ANDALEX RESOURCES, INC.
WILDCAT LOADOUT

C/007/033

RESPONSE TO
DIVISION ORDER DO-04
(WIND-BLOWN FINES)

RESPONSE TO DEFICIENCIES
TASK #3365

VOLUME 1
TEXT AND APPENDICES

SUBMITTED: JULY 29, 2010

COPY

Incoming
C0070033
#3593
R

ANDALEX
RESOURCES, INC.

P.O. BOX 910
EAST CARBON, UTAH 84520
PHONE (435) 888-4000
FAX (435) 888-4017

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

July 29, 2010

Attn: Daron Haddock
Permit Supervisor

RE: Andalex Resources, Inc.,
Wildcat Loadout, C/007/0033
Response to DO-04
Response to Deficiencies, Task 3365

Dear Mr. Haddock:

Enclosed are five copies of the response to deficiencies (Task 3365) to the response to Division Order DO-05, for the wind-blown fines.

Should you have any questions regarding this submittal, please feel free to contact me.

Sincerely,

David Shaver
Resident Agent

RECEIVED
JUL 15 2010
DIV. OF OIL, GAS & MINING

File in:
☐ Confidential
☒ Shelf
☐ Expandable
Date Folder 071510 C/0070033
See: Incoming For additional information

Form DOGM - C1 (Last Revised July 9, 2010)

COPY

File Folder # 3

APPLICATION FOR PERMIT PROCESSING

Permit Change ☐	New Permit ☐	Renewal ☐	Transfer ☐	Exploration ☐	Bond Release ☐

Permit Number: 007/033

[redacted]of Proposal: Response to DO-04, response to deficiencies (Task 3365)

Mine: Wildcat Loadout

Permittee: **Andalex Resources, Inc.**

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

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

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

☐ **Attach _3_ complete copies of the application.**

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

Signed - Name - Position - Date 7/9/2010 agent

[redacted]scribed and sworn to before me this 9TH day of July 2010.

Notary Public Linda Kerns

My Commission Expires: March 27 2013

Attest: STATE OF Utah COUNTY OF Carbon

Notary Public
LINDA KERNS
Commission #578211
My Commission Expires
March 27, 2013
State of Utah

Received by Oil, Gas & Mining

RECEIVED
JUL 15 2010
DIV. OF OIL, GAS & MINING

ASSIGNED TRACKING NUMBER

Form DOGM - C2 (Last Revised 6/93)

File Folder #

COPY

Application for Permit Processing
Detailed Schedule of Changes to the MRP

Title of Application: Response to DO-04

Response to deficiencies
Task 3365

Permit Number: 007/033

Mine: Wildcat Loadout

Permittee: Andalex Resources, Inc

Provide a detailed listing of all changes to the mining and reclamation plan which will be required as a result of this proposed permit application. Individually list all maps and drawings which are to be added, replaced, or removed from the plan. Include changes of the table of contents, section of the plan, pages, or other information as needed to specifically locate, identify and revise the existing mining and reclamation plan. Include page, section and drawing numbers as part of the description.

			DESCRIPTION OF MAP, TEXT, OR MATERIALS TO BE CHANGED
☐ ADD	☒ REPLACE	☐ REMOVE	Contents: Appendices, Plates
☐ ADD	☒ REPLACE	☐ REMOVE	Chapter 1 Text: all
☐ ADD	☒ REPLACE	☐ REMOVE	Chapter 2 Text: all
☐ ADD	☒ REPLACE	☐ REMOVE	Chapter 3 Text - all
☐ ADD	☒ REPLACE	☐ REMOVE	Chapter 4 Text: all
☐ ADD	☒ REPLACE	☐ REMOVE	Chapter 5 Text all
☐ ADD	☒ REPLACE	☐ REMOVE	Chapter 6 Text: all
☐ ADD	☒ REPLACE	☐ REMOVE	Chapter 7 Text: all
☐ ADD	☒ REPLACE	☐ REMOVE	Chapter 8 Text: all
☐ ADD	☒ REPLACE	☐ REMOVE	App A, Part 1 (U+C)
☐ ADD	☒ REPLACE	☐ REMOVE	App A, Part 2
☒ ADD	☐ REPLACE	☐ REMOVE	App B, Part A-12
☐ ADD	☒ REPLACE	☐ REMOVE	App B, Part B
☐ ADD	☒ REPLACE	☐ REMOVE	App B, Part C
☐ ADD	☒ REPLACE	☐ REMOVE	App B, Part D
☒ ADD	☐ REPLACE	☐ REMOVE	App D, Supplement (Soils)
☐ ADD	☐ REPLACE	☒ REMOVE	App K
☒ ADD	☐ REPLACE	☐ REMOVE	App P (Response to DO-04)
☐ ADD	☐ REPLACE	☒ REMOVE	App Q
☒ ADD	☐ REPLACE	☐ REMOVE	App R (Drainage Control Plan)
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	

Any other specific or special instructions required for insertion of this proposal into the Mining and Reclamation Plan?

Page 1

RECEIVED
AUG 13 2009
DIV. OF OIL, GAS & MINING

RECEIVED
JUL 15 2010
DIV. OF OIL, GAS & MINING

File Folder #

Application for Permit Processing
Detailed Schedule of Changes to the MRP

COPY

Title of Application: Response to DO-04

Response to deficiencies
Task 3365

Permit Number: 007/033

Mine: Wildcat Loadout

Permittee: Andalex Resources, Inc

Provide a detailed listing of all changes to the mining and reclamation plan which will be required as a result of this proposed permit application. Individually list all maps and drawings which are to be added, replaced, or removed from the plan. Include changes of the table of contents, section of the plan, pages, or other information as needed to specifically locate, identify and revise the existing mining and reclamation plan. Include page, section and drawing numbers as part of the description.

			DESCRIPTION OF MAP, TEXT, OR MATERIALS TO BE CHANGED
☐ ADD	☒ REPLACE	☐ REMOVE	Plate 1
☐ ADD	☒ REPLACE	☐ REMOVE	Plate 2
☐ ADD	☒ REPLACE	☐ REMOVE	Plates 3 thru 7 with Plates
☐ ADD	☐ REPLACE	☐ REMOVE	3A thr 3I
☐ ADD	☐ REPLACE	☒ REMOVE	Plates 4 thru 7
☐ ADD	☒ REPLACE	☐ REMOVE	Plate 10
☐ ADD	☒ REPLACE	☐ REMOVE	Plate 11
☐ ADD	☒ REPLACE	☐ REMOVE	Plate 12
☐ ADD	☒ REPLACE	☐ REMOVE	Plate 13
☐ ADD	☒ REPLACE	☐ REMOVE	Plate 15
☐ ADD	☒ REPLACE	☐ REMOVE	Plate 16
☐ ADD	☒ REPLACE	☐ REMOVE	Plate 17
☐ ADD	☐ REPLACE	☒ REMOVE	Plate 18, 19, 20, 21
☐ ADD	☒ REPLACE	☐ REMOVE	Plate 29
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	

Any other specific or special instructions required for insertion of this proposal into the Mining and Reclamation Plan?

Page 2

RECEIVED
AUG 13 2009
DIV. OF OIL, GAS & MINING

RECEIVED
JUL 15 2010
DIV. OF OIL, GAS & MINING

TABS

**********NOTE**********

ALL INFORMATION SHOWN IN RED HAS BEEN MODIFIED, ADDED, OR DELETED FROM THE EXISTING APPROVED M.R.P. (INCORPORATED MAY 17, 2006). ALL INFORMATION SHOWN IN BLACK HAS NOT BEEN CHANGED FROM THE APPROVED VERSION

C1/C2

1) CONTENTS

2) CHAPTER 1 LEGAL

3) CHAPTER 2 BIOLOGY

4) CHAPTER 3 SOILS

5) CHAPTER 4 LAND USE

6) CHAPTER 5 ENGINEERING

7) CHAPTER 6 GEOLOGY

8) CHAPTER 7 HYDROLOGY

9) CHAPTER 8 BONDING

10) APPENDIX A PART 1 Ownership and Control

11) APPENDIX A PART 2 Current and Previous Permits

12) APPENDIX B PART A-1 DOGM Permit

13) APPENDIX B PART A-2 Utah Railway, Lease Agreement

14) APPENDIX B PART A-3 Utah Railway, Amendment to Lease

15) APPENDIX B PART A-4 Utah Railway, Amended Trackage Agreement

16) APPENDIX B PART A-5 Agreement with Beaver Creek Coal Co.

17)	APPENDIX B PART A-6	BLM Right-of-Way Grant
18)	APPENDIX B PART A-7	BLM Notice to Proceed with Construction
19)	APPENDIX B PART A-8	BLM Access Road Right-of-Way
20)	APPENDIX B PART A-9	BLM Right-of-Way, Amendment No. 1
21)	APPENDIX B PART A-10	BLM Right-of-Way, Amendment No. 2
22)	APPENDIX B PART A-11	BLM Right-of-Way, Amendment No. 3, 4
23)	APPENDIX B PART A-13	Utah Div of Air Quality-Approval Order
24)	APPENDIX B PART A-14	Utah Dept of Transmission, Approval for Reduced Rail Clearance
25)	APPENDIX B PART A-15	Southeastern Utah District Health Dept. Wastewater Disposal System Approval
26)	APPENDIX B PART A-16	State Div of History, Archeological Clearance (Moved to CONFIDENTIAL BINDER)
27)	APPENDIX B PART A-17	State Div of History, Archeological Survey (Moved to CONFIDENTIAL BINDER)
28	APPENDIX B PART A-18	State Div of Water Rights Approved Application
29)	APPENDIX B PART A-19	State Div of Wildlife Resources Electric Transmission Pole Acceptance
30)	APPENDIX B PART A-20	U.S. Dept of Interior, Powerline Approval

31)	APPENDIX B PART A-21	State Div of Water Quality UPDES Permit
32)	APPENDIX B PART B	History of Violations
33)	APPENDIX B PART D	Bond Information
34)	APPENDIX C	Soil and Foundation Investigation
35)	APPENDIX D SUPPLEMENT	Soil Survey Soils Report, James Nyenhuis
36)	APPENDIX E	Wildlife Enhancement Project
38)	APPENDIX F	Wildlife Resources Information
38)	APPENDIX G	Garley Canyon Spring Water Rights/Analysis
41)	APPENDIX H	Sediment Pond Certification and R-69 Forms
42)	APPENDIX I	Vegetation Survey
43)	APPENDIX J	Probable Hydrologic Consequences of Operations at the Wildcat Loadout
44)	APPENDIX K	Deleted
45)	APPENDIX L	Grade Control Structures
46)	APPENDIX M	Deleted
47)	APPENDIX N	Vegetation Test Plot Monitoring
48)	APPENDIX O SUPPLEMENT	Coal Processing Waste Pile Chemical Analysis of Refuse Material
49)	APPENDIX P	Response to Division Order DO-04 Wind-Blown Fines
50)	APPENDIX Q	Deleted
51)	APPENDIX R	Sedimentation and Drainage Control Plan
55)	MAPS	

CHAPTER 1

TABLE OF CONTENTS

R645-301-100.	GENERAL	1-1
R645-301-110.	LEGAL, FINANCIAL, COMPLIANCE AND . . .	1-1
R645-301-111.	INTRODUCTION	1-2
R645-301-112.	IDENTIFICATION OF INTERESTS	1-4
R645-301-113.	VIOLATION INFORMATION	1-7
R645-301-114.	RIGHT-OF-ENTRY INFORMATION	1-10
R645-301-115.	STATUS OF UNSUITABILITY CLAIMS	1-12
R645-301-116.	PERMIT TERM	1-13
R645-301-117.	INSURANCE, PROOF OF PUBLICATION AND FACILITIES OR STRUCTURES USED IN COMMON	1-13
R645-301-118.	FILING FEE	1-14
R645-301-120.	PERMIT APPLICATION FORMAT AND CONTENTS	1-14
R645-301-121.	REQUIREMENTS	1-14
R645-301-122	REFERENCED MATERIALS	1-15
R645-301-123.	APPLICATION FOR PERMITS, CHANGES, RENEWALS, OR TRANSFERS	1-15
R645-301-130.	REPORTING AND TECHNICAL DATA	1-15
R645-301-131.	TECHNICAL DATA REQUIREMENTS	1-18
R645-301-132.	TECHNICAL ANALYSES REQUIREMENTS	1-19
R645-301-140.	MAPS AND PLANS	1-19
R645-301-141.	MAP FORMATS	1-19
R645-301-142.	PHASES OF OPERATIONS AND MINING ACTIVITY	1-19
R645-301-150.	COMPLETENESS	1-23

CHAPTER 2

TABLE OF CONTENTS

R645-301-200.	SOILS	2-1
R645-301-211.	PREMINING SOIL RESOURCES	2-2
R645-301-212.	STOCKPILING AND REDISTRIBUTION	2-2
R645-301-220.	ENVIRONMENTAL DESCRIPTION	2-8
R645-301-221.	PRIME FARMLAND INVESTIGATION	2-8
R645-301-222.	SOIL SURVEY	2-8
R645-301-223.	SOIL CHARACTERIZATION	2-9
R645-301.224.	SUBSTITUTE TOPSOIL	2-9
R645-301-230.	OPERATION PLAN	2-12
R645-301-231.	GENERAL REQUIREMENTS	2-12
R645-301-232.	TOPSOIL AND SUBSOIL REMOVAL	2-12
R645-301-233.	TOPSOIL SUBSTITUTES AND SUPPLEMENTS	2-14
R645-301-234.	TOPSOIL STORAGE	2-15
R645-301-240.	RECLAMATION PLAN	2-16
R645-301-241.	GENERAL REQUIREMENTS	2-27
R645-301-242.	SOIL REDISTRIBUTION	2-28
R645-301-243.	SOIL NUTRIENTS AND AMENDMENTS	2-29
R645-301-244.	SOIL STABILIZATION	2-29
R645-301-250.	PERFORMANCE STANDARDS	2-29
R645-301-251.	SOIL REMOVAL	2-29
R645-301-252.	SOIL STORAGE AND REDISTRIBUTION	2-30

CHAPTER 3

TABLE OF CONTENTS

R645-301-300.	BIOLOGY	3-1
R645-301-310.	INTRODUCTION	3-1
R645-301-311.	VEGETATIVE, FISH AND WILDLIFE RESOURCES	3-14
R645-301-312.	POTENTIAL IMPACTS	3-14
R645-301-313.	RESTORATION OR ENHANCEMENT	3-14
R645-301-320.	ENVIRONMENTAL DESCRIPTION	3-14
R645-301-321.	VEGETATION INFORMATION	3-15
R645-301-322.	FISH AND WILDLIFE INFORMATION	3-15
R645-301-323.	MAPS AND AERIAL PHOTOGRAPHS	3-16
R645-301-330.	OPERATION PLAN	3-16
R645-301-331.	MINIMIZING IMPACT AND SURFACE EROSION .	3-17
R645-301-332.	IMPACTS OF SUBSIDENCE ON RENEWABLE RESOURCE LANDS	3-17
R645-301-333.	USING THE BEST TECHNOLOGY CURRENTLY AVAILABLE TO MINIMIZE DISTURBANCE AND IMPACT	3-17
R645-301-340.	RECLAMATION PLAN	3-18
R645-301-341.	REVEGATATION	3-18
R645-301-342.	FISH AND WILDLIFE	3-27
R645-301-350.	PERFORMANCE STANDARDS	3-28
R645-301-351.	GENERAL REQUIREMENTS	3-28
R645-301-352.	CONTEMPORNEOUS RECLAMATION	3-28
R645-301-353.	REVEGATATION: GENERAL REQUIREMENTS . .	3-28
R645-301-354.	REVEGETATION: TIMING	3-31
R645-301-355.	REVEGETATION MULCHING AND OTHER SOIL	

STABILIZING PRACTICES 3-31

R645-301-356. REVEGETATION: STANDARDS FOR SUCCESS . . 3-32

R645-301-357. REVEGETATION: EXTENDED RESPONSIBILITY PERIOD 3-33

R645-301-358. PROTECTION OF FISH, WILDLIFE AND RELATED ENVIRONMENTAL VALUES 3-36

NRCS LETTER ON PRODUCTIVITY 3-38

CHAPTER 4

TABLE OF CONTENTS

R645-301-400.	LAND USE AND AIR QUALITY	4-1
R645-301-410.	LAND USE	4-1
R645-301-411.	ENVIRONMENTAL DESCRIPTION	4-1
R645-301-412.	RECLAMATION PLAN	4-6
R645-301-413.	PERFORMANCE STANDARDS	4-8
R645-301-414.	PERMIT REVISIONS REQUESTING APPROVAL OF ALTERNATE POSTMINING LAND USE	4-9
R645-301-420.	AIR QUALITY	4-9
R645-301-421.	CLEAN AIR ACT AND OTHER APPLICABLE LAWS	4-10
R645-301-422.	UTAH BUREAU OF AIR QUALITY	4-10
R645-301-423.	SURFACE COAL MINING AND RECLAMATION ACTIVITIES EXCEEDING 1,000,000 TONS PER YEAR	4-10
R645-301-424.	FUGITIVE DUST CONTROL - SURFACE COAL MINING AND RECLAMATION OPERATIONS LESS THAN 1,000,000 TONS PER YEAR	4-16
R645-301-425.	AIR QUALITY MONITORING - SURFACE COAL MINING AND RECLAMATION OPERATIONS LESS THAN 1,000,000 TONS PER YEAR	4-16

CHAPTER 5

TABLE OF CONTENTS

R645-301-500.	ENGINEERING	5-1
R645-301-510.	INTRODUCTION	5-1
R645-301-511.	GENERAL REQUIREMENTS	5-6
R645-301-512.	CERTIFICATION	5-6
R645-301-513.	COMPLIANCE WITH MSHA REGULATIONS AND MSHA APPROVALS	5-74
R645-301-514.	INSPECTIONS	5-75
R645-301-515.	REPORTING AND EMERGENCY PROCEDURES	5-77
R645-301-516.	PREVENTION OF SLIDES	5-79
R645-301-520.	OPERATION PLAN	5-79
R645-301-521.	GENERAL	5-79
R645-301-522.	COAL RECOVERY	5-95
R645-301-523.	MINING METHOD(S)	5-95
R645-301-524.	BLASTING AND EXPLOSIVES	5-96
R645-301-525.	SUBSIDENCE	5-96
R645-301-526.	MINE FACILITIES	5-96
R645-301-527.	TRANSPORTATION FACILITIES	5-98
R645-301-528.	HANDLING AND DISPOSAL OF COAL, OVERBURDEN, EXCESS SPOIL, AND COAL MINE WASTE	5-100
R645-301-529.	MANAGEMENT OF MINE OPENINGS	5-102
R645-301-530.	OPERATIONAL DESIGN CRITERIA AND PLANS	5-103
R645-301-531.	GENERAL	5-103
R645-301-532.	SEDIMENT CONTROL	5-103
R645-301-533.	IMPOUNDMENTS	5-103

R645-301-534. ROADS 5-105

R645-301-535. SPOIL 5-107

R645-301-536. COAL MINE WASTE 5-108

R645-301-537. REGRADED SLOPES 5-110

R645-301-540. RECLAMATION PLAN 5-110

R645-301-541. GENERAL 5-110

R645-301-542. NARRATIVES, MAPS AND PLANS 5-117

R645-301-550. RECLAMATION DESIGN CRITERIA AND PLANS . 5-121

R645-301-551. CASING AND SEALING OF UNDERGROUND OPENINGS 5-122

R645-301-552. PERMANENT FEATURES 5-122

R645-301-553. BACKFILLING AND GRADING 5-122

R645-301-560. PERFORMANCE STANDARDS 5-126

CHAPTER 6

TABLE OF CONTENTS

R645-301-600.	GEOLOGY	6-1
R645-301-610.	INTRODUCTION	6-1
R645-301-611.	GENERAL REQUIREMENTS	6-1
R645-301-612.	CROSS SECTION, MAPS AND PLANS	6-4
R645-301-620.	ENVIRONMENTAL DESCRIPTION	6-4
R645-301-621.	GENERAL REQUIREMENTS	6-4
R645-301-622.	CROSS SECTIONS, MAPS AND PLANS	6-4
R645-301-623.	GEOLOGIC INFORMATION	6-5
R645-301-624.	GEOLOGIC INFORMATION	6-5
R645-301-625.	ADDITIONAL INFORMATION	6-7
R645-301-626.	WAIVER FROM COLLECTION AND ANALYSIS	6-7
R645-301-627.	OVERBURDEN	6-7
R645-301-630.	OPERATION PLAN	6-7
R645-301-631.	CASING AND SEALING OF EXPLORATION HOLES AND BOREHOLES	6-7
R645-301-632.	SUBSIDENCE MONITORING	6-8
R645-301-640.	PERFORMANCE STANDARDS	6-8
R645-301-641.	ALL EXPLORATION HOLES AND BOREHOLES	6-8
R645-301-642.	MONUMENTS AND SURFACE MARKERS	6-8

