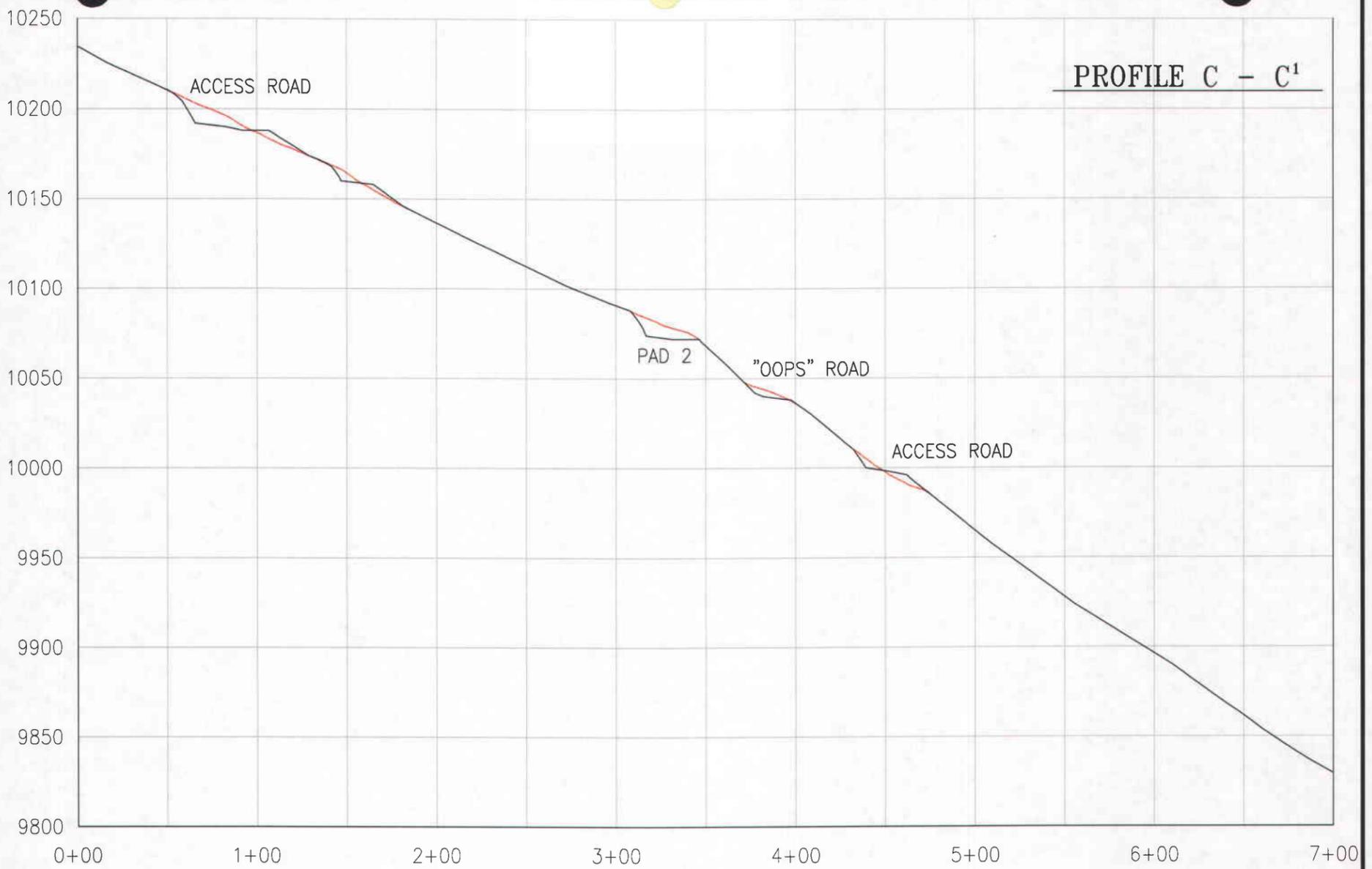
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APPROVED BY	DS	DATE	24 JUNE 2008

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 \_\_\_\_\_ EXISTING DISTURBED PROFILE

REVISION #1

ATTACHMENT 13 - PLATE 3 of 7



REGISTERED PROFESSIONAL ENGINEER  
 NO. 6449561  
 DAVID  
 W.  
 HIBBS  
 06/24/08  
 STATE OF UTAH

**ATTACHMENT 13**  
**DRILL PAD PROFILES**  
 (SEE PLATES 1 AND 2, ATTACHMENT 13, FOR INDEX MAPS)

**KEY**  
 - - - - - PROPOSED RECLAIMED PROFILE  
 \_\_\_\_\_ EXISTING DISTURBED PROFILE

**EAST MOUNTAIN**  
**EMERGENCY DRILL PADS**

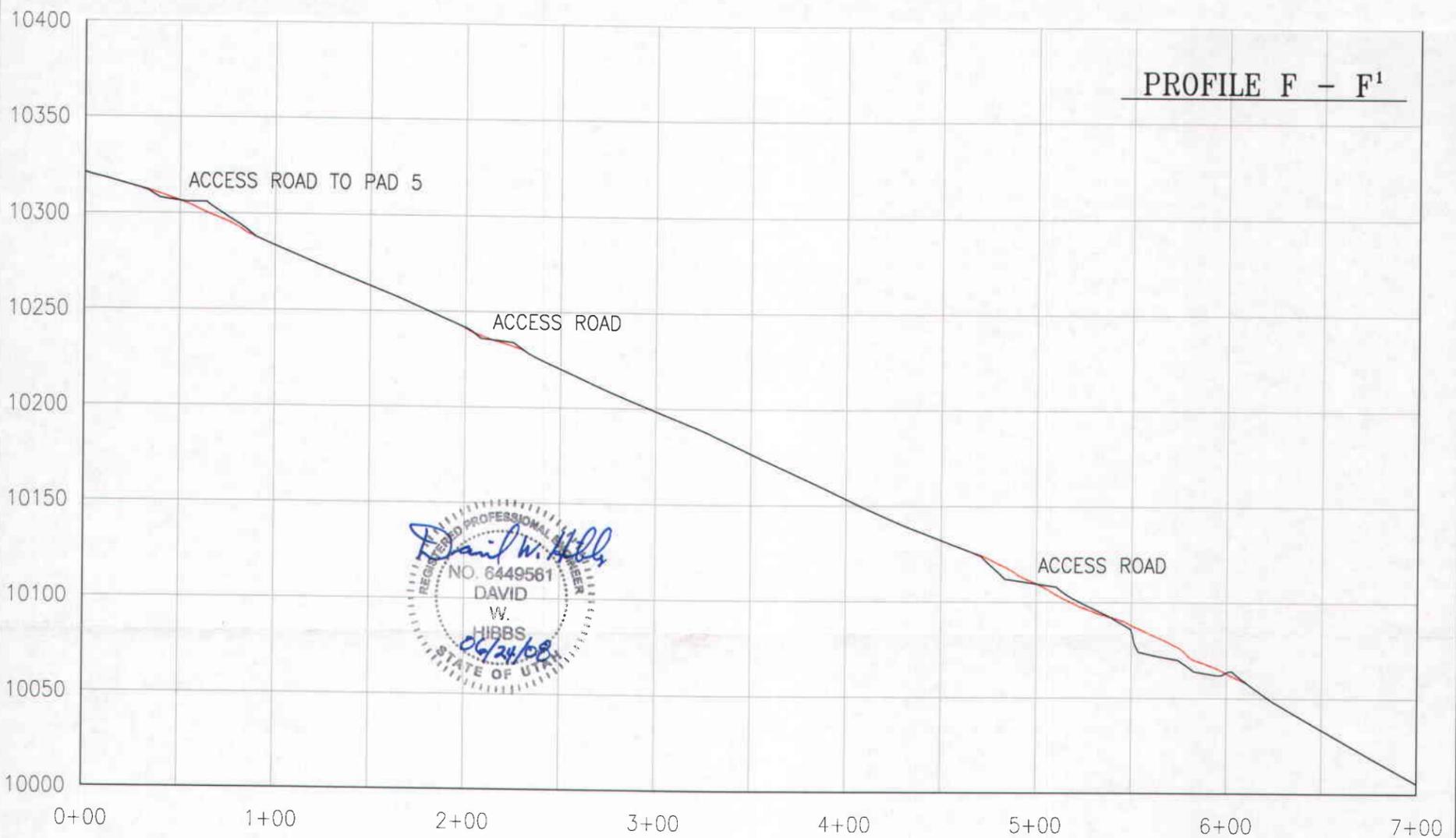
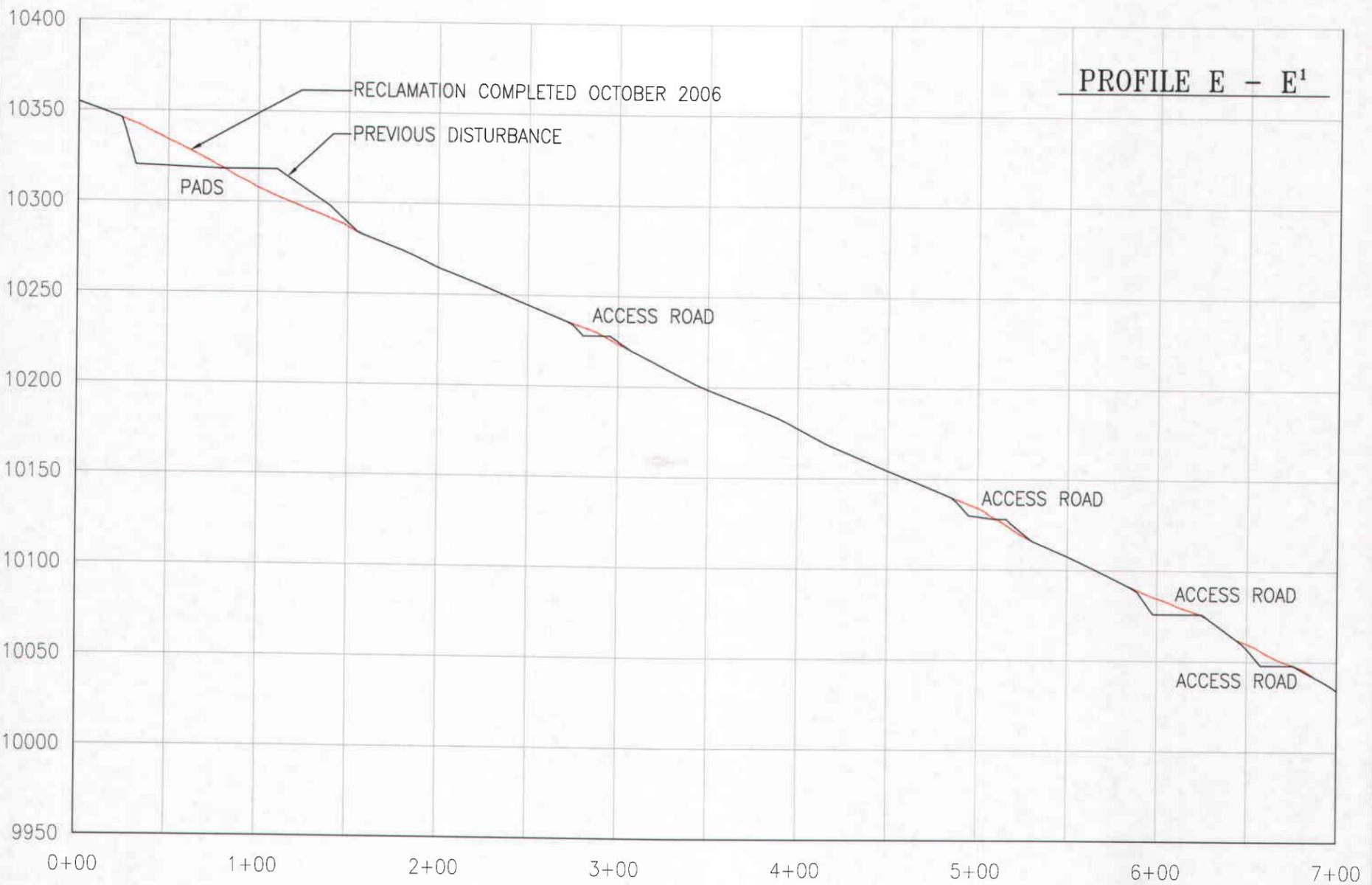
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**Crandall Canyon**  
 P.O. BOX 1077  
 PRICE, UTAH

MSHA ID #42-01715

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APPROVED BY	DS	DATE	24 JUNE 2008

