

PERMIT CHANGE TRACKING FORM

DATE RECEIVED	7/12/94	PERMIT NUMBER	ACT/007/019
Title of Proposal:	IBC, Renewal	PERMIT CHANGE #	946
Description:	Fair Installation	PERMITTEE	Judalex
		MINE NAME	Centennial

Submitted back 2/21/95

<input type="checkbox"/> 15 DAY INITIAL RESPONSE TO PERMIT CHANGE APPLICATION	DATE DUE	DATE DONE	RESULT
<input type="checkbox"/> Notice of Review Status of proposed permit change sent to the Permittee.			<input type="checkbox"/> ACCEPTED <input type="checkbox"/> REJECTED
<input type="checkbox"/> Request additional review copies prior to Division/Other Agency review.			Permit Change Classification
<input type="checkbox"/> Notice of Approval of Publication. (If change is a Significant Revision)			<input type="checkbox"/> Significant Permit Revision
<input type="checkbox"/> Notice of request to modify proposed permit change prior to approval.			<input type="checkbox"/> Permit Amendment
			<input type="checkbox"/> Incidental Boundary Change

Only copy

REVIEW TRACKING	INITIAL REVIEW		MODIFIED REVIEW		FINAL REVIEW AND FINDINGS	
DOGM REVIEWER	DUE	DONE	DUE	DONE	DUE	DONE
<input checked="" type="checkbox"/> Administrative Paul	10/14		11/18		3/31	3/16
<input checked="" type="checkbox"/> Biology Paul	10/14		11/18		3/31	3/16
<input checked="" type="checkbox"/> Engineering Wayne	10/14		11/18		3/31	3/17
<input type="checkbox"/> Geology						
<input checked="" type="checkbox"/> Soils Henry	10/14		11/18	11/16		
<input checked="" type="checkbox"/> Hydrology Steve	10/14		11/18		3/31	3/11
<input checked="" type="checkbox"/> Bonding Wayne	10/14		11/18		3/31	3/17
<input type="checkbox"/> AVS Check						

COORDINATED REVIEWS	DUE	DONE	DUE	DONE	DUE	DONE
<input type="checkbox"/> OSMRE						
<input type="checkbox"/> US Forest Service						
<input type="checkbox"/> Bureau of Land Management						
<input type="checkbox"/> US Fish and Wildlife Service						
<input type="checkbox"/> US National Parks Service						
<input type="checkbox"/> UT Environmental Quality						
<input type="checkbox"/> UT Water Resources						
<input type="checkbox"/> UT Water Rights						
<input type="checkbox"/> UT Wildlife Resources						
<input type="checkbox"/> UT State History						
<input type="checkbox"/> Other						

<input type="checkbox"/> Public Notice/Comment/Hearing Complete (If the permit change is a Significant Revision)	<input type="checkbox"/> Permit Change Approval Form signed and approved effective as of this date. <input type="checkbox"/> Permit Change Denied.
<input type="checkbox"/> Copies of permit change marked and ready for MRP.	<input type="checkbox"/> Notice of <input type="checkbox"/> Approval <input type="checkbox"/> Denial to Permittee.
<input type="checkbox"/> Special Conditions/Stipulations written for approval.	<input type="checkbox"/> Copy of Approved Permit Change to File.
<input type="checkbox"/> TA and CHIA modified as required.	<input type="checkbox"/> Copy of Approved Permit Change to Permittee.
<input type="checkbox"/> Permit Change Approval Form ready for approval.	<input type="checkbox"/> Copies to Other Agencies and Price Field Office.

PERMIT CHANGE TRACKING FORM

DATE RECEIVED	9/12/94	PERMIT NUMBER	ACT/007/019
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Description:	Fair Installation	PERMITTEE	Judalex
		MINE NAME	Centennial

Submitted back 2/21/95

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<input type="checkbox"/> UT Water Resources						
<input type="checkbox"/> UT Water Rights						
<input type="checkbox"/> UT Wildlife Resources						
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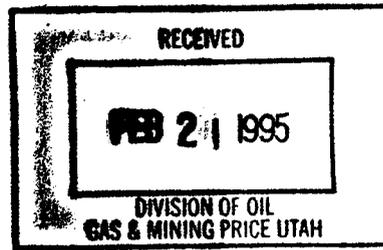
ANDALEX
RESOURCES, INC.
 Tower Division

P.O. BOX 902
 PRICE, UTAH 84501
 PHONE (801) 637-5385
 TELECOPIER (801) 637-8860

*ACT/007/019- 2/24
 946
 Baron -
 This rec'd a
 30-day extension. but
 on time.....
 In review.
 PAM.*

February 21, 1995

State of Utah
 Department of Natural Resources
 Division of Oil, Gas & Mining
 355 West North Temple
 3 Triad Center, Suite 350
 Salt Lake City, Utah 84180-1203



Attn: Pamela Grubaugh-Littig, Permit Coordinator

Re: ACT 007/019-94G Fan Installation #2 Copy PAM

Dear Ms. Littig:

Enclosed please find a response to all requirements outlined by your staff.

R645-301-114

1. Andalex has obtained necessary right of entry documents for both the state and private lands. These easement approvals should be included in Appendix J of the approved MRP.

R645-301-320

1. A survey was conducted by Mr. Robert Thompson regarding the presence of Canyon Sweetvetch. None was found and a letter to that effect is being arranged to be included in the MRP.

R645-301-330

1. Andalex has committed to no construction activity at the fan location within 1/2 mile of the Eagle nest during the nesting season if the nest is active.



ANDALEX
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Tower Division

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2. The Bureau of Land Management in the Right of Way Grant specifically disallows construction in this area from December 1 through April 15. We understand there is no flexibility other than an emergency safety or loss of resource situation.
3. All routine maintenance except for snow removal will be preformed from inside the mine from December 1 to July 1.

R645-301-340

1. Andalex has committed to using the seed mixture on page 80 and the shrubs shown on page 74 of the MRP. This will now occur in the fall of 1995 rather than 1994.

R645-301-500

1. Andalex will demonstrate that the road embankment will have a safety factor of 1.3 or greater following their construction.
2. Also during this study it will be demonstrated that the slopes of the pad, both cut and fill, will have a safety factor of 1.3 or greater. Construction lifts will not exceed 4 feet.
3. Plates previously submitted show that the reclamation contours will mimic the original contours. This is specified on the plates. We have discussed removal of the culvert, etc.

R645-301-542-600, 742.313 and 764

1. Andalex has addressed activities within this "stream" buffer zone.

Please call with any questions.

Sincerely,

Michael W. Glasson,
Senior Geologist



United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Moab District
Price River Resource Area
900 North 700 East
Price, Utah 84501

2890
UTU-64158
(U-066)

CERTIFIED MAIL--RETURN RECEIPT REQUESTED
Certification No. 060 435 539

JAN 5 1990

NOTICE

Andalex Resources Incorporated : Right-of-Way Application
P. O. Box 902 : UTU-64158
Price, Utah 84501 :

Right-of-Way Grant Offered; Stipulations Required Advance Rental Required

On December 6, 1988, Andalex Resources Incorporated filed right-of-way application UTU-64158 for a mine site facility, on public lands in Carbon County, Utah.

The Bureau of Land Management proposes to issue the enclosed grant for the right-of-way referenced above. If you are in agreement with the proposed terms, conditions, and stipulations, please execute and return two copies of the enclosed grant. This grant, along with the authority to use the lands described in the document, becomes effective on the date it is signed by the BLM authorized officer. A copy of the right-of-way grant will be returned to you when signed.

Section 4a of the enclosed right-of-way grant incorporates by reference all of the regulations contained in Chapter 43 of the Code of Federal Regulations (CFR) part 2800. These regulatory provisions are mandatory and apply whether or not they are specifically mentioned in the grant. You should be familiar with 43 CFR 2800 before executing the grant.

Regulations at 43 CFR 2803.1-2 require the right-of-way holder to pay fair market value rental as determined by the authorized officer.

Pending formal appraisal, the advance rental deposit is \$25.00.

The regulations at 43 CFR 2808.4 require the holder of a right-of-way to reimburse the United States for costs incurred in monitoring the construction, operation, maintenance, and termination of the authorized facilities on the right-of-way, and the protection and rehabilitation of the lands involved. The monitoring fee of \$100.00 has been paid.

You are allowed thirty (30) days from receipt of this notice to sign and return both copies of the grant and required payment(s) (please make check payable to the Department of the Interior - BLM) or the application shall be rejected in its entirety.

If you have any questions, please feel free to contact Mark Mackiewicz of my staff at (801) 637-4584.



Area Manager

Acting

Enclosure:
Proposed Grant (in duplicate)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

RIGHT-OF-WAY GRANT/TEMPORARY USE PERMIT

Issuing Office

Moab District, Price River R.A.

Serial Number

UTU-64158

1. A (right-of-way) (permit) is hereby granted pursuant to:

- a. Title V of the Federal Land Policy and Management Act of October 21, 1976 (90 Stat. 2776; 43 U.S.C. 1761);
- b. Section 28 of the Mineral Leasing Act of 1920, as amended (30 U.S.C. 185);
- c. Other (describe) _____

2. Nature of Interest:

- a. By this instrument, the holder Andalex Resources Incorporated receives a right to construct, operate, maintain, and terminate a n access road, two portals, pad site, & two coal tunnels. on public lands (or Federal land for MLA Rights-of-Way) described as follows:

Salt Lake Meridian, Utah
 T. 13 S., R. 10 E., Sec. 13, Lot 1.
 T. 13 S., R. 11 E., Sec. 18, Lot 2, NE4SW4.

- b. The right-of-way granted herein for an access road is 16 feet in width, 3000 feet in length encompassing 1.00 acres more or less, pad site is 70 feet in width and 250 feet in length encompassing 0.40 acres more or less, and two coal tunnels approximately 70 feet in length, 20 feet in width and 7 feet in height, and one 30 feet in length, 20 feet in width and 7 feet in height encompassing 0.05 acres more or less.

- b. The right-of-way or permit area granted herein is _____ feet wide, _____ feet long and contains _____ acres, more or less. If a site type facility, the facility contains _____ acres.
- c. This instrument shall terminate on January 10, 2020, thirty (30) years from its effective date unless, prior thereto, it is relinquished, abandoned, terminated, or modified pursuant to the terms and conditions of this instrument or of any applicable Federal law or regulation.
- d. This instrument may may not be renewed. If renewed, the right-of-way or permit shall be subject to the regulations existing at the time of renewal and any other terms and conditions that the authorized officer deems necessary to protect the public interest.
- e. Notwithstanding the expiration of this instrument or any renewal thereof, early relinquishment, abandonment, or termination, the provisions of this instrument, to the extent applicable, shall continue in effect and shall be binding on the holder, its successors, or assigns, until they have fully satisfied the obligations and/or liabilities accruing herein before or on account of the expiration, or prior termination, of the grant.

3. Rental:

For and in consideration of the rights granted, the holder agrees to pay the Bureau of Land Management fair market value rental as determined by the authorized officer unless specifically exempted from such payment by regulation. Provided, however, that the rental may be adjusted by the authorized officer, whenever necessary, to reflect changes in the fair market rental value as determined by the application of sound business management principles, and so far as practicable and feasible, in accordance with comparable commercial practices.

4. Terms and Conditions:

- a. This grant or permit is issued subject to the holder's compliance with all applicable regulations contained in Title 43 Code of Federal Regulations parts 2800 and 2880.
- b. Upon grant termination by the authorized officer, all improvements shall be removed from the public lands within --- days, or otherwise disposed of as provided in paragraph (4)(d) or as directed by the authorized officer.
- c. Each grant issued pursuant to the authority of paragraph (1)(a) for a term of 20 years or more shall, at a minimum, be reviewed by the authorized officer at the end of the 20th year and at regular intervals thereafter not to exceed 10 years. Provided, however, that a right-of-way or permit granted herein may be reviewed at any time deemed necessary by the authorized officer.
- d. The stipulations, plans, maps, or designs set forth in Exhibit(s) A & B, dated JAN 5 1990, attached hereto, are incorporated into and made a part of this grant instrument as fully and effectively as if they were set forth herein in their entirety.
- e. Failure of the holder to comply with applicable law or any provision of this right-of-way grant or permit shall constitute grounds for suspension or termination thereof.
- f. The holder shall perform all operations in a good and workmanlike manner so as to ensure protection of the environment and the health and safety of the public.

IN WITNESS WHEREOF, The undersigned agrees to the terms and conditions of this right-of-way grant or permit.

Samuel C. Duzgiley
(Signature of Holder)

[Signature]
(Signature of Authorized Officer)

General Manager
(Title)

Acting Area Manager
(Title)

1-9-90
(Date)

January 11, 1990
(Effective Date of Grant)

Exhibit A
Stipulations

JAN 25 1990

1. The holder shall comply with applicable Federal and State laws and regulations issues thereunder, existing or hereafter enacted or promulgated, affecting in any manner construction, operation, maintenance or termination of facilities located on the right-of-way to include all applicable regulations in 30 CFR Chapter VII and regulations developed to implement the Coal Mining Reclamation Act of 1978 (U.C.A. 40-10-1 et.seq.) Chapter I Parts U.M.C. 700-845.

2. The holder shall construct, operate, and maintain the facilities, improvements, and structures within this right-of-way in strict conformity with the Andalex Resources Mining and Reclamation Plan (approved 1/4/82) (renewed 3/2/87) and the "Aberdeen Mine Revision" to the approved mine plan (ACT/007/019). Any relocation, additional construction, or use that is not in accord with the approved plan(s), shall not be initiated without the prior written approval of the authorized officer. A copy of the complete right-of-way grant, including all stipulations and approved plan(s) of development, shall be made available on the right-of-way area during construction, operation, and termination. Noncompliance with the above will be grounds for an immediate temporary suspension of activities if it constitutes a threat to public health and safety or the environment.

3. The holder shall be liable for damage or injury to the United States to the extent provided by 43 CFR Sec. 2803.1-4. The holder shall be held to a standard of strict liability for damage or injury to the United States resulting from fire or soil movement (including landslides and slumps, as well as wind and water-caused movement of particles) caused or substantially aggravated by any of the following within the right-of-way or permit area.

4. The holder shall insure that the bond securing coal lease SL-027304 is modified to include the underground portion of right-of-way UTU-64158, prior to moving onto the right-of-way area. Written documentation noting this change shall be presented to the authorized officer.

5. The holder shall follow all provisions of its revised Resource Recovery and Protection Plan (R₂P₂) covering coal lease SL-027304 in removal of coal from the right-of-way.

6. The holder shall pay fair market value for the coal removed in the construction of the tunnels. Fair market value is determined to be the difference between the actual mining costs and the selling price of the coal at the mine by not less than eight (8) percent of the value of the coal at the mine. Mining cost will include only the actual extractive costs at the mine and will not include capital investments relating to permanent mine development or offsite administrative costs. Coal tonnage removed will be determined by volumetric calculation or actual mine weights provided by the holder. The holder shall provide information as to the contracted price of coal sold and estimated per ton mining cost. Payment of all coal shall be made within thirty (30) days after billing by the authorized officer.

7. The holder shall contact the authorized officer at least fourteen (14) days prior to the anticipated start of construction and/or any surface disturbing activities. The authorized officer may require and schedule a preconstruction conference with the holder prior to the holder's commencing construction and/or surface disturbing activities on the right-of-way. The holder and/or his representative shall attend this conference. The holder's contractor, or agents involved with construction and/or any surface disturbing activities associated with the right-of-way, shall also attend this conference to review the stipulations of the grant including the plan(s) of development.

8. The holder shall not initiate any construction or other surface disturbing activities on the right-of-way without the prior written authorization of the authorized officer. Such authorization shall be a written notice to proceed issued by the authorized officer. Any notice to proceed shall authorize construction or use only as therein expressly stated and only for the particular location or use therein described.

9. The authorized officer may suspend or terminate in whole, or part, any notice to proceed which has been issued when, in his judgment, unforeseen conditions arise which result in the approved terms and conditions being inadequate to protect the public health and safety or to protect the environment.

10. The holder shall designate a representative(s) who shall have the authority to act upon and to implement instructions from the authorized officer. The holder's representative shall be available for communication with the authorized officer within a reasonable time when construction or other surface disturbing activities are underway.

11. The holder shall conduct all activities associated with construction, operation, and termination of the right-of-way within the authorized limits of the right-of-way.

12. The holder shall complete a cultural and historic clearance of the right-of-way prior to initiation of construction. All persons in the area who are associated with the project will be informed by the holder that they will be subject to prosecution for disturbing archaeological sites or collecting artifacts. If subsurface cultural material is exposed during construction, work at that spot will stop immediately and the BLM, Price River Resource Area Office will be contacted (phone (801) 637-4584). The holder will be responsible for the cost of evaluation of the discovery and proper mitigation measures. Any decision as to proper mitigation shall be made by the authorized officer after consulting with the holder.

13. Prior to construction an inventory of the project area will be conducted by the authorized officer to determine the presence of the plant Hedysarum occidentale var. canone. A Notice to Proceed will not be issued until this clearance has been made and a satisfactory mitigation plan developed if necessary.

14. The holder shall not conduct construction activities within 0.5 miles or a designated buffer zone from active raptor nest sites during the nesting period, February 15 to July 15. Buffer zones and or adjustments to the nesting period will be determined by the authorized officer in consultation with the United States Fish and Wildlife Service (USFWS) and the Utah Division of Wildlife Resources (UDWR).

15. The holder shall ensure that no new access road construction is within line-of-sight of the raptor nests identified within 0.5 miles of the proposed road. Prior to road construction the authorized officer shall be afforded the opportunity to inspect the flagged access road.

16. The holder shall conduct all routine maintenance work on the access road except required snow removal, during the period of July 1 to December 1 to minimize impacts to raptors, mule deer and elk.

17. The holder shall restrict construction of all above ground facilities authorized under this right-of-way during the period of December 1 through April 15 to minimize impacts to wintering deer and elk.

18. The holder shall furnish and install culverts of the gauge, materials, diameter(s), and length(s) indicated and approved by the authorized officer. Culverts shall be free of corrosion, dents, or other deleterious conditions. Culverts shall be placed on channel bottoms on firm, uniform beds which have been shaped to accept them and aligned to minimize erosion. Backfill shall be thoroughly compacted. No equipment shall be routed over a culvert until backfill depth is adequate to protect the culverts.

19. The holder shall maintain the right-of-way in a safe, usable condition, as directed by the authorized officer. (A regular maintenance program shall include, but is not limited to, blading, ditching, culvert installation, and surfacing).

20. The holder shall seed all disturbed areas with the seed mixture(s) to be developed in consultation with the Utah Division of Oil Gas and Mining (UDOGM) and the authorized officer. The seed mixture(s) shall be planted in the amounts specified in pounds of pure live seed (PLS)/acre. There shall be no primary or secondary noxious weeds in the seed mixture. Seed shall be tested and the viability testing of seed shall be done in accordance with State Law(s) and within 9 months prior to purchase. Commercial seed shall be either certified or registered seed. The seed mixture container shall be tagged in accordance with State law(s) and available for inspection by the authorized officer.

Seed shall be planted using a drill equipped with a depth regulator to ensure proper depth of planting where drilling is possible. The seed mixture shall be evenly and uniformly planted over the disturbed area. Since smaller or heavier seeds have a tendency to drop to the bottom of the drill and are planted first, the holder shall take appropriate measures to ensure this does not occur. Where drilling is not possible, seed shall be broadcast and the area shall be raked or chained to cover the seed. When broadcasting the seed, the pounds per acre noted below are to be doubled. The seeding will be repeated until a satisfactory stand is established as determined by the authorized officer. Evaluation of growth will not be made before completion of the second growing season after seeding. The authorized officer is to be notified a minimum of ten (10) days prior to seeding of the project.

21. All above-ground structures not subject to safety requirements shall be painted by the holder to blend with the natural color of the landscape. The paint used shall be a color which simulates "Standard Environmental Colors" designated by the Rocky Mountain Five-State Interagency Committee. The color selected for this site will be determined by the authorized officer in consultation with the holder.

22. The holder is authorized to install a locked gate across the road accessing the Left Fork of Deadman Canyon. The gate shall be constructed to meet BLM Standards. The gate shall be appropriately signed stating that access by foot is authorized and stating where a key may be obtained to open the gate.

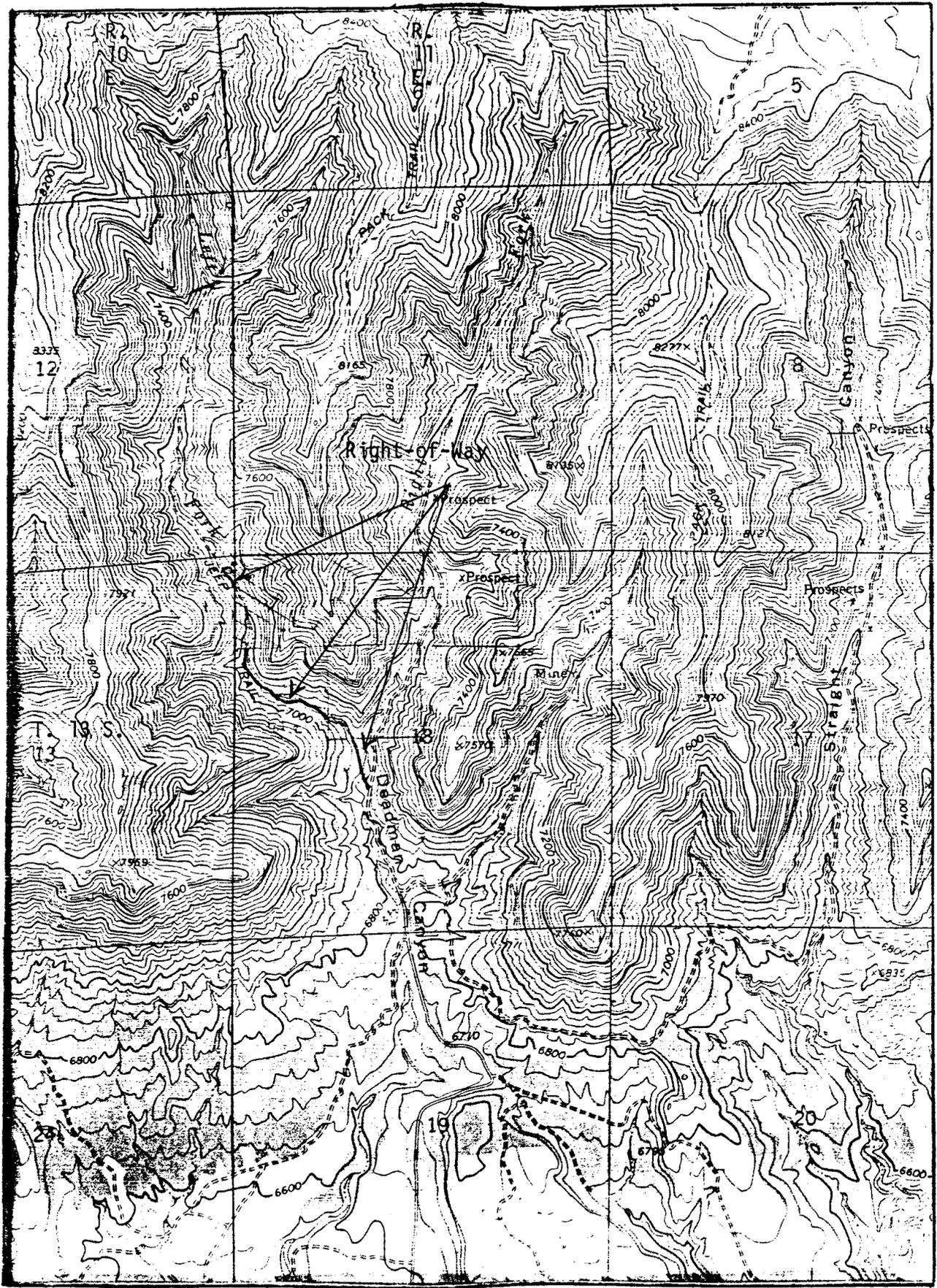
23. Construction sites shall be maintained in a sanitary condition at all times; waste materials at those sites shall be disposed of promptly at an appropriate waste disposal site. "Waste" means all discarded matter including human waste, trash, garbage, refuse, oil drums, petroleum products, ashes, and equipment.

24. Prior to termination of the right-of-way, the holder shall contact the authorized officer to arrange a pretermination conference. This conference will be held to review the termination provisions of the grant.

One (1) year prior to termination of the right-of-way, the holder shall contact the authorized officer to arrange a joint inspection of the right-of-way. This inspection will be held to agree to an acceptable termination (and rehabilitation) plan. This plan shall include, but is not limited to, removal of facilities, drainage structures, or surface material, recontouring, topsoiling, or seeding. The authorized officer must approve the plan in writing prior to the the holder's commencement of any termination activities.

Wang 0238M

Exhibit B



Deadman Canyon 7 1/2 Minute Quadrangle showing right-of-way location.



United States Department of the Interior

BUREAU OF LAND MANAGEMENT

2890
UTU-64158
(U-066)

Moab District
Price River Resource Area
900 North 700 East
Price, Utah 84501

Mike Glasson
Andalex Resources Incorporated
P. O. Box 902
Price, Utah 84501

MAR 14 1989

Dear Mr. Glasson:

A meeting and field trip was conducted on January 31, 1989, to develop recommendations for Andalex Resources with regard to proposed development in the left fork of Deadman Canyon and an apparent conflict with a nesting golden eagle. The meeting was attended by Utah Division of Wildlife Resources (UDWR), Utah Division of Oil, Gas and Mining (UDOGM) and U. S. Fish and Wildlife Services (USFWS).