CHAPTER 7

TABLE OF CONTENTS

R645-301-700.	HYDROLOGY	7-1
R645-301-710.	INTRODUCTION	7-1
R645-301-711.	GENERAL REQUIREMENTS	7-2
R645-301-712.	CERTIFICATION	7-8
R645-301-713.	INSPECTION	7-9
R645-301-720.	ENVIRONMENTAL DESCRIPTION	7-9
R645-301-721.	GENERAL REQUIREMENTS	7-9
R645-301-722.	CROSS SECTIONS AND MAPS	7-9
R645-301-723.	SAMPLING AND ANALYSIS	7-9
R645-301-724.	BASELINE INFORMATION	7-15
R645-301-725.	BASELINE CUMULATIVE IMPACT AREA INFORMATION	7-23
R645-301-726.	MODELING	7-24
R645-301-727.	ALTERNATIVE WATER SOURCE INFORMATION	7-24
R645-301-728.	PROBABLE HYDROLOGIC CONSEQUENCES (PHC) DETERMINATION	7-24
R645-301-729.	CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT (CHIA)	7-25
R645-301-730.	OPERATION PLAN	7-26
R645-301-731.	GENERAL REQUIREMENTS	7-26
R645-301-732.	SEDIMENT CONTROL MEASURES	7-32
R645-301-733.	IMPOUNDMENTS	7-33
R645-301-734.	DISCHARGE STRUCTURES	7-37
R645-301-735.	DISPOSAL OF EXCESS SPOIL	7-37
R645-301-736.	COAL MINE WASTE	7-37

R645-301-737. NON-COAL MINE WASTE 7-38

R645-301-738. TEMPORARY CASING AND SEALING OF WELLS . 7-38

R645-301-740. DESIGN CRITERIA AND PLANS 7-38

R645-301-741. GENERAL REQUIREMENTS 7-38

R645-301-742. SEDIMENT CONTROL MEASURES 7-38

R645-301-743. IMPOUNDMENTS 7-45

R645-301-744. DISCHARGE STRUCTURES 7-47

R645-301-745. DISPOSAL OF EXCESS SPOIL 7-47

R645-301-746. COAL MINE WASTE 7-49

R645-301-747. DISPOSAL OF NON-COAL MINE WASTE 7-51

R645-301-748. CASING AND SEALING OF WELLS 7-51

R645-301-750. PERFORMANCE STANDARDS 7-51

R645-301-751. WATER QUALITY STANDARDS AND EFFLUENT LIMITATIONS 7-52

R645-301-752. SEDIMENT CONTROL MEASURES 7-52

R645-301-753. IMPOUNDMENTS AND DISCHARGE STRUCTURES . 7-53

R645-301-754. DISPOSAL OF EXCESS SPOIL, COAL MINE WASTE AND NON-COAL MINE WASTE 7-53

R645-301-755. CASING AND SEALING OF WELLS 7-53

R645-301-760. RECLAMATION 7-53

R645-301-761. GENERAL REQUIREMENTS 7-53

R645-301-762. ROADS 7-53

R645-301-763. SILTATION STRUCTURES 7-53

R645-301-764. STRUCTURE REMOVAL 7-54

R645-301-765. PERMANENT CASING AND SEALING OF WELLS . 7-54

CHAPTER 8

TABLE OF CONTENTS

R645-301-800. BONDING AND INSURANCE 8-1

R645-301-810. BONDING DEFINITIONS AND DIVISION RESPONSIBILITIES 8-2

R645-301-820. REQUIREMENT TO FILE A BOND 8-2

R645-301-830. DETERMINATION OF BOND AMOUNT 8-2

R645-301-840. GENERAL TERMS AND CONDITIONS OF THE BOND 8-2

R645-301-850. BONDING REQUIREMENTS FOR UNDERGROUND MINING OPERATIONS 8-2

R645-301-860. FORMS OF BONDS 8-3

R645-301-870. REPLACEMENT OF BONDS 8-3

R645-301-880. REQUIREMENT TO RELEASE PERFORMANCE BONDS 8-3

R645-301-890. TERMS AND CONDITIONS FOR LIABILITY INSURANCE 8-3

APPENDICES:

Appendix A
PART 1 Ownership and Control

Appendix A
PART 2 Current and Previous Coal Mining Permits

Appendix B
PART A

A-1. DOGM Permit

A-2. Utah Railway, Lease Agreement

A-3. Utah Railway, Amendment to Lease

A-4. Utah Railway, Amended Trackage Agreement

A-5. Agreement with Beaver Creek Coal Company

A-6. BLM Right-of-Way Grant

A-7. BLM Notice to Proceed with Construction

A-8. BLM Access Road Right-of-Way

A-9. BLM Right-of-Way, Amendment No. 1

A-10. BLM Right-of-Way, Amendment No. 2

A-11. BLM Right-of-Way, Amendment No. 3, 4

A-12. BLM Right-of-Way, Amendment No. 5, Feb 5, 2007

A-13. Utah Division of Air Quality- Approval Order

A-14. Utah Dept of Transportation, Approval for Reduced Rail Clearance

A-15. Southeastern Utah District Health Dept., Wastewater Disposal System Approval

A-16. State Div of History, Archeological Clearance (Moved to CONFIDENTIAL BINDER)

A-17. State Div of History, Archeological Survey (Moved to CONFIDENTIAL BINDER)

A-18. State Div of Water Rights, Approved Application

A-19. State Div of Wildlife Resources, Electric

	Transmission Pole Acceptable
A-20.	U.S. Dept of Interior, Powerline Approval
A-21.	State Div of Environmental Protection, Renewal of Discharge Permit
PART B	History of Violations
PART C	Insurance
PART D	Bond Information
Appendix C	Soil and Foundation Investigation
Appendix D	Soil Survey
Suplmt	Soils Report, James Nyenhuis
Appendix E	Wildlife Enhancement Project
Appendix F	Wildlife Resources Information
Appendix G	Garley Canyon Spring Water Rights/Analyses
Appendix H	Sediment Pond Certifications and R-69 Forms
Appendix I	Vegetation Survey
Appendix J	Probable Hydrologic Consequences of Operations at the Wildcat Loadout
Appendix K	Deleted
Appendix L	Grade Control Structures
Appendix M	Water Monitoring Data
Appendix N	Vegetation Test Plot Monitoring
Appendix O	Coal Processing Waste Pil
Appendix P	Response to DO-04, wind-Blown Fines
Appendix Q	Deleted
Appendix R	Sedimentation and Drainage Control Plan

NOTE: CONFIDENTIAL BINDER CONTAINS ALL ARCHEOLOGY INFORMATION

PLATES

PLATE #	PLATE TITLE
Plate 1	Existing Surface Facility Map
Plate 1A	Proposed Surface Facility Map, Response to DO-04
Plate 1B	Disturbed Areas
Plate 2	Deleted
Plate 2A	Proposed Drainage Map, Response to D0-04
Plate 3A	Sediment Pond A
Plate 3B	Deleted
Plate 3C	Sediment Pond C
Plate 3D	Sediment Pond D
Plate 3E	Sediment Pond E
Plate 3F	Sediment Pond F
Plate 3G	Sediment Pond G
Plate 3H	Permanent Impoundment
Plate 3I	Depression Area
Plate 4	Deleted
Plate 5	Deleted
Plate 6	Deleted
Plate 7	Deleted
Plate 8	Final Reclamation Hydrology, Phase 1
Plate 9	Final Reclamation Contours, Phase 2
Plate 10	Cross Sections
Plate 11	Soils Map
Plate 12	Geology Map
Plate 13	Topsoil Piles
Plate 14	Cross Section Reference Map

Plate 15	Watershed Map
Plate 16	Surface and Subsurface Ownership Map
Plate 17	Typical Road Cross-sections
Plate 18	Deleted
Plate 19	Deleted
Plate 20	Deleted
Plate 21	Deleted
Plate 29	Vegetation Map

ANDALEX RESOURCES, INC.

WILDCAT LOADOUT

MINING AND RECLAMATION PLAN

CHAPTER 1, LEGAL

CHAPTER 1

TABLE OF CONTENTS

R645-301-100.	GENERAL	1-1
R645-301-110.	LEGAL, FINANCIAL, COMPLIANCE AND . . .	1-1
R645-301-111.	INTRODUCTION	1-2
R645-301-112.	IDENTIFICATION OF INTERESTS	1-4
R645-301-113.	VIOLATION INFORMATION	1-7
R645-301-114.	RIGHT-OF-ENTRY INFORMATION	1-10
R645-301-115.	STATUS OF UNSUITABILITY CLAIMS	1-12
R645-301-116.	PERMIT TERM	1-13
R645-301-117.	INSURANCE, PROOF OF PUBLICATION AND FACILITIES OR STRUCTURES USED IN COMMON	1-13
R645-301-118.	FILING FEE	1-14
R645-301-120.	PERMIT APPLICATION FORMAT AND CONTENTS	1-14
R645-301-121.	REQUIREMENTS	1-14
R645-301-122	REFERENCED MATERIALS	1-15
R645-301-123.	APPLICATION FOR PERMITS, CHANGES, RENEWALS, OR TRANSFERS	1-15
R645-301-130.	REPORTING AND TECHNICAL DATA	1-15
R645-301-131.	TECHNICAL DATA REQUIREMENTS	1-18
R645-301-132.	TECHNICAL ANALYSES REQUIREMENTS	1-19
R645-301-140.	MAPS AND PLANS	1-19
R645-301-141.	MAP FORMATS	1-19
R645-301-142.	PHASES OF OPERATIONS AND MINING ACTIVITY	1-19
R645-301-150.	COMPLETENESS	1-23

R645-301-100. GENERAL

R645-301-110. LEGAL, FINANCIAL, AND COMPLIANCE INFORMATION

Legal, Financial, Compliance and Information

The objective of this chapter is to set forth all relevant information concerning ownership and control of Andalex Resources, Inc., the ownership and control of the property to be affected by mining activities and all other information and documentation required.

Compliance Information

a) Suspension and Revocation

Andalex Resources, Inc., affiliates or persons controlled by or under common control with Andalex haven't had a mining permit suspended or revoked within the last five years.

b) Forfeiture of Bond

Andalex Resources, Inc., affiliates or persons controlled by or under common control with Andalex have not forfeited a mining bond or similar security in lieu of bond.

c) History of Violations

Appendix B, *Part B* contains a listing of all violations received within the last three years prior to the date of this application by Andalex and affiliated companies.

R645-301-111. INTRODUCTION

Introduction and Overview of Project Permit Application

A. Introduction

This permit application is being submitted by Andalex Resources, Inc., in order that coal can be stored and loaded out of it's coal loadout facility located at Wildcat Junction, near Helper, Utah. This facility is known as the Wildcat Loadout. Andalex is a corporation organized and existing under the laws of the state of

Delaware and qualified to do business in Utah. Andalex Resources has a permit to operate it's coal loading and storage facility known as Wildcat Loadout, in accordance with the appropriate regulations. This coal loadout facility is located on land owned by the United States of America in Carbon County, Utah.

Andalex was granted the right-of-way in January, 1982, by the Bureau of Land Management of the United States Department of the Interior. Andalex Resources, the designated operator, along with AMCA Coal Leasing, Inc., its' land acquisition and development branch, control all lands within the proposed coal loadout facility area. Andalex Resources, Inc., has therefore prepared this coal loadout facility permit application rewritten under the R645 Coal Mining Rules format, for submission to the appropriate regulatory authorities for review and approval.

B. Overview and Summary of Project

Coal storage and loading activities at Wildcat started officially on April 2, 1985, when the first coal was brought there for storage and eventual loadout, under a permit issued to Andalex Resources by the Bureau of Land Management, U.S. Department of the Interior. This coal loadout facility is located approximately three miles west of U.S. Highway 6, Consumer's Road, Helper, Utah, in Carbon County and can be more accurately described as parts of Section 33, Township 13 South, Range 9 East, S.L.B. & M. (please see Figure 1). The permit area contains approximately 100.19 acres, of which 12.5 acres are under lease to the Utah Railway by the Bureau of Land Management. The facility is located within a 270 acre BLM right-of-way. The serial number for this right-of-way is U-48027.

There are no perennial streams or bodies of water on the property. Water for culinary purposes is supplied by Price Municipal Corporation and hauled down to the facility using approved culinary tank trucks. The water is in turn stored in an approved culinary tank at the loadout.

Historically, coal loading activities had been the sole use for this permit area, even prior to being leased to Andalex Resources. This is evidenced by the fact that the soil survey of the area revealed that of the eight

test holes, two completely lacked topsoil and one located along the tracks had approximately two feet of fine coal and no topsoil. Coal had been stored along the tracks for shipping purposes in the past. It is appropriately justifiable to conclude that Andalex's proposed use of the area for coal storage and loading activities will be fully compatible with its' previous use, and as such, no significant new disturbance of the area has occurred. Observations have shown that the previous land use consisting of wildlife habitat and migrations has not been interrupted. This is evidenced by repeated sightings of deer herds moving through the permit area. Other mammals and birds continue to use this area for their habitat. Access to the loadout and storage facility is by paved county and state roads, which are also maintained by the county and state.

Coal is hauled from the Centennial Mine, Genwal Resources, and West Ridge Mine. All surface and support facilities necessary for present operations have been completed. There are no additions or modifications proposed at this time. Aside from the DOGM permit, Andalex Resources has acquired all the necessary approvals, licenses, rights-of-way, and permits at both state and federal levels to conduct coal storage and loading operations on the plan area. The facility is designed to handle loading and crushing activities up to 5.5 million tons per year.

Upon cessation of coal loading activities, reclamation activities will commence in accordance with the plans outlined in this application. The land will be restored to a condition equal to or better than the premining condition, according to available technology.

This facility is located in an area where mining and it's related activities have been the main industry, and as a result, the surrounding communities are properly adapted. The labor supply is excellent and well trained. With all these considerations, coupled with the prudent management at Andalex, the Wildcat Coal Loadout Facility is a model operation in the Carbon County area with no significant environmental or socioeconomic impact.

C. Organization of Application

This permit application has been organized in accordance with the general requirements for format and contents as

outlined in the R645 Coal Mining Rules.

R645-301-112. IDENTIFICATION OF INTERESTS.

Identification of Interests

1. Permit Applicant

   Andalex Resources, Inc.
   P.O. Box 910
   East Carbon, Utah 84520
   (435) 888-4000

2. Legal and Equitable Owners of Record

   The addresses of owners of record are as follows:
   Bureau of Land Management
   Utah State Office
   P.O. Box 45155
   Salt Lake City, Utah 84145-0155
   (801) 539-4017

   Utah Railroad
   P.O. Box 11608
   Salt Lake City, Utah 84147
   (801) 521-3447

   Andalex Resources, Inc.
   P.O. Box 910
   East Carbon, Utah 84520
   (435) 888-4000

   All land within the permit area in question is owned by the United States of America and is leased by the Utah Railroad Corporation and Andalex Resources, Inc.

3. Purchaser's of Record Under Real Estate Contracts

   There are no purchasers of record under any real estate contracts of areas to be affected by surface operations and facilities of this loadout, and there are no purchasers of record under any real estate contracts of the coal to be loaded out.

R645-301-112.100. TYPE OF BUSINESS

Andalex Resources, a corporation organized and existing under the laws of Delaware and qualified to do business in Utah, operates the Wildcat Loadout Facility. This facility stores, processes and ships coal for various operations in the area. This mining permit application has been prepared by Andalex Resources and is being submitted for review and approval by the appropriate regulatory authorities.

R645-301-112.200. NAMES, LOCATIONS, RESIDENT AGENT

Resident Agent who will accept service of process for Andalex Resources, Inc., Wildcat Loadout, ACT/007/033:

David Shaver
Andalex Resources, Inc.
P.O. Box 910
East Carbon, Utah 84520

Also, see Chapter 8, for notarized statement pertaining to completeness and accuracy.

R645-301-112.300. OTHER THAN SINGLE PROPRIETORSHIPS

Andalex Resources, Inc., Tower Division, holds the exclusive coal operating interests in the permit area.

R645-301-112.310. OFFICERS AND SHAREHOLDERS

Refer to Appendix A, Part 1 for information on officers and shareholders.

R645-301-112.320. OWNERSHIP AND CONTROL RELATIONSHIP TO APPLICANT

Refer to Appendix A, Part 1 for ownership and control information.

R645-301-112.400. PENDING, CURRENT AND PREVIOUS COAL PERMITS

A list of current and previous coal mining permits held by Andalex and its affiliates is included in Appendix A, Part 2.

R645-301-112.500. SURFACE AND MINERAL OWNERSHIP

All surface and subsurface areas contiguous to the permit area are owned by the United States. The name and address of the responsible authority representing the federal government is as follows:

Bureau of Land Management
Utah State Office
Federal Building
Salt Lake City, Utah 84111
(801) 524-3004

R645-301-112.600. ADJACENT SURFACE AND MINERAL OWNERSHIP

Refer to Plate 16 for adjacent surface and mineral ownership.

R645-301-112.700. MSHA NUMBERS FOR ALL MINE-ASSOCIATED STRUCTURES

The Wildcat Loadout and Refuse Pile have the following M.S.H.A. I.D. Numbers:

Loadout	-	MSHA I.D. 42-01864
Refuse Pile	-	MSHA I.D. 1211-UT-09-01864-01

R645-301-112.800. STATEMENT OF ALL LANDS AND INTERESTS IN LANDS

N/A

R645-301-113. VIOLATION INFORMATION

History of Violations

Appendix B, *Part B* contains a listing of all violations received within the last three years prior to the date of this application by Andalex and affiliated companies.

R645-301-113.100. COMPLIANCE INFORMATION

Andalex Resources, Inc., affiliates or persons controlled by or under common control with Andalex haven't had a mining permit suspended or revoked within the last five years.

Andalex Resources, Inc., affiliates or persons controlled by or under common control with Andalex have not forfeited a mining bond or similar security in lieu of bond.

Appendix B, *Part B* contains a listing of all violations received within the last three years prior to the date of this application by Andalex and affiliated companies.

R645-301-113.110. SUSPENDED OR REVOKED PERMITS

Andalex Resources, Inc., affiliates or persons controlled by or under common control with Andalex haven't had a mining permit suspended or revoked within the last five years.

R645-301-113.120. FORFEITED BONDS

Andalex Resources, Inc., affiliates or persons controlled by or under common control with Andalex have not forfeited a mining bond or similar security in lieu of bond.

R645-301-113.200. EXPLANATION OF PERMIT OF BOND FORFEITURE

N/A

R645-301-113.210 PERMIT AND BOND IDENTIFICATION

The following is a list of all other licenses and permits under applicable state and federal land use, air and water quality, water rights, and health and safety laws and regulations held by Andalex Resources in order to operate its coal loading facility. These permits can also be found in Appendix B.