REVISION #1

ATTACHMENT 13 - PLATE 4 of 7



**ATTACHMENT 13**  
**DRILL PAD PROFILES**  
 (SEE PLATES 1 AND 2, ATTACHMENT 13, FOR INDEX MAPS)

**EAST MOUNTAIN  
 EMERGENCY DRILL PADS**

**Crandall Canyon Mines**  
 Crandall Canyon  
 P.O. BOX 1077  
 PRICE, UTAH

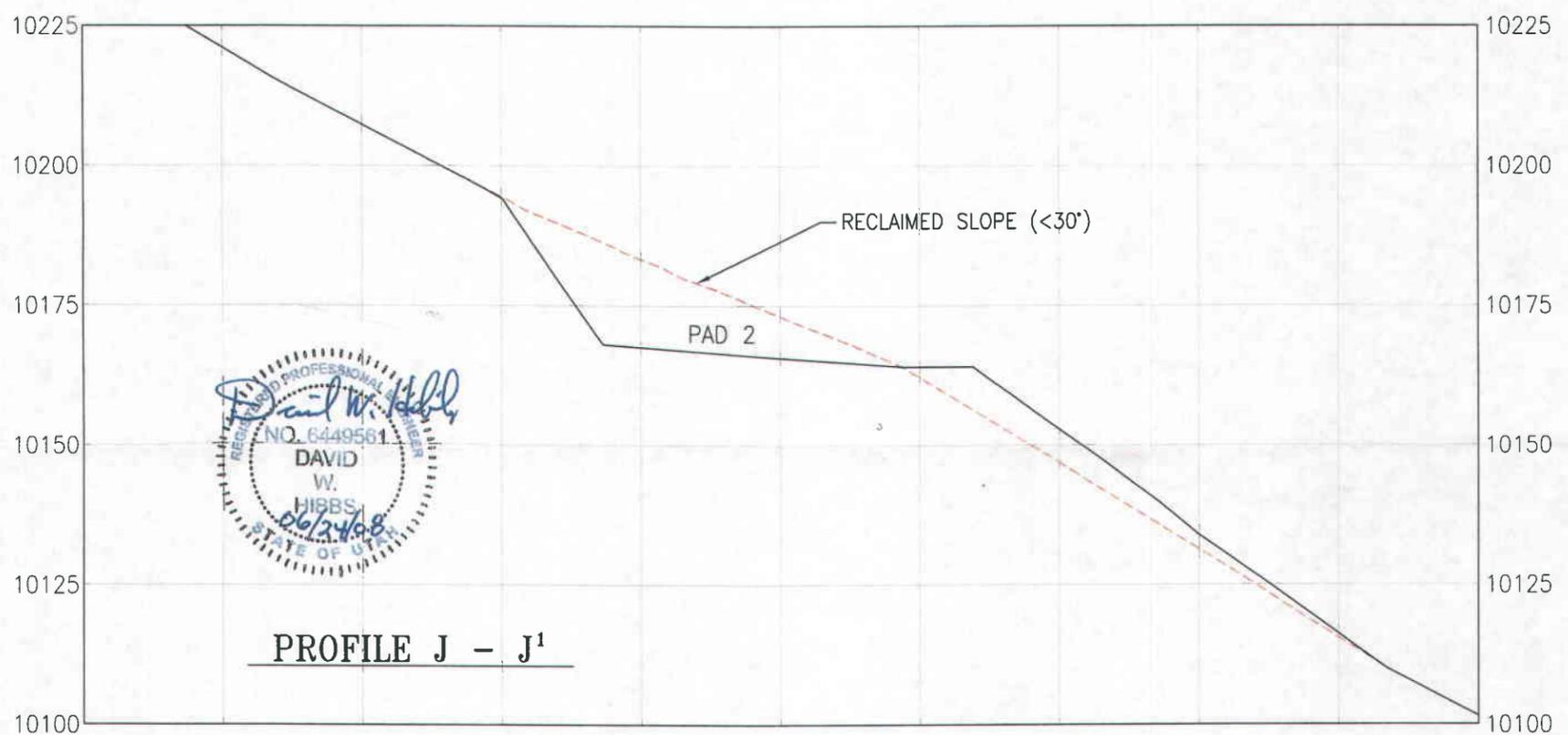
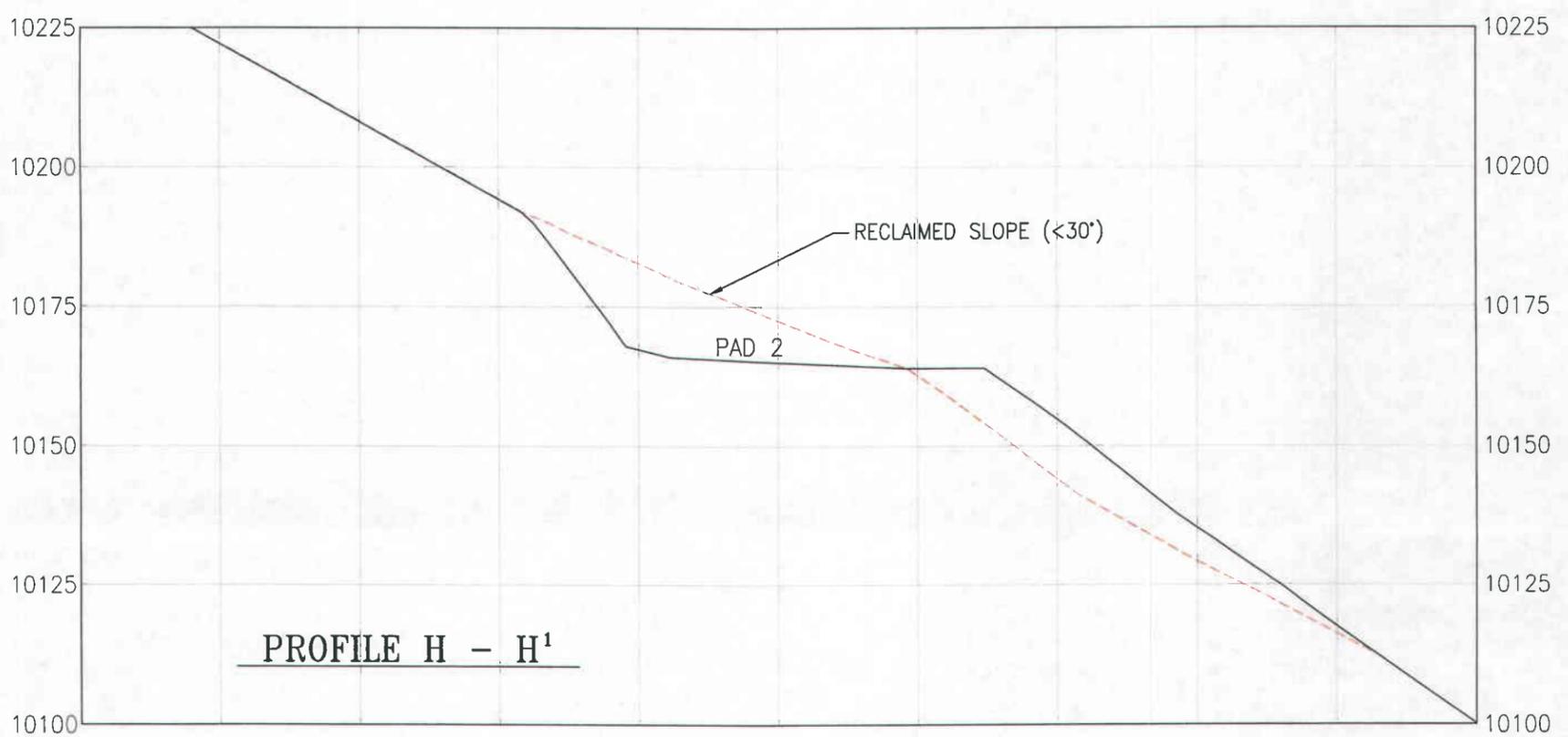
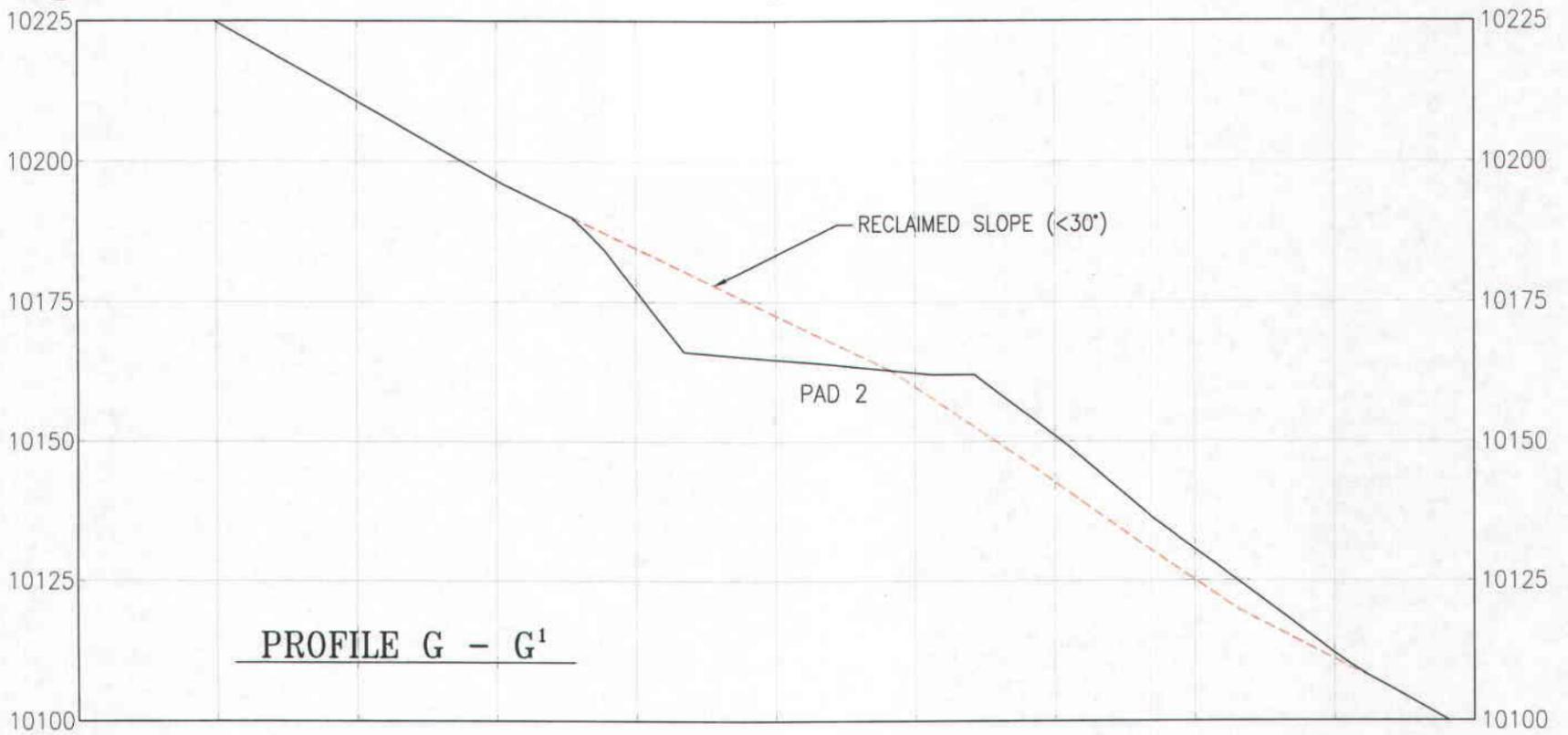
MSHA ID #42-01715

DRAWN BY	PJ	SCALE	1" = 75'
APPROVED BY	DS	DATE	24 JUNE 2008

- KEY**
- PROPOSED RECLAIMED PROFILE
  - EXISTING DISTURBED PROFILE

REVISION #1

ATTACHMENT 13 - PLATE 5 of 7



**ATTACHMENT 13**  
**DRILL PAD PROFILES**  
(SEE PLATES 1 AND 2, ATTACHMENT 13, FOR INDEX MAPS)

**EAST MOUNTAIN**  
**EMERGENCY DRILL PADS**

**Crandall Canyon Mines**

**Crandall Canyon**  
P.O. BOX 1077  
PRICE, UTAH

MSHA ID #42-01715

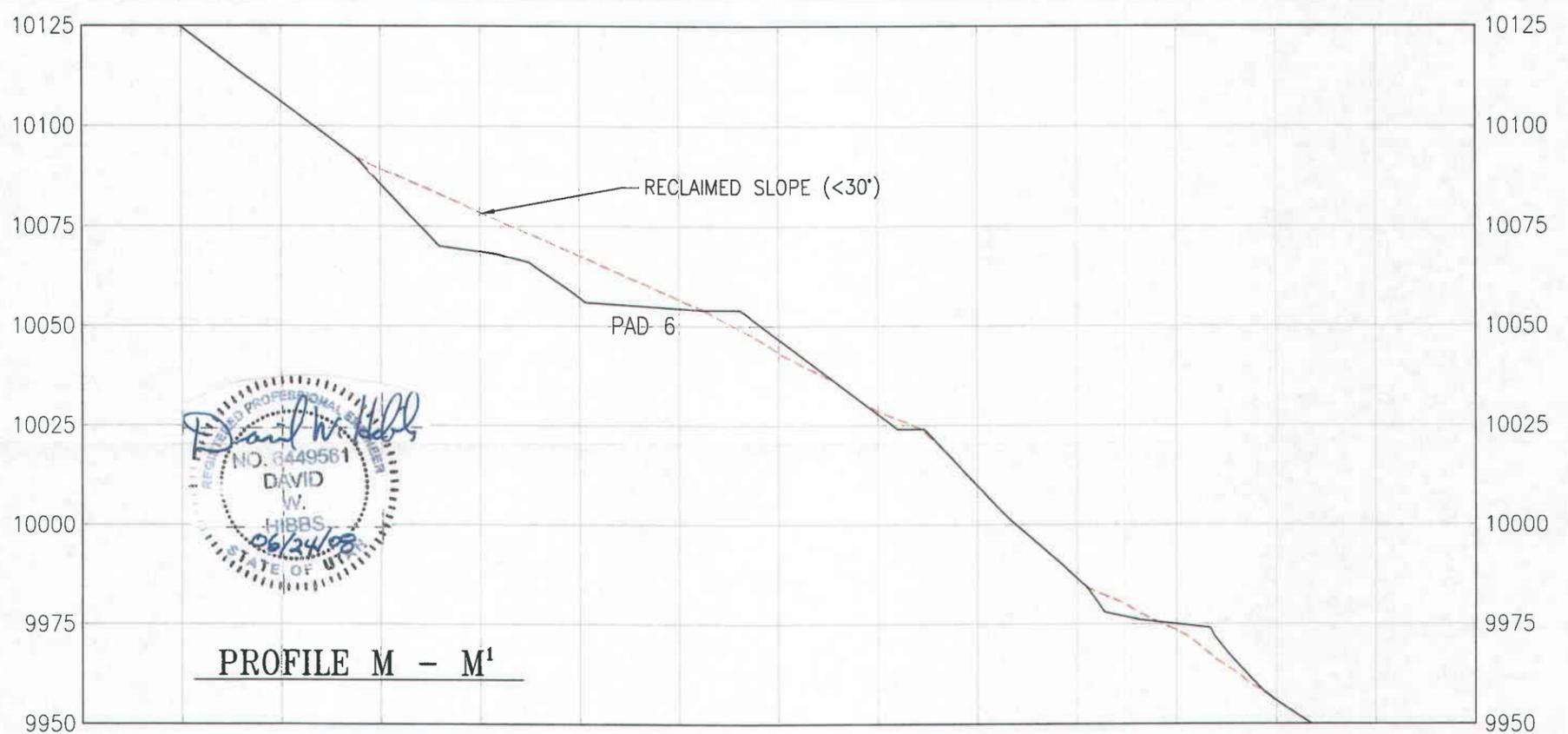
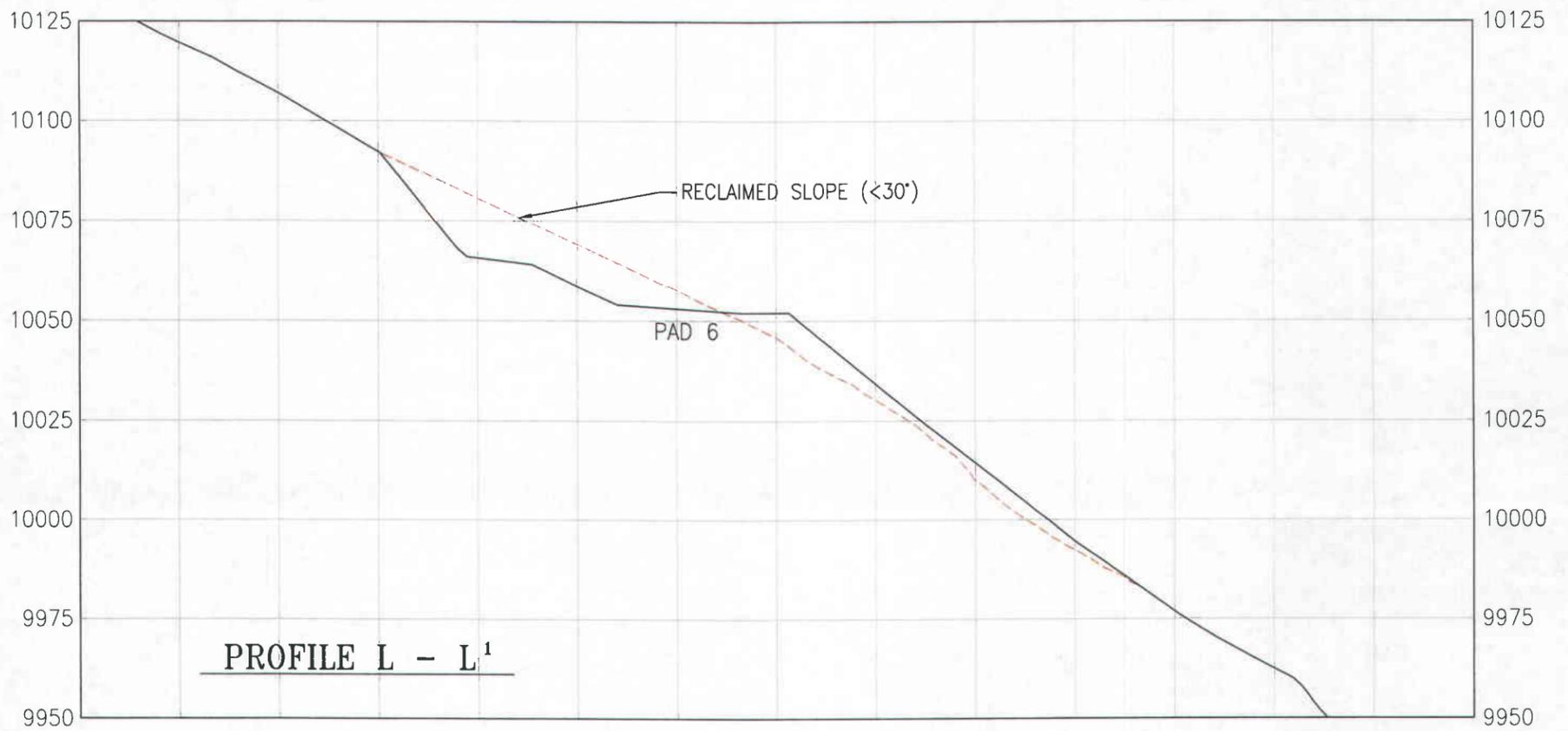
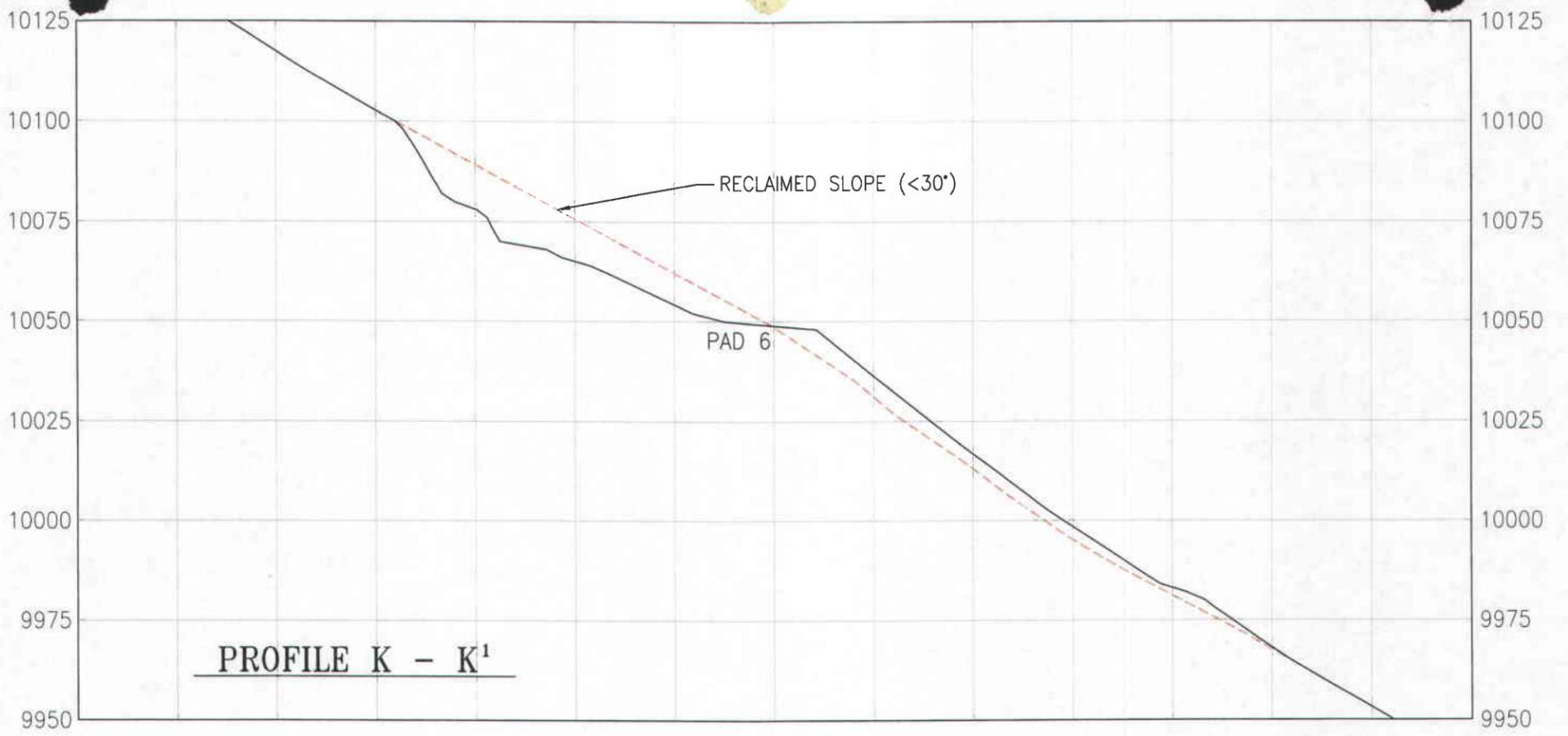
DRAWN BY	PJ	SCALE	1" = 30'
APPROVED BY	DS	DATE	15 JULY 2008