The first part of the meeting served to acquaint representatives of the various agencies with proposed surface facilities in the left fork of Deadman Canyon and their proximity to a golden eagle nest documented active in 1981 and 1988. Two scenarios for development in the left fork were identified. The minimum development scenario was construction of a ventilation fan in the left fork. All other surface facilities required for the Aberdeen Mine in this scenario would be constructed in the right fork. The maximum development proposal was to construct the major facilities needed for the Aberdeen Mine in the left fork, including a main entry, top soil storage, material storage, coal stockpile, fan, power substation, truck loadout, major access road, and sedimentation pond. The meeting concluded at Andalex Resources' office when Lane Adair reported on the company's status with regard to development in the left fork and progress in exploring old mine workings in the right fork.

On the field trip, we visited the proposed facility location in the left fork and viewed its proximity to the golden eagle nest, approximately one-quarter mile away. Site specific issues discussed at the site included viewshed from the nest site (whether proposed facilities would be in direct line-of-sight), ability to move facility locations up or down canyon to avoid the one-half-mile buffer zone, etc. The following comments and recommendations were made on the two development proposals.

Minimum Development Proposal

There was general concurrence that a ventilation fan could be accommodated in the left fork, as shown in Figure 1, with no significant impact to golden eagle nesting activity.

RECEIVED

MAR 14 1989

ANDALEX RESOURCES, INC.

Specific recommendations included:

1. The fan would be located out of line-of-sight for the eagle nest. Figure 2 shows the viewshed from the nest and indicates the proposed fan location would be acceptable with minor, if any, modification necessary.
2. Permit only minimal road upgrading for surface access to the fan.
3. The fan be constructed primarily from within the mine, including power, and that construction be completed outside the nesting period, February 1 to July 15.
4. Daily fan maintenance and inspection be conducted from within the mine.

Maximum Development Proposal

There was consensus among the agencies that maximum development as shown in Figure 1 would significantly impact golden eagle nesting activity. Specific recommendations included:

1. Disallow significant development, beyond minor road upgrading and the ventilation fan, within the one-half-mile buffer zone.
2. Maximize opportunities in the right fork for accessing and locating facilities for the Aberdeen Mine. This could include some rock tunneling to accommodate high-profile equipment.
3. Evaluate feasibility of constructing a rock slope to access old workings in the coal seam above the Aberdeen and utilize these workings to access the Aberdeen Mine.

In the event development of the Aberdeen Mine is not technically feasible from the right fork, the following recommendations should be used as guidelines in designing facilities for the left fork. It should be emphasized that such development within the one-half-mile buffer zone may impact the golden eagle nest and would require further coordination with the USF&WS and UDWR.

1. All active facilities (those involving nonstationary equipment operation or human activity) should be placed outside the one-half-mile buffer zone.
2. Passive facilities or structures (top soil storage sedimentation pond, etc.) should be located out of line-of-sight.
3. Vegetation such as quick growing poplars and earthen berms have been utilized to help shield facilities and minimize impacts to wildlife.
4. A covered coal conveyor system could be utilized to transport coal out of the one-half-mile buffer zone or even to surface facilities in the right fork.

One other issue, mule deer winter and/or transitional range was raised with respect to maximum development in the left fork. Any proposals with significant surface disturbance should include measures to mitigate impacts to habitats important for mule deer in the spring and fall transitional periods.

We are hopeful these recommendations will help avoid serious conflicts with development of the Aberdeen Mine and facilitate the issuance of appropriate rights-of-way for Andalex. If there are any questions about these recommendations, please feel free to contact David Mills of my staff at 637-4584.

Sincerely yours,

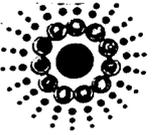

Area Manager

Enclosures (2):

1-Figure 1

2-Figure 2

cc: UDWR
USFWS
UDOGM



ANDALEX
RESOURCES, INC.
Tower Division

P.O. BOX 902
PRICE, UTAH 84501
PHONE (801) 637-5385
TELECOPIER (801) 637-8860

November 17, 1994

Mrs. Gladys Artman
PO Box 22
Mountain City, GA 30562

Dear Mrs. Artman:

Thank you for calling with regard to your property here in Carbon County, Utah. Andalex will make a one-time payment of \$1000 for easement across the southwestern corner of your property.

Please acknowledge your concurrence by signing and returning the attached copy of this letter in the stamped envelope included for your convenience. Upon receipt of the signed letter, a check will be mailed to you immediately. Thank you very much.

Sincerely,

Michael W. Glasson
Senior Geologist

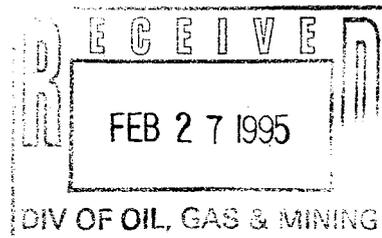
November 23, 1994

Date-

Gladys Artman

Gladys Artman (or authorized agent)

g:\wp51\fin\public\glasson\007-019.fan





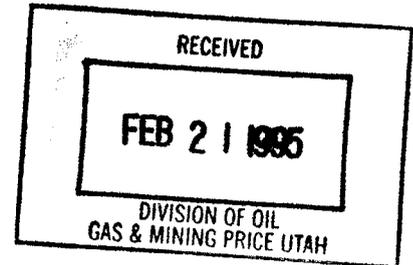
State of Utah
School and Institutional
Trust Lands Administration

Michael O. Leavitt
Governor

Scott Hirschi
Director

355 West North Temple
3 Triad Center, Suite 400
Salt Lake City, UT 84180-1204
801-538-5508
801-355-0922 (fax)

December 16, 1994



Andalex Resources, Inc.
P.O. Box 902
Price, UT 84501

RE: Easement No. 302

Dear Sir or Madame:

The above-referenced easement has been fully executed by the Director of the School and Institutional Trust Lands Administration. One original document is enclosed for your records.

Sincerely,

DIANE DURRANT
OFFICE TECHNICIAN

dd
Enclosure

E A S E M E N T

**Fund: School
Easement No. 302**

THE STATE OF UTAH, by and through the School and Institutional Trust Lands Administration, GRANTOR, in consideration of the payment of \$290.85 plus a \$600.00 application fee, receipt of which is acknowledged, and the promise of the GRANTEE to pay an administrative fee as provided by Administration Rules R850-40-1800 and R850-4-100, as amended or replaced, to the GRANTOR on or before January 1, 1997, and every third year thereafter, or within 10 days of notice from GRANTOR that payment is due, hereby grants to ANDALEX RESOURCES, INC., P.O. Box 902, Price, UT 84501, GRANTEE, the right to construct, operate, repair and maintain an access road on state trust lands described as follows:

Township 13 South, Range 11 East, SLB&M

Section 18: Within the NE $\frac{1}{4}$ SW $\frac{1}{4}$, as follows:

A 16-foot-wide road right-of-way traversing trust lands, beginning at a point along the existing "Deadman Canyon" road and continuing for a distance of approximately 640 feet (38.78 rods) to a point located approximately 1630 feet east of the west quarter corner, along the north boundary of the SW $\frac{1}{4}$ of said Section 18.

Containing 0.24 acre, more or less.

(A location map is attached as Exhibit A)

TO HAVE AND TO HOLD for a term of 30 years subject to the following terms and conditions and any valid and existing rights or until GRANTEE, its successors and assigns shall fail to make any payment in accordance with its promise above set forth. This easement is granted only for the purpose described above as far as it is consistent with the principles and obligations in the Enabling Act of Utah (Act of July 16, 1894, Ch. 138, 28 Stat. 107) and the Constitution of the State of Utah.

1. GRANTEE shall pay for all cost and expense in connection with the construction, operation, repair, replacement and maintenance of said access road, and hold GRANTOR harmless from any and all liability (including expenses for attorney's fees) which may arise from the construction, operation, and maintenance of said access road, so long as the easement shall remain in force and effect.

2. GRANTEE shall have sixty (60) days after the expiration of the terms of this easement to remove said access road. In the event the same is not removed within sixty (60)

days, it is mutually agreed by and between the GRANTOR and GRANTEE that the GRANTOR shall have the right to remove, or cause the same to be removed, all at the cost and expense of the GRANTEE.

3. GRANTEE shall contact all existing easement holders and cooperate with them with respect to where and how material may be removed so as not to cause damage to existing easements.

4. GRANTEE agrees that, for good cause shown, at any time during the term of this easement, the GRANTOR may require that the amount of an existing bond be increased or if a bond has not been previously required, GRANTOR may require GRANTEE to post with the Administration a bond with an approved corporate surety company authorized to transact business in the State of Utah, or such other surety as may be acceptable to the GRANTOR, in a penal sum to be determined by GRANTOR, said bond to be conditioned upon full compliance with all terms and conditions of this easement and the rules relating hereto. The amount of this bond shall not be deemed to limit any liability of GRANTEE.

5. GRANTEE assumes liability for and agrees to indemnify GRANTOR for and against any and all liability, including attorney's fees, of any nature imposed upon, incurred by, or asserted against GRANTOR which in any way relates to or arises out of the activity or presence upon the easement of GRANTEE, its servants, employees, agents, sublessees, assignees or invitees.

6. This easement may be terminated by GRANTOR upon breach of any conditions hereof. If GRANTOR determines that the GRANTEE, its assigns or successors in interest have breached any conditions of this easement, GRANTOR shall notify the breaching party (parties) in writing by certified mail, return receipt requested, specifying the particular breach. The breaching party (parties) shall have thirty (30) days from the date of such notice, or such longer period as may be required under the circumstances as approved by the (GRANTOR) to correct such breach. If breaching party (parties) fails (fail) to correct such breach within such period, GRANTOR may terminate this easement upon thirty (30) days notice; provided, however, such termination shall not release breaching party (parties) from liability for damage prior to such termination.

7. GRANTEE consents to suit in the courts of the State of Utah in any dispute arising under the terms of this easement or as a result of operations carried on under this easement. Service of process in any such action is hereby agreed to be sufficient if sent by registered mail to the GRANTEE at the last known address of GRANTEE appearing on the GRANTOR'S records.

8. GRANTEE agrees for itself, successors and assigns that any suit brought by the

GRANTEE, its successors or assigns concerning this easement may be maintained only in the Utah State District Court of Salt Lake County.

9. The acquisition or assumption by another party under an agreement with the GRANTEE of any right or obligation of the GRANTEE under this easement shall be ineffective as to the GRANTOR unless and until GRANTOR shall have been notified of such agreement and shall have recognized and approved the same in writing, and in no case shall such recognition or approval: (i) operate to relieve the GRANTEE of the responsibilities or liabilities assumed by GRANTEE hereunder; or (ii) be given unless such other party is acceptable to GRANTOR as a GRANTEE, and assumes in writing all of the obligations of the GRANTEE under the terms of this easement as to the balance of the term thereof, or acquires the rights in trust as security and subject to such conditions as may be necessary for the protection of the public interests.

10. GRANTEE shall at all times observe reasonable precautions to prevent fire on said easement and shall comply with all applicable laws and regulations of any governmental agency having jurisdiction. In the event of a fire on said easement proximately caused by GRANTEE, its servants, employees, agents, sublessees, assignees or licensees which necessitates suppression action by the State Forester, GRANTEE agrees to reimburse GRANTOR for the cost of such fire suppression action.

11. GRANTEE shall surrender to GRANTOR said lands in the original land contour in order to allow the area to properly drain. Rehabilitation shall be done with the approval and to the specifications of the GRANTOR.

12. GRANTEE, in exercising the privileges granted by this easement, shall comply with the provisions of all valid Federal, State, County, and Municipal laws, ordinances, and regulations which are applicable to the subject tract and operations covered by this easement. GRANTEE shall neither commit nor permit any waste on the easement premises. GRANTEE shall take reasonable precautions to prevent pollution or deterioration of lands or waters which may result from the exercise of the privileges granted pursuant to this easement.

13. GRANTOR herein reserves the right to utilize said easement for access to and from the lands owned by GRANTOR on both sides of said easement.

14. It is expressly understood and agreed that the right herein granted is non-exclusive and GRANTOR hereby reserves the right to issue other non-exclusive easements, leases, or permits on or across the subject property where such uses are appropriate and compatible or to dispose of the property by sale or exchange.

15. GRANTOR expressly reserves the right to lease said land for the exploration,

development and production of oil, gas and all other minerals, together with the right of ingress and egress across said easement; provided that no drilling of oil wells shall be conducted, nor will mining shafts be located within the boundaries of said easement.

16. GRANTEE agrees that the removal of ordinary sand and gravel or similar materials from the easement is not permitted except when the GRANTEE has applied for and received a materials permit from the GRANTOR.

17. GRANTEE agrees that no trees may be cut or removed from the easement except when the GRANTEE has applied for and received a small forest products permit or timber contract from the GRANTOR.

18. It is hereby understood and agreed that all treasure-trove and all articles of antiquity in or upon the subject lands are and shall remain the property of the GRANTOR. GRANTEE shall report any discovery of a "site" or "Specimen" to the GRANTOR and the Division of State History in compliance with Section 63-18-27 Utah Code Annotated (1953) as amended.

19. GRANTOR claims title in fee simple, but does not warrant to GRANTEE the validity of title to these premises. GRANTEE shall have no claim for damages or refund against the GRANTOR for any claimed failure or deficiency of GRANTOR'S title to said lands or for interference by any third party.

20. GRANTOR reserves the right to inspect the area of operation at a later date and recall GRANTEE for correction of any violations of the above stipulations. If the GRANTEE fails to correct such violations within a reasonable time the GRANTOR may, after thirty (30) days written notice, re-enter and terminate this grant.

21. This easement is granted pursuant to the provisions of all applicable laws and subject to the rules of the departments and agencies of the State of Utah presently in effect and to such laws and rules as may be hereafter promulgated by the State.

22. Any notice contemplated herein to be served upon GRANTEE shall be in writing and shall be deemed sufficient if deposited in the United States mail, postage prepaid and certified or registered, and addressed as follows:

Andalex Resources, Inc.
P.O. Box 902
Price, UT 84501

or at any such other address as GRANTEE may from time to time designate by written notice to GRANTOR.

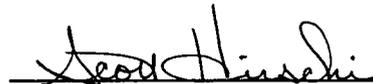
23. This EASEMENT shall be interpreted and governed by the laws of the State of Utah and the provisions hereof shall inure to and be binding upon the successors and assigns of GRANTEE.

IN WITNESS WHEREOF, the State of Utah, by and through the School and Institutional Trust Lands Administration, has caused these presents to be executed this 14th day of DECEMBER, 1994, by the Director.

GRANTOR: STATE OF UTAH
School and Institutional
Trust Lands Administration
3 Triad Center, Suite 400
355 West North Temple
Salt Lake City, Utah 84180-1204



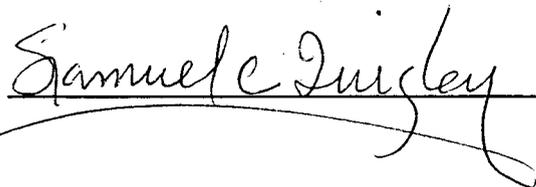
By:



SCOTT HIRSCHI, DIRECTOR

GRANTEE: ANDALEX RESOURCES, INC.
P.O. Box 902
Price, Utah 84501

By:



APPROVED AS TO FORM
JAN GRAHAM
ATTORNEY GENERAL

BY: s/ STEVEN F. ALDER
Assistant Attorney General

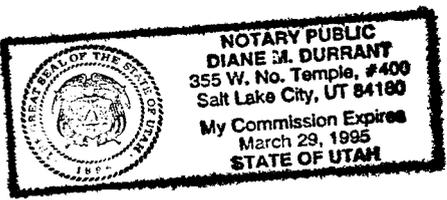
Easement No. 302
Andalex Resources, Inc.
Page 6

STATE OF UTAH)
)
) SS.
)
COUNTY OF SALT LAKE)

On the 14th day of December, 19 94, personally appeared before me Scott Hirschi, who being duly sworn did say that he is the Director of the Utah School and Institutional Trust Lands Administration, and authorized to execute the above instrument.

My commission expires:
3/29/95

Diane M. Durrant
Notary Public, residing at:
SLC, UT

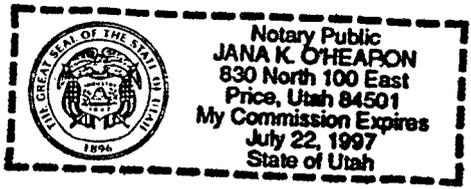


STATE OF Utah)
)
) SS.
)
COUNTY OF Carbon)

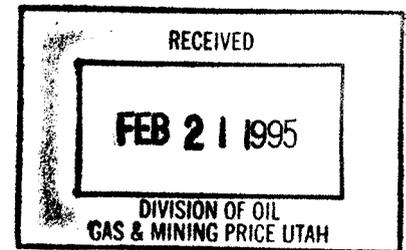
On the 9th day of December, 19 94, personally appeared before me Samuel C. Augley, who being duly sworn did say that he is the General Manager of ANDALEX, INC., and authorized to execute the above instrument..

My commission expires:
July 22, 1997

Jana K. O'Healon
Notary Public, residing at:



Earth Environmental Consultants
September, 1981
Soil Survey and Vegetation Inventory
(Appendix M)



Description

Vegetative Types: Please see Soil Survey and Vegetation Inventory in Appendix M.

The vegetative types include Mountain Brush, Pinion-Juniper Woodland, Sagebrush-Grass, and Conifer-Aspen. The new Sunedco Lease as well as the new Graves Lease are located primarily in the Mountain Brush and Conifer-Aspen communities.

Threatened or Endangered Species

There have been no known threatened or endangered species observed in the lease area (Welsh 1977). A study was conducted in the Left Hand Fork for both the access road and the fan installation site to determine the presence of Canyon Sweetvetch. None was found. Additionally, the surveyor does not believe the habitat exists for this plant.

Plant Communities: Please see Soil Survey and Vegetation Inventory in Appendix M.

The Mountain Brush type is the largest in the area. It is found predominately at elevations of about 7,500 feet. This community consists of sage, mountain mahogany, serviceberry, snowberry, squaw apple, gambels oak, and maple. Minor amounts of rabbitbrush, cliffrose, and bitterbrush can be found. Associated grass species are wildrye, Indian ricegrass, wheat grass, bull grass, and blue grass.

The Sagebrush-Grass group is present from 7,200 to 9,000 feet on and in the low benches below the cliffs. Sage and rabbit brush appear associated with the common grasses occurring in other communities such as curly grass, indian rice grass, and bull grass. Fourwing and saltbrush is found on better drained soils. Shad scale and curly grass associations are found on the heavier clay soils.

The Pinion-Juniper Woodland community occurs in the area from an elevation of 5,600 to 8,000 feet and dominates the area below the escarpment of the Book Cliffs. Pinion pine and Utah juniper are the dominant species with bull grass, indian rice grass, and birch leaf mahogany as associated species.

Revised 2/21/95

The Conifer-Aspen becomes fairly extensive in the more moist sites and at higher elevations. Elevations range from about 7,000 to 9,000 feet. Aspen predominates at the lower elevations with associated species being serviceberry, snowberry, Oregon grape, mountain brome, and peavine. Douglas fir is scattered throughout the area above 7,500 feet elevation. A few big red pine, white pine, and fir are found in the upper canyon bottoms. Understory grasses present include curly grass, indian rice grass, shadscale, black sage, and crested wheatgrass.

Identified species of noxious or poisonous weeds in the area are halogeton, cockleburr, loco, and copperweed. There are no concentrated areas or serious problems from these poisonous plants.

Some of the most important vegetation species are listed in Table III-10 following this page.

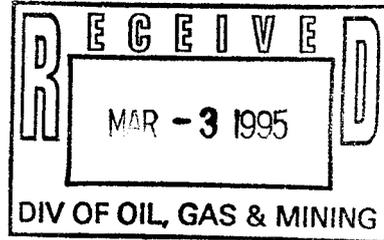
Revised 2/21/95



ANDALEX
RESOURCES, INC.
 Tower Division

P.O. BOX 902
 PRICE, UTAH 84501
 PHONE (801) 637-5385
 TELECOPIER (801) 637-8860

March 1, 1995



State of Utah
 Department of Natural Resources
 Division of Oil, Gas & Mining
 355 West North Temple
 3 Triad Center, Suite 350
 Salt Lake City, Utah 84180-1203

Attn: Pamela Grubaugh-Littig, Permit Supervisor

Re: ACT 007/019-94G - Left Fork Fan

Dear Ms. Littig:

#2 Copy PAM (all) for (Paul Baker) Left Fork Fan

Enclosed is a response to a question raised regarding the presence of Canyon Sweetvetch in the Left Fork of Deadman Canyon. This letter should be inserted at the end of Appendix M, Soil Survey and Vegetation Information. Thank you.

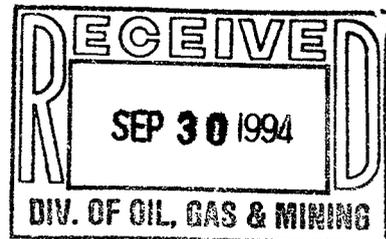
Sincerely,

Michael W. Glasson
 Senior Geologist



ANDALEX
RESOURCES, INC.
Tower Division

P.O. BOX 902
PRICE, UTAH 84501
PHONE (801) 637-5385
TELECOPIER (801) 637-8860



September 28, 1994

State of Utah
Department of Natural Resources
Division of Oil, Gas & Mining
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203

Attn: Daron Haddock, Permit Supervisor

Re: ACT 007/019, Left Fork Fan Breakout

Dear Mr. *Daron* Haddock:

Enclosed for your review is the archaeological clearance which we discussed.

Thank you for your assistance.

Sincerely,

Michael W. Glasson
Senior Geologist

Enclosures

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946
ACT/007/019 # 2
Copy (all)
Daron -
This came in
for the breakout.

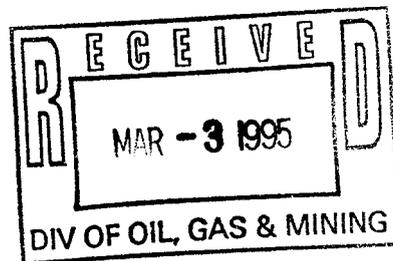


ANDALEX
RESOURCES, INC.
Tower Division

P.O. BOX 902
PRICE, UTAH 84501
PHONE (801) 637-5385
TELECOPIER (801) 637-8860

February 28, 1995

State of Utah
Department of Natural Resources
Division of Oil, Gas & Mining
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203



Attn: Daron Haddock, Permit Supervisor

Re: ACT 007/019 - Left Fork Fan

Dear Mr. Haddock:

This letter is to inform you that in the Fall of 1994, Mr. Robert Thompson from the U.S. Forest Service was taken to the site of the fan installation to make observations regarding the presence of Canyon Sweetvetch. Observations were made both along the access road and at the fan location.

No Canyon Sweetvetch was observed nor, in Mr. Thompson's professional opinion, does the habitat for the plant exist in the area in question.

Please call with any questions. Thank you.

Sincerely,

Michael W. Glasson
Senior Geologist

Robert Thompson

R645-301-341.210.

SPECIES AND AMOUNTS PER ACRE OF
SEEDS AND/OR SEEDLINGS USED *

SPECIES	# PLS/acre
<u>Grasses:</u>	
<u>Agropyron smithii</u>	3.0
Western wheatgrass	
<u>Agropyron spicatum</u>	2.0
Bluebunch wheatgrass	
<u>Agropyron trachycaulum</u>	2.0
Slender wheatgrass	
<u>Bromus marginatus</u>	3.0
Mountain brome	
<u>Oryzopsis hymenoides</u>	2.0
Indian ricegrass	
<u>Poa sandbergii (secunda)</u>	0.25
Sandberg bluegrass	
<u>Forbs:</u>	
<u>Artemisia ludoviciana</u>	0.1
Louisiana sagebrush	
<u>Hedysarum borealis</u>	1.0
Northern sweetvetch	
<u>Linum lewisii</u>	1.0
Lewis flax	
<u>Melilotus officinalis</u>	0.5
Yellow sweetclover	
<u>Penstemon strictus</u>	0.25
'Bandera' Rocky Mtn. penstemon	
<u>Shrubs:</u>	
<u>Amelanchier alnifolia</u>	1.0
Serviceberry	
<u>Artemisia tridentata vaseyana</u>	0.2
Mountain big sagebrush	
<u>Cercocarpus ledifolius</u>	1.0
Curleaf mountain mahogany	
<u>Cercocarpus montanus</u>	1.0
True mountain mahogany	
<u>Chrysothamnus nauseosus albicaulis</u>	1.0
Whitestem rubber rabbitbrush	
<u>Purshia tridentata</u>	3.0
Bitterbrush	
<u>Symphoricarpos oreophilus</u>	1.0
Mountain snowberry	
Total	23.3

Rate is pounds Pure Live Seed/Acre for drill seeding. Broadcast seeding is double the drill rate.

SPECIES	<u># PLS/acre</u>
<u>Grasses:</u>	
<u>Agropyron riparium</u>	2.0
Western wheatgrass	
<u>Agropyron trachycaulum</u>	2.0
Slender wheatgrass	
<u>Bromus marginatus</u>	3.0
Mountain brome	
<u>Elymus cinereus</u>	2.0
Great Basin wildrye	
<u>Phalaris arundinacea</u>	0.5
Reed canarygrass	
<u>Poa pratensis</u>	0.1
Sandberg bluegrass	
<u>Forbs:</u>	
<u>Achillea millifolium</u>	0.1
Yarrow	
<u>Artemisia ludoviciana</u>	0.1
Louisiana sagebrush	
<u>Hedysarum borealis</u>	1.0
Northern sweetvetch	
<u>Melilotus officinalis</u>	0.5
Yellow sweetclover	
<u>Osmorhiza occidentalis</u>	2.0
Sweet anise	
<u>Shrubs:</u>	
<u>Amelanchier alnifolia</u>	1.0
Serviceberry	
<u>Artemisia tridentata vaseyana</u>	0.1
Mountain big sagebrush	
<u>Rhus trilobata</u>	1.0
Squawbush	
<u>Sambucus cerulea</u>	1.0
Blue elderberry	
<u>Symphoricarpos oreophilus</u>	<u>1.0</u>
Mountain snowberry	
Total	17.4
<u>Trees (transplants):</u>	
<u>Populus angustifolia</u> (Narrowleaf cottonwood)	#/Acre 250
<u>Acer negundo</u> (Box Elder)	250
<u>Prunus virginiana</u> (Chokecherry)	250
<u>Quercus gambelii</u> (Gambel oak)	<u>250</u>
Total	1000

Rate is pounds Pure Live Seed/Acre for drill seeding. Broadcast seeding is double the drill rate.