State:

1. State of Utah
   Department of Natural Resources
   Division of Oil, Gas, and Mining
   1594 West North Temple, Suite 1210
   Box 145801
   Salt Lake City, Utah 84114-5801

   Reference I.D.: DOGM MRP C/007/033

2. State of Utah
   Department of Health
   Division of Environmental Health
   150 West North Temple
   P.O. Box 2500
   Salt Lake City, Utah 84110

   - Air Quality Construction and Operation Permit
     Approved July 22, 1982

   - Water Quality - Sediment and Drainage
     Approved September 15, 1982

   - Septic and Culinary Plan (1)
     Approved April 1, 1982

3. Utah Division of Water Quality
   P.O. Box 144870
   Salt Lake City, Utah 84114-4870

   - UPDES Discharge Permit #UTG040007

Federal:

1. Bureau of Land Management
   Utah State Office
   P.O. Box 45155
   Salt Lake City, Utah 84145-0155

   - Right-of-Way
     Permit Number U-48027
     Granted January 12, 1982
     Amended February 5, 2007

2. U.S. Department of Labor

Mine Safety and Health Administration (M.S.H.A.)
P.O. Box 25367
Denver, Colorado 80225
(District 9)
Wildcat Loadout Facility I.D. 42-01864

R645-301-113.220. REGULATORY AUTHORITIES INVOLVED

See above

R645-301-113.230. CURRENT STATUS OF PERMIT AND BOND

See above

R645-301-113.240. ADMINISTRATIVE OR JUDICIAL PROCEDURES

Appendix B

R645-301-113.250. CURRENT STATUS OF PROCEEDINGS

Appendix B

R645-301-113.300. LIST OF ALL VIOLATIONS NOTICES

Appendix B

R645-301-113.310. IDENTIFICATION OF VIOLATIONS

Appendix B

R645-301-113.320. DESCRIPTION OF VIOLATIONS

Appendix B

R645-301-113.330. LOCATION OF VIOLATIONS PROCEEDINGS

Appendix B

R645-301-113.340. STATUS OF VIOLATIONS PROCEEDINGS

Appendix B

R645-301-113.350. ACTIONS TAKEN TO ABATE VIOLATIONS

R645-301-114. RIGHT-OF-ENTRY INFORMATION

Andalex Resources, Inc.,currently holds approximately *270* acres of BLM federal land within which the permit area is located. Andalex bases its' legal right to enter and conduct coal loading activities in the permit area pursuant to the language contained in the right-of-way, specifically the actual grant (amended) dated March 24, 1982, and amended February 5, 2007 *(see Appendix B-Part A-12A)*. This right-of-way was granted under the authority of the Federal Land Policy and Management Act of 1976 (90 Stat. 2776; 43 U.S.C. 1761, Sec. 501 (a)(7)). All valid rights existing on the date of this grant shall apply.

A right to enter and conduct loading activities on the approximately thirteen acres of the permit area leased to the Utah Railroad is contained in the private lease agreement between Utah Railroad and Andalex Resources in November, 1981.

The BLM right-of-way can be described as follows:

U-48027:

Salt Lake Base and Meridian, Utah Township 13 South, Range 9 East, Section 33,

NE¼SW¼NE¼, S½SW¼NE¼, E½SW¼, SE¼, containing 270 acres

It is important to note that this is a non-exclusive areal right-of-way, and that there are numerous other equally valid rights-of-way which occupy much of this same area. For example, overlapping rights-of-ways exist for the Utah Railway tracks, the State Highway 139, the Carbon County Consumers Road, the by-pass road, the Trestle public road, Rocky Mountain Power 46 KV powerline, Phillip Petroleum's gas well and pipeline corridor, and Hidden Splendor shop facility. BLM determined the final 270 acre configuration in part to "square up" the boundary for administrative purposes. Being a non-exclusive right-of-way means there is no conflict among grantees, and no inherent liability from one grantee to the next, as long as each grantee's activities are within the terms of their respective

right-of-way.

The DOGM permit area is located within the BLM right-of-way and is described as follows:

NW¼SE¼, N½SW¼SE¼, E½E½NE¼SW¼, E½NE¼SE¼SW¼, NE¼SE¼SE¼SW¼, NW¼SW¼SW¼SE¼, E½SE¼SW¼NE¼ and portions of N½NW¼NE¼SE¼, NE¼SW¼NE¼, SW¼SW¼NE¼, NW¼SE¼SW¼NE¼, W½NE¼SW¼, W½E½NE¼SW¼, W½E½SE¼SW¼, comprising 100.19 acres, more or less.

In addition, there is a parcel of land 500 feet by 500 feet square whose southeast corner is located 990 feet east of the center of Section 33.

Also see Appendix B, Part A-5, for a letter from Beaver Creek Coal Company allowing Andalex to operate on a small portion of their leased land described in the letter.

R645-301-114.100. DOCUMENTATION

Appendix B

R645-301-114.200. SEVERED SURFACE AND MINERAL ESTATES

Appendix B

R645-301-114.210. WRITTEN SURFACE OWNER CONSENT FOR COAL EXTRACTION

N/A

R645-301-114.220. CONVEYANCE EXPRESSLY GRANTING RIGHT TO MINE COAL

N/A

R645-301-114.230. DOCUMENTATION OF LEGAL AUTHORITY TO MINE COAL

N/A

R645-301-114.300. ADJUDICATION OF PROPERTY RIGHTS DISPUTES

The Division does not have the authority to adjudicate property rights disputes.

R645-301-115. STATUS OF UNSUITABILITY CLAIMS

N/A

R645-301-115.100. IDENTIFICATION OF LANDS UNSUITABLE

The permit area is not within an area designated unsuitable for the affects of mining activities, specifically, coal loading activities, under study for designation in an administrative proceeding initiated under those parts. Further, there are no occupied dwellings within 300 feet of the permit.

R645-301-115.200. CLAIMS OF EXEMPTION BY COMMITMENT PRIOR TO JANUARY 4, 1977

None.

R645-301-115.300. MINING AND RECLAMATION OPERATIONS WITHIN 300 FEET OF AN OCCUPIED DWELLING OR WITHIN 100 FEET OF A PUBLIC ROAD

The Consumers Road and the Trestle Road are public roads within 100 feet of the disturbed area boundary.

R645-301-116. PERMIT TERM

The requested term of this permit is five years. Andalex will then apply for five year extensions over the life of this operation.

R645-301-116.100. SCHEDULE OF PHASED MINING AND RECLAMATION ACTIVITIES

See R645-301-142

R645-301-116.200. PERMIT TERM IN EXCESS OF FIVE YEARS

The requested term of this permit is five years. Andalex will then apply for five year extensions over the life of the mine.

R645-301-116.210. COMPLETENESS AND ACCURACY FOR LONGER TERM

N/A

R645-301-116.220. DEMONSTRATION OF NEED FOR LONGER TERM

N/A

R645-301-117. INSURANCE, PROOF OF PUBLICATION AND FACILITIES OR STRUCTURES USED IN COMMON

Appendix B contains certificates of liability insurance covering personal injury and property damage resulting from this operation.

R645-301-117.100. LIABILITY INSURANCE

Appendix B

R645-301-117.200. NEWSPAPER PUBLICATION

A copy of the newspaper advertisement of this Mining and Reclamation Plan and proof of publication of the advertisement is filed with the Division and made part of the complete application. (See Appendix B).

R645-301-117.300. FACILITIES USED IN COMMON

N/A

R645-301-118. FILING FEE

N/A

R645-301-120. PERMIT APPLICATION FORMAT AND CONTENTS

Summary of Table of Contents

R645-301-100. General

R645-301-200. Soils

R645-301-300. Biology

R645-301-400. Land Use and Air Quality

R645-301-500. Engineering

R645-301-600. Geology

R645-301-700. Hydrology

R645-301-800. Bonding and Insurance

R645-301-121. REQUIREMENTS

R645-301-121.100. CURRENT INFORMATION

Information is current.

R645-301-121.200. CLEAR AND CONCISE

Information is clear and concise.

R645-301-121.300. FORMAT REQUIREMENTS

To facilitate review of the application, each chapter listed above has been further divided into specific parts and sections. These can be found listed in the detailed table of contents appearing at the beginning of this text along with the page numbers on which they appear. This table of contents also contains lists of figures, tables, plates, exhibits, and appendices to facilitate cross referencing between chapters.

Exhibits include appropriate supporting documents, reports and publications and are included as appendices.

Maps which were not reduced to fit into the text are included

in a separate volume as plates. All maps and plans are submitted in accordance with the requirements.

R645-301-122. REFERENCED MATERIALS

All references and referenced publications and materials are listed under R645-301-130.

R645-301-123. APPLICATION FOR PERMITS, CHANGES, RENEWALS, OR TRANSFERS

This permit is submitted to update information to the R645 permit format.

R645-301-130. REPORTING AND TECHNICAL DATA

Preparation of Application

A. Persons and Consultants Involved

The following persons and/or organizations were involved in collection and analysis of the technical data set forth in this application.

1. In House Consulting Services

   a) Andalex Resources, Inc., AMCA Coal Leasing, Inc.
   Samuel C. Quigley - General Manager (prior)
   Michael W. Glasson - Senior Geologist (prior)
   David E. Shaver - Chief Engineer (prior)

2. Outside Consulting Services

   a) Dan W. Guy - Registered Professional Engineer (State of Utah No. 4548)
   Price, Utah
   - Sedimentation and Drainage Control Plan

   b) Bruce T.S. Ware - Registered Land Surveyor
   Price, Utah

   c) Rollins, Brown, and Gunnell
   Provo, Utah
   - Foundation Study

d) Earl Jensen - Soil Scientist
Price, Utah

e) Roy Harniss - Range Scientist
Logan, Utah
- Vegetation Inventory

B. Coordination and Consultation with Governmental Agencies

The following governmental agencies were consulted in the preparation of information set forth in this application.

U.S. Department of Agriculture
Soil Conservation Service
Price, Utah

U.S. Department of the Interior
Bureau of Land Management
Price, Utah
Salt Lake City, Utah

Office of Surface Mining
Reclamation and Enforcement
Denver, Colorado

U.S. Fish and Wildlife Service
Salt Lake City, Utah

State of Utah:
Department of Natural Resources
Division of Oil, Gas, and Mining
Salt Lake City, Utah

Antiquities Section (Consulting Services Branch)
Salt Lake City, Utah
(Archaeological Survey)

Department of Natural Resources
Division of Wildlife Resources
Salt Lake City, Utah
Price, Utah

Department of Community & Economic Development
Division of State History

Salt Lake City, Utah

Department of Natural Resources
Division of Water Rights
Salt Lake City, Utah

Department of Health
Division of Environmental Health
Salt Lake City, Utah

C. References

Andalex Resources, Inc. 1987 - Mining and Reclamation Plan
Submitted to the State of Utah
Department of Natural Resources, D.O.G.M.

Doelling, H.H. 1972 - Central Utah Coal Fields
U.G.M.S. Monograph Series No. 3

U.S.D.A. 1978 - Soil Survey and Interpretations of the Coal Creek Emery Portion of the Price River and Emery County Areas, Carbon and Emery Counties, Utah. S.C.S.

U.S.D.I. 1979 - Final Environmental Statement, Development of Coal Resources in Central Utah, Parts 1 and 2

D. Bibliography

Barfield, B.J., Warner, R.C. and Haan, C.R. 1983. Applied Hydrology and Sedimentology for Disturbed Areas. Olkahoma Technical Press, Stillwater, 603 pp.

Cordova, R.M., 1964, "Hydrogeologic Reconnaissance of Part of Head Waters Area of the Price River, Utah", Utah Geological and Mineral Survey, Water Resources Bulletin 4, p. 26.

Fisher, D.J., Erdmann, C.E., and Reeside, J.B., 1960. "Cretaceous and Testing Formation of the Book Cliffs, Carbon, Emery, and Grand Counties, Utah, and Garfield and Mesa Counties, Colorado", U.S.

Geological Survey, Professional Paper 332, p. 80.

Price, D. and Arnow, T., 1974. Summary Appraisals of the Nation's Ground Water Resources - Upper Colorado Region. U.S. Geological Survey Professional Paper 813-C, 40 pp.

Spieker, Edmond M., 1931. Wasatch Coal Field, Utah. U.S. Geological Survey, Bulletin 819.

U.S. Bureau of Reclamation, 1977. Design of Small Dams, U.S. Government Printing Office, Washington, D.C., 816 pp.

Waddell, K.M., and other, 1981. Hydrologic Reconnaissance of the Wasatch Plateau, Book Cliffs Field Areas, Utah. U.S.G.S. Water Supply Paper 2068.

R645-301-131. TECHNICAL DATA REQUIREMENTS

Where applicable, technical data submitted has been identified as to who prepared the information and is stamped by that registered professional engineer (P.E.).

R645-301-132. TECHNICAL ANALYSES REQUIREMENTS

Analyses are prepared by a qualified professional engineer.

R645-301-140. MAPS AND PLANS

Per Division Requirement.

R645-301-141. MAP FORMATS

Per Division Requirement.

R645-301-142. PHASES OF OPERATIONS AND MINING ACTIVITY

Introduction and Overview of Project Permit Application

This permit application is being submitted by Andalex

Resources, Inc., in order that coal can be stored and loaded out of its' coal loadout facility located at Wildcat Junction, near Helper, Utah. This facility is known as the Wildcat Loadout. Andalex is a corporation organized and existing under the laws of the state of Delaware and qualified to do business in Utah. Andalex Resources hereby seeks the permit to operate its' coal loading and storage facility known as Wildcat Loadout, in accordance with the appropriate regulations. This coal loadout facility is located on land owned by the United States of America in Carbon County, Utah.

Andalex was granted the right-of-way in January, 1982, by the Bureau of Land Management of the United States Department of the Interior. *The right-of-way was subsequently amended on February 5, 2007.* Andalex Resources, the designated operator, along with AMCA Coal Leasing, Inc., its' land acquisition and development branch, control all lands within the proposed coal loadout facility area. Andalex Resources, Inc., has therefore prepared this coal loadout facility permit application for submission to the appropriate regulatory authorities for review and approval.

Coal storage and loading activities at Wildcat started officially on April 2, 1985, when the first coal was brought there for storage and eventual loadout, under a permit issued to Andalex Resources by the Bureau of Land Management, U.S. Department of the Interior. This coal loadout facility is located approximately three miles west of U.S. Highway 6, Consumer's Road, Helper, Utah, in Carbon County and can be more accurately described as parts of Section 33, Township 13 South, Range 9 East, S.L.B. & M. (please see Plate 1). The BLM right-of-way property contains approximately *270* acres, of which 12.5 acres are under lease to the Utah Railway by the Bureau of Land Management. The serial number for this right-of-way is U-48027. The permit area occupies 100.19 acres within the BLM right-of-way.

There are no perennial streams or bodies of water on the property. Water for culinary purposes is supplied by Price Municipal Corporation and hauled down to the facility using approved culinary tank trucks. The water is in turn stored in an approved culinary tank at the loadout.

Historically, coal loading activities had been the sole use for this permit area, even prior to being leased to Andalex Resources. This is evidenced by the fact that the soil survey of the area revealed that of the eight test holes, two completely lacked topsoil and one located along the tracks had approximately two feet of fine coal and no topsoil. Coal had been stored along the tracks for shipping purposes in the past. It is appropriately justifiable to conclude that Andalex's proposed use of the area for coal storage and loading activities will be fully compatible with its' previous use, and as such, no significant new disturbance of the area has occurred. Observations have shown that the previous land use consisting of wildlife habitat and migrations has not been interrupted. This is evidenced by repeated sightings of deer herds moving through the permit area. Other mammals and birds continue to use this area for their habitat. Access to the loadout and storage facility is by paved county and state roads, which are also maintained by the county and state.

Coal is hauled from the Centennial Mine, Genwal Resources and West Ridge Mine. All surface and support facilities necessary for present operations have been completed. There are no additions or modifications proposed at this time. Aside from the DOGM permit, Andalex Resources has acquired all the necessary approvals, licenses, rights-of-way, and permits at both state and federal levels to conduct coal storage and loading operations on the plan area. The facility is designed to handle loading and crushing activities up to 5.5 million tons per year.

Upon cessation of coal loading activities, reclamation activities will commence in accordance with the plans outlined in this application. The land will be restored to a condition equal to or better than the premining condition, according to available technology.

This facility is located in an area where mining and its' related activities have been the main industry, and as a result, the surrounding communities are properly adapted. The labor supply is excellent and well trained. With all these considerations, coupled with the prudent management at Andalex, the Wildcat Coal Loadout Facility is a model operation in the Carbon County area with no significant environmental or socioeconomic impact.

R645-301-142.100. PRIOR TO AUGUST 3, 1977

None by Andalex Resources. A wash plant and loadout were operated by other independent companies or individuals in areas presently consumed by Andalex's surface facilities. Andalex's encroachment onto these previously disturbed areas transferred the responsibility for reclamation to Andalex. The specific locations of disturbed areas prior to Andalex's mining activities is irrelevant.

R645-301-142.200. AFTER AUGUST 3, 1977

All of Andalex's surface facilities and mining operations began after August 3, 1977.

R645-301-142.210. PRIOR TO MAY 3, 1978

See R645-301-142.100.

R645-301-142.220. SMALL OPERATOR'S EXEMPTION PRIOR TO JANUARY 1, 1979

N/A

R645-301-142.300. AFTER MAY 3, 1978 (OR JANUARY 1, 1979 FOR SMALL OPERATOR'S EXEMPTION) AND PRIOR TO APPROVAL OF STATE PROGRAM

N/A

R645-301-142.400. AFTER ISSUANCE OF PERMIT BY THE DIVISION

A list of all applicable permits is included in Appendix B.

R645-301-150. COMPLETENESS

Per Division.

ANDALEX RESOURCES, INC.

WILDCAT LOADOUT

MINING AND RECLAMATION PLAN

CHAPTER 2, SOILS

CHAPTER 2

TABLE OF CONTENTS

R645-301-200.	SOILS	2-1
R645-301-211.	PREMINING SOIL RESOURCES	2-2
R645-301-212.	STOCKPILING AND REDISTRIBUTION	2-2
R645-301-220.	ENVIRONMENTAL DESCRIPTION	2-8
R645-301-221.	PRIME FARMLAND INVESTIGATION	2-8
R645-301-222.	SOIL SURVEY	2-8
R645-301-223.	SOIL CHARACTERIZATION	2-9
R645-301.224.	SUBSTITUTE TOPSOIL	2-9
R645-301-230.	OPERATION PLAN	2-12
R645-301-231.	GENERAL REQUIREMENTS	2-12
R645-301-232.	TOPSOIL AND SUBSOIL REMOVAL	2-12
R645-301-233.	TOPSOIL SUBSTITUTES AND SUPPLEMENTS	2-14
R645-301-234.	TOPSOIL STORAGE	2-15
R645-301-240.	RECLAMATION PLAN	2-16
R645-301-241.	GENERAL REQUIREMENTS	2-27
R645-301-242.	SOIL REDISTRIBUTION	2-28
R645-301-243.	SOIL NUTRIENTS AND AMENDMENTS	2-29
R645-301-244.	SOIL STABILIZATION	2-29
R645-301-250.	PERFORMANCE STANDARDS	2-29
R645-301-251.	SOIL REMOVAL	2-29
R645-301-252.	SOIL STORAGE AND REDISTRIBUTION	2-30

R645-301-200. SOILS

HISTORICAL NOTE: In 2004, the Division issued an Order DO-04 for wind-blown fines which had accumulated outside the disturbed area, primarily in the area southwest of the main coal storage pile below sediment Pond B. A complete description of the mitigation plan proposed for DO-04 is included in Appendix P.

I. Soil Survey and Vegetation Inventory (please see Appendix D, *Appendix D Supplement,* and Appendix I).

1. Introduction

Appendix D is a survey conducted by the SCS in the Wildcat area and depicts the major soil types here. Appendix D also includes a survey including sampling as performed by Earl Jensen consulting as a soil scientist. Included in this survey is a soil profile description for each soil type identified on the permit area. Plate 11 depicts the soils as outlined by the Order 3 Survey performed by the SCS.

R645-301-211. PREMINING SOIL RESOURCES

The entire disturbed area, with the exception of approximately 20 acres, was disturbed pre-law by previous owners, and no topsoil was saved.

Topsoil was removed prior to construction in 1984, and stored and protected for use in final reclamation. Please see Plate 13*C* for a summary of stored topsoil. Appendix D also includes a topsoil mass balance and includes soil quality data from the Utah State University Testing Laboratory. The mass balance indicates that there may not be sufficient volume of topsoil for final reclamation. Andalex has committed to identifying and testing for suitable substitute material either off the permit area or possibly within the permit area if a suitable growth medium can be identified.