REVISION #2

ATTACHMENT 13 - PLATE 6 of 7

**KEY**

- - - - - PROPOSED RECLAIMED PROFILE (APPROXIMATE)
- EXISTING DISTURBED PROFILE



**ATTACHMENT 13**  
**DRILL PAD PROFILES**  
(SEE PLATES 1 AND 2, ATTACHMENT 13, FOR INDEX MAPS)

**EAST MOUNTAIN  
EMERGENCY DRILL PADS**

**Crandall Canyon Mines**  
Crandall Canyon  
P.O. BOX 1077  
PRICE, UTAH

MSHA ID #42-01715

DRAWN BY	PJ	SCALE	1" = 40'
APPROVED BY	DS	DATE	15 JULY 2008

ATTACHMENT 13 - PLATE 7 of 7

**KEY**

----- PROPOSED RECLAIMED PROFILE (APPROXIMATE)

————— EXISTING DISTURBED PROFILE

REVISION #2

ATTACHMENT 14

FOREST SERVICE ROAD PERMIT  
0410-03-46

U.S. DEPARTMENT OF AGRICULTURE  
FOREST SERVICE

ROAD USE PERMIT  
#0410-03-46  
AUTHORITY:

Section 4 and Section 6 of the National Forest Roads and Trails Act  
16 U.S.C. 535 and 537

Bruce Hill  
President  
(435) 888-4017

Genwal Resources, Inc.  
P.O. Box 1077  
Price, Utah 84501

(the holder), is hereby granted use of the following roads or road segments and related transportation facilities (hereinafter "roads") on the Ferron/Price District Ranger, Manti-LaSal National Forest, for commercial hauling, subject to the terms and conditions of this permit:

- NFSR # 50040 from the end of pavement at MP 3.13 located at the Trail Mountain Mine to MP 9.40 a distance of approximately 6.3 miles,
- NFSR # 50145 from the junction with NFSR # 50040 at MP 0.00 to the junction with NFSR # 50244 at MP 2.74 a distance of approximately 2.7 miles,
- NFSR # 50244 from the junction with NFSR # 50145 at MP 0.00 to the road termini at MP 2.45 a distance of approximately 2.5 miles,

for the purpose of transporting personnel, equipment, supplies and materials for reclamation work resulting from mine rescue efforts on East Mountain

Total permitted miles on National Forest System Roads to access mine rescue reclamation areas: 11.5

Holder shall submit payment for deferred maintenance as prescribed below and shall perform recurring maintenance as prescribed below.

**APPENDICES**

- A – Annual Operating Plan
- B – Commensurate Share Calculation
- C – Maintenance Requirements

**TERMS AND CONDITIONS**

**I. GENERAL TERMS**

**A. AUTHORITY.** This permit is issued pursuant to the National Forest Roads and Trails Act, 16 U.S.C. 535 and 537, and 36 CFR Part 212, Subpart A, as amended, and is subject to their provisions.

**B. RESPONSIBLE OFFICIAL.** The responsible official is the Ferron/Price District Ranger, 115 West Canyon Road, P.O. Box 310, Ferron Utah, 84523, telephone no. 435-384-2372 or a subordinate officer with delegated authority.

**C. TERM.** This permit shall expire at midnight on October 1, 2008. Expiration of this permit shall not require notice, a decision document, or any environmental analysis or other documentation.

D. **RENEWAL**. This permit is not renewable. Prior to expiration of this permit, the holder may apply for a new permit that would renew the use authorized by this permit. Renewal of the use shall be at the sole discretion of the responsible official.

E. **AMENDMENT**. This permit may be amended in whole or in part by the Forest Service when, at the discretion of the responsible official, this action is deemed necessary or desirable to incorporate new terms that may be required by law, regulation, directive, the applicable land management plan, or projects and activities implementing a land management plan pursuant to 36 CFR part 215.

F. **COMPLIANCE WITH LAWS, REGULATIONS, AND OTHER LEGAL REQUIREMENTS**. In exercising the rights and privileges granted by this permit, the holder shall comply with all present and future federal laws and regulations and all present and future state, county, and municipal laws, regulations, and other legal requirements, including state traffic laws, that apply to the permit area, to the extent they do not conflict with federal law, regulation, or policy. The Forest Service assumes no responsibility for enforcing laws, regulations, and other legal requirements that fall under the jurisdiction of other governmental entities.

G. **NON-EXCLUSIVE USE**. The use authorized by this permit is not exclusive. The Forest Service reserves the right to use the roads authorized by this permit and to allow others to use them at any time. The holder shall use the roads authorized by this permit in a manner that will not unreasonably or unnecessarily interfere with their use by others, including the Forest Service. Except for any restrictions that the holder and the Forest Service agree are necessary to protect public safety and road investments, the roads authorized by this permit shall remain open to the public for all lawful purposes.

H. **ASSIGNABILITY**. This permit is not assignable or transferable.

## II. **OPERATIONS**

A. **ANNUAL OPERATING PLAN**. The holder shall prepare and annually revise by April 1 an operating plan. The annual operating plan shall be prepared in consultation with the responsible official or the responsible official's designated representative and shall cover all operations authorized by this permit. At a minimum, the annual operating plan shall specify the date the use authorized by this permit will commence, the duration and extent of the use, the products that will be hauled, a traffic control plan per clause II.D, the names of the holder's employees, contractors, and subcontractors who will use the roads authorized by this permit on behalf of the holder, and any other information regarding the authorized use deemed necessary by the responsible official. The annual operating plan shall be submitted by the holder and approved by the responsible official or the responsible official's designated representative prior to commencement of commercial hauling under this permit and shall be attached to this permit as Appendix A. If there is any material change in the information contained in the annual operating plan, the holder shall notify the responsible official promptly in writing of the change.

B. **HOLDER'S REPRESENTATIVE**. The holder shall designate a representative for purposes of administration of this permit and shall notify the responsible official in writing who the holder's representative will be.

C. **USE RECORDS**. Semi-annually, during periods the holder is conducting commercial hauling on the roads covered by this permit, the holder shall provide scale or other records acceptable to the responsible official that document the quantity hauled, calculated in the unit of measure (e.g., thousands of board feet, tons, cubic yards, or vehicle units) used to determine payments in lieu of performance under clause III.D or the holder's investment share under section V.

D. **PUBLIC SAFETY**. When the holder is engaged in commercial hauling adjacent to or on National Forest System roads or National Forest System trails open to public travel, the holder shall provide users with adequate warning of hazardous conditions associated with the holder's operations. A traffic control plan for each commercial hauling project shall be approved by the responsible official in writing before commercial hauling commences. Warning devices shall be appropriate for current conditions and shall be covered or removed when not needed. Flags and other warning devices shall comply with the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) and any specifications attached to this permit.

## E. **TRAFFIC RULES AND USE RESTRICTIONS**

1. The holder and its agents, employees, and contractors shall comply with all traffic rules and use restrictions imposed by the Forest Service, including:
  - a. Road closures or use restrictions prompted by weather conditions, a fire hazard, or road construction or maintenance.
  - b. Traffic rules for safe and effective use of roads.
  - c. Regulation of the number of vehicles using a road to prevent traffic congestion.
2. Unless specified in this permit or approved in writing by the responsible official, use of motor vehicles by the holder or its agents, employees, or contractors must be in accordance with the applicable motor vehicle use map (36 CFR 261.13).
3. Temporary traffic control signs, flagging, and warning devices for road construction, operation, or maintenance conducted under this permit shall comply with Part 6 of the MUTCD.
4. The holder shall not conduct loading operations on permitted roads without advance notification and written approval of the responsible official.
5. The holder shall not operate vehicles or equipment with cleats or other tracks that will injure the road surface.
6. Heavy equipment shall not be moved on Forest System Roads on the following days:

4th of July Weekend, 24th of July Weekend, Labor Day Weekend, Columbus Day Weekend, opening weekends of general deer and elk hunts; "Weekend" includes Friday. If the holiday is on Tuesday, weekend restriction extends to include Monday and Tuesday. If the holiday is on Thursday the holiday weekend restriction extends to include Thursday and Friday. If the holiday is on Wednesday, the weekend hauling restriction extends through Wednesday, including the preceding Monday and Tuesday.

If a water truck is required during these periods, it must be preceded by a pilot vehicle when hauling water on the permitted roads.

7. Permitted use is restricted to normal dry season July 1 to October 1. If permitted use is necessary beyond October 1, use shall be restricted to the road surface being in a dry or frozen condition. Graveling segments of the road surface may be required subject to permittee's use during specific road surface conditions.
8. All vehicles and materials shall be washed free of noxious weed and/or noxious weed seed before accessing permitted roads. Material and substance used in, or transported on permitted roads shall be certified weed free.

**F. REQUIREMENT TO CARRY A COPY OF THE PERMIT.** Drivers of all vehicles operating under this permit shall have a copy of the first sheet of this permit in their vehicle. The copy will be presented, on request, to any Forest Service officer.

**G. LOAD MARKING.** Unless otherwise approved in writing by the responsible official, when hauling wood products under authority of this permit, a 6" minimum size red letter "P" shall be painted on three or more ends of logs visible from the front and on three or more ends of logs visible from the back of the load.

### **III. PERFORMANCE AND COST RECOVERY**

**A. RECONSTRUCTION REQUIRED TO ACCOMMODATE USE.** The holder shall perform any road reconstruction required to accommodate the holder's use under this permit, or deposit funds sufficient to cover the cost of the reconstruction, before the holder's use commences.

## **B. COMMENSURATE SHARE**

1. The holder shall perform maintenance, or deposit funds sufficient to cover the cost of maintenance, commensurate with the holder's use of the roads authorized by this permit (the holder's commensurate share), measured, e.g., in thousand board feet, cubic yards, or vehicle units. The holder shall be entirely responsible for maintenance that is necessitated by the holder's use, i.e., maintenance which would not be necessary if the holder's use did not occur. The holder shall be proportionately responsible with other users of the roads authorized by this permit for maintenance not necessitated by traffic, i.e., maintenance that is necessary due to natural causes such as rain, wind, rock fall, and growth of brush. Maintenance that could be required or for which payment could be required by this clause includes, at a minimum, work addressed in section IV of this permit.

2. The initial calculation of the holder's commensurate share, including the maintenance made necessary by the authorized use and the cost of the maintenance, is shown in Appendix B. The value of the holder's commensurate share for the use authorized by this permit is \$1,270 for deferred maintenance (surface replacement), provided that the rate shall be revised upward or downward on the anniversary date of this permit, based on estimated costs and anticipated use of the roads authorized under this permit. If the value of the holder's commensurate share exceeds the cost of maintenance that is performed on the roads authorized by this permit, the difference between the value of the holder's commensurate share and the cost of the maintenance performed shall be deposited in cash, as provided in clause III.D.

**C. PERFORMANCE BOND FOR ROAD MAINTENANCE.** As a further guarantee of the holder's commensurate share obligation, the responsible official may require the holder to furnish a surety bond or other security.

1. As a further guarantee of compliance with the holder's commensurate share obligation, the holder shall deliver and maintain a surety bond or other acceptable security, such as cash deposited and maintained in a federal depository or negotiable securities of the United States, in the amount of \$125,500. The responsible official may periodically evaluate the adequacy of the bond or other security and increase or decrease the amount as appropriate. If the bond or other security becomes unsatisfactory to the responsible official, the holder shall within 30 days of demand furnish a new bond or other security issued by a surety that is solvent and satisfactory to the responsible official. If the holder fails to meet any of the requirements secured under this clause, money deposited pursuant to this clause shall be retained by the United States to the extent necessary to satisfy the obligations secured under this clause, without prejudice to any other rights and remedies of the United States.

2. The bond shall be released or other security returned 30 days after (a) the responsible official certifies that the obligations covered by the bond or other security are met and (b) the holder establishes to the satisfaction of the responsible official that all claims for labor and material for the secured obligations have been paid or released.

**D. PAYMENT IN LIEU OF PERFORMANCE.** An initial payment in lieu of performance of deferred maintenance in the amount of \$1,270 shall be made before use commences under this permit. Thereafter, payments in lieu of performance shall be made [weekly/monthly] in the amount of \$\_N/A\_, calculated using the rate of payment for the holder's commensurate share in clause III.B. Payments shall be based on monthly use records submitted per clause II.C. Payments shall be sent to USDA Forest Service, P.O. Box 894183, Los Angeles, CA 90189-4183. In lieu of an advance payment, the holder may deliver and maintain a surety bond or other acceptable security, such as cash deposited and maintained in a federal depository or negotiable securities of the United States, in the amount of \$1,270. If the holder fails to meet the payment obligation secured under this clause, money deposited pursuant to this clause shall be retained by the United States to the extent necessary to satisfy the obligation, without prejudice to any other rights and remedies of the United States. The surety bond shall be released or other security returned 30 days after the responsible official certifies that the obligation covered by the bond or other security is met.

## **IV. REQUIREMENTS FOR CONDUCTING MAINTENANCE**

**A. IN GENERAL.** When maintenance is performed, it shall be conducted in accordance with the following requirements and the requirements in Appendix C:

1. The holder shall perform maintenance on the roads authorized by this permit that is necessary to protect and repair the roadbed, road surface, and associated transportation facilities.
2. The holder shall resurface the roads authorized by this permit to the extent loss of surfacing is caused by the use authorized by this permit.
3. If other commercial haulers are operating on the roads authorized by this permit, the holder and those commercial haulers shall enter into an agreement for performance of maintenance on these roads. If conflicts arise regarding responsibility for the maintenance, commercial hauling on these roads shall cease until the conflicts are resolved.

**B. SNOW REMOVAL.** Snow removal shall be conducted in a manner that protects roads, ensures safe and efficient transportation of materials, and prevents erosion damage to roads, streams, and adjacent lands.

Snow removal must be authorized by the responsible official prior to implementation.

The holder shall:

1. Remove snow from the entire width of the road surface, including turnouts and ditch lines. Through-cuts will be allowed only after snow depths exceed the height of the cab or across flat ground. Disposal shall always be to the outside or downhill side of the road.
2. Remove snow slides, earth slides, fallen timber, and boulders that obstruct the road surface.
3. Remove snow, ice, and debris from ditches and culverts so that the drainage system will function efficiently at all times.
4. Deposit all debris, except snow and ice, removed from the road surface and ditches at locations approved by the responsible official and away from stream channels.
5. Leave at least 4 inches of snow to protect the road.
6. Restore any damage resulting from snow removal in a timely manner.
7. Ensure that snow plowing is conducted in accordance with the traffic control plan required under clause II.D.

The holder shall not:

8. Undercut constructed slopes or remove gravel or other surfacing material from the road surface.
9. Leave snow berms on the road surface. Berms on the shoulder of the road shall be removed or drainage holes shall be opened and maintained. Drainage holes shall be spaced as necessary to obtain satisfactory surface drainage without discharge on erodible fills.

Outlets - Outlets for surface runoff shall be placed in all snow through-cuts at points where water can flow off the road surface at the following intervals:

Road grades of 8% or less - 500 feet center to center minimum  
Road grades greater than 8% - 300 feet center to center minimum

10. Use equipment with cleats or other tracks to plow snow without prior written approval of the responsible official.
11. Equipment - The equipment should be in sound operating condition, be equipped with angle blade or adequate grousers or traction tires, and be operated by a fully qualified operator.
12. Sanding of hazardous areas shall be with sand. Coal dust, chemicals, or salt are not to be used.

13. Cattleguards - Crawler tractors will not be operated across cattleguards.
14. Culvert Cleaning - Culvert heads and outlets shall be cleaned of snow-pack by hand.
15. Tree Damage - Snow should not be pushed, blown, or stacked on trees along the roadside. Care will be taken to avoid scarring trees with equipment.
16. The road may be used while a snow floor remains intact or under frozen conditions. All travel must cease when temperatures allow the road to thaw and rutting of the road surface is occurring. This closure will be in effect until the surface dries or refreezes.
17. Inspections: Intermittent inspections may be made during snow removal operations. Final inspection will be made to check for full compliance and damages.

## **V. RIGHTS AND LIABILITIES**

**A. LEGAL EFFECT OF THE PERMIT**. This permit, which is revocable and terminable, is a federal license. This permit does not constitute a contract or lease for purposes of the Contract Disputes Act, 41 U.S.C. 601. This permit is not real property, does not convey any interest in real property, and may not be used as collateral for a loan.

**B. VALID OUTSTANDING RIGHTS**. This permit is subject to all valid outstanding rights.

**C. ABSENCE OF THIRD-PARTY BENEFICIARY RIGHTS**. The parties to this permit do not intend to confer any rights on any third party as a beneficiary under this permit.

**D. RISK OF LOSS**. The holder assumes all risk of loss associated with use of the roads authorized by this permit, including but not limited to theft, vandalism, fire and any fire-fighting activities (including prescribed burns), avalanches, rising waters, winds, falling limbs or trees, and acts of God.

**E. DAMAGE TO UNITED STATES PROPERTY**. The holder has an affirmative duty to protect from damage the land, property, and other interests of the United States. Damage includes but is not limited to fire suppression costs, damage to government improvements covered by this permit, and all costs and damages associated with or resulting from the release or threatened release of a hazardous material occurring during or as a result of activities of the holder or the holder's heirs, assigns, agents, employees, contractors, or lessees on, or related to, the lands, property, and other interests covered by this permit. For purposes of this clause, "hazardous material" shall mean any hazardous substance, pollutant, contaminant, hazardous waste, oil, and/or petroleum product, as those terms are defined under any federal, state, or local law or regulation.