*This seed mixture and shrub list will be used for interim reclamation in the left hand fork fan installation and on the new topsoil pile.

Revised 2/21/95

The Aberdeen Mine surface facilities will include one additional bathhouse, and one lamphouse.

Upon completion of mining activities, the portals will be sealed according to existing state and federal regulations and all buildings and structures not being utilized as part of the reclamation sequence, will be removed, according to the Reclamation Plan outlined in Part F of this Chapter.

Construction Schedule

All of the above structures have been completed. The earthwork for the Aberdeen Mine was completed in 1989. The surface facilities were in early 1990. Construction has been located and carried out so as to prevent and control erosion, siltation, water pollution, and damage to property. All facilities have been designed and constructed and will be maintained and used in a manner which prevents damage to wildlife and related environmental values. Any future construction will be conducted in a similar manner according to regulations regarding protection of the hydrologic system, etc. The rock tunnels for the Centennial Seam development were constructed in the spring of 1990 and completed late in 1990. As previously discussed this mining will require no new surface facilities except the left fork fan installation (1994). It should be noted that no construction activities will occur within one-half mile of the Golden Eagle nest located in the left hand fork during the nesting season, February 15 through July 15, if it is determined that the nest is active. Also, to minimize disturbance to wintering elk and deer there shall be no construction activities from December 1 through April 15. Except for snow removal, all routine maintenance will be accomplished from inside the mine.

Upon completion of construction of the left hand fork fan installation, Andalex will perform a slope stability study to ensure that all road embankments of a minimum static safety factor of 1.3. This study will also determine that the cut and fill slopes of the pad have a minimum static safety factor of 1.3. It should be noted that the construction of the pad will be consistent with common construction practices including limiting the thickness of lifts to a maximum of four (4) feet.

Reclamation of the pad, which is shown on the Cut Fill Cross Section Plates, will occur immediately after cessation of mining. Reclamation will consist of culvert removal with appropriate drainage protection, and regrading and backfilling to the original contour. This will be followed by replacement of topsoil and permanent revegetation. At all times during reclamation appropriate sediment control such as straw dikes and silt fences will be employed to prevent additional sediment contributions to the drainage system.

Revised 2/21/95

Construction Methods

Major Equipment

The portal and building sites were leveled using dozers, trucks, and loaders. At the building sites, the topsoil was removed and transported to a nearby area for storage.

All surface pads have been graveled and all other disturbed areas (pond embankments, etc.) have been reseeded.

R645-301-512.210. EXCESS SPOIL

N/A

R645-301-512.220. DURABLE ROCK FILLS

N/A

Revised 10/21/94, 2/21/95

R645-301-731.513. DIVERTING MINE WATER INTO UNDERGROUND WORKINGS

N/A

R645-301-731.520. GRAVITY DISCHARGES FROM MINE WORKINGS

If a discharge is found to occur after sealing, the water will be sampled quarterly for compliance with effluent standards of 817.42 and treated (if necessary) during the liability period. See Figures IV-1 and IV-2 for portal sealing details.

R645-301-731.521. DISCHARGE CONTROL

See R645-301-731.520.

Havent address the 48" culvert at the beginning of Road

R645-301-731.522. PREVENTION OF DISCHARGE

N/A

R645-301-731.600. STREAM BUFFER ZONES

R645-301-731.610. BUFFER ZONE LOCATIONS

The fan installation in the left hand fork of Deadman Canyon will require that the intermittent drainage is crossed. A 42-inch culvert will divert the natural runoff underneath the pad where the fan will be located. Since this activity is within 100 feet of an intermittent stream, the Division may authorize this activity by virtue of compliance with all R645-301-731.600 regulations. It should be emphasized that the stream buffer zones will not be adversely affected due to the installation of the culvert and the alternate sediment control measures. Also, travel on the access road and at the pad area will be restricted to times of no flow.

It should be noted (R645-301-542.600) that the access road to the fan installation is already in existence; Andalex intends only to upgrade the road as needed and as described. This road will be left in place following cessation of mining to be consistent with the pre-mining condition.

The culvert will be removed upon cessation of mining. Sediment control measures downstream from this activity will be provided in the form of silt fences or straw dikes located in the drainage channel during the removal of the culvert. As there are no

permanent water treatment facilities constructed for this fan installation, none need be removed. Typical designs for berms and diversions are shown on the Design Drawings. This includes the berm surrounding the topsoil pile. (See Plate "Aberdeen Mine Left Hand Fork Fan Installation, Sedimentation/Drainage Control".) These typical designs will adequately convey a two-year, ten-hour storm event. Sediment control during construction and reclamation will consist of straw bales or silt fences located downstream from the construction activity.

**R645-301-731.611. VOLITION OF WATER QUALITY
STANDARDS OR EFFLUENT LIMITATIONS**

Coal mining and reclamation operations will not cause or contribute to the violation of applicable Utah or federal water quality standards and will not adversely affect the water quantity and quality of other environmental resources of the stream.

Revised 11/17/94

R645-301-731.612. STREAM DIVERSIONS

See R645-301-512.240, Culvert Design

This diversion will comply with all the requirements of R645-301-742.300 (diversion structures). Also, please refer to culvert sizing calculations in Appendix O.

R645-301-731.620. BUFFER ZONE SIGNS AND MARKERS

This buffer zone will be marked as specified in R645-301-521.260. Signs will be clearly marked to prevent additional disturbance by operations.

Revised 11/07/94, 2/21/95



ARCHEOLOGICAL - ENVIRONMENTAL RESEARCH CORPORATION

P. O. Box 853 Bountiful, Utah 84011-0853

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September 26, 1994

Subject: **CULTURAL RESOURCE EVALUATION OF A PROPOSED
FAN PORTAL LOCATION IN THE DEADMAN CANYON
LOCALITY OF CARBON COUNTY, UTAH**

Project: **Andalex Mine Development Program**

Permit No.: **Dept. of Interior, BLM (Utah) -- Ut-93-54937**

State Project No: **UT-94-AF-556b**

To: **Andalex Resources, Inc., Attn: Michael Glasson, P.O. Box 902, Price, Utah
84501**

**Bureau of Land Management, Attn: Blaine Miller, P.O. Box AB, Price, Utah
84501**

Info: **Antiquities Section, Division of State History, 300 Rio Grande, Salt Lake City,
Utah 84101**

**CULTURAL RESOURCE EVALUATION
OF A PROPOSED FAN PORTAL LOCATION
IN THE
DEADMAN CANYON LOCALITY OF
CARBON COUNTY, UTAH**

Report Prepared for Andalex Resources, Inc.

Dept. of Interior (BLM-Utah) Permit No.: UT-93-54937
AERC Project 1451 (ANDX-94-3)

Utah State Project No.: UT-94-AF-556b

Principal Investigator
F. Richard Hauck, Ph.D.

Author of the Report
F. Richard Hauck



**ARCHEOLOGICAL-ENVIRONMENTAL RESEARCH
CORPORATION (AERC)**

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September 26, 1994

ABSTRACT

An intensive cultural resource evaluation has been conducted for the Andalex Resources, Inc. of a proposed fan portal break-out location situated on federal public lands in the Deadman Canyon locality of Carbon County, Utah. This evaluation involved a total of 1 acre associated with the arroyo fill, access route corridor, and break-out portal area in the Left Fork of Deadman Canyon.

These evaluations were conducted by F. Richard Hauck of AERC on September 21, 1994.

No previously recorded significant or National Register eligible cultural resources will be adversely affected by the proposed development.

No isolated artifacts were observed during the evaluation.

No paleontological loci were identified during the evaluation.

No newly identified cultural resource activity loci were discovered and recorded during the examination.

AERC recommends project clearance based on adherence to the stipulations noted in the final section of this report.

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GENERAL INFORMATION

On September 21, 1994, AERC archaeologist F. Richard Hauck conducted an intensive cultural resource evaluation within the Deadman Canyon locality of Carbon County Utah (see Map). This project was initiated for Andalex Resources, Inc. of Price, Utah.

This examination involved a proposed fan portal break-out location in the Left Fork Canyon of Deadman Canyon. A total of one acre was examined. This evaluation area was associated with the proposed development of an arroyo crossing which will be filled and drained through a culvert, an access roadway from the present two-track across the arroyo into the breakout location, and the fan portal location (see Map).

All evaluated areas are situated on federal lands administered by the Moab District, Price River Resource Area of the Bureau of Land Management (BLM).

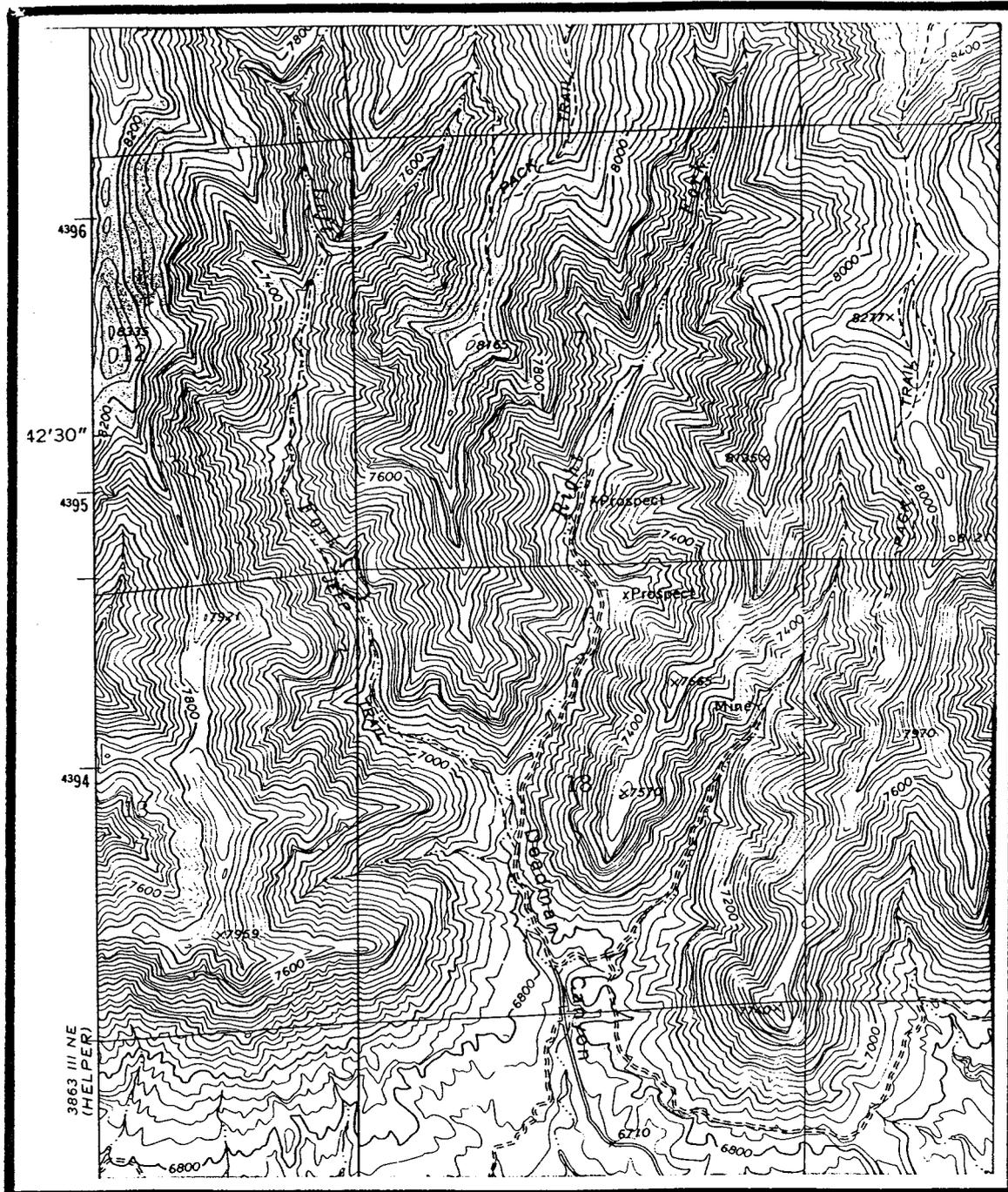
The purpose of the field study and this report is to identify and document cultural resource presence and assess National Register potential significance relative to established criteria (cf., Title 36 CFR 60.6). The development of the proposed fan portal location and access roadway requires an archaeological evaluation in compliance with U.C.A. 9-8-404, the Federal Antiquities Act of 1906, the Reservoir Salvage Act of 1960-as amended by P.L. 93-291, Section 106 of the National Historic Preservation Act of 1966-as amended, the National Environmental Policy Act of 1969, the Federal Land Policy and Management Act of 1979, the Archaeological Resources Protection Act of 1979, the Native American Religious Freedom Act of 1978, the Historic Preservation Act of 1980, and Executive Order 11593.

In addition to documenting cultural identity and significance, mitigation recommendations relative to the preservation of cultural data and materials can be directed to the Moab District of the BLM, and to the Utah State Antiquities Section. This work was done under U.S. Department of Interior Permit for Utah UT-93-54937 which expires on January 31, 1995.

Project Location

The proposed project area is situated on the canyon bottom and lower east slope associated with the Book Cliff complex in central Utah.

The proposed fan portal area is located in the adjacent corners of Sections 12 and 13, Township 13 South Range 10 East and Sections 7 and 18 of Township 13 South, Range 11 East (see Map).



T. 13 South
 R. 10 and 11 E.
Meridian: SLBM
Quad: Deadman
 Canyon, Utah

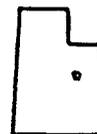
MAP

Cultural Resource Survey of
 a Proposed Fan Portal in
 the Deadman Canyon Locality
 of Carbon County, Utah

Legend:
 Portal Area
 Surveyed



Project: ANDX-94-3
Series: Central Utah
Date: 9-26-94
Scale: 1:24,000



This location is on public lands administrated by the Moab District, Price Area offices of the Bureau of Land Management.

The project location is in the Deadman Canyon locality of Carbon County, Utah. It is situated on the Deadman Canyon, Utah 7.5 minute topographic quad.

Environmental Description

The project area is situated at the 7010 foot elevation zone above sea level. Narrow canyon terrain surfaces are associated with this location.

The vegetation in the project area is characterized by Pinyon/Juniper woodland and associated rangeland vegetation including *Chrysothamnus spp.*, *Artemisia spp.*, and a variety of grasses. Cliffrose (*Cowania stansburiana*), Ash (*Fraxinus spp.*), Squawbush (*Rhus trilobata*), Oak (*Quercus spp.*) and Sarvisberry (*Amelanchier utahensis*) are encountered within the drainages and in water holding pockets within the sandstone ledges.

The geological association within this project area consists of the Cretaceous age Blackhawk Group (Hintze 1973; Stokes 1986).

PREVIOUS RESEARCH IN THE LOCALITY

File Search

A records search of the site files and maps at the Antiquities Section of the State Historic Preservation Office in Salt Lake City was conducted on September 12, 1994. A similar search was conducted in the Price BLM office on September 21, 1994. The National Register of Historic Places has been consulted and no registered historic or prehistoric properties will be affected by the proposed development.

Previous archaeological research in the locality has revealed the presence of few archaeological loci. The only previous evaluation within the project area involved an examination of the existing roadway corridor in the bottom of the Left Fork of Deadman Canyon conducted by Senco-Phoenix in 1986 (Senulis 1986). That examination passed through the western portion of the present project area; no cultural resources were observed or recorded.

Prehistory and History of the Cultural Region

Currently available information indicates that the southern Colorado Plateau Cultural Region has been occupied by a variety of cultures beginning perhaps as early as 10,000 B.C. These cultures, as identified by their material remains, demonstrate a cultural developmental process that begins with the earliest identified Paleoindian peoples (10,000 -- 7,000 B.C.) and extends through the Archaic (ca. 7,000 B.C. -- A.D. 300), and Formative (ca. A.D. 400 -- 1200) Stages, and the Late Prehistoric-Protohistoric periods (ca. A.D. 1200 -- 1850) to conclude in the Historic-Modern period which was initiated with the incursion of the Euro-American trappers, explorers, and settlers. Basically, each cultural stage -- with the exception of the Late Prehistoric hunting and gathering Shoshonean bands -- features a more complex life-way and social order than occurred during the earlier stage of development (Hauck 1991:53).

For a more comprehensive treatment of the prehistory and history of this region see Archaeological Evaluations in the Northern Colorado Plateau Cultural Area (Hauck 1991), Prehistory of Utah and the Eastern Great Basin (Jennings 1978), and Cultural Resource Evaluation in Central Utah -- 1977 (Hauck 1979).

FIELD EVALUATIONS

Methodology

The intensive evaluation associated with the proposed fan portal break-out area and its associated access route consisted of the archaeologist walking a series of 5 to 10 meter wide transects across the surface within the proposed development zone.

Observation of cultural materials results in intensive examinations to determine the nature of the resource (isolate or activity locus). The analysis of each specific cultural site results in its subsequently being sketched, photographed, and appropriately recorded on the standard Intermountain Antiquities Computer System (IMACS) forms. Cultural sites are then evaluated for significance utilizing the standards described below and mitigation recommendations are considered as a means of preserving significant resources which may be situated within the development zone.

Site Significance Criteria

Prehistoric and historic cultural sites which can be considered as eligible for nomination to the National Register of Historic Places have been outlined as follows in the National

Register's Criteria for Evaluation as established in Title 36 CFR 60.6: *The quality of significance in American ... archaeology ... and culture is present in ... sites ... that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:*

- a. That are associated with events that have made a significant contribution to the broad patterns of our history; or*
- b. that are associated with the lives of persons significant in our past; or*
- c. that embody the distinctive characteristics of a type, period, or method of construction ... ; or*
- d. that have yielded, or may be likely to yield, information important in prehistory or history.*

In addition to satisfying one or more of these general conditions, a significant cultural resource site in Utah will generally be considered as being eligible for inclusion in the National Register if it should advance our current state of knowledge relating to chronology, cultural relationships, origins, and cultural life ways of prehistoric or historic groups in the area.

In a final review of any site's cultural significance, the site must possess integrity and at least one of the above criteria to be considered eligible for nomination to the National Record of Historic Places.

Results of the Inventory

No prehistoric or historic cultural resource activity loci were observed and recorded during the archaeological evaluations.

No paleontological loci were observed or recorded during the evaluation.

No isolated artifacts were observed within the development area.

CONCLUSION AND RECOMMENDATIONS

No cultural or paleontological resources were observed within the development area during the archaeological survey.

AERC recommends that a cultural resource clearance be granted to Andalex Resources, Inc. relative to the development of this fan portal break-out location based upon adherence to the following stipulations:

1. all vehicle traffic, personnel movement, and construction should be confined to the flagged development areas as examined, and to existing roads;
2. all personnel should refrain from collecting artifacts or from disturbing any cultural resources in the area; and
3. the principal authority should be consulted should cultural remains from subsurface deposits be exposed during exploratory and developmental work or if the need arises to relocate or otherwise alter the development area.



F. Richard Hauck, Ph.D.
President and Principal
Investigator

REFERENCES

Hauck, F. Richard

1979 Cultural Resource Evaluation in Central Utah -- 1977. Cultural Resource Series, No. 3, Bureau of Land Management, Salt Lake City.

1991 Archaeological Evaluations on the Northern Colorado Plateau Cultural Area, AERC Paper No. 45, Archeological-Environmental Research Corporation, Bountiful.

Hintze, Lehi F.

1973 "Geologic History of Utah." Brigham Young University Geology Studies, Vol. 20, Pt. 3, Provo.

Jennings, Jesse D.

1978 Prehistory of Utah and The Eastern Great Basin." University of Utah Anthropological Papers Number 98. University of Utah Press, Salt Lake City.

1989 Prehistory of North America. Third Edition, Mayfield Publishing Company, Mountain View, California.

Senulis, John A.

1986 "Intensive Cultural Resource Survey and Inventory of the Left Fork of Deadman Canyon Coal Mine." Report prepared for the Beaver Creek Coal Company. Senco-Phoenix Consulting Company, Salt Lake City.

Stokes, W.L.

1986 "Geology of Utah." Occasional Paper Number 6 of the Utah Museum of Natural History, University of Utah, Salt Lake City.

PERMIT CHANGE TRACKING FORM

DATE RECEIVED	9/12/94	PERMIT NUMBER	ACT/007/019
Title of Proposal:	Ibe, Remote	PERMIT CHANGE #	946
Description:	Fur Installation	PERMITTEE	Indalex
		MINE NAME	Centennial

Submitted Rec'd 2/21/95

	DATE DUE	DATE DONE	RESULT
<input type="checkbox"/> 15 DAY INITIAL RESPONSE TO PERMIT CHANGE APPLICATION			<input type="checkbox"/> ACCEPTED <input type="checkbox"/> REJECTED
<input type="checkbox"/> Notice of Review Status of proposed permit change sent to the Permittee.			Permit Change Classification <input type="checkbox"/> Significant Permit Revision <input type="checkbox"/> Permit Amendment <input type="checkbox"/> Incidental Boundary Change
<input type="checkbox"/> Request additional review copies prior to Division/Other Agency review.			
<input type="checkbox"/> Notice of Approval of Publication. (If change is a Significant Revision.)			
<input type="checkbox"/> Notice of request to modify proposed permit change prior to approval.			

REVIEW TRACKING	INITIAL REVIEW		MODIFIED REVIEW		FINAL REVIEW AND FINDINGS	
DOGM REVIEWER	DUE	DONE	DUE	DONE	DUE	DONE
<input checked="" type="checkbox"/> Administrative <i>Paul</i>	10/14		11/18		3/31	5/18
<input checked="" type="checkbox"/> Biology <i>Paul</i>	10/14		11/18		3/31	5/18
<input checked="" type="checkbox"/> Engineering <i>Wayne</i>	10/14		11/18		3/31	3/31 5/19
<input type="checkbox"/> Geology						
<input checked="" type="checkbox"/> Soils <i>Henry</i>	10/14		11/18	11/16		
<input checked="" type="checkbox"/> Hydrology <i>Steve</i>	10/14		11/18		3/31	5/18
<input checked="" type="checkbox"/> Bonding <i>Wayne</i>	10/14		11/18		3/31	5/18
<input type="checkbox"/> AVS Check						

Rec'd 4/20

COORDINATED REVIEWS	DUE	DONE	DUE	DONE	DUE	DONE
<input type="checkbox"/> OSMRE						
<input type="checkbox"/> US Forest Service						
<input type="checkbox"/> Bureau of Land Management						
<input type="checkbox"/> US Fish and Wildlife Service						
<input type="checkbox"/> US National Parks Service						
<input type="checkbox"/> UT Environmental Quality						
<input type="checkbox"/> UT Water Resources						
<input type="checkbox"/> UT Water Rights						
<input type="checkbox"/> UT Wildlife Resources						
<input type="checkbox"/> UT State History						
<input type="checkbox"/> Other						

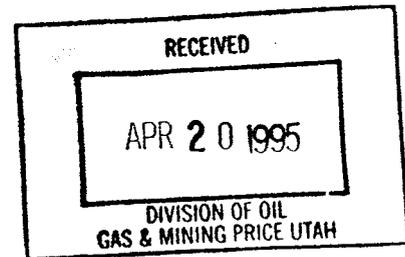
<input type="checkbox"/> Public Notice/Comment/Hearing Complete (If the permit change is a Significant Revision)	<input type="checkbox"/> Permit Change Approval Form signed and approved effective as of this date. <input type="checkbox"/> Permit Change Denied.
<input type="checkbox"/> Copies of permit change marked and ready for MRP.	<input type="checkbox"/> Notice of <input type="checkbox"/> Approval <input type="checkbox"/> Denial to Permittee.
<input type="checkbox"/> Special Conditions/Stipulations written for approval.	<input type="checkbox"/> Copy of Approved Permit Change to File.
<input type="checkbox"/> TA and CHIA modified as required.	<input type="checkbox"/> Copy of Approved Permit Change to Permittee.
<input type="checkbox"/> Permit Change Approval Form ready for approval.	<input type="checkbox"/> Copies to Other Agencies and Price Field Office.



ANDALEX
RESOURCES, INC.
Tower Division

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PRICE, UTAH 84501
PHONE (801) 637-5385
TELECOPIER (801) 637-8860

April 20, 1995



State of Utah
Department of Natural Resources
Division of Oil, Gas, & Mining
355 W. North Temple
3 Triad Center
Suite 350
Salt Lake City, UT 84180-1203

Attn: Pamela Grubaugh-Littig
re: ACT 007/019 Left Fork Fan

Dear Ms. Littig

#2

949
Copy Done -

Enclosed is Andalex's response to the deficiencies outlined in your March 21 letter. I am sure that this material will clarify any outstanding questions by your staff.

Sincerely,

Michael W. Glasson
Senior Geologist

However, for the purpose of this analysis, it should be assured that based on means cost data the following prices on earthwork can be used:

Open Dozer grading : \$2.25/yd
Fill Placement : \$1.16/yd
Topsoil Placement: \$1.16/yd
Topsoil Hauling: \$4.55/yd
Compaction: \$.21/yd

The following cost projection reflects hourly rates. An additional earthwork estimate can be found following the mass balance estimates.