R645-301-212. STOCKPILING AND REDISTRIBUTION

Removal and Storage of Topsoil and Subsoils

(Also the following sections: R645-301-230, 231.100, 231.400, 232, 234, 251 and 252)

The area from which topsoil was removed is approximately 20 acres (the surface area which was not previously impacted by loading operations prior to Andalex) and includes poorly developed soils. Using scrapers, the soil was scraped from the surface to a depth of approximately six inches and dumped at separate sites on the site. The topsoil storage areas are shown on Plate 1. No topsoil was gathered from ASCA portions of the permit area including the topsoil stockpile on the west side north of Pond F. All topsoil piles are to be considered ASCA exemptions (see Plate 2A). This part of the permit area is where the topsoil piles were placed. Although soil studies indicate suitable material to a depth greater than six inches, Andalex needed to use this subsoil material for fill in the construction of their surface facilities. It should be noted that in several areas on the facility where excavations were made, piles of coal fines where uncovered in some cases up to six feet thick. This material was reclaimed and used as a base for Andalex's coal storage piles. However, no topsoil was available in these areas. The topsoil was removed as a separate operation from areas to be disturbed by surface installations, such as roads and areas upon which support facilities are sited. Topsoil has been segregated, stockpiled, and protected from wind and water erosion and contaminants through revegetation and the use of ditches. All topsoil piles are equipped with impermeable earthen berms. If over a period of time these berms become backfilled with soil as a result of minor erosion, Andalex will remove the material and place it back on the pile thereby maintaining the berm protection at all times. Likewise, substitute topsoil sites, once identified, will be protected with vegetation. Samples were taken of all the topsoil piles to determine whether the material which was gathered is suitable for final reclamation. This analysis is included in Appendix D. Andalex is willing to commit to any necessary steps to insure that the topsoil material is suitable for final reclamation such as the use of additives, fertilizer, etc. Andalex suggests that the topsoil be tested prior to final reclamation as conditions in the piles may change over the next fifteen

to twenty years. Parameters that are being analyzed are pH, Ec, saturation percent, texture, organic C, SAR, Total N, available P, percent $CaCO_3$, Selenium, and Boron. Disturbed areas no longer required for the conduct of mining operations have been graded and revegetated. Once the topsoil was removed, the areas were graded to accommodate the surface facilities. Andalex submitted plans to modify the disturbed area boundary and to increase the capacity of the Wildcat Loadout. This proposal included plans to relocate three of the topsoil piles on the east side of the permit area. These topsoil piles (B, C, D) have been moved to the west side of Wildcat where they are protected from additional wind-carried coal fines. The new pile has been renamed Topsoil Pile "B". After these piles were relocated, they also were reseeded once again with an interim seed mixture which will provide further protection from erosion. For further information about topsoil, please see Appendix D.

There are presently 4 topsoil stockpiles on this site.

Topsoil Pile Summary, Existing		
Topsoil Pile A	11,877 $ft.^3$	(**See note below)
Topsoil Pile B	285,810 $ft.^3$	
Topsoil Pile E	122,176 $ft.^3$	
Topsoil Pile F	44,363 $ft.^3$	
Total	464,499 $ft.^3$	(17,204 CY)

Topsoil piles B, C and D have been moved away from the coal storage piles to the west side of Wildcat where they will no longer be subjected to wind-borne coal fines(Existing Topsoil Pile "B"). These piles represent a total volume of 285,770 ft^3. The new topsoil pile is a long, narrow pile situated adjacent to the existing topsoil pile on the west side. The new pile is approximately 10 feet in height, 75 feet wide and 500 feet long. Slopes on the topsoil pile do not exceed 2V:1H. A containment berm has been constructed around the perimeter of the pile to a minimum height of two feet. Surface area and surface roughness have been maximized to allow microbial activity and organic matter cycling. The new topsoil pile, was reseeded between October 1 and October 14, 1994, broadcasting the following pure live seed mixture or drill seeding at half the specified rate.

Fairway crested wheatgrass	4 lb/ac
Bozoisky Russian wildrye	4 lb/ac
Arriba Western wheatgrass	4 lb/ac
Nezpar Indian ricegrass	4 lb/ac
Critana thickspike wheatgrass	4 lb/ac
Forage Kochia	4 lb/ac
Rincon Fourwing saltbush	4 lb/ac
Shadscale	2 lb/ac
Gordon Creek Wyoming sagebrush	.5 lb/ac
Castle Valley Gardner saltbush	2 lb/ac

Areas where topsoil has been moved will be drill seeded with the approved mixtures or hand broadcast at 1-1/2 times the specified rate. Andalex proposes the use of several techniques in order to measure revegetation success. These will include the use of non-weedy alfalfa mulch at the rate of three to four tons per acre as well as excelsior matting and chicken wire for erosion control. Mulch will be crimped in on the topsoil pile and in the areas previously designated as undisturbed a light application of water will be applied immediately after seeding. It should be noted that prior to revegetation of the areas previously designated as undisturbed coal fines were vacuumed to the extent possible. Also, if deemed necessary in future years, coal fines will be vacuumed in areas where revegetation could potentially be affected adversely.

It should be noted that areas from which topsoil piles were removed and on the area where fill material was borrowed additional topsoil was gathered to a depth of twelve inches and placed on the new topsoil storage pile on the west side.

** It should also be noted that, under the plan to address the Division Order DO-04 (wind-blown fines), the company commits to salvaging 6" of topsoil from the clean-up area shown on Plate 1A. It is estimated that about 3000 cubic yards of material will be salvaged at that time. The material will be stored as an extension to existing Topsoil Pile A which is located nearby. For a complete description of the topsoil salvaging and stockpiling plan associated with Division Order DO-04, refer to Appendix P.

Backfilling, Grading, and Soil Replacement and Stabilization (Also R645-301-232.400)

All disturbed areas will be backfilled and graded to as near as possible the approximate original contour with the exception of the natural drainage which came through the loadout site prior to Swisher Coal Company's establishment of their loadout facility. Andalex has diverted this natural drainage and will provide permanent protection of this diversion once reclamation is complete. Please refer to ~~Chapter 5~~ *Appendix R*, re Undisturbed Diversions for more detail. Slopes shall not exceed the angle of repose or such lessor slopes as required by the regulatory authority to maintain stability. Fill material will be compacted to assure stability. This is a flat lying area and therefore stabilization should be achieved easily.

Areas which will be backfilled include foundation areas such as the loadout, the reclaim tunnels (including the expanded reclaim system), and the truck dumps. All backfilled and regraded areas, including the Wildcat Expansion areas, will be reclaimed. Areas to be regraded include the loadout site, stockpile sites, and roads. These areas can all be regraded simultaneously because of the simple topography of the area. Where possible, all final grading and placement of topsoil will be done along the contour to minimize erosion.

In all cases, grading will be conducted in a manner which minimizes erosion and provides a stable surface for the placement of topsoils.

Upon reclamation, topsoil will be hauled to the area by end dump trucks, piled and spread using a grader. Where possible, the soil will be distributed along the contour. The thickness of the re-established soil will be consistent with soils in the vicinity and will be sufficient to support vegetation equal to or superior to pre-mining history. As previously mentioned, Andalex was unable to gather topsoil because of the previous disturbance. However, Andalex has committed to identifying and testing topsoil substitute areas either within or outside of the permit area as needed so that upon final reclamation, the entire disturbed area of approximately ~~60.94~~ *74.46* acres can be resurfaced with six inches of topsoil or less if allowed by the Division

(please see Plate 1 for the location of these topsoil substitute areas. They are identified on Plate 1 as revegetation test plots.) Existing topsoil piles on site total approximately 464,499 cubic feet (17,204 cubic yards)of material. Andalex feels and it is apparent from the soils inventory, that much of the fill material used onsite could be used as topsoil substitute. As previously mentioned, four topsoil substitute areas have been identified and are shown on Plate 1. Soil samples from these locations have been analyzed and the results are included in Appendix N. Once it has been determined that the substitute material is suitable for reclamation purposes, the actual area of substitute material will be carefully outlined on Plate 1 and the volumes included in the Topsoil Pile Summary. These areas have been protected from wind and water erosion through revegetation using the currently approved seed mixture. Please refer to Appendix D for the specific methods for this revegetation and monitoring. Revegetation of all existing topsoil piles will be accomplished in the same manner as the substitute piles (revegetation test areas). The only area which will not be subject to topsoil redistribution will be the ASCA's, where topsoil was not stripped, the Utah Railway tracks, the Permanent Impoundment, and Diversion UD-1.

It should be noted that when rills or gullies deeper than nine inches form in areas that have been regraded or topsoiled, the rills and gullies will be filled, graded, or otherwise stabilized and the area reseeded or replanted. Rills and gullies of lessor size will be stabilized and the area reseeded or replanted if the rills or gullies are disruptive to the approved postmining land use or result in additional erosion and sedimentation.

At any time a slide occurs which may have a potential adverse effect on public, property, health, safety, or the environment, Andalex Resources shall notify the Division by the fastest available means and comply with any remedial measures required by the Division.

R645-301-220. ENVIRONMENTAL DESCRIPTION

Appendix D

R645-301-221. PRIME FARMLAND INVESTIGATION

Appendix D

R645-301-222. SOIL SURVEY

Appendix D

James Nyenhuis, working for Mt. Nebo Scientific, completed a survey of the general area proposed for the coal fines cleanup (see Appendix D Supplement).

R645-301-222.100. SOIL MAP

Plate 11

R645-301-222.200. SOIL IDENTIFICATION

Appendix D

R645-301-222.300. SOIL DESCRIPTION

Appendix D

R645-301-222.400. SOIL PRODUCTIVITY

Appendix D

R645-301-223. SOIL CHARACTERIZATION

Appendix D

R645-301-224. SUBSTITUTE TOPSOIL

(Also the following: R645-301-231.200, 231.300, 232.720 and 233)

Andalex has identified four different locations within the permit area to be used for revegetation test plots. These areas are all located on slopes of fill material created during the construction of the site. The object of these test areas is to determine whether or not all of the fill material within the permit area may be used as substitute topsoil for final reclamation purposes. The

test plot locations are shown on Plate 1 designated A, B, C & D, and are located in such a fashion so as to cover the various types of fill material throughout the entire permit area. It is doubtful that the different fill areas vary with respect to chemical constituants or reclamability; however, the revegetation test plots will prove or disprove this theory. It is Andalex's goal to demonstrate that any of the fill material may be used as topsoil substitute and thereby mitigating the shortfall of topsoil gathered due to previous disturbance on site. Based on the area to be reclaimed versus the volume of topsoil currently gathered and in piles, Andalex requires that an additional 31,954 cubic yards of substitute material be identified.

These four locations were treated according to discussions and commitments between Andalex and the Division in the fall of 1989. The treatment included fertilizing, tilling, mulching (weedless alfalfa hay) and seeding. Andalex agreed to quantitatively analyze these areas after two growing years and conducted the survey in the summer of 1992 and 1993. The results of the survey are found in Appendix N. Andalex will perform one more quantitative test on these plots in the summer of 2006. Andalex recommends that the consultant perfoming the survey be asked for an opinion as well. These techniques may include different bed preparation; using native, local seed; and different fertilizing techniques, indluding no fertilizer.

In the unlikely event it is determined that the fill material is not suitable for topsoil substitute, Andalex will commit to further discussing solutions with the Division, or locating offsite topsoil substitute material. This will have to be accomplished in conjunction with a new Bureau of Land Management right-of-way issued for this purpose; therefore, it is hoped that the fill material proves suitable.

In addition to these revegetation test plots, in 1994, Andalex created four new test plots on the surface of the new topsoil storage piles located on the west side of the tracks adjacent to existing topsoil pile E.

These test plots will be approximately 40 feet square and will not be situated on any of the slopes of the topsoil pile. All four test plots will have a roughened surface (roughened meaning troughs and hills between one and four

feet in height). Also, all four test plots, along with the remainder of the surface of the topsoil pile will be mulched and have incorporated one ton of weed-free alfalfa hay per acre (the alfalfa will be tested by the Utah State University Agricultural Extension Service). The seed mixture to be used on all of the test plots, as well of the remainder of the topsoil pile is listed on Page 2-4 of this Plan. Seeding will occur no later than October 14, 1994. Seeding will be by hand-broadcasting and will not be raked if the surface is in a loose condition and not crusted.

Test Plot 1 - Test Plot 1 will not be irrigated; it will be mulched with three to four-tons-per-acre of alfalfa hay in an effort to retain natural moisture. The alfalfa hay will be incorporated into the surface so as not to attract deer.

Test Plot 2 - Test Plot 2 will be irrigated. Irrigation will be accomplished through the use of soaker hoses or fine-mist spray according to the following schedule:

In terms of inches of water, the initial profile wetting will be one inch which will occur in the Spring of 1995, approximately April 1. Irrigation will proceed at the rate of one inch every four days for four to six weeks (assuming lack of natural precipitation). Following this, the plot will be irrigated with one inch of water every two weeks until the end of the season, approximately mid-September, 1995. In addition, Test Plot 2 will be covered with North American Green Straw matting, which will be stapled adequately to the surface. The matting which is planned for use will have netting on one side only.

Test Plot 3 - Test Plot 3 will be irrigated in the same fashion of Test Plot 2. In addition, Test Plot 3 will have 1.5 tons-per-acre straw applied and achored with biodegradable netting.

Test Plot 4 - Test Plot 4 will not be irrigated. In addition to the one-ton-per-acre alfalfa mulch this test plot will be covered with 1.5 tons-per-acre oat or barley straw. This straw will also be covered with a biodegradable mesh which will be stapled to the surface.

It should be noted these test plots were last monitored

in 1997, and at that time, showed that they can be revegetated. No further monitoring of these test plots is proposed.

R645-301-230. OPERATION PLAN

See R645-301-212

R645-301-231. GENERAL REQUIREMENTS

R645-301-231.100. REMOVAL AND STORAGE

See R645-301-212

R645-301-231.200. SUITABILITY OF TOPSOIL SUBSTITUTES

See R645-301-224

R645-301-231.300. TESTING PLAN

See R645-301-224

R645-301-231.400. TOPSOIL HANDLING AND STORAGE AREAS

See R645-301-212

R645-301-232. TOPSOIL AND SUBSOIL REMOVAL

See R645-301-212

R645-301-232.100. TOPSOIL SEGREGATION

See R645-301-212

R645-301-232.200. INSUFFICIENT QUANTITY OR POOR QUALITY

See R645-301-224

R645-301-232.300. TOPSOIL LESS THAN SIX INCHES THICK

N/A

R645-301-232.400. TOPSOIL REMOVAL FOR MINOR DISTURBANCES

N/A

R645-301-232.410. SMALL STRUCTURES

N/A

R645-301-232.420. PROTECTION OF EXISTING VEGETATION AND EROSION PROTECTION

See R645-301-212

R645-301-232.500. SUBSOIL SEGRETATION

N/A

R645-301-232.600. TIMING

All post-law disturbed area soils have been removed and stockpiled. There are no plans to disturb additional areas at this time.

R645-301-232.700. TOPSOIL AND SUBSOIL REMOVAL UNDER ADVERSE CONDITIONS

N/A

R645-301-232.710. IMPRACTICABILITY

N/A

R645-301-232.720. IMPORTING TOPSOIL MATERIAL

See R645-301-224

R645-301-233. TOPSOIL SUBSTITUTES AND SUPPLEMENTS

See R645-301-224

R645-301-233.100. SELECTED OVERBURDEN MATERIALS

See R645-301-224

R645-301-233.200. SUITABILITY OF TOPSOIL SUBSTITUTES AND SUPPLEMENTS

See R645-301-224

R645-301-233.300. PHYSICAL AND CHEMICAL ANALYSES

Appendices D and N.

R645-301-233.310. SCS PUBLISHED DATA

Appendix D

R645-301-233.320. SCS TECHNICAL GUIDES

Appendix D

R645-301-233.330. OTHER PUBLISHED DATA

Appendix D

R645-301-233.340. RESULTS OF FIELD SITE TRIALS OR GREENHOUSE TESTS

See R645-301-212 and Appendix N.

R645-301-233.400. DEMONSTRATION OF INSUFFICIENT TOPSOIL AND SUITABILITY OF SUBSTITUTE MATERIALS

See R645-301-224

R645-301-234. TOPSOIL STORAGE

See R645-301-212

R645-301-234.100. STOCKPILING AND REDISTRIBUTION

See R645-301-212

R645-301-234.200. STOCKPILING REQUIREMENTS

See R645-301-212

R645-301-234.210. PLACEMENT

See R645-301-212 and Plate I

R645-301-234.220. PROTECTION

See R645-301-212

R645-301-234.230. VEGETATIVE COVER

See R645-301-212

R645-301-234.240. REHANDLING

See R645-301-212

R645-301-234.300. LONG-TERM STORAGE AND DISTRIBUTION

See R645-301-212

R645-301-234.310. CAPABILITY OF HOST SITE

See R645-301-212

R645-301-234.320. SUITABILITY FOR REDISTRIBUTION

See R645-301-212 and R645-301-224

R645-301-240. RECLAMATION PLAN

Timetable for Major Reclamation Steps

Introduction

Reclamation will be uncomplicated since this area is flat lying and topographically simple. All disturbed areas no longer required for the conduct of operations were immediately revegetated. In the future, any areas no longer required for operations will also be immediately revegetated.

When buildings and final site preparation was completed, the topsoil was revegetated to prevent erosion.

When the project is expired, perhaps in 30 years, extraneous material will be removed. Roads will be regraded and using the most advanced technology at the time, Andalex will re-establish the terrain to as nearly the original as practical.

Reclamation Timetable

Reclamation will be accomplished in two phases. Phase I will commence immediately after the project has expired. Phase I involves the majority of the reclamation steps. It will bring the site to nearly complete with the exception of sedimentation ponds which will be left in place until revegetation has been determined complete. Prior to revegetation being complete, there is a possibility for runoff within the disturbed area to accumulate a sediment load. These ponds left in place will prevent this runoff from leaving the disturbed area. Once the vegetation has been established which will probably take a minimum of two years, Phase II of the reclamation will commence. This phase involves the removal of the four sediment ponds which were left, regrading, and revegetating these areas, and finally, Andalex's commitment to monitoring.

Phase I

The first step will be to remove structures. Since none of the structures will remain on site, this will be the largest part of the Phase I effort and will also be the most expensive. The following is a list of structures which will be brought down and removed either complete or as scrap/salvage.

1. 14 x 60 Scale House Trailer

2. Truck Scales
3. Substation
4. Truck Dump (west side)*
5. Crushing Plant (west side)*
6. Radial Stacker (west side)*
7. Reclaim Tunnel (west side)
8. Loadout Conveyor (west side)*
9. Control Building (west side)
10. Truck Dump & Reclaim (2 each)
11. Conveyor T
12. Crusher and Screening Plant
13. Lump Coal Belt
14. Stoker Radial Stacker
15. Conveyor Y, Y-1
16. Main Radial Stacker (2 each)
17. Loadout Reclaim Tunnel, port supports, hoppers
18. Conveyor R
19. Loadout Tower
20. Miscellaneous (Guard Rails, Office, Water Tanks, Motor Control Centers)
21. Powerline
22. 40' x 40' Shop Building and foundation

* Portable

The next step will be to remove any coal remaining on the various storage areas. This will not amount to a large volume of material and it will either be hauled to an approved storage area off-site or it will be disposed of within the loadout permit area by burial. This will include the coal refuse pile currently stored at Wildcat. The refuse pile will be flattened and buried according to the reclamation plan regarding coal mine refuse (Chapter 5).

Once the coal has been removed, then the recontouring and regrading portion will commence. It is anticipated that the structure removal will take approximately one year to complete so at this point, we would be into the reclamation about thirteen months. The first step in the recontouring and regrading would be the removal of the culverts. They have been left in until this point so the disturbed area would drain properly. The recontouring would primarily involve the primary and secondary roads, the loadout pad, and the coal stockpile areas. The undisturbed diversion west of the facility would become permanent at this point and would be capable of passing a 100 year precipitation event. The original natural

drainage could not be restored because of the Utah Railroad. This natural drainage has been either blocked or diverted for the last 30 years by predecessors to Andalex.