1. The holder shall avoid damaging or contaminating the environment, including but not limited to the soil, vegetation (such as trees, shrubs, and grass), surface water, and groundwater, while conducting commercial hauling under this permit. If the environment or any government property covered by this permit becomes damaged during the holder's use under this permit, the holder shall immediately repair the damage or replace the damaged items to the satisfaction of the responsible official and at no expense to the United States.

2. The holder shall be liable for all injury, loss, or damage, including fire suppression, or other costs in connection with rehabilitation or restoration of natural resources associated with the use authorized by this permit. Compensation shall include but not be limited to the value of resources damaged or destroyed, the costs of restoration, cleanup, or other mitigation, fire suppression or other types of abatement costs, and all administrative, legal (including attorney's fees), and other costs. Such costs may be deducted from a performance bond required under clause III.C.

3. The holder shall be liable for damage caused by use of the holder or the holder's heirs, assigns, agents, employees, contractors, or lessees to all roads and trails of the United States to the same extent as provided under clause V.E.1.

**F. HEALTH, SAFETY, AND ENVIRONMENTAL PROTECTION**. The holder shall promptly abate as completely as possible and in compliance with all applicable laws and regulations any activity or condition arising out of or relating to use of the roads authorized by this permit that causes or threatens to cause a

hazard to public health or the safety of the holder's employees or agents or harm to the environment (including areas of vegetation or timber, fish or other wildlife populations, their habitats, or any other natural resources). The holder shall immediately notify the responsible official of all traffic accidents and any other serious accidents that occur in connection with the authorized use. The responsibility to protect the health and safety of all persons affected by use of the roads authorized by this permit is solely that of the holder. The Forest Service has no duty under the terms of this permit to inspect the roads authorized by this permit or authorized activities of the holder for hazardous conditions or compliance with health and safety standards.

**G. COMPLIANCE WITH ENVIRONMENTAL LAWS.** The holder shall in connection with use of the roads authorized by this permit comply with all applicable federal, state, and local environmental laws and regulations, including but not limited to those established pursuant to the Resource Conservation and Recovery Act, as amended, 42 U.S.C. 6901 *et seq.*, the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 *et seq.*, the Oil Pollution Act, as amended, 33 U.S.C. 2701 *et seq.*, the Clean Air Act, as amended, 42 U.S.C. 7401 *et seq.*, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, 42 U.S.C. 9601 *et seq.*, the Toxic Substances Control Act, as amended, 15 U.S.C. 2601 *et seq.*, the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, 7 U.S.C. 136 *et seq.*, and the Safe Drinking Water Act, as amended, 42 U.S.C. 300f *et seq.*

**H. INDEMNIFICATION OF THE UNITED STATES.** The holder shall indemnify, defend, and hold harmless the United States for any costs, damages, claims, liabilities, and judgments arising from past, present, and future acts or omissions of the holder or the holder's employees, contractors, or subcontractors in connection with use of the roads authorized by this permit. This indemnification provision includes but is not limited to acts and omissions of the holder or the holder's heirs, assigns, agents, employees, or contractors in connection with use of the roads authorized by this permit which result in (1) violations of any laws and regulations which are now or which may in the future become applicable, and including but not limited to those environmental laws listed in clause V.G. of this permit; (2) judgments, claims, demands, penalties, or fees assessed against the United States; (3) costs, expenses, and damages incurred by the United States; or (4) the release or threatened release of any solid waste, hazardous waste, hazardous substance, pollutant, contaminant, oil in any form, or petroleum product into the environment. The responsible official may prescribe terms that allow the holder to replace, repair, restore, or otherwise undertake necessary curative actions to mitigate damages in addition to or as an alternative to monetary indemnification.

#### **I. INSURANCE**

1. The holder or the holder's employees, contractors, or subcontractors shall have in force automobile insurance covering losses associated with the use authorized by this permit in at least the amount of \$100,000 for injury or death to one person, \$300,000 for injury or death to two or more persons, and \$50,000 for property damage. Minimum amounts of coverage and other insurance requirements are subject to change at the sole discretion of the responsible official on the anniversary date of this permit.

2. Any insurance policies obtained by the holder pursuant to this clause shall name the United States as an additional insured, and the additional insured provision shall provide for insurance coverage for the United States as required under clause V.I. The policies also shall specify that the insurance company shall give 30 days prior written notice to the responsible official of cancellation of or any modification to the policies.

3. The holder shall furnish proof of insurance, such as a certificate of insurance, to the responsible official prior to issuance of this permit and each year thereafter that this permit is in effect. The Forest Service reserves the right to review and approve the insurance policy prior to issuance. The holder shall send an authenticated copy of any insurance policy obtained pursuant to clause V.I. to the responsible official immediately upon issuance of the policy. The certificate of insurance, the authenticated copy of the insurance policy, and written notice of cancellation or modification of insurance should be sent to Ferron/Price Ranger District, 599 West Price River Drive, Price Utah, 84501, Attn: Elaine Alexander, telephone (435)-636-3567.

#### **VI. REVOCATION, SUSPENSION, AND TERMINATION**

**A. REVOCATION AND SUSPENSION.** The responsible official may revoke or suspend this permit in whole or in part for:

1. Noncompliance with federal, state, or local law.
2. Noncompliance with the terms of this permit.
3. Abandonment or other failure of the holder to exercise the privileges granted.

Prior to revocation or suspension, other than immediate suspension under clause VI.B, the responsible official shall give the holder written notice of the grounds for revocation or suspension and a reasonable time, typically not to exceed 90 days, to cure any noncompliance. Revocation or suspension of this permit shall not give rise to any claim for damages by the holder against the Forest Service.

**B. IMMEDIATE SUSPENSION.** The responsible official may immediately suspend this permit in whole or in part when necessary to protect public health or safety or the environment. The suspension decision shall be in writing.

**C. TERMINATION.** This permit shall terminate when by its terms a fixed or agreed upon condition, event, or time occurs without any action by the responsible official, such as expiration of the permit by its terms on a specified date or with the consent of the holder. Termination of this permit shall not give rise to any claim for damages by the holder against the Forest Service.

**VII. MISCELLANEOUS PROVISIONS**

**A. MEMBERS OF CONGRESS.** No member of or delegate to Congress or Resident Commissioner shall benefit from this permit either directly or indirectly, except to the extent the authorized use provides a general benefit to a corporation.

**B. CURRENT ADDRESSES.** The holder and the responsible official shall keep each other informed of current mailing addresses, including those necessary for payment of the holder's commensurate or investment share.

**C. SUPERIOR CLAUSES.** If there is a conflict between any of the preceding printed clauses and any of the following clauses, the preceding printed clauses shall control.

**THIS PERMIT IS ACCEPTED SUBJECT TO ALL ITS TERMS AND CONDITIONS.**

**BEFORE ANY PERMIT IS ISSUED TO AN ENTITY, DOCUMENTATION MUST BE PROVIDED TO THE RESPONSIBLE OFFICIAL OF THE AUTHORITY OF THE SIGNATORY FOR THE ENTITY TO BIND IT TO THE TERMS AND CONDITIONS OF THE PERMIT.**

ACCEPTED: *Genwal Resources, Inc*  
*Bruce Hill*

HOLDER NAME, PRECEDED BY NAME AND TITLE OF PERSON SIGNING ON BEHALF OF HOLDER, IF HOLDER IS AN ENTITY	SIGNATURE	DATE
---	-----------	------

APPROVED:

NAME AND TITLE OF RESPONSIBLE OFFICIAL	SIGNATURE	DATE
--	-----------	------

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0596-0016. The time required to complete this information collection is estimated to average 12 hour per response, including the time for reviewing

instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a discrimination complaint write USDA, Director, Office of Civil Rights, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call (800) 975-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

The Privacy Act of 1974 (5 U.S.C. 552a) and the Freedom of Information Act (5 U.S.C. 552) govern the confidentiality to be provided for information received by the Forest Service.

**APPENDIX B**  
**Commensurate Share Calculation**

Recurring Maintenance:

Holder shall perform recurring maintenance on permitted road segments as described in appendix C – attached.

Estimated cost of maintenance of permitted road segments:

		RECURRING MAINTENANCE GRAVEL ROAD W CULVERTS Davis Bacon Wage Rates (155 horsepower grader) 2007 cost guide	
		Genwal - Mine Rescue for 50040, 50145, 50244	
			<u>Gravel w/ Ditch</u> cost/mile
Scarification	Grader & Operator @ 4 hours/mile, typically use 1.3hr/mile  1.3*(63.91+40.90+20.42+21.10)=		190
Blade	Grader, Operator, Laborer and Truck @ 4 hours/mile  4*(63.91+40.90+20.42+21.10)=		585
Pull Ditches	Grader, Operator, Laborer and Truck @ 2 hours/mile  2*(63.91+40.90+20.42+21.10)=		292
Clean Culverts	laborer @ 3hrs/mile  3*(20.42)=		61
\$ Cost per Mile	GRAVEL ROAD W CULVERTS		\$1,129
miles on permit	Agg w/ ditch 50040, 50145, 50244	9.31	\$10,515
			\$10,515
		Mobilization	\$567
	Total		\$11,083

RECURRING MAINTENANCE  
 NATIVE SURFACE WO/DITCH  
 Davis Bacon Wage Rates  
 (155 horsepower grader)  
 2007 cost guide

RECURRING MAINTENANCE OF  
 Genwal - Mine Rescue  
 for 50244 native wo/ ditch

		<u>Native wo/ Ditch</u>
		cost/mile
	Scarification	
	Grader & Operator @ 4 hours/mile, typically - use 2 hr/mile	
	$2*(63.91+40.90+20.42+21.10)=$	293
	Blade	
	Grader, Operator, Laborer and Truck @ 4 hours/mile	
	$4*(63.91+40.90+20.42+21.10)=$	585
	Drain Dip Maintenance	
	Grader, Operator and Truck @ 2 hours/mile	
	$6*(63.91+40.90+21.10)=$	755
\$ Cost per Mile	native wo/ ditch	\$1,633
miles on permit	native wo/ ditch 50244	2.15      \$3,512
		\$3,512
		\$3,512
	Total	\$3,512
	use	<b>\$3,500</b>

Cost basis is Forest Service 2007 cost guide for contracted equipment & labor rates applied to the time per maintenance cycle for the project roads. Does not include costs for work described in APPENDIX C, Recurring Maintenance – items A, D, E, F, G and H.



## APPENDIX C Maintenance Requirements

Provide maintenance as appropriate to ensure safe travel and ensure all culverts have a minimum cover depth of 12-inches. Process the fill material over culverts to provide smooth transition along existing road profile.

### Recurring Maintenance:

Work in lieu of payment for recurring maintenance shall be performed as outlined below.

Road maintenance is defined as the performance of work on the entire road facility commensurate with permittee's use. This work consists of restoration and preservation of surface, shoulders, roadsides, structures, drainage, sight distance, and such traffic control devices as are necessary for prevention of excessive erosion damage to the facility and adjacent lands.

I. Description. Maintenance work to be done currently during the periods of use by the permittee shall include:

- A. Removal of slides and boulders, which obstruct safe sight distance.
- B. Adequate blading and shaping of roadway surfaces, ditches, and grade dips to maintain the original cross-sections.
- C. Removal of earth and debris from ditches and culverts so that the drainage systems will function efficiently at all times.
- D. Prevention of excessive dusting of road surface materials.
- E. Repair of damages to fences, cattleguards, culverts, and other roadway structures including traffic regulatory and directional signs.
- F. Restoration of eroded fills and repair and protection of shoulder berms, berm outlets, stabilized waterways, vegetated slopes, and other erosion control features.

II. Performance. All items of maintenance work shall be done currently as necessary to insure safe, efficient transportation and to protect roads, streams, and adjacent lands from excessive damage. Work shall be done in accordance with the following minimum standards of performance.

- A. Removal of Material. Earth, rocks, trees, brush, and debris removed from roadways and ditches shall not be deposited in stream channels or upon slope stabilization and erosion control features.
- B. During roadway blading and shaping operations, banks shall not be undercut nor shall gravel or other selected surfacing material be bladed off the roadway surface. The original crown or slope of the road shall be preserved. Mud, debris, and oversize material shall be deposited outside the roadway by hand or by careful blading, and these materials shall not be mixed with the road surfacing material.
- C. Ditches, culverts, drop inlets, trash racks, downspouts, and splatter structures shall be kept clear of earth, slash, and other debris so that drainage systems will function efficiently during, and immediately following, periods of road use by permittee. This includes correcting and eliminating causes of erosion or plugging of the structure, and actual repair of the structure and riprap if damaged.
- D. Fugitive dust shall be controlled to prevent hazardous driving conditions or loss of road surface or binder material.
- E. Permittee shall promptly repair all damages, caused by the permittee's operations, to the road surface or to any structures in or adjacent to the roadways. To transport any overweight loads (those that exceed HS-20 loading) will require five (5) days notice prior to transporting on Forest Roads. An inspection of drainage and other structures (bridges, etc.) will be made to determine if the structure can safely accommodate the load.

F. Any washing or settling of roadway fills shall be corrected promptly to prevent additional soil erosion or roadway damage. Shoulder berms, berm outlets, and stabilized waterways shall be protected during road maintenance operations and, if damaged, such structures shall be promptly restored to their original condition, including repair and reseeding of vegetation established to control slope erosion. No earth, rocks, or other debris shall be deposited upon any roadside slope stabilization structure or feature.

(END APPENDIX C)

**ATTACHMENT 15**

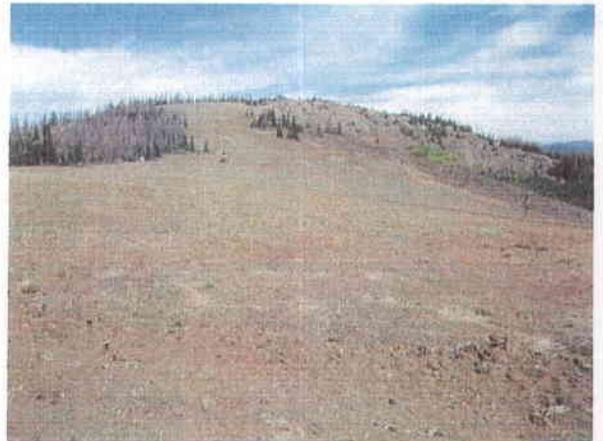
**“Evaluation of the Potential for Adverse Impacts to Hydrologic Resources in the Vicinity of the Crandall Canyon Mine Emergency Mine-Rescue Drillholes”**

**Petersen Hydrologic, LLC**

**Evaluation of the Potential for  
Adverse Impacts to Hydrologic  
Resources in the Vicinity of the  
Genwal Resources, Inc. Crandall  
Canyon Mine Emergency  
Mine-Rescue Drill holes, 2007**

17 December 2007

Utah American Energy, Inc.  
Genwal Mine  
Huntington, Utah



**PETERSEN HYDROLOGIC, LLC**  
CONSULTANTS IN HYDROGEOLOGY

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**Evaluation of the Potential for Adverse Impacts to Hydrologic  
Resources in the Vicinity of the Genwal Resources, Inc. Crandall  
Canyon Mine Emergency Mine-Rescue Drill holes, 2007**

**1.0 Introduction**

The Crandall Canyon Mine is located in the Wasatch Plateau coal field approximately 15 miles northwest of Huntington, Utah (Figure 1). The mine is operated by Utah American Energy, Inc.

On August 6, 2007 a major mine bump/bounce occurred in the Main West pillar section of the mine, trapping six coal miners underground. Access to the trapped miners through the mine workings was not immediately possible because the mine entries were filled with coal and debris emplaced by the mine collapse event. Consequently, it was determined that emergency mine-rescue drill holes would be drilled from the land surface on East Mountain into the underlying mine voids near the likely location of the trapped miners. In the obvious

interest in the preservation of human life, the planning and drilling of the drill holes was expedited to the extent possible. The drilling of the drill holes commenced 7 August 2007, the day following the mine bump/bounce event. The last drill hole (Drill Hole #7) was finished on 30 August 2007. The locations of these drill holes are shown on Figure 2. The first drill hole to penetrate the mine workings (Drill Hole #1) was a small-diameter 2-1/2 inch hole. The first drilled of the 8-7/8 inch drill holes (Drill Hole #2) was cased for mine-rescue purposes. The remaining five 8-7/8 inch drill holes were drilled as rapidly as possible to maximize the chance of a successful mine rescue and, consequently, were not cased but remained as open boreholes.

Upon the suspension of the mine-rescue efforts, the mine-rescue drill holes were prepared to be plugged and abandoned and the drill pads to be reclaimed. The plugging of the drill holes occurred in early November, 2007. Complete plugging of some of the mine-rescue drill holes could not be accomplished because of obstructions and blockages that were present in the drill holes that prevented the continuous emplacement of the hole plugging materials.

The purpose of this investigation is to evaluate the potential for impacts to hydrologic resources in the vicinity of the mine-rescue drill holes that could possibly occur as a result of draining of groundwater through the incompletely plugged drill holes.

Including this introduction, this report contains the following sections:

1. Introduction
2. Methods of Study
3. Presentation of Data
4. Climate
5. Geologic Setting
6. Hydrogeologic Framework
7. Discussion
8. Conclusions
9. References Cited

## 2.0 Methods of Study

- Maps and reports showing the locations, depths, and construction details of the Crandall Canyon Mine drill holes were obtained from Utah American Energy and reviewed.
- A spring and seep verification survey was performed in the Crandall Canyon Mine drill hole and adjacent area. The location and extent of this survey is shown on Figure 2. In this survey, springs and seeps previously identified in spring and seep surveys in the area were visited and discharge rates were measured. GPS locations were also determined for each spring and seep and digital photographs were taken.

During this survey, some additional spring and seep locations were identified in the study area. Monitoring data from these springs and seeps were included in the spring and seep verification survey data (Table 3).