Regarding the left hand fork fan installation, the specific time table for this project will coincide with the reclamation of the right hand fork minesite. The bond estimate now includes this fan installation and is still well within Andalex's existing bond amount. The specific schedule for reclamation of the fan will begin with the cut slope backfill, followed by removal of the culvert from the left fork drainage and, finally, by streambed reclamation the same as will be performed in the right hand fork. Topsoil redistribution and revegetation will follow the culvert removal. During both construction and reclamation phases, Andalex will provide adequate supplementary sediment control in the form of silt fences and/or straw berms to prevent additional sediment loads to the drainage.

Andalex has supplied the Division with a Drawing entitled "Left Hand Fork Cut/Fill". This drawing has a notation which indicates that the existing contours will reflect the reclamation contours (post-mining).

3
Text
Pages

Revised 11/09/94, 4/20/95

SPECIES	<u># PLS/acre</u>
<u>Grasses:</u>	
<u>Agropyron riparium</u>	2.0
Western wheatgrass	
<u>Agropyron trachycaulum</u>	2.0
Slender wheatgrass	
<u>Bromus marginatus</u>	3.0
Mountain brome	
<u>Elymus cinereus</u>	2.0
Great Basin wildrye	
<u>Phalaris arundinacea</u>	0.5
Reed canarygrass	
<u>Poa pratensis</u>	0.1
Sandberg bluegrass	
<u>Forbs:</u>	
<u>Achillea millifolium</u>	0.1
Yarrow	
<u>Artemisia ludoviciana</u>	0.1
Louisiana sagebrush	
<u>Hedysarum borealis</u>	1.0
Northern sweetvetch	
<u>Melilotus officinalis</u>	0.5
Yellow sweetclover	
<u>Osmorhiza occidentalis</u>	2.0
Sweet anise	
<u>Shrubs:</u>	
<u>Amelanchier alnifolia</u>	1.0
Serviceberry	
<u>Artemisia tridentata vaseyana</u>	0.1
Mountain big sagebrush	
<u>Rhus trilobata</u>	1.0
Squawbush	
<u>Sambucus cerulea</u>	1.0
Blue elderberry	
<u>Symphoricarpos oreophilus</u>	<u>1.0</u>
Mountain snowberry	
Total	17.4
<u>Trees (transplants):</u>	
<u>Populus angustifolia</u> (Narrowleaf cottonwood)	#/Acre 250
<u>Acer negundo</u> (Box Elder)	250
<u>Prunus virginiana</u> (Chokecherry)	250
<u>Quercus gambelii</u> (Gambel oak)	<u>250</u>
Total	<u>1000</u>

Rate is pounds Pure Live Seed/Acre for drill seeding. Broadcast seeding is double the drill rate.

*This seed mixture and shrub list will be used for interim reclamation in the left hand fork fan installation and on the new topsoil pile. This seed mixture and shrub list will also be used for final reclamation. Also, this shrub list will be attempted on the new topsoil pile in the left hand fork.

Revised 2/21/95, 4/20/95

permanent water treatment facilities constructed for this fan installation, none need be removed. Typical designs for berms and diversions are shown on the Design Drawings. This includes the berm surrounding the topsoil pile. (See Plate "Aberdeen Mine Left Hand Fork Fan Installation, Sedimentation/Drainage Control".) These typical designs will adequately convey a two-year, ten-hour storm event. Sediment control during construction and reclamation will consist of straw bales or silt fences located downstream from the construction activity.

The same restrictions will also apply to the 48-inch culvert at the lower road / stream crossing and in places where the road will be improved within the stream buffer zone. That is, activities will be allowed only during periods of no flow. Also, and by the same token, the lower culvert will be removed upon final reclamation if is deemed appropriate by the surface land-owner or management agency.

Andalex will reclaim this road entirely if it is determined through communications with the surface owners and land management agencies that this is the appropriate action. Andalex intends to obtain official comments on the status of the road for post-mining landuse from the State of Utah, Gladys Artman and the Bureau of Land Management.

R645-301-731.611. VOLITION OF WATER QUALITY STANDARDS OR EFFLUENT LIMITATIONS

Coal mining and reclamation operations will not cause or contribute to the violation of applicable Utah or federal water quality standards and will not adversely affect the water quantity and quality of other environmental resources of the stream.

Revised 11/17/94

R645-301-731.612. STREAM DIVERSIONS

See R645-301-512.240, Culvert Design

This diversion will comply with all the requirements of R645-301-742.300 (diversion structures). Also, please refer to culvert sizing calculations in Appendix O.

R645-301-731.620. BUFFER ZONE SIGNS AND MARKERS

This buffer zone will be marked as specified in R645-301-521.260. Signs will be clearly marked to prevent additional disturbance by operations.

Revised 11/07/94, 2/21/95, 4/20/95



BLACKHAWK ENGINEERING, CO.

Rt. 1, Box 146-H5 - Helper, Utah 84526 - Telephone (801) 637-2422

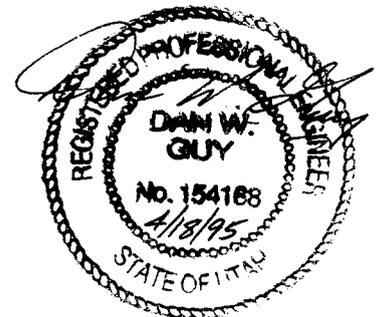
*Appendix
K*

SLOPE STABILITY EVALUATION

LEFT FORK DEADMAN CANYON

FAN ACCESS ROADS

**PREPARED BY: BLACKHAWK ENGINEERING, CO.
DAN W. GUY, P.E.
APRIL 18, 1995**





BLACKHAWK ENGINEERING, CO.

Rt. 1, Box 146-H5 - Helper, Utah 84526 - Telephone (801) 637-2422

April 18, 1995

*Mr. Mike Glasson
Andalex Resources, Inc.
P.O. Box 902
Price, Utah 84501*

*Re: Slope Stability Evaluation
Proposed Left Fork Fan Installation*

Dear Mike:

Per your request, I have completed a slope stability evaluation for the road embankments for the proposed left-fork of Deadman Canyon Fan Installation. The purpose of the evaluation was to show that existing and proposed road embankments will have a minimum static safety factor of at least 1.3. The following report will discuss the results of the field/literature investigation and engineering analysis.

Field Investigation

The proposed road project consists of using approximately 4100' of existing road in the canyon and construction of approximately 200' of a new access road to the proposed fan pad area.

Since the majority of the road is existing, and will receive only minimal upgrade for access, 2 cross-sections were surveyed at the steeper, more critical points on this road, at stations 20+00 and 34+00. An additional cross-section was run on the area of the proposed new access road at station 1+00, and the proposed road section was super-imposed on the existing ground line.

A soils investigation of this area was completed by Earthfax Engineering, Inc. on 09/22/94. The following soils descriptions were taken directly from their report:

Slopes are 8 to 20 percent. They are concave, east and west facing and are short in length.

Vegetation is that described as the Mountain Stony Loam (oak) range site in the following section. Most visible is the fairly dense gamble oak and bigtooth maple.

Included in mapping are small areas of Datino soils along the upper margins and small areas of a soil identical in all characteristics except it contains more rock fragments throughout the soil profile than is allowed for the Brycan series.

In a typical profile, the surface layer is grayish brown bouldery loam about 28 centimeters (11 inches) thick. The underlying layer is brown bouldery sandy loam about 38 centimeters (15 inches) thick. The next layer is pale brown sandy clay loam about 35 centimeters (14 inches) thick. The next layer is light brownish gray light clay loam (31 percent clay) about 35 centimeters (14 inches) thick. The next layer is pale brown loam about 35 centimeters (14 inches) thick. This soil has thick layers of buried surface layers.

Permeability is moderate. Available water capacity is about 28 centimeters (11 inches) to a depth of 1.5 meters (60 inches). Organic matter content of the surface, and in some buried layers, is about 2 percent. Effective rooting depth is about 1.5 meters (60 inches). Surface runoff is slow and erosion hazard is slight under native vegetation, and moderate if vegetation is removed. Erodibility is moderate. This soil is used for grazing of livestock and wildlife habitat.

The taxonomic classification of this soil is fine-loamy, mixed, Cumilic Haploborolls.

A typical pedon of Brycan bouldery loam, 8 to 20 percent slope was described near the north boundary of the Sunnyside Area, about 7.5 meters (25 feet) west of the drainage bottom.

Additional information on soils of the area was taken from a report by the Soil Conservation Service entitled "Soil Survey of Carbon Area, Utah". This report describes 2 soil types for the area:

- (1) Pathead - Curecanti Family for the lower (existing) road area and;*
- (2) Comodore - Datino Variant Complex for the proposed access road and pad area.*

Both soils are very similar in composition and are described as a stony, sandy loam with a low shrink/swell factor. Both soils are classed as A-2 to A-4 with a Plasticity Index of 5-15 and a liquid limit of 20-30. These descriptions are consistent with those in the Earthfax Report. It should also be noted that the same soil types occur in the right fork of Deadman Canyon at the existing minesite.

Methodology

Based on conversations with Mr. Wayne Western of the Utah Division of Oil, Gas and Mining, the use of available, pertinent information of the soils of the area would be acceptable for this investigation.

Two previous slope stability analyses had been conducted on the Centennial Sedimentation Pond "E" and Pinnacle Mines sites, by Palmer Wilding Consulting Engineers and Rollins, Brown & Gunnell, Inc., respectively. Since each of these areas are located in the same soil types as the proposed fan area and roads in the adjacent canyon, based on the SCS report, the geotechnical information on the soils was taken from these reports.

Based on the Sedimentation Pond Slope Stability Analyses by Palmer Wilding Consulting Engineers in May, 1989, the soil internal friction angles varied from 36° to 38° and the cohesion was 100 psf. Based on the Slope Stability Investigation of the Pinnacle Mine by Rollins, Brown and Gunnell, Inc. in February, 1981, the internal friction angle was 32° and the cohesion strength was based on a conservative 250 psf. Average material density was 102 pcf.

Using the above reports, a conservative value of 32° was used for the internal friction angle, 200 psf for the cohesion strength, and 102 pcf was used for material density. Slope heights and angles were taken directly from the cross-sections in Figures 1,2, & 3 of this report. No fractures were observed in the field and none are assumed present in this analysis.

The stability analyses was performed using the Hoek Method (Hoek, E., and J.W. Bray, 1981, Rock Slope Engineering, Revised Third Edition, IMM, London).

Parameters were established for the cut and fill slopes for each cross-section area. A rotational shear analysis was then performed on each section using the circular failure charts (Figures 4 and 5) in this report. A Factor of Safety for each area was then determined from the charts.

Stability Analyses

The following input parameters were used for each of the measured sections:

SECTION 1		
	Cut	Fill
Slope Height	10'	8'
Slope Angle	50°	24°
Soil Cohesion	200 psf	200 psf
Friction Angle	32°	32°
Bulk Density	102 pcf	102 pcf
SECTION 2		
	Cut	Fill
Slope Height	20'	22'
Slope Angle	48°	30°
Soil Cohesion	200 psf	200 psf
Friction Angle	32°	32°
Bulk Density	102 pcf	102 pcf

SECTION 3	Upslope Fill	Downslope Fill
<i>Slope Height</i>	<i>12'</i>	<i>10'</i>
<i>Slope Angle</i>	<i>26.5°</i>	<i>26.5°</i>
<i>Soil Cohesion</i>	<i>200 psf</i>	<i>200 psf</i>
<i>Friction Angle</i>	<i>32°</i>	<i>32°</i>
<i>Bulk Density</i>	<i>102 pcf</i>	<i>102 pcf</i>

Safety factors were determined in the following way:

- (1) The cohesion (200 psf) was divided by the multiple of the density (102 pcf) x the slope height (H) x the tangent of the internal friction angle (Tan 32°);*
- (2) The result of the above is found on the right side of the chart and the line is followed down to the slope angle;*
- (3) Once the intersection of the cohesion factor and slope angle is found, follow the horizontal line to the left and read the result of Tangent of internal friction angle divided by the Factor of Safety (F);*
- (4) The Factor of Safety is then determined by dividing the Tangent of the internal friction angle (Tan 32°) by the reading obtained in (3) above.*

Results

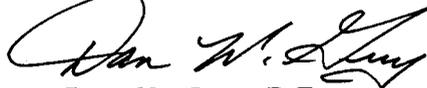
Section	Safety Factor (Dry Conditions)	Safety Factor (Saturated Conditions)
<i>#1 - Cut</i>	<i>1.95</i>	<i>1.52</i>
<i>#1 - Fill</i>	<i>3.68</i>	<i>2.60</i>
<i>#2 - Cut</i>	<i>1.49</i>	<i>1.30</i>
<i>#2 - Fill</i>	<i>2.08</i>	<i>1.45</i>
<i>#3 - Upslope (Fill)</i>	<i>2.72</i>	<i>2.08</i>
<i>#3 - Downslope (Fill)</i>	<i>3.12</i>	<i>2.23</i>

Conclusion

Based on the input parameters used, which are considered conservative, all measured cut and fill sections of the existing road and the proposed new road are demonstrated to have a slope stability Factor of Safety greater than 1.30, as required.

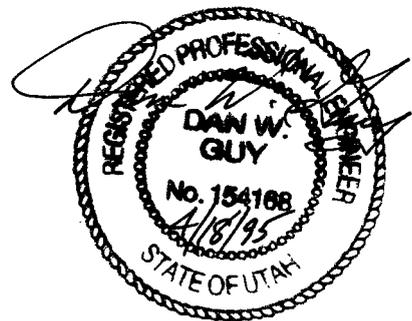
I appreciate the opportunity to work with you on this project. If you have any questions or need any further information, please let me know.

Respectfully,



Dan W. Guy, P.E.

President



LOWER SECTION #1
(EXISTING ROAD)

1" = 10'

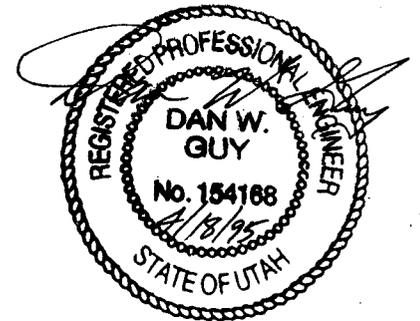
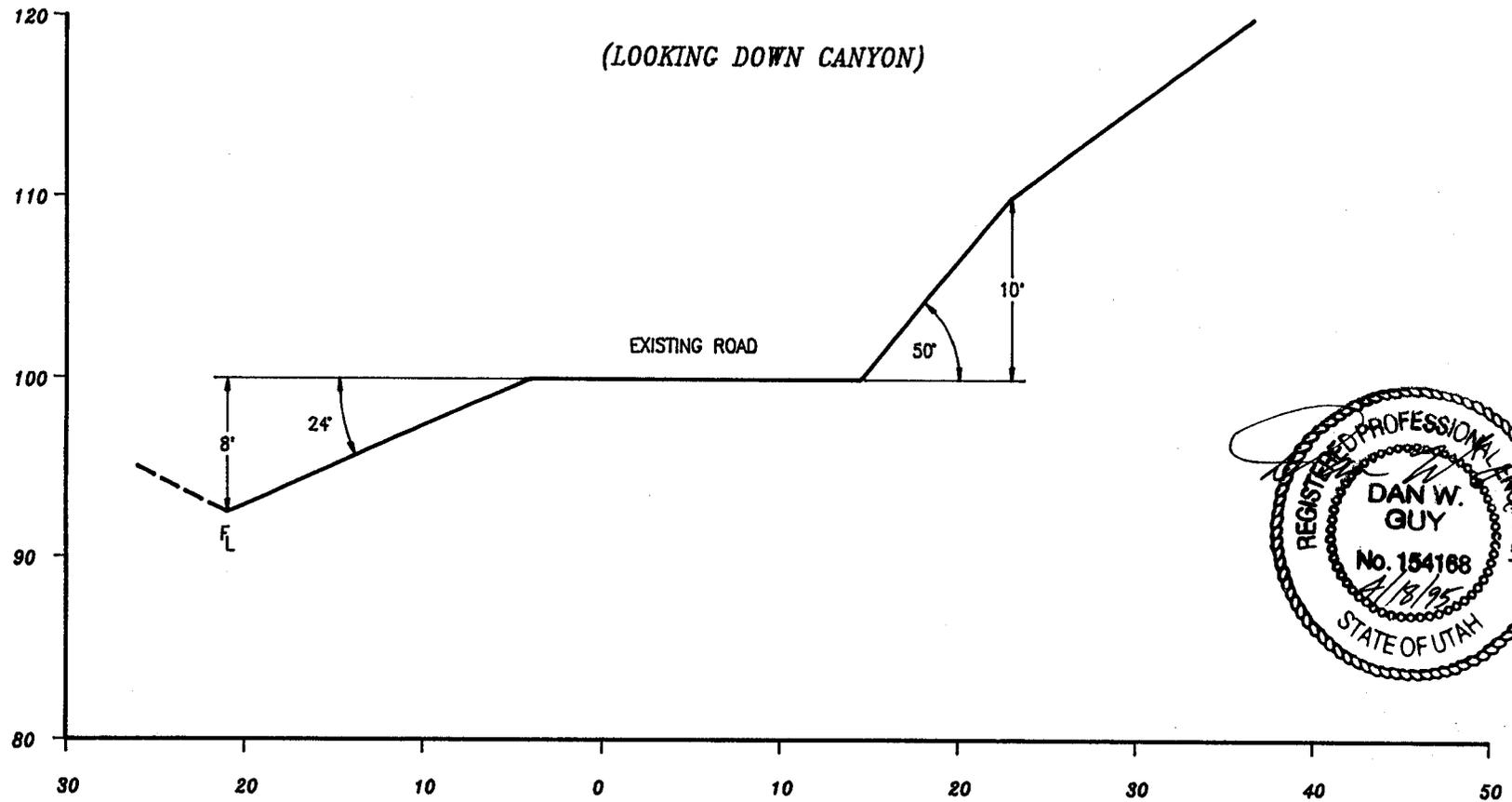


FIGURE 1

MIDDLE SECTION #2
(EXISTING ROAD)

1" = 10'

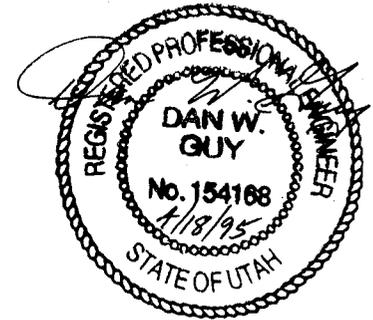
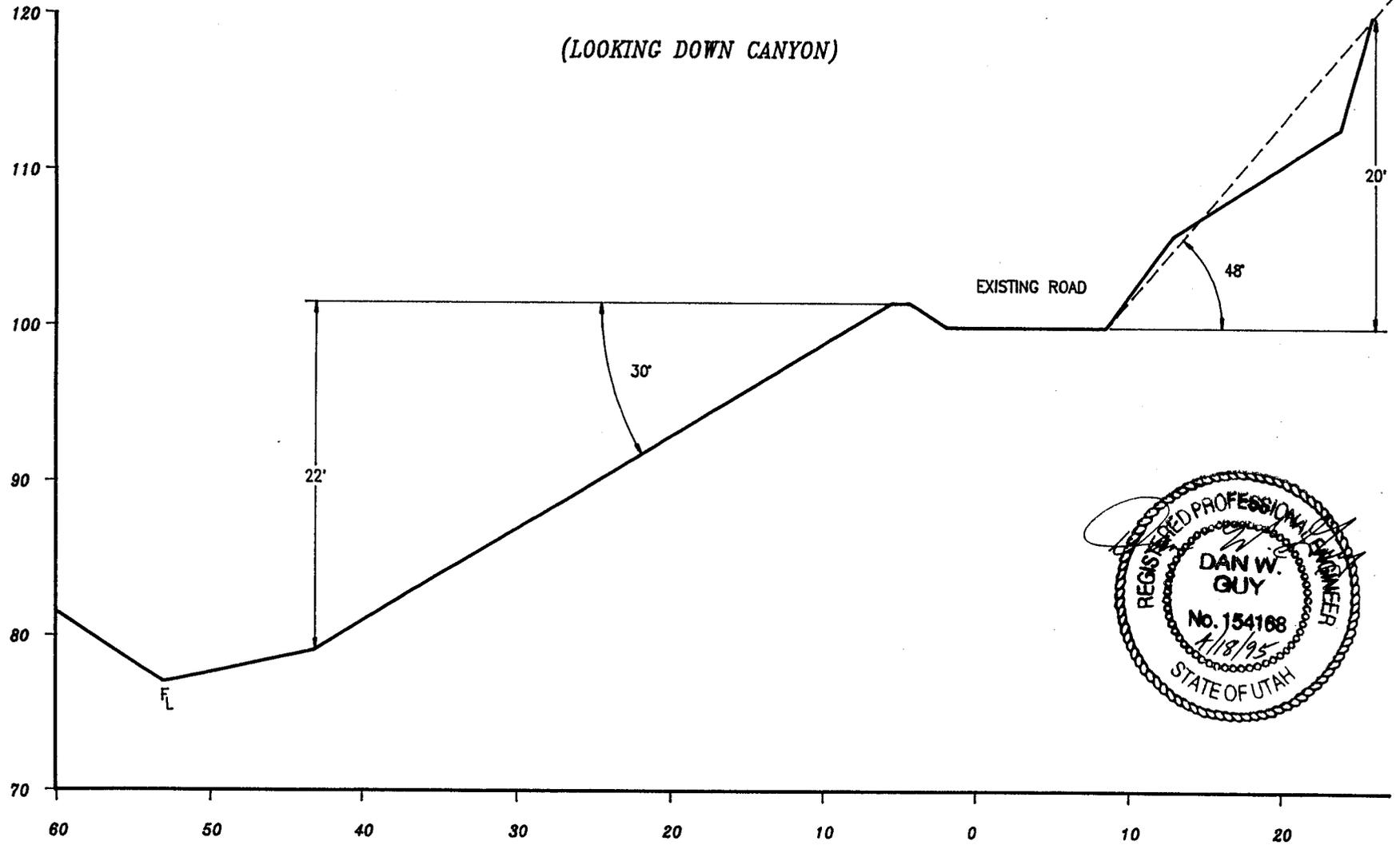


FIGURE 2

UPPER SECTION #3
(PROPOSED ROAD)

1" = 20'

(LOOKING UP CANYON)

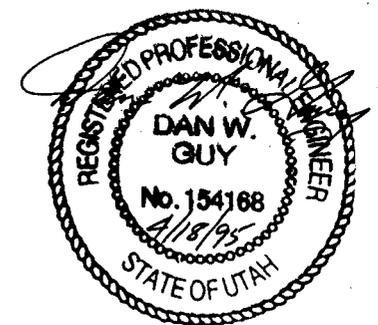
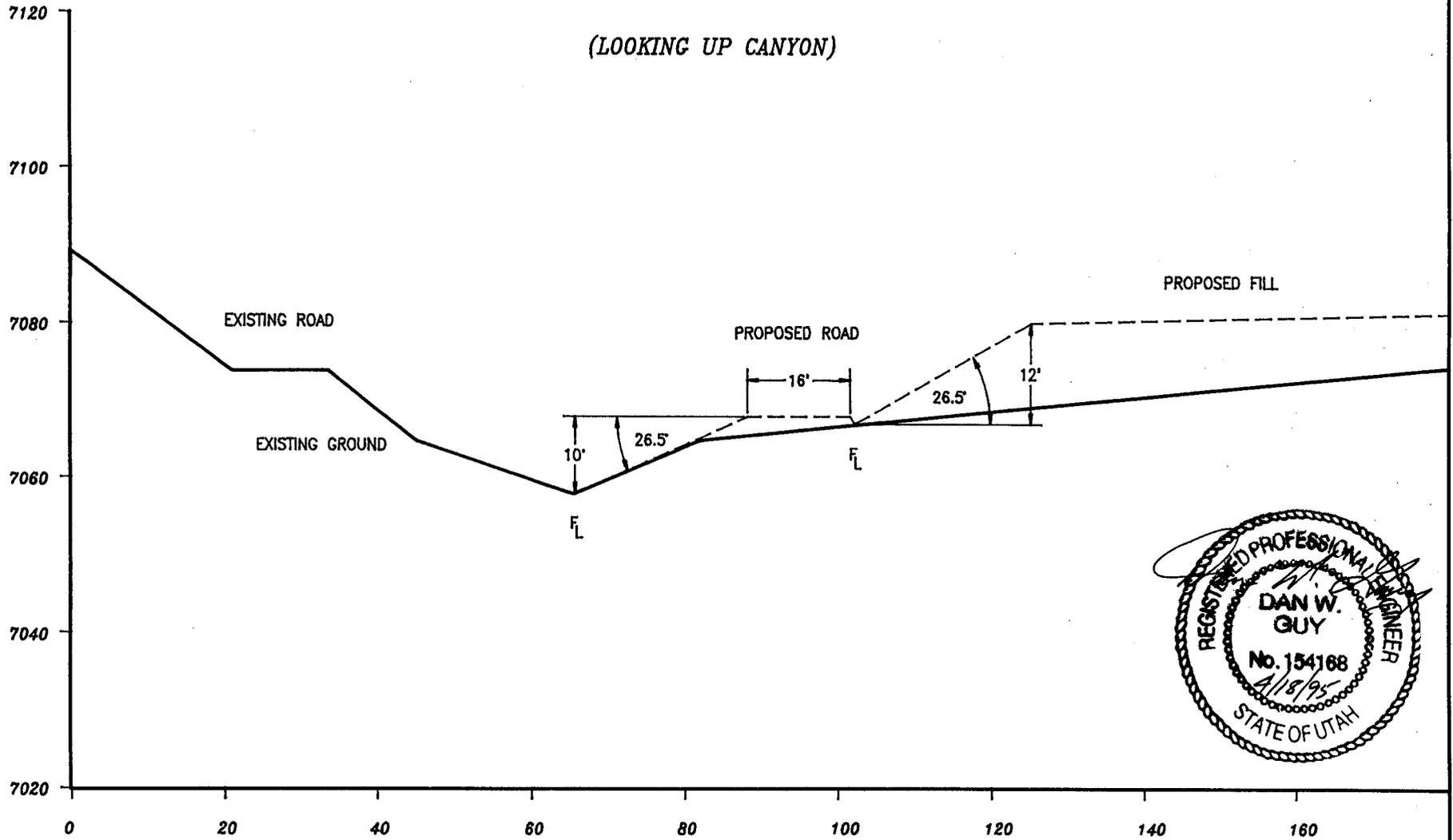


FIGURE 3

C=Cohesion-psf

Y=Density-pcf

H=Slope Height-ft.