It is estimated by the cross sections that approximately 74,000 cubic yards of material will have to be moved in this process of recontouring and grading (please see Tables II-1 and II-1A re Mass Balance Summary). This part of Phase I will include the removal of ponds G and E and establishing new drainages to Ponds A, C, and D. Recontouring will take one month.

TABLE II-1

Mass Balance Summary

	Cut	Fill
1 + 00	740.8	926.0
0 + 00	1,111.2	
1 + 00	3,333.6	
2 + 00	1,481.6	2,963.2
3 + 00	1,852.0	5,185.6
4 + 00		5,926.4
5 + 00	1,111.2	4,074.4
6 + 00		4,444.8
7 + 00		1,481.6
8 + 00	7,037.6	4,444.8
9 + 00	6,667.2	2,963.2
10 + 00	7,037.6	2,222.4
11 + 00	4,444.8	2,963.2
12 + 00	8,519.2	4,444.8
13 + 00	1,481.6	6,296.8
14 + 00		8,148.8
15 + 00	7,408.0	4,444.8
16 + 00	6,667.2	3,704.0
17 + 00	2,222.4	5,185.6
18 + 00	5,926.4	2,222.4
19 + 00	1,481.6	1,852.0
20 + 00		740.8
21 + 00	5,185.6	
Total	73,709.6	74,635.6

Note: Refer to Plate 14 for cross-section locations.

TABLE II-1A

Mass Balance
Expanded Wildcat Pad Cross Sections

	Cut	Fill
0+00 - 0+60	0	0
0+80	24.0	0
1+00	22.9	0
1+20	26.1	0
1+40	24.5	0
1+60	58.7	0
1+80 - 3+80	0	0
4+00	0	78.4
4+20	0	250.4
4+40	0	302.3
4+60	181.0	301.3
4+80	157.2	310.1
5+00	139.9	273.5
5+20	132.4	272.7
5+40	135.5	271.7
5+60	153.2	251.3
5+80	169.7	204.9
6+00	171.4	194.7
6+20	173.5	148.0
6+40	185.7	109.3
6+60	227.3	88.4
6+80	234.7	35.0
7+00	211.9	17.0
7+20	0	0
Totals	2,429.6	3,109.0
x 20% swell =	485.9	
	2,915.5	

Note: Refer to Plate 14 for cross-section locations.

At the request of the Division, no extraordinary compaction will be applied to the last few lifts during the recontouring/grading, to provide a relatively loose rooting zone of four feet. This loose application of fill will eliminate the need for ripping prior to topsoil placement. During this operation, if it is determined that additional sediment control measures are needed for the diversions leading to the four ponds, they will be put in at this time. These measures might include rock check dams or straw dikes.

The next steps in Phase I will not take place until the fall of whatever year we are in at this point. So far the project has taken 14 to 15 months. The next two steps in the process are topsoil redistribution, where additional substitute will be hauled in if necessary, and revegetation. Once the topsoil is spread, the area will be roughened by gouging, and the area will be hydroseeded and hydromulched. The entire revegetation procedure is described in this chapter.

Finally in Phase I, monitoring will commence. Observations of revegetation success and slope stability will be observed. If any part of this is unsuccessful, corrective measures will be taken.

Since Andalex estimates a minimum of two years before vegetation has taken hold to prevent erosion, then the entire Phase I project will take at least 3-1/2 years.

Phase II

Phase II of the reclamation will commence as soon as the monitoring of Phase I allows.

All that is left at this point is the removal (recontouring) of Ponds A, C, and D and the removal of the field fence surrounding the permit area. Once the areas have been graded, they will be prepared with loose filling of the upper lifts, (as described in Phase I above), prior to topsoil redistribution. At this point, if it is not already the fall season, Andalex will wait before redistributing the topsoil and revegetating. The same methods for revegetation will be used as in the Phase I reclamation.

Monitoring will then continue until the release of the bond.

Please note that earthwork will be done in both Phase I and II as much as possible during the dry seasons to avoid unnecessary erosion to the regraded areas. If dust becomes a problem, water will be used to control it.

Reclamation Cost and Bonding

A description of reclamation is provided in R645-301-542.400. Bond information and detailed costs are provided in Appendix B.

Soil Testing Plan and Soil Preparation

Where possible the soil will be distributed along the contour. Soil will be redistributed using dump trucks and graders. The thickness of the re-established soil will be consistent with the pre-mining conditions. As this facility was previously impacted by other loading operations, Andalex was unable to gather topsoil on these areas. This will require the use of topsoil substitute material for final reclamation. Andalex has chosen potential topsoil substitute material and is currently in the process of performing the necessary tests and monitoring to demonstrate that it is suitable (page 51). Twenty samples of potential substitute topsoil material have been sent to the Utah State University Soils Lab. There are four test plot locations, A through D (Plate 1), and samples at each location have been taken from 0-6", 6-12", 1-2', 2-3', & 3-4'. Samples will be taken from the new test area west of the railroad tracks at these same depths. All test plots, including the newest plot will be analyzed for: soil color, texture, pH, organic carbon, saturation percentage, alkalinity, electrical conductivity, calcium carbonate percentage, sodium absorption ratio, soluble potassium, magnesium, calcium, sodium, total nitrogen, available phosphorous, available water capacity, and percent rock fragments. The results can be found in Appendix N. Once any of the areas of substitute material have been determined suitable for reclamation, all or part of these areas will be carefully outlined on Plate 1 and the volumes necessary to make up the current topsoil deficit, will be included in the Topsoil Pile Summary. This will require approximately 31,954 additional cubic yards of material.

Prior to final reclamation, samples will be taken of the stored topsoil to determine any deficiencies which would affect the growth of newly revegetated areas. Any deficiencies will be corrected by adding to the soil chemical fertilizers, organic mulch, or any other substances recommended by the regulatory authority. Preparation techniques such as discing will be incorporated.

Species and Amounts of Seeds and Seedlings

A reference area has been established by Andalex and DOGM. The sagebrush/grass reference area was used in combination with a vegetation inventory to determine the final seed mixture and amounts of seed to be used for final reclamation.

The following seed mixture, was developed by Mt. Nebo Scientific in conjunction with the vegetation inventory and UDOGM comments.

Planting and Seeding Methods

All reclaimed areas will be stabilized by gouging prior to reseeding. The gouging will be done with a backhoe or trackhoe, and will consist of gouges at least 18" deep by 24" - 36" wide, spaced 6' - 10' apart. All areas will then be hydroseeded and hydromulched.

Mulching Techniques

Vegetative cover will be promptly re-established following cessation of mining activities to stabilize erosion. Re-seeding will occur during the first normal period for favorable growth following regrading. Mulch will be applied to all reseeded areas. Areas which are hydromulched will be done so using an organic type mulch at the rate of one ton per acre. Where hydroseeding and hydromulching occur, a tackifier will be added to both the seed and the mulch.

Mulch will be used wherever seeds are planted. All disturbed areas will be reseeded. These areas are shown on Plate 1B and constitute 74.46 acres. (Not including the Utah Railway tracks).

Wildcat Loadout Final Seed Mixture			
Scientific Name	**Common Name**	**PLS/A**	**Seeds Per**
Amelanchier utahensis	Utah serviceberry	7.00	4.15
Artemisia tridentata	Big sagebrush	0.06	3.44
Ceratoides Ianata	Winterfat	5.00	6.31
Chrysothamnus nauseosus	Rubber rabbitbrush	0.30	2.75
Purshia tridentata	Bitterbrush	12.00	4.13
Archillea millefolium	Yarrow	0.05	3.18
Hedysatum boreale	Northern sweetvetch	8.00	6.17
Linum lewisii	Lewis flax	1.00	6.38
Penstemon palmeri	Palmer penstemon	0.50	7.00
Viquiera multiflora	Showy goldeneye	0.20	4.84
Bouteloua gracilis	Blue grama	0.60	9.79
Elymus spicatus	Bluebunch wheatgrass	2.50	8.03
Elymus trachycaulus	Slender wheatgrass	2.50	9.18
Hilaria jamesii	Galleta	2.50	9.13
Stipa comata	Needle-and-thread	3.00	7.92
Stipa hymenoides	Indian ricegrass	2.00	8.63
TOTALS		47.21	101.06

~~Wildcat Loadout Interim Seed Mixture~~			
~~**Scientific Name**~~	~~**Common Name**~~	~~**PLS/A**~~	~~**Seeds Per**~~
~~*Archillea millefolium*~~	~~Yarrow~~	~~0.30~~	~~19.08~~
~~*Elymus Lanceolatus*~~	~~Thickspike Wheatgrass~~	~~8.00~~	~~28.28~~
~~*Elymus smithii*~~	~~Western Wheatgrass~~	~~9.00~~	~~26.03~~
~~*Elymus stachycaulus*~~	~~Slender Wheatgrass~~	~~8.00~~	~~29.38~~
~~TOTALS~~		~~26.30~~	~~102.78~~

Interim Mix for broadcast seeding at Wildcat Loadout

Scientific Name	Common Name	PLS/ft
1) FORBS (Use 2 species from the list below to arrive at 7 PLS/ft2)		
Achillea millefolium var. occidentalis	Western yarrow	
Sphaeralcea ambigua	Desert globemallow	
Castilleja applegatei ssp. martinii	Early Indian paintbrush	
Baileya multiradiata	Desert marigold	
Oenothera speciosa	Showy evening primrose	
Penstemon eatonii	Firecracker penstemon	
Sub TOTAL for forbs		7.0
2) Cold Season GRASSES (Use Triticale and any other two cold season species to arrive at 18 PLS/ft2)		
Triticum aestivum x Secale cereale	Triticale (sterile rye)	3.0
Achnatherum hymenoides	Indian ricegrass	5.0
Bromus anomalus	Nodding brome	5.0
Elymus lanceolatus spp. lanceolatus	Thickspike wheatgrass	5.0
Elymus lanceolatus spp. lanceolatus	Slender wheatgrass	5.0
Pascopyrum smithii	Western wheatgrass	5.0

Sub TOTAL Cold Season Grasses		18.0
3) Warm Season GRASSES (Use any three warm season species to arrive at 15 PLS/ft2)		
Aristida pupurea	Purple threeawn	5.0
Bouteloua gracilis	Blue grama	5.0
Eragrostis trichodes	Sand lovegrass	5.0
Pleuraphis jamesii	Galleta grass	5.0
Sporobolus airoides	Alkali sacaton	5.0
Sporobolus cryptandrus	Sand drop seed	5.0
SubTOTALWarm Season Grasses		15.0
TOTAL Forbs and Grasses		40.0

Management Practices, e.g., Irrigation, Pest, and Disease Control

No mechanical irrigation will be used because of the lack of water in the area. Vegetative growth will be subject to normal rainfall and winter snowfall. Vegetation will be protected from both wildlife and livestock by drift-fences until the reclaimed areas have been adequately re-established. Upon approval, the fences will be removed. Fences are already standing surrounding the permit area. Pesticides and herbicides will be used as necessary. Should any persistent pesticides be needed, the Division's approval will be obtained prior to their use.

Measures to Determine Success

Revegetation will be closely monitored. Areas which fail to support sufficient growth to stabilize conditions will be tested and reseeded until a proper cover is established. Physical examinations will be conducted to note any species which are not thriving or regenerating. If this occurs, species will be substituted at the recommendation of the regulatory authority. Any other species will be added at

the time of reclamation upon recommendation of the regulatory authority. All reclaimed areas will be monitored and maintained by the constant observation of Andalex until the surety release is granted. This will include slope staking on any sloped areas.

Revegetation monitoring parameters to be measured are growth rate, plant density and percent cover. We would expect to monitor or supervise monitoring at least monthly during the first two growing seasons. From experience with interim revegetation at the minesite, we have learned that two growing seasons are needed to establish any success. After this we would know whether reclamation was progressing successfully.

Andalex is committed to quantitative sampling of reclamation cover, frequency and woody plant density during years 2, 3, 5, 9, and 10. Productivity will be sampled only during years 9 and 10. The reference area will be sampled during years 9 and 10.

Andalex commits, that prior to final reclamation, the final seed mix will be re-evaluated for correlation with successful species establishment on the spoil and topsoil test plots and topsoil stockpiles.

R645-301-241. GENERAL REQUIREMENTS

R645-301-242. SOIL REDISTRIBUTION

Topsoil and or substitute topsoil is to be redistributed to a depth of 6-inches (or less as approved by the Division) across the entire ~~60.94~~ *74.46* acre disturbed area, as shown on Plate 1B

R645-301-242.100. CRITERIA FOR REDISTRIBUTION

The only criteria is that it will be redistributed to a depth of 6 inches (or a lessor amount as approved by the Division).

R645-301-242.110. UNIFORMITY AND CONSISTENCY

The soil will be redistributed uniformly and consistent with the regraded contours.

R645-301-242.120. PREVENTION OF COMPACTION

Once redistributed, unnecessary compaction from equipment will be avoided.

R645-301-242.130. PROTECTION FROM WIND AND WATER EROSION

The topsoil will be protected from wind and water erosion through mulching and revegetation.

R645-301-242.200. REGRADING AND TREATMENT

Not applicable, unless unacceptable rills and gullies are observed. (See R645-301-212)

R645-301-242.300. EMBANKMENTS OF PERMANENT IMPOUNDMENTS OR ROADS

The 2-celled Permanent Impoundment will be left. The embankments are stable and vegetated. Details are discussed in Chapter 7 of this Permit.

R645-301-242.310. PREVENTION OF SEDIMENTATION

Sediment Ponds A, C, D and F will be left in place until revegetation standards are reached (Phase I).

R645-301-242.320. OTHER METHODS OF STABILIZATION

Roughening/gouging will be the primary method of stabilization. Other methods may include mulching and rip-rap.

R645-301-243. SOIL NUTRIENTS AND AMENDMENTS

As needed to be determined through Phase I monitoring.

R645-301-244. SOIL STABILIZATION

See R645-301-242.

R645-301-244.100. EROSION CONTROL AND AIR POLLUTION

See R645-301-242.

R645-301-244.200. SOIL STABILIZING PRACTICES

See R645-301-242.

R645-301-244.300. RILLS AND GULLIES

See R645-301-212 and R645-301-242.

R645-301-244.310. DISRUPTION OF POSTMINING LAND USE OR ESTABLISHMENT OF VEGETATIVE COVER

Vegetative cover will be in accordance with revegetation practices found in R645-301-331.

R645-301-244.320. CAUSE OR CONTRIBUTE TO A VIOLATION OF WATER QUALITY STANDARDS

Andalex will not violate water quality standards. This will be demonstrated through monitoring practices.

R645-301-250. PERFORMANCE STANDARDS

All performance standards will be adhered to.

R645-301-251. SOIL REMOVAL

See R645-301-212.

R645-301-252. SOIL STORAGE AND REDISTRIBUTION

See R645-301-212.

ANDALEX RESOURCES, INC.

WILDCAT LOADOUT

MINING AND RECLAMATION PLAN

CHAPTER 3, BIOLOGY

CHAPTER 3

TABLE OF CONTENTS

R645-301-300.	BIOLOGY	3-1
R645-301-310.	INTRODUCTION	3-1
R645-301-311.	VEGETATIVE, FISH AND WILDLIFE RESOURCES	3-14
R645-301-312.	POTENTIAL IMPACTS	3-14
R645-301-313.	RESTORATION OR ENHANCEMENT	3-14
R645-301-320.	ENVIRONMENTAL DESCRIPTION	3-14
R645-301-321.	VEGETATION INFORMATION	3-15
R645-301-322.	FISH AND WILDLIFE INFORMATION	3-15
R645-301-323.	MAPS AND AERIAL PHOTOGRAPHS	3-16
R645-301-330.	OPERATION PLAN	3-16
R645-301-331.	MINIMIZING IMPACT AND SURFACE EROSION .	3-17
R645-301-332.	IMPACTS OF SUBSIDENCE ON RENEWABLE RESOURCE LANDS	3-17
R645-301-333.	USING THE BEST TECHNOLOGY CURRENTLY AVAILABLE TO MINIMIZE DISTURBANCE AND IMPACT	3-17
R645-301-340.	RECLAMATION PLAN	3-18
R645-301-341.	REVEGATATION	3-18
R645-301-342.	FISH AND WILDLIFE	3-27
R645-301-350.	PERFORMANCE STANDARDS	3-28
R645-301-351.	GENERAL REQUIREMENTS	3-28
R645-301-352.	CONTEMPORNEOUS RECLAMATION	3-28
R645-301-353.	REVEGATATION: GENERAL REQUIREMENTS . .	3-28
R645-301-354.	REVEGETATION: TIMING	3-31
R645-301-355.	REVEGETATION MULCHING AND OTHER SOIL	

STABILIZING PRACTICES 3-31

R645-301-356. REVEGETATION: STANDARDS FOR SUCCESS . . 3-32

R645-301-357. REVEGETATION: EXTENDED RESPONSIBILITY PERIOD 3-33

R645-301-358. PROTECTION OF FISH, WILDLIFE AND RELATED ENVIRONMENTAL VALUES 3-36

NRCS LETTER ON PRODUCTIVITY 3-38

CHAPTER 3, BIOLOGY

HISTORICAL NOTE: In 2004, the Division issued an Order DO-04 for wind-blown fines which had accumulated outside the disturbed area, primarily in the area southwest of the main coal storage pile below sediment Pond B. A complete description of the mitigation plan proposed for DO-04 is included in Appendix P.

R645-301-300. BIOLOGY

R645-301-310. INTRODUCTION

Vegetation Information

Introduction

An intensive detailed vegetation survey was not required or performed for the BLM Right-of-Way prior to the construction of this facility. It was a sagebrush/grass lowland with a Pinyon-Juniper community to the west. The following letter, shows the two reference areas identified by the SCS which show the general vegetative types in the area. Although the SCS identified these two areas, a third area was chosen by the Division of Oil, Gas, and Mining and Andalex Resources and is shown on Plate 1. A detailed vegetation inventory has been performed for Andalex by a qualified range scientist on this third reference area and is included in this document as Appendix I. This inventory will be the basis for a seed mixture to be used during reclamation. Please note that although the SCS identified two reference areas, the reference area being used for this MRP was designated by DOGM and Andalex for use during reclamation.

Description **(Also R645-301-311, 320 and 321)**

Vegetative Types

The vegetative types include Pinyon-Juniper and Sagebrush-Grass. The Loadout Facility was constructed entirely within the Sagebrush-Grass Community. Please see Table III-7. Also refer to Appendix I.

Threatened or Endangered Species

There are no known threatened or endangered species within the permit area and the detailed inventory of the reference area has confirmed this.

Plant Communities **(Also R645-301-323.400)**

The Sagebrush-Grass group is present from 6,200 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 Pinyon-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 Wasatch Plateau. Pinyon pine and Utah juniper are the dominant species with bull grass, Indian rice grass, and birch leaf mahogany as associated species.

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-7. Please see Appendix I for the site specific vegetation inventory.

TABLE III-7

Vegetation Possibly Occurring in Area

Common Name	Scientific Name
Grasses:	
curly grass	Hilaria jamesii
indian rice grass	Oryzopsis hymenoides
squirreltail	Sitanian hystix
needle and thread grass	Stipa commata
no eatum grass	Aristida fendleriana
western wheat grass	Agropyron smithii
bull grass	Elymus salinus
Shrubs:	
nuttal saltbush	Atriplex nuttallii
mat saltbush	Atriplex corrugata
shadscale	Atriplex confertifoldia
fourwing saltbush	Atriplex canecens
big sagebrush	Artemisia tridentate
black sagebrush	Artemisia arbuscula nova
greasewood	Sarobatus vermiculatus
small rabbitbrush	Chrysothamnus viscidiflorus
big rabbitbrush	Chrysothamnus nauseosus
mountain-mahogany	Cercocarpus montanus
serviceberry	Amelanchief alnifolia
curlleaf mahogany	Cercocarpus ledifolius
squaw apple	Peraphyllum ramosissimum
snowberry	Symphoricarpos oreophilus
Trees:	
juniper	Juniperus osteosperma
pinion	Pinus edulis
ponderosa pine	Pinus ponderosa
aspen	Populus temuloides
limber pine	Pinus flexilis
douglas fir	Pseudotsuga menziesii
gambel oak	Quercus gambelii

Area to be Disturbed

The surface area disturbed is ~~60.94~~ 74.46 as shown on Plate 1B. ~~of which approximately 20 acres were disturbed by Andalex.~~ The disturbed area does not include the ASCA's or the Utah Railway tracks. The present surface facilities are located in an area that has been previously impacted by loading activities. Actual plant communities which have been disturbed is the Sage-Grass. Extreme care has been taken to disturb as little vegetation as possible and revegetation has been immediately carried out on all disturbed areas no longer needed for the mining operation.