- In conjunction with Genwal Resources' water monitoring plan as approved by the Utah Division of Oil, Gas and Mining, four springs near the drill-hole area are monitored quarterly. These include springs SP1-19, SP1-22, SP1-24, and SP2-24. A supplemental 4<sup>th</sup>-quarter monitoring event was performed at these springs during November 2007.
- The Joes Valley stream drainage west of the drill-hole area was traversed on 9 August 2007. No indications of any adverse impacts related to the drilling activities were observed.
- Video logs of Drill Holes #2 - #7 were obtained from Utah American Energy and reviewed. Estimates of fluid discharge rates in these drill holes were made based on visual observations of the video logs. These discharge estimates were calibrated by comparing the observed drainage in the drill-hole videos to controlled laboratory observations of a continuous stream of water running over an 8.5-inch disk to simulate conditions seen by the down-hole video camera. The flow rate of the continuous stream of water in the laboratory was adjusted until the appearance of the water dripping over the disk was similar to that observed in the drill-hole video. The

flow rate of the continuous stream of water was then measured to obtain the approximate drill-hole fluid drainage rate. It should be noted that in most of the drill holes, the water observed in the video log had a foamy consistency, which made estimations of fluid discharge rate difficult (discharge rates would tend to be overestimated). This fluid of foamy consistency is likely related to the residual drilling foam in the drill hole that originated from drilling operations.

### 3.0 Presentation of Data

Drill-hole information, including hole depth and geologic formations penetrated by the drill holes are presented in Table 1. Drill-hole locations and drilling road locations are shown on Figure 2. The locations of springs and seeps surveyed in the November 2007 spring and seep verification survey, the extent of the survey, and the locations of Genwal's regular quarterly water monitoring sites in the vicinity of the drill holes are also shown on Figure 2. Water monitoring results for 2006-2007 monitoring at the four regular spring monitoring sites in the area are presented in Table 2. Regular quarterly monitoring at spring sites SP1-19, 1-22, and 1-24 includes discharge measurements and measurements of field water quality parameters. Additionally, monitoring at spring SP2-24 includes laboratory chemical measurements. Historical discharge and water quality data for Genwal's quarterly water monitoring sites are available on-line at the Utah Division of Oil, Gas and Mining on-line hydrology database

(UDOGM, 2007). Discharge hydrographs for the four Genwal spring quarterly monitoring sites near the drill hole locations are presented in Figures 4, 5, 6, and 7.

The results of the November 2007 spring and seep verification survey, including spring and seep locations and discharge rates are presented in Table 3. Estimates of fluid discharge rates as observed in video logs of the mine-rescue drill holes shortly after drilling are presented in Table 4.

#### 4.0 Climate

Precipitation at the Crandall Canyon Mine averages about 20 inches annually (UDOGM, 2005). A plot of the Palmer Hydrologic Drought Index for Utah Region 4 (which includes the Crandall Canyon Mine area) is shown on Figure 3. The PHDI is a monthly value generated by the National Climatic Data Center (NCDC, 2007) that indicates the severity of a wet or dry spell. The PHDI is calculated from climatic and hydrologic parameters such as temperature, precipitation, evapotranspiration, soil water recharge, soil water loss, and runoff. Because the PHDI takes into account parameters that affect the balance between moisture supply and moisture demand, the index is a useful tool for evaluating the long-term relationship between climate and groundwater recharge and discharge. Consequently, it is a useful tool for determining whether changes in discharge in a spring or water levels in a well are related to climate or other factors.

It is apparent in Figure 3 that climatic conditions in 2006 were continuously wetter than normal with the region in a mild to moderate wet spell. Beginning in early 2007 the region transitioned to dryer climatic conditions, with the region experiencing a period of mild to moderate drought beginning in March 2007 and continuing through November 2007.

## 5.0 Geologic Setting

The bedrock geologic formations penetrated by the Crandall Canyon Mine drill holes include the Blackhawk Formation, Castlegate Sandstone, Price River Formation, and the North Horn Formation. These formations are described in Genwal Resources Mining and Reclamation Plan (Genwal MRP) and are briefly described below.

### *Blackhawk Formation*

The Blackhawk Formation consists of lenticular, discontinuous beds of sandstone, mudstone, and shale. The formation also contains the economic coals seams present in the Crandall Canyon Mine area. Individual rock layers in the Blackhawk Formation are generally not laterally continuous and cannot be traced over significant distances. The formation consists of an upper non-marine, suspended-load fluvial portion and a lower marine shoreface and non-marine foreshore portion. Sandstone paleochannels are present in the Blackhawk Formation that are isolated both vertically and horizontally by mud-rich overbank and

interfluvial rocks. The Blackhawk Formation ranges from 600 to 700 feet in thickness in the mine area. The Hiawatha Coal Seam, in which the Crandall Canyon Mine workings are located, is situated near the base of the formation, directly on or just above the Spring Canyon member of the Star Point Sandstone (UDOGM, 2005).

### ***Castlegate Sandstone***

The Castlegate Sandstone overlies the Blackhawk Formation and forms highly resistant cliffs above the less resistant Blackhawk Formation. The Castlegate Sandstone was deposited by a braided fluvial system and is made up of coarse-grained, often conglomeratic, fluvial sandstone with some thin interbeds of siltstone and claystone, especially toward the base of the unit. The existence of mudstone drapes and pervasive carbonate and silica cement greatly reduces the overall permeability of the sandstone. The formation ranges from 150 to 250 feet thick in the Genwal permit area (Danielson and Sylla, 1983).

### ***Price River Formation***

The Price River Formation overlies the Castlegate Sandstone and consists of sandstone with interbedded shale and some conglomerate. The formation typically forms alternating ledges and slopes that result from the interbedded resistant and non-resistant rock layers.

Approximately equal portions of sandstone and mudstone appear in the Price River Formation. Large point bars indicate a mixed load system. Periods of low flow created mudstone drapes that separate individual sandstone layers both vertically and horizontally. The Price River Formation ranges in thickness from about 600 to 700 feet in the area.

### *North Horn Formation*

The North Horn Formation overlies the Price River Formation and is composed primarily of shale with thin interbeds of sandstone, limestone, and conglomerate. It typically forms steep slopes on the upper surfaces of the Wasatch Plateau. Lenticular sandstone channels exist throughout the formation. The lower two-thirds of the formation consists primarily of bentonitic mudstones. The North Horn Formation was deposited in an alluvial-plain/suspended-load fluvial channel environment. In such environments, layers of mud are more abundant than layers of sands, which occur in sandstone channels. The sandstone channels are generally isolated from each other both laterally and vertically by mud-rich overbank and interfluvial rocks. The thickness of the North Horn Formation in the vicinity of the Crandall Canyon Mine ranges from 750 to 800 feet.

### *Alluvium*

Unconsolidated quaternary colluvium, alluvium, and soils are present at the surface over most of the vicinity near the Crandall Canyon Mine drill holes. Alluvial deposits are especially prominent along the base of East Mountain in Joes Valley (UDOGM, 2005).

### *Structure*

Rock layers in the vicinity of the Crandall Canyon Mine drill holes dip gently to the west at less than 5 degrees. The dip of the rocks is controlled by an approximately north-south

trending anticline which runs through the western portion of the mine permit area (UDOGM, 2005).

The Crandall Canyon Mine drill-hole area is situated on the steep, western margins of East Mountain, an upland area which rises to more than 10,500 feet immediately east of the drill-hole area (Figure 2). The steep western escarpment of East Mountain is related to the Joes Valley Fault zone. The Joes Valley Fault zone is a north-south trending major structural feature which is about 80 miles long. Offset on the fault is up to 2,500 feet (Danielson and Sylla, 1983). The Crandall Canyon Mine underground workings terminate east of the Joes Valley Fault zone, as the coal seam west of the fault has been down-dropped a large distance beneath Joes Valley. Several faults with much smaller offsets synthetic to the Joes Valley Fault were encountered in the underground mine workings east of the Joes Valley Fault.

Joes Valley is a broad, flat-bottomed alluvial valley situated below East Mountain west of the Joes Valley Fault zone.

## 6.0 Hydrogeologic Framework

The heterogeneity of the geologic formations in the Crandall Canyon Mine area has a profound effect on the nature of groundwater recharge, groundwater flowpaths, and groundwater discharge mechanisms. Because of the lenticular, discontinuous nature of

permeable rock strata in the area, regional-type groundwater systems generally do not form in the vicinity of the mine. As stated in the East Mountain Cumulative Hydrologic Impact Assessment (CHIA; UDOGM, 2005): *“In the Blackhawk, Price River, and North Horn Formations, higher permeability sandstones occur as lenticular and tabular channel and overbank deposits within a lower permeability claystone and siltstone matrix. The sandstones are laterally and vertically discontinuous and pinch-out over short distances, and individual sandstone units are poorly interconnected, isolated by the claystones and siltstones. However, these sandstones, especially where fractured, can produce significant ground-water flows from local systems”*. Also stated in the East Mountain CHIA: *“Lateral and vertical variations in these characteristics can create internal low-permeability zones or barriers, so that a unit that to the eye appears to be very uniform and to have aquifer characteristics can actually be incapable of storing or transporting water in any significant amount. Such vertical and lateral inhomogeneities are common within sandstone units of the Blackhawk and Price River Formations and in the Star Point Sandstone.”* And also from the East Mountain CHIA *“Although there are local perched and fracture-related aquifers at East Mountain, the quality, quantity, use, storage, flow and transport, and discharge of ground water do not indicate the presence of a regional aquifer or aquifer system”*. Similar statements are present in Genwal Resources’ statement of Probable Hydrologic Consequences of coal mining for the Crandall Canyon No. 1 Mine (Genwal Resources PHC).

The marked seasonal and climatic variability in spring discharge rates suggest primarily shallow, seasonal recharge mechanisms for these springs. Spring discharge originating from

deep circulation within the bedrock of East Mountain is uncommon. As stated in the East Mountain CHIA: *“Springs associated with perched water-bearing units generally exhibit their highest flow during or immediately after snowmelt and recede to a baseflow condition or cease flowing by late summer or fall. Such rapid response indicates that the springs are close to their recharge sources and the systems are local rather than regional. Flow from these perched systems is often associated with fractures.”*

Also of significance to this investigation is the fact that much of the bedrock sequence in the Wasatch Plateau area contains appreciable quantities of swelling clays that have the ability to heal fractures. As indicated in the East Mountain CHIA: *“The interbedded claystones, siltstones, and sandstones of the Wasatch Plateau are rich in swelling clay minerals of the montmorillonite or smectite group. Swelling clays absorb water to expand to as much as 150 percent of their dry volume. These swelling clays reduce the hydraulic conductivity of the rock or soil that contains them and contribute to the rapid closing or healing of tension fractures that result from subsidence”*. Similar statements are present in Genwal Resources’ statement of Probable Hydrologic Consequences of coal mining for the Crandall Canyon No. 1 Mine (Genwal Resources PHC).

Anecdotal information from drillers familiar with drilling conditions in the region indicates that drill holes in the Blackhawk Formation are unstable and slough badly after several days if left uncased.

It is also important to note that the areas adjacent to the Main West pillar section had undergone considerable subsidence prior to the mine bump/bounce of August 2007. Mining of longwall panel blocks both to the north and to the south of the Main West pillar section area have resulted in measured subsidence on the order of 6 to 8 feet in these areas (Personal communication, Dave Shaver, 2007).

Mine personnel indicate that there was no appreciable water being made underground in the active mining areas immediately prior to the mine bump/bounce event (Gary Peacock, Superintendent, Crandall Canyon Mine, 2007). This observation supports the conclusion that there was no appreciable flow of groundwater from strata overlying the active mining area into the mine workings prior to the mine bounce/bump event (which was after the subsidence of the surrounding areas resulting from previous longwall mining operations in the area had occurred).

Discussions with personnel present during the drilling of the mine-rescue boreholes indicate that appreciable water gains were not observed during the drilling process (Dave Canning, Utah American Energy). During the drilling of the holes, drilling fluids were pumped from mud pits at the drilling site down the drill hole and then circulated back to the surface to facilitate the removal of the drill cuttings from the borehole. Commonly, when zones of appreciable water inflow are encountered during a drilling operation, the volume of fluid in the mud pit will increase as a result of groundwater from the formation entering the borehole and being circulated to the surface. That no such occurrence was noted during the drilling of

the Crandall Canyon Mine drill holes suggests that no substantial groundwater inflows occurred during drilling (although the possibility that minor inflows of groundwater may have occurred cannot be excluded). It is also noteworthy that the drilling fluid/foam used during drilling of the drill holes was clearly evident in the video logs of most of the drill holes, suggesting that at least some of the fluid observed in the drill hole video logs may have been residual drilling fluid draining from the recently drilled boreholes rather than groundwater from the surrounding rock formations.

## 7.0 Discussion

As described above, groundwater aquifers, in the traditional sense, do not occur in the vicinity of the Crandall Canyon Mine drill holes. Rather, groundwater systems that support springs and seeps in the vicinity of the drill holes are predominantly shallow, local systems that are recharged seasonally by the springtime snowmelt event. Springs and seeps that are sourced from groundwater systems that circulate deeply through the core of the East Mountain are probably absent in the area of the drill holes.

It should also be noted that, prior to the occurrence of the mine collapse, the rock strata overlying adjacent longwall mined areas were not in an undisturbed condition. Longwall mining, with its associated ground subsidence, had occurred in large areas both north and

south of the Main West pillar area several years prior to the mine bump/bounce event. Perched groundwaters in sandstone paleochannels in the mine roof areas overlying longwall panels (within the zone of upward propagation of appreciable cracking/caving) were likely dewatered at that time. The maximum upward extent of the zone of caving/fracturing is commonly estimated by the Utah Division of Oil, Gas and Mining to be about 50 times the coal extraction height (UDOGM, 2005) or about 400 feet in longwall mined areas near the West Main pillar area. The rock strata in the area may have been further disturbed as a result of the considerable ground-shaking events that occurred at the time of and in the aftermath of the mine bump/bounce event(s).

The rates of fluid discharge observed in the drill holes were meager. In total, at most a combined discharge of only a few gallons per minute was observed in the drill holes (Table 4). This quantity of fluid drainage, when evaluated in light of the many tens of millions of cubic yards of materials that make up the rock strata overlying the mine area in the immediate vicinity of the drill holes, seems of minor significance. Additionally, a substantial portion of the water observed in the drill hole video logs may possibly have been residual drilling fluid slowly draining from the many hundreds of linear feet of well bore shortly after drilling was completed (a possibility supported by the foamy consistency of some of the observed fluids in the drill holes). It is probable that the groundwater component of the fluid discharge rates observed in video logs of recently drilled boreholes will also decline over time. Due to the partitioning of permeable horizons in the deep rock strata, where groundwater in such partitions may have been intercepted by the drill holes, discharge from

these strata would be expected to gradually decline because the permeable stratum are likely not in good hydraulic communication with recharge sources.

Because of the general tendency of open boreholes drilled in the rock strata of the Wasatch Plateau to slough over time, and because of the presence of appreciable quantities of swelling clays in rocks surrounding the boreholes, the probability of the drill holes effectively sealing themselves naturally over time seems high. Indeed, the fact that the mine-rescue drill holes had already begun to close-in by the time the time of the well plugging seems to support this conclusion.

Based on the discharge rates and water quality parameters measured at the four quarterly water monitoring spring sites subsequent to the mine collapse event, there is no indication of diminution of groundwater discharge from the springs or a degradation of groundwater quality at the springs that could be attributed to the presence of the partially plugged drill holes. The lower discharge rates measured at these four springs during 2007 relative to 2006 are most likely attributable to the drier climatic conditions the region experienced in 2007 relative to 2006 as reflected in the plot of the PHDI (Figure 3). (Similar trends in spring discharge rates in 2006 and 2007 are evident in spring discharge rates measured elsewhere by the author in other locations in the Wasatch Plateau coal district.) Continued monitoring of the four quarterly spring monitoring sites near the drill hole locations will be performed during 2008 to verify this conclusion.

## 8.0 Conclusions

It is my professional opinion that the presence of the Crandall Canyon Mine mine-rescue drill holes in their current state of abandonment will likely not result in any significant detrimental impacts to groundwater resources in the vicinity of the drill holes.

## 9.0 References Cited

Danielson, T.W., and Sylla, D.A., 1983, Hydrology of coal-resource areas in southern Wasatch Plateau, Central Utah: USGS Water Resources Investigations Report 82-4009.

Genwal Resources, Inc., Mining and Reclamation Plan, Crandall Canyon No. 1 Mine.

Genwal Resources, Inc., Probable Hydrologic Consequences Determination for Crandall Canyon No. 1 Mine.

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Utah Division of Oil, Gas and Mining, 2007, On-line hydrology database: <http://ogm.utah.gov/coal/edi/wqdb.htm>

Utah Division of Oil, Gas and Mining, 2005, East Mountain Cumulative Hydrologic Impact Assessment (CHIA).



Figure 1 Location of the Genwal Resources, Inc. Crandall Canyon Mine.