ϕ =Internal Friction Angle

(DRY CONDITIONS)

CIRCULAR FAILURE CHART NUMBER 1

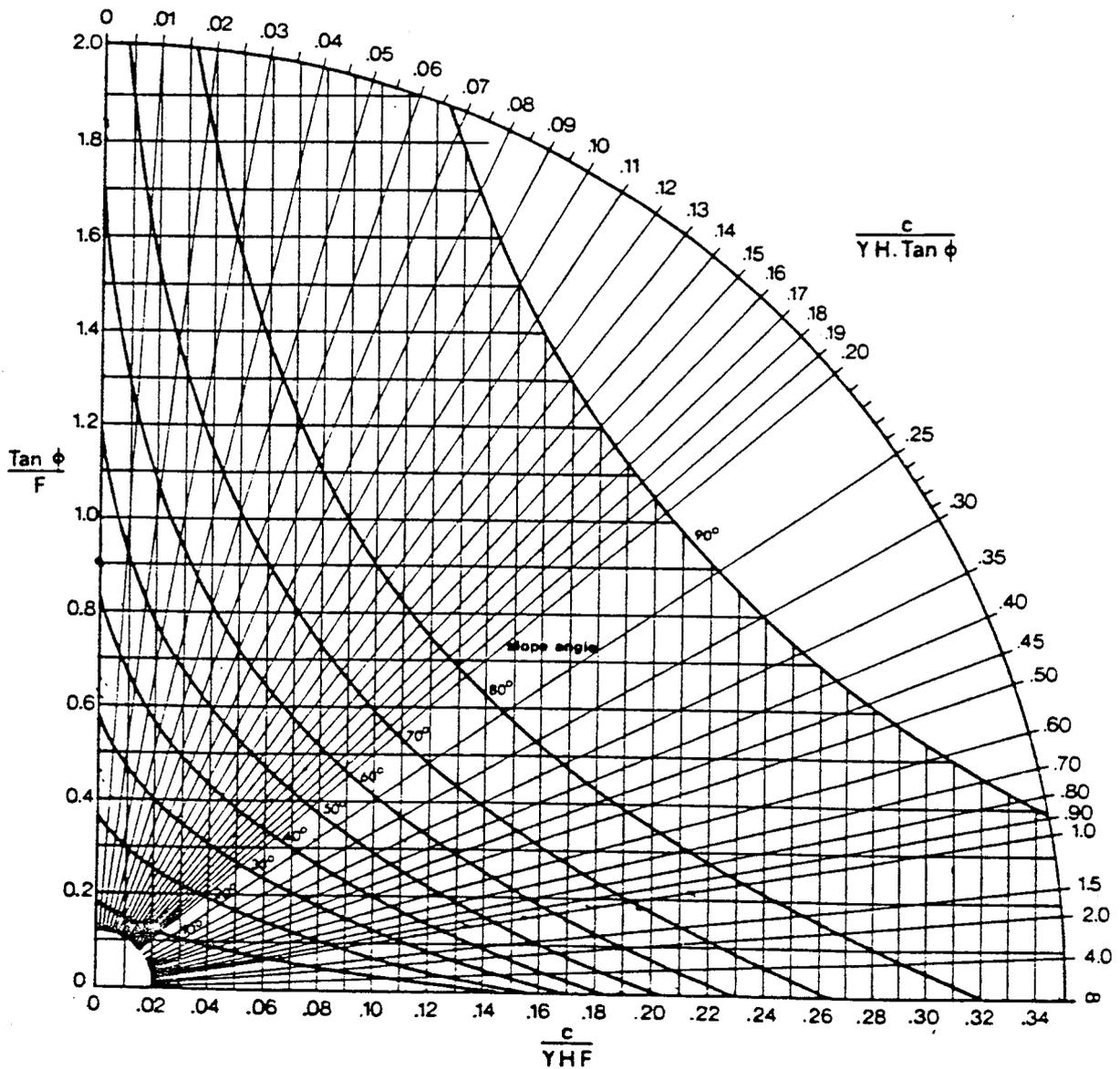


FIGURE 4

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

(SATURATED CONDITIONS)

CIRCULAR FAILURE CHART NUMBER 5

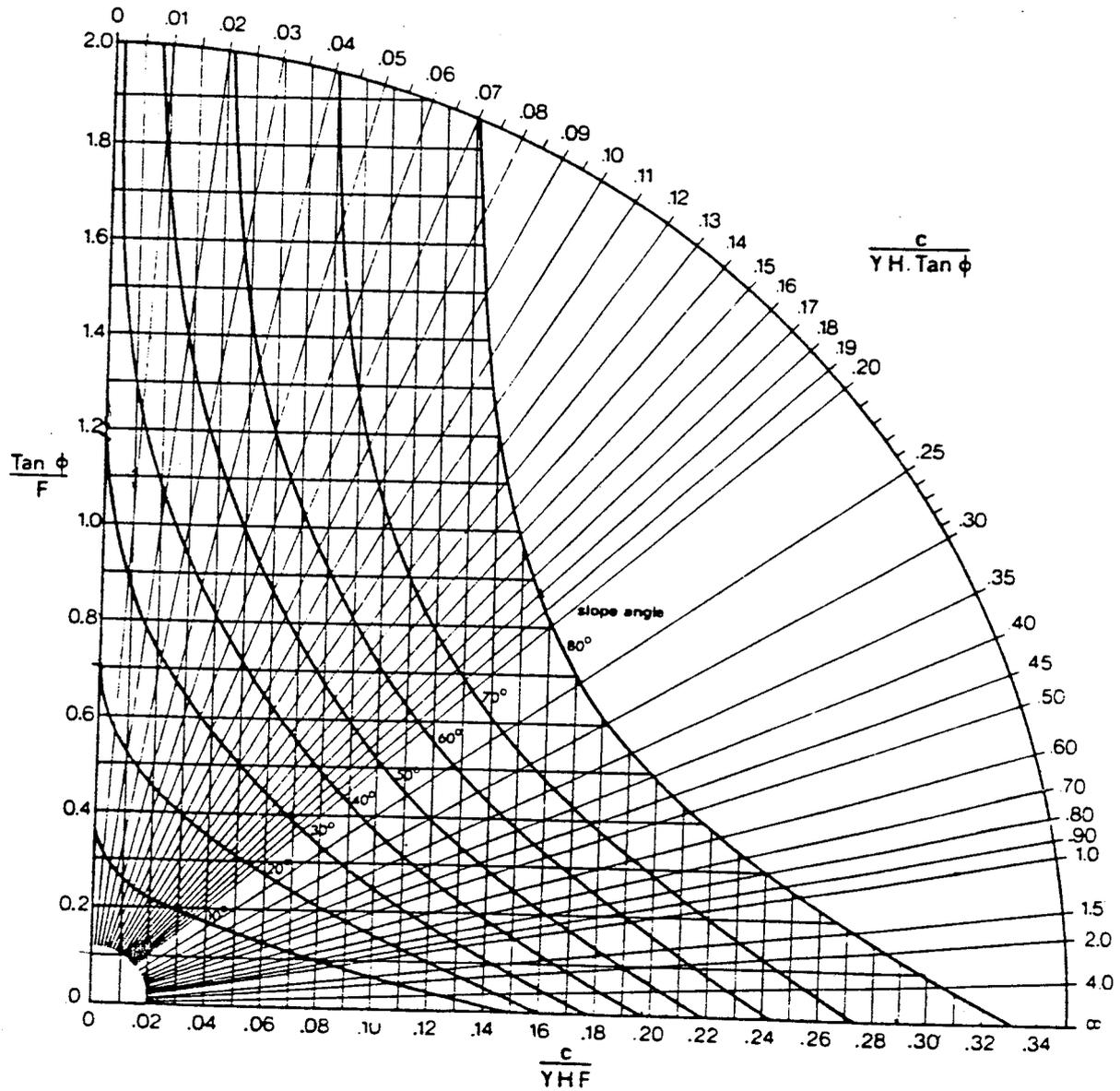


FIGURE 5

APPENDIX T

LEFT HAND FORK FAN

MISCELLANEOUS DIVERSIONS

Miscellaneous Diversions (Size Justification)

(1) *Fan Pad Ditch*

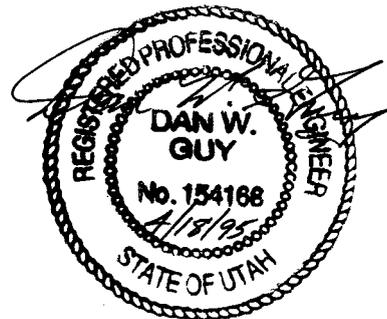
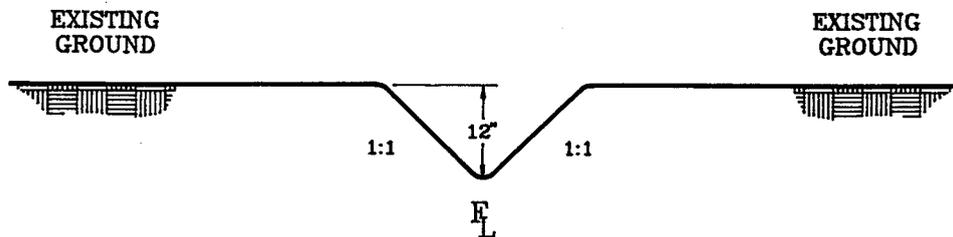
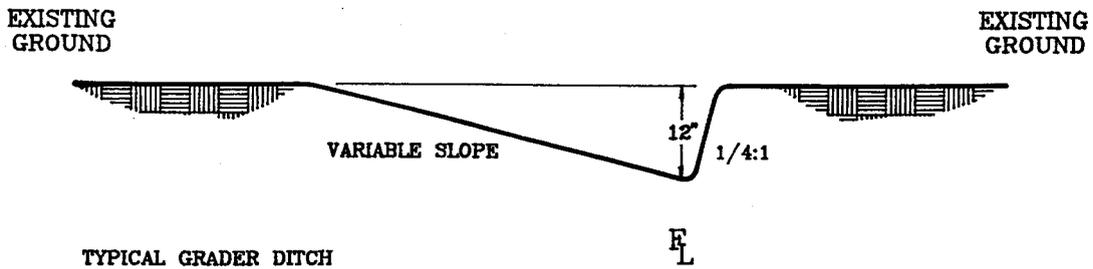
- a. *Sized for 10 year-24 hour or 100 year-6 hour storm.*
- b. *Maximum Flow Depth - 0.38'.*
- c. *Velocity less than 5.0 fps.*
- d. *12" deep; 1:1 side slopes; 9% grade.*

(2) *Berms*

- a. *Sized to contain or divert runoff from a 10 year-24 hour or 100 year-6 hour storm.*
- b. *Fan Pad Berm*
 1. *Maximum water depth against berm would be less than that in the fan pad ditch or 0.38'.*
- c. *Topsoil Berm*
 1. *Area is much less than that of the pad (approximately 0.12 acres vs. 0.80 acres).*
 2. *Runoff from topsoil pile would also be much less than from the pad; therefore, the maximum water depth against the berm would also be less than 0.38'.*
- d. *Berms are proposed to be a minimum of 1.5' high with 1:1 side slopes; therefore, berms are adequately sized to contain or direct the maximum runoff depth of 0.38' or less.*

Appendix
T

TYPICAL
DISTURBED DITCH
CONFIGURATIONS



NOTE:

DITCH SHAPE OR CONFIGURATION MAY VARY; HOWEVER MINIMUM CROSS-SECTIONAL AREAS WILL BE MAINTAINED AT 0.5 SQUARE FEET.

Title of run: FAN PAD DITCH 10/24

Solving for.....= Depth Normal
Triangle

Flow depth (ft).....=	0.38
First Side slope.....=	1.0
Second Side slope.....=	1.0
Slope of diversion.....=	0.0900
Manning"s n.....=	0.025
CFS.....=	0.68
Cross section area (sqft)..=	0.14
Hydrualic radius.....=	0.13
fps.....=	4.70
Froude number.....=	2.26

Title of run: FAN PAD DITCH 100/6

Solving for.....= Depth Normal
Triangle

Flow depth (ft).....=	0.38
First Side slope.....=	1.0
Second Side slope.....=	1.0
Slope of diversion.....=	0.0900
Manning"s n.....=	0.025
CFS.....=	0.68
Cross section area (sqft)..=	0.14
Hydrualic radius.....=	0.13
fps.....=	4.70
Froude number.....=	2.26

Title of run: FAN PAD DITCH 100/6

Solving for.....= Depth Normal

Triangle

Flow depth (ft).....=	0.38
First Side slope.....=	1.0
Second Side slope.....=	1.0
Slope of diversion.....=	0.0900
Manning"s n.....=	0.025
CFS.....=	0.68
Cross section area (sqft)..=	0.14
Hydrualic radius.....=	0.13
fps.....=	4.70
Froude number.....=	2.26

Title of run: FAN PAD DITCH 100/6

Solving for.....= Depth Normal
Triangle

Flow depth (ft).....=	0.38
First Side slope.....=	1.0
Second Side slope.....=	1.0
Slope of diversion.....=	0.0900
Manning"s n.....=	0.025
CFS.....=	0.68
Cross section area (sqft)..=	0.14
Hydrualic radius.....=	0.13
fps.....=	4.70
Froude number.....=	2.26

PERMIT CHANGE TRACKING FORM

DATE RECEIVED	7/12/94	PERMIT NUMBER	ACT/007/019
Title of Proposal:	IBC, Remote	PERMIT CHANGE #	946
Description:	Fan Installation	PERMITTEE	Indalex
		MINE NAME	Centennial

Submitted Rec'd 2/21/95

	DATE DUE	DATE DONE	RESULT
<input type="checkbox"/> 15 DAY INITIAL RESPONSE TO PERMIT CHANGE APPLICATION			<input type="checkbox"/> ACCEPTED <input type="checkbox"/> REJECTED
<input type="checkbox"/> Notice of Review Status of proposed permit change sent to the Permittee.			Permit Change Classification <input type="checkbox"/> Significant Permit Revision <input type="checkbox"/> Permit Amendment <input type="checkbox"/> Incidental Boundary Change
<input type="checkbox"/> Request additional review copies prior to Division/Other Agency review.			
<input type="checkbox"/> Notice of Approval of Publication. (If change is a Significant Revision.)			
<input type="checkbox"/> Notice of request to modify proposed permit change prior to approval.			

REVIEW TRACKING	INITIAL REVIEW		MODIFIED REVIEW		FINAL REVIEW AND FINDINGS	
DOGMR REVIEWER	DUE	DONE	DUE	DONE	DUE	DONE
<input checked="" type="checkbox"/> Administrative Paul	10/14		11/18		3/31	5/18
<input checked="" type="checkbox"/> Biology Paul	10/14		11/18		3/31	5/18
<input checked="" type="checkbox"/> Engineering Wayne	10/14		11/18		3/31	3/31 5/19
<input type="checkbox"/> Geology						
<input checked="" type="checkbox"/> Soils Henry	10/14		11/18	11/16		
<input checked="" type="checkbox"/> Hydrology Steve	10/14		11/18		3/31	5/18
<input checked="" type="checkbox"/> Bonding Wayne	10/14		11/18		3/31	3/31 5/18
<input type="checkbox"/> AVS Check						

Rec'd 4/20

COORDINATED REVIEWS	DUE	DONE	DUE	DONE	DUE	DONE
<input type="checkbox"/> OSMRE						
<input type="checkbox"/> US Forest Service						
<input type="checkbox"/> Bureau of Land Management						
<input type="checkbox"/> US Fish and Wildlife Service						
<input type="checkbox"/> US National Parks Service						
<input type="checkbox"/> UT Environmental Quality						
<input type="checkbox"/> UT Water Resources						
<input type="checkbox"/> UT Water Rights						
<input type="checkbox"/> UT Wildlife Resources						
<input type="checkbox"/> UT State History						
<input type="checkbox"/> Other						

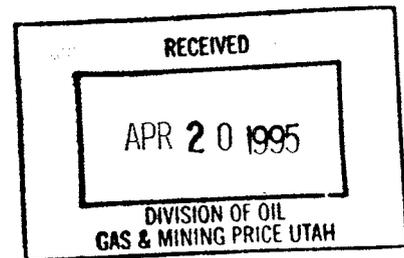
<input type="checkbox"/> Public Notice/Comment/Hearing Complete (If the permit change is a Significant Revision)	<input type="checkbox"/> Permit Change Approval Form signed and approved effective as of this date. <input type="checkbox"/> Permit Change Denied.
<input type="checkbox"/> Copies of permit change marked and ready for MRP.	<input type="checkbox"/> Notice of <input type="checkbox"/> Approval <input type="checkbox"/> Denial to Permittee.
<input type="checkbox"/> Special Conditions/Stipulations written for approval.	<input type="checkbox"/> Copy of Approved Permit Change to File.
<input type="checkbox"/> TA and CHIA modified as required.	<input type="checkbox"/> Copy of Approved Permit Change to Permittee.
<input type="checkbox"/> Permit Change Approval Form ready for approval.	<input type="checkbox"/> Copies to Other Agencies and Price Field Office.



ANDALEX
RESOURCES, INC.
Tower Division

P.O. BOX 902
PRICE, UTAH 84501
PHONE (801) 637-5385
TELECOPIER (801) 637-8860

April 20, 1995



State of Utah
Department of Natural Resources
Division of Oil, Gas, & Mining
355 W. North Temple
3 Triad Center
Suite 350
Salt Lake City, UT 84180-1203

Attn: Pamela Grubaugh-Littig
re: ACT 007/019 Left Fork Fan

Dear Ms. Littig

#2

949
Copy Done

Enclosed is Andalex's response to the deficiencies outlined in your March 21 letter. I am sure that this material will clarify any outstanding questions by your staff.

Sincerely,

Michael W. Glasson
Senior Geologist

However, for the purpose of this analysis, it should be assured that based on means cost data the following prices on earthwork can be used:

Open Dozer grading : \$2.25/yd
Fill Placement : \$1.16/yd
Topsoil Placement: \$1.16/yd
Topsoil Hauling: \$4.55/yd
Compaction: \$.21/yd

The following cost projection reflects hourly rates. An additional earthwork estimate can be found following the mass balance estimates.

Regarding the left hand fork fan installation, the specific time table for this project will coincide with the reclamation of the right hand fork minesite. The bond estimate now includes this fan installation and is still well within Andalex's existing bond amount. The specific schedule for reclamation of the fan will begin with the cut slope backfill, followed by removal of the culvert from the left fork drainage and, finally, by streambed reclamation the same as will be performed in the right hand fork. Topsoil redistribution and revegetation will follow the culvert removal. During both construction and reclamation phases, Andalex will provide adequate supplementary sediment control in the form of silt fences and/or straw berms to prevent additional sediment loads to the drainage.

Andalex has supplied the Division with a Drawing entitled "Left Hand Fork Cut/Fill". This drawing has a notation which indicates that the existing contours will reflect the reclamation contours (post-mining).

3
Text
Pages

Revised 11/09/94, 4/20/95

SPECIES	# PLS/acre
<u>Grasses:</u>	
<u>Agropyron riparium</u>	2.0
Western wheatgrass	
<u>Agropyron trachycaulum</u>	2.0
Slender wheatgrass	
<u>Bromus marginatus</u>	3.0
Mountain brome	
<u>Elymus cinereus</u>	2.0
Great Basin wildrye	
<u>Phalaris arundinacea</u>	0.5
Reed canarygrass	
<u>Poa pratensis</u>	0.1
Sandberg bluegrass	
<u>Forbs:</u>	
<u>Achillea millifolium</u>	0.1
Yarrow	
<u>Artemisia ludoviciana</u>	0.1
Louisiana sagebrush	
<u>Hedysarum borealis</u>	1.0
Northern sweetvetch	
<u>Melilotus officinalis</u>	0.5
Yellow sweetclover	
<u>Osmorhiza occidentalis</u>	2.0
Sweet anise	
<u>Shrubs:</u>	
<u>Amelanchier alnifolia</u>	1.0
Serviceberry	
<u>Artemisia tridentata vaseyana</u>	0.1
Mountain big sagebrush	
<u>Rhus trilobata</u>	1.0
Squawbush	
<u>Sambucus cerulea</u>	1.0
Blue elderberry	
<u>Symphoricarpos oreophilus</u>	1.0
Mountain snowberry	
Total	17.4
<u>Trees (transplants):</u>	
<u>Populus angustifolia</u> (Narrowleaf cottonwood)	250
<u>Acer negundo</u> (Box Elder)	250
<u>Prunus virginiana</u> (Chokecherry)	250
<u>Quercus gambelii</u> (Gambel oak)	250
Total	1000

Rate is pounds Pure Live Seed/Acre for drill seeding. Broadcast seeding is double the drill rate.

*This seed mixture and shrub list will be used for interim reclamation in the left hand fork fan installation and on the new topsoil pile. This seed mixture and shrub list will also be used for final reclamation. Also, this shrub list will be attempted on the new topsoil pile in the left hand fork.
Revised 2/21/95, 4/20/95

permanent water treatment facilities constructed for this fan installation, none need be removed. Typical designs for berms and diversions are shown on the Design Drawings. This includes the berm surrounding the topsoil pile. (See Plate "Aberdeen Mine Left Hand Fork Fan Installation, Sedimentation/Drainage Control".) These typical designs will adequately convey a two-year, ten-hour storm event. Sediment control during construction and reclamation will consist of straw bales or silt fences located downstream from the construction activity.

The same restrictions will also apply to the 48-inch culvert at the lower road / stream crossing and in places where the road will be improved within the stream buffer zone. That is, activities will be allowed only during periods of no flow. Also, and by the same token, the lower culvert will be removed upon final reclamation if is deemed appropriate by the surface land-owner or management agency.

Andalex will reclaim this road entirely if it is determined through communications with the surface owners and land management agencies that this is the appropriate action. Andalex intends to obtain official comments on the status of the road for post-mining landuse from the State of Utah, Gladys Artman and the Bureau of Land Management.

R645-301-731.611. VOLITION OF WATER QUALITY STANDARDS OR EFFLUENT LIMITATIONS

Coal mining and reclamation operations will not cause or contribute to the violation of applicable Utah or federal water quality standards and will not adversely affect the water quantity and quality of other environmental resources of the stream.

Revised 11/17/94

R645-301-731.612. STREAM DIVERSIONS

See R645-301-512.240, Culvert Design

This diversion will comply with all the requirements of R645-301-742.300 (diversion structures). Also, please refer to culvert sizing calculations in Appendix O.

R645-301-731.620. BUFFER ZONE SIGNS AND MARKERS

This buffer zone will be marked as specified in R645-301-521.260. Signs will be clearly marked to prevent additional disturbance by operations.

Revised 11/07/94, 2/21/95, 4/20/95



BLACKHAWK ENGINEERING, CO.

Rt. 1, Box 146-H5 - Helper, Utah 84526 - Telephone (801) 637-2422

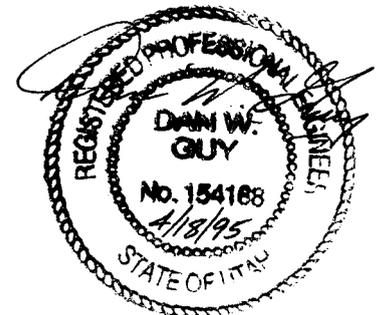
*Appendix
K.*

SLOPE STABILITY EVALUATION

LEFT FORK DEADMAN CANYON

FAN ACCESS ROADS

PREPARED BY: BLACKHAWK ENGINEERING, CO.
DAN W. GUY, P.E.
APRIL 18, 1995





BLACKHAWK ENGINEERING, CO.

Rt. 1, Box 146-H5 - Helper, Utah 84526 - Telephone (801) 637-2422

April 18, 1995

*Mr. Mike Glasson
Andalex Resources, Inc.
P.O. Box 902
Price, Utah 84501*

*Re: Slope Stability Evaluation
Proposed Left Fork Fan Installation*

Dear Mike:

Per your request, I have completed a slope stability evaluation for the road embankments for the proposed left-fork of Deadman Canyon Fan Installation. The purpose of the evaluation was to show that existing and proposed road embankments will have a minimum static safety factor of at least 1.3. The following report will discuss the results of the field/literature investigation and engineering analysis.

Field Investigation

The proposed road project consists of using approximately 4100' of existing road in the canyon and construction of approximately 200' of a new access road to the proposed fan pad area.

Since the majority of the road is existing, and will receive only minimal upgrade for access, 2 cross-sections were surveyed at the steeper, more critical points on this road, at stations 20+00 and 34+00. An additional cross-section was run on the area of the proposed new access road at station 1+00, and the proposed road section was super-imposed on the existing ground line.

A soils investigation of this area was completed by Earthfax Engineering, Inc. on 09/22/94. The following soils descriptions were taken directly from their report:

Slopes are 8 to 20 percent. They are concave, east and west facing and are short in length.

Vegetation is that described as the Mountain Stony Loam (oak) range site in the following section. Most visible is the fairly dense gamble oak and bigtooth maple.

Included in mapping are small areas of Datino soils along the upper margins and small areas of a soil identical in all characteristics except it contains more rock fragments throughout the soil profile than is allowed for the Brycan series.