Fish and Wildlife Resources and Plan **(Also R645-301-342)**

Introduction

The loadout area is located east of the Wasatch Plateau, a region which supports about 360 vertebrate wildlife species. The abundance and distribution of wildlife in the lease area is directly related to present land use activities and capabilities. Use of this area by certain species is limited to lack of perennial water. Wildlife species possibly occurring in the lease area are listed in Table III-8. Please see Appendix F re Wildlife Resources Information.

Source of Data

Department of the Interior, 1979. Final Environmental Statement - Development of Coal Resources in Central Utah, Parts 1 and 2. (Sections 3, 4.0, 4.1, 4.2, 4.3, 4.4, and 4.5)

Andalex Resources (Chapter 3)

Utah Department of Natural Resources, Division of Fish and Wildlife. (Appendix F)

U.S. Department of Interior, Bureau of Land Management (Appendix E)

Habitats

Previously described vegetation provides fair to excellent habitat for a variety of wildlife species. It also provides critically important winter range for deer.

Species (Please see Table III-8)

Mammals

Mammals occurring in the area can be divided into two groups, game species and non-game species.

The main game species include mule deer, mountain lion, black bear, elk, and cottontail rabbits. Mule deer, however, are the most important wildlife resource in the area. Mountain lion are present but little information is available due to their ranging habits. Generally, their movement coincides with the migration of deer. Black bear may occasionally be found in the vegetated canyons, usually along the cliff face. They normally inhabit the Wasatch Plateau to the west but little data is available on their populations. The permit area is not within the limits of the elk range. Cottontail rabbits are distributed throughout the area.

Non-game mammals include several species of small animals inhabiting the area. Predator species such as coyote and bobcat occasionally are found in the area and depend on small rodents and rabbits for their source of food. Information on non-game species is generally unavailable.

TABLE III-8

List of Animals Possibly Occurring in Region

Common Name	Scientific Name
Mammals:	
Badger	Taxidea taxus
Black Bear	Ursus americanus
Bobcat	Lynx rufus
Coyote	Canis latrans
Deer mouse	Peromyscus maniculatus
Desert Cottontail	Sylvilagus audubonni
Elk	Cervus elaphus
Ground Squirrel	Spermophillus tridecelineatus
Least Chipmunk	Eutomias minimus
Mountain Lion	Felis concolor
Mule Deer	Odocoileus hemionus
Porcupine	Evethizon dorsatum
Striped Skunk	Mephitus mephitus
White-tailed Jackrabbit	Lepus townsendii
White-tailed Prairie Dog	Cynomys leucurus
Birds:	
Brewers Sparrow	Spizella breweri
Blue Grouse	Dendragapus obscurus
Common Nighhawk	Chordeiles minor
House Sparrow	Passer Domesticus
Lark Sparrow	Chondestes grammacus
Magpie	Pica pica
Mourning Dove	Zenaidura macroura
Pinyon Jay	Gymnorhinus cyanocephala
Red-tailed Hawk	Buteo jamaicenis
Robin	Turdus migratorius
Ruffed Grouse	Bonasa umbellus
Sage Grouse	Centrocercus urophasianus
Sparrow Hawk	Falco sparverius
Turkey Vulture	Cathartes aura
Vesper Sparrow	Pooecetes gromineus
Great Horned Owl	Bubo Virginianus

Birds

Raptors

The turkey vulture and red-tailed hawk frequent the area. A variety of other raptors breed in the Price area; however, there is a poor density of raptors throughout the plan area. Bald eagles migrate through this area in the winter and a variety of owl species are occasionally observed year round.

Most interestingly, a family of Great Horned Owls successfully nested on top of the loadout structure. A Great Horned Owl had been observed during the winter months flying and roosting near by. Owl eggs were first observed on top of the loadout beneath the conveyor belt in early March. The DWR was contacted immediately and we were instructed to do nothing and continue operations normally. The DWR advised us that once the chicks hatched, they would move them to a nest box which Andalex built and mounted nearby but out of the way. The chicks hatched in mid April and were moved the same day. When the chicks (two) were approximately one month old, they were banded by officers of the DWR. The chicks matured and left the nest in June. The DWR feels that there is a strong possibility that the owls may return in 1989.

Other

Sage grouse inhabit the sagebrush flats at the foot of the cliffs. Blue and ruffed grouse may occasionally be found in the vegetated canyons of the area. Chukars can be found around the cliffs. Mourning doves are generally distributed throughout the area; however, the lack of perennial water limits dove nesting habitat in the area. Other representative birds include the magpie, bluebird, robin, and several species of sparrow.

Reptiles and Amphibians

The most prominent species of reptiles include the rattlesnake and sagebrush lizard. No aquatic fauna are present in the area.

Fish

There are no active fisheries as there are no permanent

bodies of water or perennial streams in the area. No aquatic fauna are found.

Threatened or Endangered Species

There have been no known threatened or endangered species on or near the lease area according to a survey conducted by the Utah Division of Wildlife Resources.

Impacts of Operations **(Also R645-301-333)**

Construction of all roads, powerlines, and surface facilities has been completed and loading operations have commenced. Therefore, no additional impact of operations on wildlife is anticipated. Powerlines were constructed according to DWR and USF&W guidelines. It should be noted that this facility has had a good history of co-existing with wildlife in this area. This is constantly observed.

Fish and Wildlife Plan **(Also R645-301-322.210, 333.200 and 358)**

The Fish and Wildlife Plan was prepared by the Utah DWR under the direction of Mr. Larry Dalton in 1987 (please see Appendix F). The purpose for this study was to estimate the types and densities of wildlife expected to be found in the area. It was also done to determine whether or not threatened or endangered species existed and whether or not the impacts to wildlife could be mitigated. The environmental assessment performed by the B.L.M. (Appendix E) was performed to estimate the best methods which could be used for the Wildlife Enhancement Project. Part of any grant issued by the B.L.M. includes an environmental assessment. This assessment was put together by the B.L.M. in the summer of 1984.

Andalex has made every possible effort to minimize disturbances to wildlife habitat in the area and where possible will enhance that habitat during reclamation.

Please refer to Appendix F re Fish and Wildlife Resources and Plan. It should be noted that there is no aquatic life in the permit area as this area is dry except as a result of direct precipitation (ephemeral streams). Andalex has performed numerous mitigative measures including extensive revegetation in the area directly mitigating our disturbance. Andalex has performed all

mitigative measures outlined in the Fish and Wildlife Plan (Appendix F) with the exception of the use of swareflex reflectors.

Andalex has advised and encouraged employees to avoid unnecessary disturbances to all wildlife regardless of the season, but especially the depleted winter season or the breeding season. Hunting and all wildlife regulations are adhered to. In corporation with the Division of Wildlife Resources and the College of Eastern Utah, Andalex has incorporated a visual training guide for its employees to be used annually during mine retraining.

To date, Andalex has had no use for poisons for rodent control or any other persistent pesticide.

Snake dens will be reported to the DWR.

Andalex will report the sitings of any known threatened or endangered species within or in the vicinity of the permit area.

Andalex will commit to reporting any unapproved range or forest fires. Spontaneous combustion in the coal piles occurs from time to time particularly in the winter months. These small smoldering areas in the coal piles are extinguished easily and immediately using a frontend loader. All coal piles are subject to this phenomenon and Andalex is sure that the division would not want each small coal fire reported.

No avifauna will be disturbed within Andalex's minesite and in particular, raptors and their nests. Andalex's powerline was constructed under the guidance of the Utah DWR and USF&W.

Lodges, nests, and dens for all mammals will be protected from disturbance. Andalex has reduced speed limits posted within the permit area to 15 mph. The haulroad year-round is posted at 40 mph. Swareflex reflectors will not be implemented.

There are no unpaved sections of the haul road and swareflex reflectors are not being used. Andalex has

demonstrated mitigation of impacted habitat through revegetation efforts on areas in and outside the permit area. We have had employee wildlife education sessions in the past and may perhaps in the future. The powerline was constructed under strict guidelines and has been thoroughly checked by both the Utah DWR and the U.S. Fish and Wildlife Service. Prior to November 30, 1988, Andalex will provide the 4" gap in the ground wire on all cross-arm type structures from the substation to the loadout.

Please note that as an indication that this facility is not disruptive to wildlife, deer herds are constantly observed moving through the area, drinking from our ponds, and feeding on revegetated areas. Also, small mammals such as prairie dogs have formed towns within the permit area.

Most interestingly, a family of Great Horned Owls have successfully nested on top of the loadout structure.

Should Andalex observe reoccurring problems with respect to wildlife fatalities which potentially could be corrected, Andalex will make every effort to correct these problems.

Please note that a large area of revegetation was undertaken by Andalex to enhance wildlife range thereby mitigating the loss of range through the construction of this facility. The acreage enhanced by Andalex Resources is roughly the same as that acreage disturbed by Andalex for the Wildcat Loadout Facility. Please bear in mind that the majority of the Wildcat Facility had been previously impacted by coal loading operations and railroad operations. Appendix E is a description of the mitigation work performed by Andalex under the direction of the B.L.M. and the Utah D.W.R. Andalex is following all guidelines set forth in the Fish and Wildlife Plan except the use of swareflex reflectors.

Andalex Resources was issued a right-of-way and a temporary land use permit associated with its' Wildcat Loadout Facility. A stipulation to these grants was that Andalex would perform a wildlife enhancement project to

mitigate the loss of critical deer winter range as a result of the construction of the loadout facility. This work was performed under the direction of the Bureau of Land Management and the Division of Wildlife Resources in the fall of 1984. The work consisted of the elimination of undesirable vegetation and replacing it with preferred deer range species. Vegetation was removed with a plow and the seed mixture developed by the Utah DWR was planted using a rangeland drill. Andalex Resources performed this work on an area of approximately 21 acres (Plate 1B outlines the area impacted by Andalex for the Wildcat Loadout. The remaining acreage consumed by the Wildcat Loadout Facility was previously disturbed). Andalex has fulfilled its' obligations under these grants. It should be noted that contemporaneous reclamation as well as sediment pond construction has in itself mitigated impact to deer winter range within the permit area. It should also be noted that the mineral sale borrow area was never used. Please see Appendix E.

During the spring of 1988, Andalex Resources' personnel traveled to the site where wildlife enhancement took place. Areas which were plowed and seed drilled were stepped off and measured in the field and a total of 21 acres was estimated with reasonable accuracy. A direction and chain method was utilized to measure the areas. Plate 18 depicts the areas disturbed by Andalex versus previously disturbed areas. These two areas can be distinguished easily on the aerial photo. Please note that the temporary land use area was one of the previously disturbed areas and as such, Andalex did not destroy any valuable deer winter range. The actual acreage disturbed by Andalex totals ~~24.5~~ 74.46 acres. Andalex would also like to point out that large portions of the disturbed area have been enhanced subsequent to the construction of the facility to create reasonably good wildlife habitat, specifically, deer. This has been accomplished with contemporaneous reclamation of all areas not being utilized within the disturbed area (pond embankments, other slopes, and topsoil storage piles have all been revegetated). Also, it has been observed that the sedimentation ponds create drinking reservoirs for deer. During winter months at the Wildcat facility, deer herds of up to 50 animals have been observed on a frequent basis, grazing and drinking within Andalex's disturbed area. The deer actually congregate within Andalex's disturbed area. None of Andalex's activities

affect the deer herd as far as migration or movement. Deer have been observed even walking beneath unit trains. Therefore, Andalex's facility offers no obstructions to deer movement. Taking all this into consideration, and as a result of an agreement between Andalex and the Utah Division of Wildlife Resources, Andalex has agreed to enhance an additional approximately 15 acres in the near future. Andalex will perform this work in the fall of 1989 in accordance with the UDWR alternative 1.

Water consumption at this site averages approximately 2.48 acre feet per year. Of this amount, approximately 2.16 acre feet is used for dust control and 0.32 acre feet is used for culinary purposes.

R645-301-311. VEGETATIVE, FISH AND WILDLIFE RESOURCES

See R645-301-310.

R645-301-312. POTENTIAL IMPACTS

See R645-301-310 "Area to be Disturbed".

R645-301-313. RESTORATION OR ENHANCEMENT

See Appendix E.

R645-301-320. ENVIRONMENTAL DESCRIPTION

See R645-301-310.

R645-301-321. VEGETATION INFORMATION

See R645-301-310.

R645-301-321.100. POTENTIAL FOR REESTABLISHING VEGETATION

Appendix N

R645-301-321.200. PREMINING PRODUCTIVITY

Not available - Site was disturbed pre-law by another operation.

R645-301-322. FISH AND WILDLIFE INFORMATION

Appendix F; R645-301-310.

R645-301-322.100. PROTECTION AND ENHANCEMENT PLAN

Appendix E & F

R645-301-322.200. SITE-SPECIFIC RESOURCE INFORMATION

Appendix F

R645-301-322.210. THREATENED OR ENDANGERED SPECIES

See R645-301-310

R645-301-322.220. HABITATS OF UNUSUALLY HIGH VALUE FOR FISH AND WILDLIFE

See R645-301-310.

R645-301-322.230. OTHER SPECIES OR HABITATS REQUIRING SPECIAL PROTECTION

N/A

R645-301-322.300. FISH AND WILDLIFE SERVICE REVIEW

Appendix B - Item 22 (Powerline Approval)

R645-301-323. MAPS AND AERIAL PHOTOGRAPHS

N/A

R645-301-323.100. REFERENCE AREAS

See Plate 1.

R645-301-323.200. MONITORING STATIONS

N/A

R645-301-323.300. ENHANCEMENT FACILITIES

N/A

R645-301-323.400. PLANT COMMUNITIES

See R645-301-310.

R645-301-330. OPERATION PLAN

Maps and Plans

The lands affected by this operation (surface only) are clearly shown on Plate 1. Plate 1 depicts all buildings, utilities, and facilities. All of the land within this permit area which is to be affected already has been. This is a surface facility only and involves no underground workings. The bond required by the Division is for the entire affected area including all the surface facilities.

Coal storage, topsoil storage, loading areas, coal preparation waste areas are all depicted on the surface facilities map. Additional detail on topsoil, diversions, and ponds can be found in Volume II on Plates *1, 1A, 2, 3 and 13*.

There is no storage of explosives at the Wildcat Loadout.

The final surface configurations will be similar to the surface prior to Andalex's involvement at Wildcat. Cross sections and a surface configuration plate are included ~~in~~ Volume II as 10 and 9 respectively.

Surface water monitoring locations are shown on Plate *2A*.

After the completion of activities at this facility, no structures will remain with the exception of the railroad grade, the tracks, and it's associated drainage structures.

All maps requiring certifications by a registered person have been done so. Included are stamps from experts in related fields such as surveying.

R645-301-331. MINIMIZING IMPACT AND SURFACE EROSION

Protection measures are described in Appendix F. Revegetation and erosion control are described in Section R645-301-340 and R645-301-512.240, respectively

R645-301-332. IMPACTS OF SUBSIDENCE ON RENEWABLE RESOURCE LANDS

N/A

R645-301-333. USING THE BEST TECHNOLOGY CURRENTLY AVAILABLE TO MINIMIZE DISTURBANCE AND IMPACT

See R645-301-310.

R645-301-333.100. PROTECTION OF THREATENED AND ENDANGERED SPECIES

There have been no known threatened or endangered species within the permit area. See R645-301-310.

With regard to the Colorado River Endangered Fish Recovery Program, surface consumption is limited to water sprayed on the haul roads for dust suppression, and water used for showers and toilets. This water is all hauled in under contract with D&D Trucking, who purchase the water from the Price River Water Improvement District. Daily records kept at the loadout show that for the year 2007 D&D delivered 677 loads, each with 4000 gallons for a total of 2,708,000 gallons. The other potential source of consumption is evaporation from the sediment ponds. Unlike slurry ponds or treatment ponds, the sediment ponds are normally dry and the evaporation amount is minimal.

R645-301-333.200. SITE-SPECIFIC PROTECTION OF THREATENED AND ENDANGERED SPECIES

See R645-301-310.

R645-301-333.300. PROTECTIVE MEASURES DURING ACTIVE PHASES OF MINING OPERATIONS

Appendix F

R645-301-340. RECLAMATION PLAN

The complete reclamation plan is described under R645-301-240.

R645-301-341. REVEGETATION

Revegetation

Revegetation will be accomplished by Andalex or under Andalex's direct supervision and under the recommendations of the regulatory authority. A seed mixture has been developed and can be found in this chapter. This mixture was developed by estimating vegetative types in the sagebrush/grass reference area established by DOGM and Andalex. Please refer to Appendix I and Plate 1.

R645-301-341.100 SCHEDULE AND TIMETABLE

Schedule of Revegetation

The seeding of native flora (consisting where possible of deer browse species), will commence as soon as is practical following regrading and topsoil replacement. This revegetation will help stabilize the soil and the fill quickly. Revegetation will be accomplished by Andalex or under Andalex's direct supervision and under the recommendations of the regulatory authorities. Revegetation will occur during the first fall planting season following the regrading and topsoil redistribution. Please refer to Revegetation Schedule.

Andalex Resources' Revegetation Schedule

TASK	MONTH: MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Review reveg. plan	XX	X								
Order seed			X							
Regrading				XXXX	XXXX	XXXX				
Spread topsoil							XXX			
Seedbed Prep.							XX	X		
Apply fertilizer		XX*						XX		
Seeding								XX	X	
Mulching								XX	X	

Tasks to be done in subsequent years: (years 2, 3, and 5, 9, and 10, following planting, minimum)**

* May need application of N the spring following seeding.

** Productivity will be sampled only during years 9 and 10. Also, the reference area will be sampled during the years 9 and 10.

Andalex Resources' Revegetation Monitoring Schedule

QUALITATIVE OBSERVATIONS:

Reclamation type	YEAR 1	2	3	4	5	6	7	8	9	10
Permanent Reclamation	X	X	X	X	X	X	X	X	X	X
Trial Plantings	X	X	X	X	X	X	X	X	X	X
Test Plots	X	X	X	X	X	X	X	X	X	X
Interim Stabilization	X	X	X	X	X	X	X	X	X	X

QUANTITATIVE OBSERVATIONS:

Parameter	YEAR 1	2	3	4	5	6	7	8	9	10
Cover		X	X		X				X	X
Frequency		X	X		X				X	X
Woody Plant Density		X	X		X				X	X
Transplant Survival	X*	X	X							
Productivity:										
Test plots			X		X				X	X
All Other Revegetation									X	X

* Sampling will take place in the fall of the year.

R645-301-341.200. DESCRIPTION

Soil Testing Plan and Soil Preparation

Where possible the soil will be distributed along the contour. Soil will be redistributed using dump trucks and graders. The thickness of the re-established soil will be consistent with the pre-mining conditions. As this facility was previously impacted by other loading operations, Andalex was unable to gather topsoil on these areas. This will require the use of topsoil substitute material for final reclamation. Andalex has chosen potential topsoil substitute material and is currently in the process of performing the necessary tests and monitoring to demonstrate that it is suitable (page 51). Twenty samples of potential substitute topsoil material have been sent to the Utah State University Soils Lab. There are four test plot locations, A through D (Plate 1), and samples at each location have been taken from 0-6", 6-12", 1-2', 2-3', & 3-4'. Samples will be taken from the new test area west of the railroad tracks at these same depths. All test plots, including the newest plot will be analyzed for: soil color, texture, pH, organic carbon, saturation percentage, alkalinity, electrical conductivity, calcium carbonate percentage, sodium absorption ratio, soluable potassium, magnesium, calcium, sodium, total nitrogen, available phosphorous, available water capacity, and percent rock fragments. The results can be found in Appendix D. Once any of the areas of substitute material have been determined suitable for reclamation, all or part of these areas will be carefully outlined on Plate 1 and the volumes necessary to make up the current topsoil deficit, will be included in the Topsoil Pile Summary. This will require approximately 29,000 additional cubic yards of material.