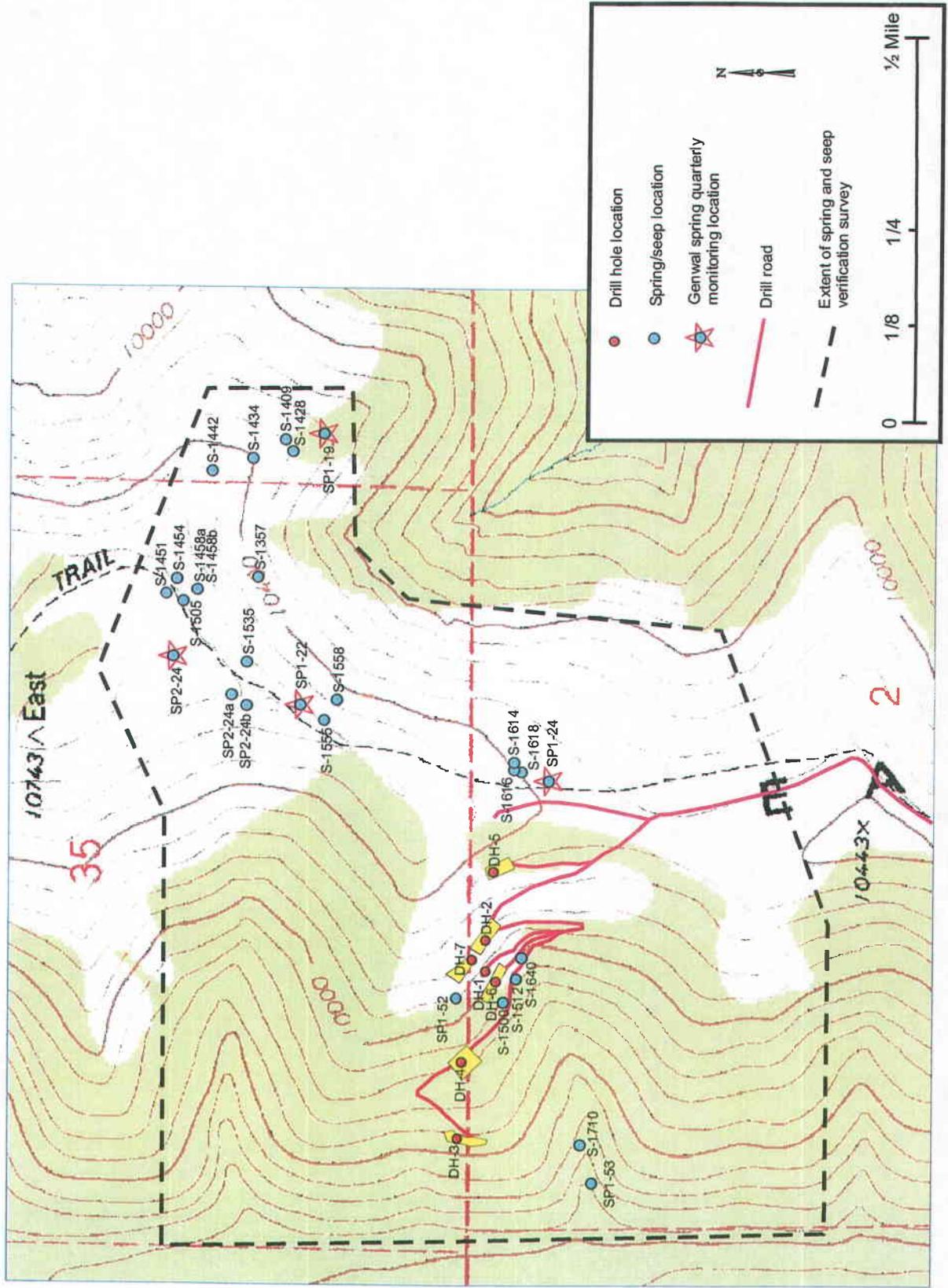


Figure 2 Locations of Genwal drill holes and springs and seeps in the vicinity.

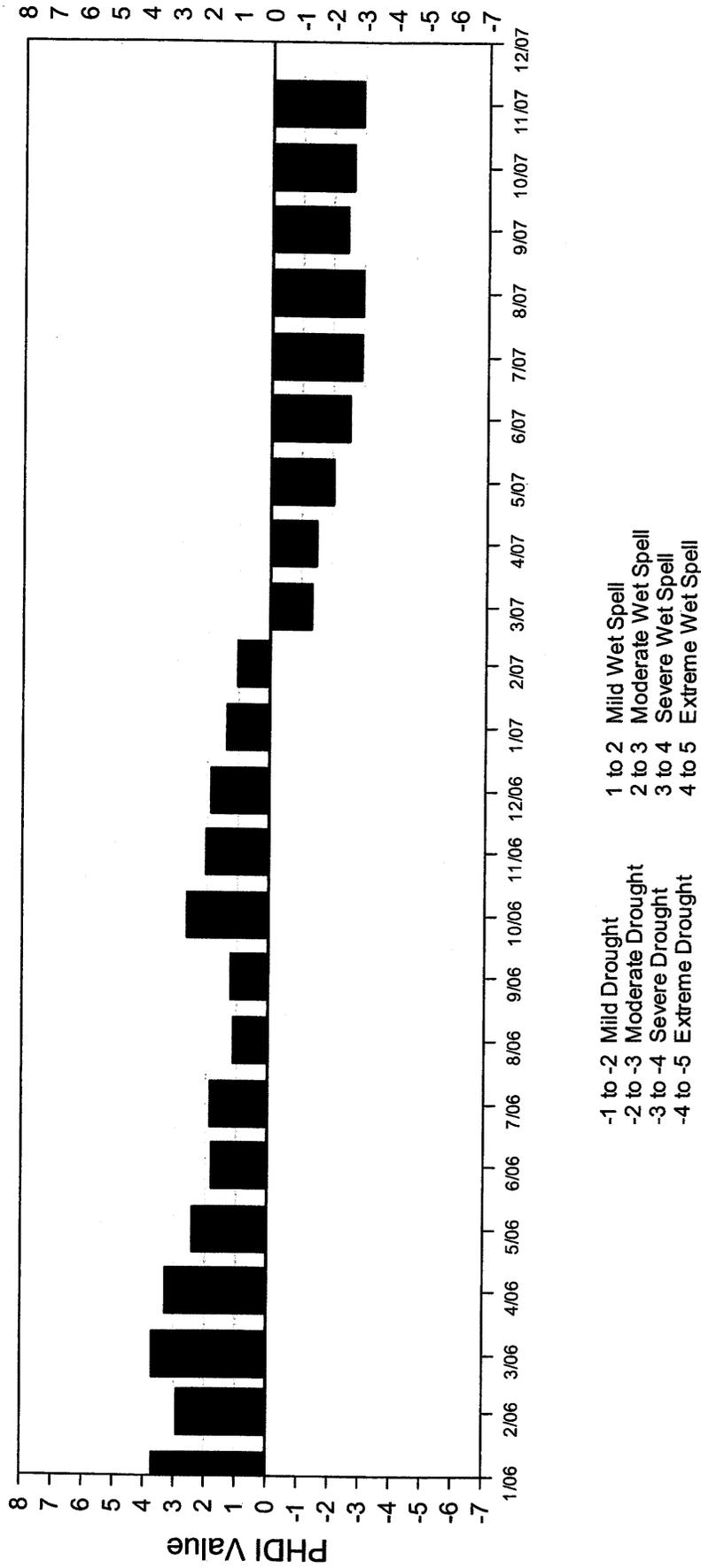


Figure 3 Plot of Palmer Hydrologic Drought Index for Utah Region 4.

# SP1-19

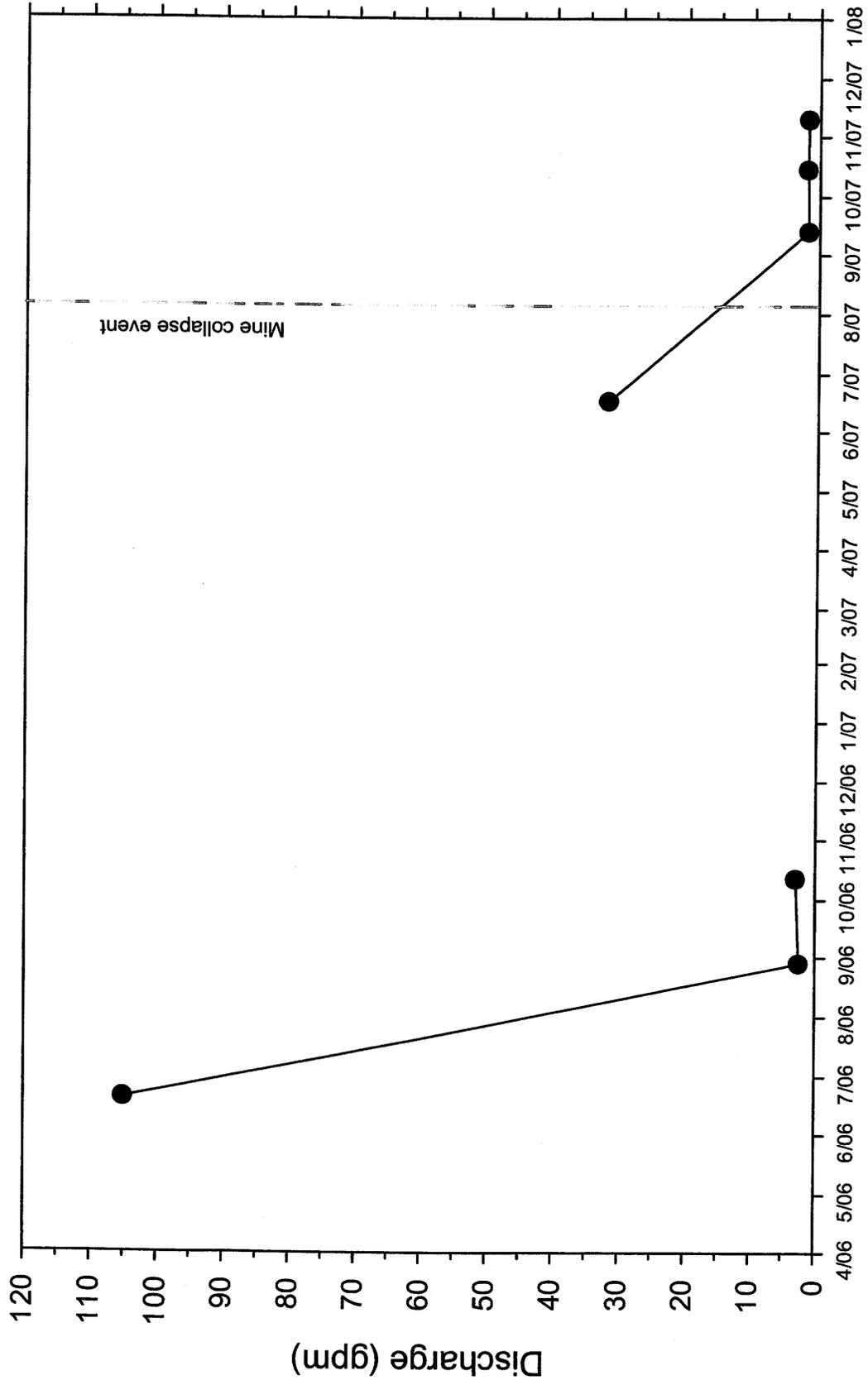


Figure 4 Discharge hydrograph for spring SP1-19, 2006-2007 (see Figure 2 for spring location).

# SP1-22

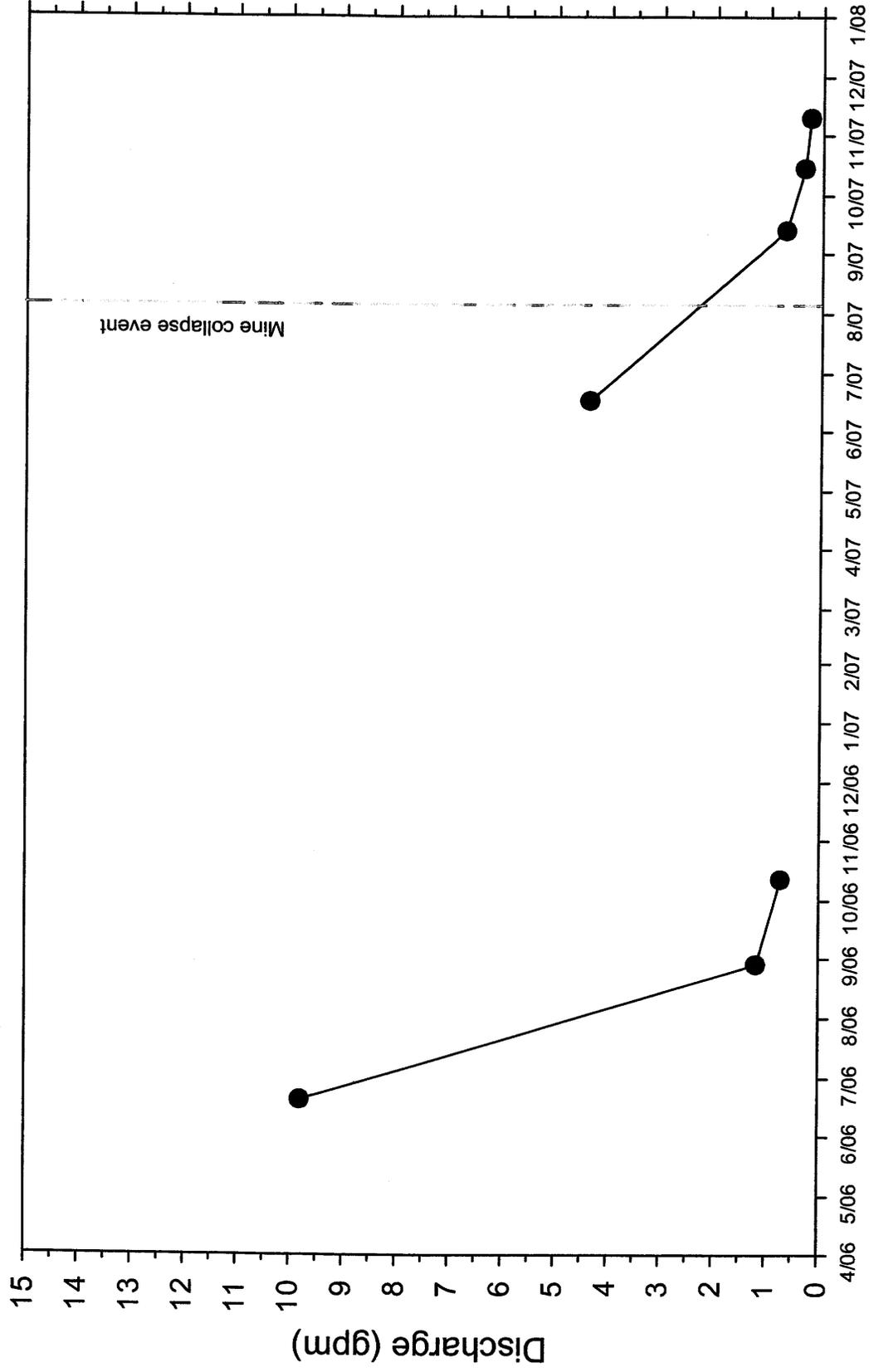


Figure 5 Discharge hydrograph for spring SP1-22, 2006-2007 (see Figure 2 for spring location).

# SP1-24

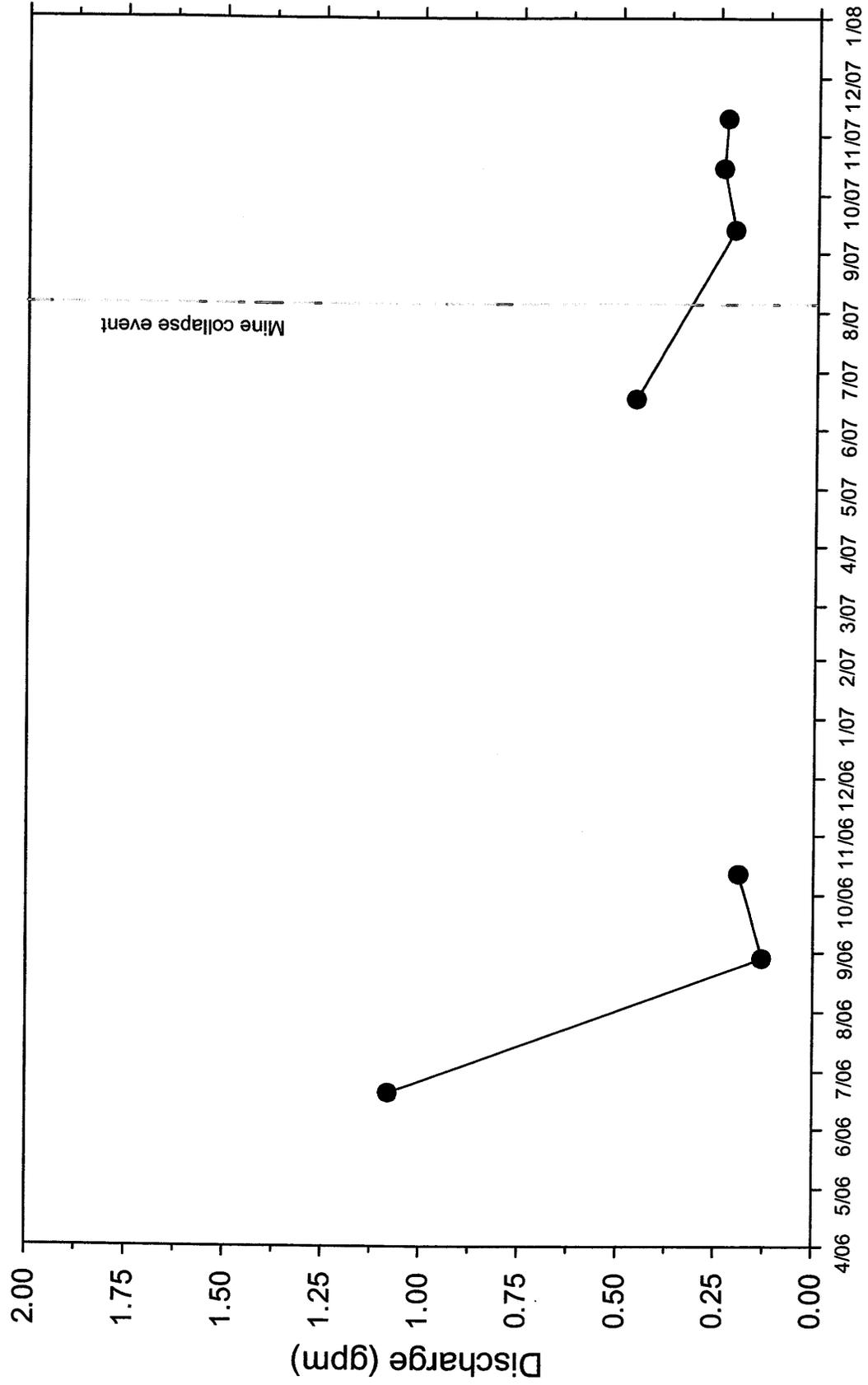


Figure 6 Discharge hydrograph for spring SP1-24, 2006-2007 (see Figure 2 for spring location).