In a typical profile, the surface layer is grayish brown bouldery loam about 28 centimeters (11 inches) thick. The underlying layer is brown bouldery sandy loam about 38 centimeters (15 inches) thick. The next layer is pale brown sandy clay loam about 35 centimeters (14 inches) thick. The next layer is light brownish gray light clay loam (31 percent clay) about 35 centimeters (14 inches) thick. The next layer is pale brown loam about 35 centimeters (14 inches) thick. This soil has thick layers of buried surface layers.

Permeability is moderate. Available water capacity is about 28 centimeters (11 inches) to a depth of 1.5 meters (60 inches). Organic matter content of the surface, and in some buried layers, is about 2 percent. Effective rooting depth is about 1.5 meters (60 inches). Surface runoff is slow and erosion hazard is slight under native vegetation, and moderate if vegetation is removed. Erodibility is moderate. This soil is used for grazing of livestock and wildlife habitat.

The taxonomic classification of this soil is fine-loamy, mixed, Cumilic Haploborolls.

A typical pedon of Brycan bouldery loam, 8 to 20 percent slope was described near the north boundary of the Sunnyside Area, about 7.5 meters (25 feet) west of the drainage bottom.

Additional information on soils of the area was taken from a report by the Soil Conservation Service entitled "Soil Survey of Carbon Area, Utah". This report describes 2 soil types for the area:

- (1) Pathead - Curecanti Family for the lower (existing) road area and;*
- (2) Comodore - Datino Variant Complex for the proposed access road and pad area.*

Both soils are very similar in composition and are described as a stony, sandy loam with a low shrink/swell factor. Both soils are classed as A-2 to A-4 with a Plasticity Index of 5-15 and a liquid limit of 20-30. These descriptions are consistent with those in the Earthfax Report. It should also be noted that the same soil types occur in the right fork of Deadman Canyon at the existing minesite.

Methodology

Based on conversations with Mr. Wayne Western of the Utah Division of Oil, Gas and Mining, the use of available, pertinent information of the soils of the area would be acceptable for this investigation.

Two previous slope stability analyses had been conducted on the Centennial Sedimentation Pond "E" and Pinnacle Mines sites, by Palmer Wilding Consulting Engineers and Rollins, Brown & Gunnell, Inc., respectively. Since each of these areas are located in the same soil types as the proposed fan area and roads in the adjacent canyon, based on the SCS report, the geotechnical information on the soils was taken from these reports.

Based on the Sedimentation Pond Slope Stability Analyses by Palmer Wilding Consulting Engineers in May, 1989, the soil internal friction angles varied from 36° to 38° and the cohesion was 100 psf. Based on the Slope Stability Investigation of the Pinnacle Mine by Rollins, Brown and Gunnell, Inc. in February, 1981, the internal friction angle was 32° and the cohesion strength was based on a conservative 250 psf. Average material density was 102 pcf.

Using the above reports, a conservative value of 32° was used for the internal friction angle, 200 psf for the cohesion strength, and 102 pcf was used for material density. Slope heights and angles were taken directly from the cross-sections in Figures 1,2, & 3 of this report. No fractures were observed in the field and none are assumed present in this analysis.

The stability analyses was performed using the Hoek Method (Hoek, E., and J.W. Bray, 1981, Rock Slope Engineering, Revised Third Edition, IMM, London).

Parameters were established for the cut and fill slopes for each cross-section area. A rotational shear analysis was then performed on each section using the circular failure charts (Figures 4 and 5) in this report. A Factor of Safety for each area was then determined from the charts.

Stability Analyses

The following input parameters were used for each of the measured sections:

SECTION 1

	<i>Cut</i>	<i>Fill</i>
<i>Slope Height</i>	10'	8'
<i>Slope Angle</i>	50°	24°
<i>Soil Cohesion</i>	200 psf	200 psf
<i>Friction Angle</i>	32°	32°
<i>Bulk Density</i>	102 pcf	102 pcf

SECTION 2

	<i>Cut</i>	<i>Fill</i>
<i>Slope Height</i>	20'	22'
<i>Slope Angle</i>	48°	30°
<i>Soil Cohesion</i>	200 psf	200 psf
<i>Friction Angle</i>	32°	32°
<i>Bulk Density</i>	102 pcf	102 pcf

<i>SECTION 3</i>	<i>Upslope Fill</i>	<i>Downslope Fill</i>
<i>Slope Height</i>	<i>12'</i>	<i>10'</i>
<i>Slope Angle</i>	<i>26.5°</i>	<i>26.5°</i>
<i>Soil Cohesion</i>	<i>200 psf</i>	<i>200 psf</i>
<i>Friction Angle</i>	<i>32°</i>	<i>32°</i>
<i>Bulk Density</i>	<i>102 pcf</i>	<i>102 pcf</i>

Safety factors were determined in the following way:

- (1) The cohesion (200 psf) was divided by the multiple of the density (102 pcf) x the slope height (H) x the tangent of the internal friction angle (Tan 32°);*
- (2) The result of the above is found on the right side of the chart and the line is followed down to the slope angle;*
- (3) Once the intersection of the cohesion factor and slope angle is found, follow the horizontal line to the left and read the result of Tangent of internal friction angle divided by the Factor of Safety (F);*
- (4) The Factor of Safety is then determined by dividing the Tangent of the internal friction angle (Tan 32°) by the reading obtained in (3) above.*

Results

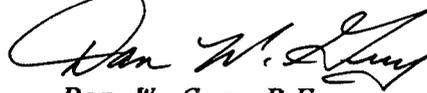
<i>Section</i>	<i>Safety Factor (Dry Conditions)</i>	<i>Safety Factor (Saturated Conditions)</i>
<i>#1 - Cut</i>	<i>1.95</i>	<i>1.52</i>
<i>#1 - Fill</i>	<i>3.68</i>	<i>2.60</i>
<i>#2 - Cut</i>	<i>1.49</i>	<i>1.30</i>
<i>#2 - Fill</i>	<i>2.08</i>	<i>1.45</i>
<i>#3 - Upslope (Fill)</i>	<i>2.72</i>	<i>2.08</i>
<i>#3 - Downslope (Fill)</i>	<i>3.12</i>	<i>2.23</i>

Conclusion

Based on the input parameters used, which are considered conservative, all measured cut and fill sections of the existing road and the proposed new road are demonstrated to have a slope stability Factor of Safety greater than 1.30, as required.

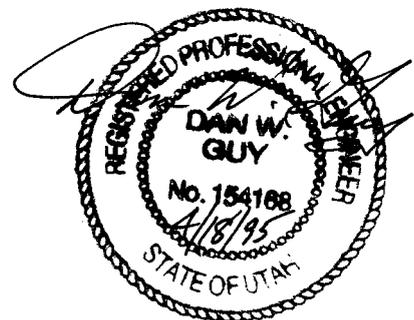
I appreciate the opportunity to work with you on this project. If you have any questions or need any further information, please let me know.

Respectfully,



Dan W. Guy, P.E.

President



LOWER SECTION #1
(EXISTING ROAD)

1" = 10'

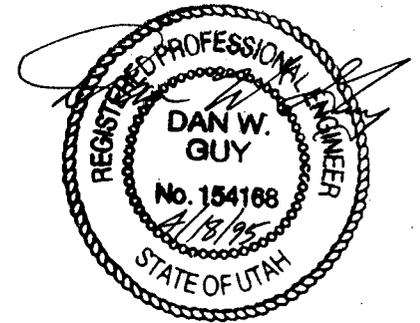
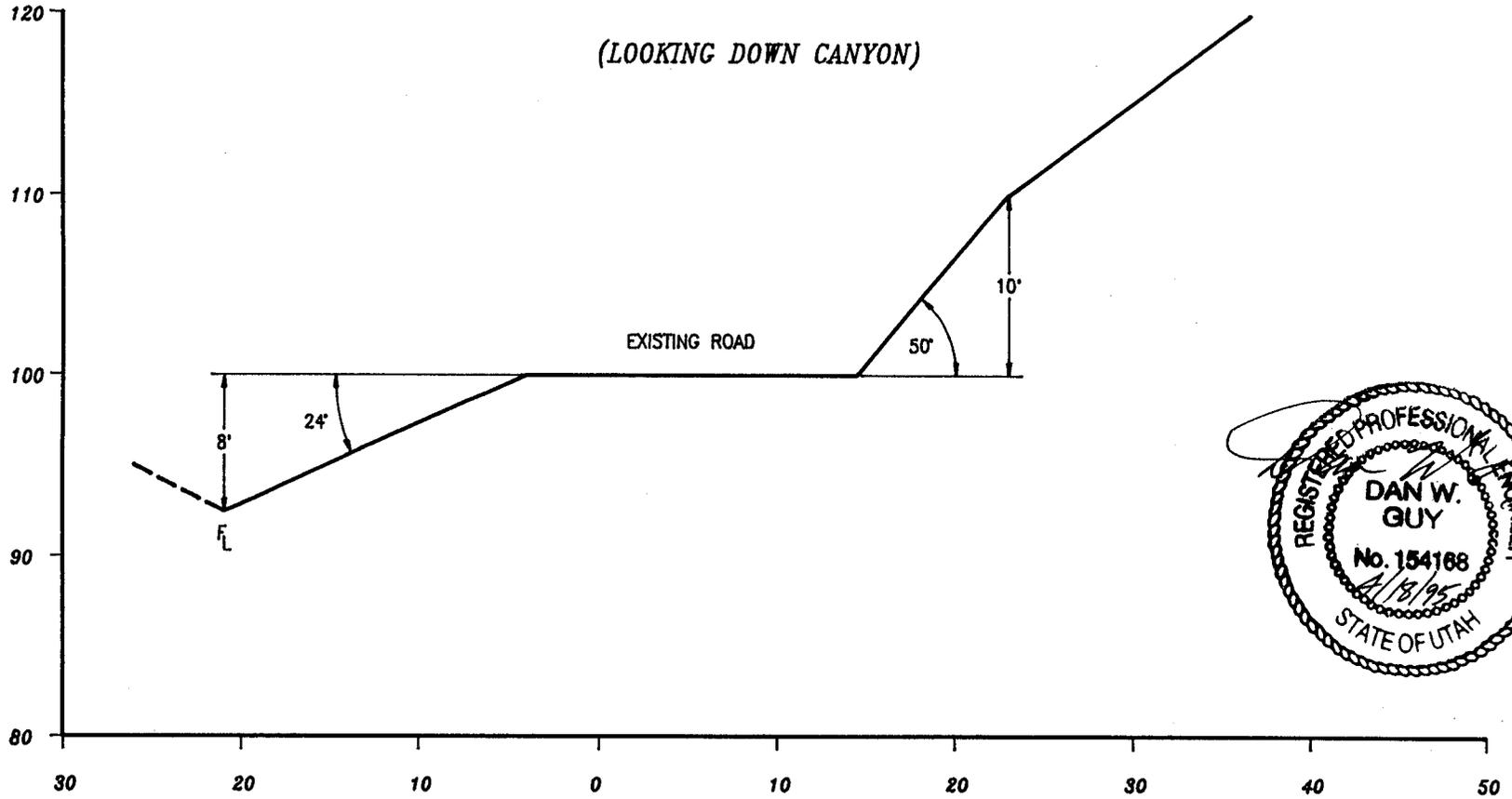


FIGURE 1

MIDDLE SECTION #2
(EXISTING ROAD)

1" = 10'

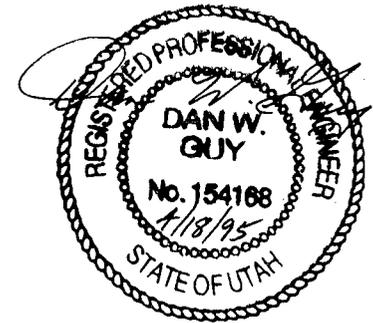
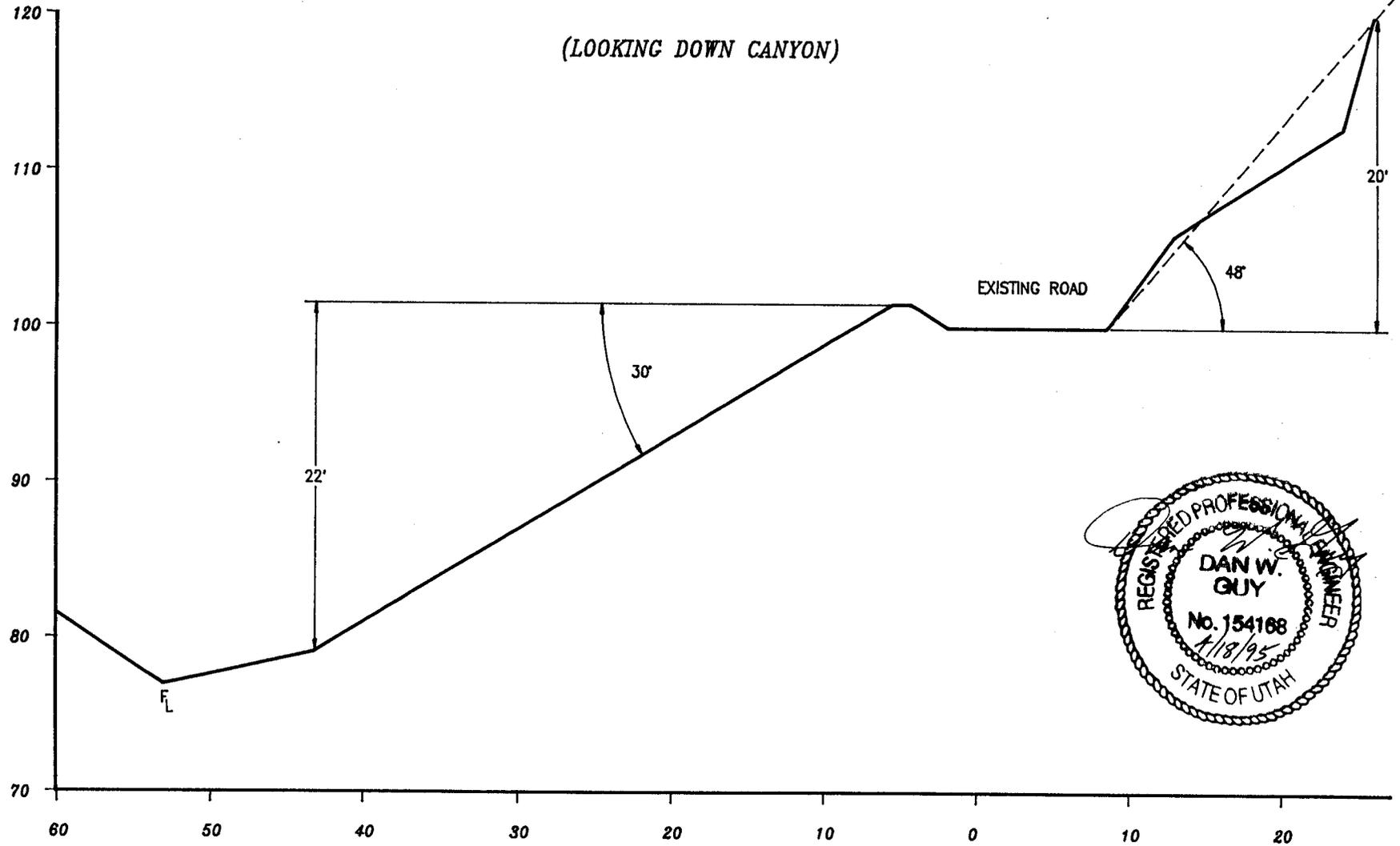


FIGURE 2

UPPER SECTION #3
(PROPOSED ROAD)

1" = 20'

(LOOKING UP CANYON)

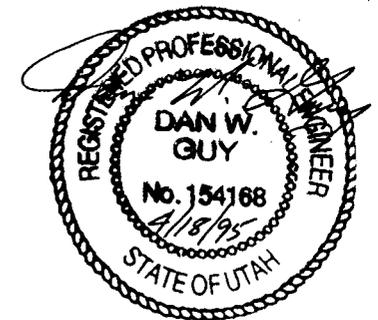
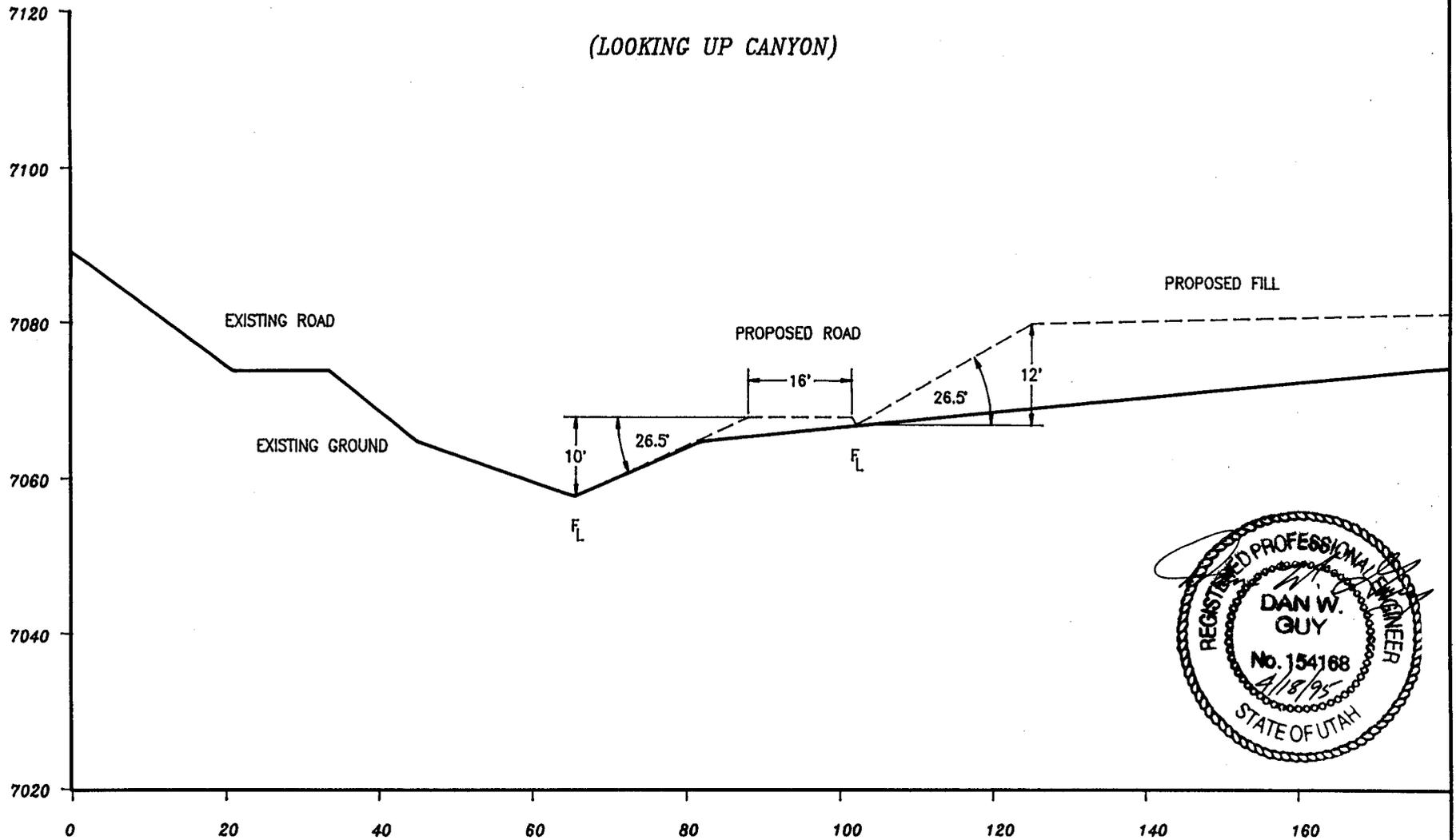


FIGURE 3

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

(DRY CONDITIONS)

CIRCULAR FAILURE CHART NUMBER 1

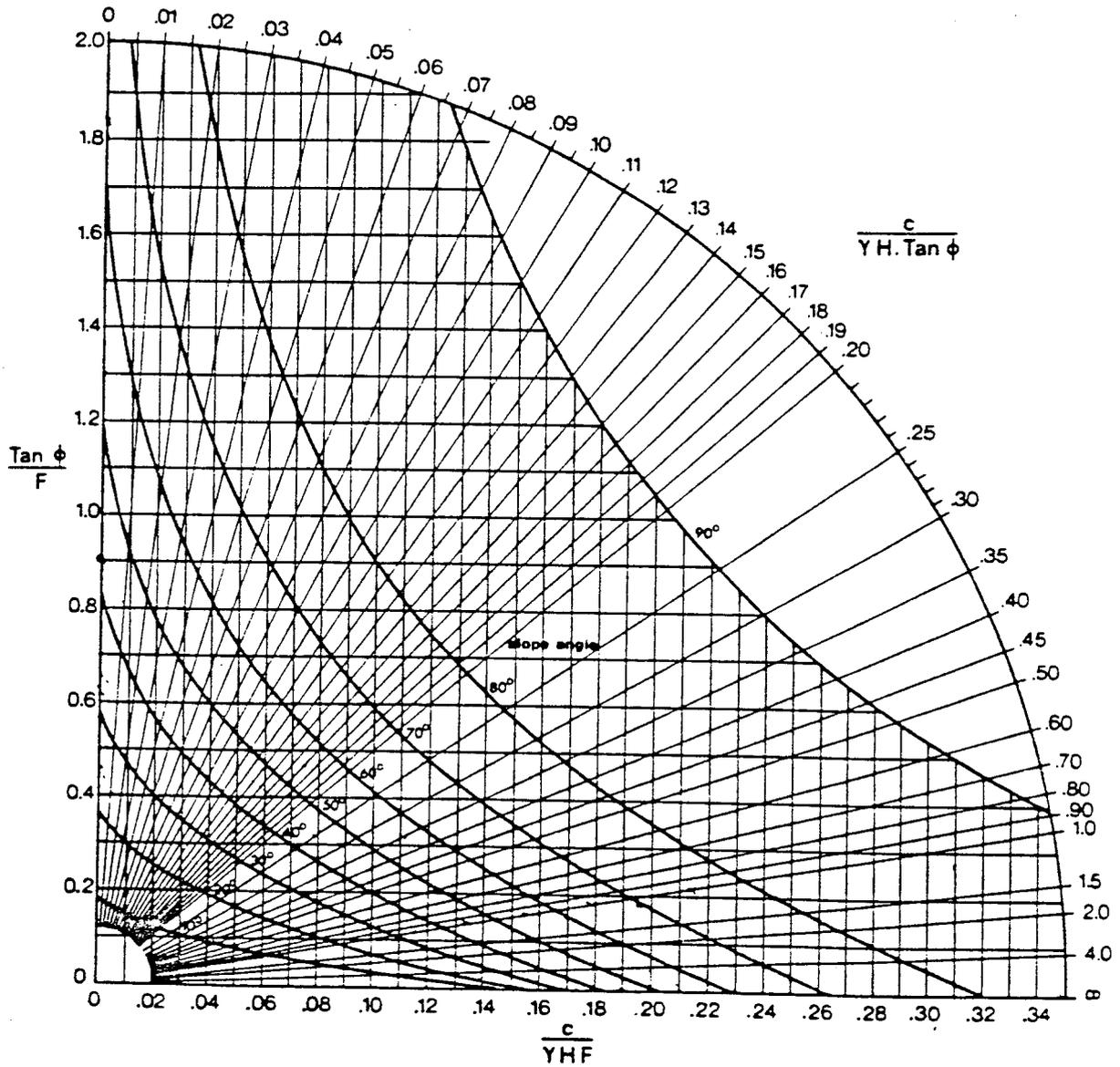


FIGURE 4

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

(SATURATED CONDITIONS)

CIRCULAR FAILURE CHART NUMBER 5

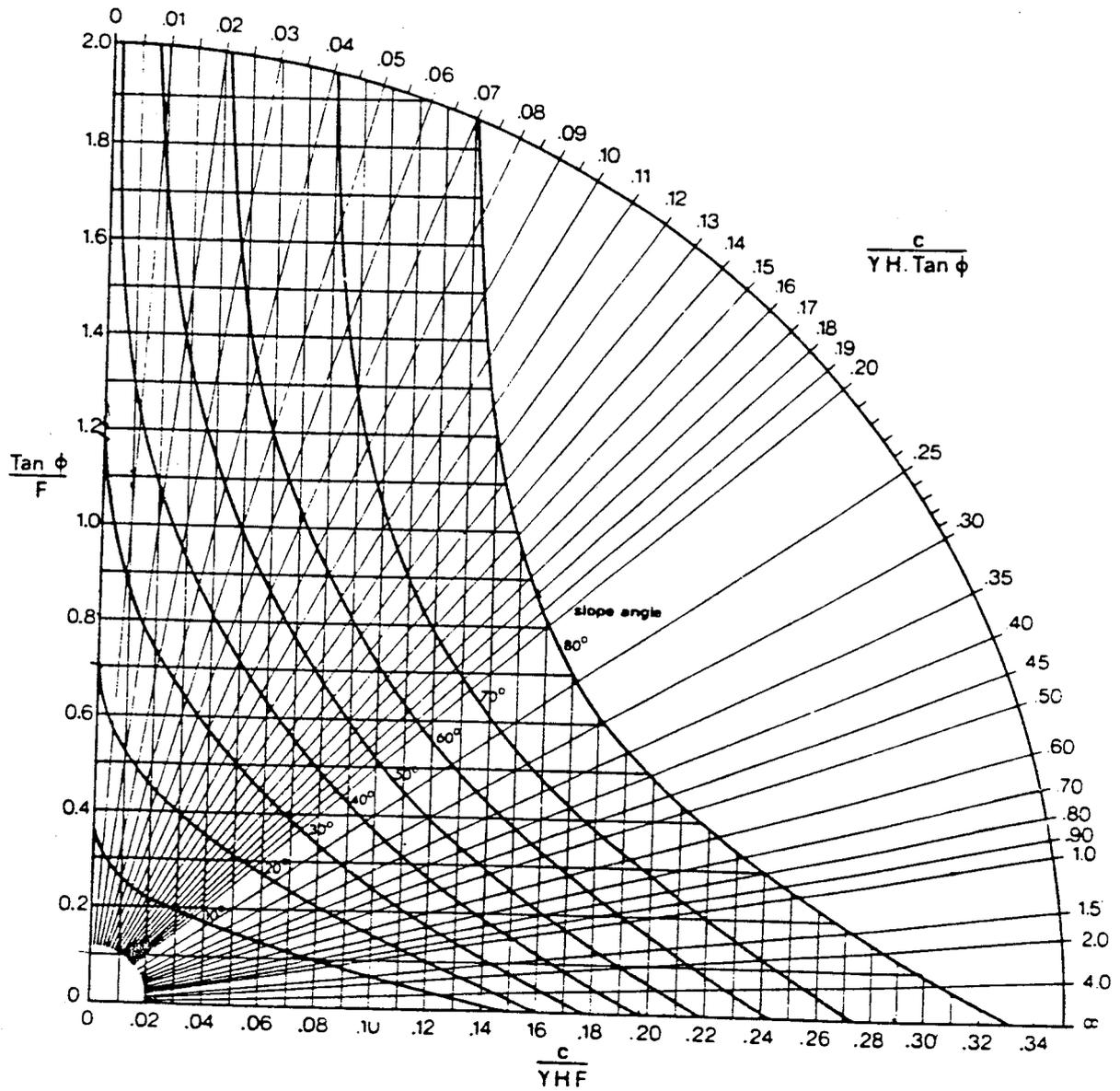


FIGURE 5

APPENDIX T
LEFT HAND FORK FAN
MISCELLANEOUS DIVERSIONS

Appendix
T

Miscellaneous Diversions (Size Justification)