Prior to final reclamation, samples will be taken of the stored topsoil to determine any deficiencies which would affect the growth of newly revegetated areas. Any deficiencies will be corrected by adding to the soil chemical fertilizers, organic mulch, or any other substances recommended by the regulatory authority. Preparation techniques such as discing will be incorporated.

R645-301-341.210. SPECIES AND AMOUNTS PER ACRE OF SEEDS AND/OR SEEDLINGS USED

A reference area has been established by Andalex and DOGM. The sagebrush/grass reference area was used in combination with a vegetation inventory to determine the final seed mixture and amounts of seed to be used for final reclamation.

The following seed mixture, was developed by UDOGM in conjunction with the vegetation inventory.

Wildcat Loadout Final Seed Mixture			
Scientific Name	**Common Name**	**PLS/Ac**	**Seeds Per/ft²**
Amelanchier utahensis	Utah serviceberry	7.00	4.15
Artemisia tridentata	Big sagebrush	0.06	3.44
Ceratoides Ianata	Winterfat	5.00	6.31
Chrysothamnus nauseosus	Rubber rabbitbrush	0.30	2.75
Purshia tridentata	Bitterbrush	12.00	4.13
Archillea millefolium	Yarrow	0.05	3.18
Hedysatum boreale	Northern sweetvetch	8.00	6.17
Linum lewisii	Lewis flax	1.00	6.38
Penstemon palmeri	Palmer penstemon	0.50	7.00
Viguiera multiflora	Showy goldeneye	0.20	4.84
Bouteloua gracilis	Blue grama	0.60	9.79
Elymus spicatus	Bluebunch wheatgrass	2.50	8.03
Elymus trachycaulus	Slender wheatgrass	2.50	9.18
Hilaria jamesii	Galleta	2.50	9.13
Stipa comata	Needle-and-thread grass	3.00	7.92
Stipa hymenoides	Indian ricegrass	2.00	8.63
TOTALS		47.21	101.06

~~Wildcat Loadout Interim Seed Mixture~~			
~~**Scientific Name**~~	~~**Common Name**~~	~~**PLS/Ac**~~	~~**Seeds Per/ft²**~~
~~*Archillea millefolium*~~	~~Yarrow~~	~~0.30~~	~~19.08~~
~~*Elymus Lanceolatus*~~	~~Thickspike Wheatgrass~~	~~8.00~~	~~28.28~~
~~*Elymus smithii*~~	~~Western Wheatgrass~~	~~9.00~~	~~26.03~~
~~*Elymus stachycaulus*~~	~~Slender Wheatgrass~~	~~8.00~~	~~29.38~~
~~TOTALS~~		~~26.30~~	~~102.78~~

Interim Mix for broadcast seeding at Wildcat Loadout

Scientific Name	Common Name	PLS/ft
1) FORBS (Use 2 species from the list below to arrive at 7 PLS/ft2)		
Achillea millefolium var. occidentalis	Western yarrow	
Sphaeralcea ambigua	Desert globemallow	
Castilleja applegatei ssp. martinii	Early Indian paintbrush	
Baileya multiradiata	Desert marigold	
Oenothera speciosa	Showy evening primrose	
Penstemon eatonii	Firecracker penstemon	
Sub TOTAL for forbs		7.0
2) Cold Season GRASSES (Use Triticale and any other two cold season species to arrive at 18 PLS/ft2)		
Triticum aestivum x Secale cereale	Triticale (sterile rye)	3.0
Achnatherum hymenoides	Indian ricegrass	5.0
Bromus anomalus	Nodding brome	5.0
Elymus lanceolatus spp. lanceolatus	Thickspike wheatgrass	5.0
Elymus lanceolatus spp. lanceolatus	Slender wheatgrass	5.0
Pascopyrum smithii	Western wheatgrass	5.0
Sub TOTAL Cold Season		

Grasses		18.0
3) Warm Season GRASSES (Use any three warm season species to arrive at 15 PLS/ft2)		
Aristida pupurea	Purple threeawn	5.0
Bouteloua gracilis	Blue grama	5.0
Eragrostis trichodes	Sand lovegrass	5.0
Pleuraphis jamesii	Galleta grass	5.0
Sporobolus airoides	Alkali sacaton	5.0
Sporobolus cryptandrus	Sand drop seed	5.0
SubTOTALWarm Season Grasses		15.0
TOTAL Forbs and Grasses		40.0

R645-301-341.220. METHODS USED IN PLANTING AND SEEDING

All reclaimed areas will be stabilized by gouging prior to reseeding. The gouging will be done with a backhoe or trackhoe, and will consist of gouges at least 18" deep by 14" - 36" wide, spaced approximately 6' - 10' apart. The gouging precludes the use of a drill-seeder; therefore, all areas will then be hydroseeded and hydromulched.

R645-301-341.230. MULCHING TECHNIQUES

Vegetative cover will be promptly re-established following cessation of mining activities to stabilize erosion. Re-seeding will occur during the first normal period for favorable growth following regrading. Mulch will be applied to all reseeded areas. Areas which are hydromulched will be done so using an organic type mulch at the rate of one ton per acre. Where hydroseeding and hydromulching occur, a tackifier will be added to both the seed and the mulch.

Mulch will be used wherever seeds are planted.

These areas are shown on Plate 9 and constitute ~~60.94~~ 74.46 acres.

R645-301-341.240. IRRIGATION AND PEST CONTROL MEASURES

Management Practices, e.g., Irrigation, Pest, and Disease Control

No mechanical irrigation will be used because of the lack of water in the area. Vegetative growth will be subject to normal rainfall and winter snowfall. Vegetation will be protected from both wildlife and livestock by drift-fences until the reclaimed areas have been adequately re-established. Upon approval, the fences will be removed. Fences are already standing surrounding the permit area. Pesticides and herbicides will be issued as necessary. Should any persistent pesticides be needed, the Division's approval will be obtained prior to their use.

To date, Andalex has had no use for poisons for rodent control or any other persistent pesticide.

Also see R645-301-240

R645-301-341.250. METHODS USED TO DETERMINE REVEGETATION SUCCESS

Revegetation will be closely monitored. Areas which fail to support sufficient growth to stabilize conditions will be tested and reseeded until a proper cover is established. Physical examinations will be conducted to note any species which are not thriving or regenerating. If this occurs, species will be substituted at the recommendation of the regulatory authority. Any other species will be added at the time of reclamation upon recommendation of the regulatory authority. All reclaimed areas will be monitored and maintained by the constant observation of Andalex until the surety release is granted. This will include slope staking on any sloped areas.

Revegetation monitoring parameters to be measured are growth rate, plant density and percent cover.

We would expect to monitor or supervise monitoring at least monthly during the first two growing seasons. From experience with interim revegetation at the minesite, we have learned that two growing seasons are needed to establish any success. After this we would know whether reclamation was progressing successfully.

Andalex is committed to quantitative sampling of reclamation cover, frequency and woody plant density during years 2, 3, 5, 9, and 10. Productivity will be sampled only during years 9 and 10. The reference area will be sampled during years 9 and 10.

Andalex commits to consult with the Division prior to final reclamation to determine the status of the site in terms of coal fines accumulation and vegetation success.

R645-301-341.300. STUDIES AND TESTING TO DEMONSTRATE FEASIBILITY OF REVEGETATION PLAN

See R645-301-240.

R645-301-342. FISH AND WILDLIFE

See R645-301-310

R645-301-342.100. ENHANCEMENT MEASURES

Appendix F. Andalex will endeavor to use the best technology current available to enhance wildlife habitat during the reclamation phase of its operation. This will include, but not be limited to water sources (if available), thermal cover, escapeways, hiding and loafing places, and travelways. ANDALEX will consult with the Division of Wildlife Resources, at the time of final reclamation, to determine exactly what reclamation designs, planting arrangements, and artificial structures would best enhance a wildlife habitat.

R645-301-342.200. PLANT SPECIES SELECTION

See R645-301-310.

R645-301-342.210. NUTRITIONAL VALUE

Appendix E

R645-301-342.220. COVER AND PROTECTION

Appendix F

R645-301-342.230. ABILITY TO SUPPORT AND ENHANCE HABITAT

Appendix F

R645-301-342.300. CROPLAND

N/A

R645-301-342.400. RESIDENTIAL, PUBLIC SERVICE OR INDUSTRIAL LAND USE

N/A - The post mining land use does not include residential, public service or industrial use.

R645-301-350. PERFORMANCE STANDARDS

R645-301-351. GENERAL REQUIREMENTS

All loadout and reclamation operations will be carried out according to plans provided under R645-301-330 through R645-301-340.

R645-301-352. CONTEMPORANEOUS RECLAMATION

Contemporaneous revegetation at the Wildcat Loadout will occur on topsoil piles and sediment pond embankments. The vast majority of the site will remain disturbed to facilitate the operation, until final reclamation.

R645-301-353. REVEGETATION: GENERAL REQUIREMENTS

R645-301-353.100. VEGETATIVE COVER

The vegetative cover will be as stated in the following categories.

R645-301-353.110. DIVERSITY, EFFECTIVENESS AND

PERMANENCe (Also R645-301-356 and 357)

The vegetative cover will be diverse, effective and permanent. Standards for reclamation success will be evaluated accordance with DOGM's "Vegetation Information and Monitoring Guidelines", Appendix A. The success of final reclamation will be judged on the effectiveness of the vegetation for the postmining land use and the extent of cover compared to the extent of cover for the reference area. Ground cover, production or stocking will be considered equal to the approved success standard when it reaches 90% of the success standard. Statistical adequacy of all statistical sampling will be determined using the following formula:

$$N_{min} - \frac{t^2 S^2}{(dx)^2}$$

where:
- t = the value from appropriate t-table*, (2-tail test for pre-mine studies, 1-tail test for success studies)
- s = the sample standard deviation,
- d = the desired change in the mean,
- x = the sample mean of the parameter in question
- * = All parameters are to be tested at the 90% confidence level with a 10% change in the mean (d = .1).

Ground cover will be estimated by using one of the methods listed in "Vegetation Information Guidelines" Appendix A.

Andalex does not propose to stock shrubs or trees during interim or final revegetation.

Production measurements will be made in accordance with DOGM's "Vegetation Information Guidelines" Appendix A. Estimates may be made by the methodology which the vegetation consultant feels is the most suitable method to used for the work being performed.

An evaluation of species composition will be made, including species present, form and diversity.

For a postmining land use of grazing and wildlife habitat, the ground cover and production will be equal to or greater that a reference area. The Division's "Vegetation Information Guidelines", Appendix A will be utilized for the evaluation of the success of revegetation. Appendix

B will be references for calculating diversity.

Siltation structures will be maintained until the disturbed area is revegetated and stabilized. They will remain in place at least two years after the last augmented seeding. Siltation structures may include straw bales, silt fences or filter baskets. Removal will be contingent upon revegetation and stabilization of the area as well as DOGM concurrence. Following removal, the area will be revegetated in accordance with the reclamation plan.

R645-301-353.120. NATIVE OR DESIRABLE INTRODUCED SPECIES

The vegetative cover will be comprised of species native to the area, or of introduced species where desirable and necessary to achieve the approved postmining land use and approved by the Division.
(See R645-301-240)

R645-301-353.130. EXTENT OF COVER

The vegetative cover will be at least equal in extent of cover to the reference area.

R645-301-353.140. STABILIZING SOIL FROM SURFACE EROSION

The vegetative cover will be capable of stabilizing the soil surface from erosion.(See R645-301-240)

R645-301-353.200. REESTABLISHED PLANT SPECIES

The reestablished plant species will:

R645-301-353.210. COMPATIBILITY WITH APPROVED POST-MINING LAND USE

The reestablished plant species will be compatible with the approved postmining land use.
(See R645-301-240)

R645-301-353.220. SEASONAL CHARACTERISTICS OF GROWTH

The reestablished plant species will have the same

seasonal characteristics of growth as the original vegetation.
(See R645-301-240)

R645-301-353.230. SELF-REGENERATION AND PLANT SUCCESSION

The reestablished plant species will be capable of self-regeneration and plant succession.
(See R645-301-240)

R645-301-353.240. COMPATIBILITY WITH AREA PLANT AND ANIMAL SPECIES

The reestablished plant species will be compatible with the plant and animal species of the area.
(See R645-301-240)

R645-301-353.250. COMPLIANCE WITH OTHER APPLICABLE LAWS OR REGULATIONS

The reestablished plant species will meet the requirements of applicable Utah and federal seed, poisonous and noxious plant; and introduced species laws or regulations. The seed tag will be provided to the Division, as requested.

R645-301-353.300. EXCEPTION TO REQUIEMENTS

N/A - No request for exception.

R645-301-353.400. CROPLAND

N/A - Crop land is not a post mining land use.

R645-301-354. REVEGETATION: TIMING

Disturbed areas will be planted during the first normal period for favorable planting conditions after replacement of the plant-growth medium. The normal period for favorable planting in this area is in the fall.

R645-301-355. REVEGETATION MULCHING AND OTHER

SOIL STABILIZING PRACTICES

See R645-301-341.230.

R645-301-356 REVEGETATION: STANDARDS FOR SUCCESS

R645-301-356.100. EFFECTIVENESS OF VEGETATION FOR POST-MINING LAND USE

See R645-301-353.110

R645-301-356.110. STANDARDS FOR SUCCESS: GUIDELINES

See R645-301-240 and R645-301-353.110

R645-301-356.120. SAMPLING TECHNIQUES

See R645-301-353.110.

R645-301-356.200. CONDITIONS FOR SUCCESS

See R645-301-353.110.

R645-301-356.210. GRAZING OR PASTURE LAND

See R645-301-331 and R645-301-353.110.

R645-301-356.220. CROPLAND

N/A

R645-301-356.230. FISH AND WILDLIFE

See R645-301-353.110 and R645-301-331.

R645-301-356.231. STOCKING AND PLANTING

See R645-301-331

R645-301-356.232. TREES AND SHRUBS

See R645-301-331

R645-301-356.240. INDUSTRIAL, COMMERCIAL OR

RESIDENTIAL

N/A

R645-301-356.250. PREVIOUSLY DISTURBED AREAS

See R645-301-240 and R645-301-331

R645-301-356.300. SILTATION STRUCTURES

See R645-301-240 and R645-301-310.

R645-301-356.400. REMOVAL OF SILTATION STRUCTURES

See R645-301-240 and R645-301-310.

R645-301-357. REVEGETATION: EXTENDED RESPONSIBILITY PERIOD

R645-301-357.100. BEGINNING OF EXTENDED RESPONSIBILITY PERIOD

See R645-301-240

R645-301-357.200. VEGETATION PARAMETERS FOR SUCCESS

See R645-301-240 and R645-301-341.250

R645-301-357.210. GREATER THAN 26.0 INCHES ANNUAL PRECIPITATION

N/A

R645-301-357.220. LESS THAN 26.0 INCHES ANNUAL PRECIPIATION

See R645-301-240 and R645-301-341.250.

R645-301-357.300. HUSBANDRY PRACTICES - GENERAL INFORMATION

R645-301-357.301. SELECTIVE HUSBANDRY PRACTICES

N/A - There are no selective husbandry practices requested at this time. Such selective practices cannot be determined until the property is reclaimed and reclamation success is evaluated.

R645-301-357.302. DEMONSTRATION OF PRACTICES

N/A

R645-301-357.303. BONDED AREA

N/A

R645-301-357.304. EXTENDED RESPONSIBILITY FOR RESEEDED AREAS

Per Division

R645-301-357.310. REESTABLISHING TREES AND SHRUBS

See R645-301-240.

R645-301-357.311. RATE OF REPLANTING

See R645-301-241.210.

R645-301-357.312. ESTABLISHMENT BY SEED

See R645-301-341.210.

R645-301-357.320. WEED CONTROL AND ASSOCIATED REVEGETATION

Management Practices, e.g., Irrigation, Pest, and Disease Control

No mechanical irrigation will be used because of the lack of water in the area. Vegetative growth will be subject to normal rainfall and winter snowfall. Vegetation will be protected from both wildlife and livestock by drift-fences until the reclaimed areas have been adequately re-established. Upon approval, the fences will be removed. Fences are already standing surrounding the permit area. Pesticides and herbicides will be

issued as necessary. Should any persistent pesticides be needed, the Division's approval will be obtained prior to their use.

To date, Andalex has had no use for poisons for rodent control or any other persistent pesticide.

Also see R645-301-240

R645-301-357.321. CHEMICAL WEED CONTROL

See R645-301-240 and R645-301-357.320.

R645-301-357.322. MECHANICAL WEED CONTROL

See R645-301-240

R645-301-357.323. BIOLOGICAL WEED CONTROL

See R645-301-240

R645-301-357.324. RESEEDING DAMAGED AREAS

See R645-301-240

R645-301-357.330. CONTROL OF OTHER PESTS

See R645-301-357.320

R645-301-357.331. CONTROL OF BIG GAME

See R645-301-240

R645-301-357.332. CONTROL OF SMALL MAMMALS AND INSECTS

See R645-301-240

R645-301-357.341. AREA OF RESEEDING: NATURAL DISASTERS

See R645-301-240

R645-301-357.342. SUCCESS STANDARDS FOLLOWING A DISASTER

See R645-301-331

R645-301-357.343. TIMING OF RESEEDING FOLLOWING A DISASTER

See R645-301-240

R645-301-357.350. IRRIGATION

N/A - Not Planned

R645-301-357.360. RILL AND GULLEY REPAIR

See R645-301-212

R645-301-357.361. GREATER THAN 3% OF AREA

See R645-301-240

R645-301-357.362. EXTENT OF AFFECTED AREA

See R645-301-240

R645-301-357.363. AREA DEFINED BY RESEEDING

See R645-301-240

R645-301-357.364. RESULT OF DEFICIENT PLANS

See R645-301-240

R645-301-357.365. DEMONSTRATION OF METHOD

See R645-301-240

R645-301-358. PROTECTION OF FISH, WILDLIFE AND RELATED ENVIRONMENTAL VALUES

See R645-301-310

R645-301-358.100. ENDANGERED OR THREATENED SPECIES

See R645-301-310

R645-301-358.200. BALD OR GOLDEN EAGLES

See R645-301-310

R645-301-358.300. ENDANGERED SPECIES ACT

See R645-301-310

R645-301-358.400. WETLANDS/RIPARIAN VEGETATION

See R645-301-310

R645-301-358.500. BEST TECHNOLOGY CURRENTLY AVAILABLE

See R645-301-310

R645-301-358.510. MINIMIZE ELECTRICAL HAZARDS

See R645-301-310

R645-301-358.520. PASSAGE FOR LARGE MAMMALS

See R645-301-310

R645-301-358.530. PONDS CONTAINING HAZARDOUS OR TOXIC MATERIALS

See R645-301-310

ANDALEX RESOURCES, INC.

WILDCAT LOADOUT

MINING AND RECLAMATION PLAN

CHAPTER 4, LAND USE

CHAPTER 4

TABLE OF CONTENTS

R645-301-400.	LAND USE AND AIR QUALITY	4-1
R645-301-410.	LAND USE	4-1
R645-301-411.	ENVIRONMENTAL DESCRIPTION	4-1
R645-301-412.	RECLAMATION PLAN	4-6
R645-301-413.	PERFORMANCE STANDARDS	4-8
R645-301-414.	PERMIT REVISIONS REQUESTING APPROVAL OF ALTERNATE POSTMINING LAND USE	4-9
R645-301-420.	AIR QUALITY	4-9
R645-301-421.	CLEAN AIR ACT AND OTHER APPLICABLE LAWS	4-10
R645-301-422.	UTAH BUREAU OF AIR QUALITY	4-10
R645-301-423.	SURFACE COAL MINING AND RECLAMATION ACTIVITIES EXCEEDING 1,000,000 TONS PER YEAR	4-10
R645-301-424.	FUGITIVE DUST CONTROL - SURFACE COAL MINING AND RECLAMATION OPERATIONS LESS THAN 1,000,000 TONS PER YEAR	4-16
R645-301-425.	AIR QUALITY MONITORING - SURFACE COAL MINING AND RECLAMATION OPERATIONS LESS THAN 1,000,000 TONS PER YEAR	4-16

CHAPTER 4, LAND USE & AIR QUALITY

HISTORICAL NOTE: In 2004, the Division issued an Order DO-04 for wind-blown fines which had accumulated outside the disturbed area, primarily in the area southwest of the main coal storage pile below sediment Pond B. A complete description of the mitigation plan proposed for DO-04 is included in Appendix p.