# SP2-24

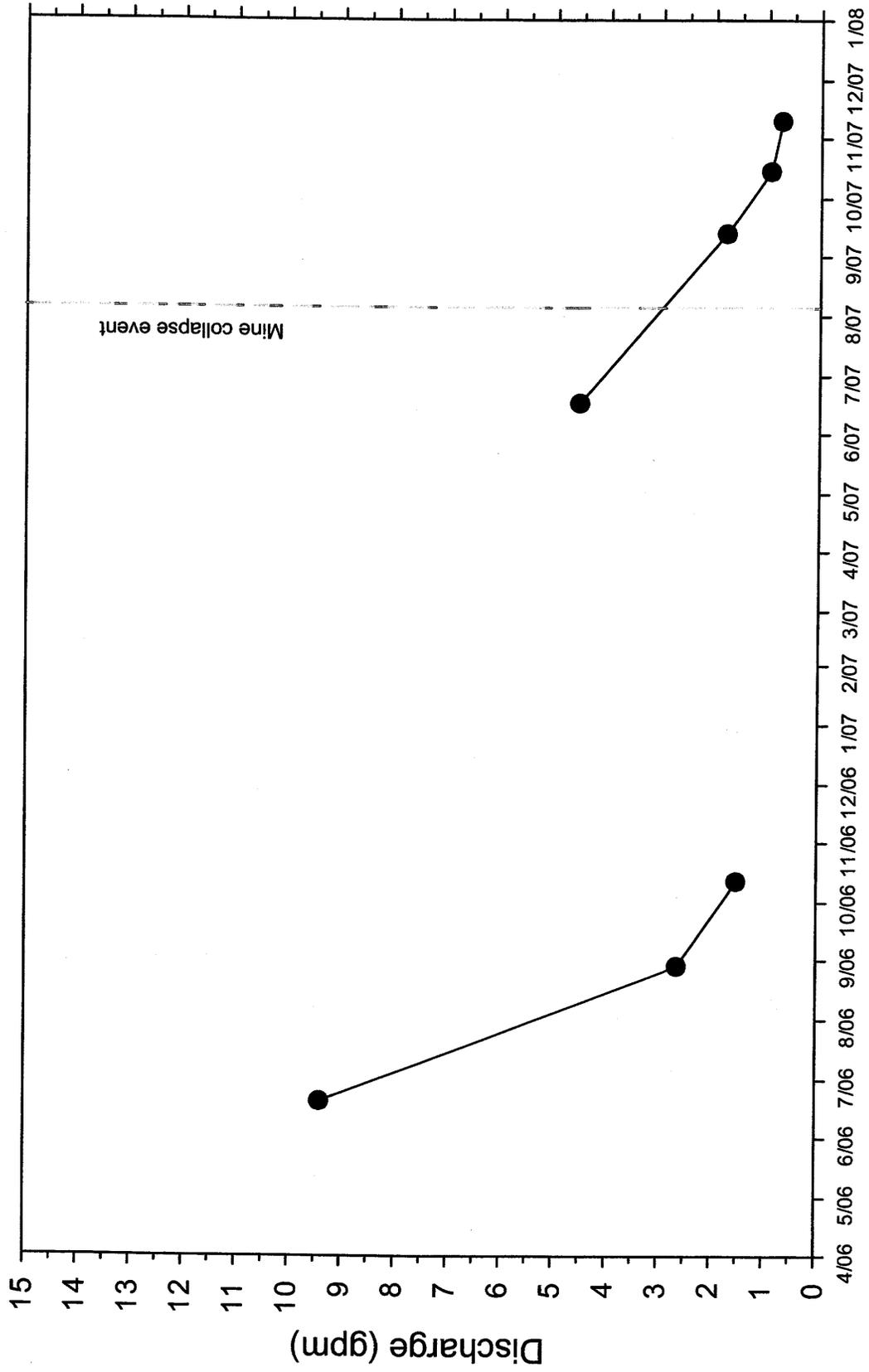


Figure 7 Discharge hydrograph for spring SP2-24, 2006-2007 (see Figure 2 for spring location).

**Table 1 Genwal drill hole information.**

PETERSEN HYDROLOGIC, LLC

	Date drilling started	Borehole diameter (inches)	Depth (feet)	Geologic formations penetrated
Drill hole #1	8/7/2007	2-1/2"	1,871	North Horn, Price River, Castlegate, Blackhawk
Drill hole #2	8/8/2007	8-7/8"	1,866	North Horn, Price River, Castlegate, Blackhawk
Drill hole #3	8/13/2007	8-7/8"	1,414	Price River, Castlegate, Blackhawk
Drill hole #4	8/16/2007	8-7/8"	1,587	North Horn, Price River, Castlegate, Blackhawk
Drill hole #5	8/19/2007	8-7/8"	2,033	North Horn, Price River, Castlegate, Blackhawk
Drill hole #6	8/23/2007	8-7/8"	1,783	North Horn, Price River, Castlegate, Blackhawk
Drill hole #7	8/28/2007	8-7/8"	1,865	North Horn, Price River, Castlegate, Blackhawk

**Table 2 Results of hydrologic monitoring at Genwal's Crandall Canyon Mine; 2006-20**

PETERSEN HYDROLOGIC, LLC

	Date	Flow (gpm)	T (°C)	pH (S.U.)	Cond (µs/cm)	
SP1-19	6/20/2006	105	4.3	7.95	402	
SP1-19	8/29/2006	2.45	6.6	7.98	445	
SP1-19	10/12/2006	2.97	6.1	7.89	451	
SP1-19	6/17/2007	32	4.3	7.85	432	
SP1-19	9/13/2007	1.64	7.6	7.42	462	Post mine collapse
SP1-19	10/15/2007	1.78	6.5	7.85	437	Post mine collapse
SP1-19	11/10/2007	1.67	5.7	7.64	423	Post mine collapse
SP1-22	6/20/2006	9.8	9.8	8.01	298	
SP1-22	8/29/2006	1.18	6.7	7.93	334	
SP1-22	10/12/2006	0.72	6.1	7.72	335	
SP1-22	6/17/2007	4.38	4.7	8.06	311	
SP1-22	9/13/2007	0.68	8.2	7.63	348	Post mine collapse
SP1-22	10/15/2007	0.34	7.5	8.12	316	Post mine collapse
SP1-22	11/10/2007	0.23	7.5	8.02	308	Post mine collapse
SP1-24	6/20/2006	1.08	6.2	7.97	399	
SP1-24	8/29/2006	0.13	12.8	7.98	419	
SP1-24	10/12/2006	0.19	7.1	7.96	413	
SP1-24	6/17/2007	0.46	8.7	8.06	417	
SP1-24	9/13/2007	0.21	11.9	7.67	432	Post mine collapse
SP1-24	10/15/2007	0.24	9.2	7.94	399	Post mine collapse
SP1-24	11/10/2007	0.23	6.1	7.97	364	Post mine collapse
SP2-24	6/20/2006	9.4	3	8.03	328	
SP2-24	8/29/2006	2.64	4.1	7.88	374	
SP2-24	10/12/2006	1.52	4.4	7.86	363	
SP2-24	6/17/2007	4.55	3.1	8.11	349	
SP2-24	9/13/2007	1.78	4.9	7.69	392	Post mine collapse
SP2-24	10/15/2007	0.95	5.1	8.07	343	Post mine collapse
SP2-24	11/10/2007	0.74	5.1	7.99	329	Post mine collapse

**Table 3 Results of November 2007 spring and seep verification survey.**

PETERSEN HYDROLOGIC, LLC

Spring/Seep	Date	UTM, NAD 27	Q (gpm)	Comments
S-1357	10-Nov-07	481744 4368892	0.64	
S-1409	10-Nov-07	482039 4368846	1.42	
S-1428	10-Nov-07	482017 4368821	0.27	
S-1434	10-Nov-07	482002 4368893	0.22	
S-1442	10-Nov-07	481969 4368985	0.48	
S-1451	10-Nov-07	481715 4369086	Dry	
S-1454	10-Nov-07	481757 4369051	<0.05	
S-1458a	10-Nov-07	481720 4369030	0.16	
S-1458b	10-Nov-07	481720 4369036	0.08	
S-1500	17-Nov-07	480847 4368388	0.11	Seepage in drill hole road cut
S-1505	10-Nov-07	481701 4369053	0.50	
S-1512	17-Nov-07	480905 4368351	0.18	Seepage in drill hole road cut
S-1535	10-Nov-07	481561 4368906	<0.05	
S-1555	10-Nov-07	481447 4368753	0.45	
S-1558	10-Nov-07	481516 4368759	0.69	
S-1614	10-Nov-07	481388 4368381	<0.05	
S-1616	10-Nov-07	481378 4368384	Dry	
S-1618	10-Nov-07	481360 4368358	0.60	
S-1640	10-Nov-07	480957 4368334	seep	
S-1710	10-Nov-07	480646 4368219	0.11	
SP1-19	10-Nov-07	482052 4368761	1.67	
SP1-22	10-Nov-07	481483 4368814	0.23	
SP1-24	10-Nov-07	481326 4368281	0.23	
SP1-52	17-Nov-07	481326 4368281	Dry	Dry/not found, area all dry
SP1-53	10-Nov-07	480476 4368190	Dry	Dry/not found, area all dry
SP2-24	10-Nov-07	481614 4369055	0.74	
SP2-24a	10-Nov-07	481502 4368944	Dry	Dry/not found, area all dry
SP2-24b	10-Nov-07	481481 4368915	Dry	Dry/not found, area all dry

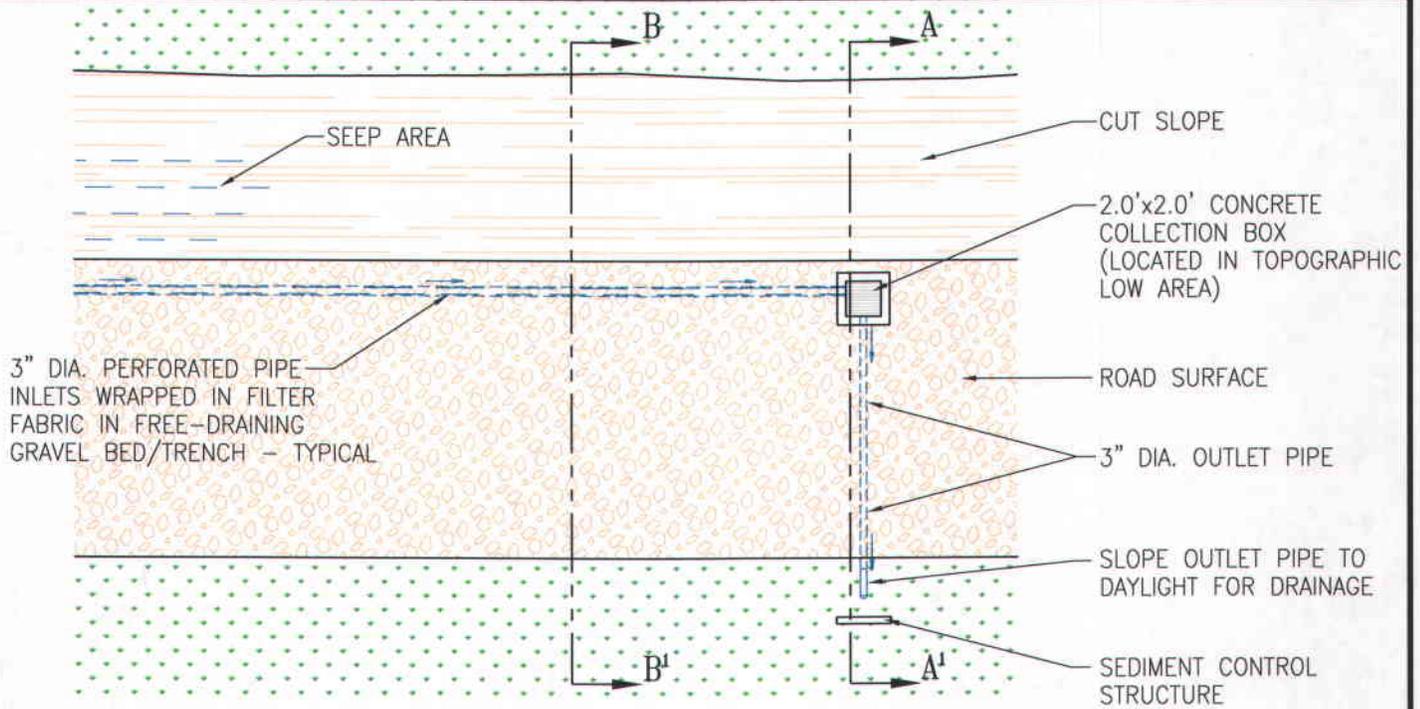
Seepage in drill hole road cut; some small puddles, no visible flow

**Table 4 Estimated rates of fluid discharge in Genwal mine-rescue drill holes based on video log observation.**  
 PETERSEN HYDROLOGIC, LLC

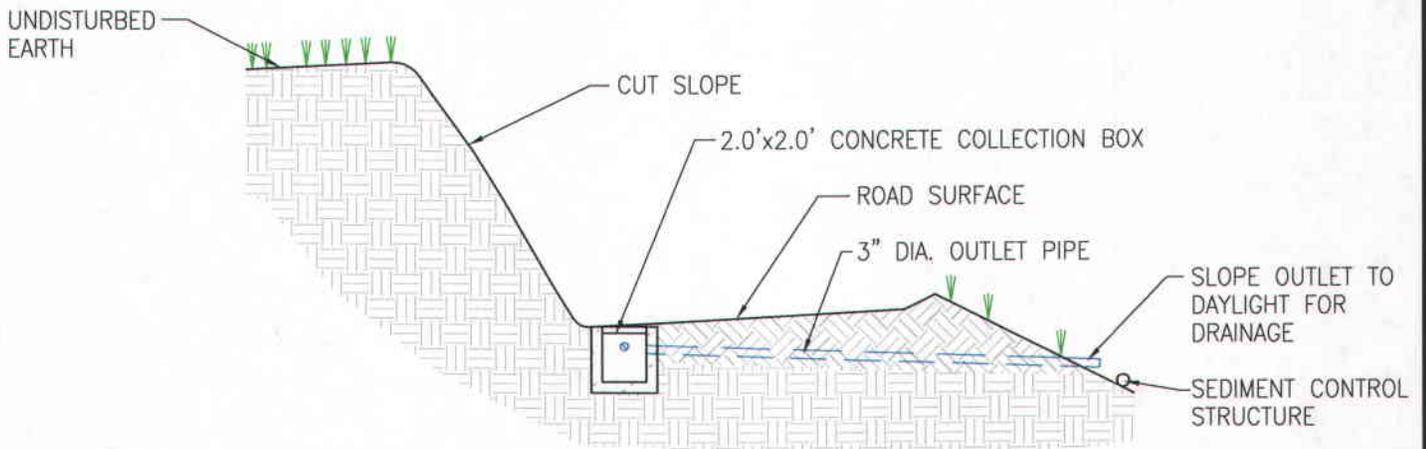
	Estimated fluid discharge rate (gpm)	Comments
DH-1	---	Hole not video recorded
DH-2	0.25	Well is cased, minimal water is somewhat foamy, lower discharge apparent in later video recordings
DH-3	2	Fluid in drill hole is foamy, difficult to estimate discharge because of foam
DH-4	0.5	Fluid in drill hole is foamy, difficult to estimate discharge because of foam
DH-5	0.25*	*Incomplete video log, drill hole is blocked at 510 feet, no video data below this point
DH-6	1	Hole is sloughing appreciably, fluid has filled the drill hole to about 1,689 feet
DH-7	1.5	Hole is sloughing appreciably, poor viewing conditions in hole, difficult to estimate discharge, fluid is foamy

**ATTACHMENT 16**

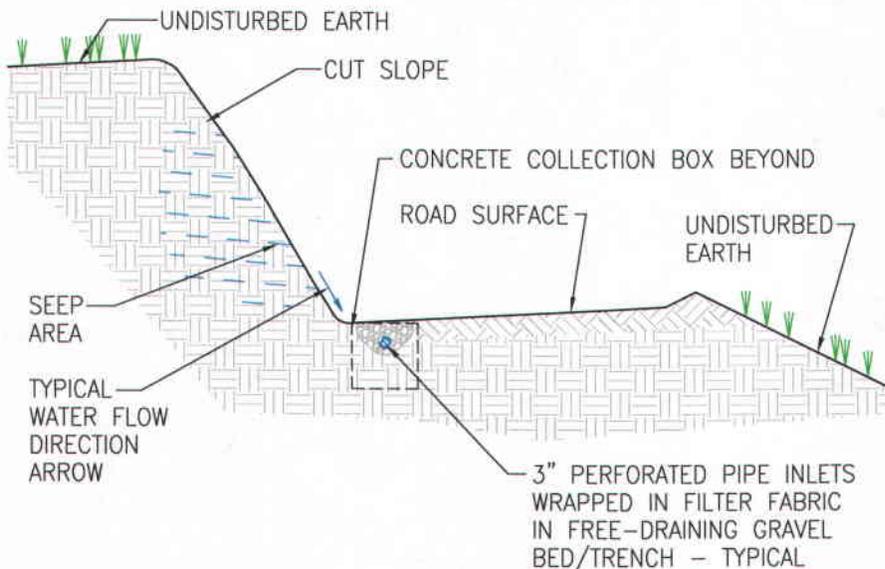
**TYPICAL SEEP COLLECTION SYSTEM  
SITLA ROAD**



TYPICAL SEEP COLLECTION - PLAN VIEW



TYPICAL SEEP COLLECTION - SECTION A<sup>1</sup>-A



TYPICAL SEEP COLLECTION - SECTION B<sup>1</sup>-B

**EAST MOUNTAIN  
EMERGENCY DRILL PADS**

**Crandall Canyon Mines**

**Crandall Canyon**

P.O. BOX 1077  
PRICE, UTAH

MSHA ID #42-01715

DRAWN BY	PJ	SCALE	NO SCALE
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APPROVED BY	DS	DATE	26 JUNE 2008
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SHEET		PLATE #1 of 1
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G:\Shared\Current Drawings\Map\Crandall Canyon\Accident Reclamation\Drain Field.dwg, Drain Field, 7/8/2008 12:58:11 PM

**ATTACHMENT 17**

**SLOPE STABILITY ANALYSIS  
(BLACKHAWK ENGINEERING)**

**STABILITY ANALYSIS**  
**FOR**  
**EAST MOUNTAIN EMERGENCY DRILLING**  
**PAD & ROAD RECLAMATION**

PREPARED BY: DAN W. GUY, P.E.  
BLACKHAWK ENGINEERING, INC.  
JUNE 2008



## Introduction:

This report is an evaluation of the expected factors of safety based on probable reclaimed sections on the East Mountain Emergency Drilling pads and road reclamation. Reclaimed sections were evaluated at slopes of 2H:1V and 1.5H:1V to determine the maximum slope height at which a minimum factor of safety of 1.30 could be achieved.