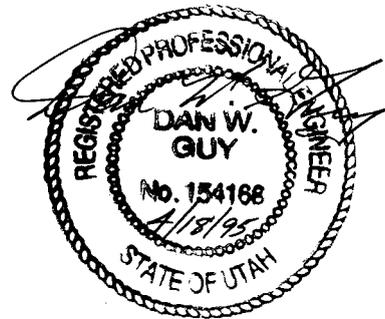
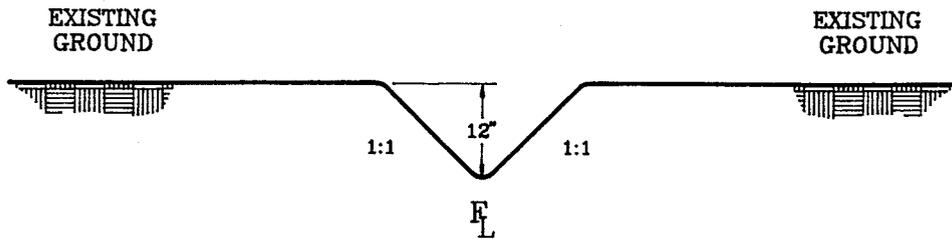
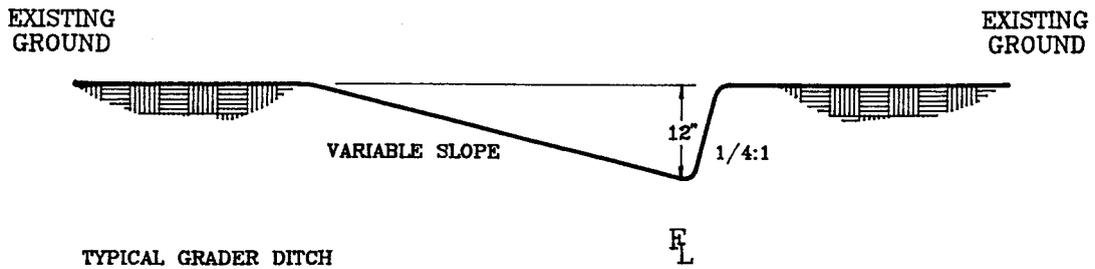
(1) *Fan Pad Ditch*

- a. *Sized for 10 year-24 hour or 100 year-6 hour storm.*
- b. *Maximum Flow Depth - 0.38'.*
- c. *Velocity less than 5.0 fps.*
- d. *12" deep; 1:1 side slopes; 9% grade.*

(2) *Berms*

- a. *Sized to contain or divert runoff from a 10 year-24 hour or 100 year-6 hour storm.*
- b. *Fan Pad Berm*
 - 1. *Maximum water depth against berm would be less than that in the fan pad ditch or 0.38'.*
- c. *Topsoil Berm*
 - 1. *Area is much less than that of the pad (approximately 0.12 acres vs. 0.80 acres).*
 - 2. *Runoff from topsoil pile would also be much less than from the pad; therefore, the maximum water depth against the berm would also be less than 0.38'.*
- d. *Berms are proposed to be a minimum of 1.5' high with 1:1 side slopes; therefore, berms are adequately sized to contain or direct the maximum runoff depth of 0.38' or less.*

TYPICAL
DISTURBED DITCH
CONFIGURATIONS



NOTE:

DITCH SHAPE OR CONFIGURATION MAY VARY; HOWEVER MINIMUM CROSS-SECTIONAL AREAS WILL BE MAINTAINED AT 0.5 SQUARE FEET.

Title of run: FAN PAD DITCH 10/24

Solving for.....= Depth Normal
Triangle

Flow depth (ft).....=	0.38
First Side slope.....=	1.0
Second Side slope.....=	1.0
Slope of diversion.....=	0.0900
Manning"s n.....=	0.025
CFS.....=	0.68
Cross section area (sqft)..=	0.14
Hydrualic radius.....=	0.13
fps.....=	4.70
Froude number.....=	2.26

Title of run: FAN PAD DITCH 100/6

Solving for.....= Depth Normal
Triangle

Flow depth (ft).....=	0.38
First Side slope.....=	1.0
Second Side slope.....=	1.0
Slope of diversion.....=	0.0900
Manning"s n.....=	0.025
CFS.....=	0.68
Cross section area (sqft)..=	0.14
Hydrualic radius.....=	0.13
fps.....=	4.70
Froude number.....=	2.26

Title of run: FAN PAD DITCH 100/6

Solving for.....= Depth Normal
Triangle

Flow depth (ft).....=	0.38
First Side slope.....=	1.0
Second Side slope.....=	1.0
Slope of diversion.....=	0.0900
Manning"s n.....=	0.025
CFS.....=	0.68
Cross section area (sqft)..=	0.14
Hydrualic radius.....=	0.13
fps.....=	4.70
Froude number.....=	2.26

Title of run: FAN PAD DITCH 100/6

Solving for.....= Depth Normal
Triangle

Flow depth (ft).....=	0.38
First Side slope.....=	1.0
Second Side slope.....=	1.0
Slope of diversion.....=	0.0900
Manning"s n.....=	0.025
CFS.....=	0.68
Cross section area (sqft)..=	0.14
Hydrualic radius.....=	0.13
fps.....=	4.70
Froude number.....=	2.26

PERMIT CHANGE TRACKING FORM

DATE RECEIVED	9/12/94	PERMIT NUMBER	ACT/007/019
Title of Proposal:	IBC, Remote	PERMIT CHANGE #	946
Description:	Fur Installation	PERMITTEE	Judalex
		MINE NAME	Centennial

Submitted 2/21/95

DATE DUE	DATE DONE	RESULT
<input type="checkbox"/> 15 DAY INITIAL RESPONSE TO PERMIT CHANGE APPLICATION		<input type="checkbox"/> ACCEPTED <input type="checkbox"/> REJECTED
<input type="checkbox"/> Notice of Review Status of proposed permit change sent to the Permittee.		Permit Change Classification
<input type="checkbox"/> Request additional review copies prior to Division/Other Agency review.		<input type="checkbox"/> Significant Permit Revision
<input type="checkbox"/> Notice of Approval of Publication. (If change is a Significant Revision.)		<input type="checkbox"/> Permit Amendment
<input type="checkbox"/> Notice of request to modify proposed permit change prior to approval.		<input type="checkbox"/> Incidental Boundary Change

REVIEW TRACKING	INITIAL REVIEW		MODIFIED REVIEW		FINAL REVIEW AND FINDINGS	
DOGM REVIEWER	DUE	DONE	DUE	DONE	DUE	DONE
<input checked="" type="checkbox"/> Administrative <u>Paul</u>	10/14		11/18		3/31	5/18
<input checked="" type="checkbox"/> Biology <u>Paul</u>	10/14		11/18		3/31	5/18
<input checked="" type="checkbox"/> Engineering <u>Wayne</u>	10/14		11/18		3/31	3/31 5/19
<input type="checkbox"/> Geology						
<input checked="" type="checkbox"/> Soils <u>Henry</u>	10/14		11/18	11/16		
<input checked="" type="checkbox"/> Hydrology <u>Steve</u>	10/14		11/18		3/31	5/18
<input checked="" type="checkbox"/> Bonding <u>Wayne</u>	10/14		11/18		3/31	3/31 5/18
<input type="checkbox"/> AVS Check						

Rec'd 4/20

COORDINATED REVIEWS	DUE	DONE	DUE	DONE	DUE	DONE
<input type="checkbox"/> OSMRE						
<input type="checkbox"/> US Forest Service						
<input type="checkbox"/> Bureau of Land Management						
<input type="checkbox"/> US Fish and Wildlife Service						
<input type="checkbox"/> US National Parks Service						
<input type="checkbox"/> UT Environmental Quality						
<input type="checkbox"/> UT Water Resources						
<input type="checkbox"/> UT Water Rights						
<input type="checkbox"/> UT Wildlife Resources						
<input type="checkbox"/> UT State History						
<input type="checkbox"/> Other						

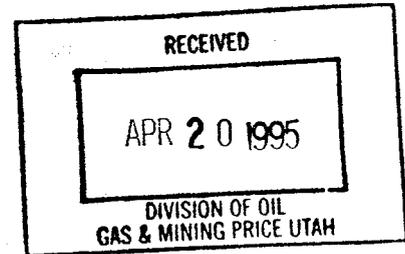
<input type="checkbox"/> Public Notice/Comment/Hearing Complete (If the permit change is a Significant Revision) <input type="checkbox"/> Copies of permit change marked and ready for MRP. <input type="checkbox"/> Special Conditions/Stipulations written for approval. <input type="checkbox"/> TA and CHIA modified as required. <input type="checkbox"/> Permit Change Approval Form ready for approval.	<input type="checkbox"/> Permit Change Approval Form signed and approved effective as of this date. <input type="checkbox"/> Permit Change Denied. <input type="checkbox"/> Notice of <input type="checkbox"/> Approval <input type="checkbox"/> Denial to Permittee. <input type="checkbox"/> Copy of Approved Permit Change to File. <input type="checkbox"/> Copy of Approved Permit Change to Permittee. <input type="checkbox"/> Copies to Other Agencies and Price Field Office.
--	--



ANDALEX
RESOURCES, INC.
Tower Division

P.O. BOX 902
PRICE, UTAH 84501
PHONE (801) 637-5385
TELECOPIER (801) 637-8860

April 20, 1995



State of Utah
Department of Natural Resources
Division of Oil, Gas, & Mining
355 W. North Temple
3 Triad Center
Suite 350
Salt Lake City, UT 84180-1203

Attn: Pamela Grubaugh-Littig
re: ACT 007/019 Left Fork Fan

Dear Ms. Littig

#2

949
Copy Done

Enclosed is Andalex's response to the deficiencies outlined in your March 21 letter. I am sure that this material will clarify any outstanding questions by your staff.

Sincerely,

Michael W. Glasson
Senior Geologist

However, for the purpose of this analysis, it should be assured that based on means cost data the following prices on earthwork can be used:

Open Dozer grading : \$2.25/yd
Fill Placement : \$1.16/yd
Topsoil Placement: \$1.16/yd
Topsoil Hauling: \$4.55/yd
Compaction: \$.21/yd

The following cost projection reflects hourly rates. An additional earthwork estimate can be found following the mass balance estimates.

Regarding the left hand fork fan installation, the specific time table for this project will coincide with the reclamation of the right hand fork minesite. The bond estimate now includes this fan installation and is still well within Andalex's existing bond amount. The specific schedule for reclamation of the fan will begin with the cut slope backfill, followed by removal of the culvert from the left fork drainage and, finally, by streambed reclamation the same as will be performed in the right hand fork. Topsoil redistribution and revegetation will follow the culvert removal. During both construction and reclamation phases, Andalex will provide adequate supplementary sediment control in the form of silt fences and/or straw berms to prevent additional sediment loads to the drainage.

Andalex has supplied the Division with a Drawing entitled "Left Hand Fork Cut/Fill". This drawing has a notation which indicates that the existing contours will reflect the reclamation contours (post-mining).

3
Text
Pages

Revised 11/09/94, 4/20/95

SPECIES	<u># PLS/acre</u>
<u>Grasses:</u>	
<u>Agropyron riparium</u> Western wheatgrass	2.0
<u>Agropyron trachycaulum</u> Slender wheatgrass	2.0
<u>Bromus marginatus</u> Mountain brome	3.0
<u>Elymus cinereus</u> Great Basin wildrye	2.0
<u>Phalaris arundinacea</u> Reed canarygrass	0.5
<u>Poa pratensis</u> Sandberg bluegrass	0.1
<u>Forbs:</u>	
<u>Achillea millifolium</u> Yarrow	0.1
<u>Artemisia ludoviciana</u> Louisiana sagebrush	0.1
<u>Hedysarum borealis</u> Northern sweetvetch	1.0
<u>Melilotus officinalis</u> Yellow sweetclover	0.5
<u>Osmorhiza occidentalis</u> Sweet anise	2.0
<u>Shrubs:</u>	
<u>Amelanchier alnifolia</u> Serviceberry	1.0
<u>Artemisia tridentata vaseyana</u> Mountain big sagebrush	0.1
<u>Rhus trilobata</u> Squawbush	1.0
<u>Sambucus cerulea</u> Blue elderberry	1.0
<u>Symphoricarpos oreophilus</u> Mountain snowberry	<u>1.0</u>
Total	17.4
<u>Trees (transplants):</u>	
<u>Populus angustifolia</u> (Narrowleaf cottonwood)	#/Acre 250
<u>Acer negundo</u> (Box Elder)	250
<u>Prunus virginiana</u> (Chokecherry)	250
<u>Quercus gambelii</u> (Gambel oak)	<u>250</u>
Total	<u>1000</u>

Rate is pounds Pure Live Seed/Acre for drill seeding. Broadcast seeding is double the drill rate.

*This seed mixture and shrub list will be used for interim reclamation in the left hand fork fan installation and on the new topsoil pile. This seed mixture and shrub list will also be used for final reclamation. Also, this shrub list will be attempted on the new topsoil pile in the left hand fork.
Revised 2/21/95, 4/20/95

permanent water treatment facilities constructed for this fan installation, none need be removed. Typical designs for berms and diversions are shown on the Design Drawings. This includes the berm surrounding the topsoil pile. (See Plate "Aberdeen Mine Left Hand Fork Fan Installation, Sedimentation/Drainage Control".) These typical designs will adequately convey a two-year, ten-hour storm event. Sediment control during construction and reclamation will consist of straw bales or silt fences located downstream from the construction activity.

The same restrictions will also apply to the 48-inch culvert at the lower road / stream crossing and in places where the road will be improved within the stream buffer zone. That is, activities will be allowed only during periods of no flow. Also, and by the same token, the lower culvert will be removed upon final reclamation if is deemed appropriate by the surface land-owner or management agency.

Andalex will reclaim this road entirely if it is determined through communications with the surface owners and land management agencies that this is the appropriate action. Andalex intends to obtain official comments on the status of the road for post-mining landuse from the State of Utah, Gladys Artman and the Bureau of Land Management.

R645-301-731.611. VOLITION OF WATER QUALITY STANDARDS OR EFFLUENT LIMITATIONS

Coal mining and reclamation operations will not cause or contribute to the violation of applicable Utah or federal water quality standards and will not adversely affect the water quantity and quality of other environmental resources of the stream.

Revised 11/17/94

R645-301-731.612. STREAM DIVERSIONS

See R645-301-512.240, Culvert Design

This diversion will comply with all the requirements of R645-301-742.300 (diversion structures). Also, please refer to culvert sizing calculations in Appendix O.

R645-301-731.620. BUFFER ZONE SIGNS AND MARKERS

This buffer zone will be marked as specified in R645-301-521.260. Signs will be clearly marked to prevent additional disturbance by operations.

Revised 11/07/94, 2/21/95, 4/20/95



BLACKHAWK ENGINEERING, CO.

Rt. 1, Box 146-H5 - Helper, Utah 84526 - Telephone (801) 637-2422

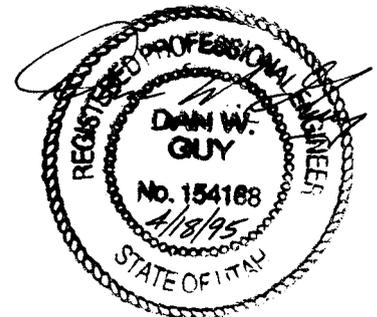
*Appendix
K*

SLOPE STABILITY EVALUATION

LEFT FORK DEADMAN CANYON

FAN ACCESS ROADS

PREPARED BY: BLACKHAWK ENGINEERING, CO.
DAN W. GUY, P.E.
APRIL 18, 1995





BLACKHAWK ENGINEERING, CO.

Rt. 1, Box 146-H5 - Helper, Utah 84526 - Telephone (801) 637-2422

April 18, 1995

*Mr. Mike Glasson
Andalex Resources, Inc.
P.O. Box 902
Price, Utah 84501*

*Re: Slope Stability Evaluation
Proposed Left Fork Fan Installation*

Dear Mike:

Per your request, I have completed a slope stability evaluation for the road embankments for the proposed left-fork of Deadman Canyon Fan Installation. The purpose of the evaluation was to show that existing and proposed road embankments will have a minimum static safety factor of at least 1.3. The following report will discuss the results of the field/literature investigation and engineering analysis.

Field Investigation

The proposed road project consists of using approximately 4100' of existing road in the canyon and construction of approximately 200' of a new access road to the proposed fan pad area.

Since the majority of the road is existing, and will receive only minimal upgrade for access, 2 cross-sections were surveyed at the steeper, more critical points on this road, at stations 20+00 and 34+00. An additional cross-section was run on the area of the proposed new access road at station 1+00, and the proposed road section was super-imposed on the existing ground line.

A soils investigation of this area was completed by Earthfax Engineering, Inc. on 09/22/94. The following soils descriptions were taken directly from their report:

Slopes are 8 to 20 percent. They are concave, east and west facing and are short in length.

Vegetation is that described as the Mountain Stony Loam (oak) range site in the following section. Most visible is the fairly dense gamble oak and bigtooth maple.

Included in mapping are small areas of Datino soils along the upper margins and small areas of a soil identical in all characteristics except it contains more rock fragments throughout the soil profile than is allowed for the Brycan series.

In a typical profile, the surface layer is grayish brown bouldery loam about 28 centimeters (11 inches) thick. The underlying layer is brown bouldery sandy loam about 38 centimeters (15 inches) thick. The next layer is pale brown sandy clay loam about 35 centimeters (14 inches) thick. The next layer is light brownish gray light clay loam (31 percent clay) about 35 centimeters (14 inches) thick. The next layer is pale brown loam about 35 centimeters (14 inches) thick. This soil has thick layers of buried surface layers.

Permeability is moderate. Available water capacity is about 28 centimeters (11 inches) to a depth of 1.5 meters (60 inches). Organic matter content of the surface, and in some buried layers, is about 2 percent. Effective rooting depth is about 1.5 meters (60 inches). Surface runoff is slow and erosion hazard is slight under native vegetation, and moderate if vegetation is removed. Erodibility is moderate. This soil is used for grazing of livestock and wildlife habitat.

The taxonomic classification of this soil is fine-loamy, mixed, Cumilic Haploborolls.

A typical pedon of Brycan bouldery loam, 8 to 20 percent slope was described near the north boundary of the Sunnyside Area, about 7.5 meters (25 feet) west of the drainage bottom.

Additional information on soils of the area was taken from a report by the Soil Conservation Service entitled "Soil Survey of Carbon Area, Utah". This report describes 2 soil types for the area:

- (1) Pathead - Curecanti Family for the lower (existing) road area and;*
- (2) Comodore - Datino Variant Complex for the proposed access road and pad area.*

Both soils are very similar in composition and are described as a stony, sandy loam with a low shrink/swell factor. Both soils are classed as A-2 to A-4 with a Plasticity Index of 5-15 and a liquid limit of 20-30. These descriptions are consistent with those in the Earthfax Report. It should also be noted that the same soil types occur in the right fork of Deadman Canyon at the existing minesite.

Methodology

Based on conversations with Mr. Wayne Western of the Utah Division of Oil, Gas and Mining, the use of available, pertinent information of the soils of the area would be acceptable for this investigation.

Two previous slope stability analyses had been conducted on the Centennial Sedimentation Pond "E" and Pinnacle Mines sites, by Palmer Wilding Consulting Engineers and Rollins, Brown & Gunnell, Inc., respectively. Since each of these areas are located in the same soil types as the proposed fan area and roads in the adjacent canyon, based on the SCS report, the geotechnical information on the soils was taken from these reports.

Based on the Sedimentation Pond Slope Stability Analyses by Palmer Wilding Consulting Engineers in May, 1989, the soil internal friction angles varied from 36° to 38° and the cohesion was 100 psf. Based on the Slope Stability Investigation of the Pinnacle Mine by Rollins, Brown and Gunnell, Inc. in February, 1981, the internal friction angle was 32° and the cohesion strength was based on a conservative 250 psf. Average material density was 102 pcf.

Using the above reports, a conservative value of 32° was used for the internal friction angle, 200 psf for the cohesion strength, and 102 pcf was used for material density. Slope heights and angles were taken directly from the cross-sections in Figures 1,2, & 3 of this report. No fractures were observed in the field and none are assumed present in this analysis.

The stability analyses was performed using the Hoek Method (Hoek, E., and J.W. Bray, 1981, Rock Slope Engineering, Revised Third Edition, IMM, London).

Parameters were established for the cut and fill slopes for each cross-section area. A rotational shear analysis was then performed on each section using the circular failure charts (Figures 4 and 5) in this report. A Factor of Safety for each area was then determined from the charts.

Stability Analyses

The following input parameters were used for each of the measured sections:

SECTION 1		
	Cut	Fill
Slope Height	10'	8'
Slope Angle	50°	24°
Soil Cohesion	200 psf	200 psf
Friction Angle	32°	32°
Bulk Density	102 pcf	102 pcf
SECTION 2		
	Cut	Fill
Slope Height	20'	22'
Slope Angle	48°	30°
Soil Cohesion	200 psf	200 psf
Friction Angle	32°	32°
Bulk Density	102 pcf	102 pcf

SECTION 3	Upslope Fill	Downslope Fill
<i>Slope Height</i>	<i>12'</i>	<i>10'</i>
<i>Slope Angle</i>	<i>26.5°</i>	<i>26.5°</i>
<i>Soil Cohesion</i>	<i>200 psf</i>	<i>200 psf</i>
<i>Friction Angle</i>	<i>32°</i>	<i>32°</i>
<i>Bulk Density</i>	<i>102 pcf</i>	<i>102 pcf</i>

Safety factors were determined in the following way:

- (1) The cohesion (200 psf) was divided by the multiple of the density (102 pcf) x the slope height (H) x the tangent of the internal friction angle (Tan 32°);*
- (2) The result of the above is found on the right side of the chart and the line is followed down to the slope angle;*
- (3) Once the intersection of the cohesion factor and slope angle is found, follow the horizontal line to the left and read the result of Tangent of internal friction angle divided by the Factor of Safety (F);*
- (4) The Factor of Safety is then determined by dividing the Tangent of the internal friction angle (Tan 32°) by the reading obtained in (3) above.*

Results

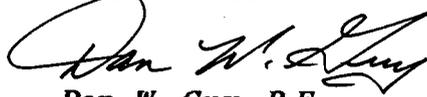
Section	Safety Factor (Dry Conditions)	Safety Factor (Saturated Conditions)
<i>#1 - Cut</i>	<i>1.95</i>	<i>1.52</i>
<i>#1 - Fill</i>	<i>3.68</i>	<i>2.60</i>
<i>#2 - Cut</i>	<i>1.49</i>	<i>1.30</i>
<i>#2 - Fill</i>	<i>2.08</i>	<i>1.45</i>
<i>#3 - Upslope (Fill)</i>	<i>2.72</i>	<i>2.08</i>
<i>#3 - Downslope (Fill)</i>	<i>3.12</i>	<i>2.23</i>

Conclusion

Based on the input parameters used, which are considered conservative, all measured cut and fill sections of the existing road and the proposed new road are demonstrated to have a slope stability Factor of Safety greater than 1.30, as required.

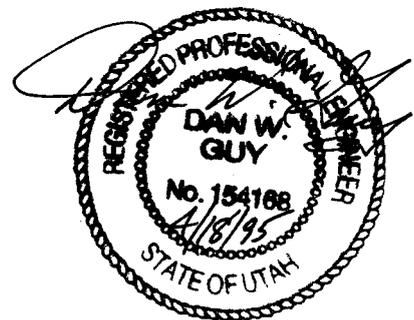
I appreciate the opportunity to work with you on this project. If you have any questions or need any further information, please let me know.

Respectfully,



Dan W. Guy, P.E.