## Procedure:

Soil characteristics for the reclaimed areas have been estimated based on similar areas which have been sampled and analyzed for stability. Three areas were used to develop an average set of soil parameters:

- (1) Sweet's Pond in Gordon Creek
- (2) Gordon Creek No. 7 Mine Highwall
- (3) West Ridge Mine Highwall

All of these sites are in the Blackhawk Formation with characteristics very similar to the proposed drilling reclamation.

The soil density, cohesion and internal friction angles for these 3 sites were averaged to develop a conservative typical soil analyses for the proposed reclamation. These average parameters were then used in the safety factor calculations for the 2 slope angles.

## Calculations:

Stability calculations were performed using the Hoek Method from Rock Slope Engineering. Under this method, stability projections can be made using soil characteristics such as density, cohesion and internal friction angle, as well as proposed slope height. This information can then be plotted on the provided circular failure charts to determine factors of safety for both Dry and Saturated Conditions.

The Hoeck Method for stability analyses was selected for the following reasons:

- (1) This method provides for a "worst-case" scenario by using a circular failure prediction based on the total height of the slope, although the actual failure surface would be considerably smaller due to the presence of some rock layers in the section;

- (2) The proposed reclaimed slopes are comparable to other reclaimed slopes in this area that have been designed, approved and successfully reclaimed based on the Hoek Method of stability analyses.

As mentioned above, the average density, cohesion and internal friction angle of the proposed backfill material were taken from 3 separate soil samples taken in similar conditions.

Slope heights and angles were estimated from Attachment 13 of the Addendum to the Reclamation Plan for the East Mountain Emergency Drill Pads - Task #2893. These numbers were then applied to the equations on the Circular Failure Charts No. 1 and No. 5 to determine the Static Safety Factor for Dry and Saturated Conditions, respectively (Figures 1 and 2).

Based on the proposed soil characteristics and slope angles, a factor of safety of 1.31 for saturated conditions and 1.93 for dry conditions can be achieved for slopes of 1.5H:1V (33.69°) up to 80' in height and for slopes of 2H:1V (26.57°) up to 150' in height. The proposed reclamation of 30° slope angle and 38' slope height have a factor of safety of 2.74 for dry conditions and 2.05 for saturated conditions.

Summary:

Calculations show the required 1.30 safety factor can be achieved for reclaimed slopes as steep as 1.5H:1V (33.60°) up to 80' in height and for 2H:1V (26.57°) slopes up to 150' in height. This is not inconsistent with the natural conditions of the area, and will allow for complete reclamation of all cut slopes created by the emergency drilling roads and pads. It should be noted that aerial photos, and contouring of the area indicate the natural angle of repose of the soils to be approximately 37° and the existing ground slope is less than 30°; therefore, the proposed slopes are well within the boundaries of stability.

TABLE 1

CALCULATION SUMMARY

---

				<u>Proposed</u>
Maximum Slope Height (H)	-	80'	150'	38'
Slope Angle	-	33.69° 1.5H:1V	26.57° 2H:1V	30°
Safety Factor (dry)	-	1.93	1.93	2.74
Safety Factor (Saturated)	-	1.31	1.31	2.05

\*Density ( $\gamma$ ) = 112.4 pcf

\*Cohesion (c) = 723.3 psf

\*Internal Friction Angle ( $\phi$ ) = 33.3°

\* Average of 3 soil samples taken for stability analyses in similar soils and conditions.

**FIGURES**

C=Cohesion-psf  
 Y=Density-pcf  
 H=Slope Height-ft.  
 $\phi$ =Internal Friction Angle

(DRY CONDITIONS)

CIRCULAR FAILURE CHART NUMBER 1

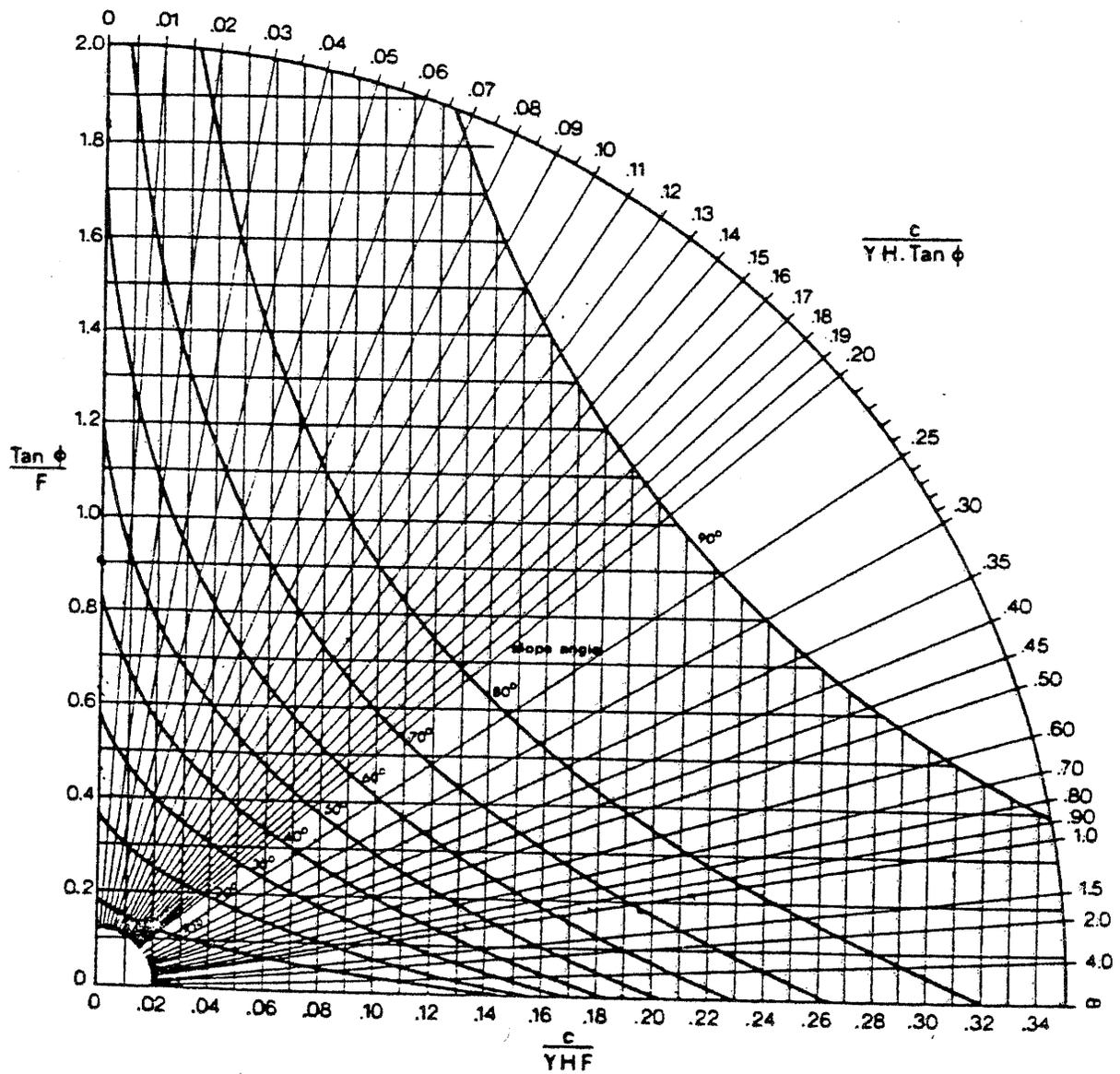


Figure 1

C=Cohesion-psf  
 Y=Density-pcf  
 H=Slope Height-ft.  
 $\phi$ =Internal Friction Angle

(SATURATED CONDITIONS)

CIRCULAR FAILURE CHART NUMBER 5

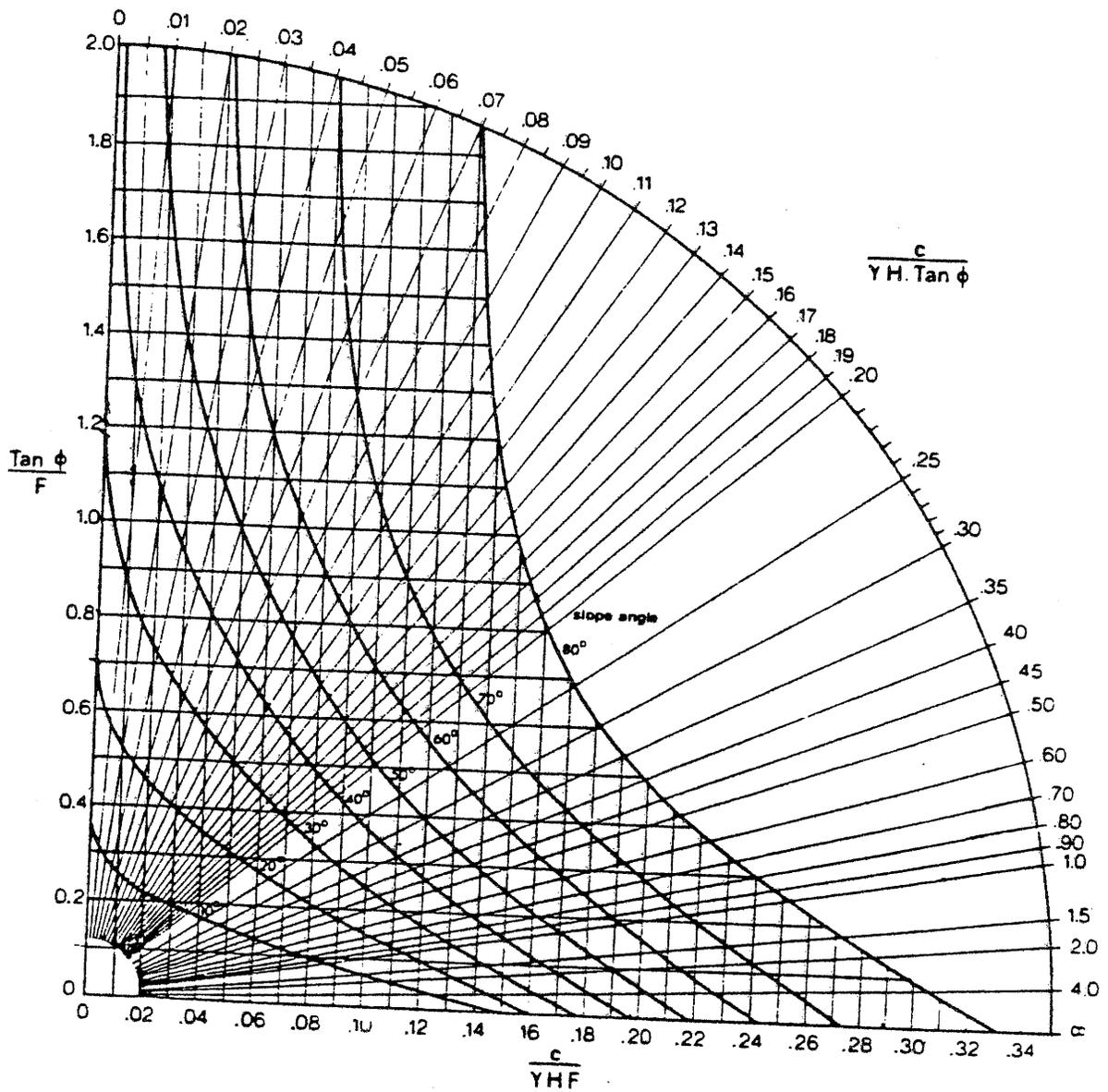
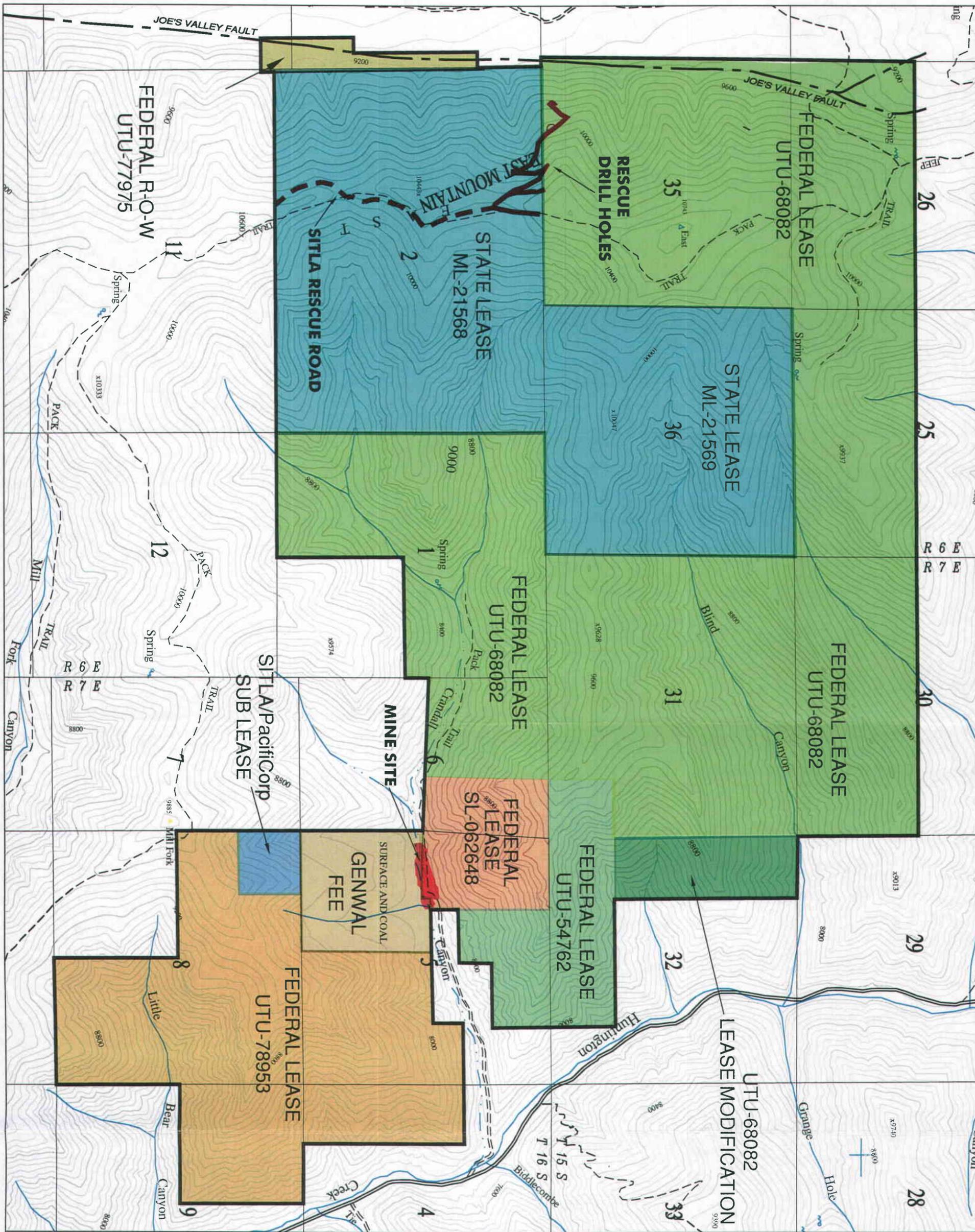


Figure 2

PLATE 1-1

LEASE-PERMIT MAP



**LEGEND**

UDOGM PERMIT BOUNDARY 

MINE SURFACE FACILITIES 

THE PERMIT AREA IS ENTIRELY WITHIN THE MANTI - LA SAL NATIONAL FOREST



P.O. Box 1077, 794 North "C" Canyon Rd, Price Utah  
Telephone: (435) 888-4000

**CRANDALL CANYON MINE  
LEASE / PERMIT AREA MAP**

REV: 10	ACAD: LEASE SOCRAN9
DATE: 6-20-08	BY: JDS
SCALE: 1"=2000'	PLATE #: 1-1