President



LOWER SECTION #1
(EXISTING ROAD)

1" = 10'

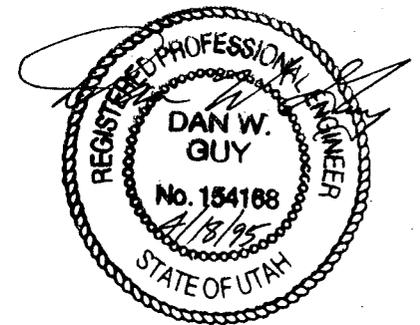
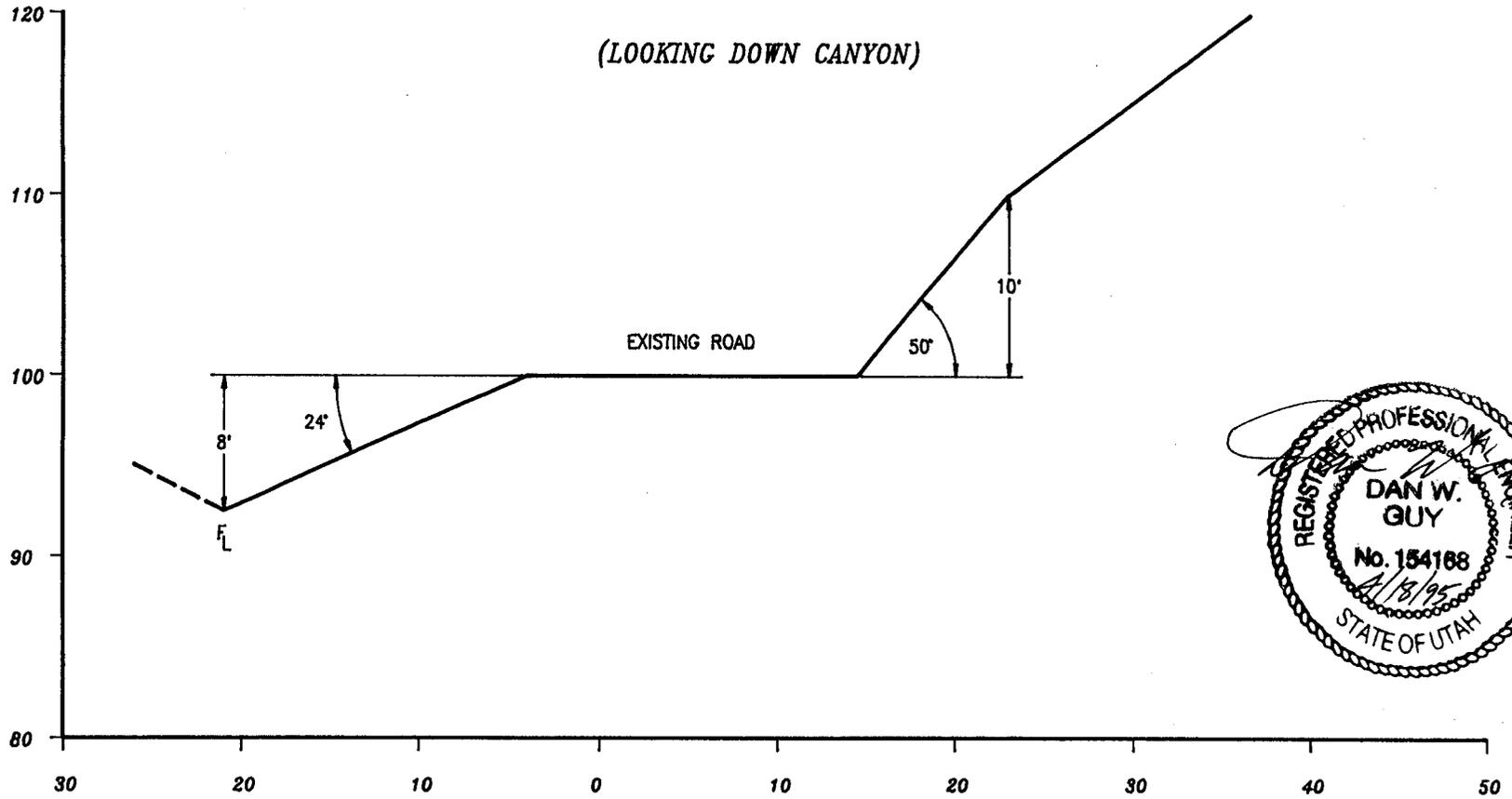


FIGURE 1

MIDDLE SECTION #2
(EXISTING ROAD)

1" = 10'

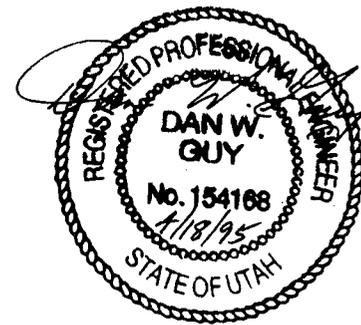
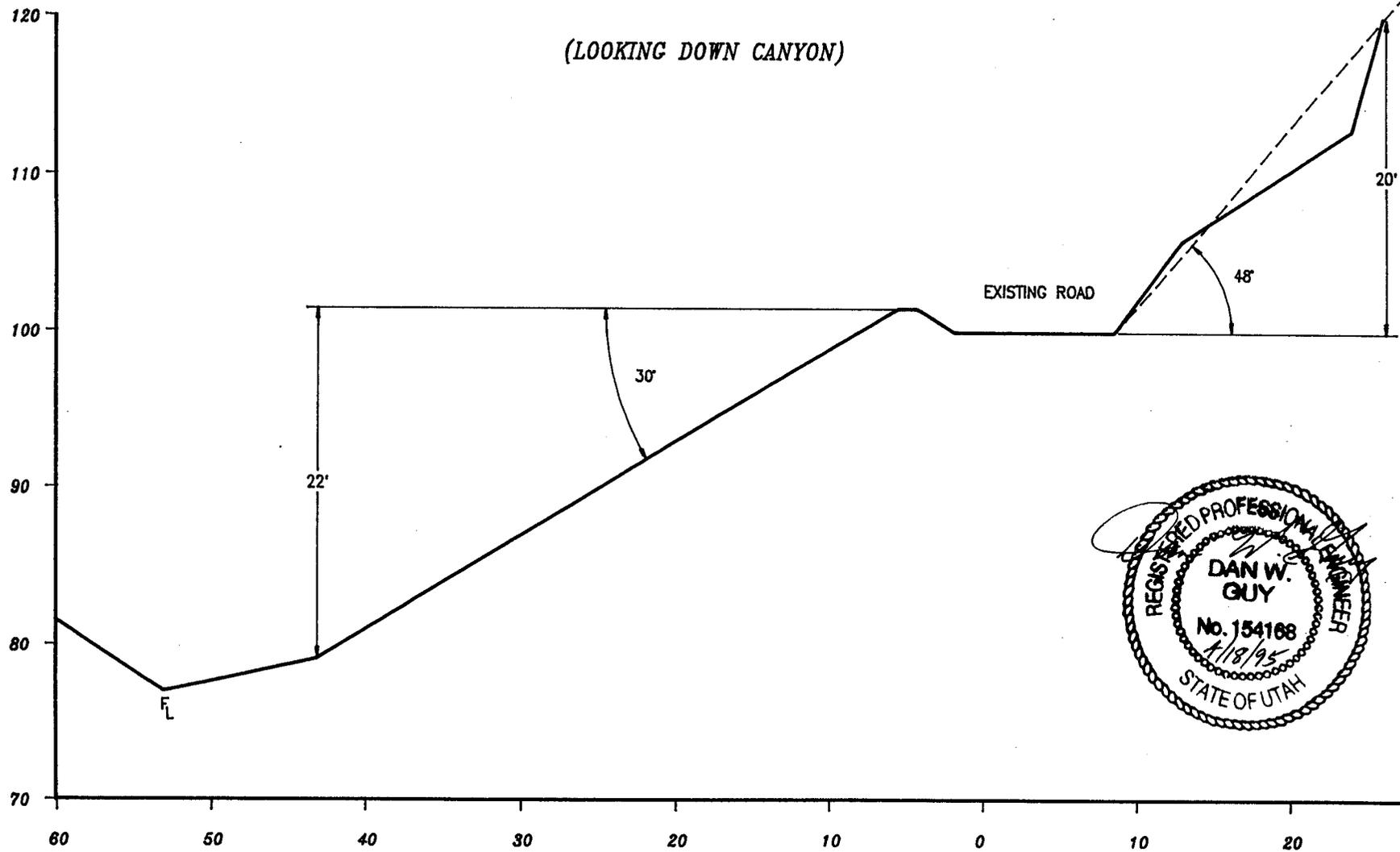


FIGURE 2

UPPER SECTION #3
(PROPOSED ROAD)

1" = 20'

(LOOKING UP CANYON)

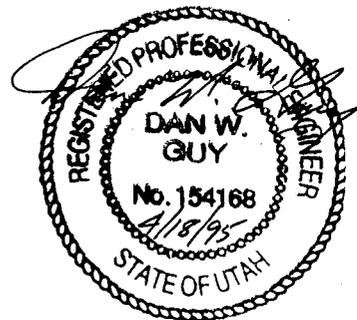
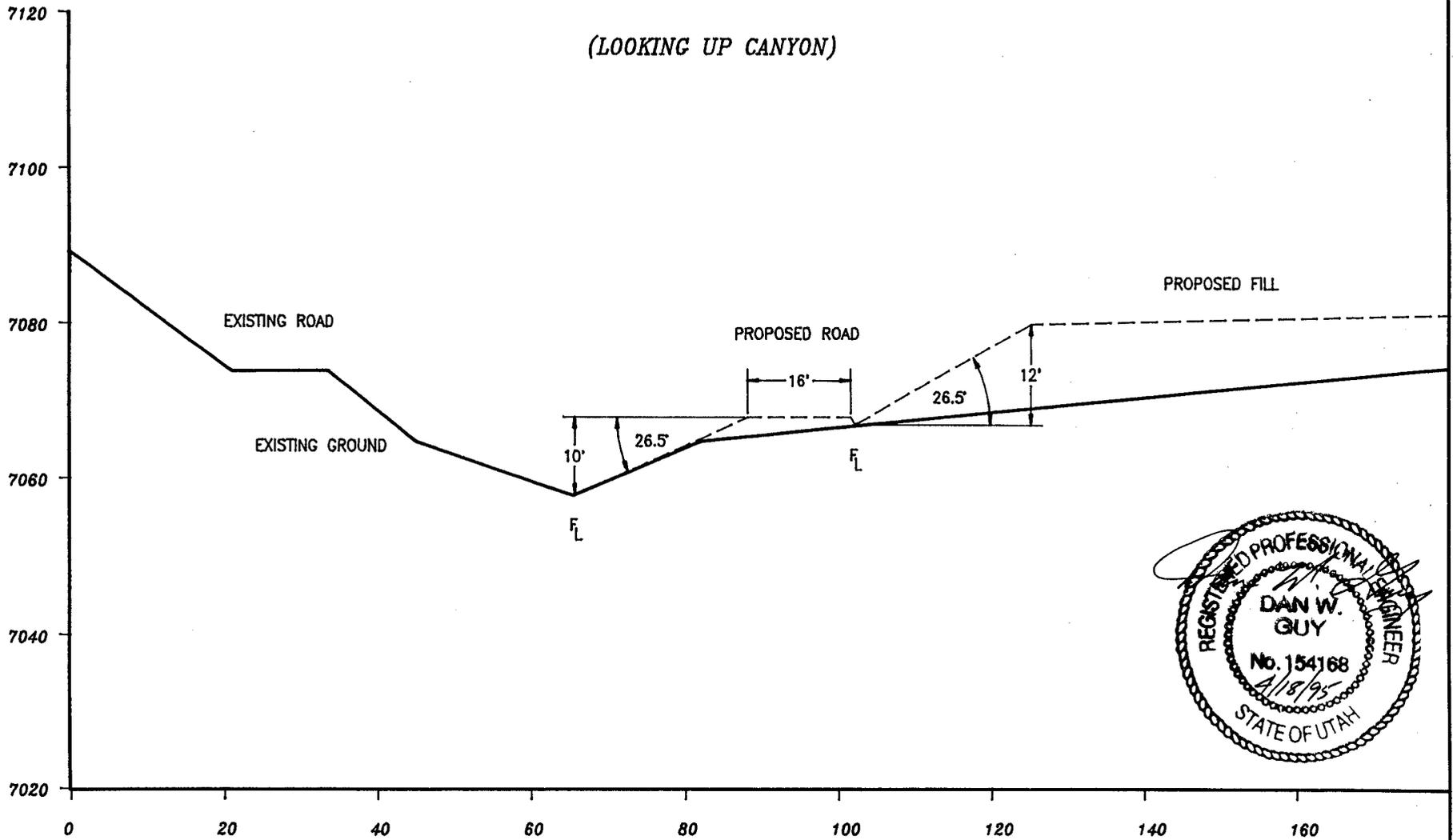


FIGURE 3

C=Cohesion-psf

Y=Density-pcf

H=Slope Height-ft.

ϕ =Internal Friction Angle

(DRY CONDITIONS)

CIRCULAR FAILURE CHART NUMBER 1

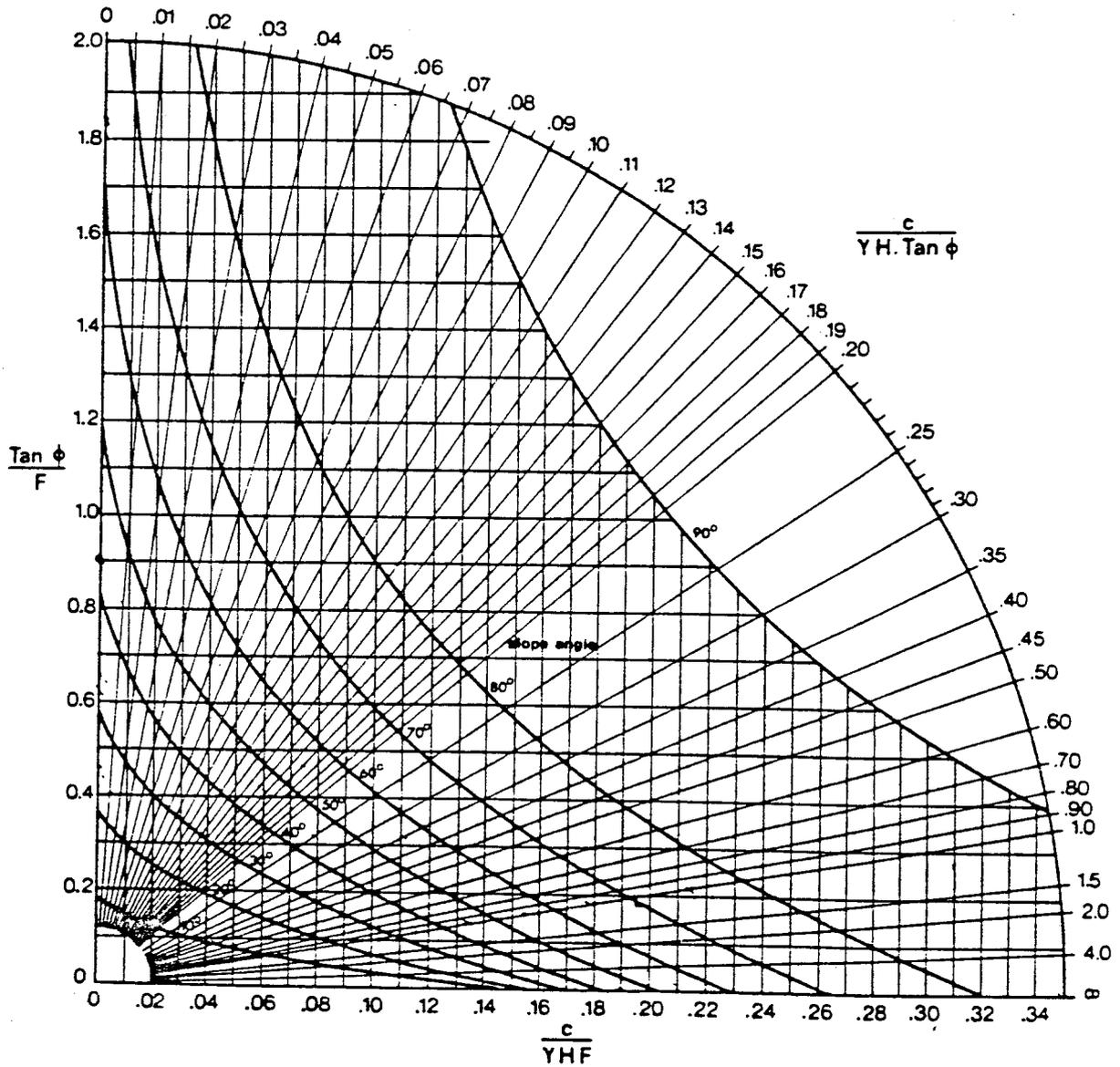


FIGURE 4

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

(SATURATED CONDITIONS)

CIRCULAR FAILURE CHART NUMBER 5

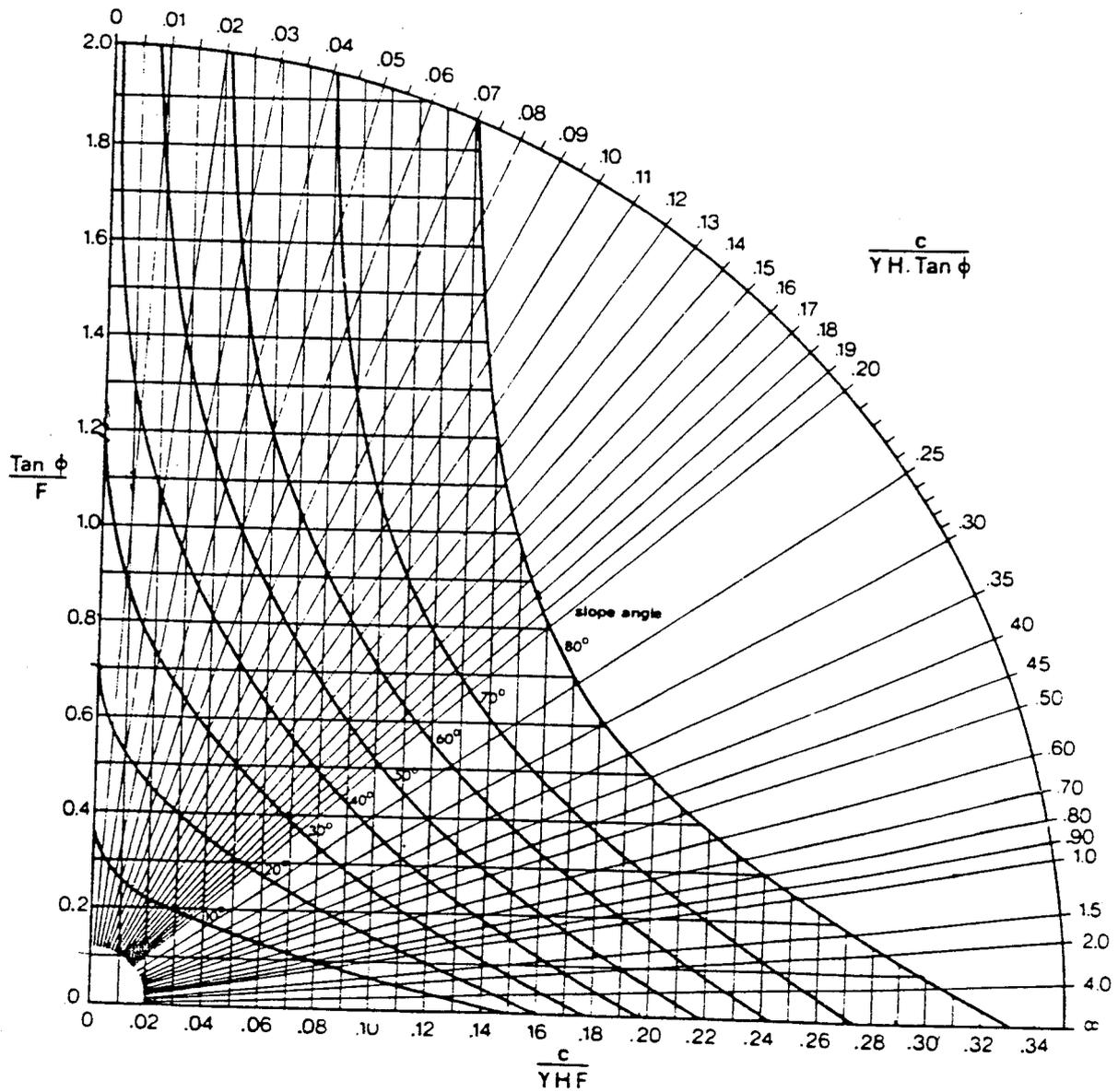


FIGURE 5

APPENDIX T
LEFT HAND FORK FAN
MISCELLANEOUS DIVERSIONS

Miscellaneous Diversions (Size Justification)

(1) *Fan Pad Ditch*

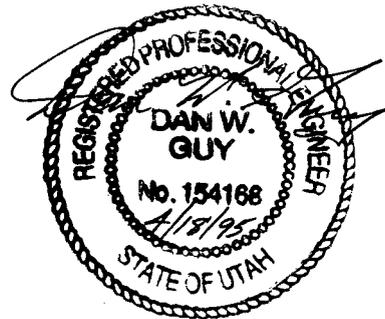
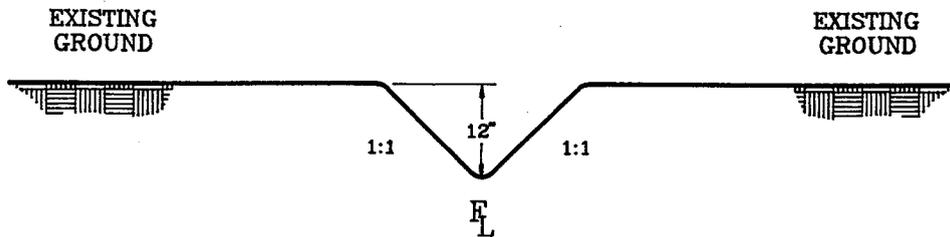
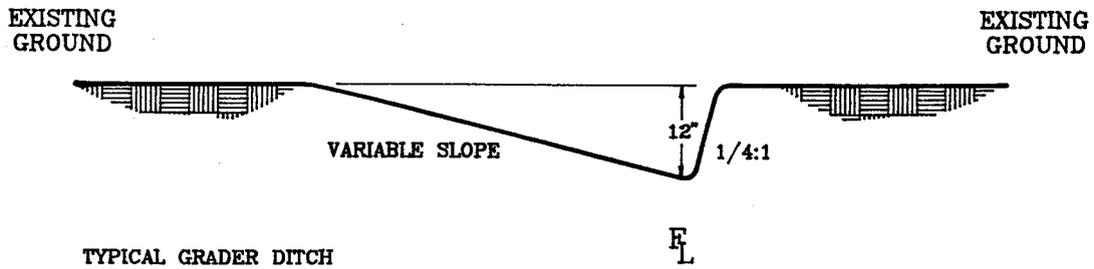
- a. *Sized for 10 year-24 hour or 100 year-6 hour storm.*
- b. *Maximum Flow Depth - 0.38'.*
- c. *Velocity less than 5.0 fps.*
- d. *12" deep; 1:1 side slopes; 9% grade.*

(2) *Berms*

- a. *Sized to contain or divert runoff from a 10 year-24 hour or 100 year-6 hour storm.*
- b. *Fan Pad Berm*
 1. *Maximum water depth against berm would be less than that in the fan pad ditch or 0.38'.*
- c. *Topsoil Berm*
 1. *Area is much less than that of the pad (approximately 0.12 acres vs. 0.80 acres).*
 2. *Runoff from topsoil pile would also be much less than from the pad; therefore, the maximum water depth against the berm would also be less than 0.38'.*
- d. *Berms are proposed to be a minimum of 1.5' high with 1:1 side slopes; therefore, berms are adequately sized to contain or direct the maximum runoff depth of 0.38' or less.*

Appendix
T

TYPICAL
DISTURBED DITCH
CONFIGURATIONS



NOTE:

DITCH SHAPE OR CONFIGURATION MAY VARY; HOWEVER MINIMUM CROSS-SECTIONAL AREAS WILL BE MAINTAINED AT 0.5 SQUARE FEET.

Title of run: FAN PAD DITCH 10/24

Solving for.....= Depth Normal
Triangle

Flow depth (ft).....=	0.38
First Side slope.....=	1.0
Second Side slope.....=	1.0
Slope of diversion.....=	0.0900
Manning"s n.....=	0.025
CFS.....=	0.68
Cross section area (sqft)..=	0.14
Hydrualic radius.....=	0.13
fps.....=	4.70
Froude number.....=	2.26

Title of run: FAN PAD DITCH 100/6

Solving for.....= Depth Normal
Triangle

Flow depth (ft).....=	0.38
First Side slope.....=	1.0
Second Side slope.....=	1.0
Slope of diversion.....=	0.0900
Manning"s n.....=	0.025
CFS.....=	0.68
Cross section area (sqft)..=	0.14
Hydrualic radius.....=	0.13
fps.....=	4.70
Froude number.....=	2.26

Title of run: FAN PAD DITCH 100/6

Solving for.....= Depth Normal
Triangle

Flow depth (ft).....=	0.38
First Side slope.....=	1.0
Second Side slope.....=	1.0
Slope of diversion.....=	0.0900
Manning"s n.....=	0.025
CFS.....=	0.68
Cross section area (sqft)..=	0.14
Hydrualic radius.....=	0.13
fps.....=	4.70
Froude number.....=	2.26

Title of run: FAN PAD DITCH 100/6
Solving for.....= Depth Normal
Triangle
Flow depth (ft).....= 0.38
First Side slope.....= 1.0
Second Side slope.....= 1.0
Slope of diversion.....= 0.0900
Manning"s n.....= 0.025
CFS.....= 0.68
Cross section area (sqft)..= 0.14
Hydrualic radius.....= 0.13
fps.....= 4.70
Froude number.....= 2.26