R645-301-400. LAND USE AND AIR QUALITY

R645-301-410. LAND USE

R645-301-411. ENVIRONMENTAL DESCRIPTION

Because of the vegetation and poor rainfall, the land is presently used only for grazing, wildlife habitat, and limited outdoor recreation. Historically, the land has also been used for coal loading.

R645-301-411.100. PREMINING LAND USE INFORMATION

Past mining in the vicinity of Wildcat includes ARCO'S Beaver Creek Mines (ten miles to the west). The Swisher Coal Company previously used the Wildcat Siding.

R645-301-411.110. USES OF THE LAND AT THE TIME OF FILING APPLICATION

The Wildcat Loadout area would fall into two land use categories: 1) Fish and Wildlife habitat and recreation lands, and 2) Range Lands. County zoning regulations (1974) indicate all lands involved in the lease application area are within Zone M and G1 which is for mining and grazing. Current land use consists of grazing, wildlife habitat, and deer hunting. No other game species are found in the area. For recreational purposes, the land is suitable for deer hunting as well as ATV riding and occasionally snowmobiling. There are no oil and gas wells or water wells.

The area is ten miles from Price, but the unavailability of water precludes any development for residential or summer homes.

R645-301-411.120. LAND USE DESCRIPTION IN CONJUNCTION WITH OTHER ENVIRONMENTAL RESOURCES

INFORMATION

Livestock grazing has been the most intense use of the permit area.

Mule deer are found within the lease area as well as the usual small mammals, predators, and passerine and raptorial birds.

Outdoor recreation in the lease area is limited and usually related to enjoyment of the open space and associated scenic facilities and hunting for wild animals.

R645-301-411.130. EXISTING LAND USES AND LAND USE CLASSIFICATION

See R645-301-411.110

R645-301-411.140. CULTURAL AND HISTORIC RESOURCES INFORMATION

To assure that no archaeological or historical sites existed in the proposed permit area a reconnaissance survey has been conducted.

This survey was conducted based on requirements of the Bureau of Land Management prior to the issuance of the right-of-way. All of the surface within this permit area is under the jurisdiction of the Bureau of Land Management.

Prior to this investigation, no recorded archaeological studies of any kind had ever been one in the survey area. Please see *the Confidential Binder.*

Archaeological clearance was granted based on this survey.

R645-301-411.141. CULTURAL AND HISTORIC RESOURCES MAPS

See *the Confidential Binder*

R645-301-411.141.1 PUBLIC PARKS AND LOCATIONS OF ANY CULTURAL OR HISTORICAL RESOURCES

N/A - There are no public parks in the proposed permit area or nearby vicinity. No other cultural or historical resources are known to exist in the area.

R645-301-411.141.2 CEMETERIES

N/A - There are no cemeteries or burial grounds in or within 100 feet of the permit area.

R645-301-411.141.3 NATIONAL SYSTEM OF TRAILS OR THE WILD AND SCENIC RIVERS SYSTEM

N/A

R645-301-411.142 COORDINATION WITH THE STATE HISTORIC PRESERVATION OFFICER (SHPO)

See *the Confidential Binder*

R645-301-411.142.1 PREVENTION OF ADVERSE IMPACTS

See *the Confidential Binder*

R645-301-411.142.2 VALID EXISTING RIGHTS OR JOINT AGENCY APPROVAL

See *the Confidential Binder*

R645-301-411.143 IMPORTANT HISTORIC AND ARCHAEOLOGICAL RESOURCES THAT MAY BE ELIGIBLE FOR LISTING ON THE NATIONAL REGISTER OF HISTORIC PLACES

N/A - See *the Confidential Binder*

R645-301-411.143.1 COLLECTION OF ADDITIONAL INFORMATION

See *the Confidential Binder*

R645-301-411.143.2 CONDUCTING FIELD INVESTIGATIONS

See *the Confidential Binder*.

R645-301-411.143.3 OTHER APPROPRIATE ANALYSES

See *the Confidential Binder.*

R645-301-411.144. APPROPRIATE MITIGATION AND TREATMENT MEASURES

See *the Confidential Binder.*

R645-301-411.200. PREVIOUS MINING ACTIVITY

No mining ever occurred at this site. The area was used as a coal processing and loadout facility.

R645-301-411.210. TYPE OF MINING METHOD USED

Area was used as a processing/loadout facility.

R645-301-411.220. COAL SEAMS OR OTHER MINERAL STRATA MINED

N/A

R645-301-411.230. EXTENT OF COAL OR OTHER MINERALS REMOVED

N/A

R645-301-411.240. APPROXIMATE DATES OF PAST MINING

The loadout area was used from approximately 1960 to present under various operators.

R645-301-411.250. USES OF LAND PRECEDING MINING

See R645-301-411.140.

R645-301-412. RECLAMATION PLAN

See R645-301-240.

R645-301-412.100. POSTMINING LAND USE PLAN

The post-mining land use will consist of livestock grazing with wildlife habitat and some recreation.

R645-301-412.110. ACHIEVEMENT OF PROPOSED POSTMINING LAND USE

See R645-301-412.100.

R645-301-412.120. RANGE OR GRAZING LAND USE

See R645-301-412.100.

R645-301-412.130. ALTERNATE POSTMINING LAND USE

N/A

R645-301-412.140. CONSISTENCY WITH SURFACE OWNER PLANS AND APPLICABLE UTAH AND LOCAL LAND USE PLANS

Socioeconomic Impacts
The proposed project is located in an area where coal mining is the major industry, therefore, the community is geared for coal operations. The labor supply is excellent, well-trained, and available. Most people in this area have a very favorable attitude towards the increased coal activity. They look forward to growth in the area which will increase population, home construction, and provide other facilities for community use.

The need for development of additional housing, school space, and changes in present community services would be among the greatest impacts, due to the increase in population. Positive effects of the project will be to increase the number of jobs, payroll, and taxes thus helping to build the community.

Land Use Changes
The limited resources, both physical and scenic, will dictate no future change in land status. Considering the extent and nature of similar lands in this area, no uses other than those previously discussed can be forecast.

Wildcat has been unsightly since coal loading activities began with the Swisher Coal Company. The new loadout is in the same area as the old tipples and waste dumps. These waste dumps are numerous and located throughout the permit area and consist of coal fines which were unmarketable during the earlier mining history. This new operation will actually be a significant reclamation phase to the permit area.

After completion of loading operations, the land will continue to be used for grazing and hunting. Although hunting may occur within the permit area during operations, grazing will not. No future change is dictated in the land status. All disturbed land will be restored in a timely manner, according to the Reclamation Plan outlined in Chapter 5, to conditions that are capable of supporting the uses they were capable of supporting before mining.

R645-301-412.200. LAND OWNER OR SURFACE MANAGER COMMENTS

As there are no proposed land use changes, there have been no negative comments from legal or equitable owners of record of surface areas to be affected or from any state or local agencies.

R645-301-412.300. SUITABILITY AND COMPATIBILITY

See R645-301-412.200.

R645-301-413. PERFORMANCE STANDARDS

R645-301-413.100. POSTMINING LAND USE

See R645-301-412.100.

R645-301-413.110. CAPABILITY OF SUPPORTING POSTMINING LAND USE

See R645-301-412.100.

R645-301-413.120. HIGHER OR BETTER USES

See R645-301-412.100.

R645-301-413.200. DETERMINING PREMINING USES OF LAND

See R645-301-412.100.

R645-301-413.210. PREMINING USES OF LAND NOT PREVIOUSLY MINED

See R645-301-412.100.

R645-301-413.220. POSTMINING LAND USE FOR LAND THAT HAS BEEN PREVIOUSLY MINED AND NOT RECLAIMED

See R645-301-412.100.

R645-301-413.300. CRITERIA FOR ALTERNATIVE POSTMINING LAND USES

N/A

R645-301-413.310. LIKELIHOOD FOR ACHIEVEMENT LAND USE

Post-mining land use as proposed shall be achieved.

R645-301-413.320. HAZARDS TO PUBLIC HEALTH OR SAFETY, OR THREAT OF WATER DIMINUTION OR POLLUTION

N/A

R645-301-413.330. PROHIBITED LAND USES

N/A

R645-301-413.331. IMPRACTICAL OR UNREASONABLE

N/A

R645-301-413.332. INCONSISTENT WITH APPLICABLE LAND USE POLICIES

N/A

R645-301-413.333. UNREASONABLE DELAY IN IMPLEMENTATION

N/A

R645-301-413.334. VIOLATION OF FEDERAL, UTAH OR LOCAL LAW

N/A

R645-301-414. PERMIT REVISIONS REQUESTING APPROVAL OF ALTERNATE POSTMINING LAND USE

N/A

R645-301-414.100. FILING DEADLINES

N/A

R645-301-414.200. SIGNIFICANT ALTERATION FROM MINING OPERATIONS IN THE ORIGINAL PERMIT

N/A

R645-301-414.300. OTHER REQUIREMENTS

N/A

R645-301-420. AIR QUALITY

(Also R645-301-421, 422 and 423)

Existing Environment

The permit area is located in a Class II air quality area.

Air Quality Impact Analysis

Air quality information has been submitted and approved by the State Bureau of Air Quality. See Appendix B.

The existing Air Quality Approval Order (DAQE-005-00) provides for a maximum coal stockpile area of 20 acres. Although the present stockpile area is well below this figure, there is a potential for the required stockpiles to increase up to, and even beyond, the present approved area; therefore, Andalex Resources, Inc. has submitted a request for modification of its Approval Order to provide for additional stockpile area, as well as increased tonnage and diesel usage. The length of the haul road has not been changed

at this time, since no changes in haul roads have taken place since the approval. Haul road lengths will change with the future expansion plans, and will be addressed with a revised Air Quality Plan at that time.

Emission Estimates

Andalex's inventory has been reviewed and approved by the Utah Bureau of Air Quality and the E.P.A.

PSD Permit and Compliance with Air Quality Laws

The Environmental Protection Agency has determined that this project does not require a PSD Air Quality Permit. The loadout is not subject to the PSD regulations because of the new definition of a major source.

R645-301-421. CLEAN AIR ACT AND OTHER APPLICABLE LAWS

See R645-301-420.

R645-301-422. UTAH BUREAU OF AIR QUALITY

See R645-301-420.

R645-301-423. SURFACE COAL MINING AND RECLAMATION ACTIVITIES EXCEEDING 1,000,000 TONS PER YEAR

See R645-301-420.

R645-301-423.100. COMPLIANCE WITH FEDERAL AND UTAH AIR QUALITY STANDARDS

See R645-301-420.

R645-301-423.200. FUGITIVE DUST CONTROL PLAN

The Wildcat Loadout and surrounding area were impacted by a previous pre-law operator. This operation left a fair amount of the existing permit area, as well as an unknown amount of the adjacent, undisturbed area, impacted by accumulations of coal fines. After Andalex Resources, Inc. took over the site, the operation was permitted under SMCRA and obtained an Air Quality Approval Order. The problem of coal fine accumulation on, and

around, this area has been addressed by Andalex since the beginning of the Wildcat Loadout operation, and has included remedial measures such as scraping coal off previously impacted areas to salvage topsoil, and vacuuming coal fines from undisturbed, impacted areas to protect soils and vegetation. In addition, Andalex Resources, Inc. has implemented a considerable number of dust control measures at the Wildcat Loadout to reduce fugitive dust and wind-blown coal fines. The following are some of the measures incorporated into the design and operation of the facility to reduce dust emissions:

(1) All roads are paved or gravel surfaced;
(2) Road speed limits are posted at 5 mph;
(3) Roads are chemically treated and watered on a regular basis;
(4) Truck dump hoppers are located below ground and equipped with sprays;
(5) Coal is recovered from stockpiles via underpile reclaim systems;
(6) All surface conveyors are covered;
(7) Conveyor transfer points are enclosed;
(8) Radial stackers load at the highest point of the pile to minimize drop distances;
(9) Railcars are loaded from an enclosed bin and extendable chute;
(10) Refuse pile is regularly compacted and watered as needed;
(11) Coal moisture is maintained at a minimum of 6% overall;
(12) Moisture content of minus 40 mesh coal is at least 4.0% by weight;
(13) All disturbed areas are drained to sedimentation ponds;
(14) Runoff from ASCA areas is controlled by containment, vegetation, silt fences and/or straw bales;
(15) ~~Wind fences are employed along the eastern edge of the largest stockpile, near Pond B;~~
(16) The location of stockpiles (more to the west) helps confine the wind-blown coal fines within the permit area.

The designs of the various controls listed above have been provided in the following sections of this permit:

(1) Impoundments/Hydrology - R645-301-512.240
(2) Roads - R645-301-512.250
(3) Operations - R645-301-520
(4) Coal Handling - R645-301-521.

While the above controls and practices are designed to minimize fugitive dust and wind-blown coal fines, it is impossible to completely eliminate them. As a result, some soils and

vegetation will be impacted by dust accumulations in the future. To minimize these impacts, Andalex Resources, Inc. proposes vacuuming of coal fine accumulations on undisturbed areas within the permit area either prior to salvage of the topsoil or prior to reclamation/reseeding. Vacuuming is considered by Andalex as the best and least destructive option for removal of coal fine accumulations. A complete plan for cleanup of wind-blown fines is described in Appendix B.

~~There is also some potential for coal dust to be blown beyond the permit boundary under extreme wind conditions. There is evidence of coal dust outside the permit area, but the time and source of these accumulations are unknown. Andalex Resources, Inc. is therefore proposing to conduct a program to monitor coal fine deposition outside the permit area, specifically east of the permit boundary. The proposed monitoring is described in Appendix P, Response to Division Order DO-04, by Patrick D. Collins, Ph.D.~~

R645-301-424. FUGITIVE DUST CONTROL - SURFACE COAL MINING AND RECLAMATION OPERATIONS LESS THAN 1,000,000 TONS PER YEAR

N/A - Greater than 1,000,000 ton/yr.

R645-301-425. AIR QUALITY MONITORING - SURFACE COAL MINING AND RECLAMATION OPERATIONS LESS THAN 1,000,000 TONS PER YEAR

N/A

ANDALEX RESOURCES, INC.

WILDCAT LOADOUT

MINING AND RECLAMATION PLAN

CHAPTER 5, ENGINEERING

CHAPTER 5

TABLE OF CONTENTS

R645-301-500.	ENGINEERING	5-1
R645-301-510.	INTRODUCTION	5-1
R645-301-511.	GENERAL REQUIREMENTS	5-6
R645-301-512.	CERTIFICATION	5-6
R645-301-513.	COMPLIANCE WITH MSHA REGULATIONS AND MSHA APPROVALS	5-74
R645-301-514.	INSPECTIONS	5-75
R645-301-515.	REPORTING AND EMERGENCY PROCEDURES	5-77
R645-301-516.	PREVENTION OF SLIDES	5-79
R645-301-520.	OPERATION PLAN	5-79
R645-301-521.	GENERAL	5-79
R645-301-522.	COAL RECOVERY	5-95
R645-301-523.	MINING METHOD(S)	5-95
R645-301-524.	BLASTING AND EXPLOSIVES	5-96
R645-301-525.	SUBSIDENCE	5-96
R645-301-526.	MINE FACILITIES	5-96
R645-301-527.	TRANSPORTATION FACILITIES	5-98
R645-301-528.	HANDLING AND DISPOSAL OF COAL, OVERBURDEN, EXCESS SPOIL, AND COAL MINE WASTE	5-100
R645-301-529.	MANAGEMENT OF MINE OPENINGS	5-102
R645-301-530.	OPERATIONAL DESIGN CRITERIA AND PLANS	5-103
R645-301-531.	GENERAL	5-103
R645-301-532.	SEDIMENT CONTROL	5-103
R645-301-533.	IMPOUNDMENTS	5-103

R645-301-534. ROADS 5-105

R645-301-535. SPOIL 5-107

R645-301-536. COAL MINE WASTE 5-108

R645-301-537. REGRADED SLOPES 5-110

R645-301-540. RECLAMATION PLAN 5-110

R645-301-541. GENERAL 5-110

R645-301-542. NARRATIVES, MAPS AND PLANS 5-117

R645-301-550. RECLAMATION DESIGN CRITERIA AND PLANS . 5-121

R645-301-551. CASING AND SEALING OF UNDERGROUND OPENINGS 5-122

R645-301-552. PERMANENT FEATURES 5-122

R645-301-553. BACKFILLING AND GRADING 5-122

R645-301-560. PERFORMANCE STANDARDS 5-126

CHAPTER 5, ENGINEERING

HISTORICAL NOTE: In 2004, the Division issued an Order DO-04 for wind-blown fines which had accumulated outside the disturbed area, primarily in the area southwest of the main coal storage pile below sediment Pond B. A complete description of the mitigation plan proposed for DO-04 is included in Appendix P.

R645-301-500. ENGINEERING

R645-301-510. INTRODUCTION

Volume II of this PAP contains plates which support the narrative of Volume I. These maps include, but are not limited to, contiguous surface and subsurface owners, the permit boundary including the area to be affected over the life of the project, a plate depicting all buildings and structures within 1,000 feet of the permit area and any surface or subsurface man-made features (powerline). Much of this information is combined on individual maps, e.g., the man-made features are on Plate 1 which also depicts buildings within 1,000 feet.

The location and boundaries of the revegetation reference area are shown on Plate 1.

Figure VII-2 depicts surface waters and receiving waters in the vicinity of the permit area. The Gordon Creek Road (County Road 139) is also depicted as it relates to the permit area on the surface facilities map.

Cross Sections, Maps, and Plans **(Also R645-301-511, 521.140, 521.150, 521.160, 521.170, 521.180 and R645-301-722)**

Many of the plans of this section are not applicable to the Wildcat Loadout Facility as it is strictly a surface facility and plans showing core samples, nature of coal seams, outcrops, active underground and abandoned workings or any others pertaining to mining (surface or underground) are not included.

Surface water monitoring stations are included on Plate 2A.

Subsurface water has not been encountered within the permit

area and the only surface water would consist of sediment ponds and diversion ditches which become surface waters only in direct response to a precipitation event. These, along with the one spring located southwest of the permit area, are shown on Plate 2A and Plate 15 and Figure VII-2 respectively.

~~There are no oil or gas wells in or adjacent to this permit area.~~ *There is a gas well drill site located near the southeast part of the facility, adjacent to the public road, which is partially within the permit area. The drillhole has been capped and the site has been reclaimed. This work was done by Conoco-Phillips under their own right-of-way issued by BLM.*

Slopes are represented by topographic maps (Plate 1) and final reclamation contours (Plate 9). The cross-sections, through these two topographic maps, are shown on Plate 10. From this, a mass balance was developed.

Operation Plan: Maps and Plans

The lands affected by this operation (surface only) are clearly shown on Plate 1. Plate 1 depicts all buildings, utilities, and facilities. ~~All of the land within this permit area which is to be affected already has been.~~ This is a surface facility only and involves no underground workings. The bond required by the Division is for the entire affected area including all the surface facilities.

The permit area shown on Plates 1, 1A and 16 contains 100.19 acres, *and is included within the 270 acre BLM right-of-way (U-48027) boundary. It is important to note that this is a non-exclusive areal right-of-way, and that there are numerous other equally valid rights-of-way which occupy much of this same area. For example, overlapping rights-of-ways exist for the Utah Railway tracks, the State Highway 139, the Carbon County Consumers Road, the by-pass road, the Trestle public road, Rocky Mountain Power 46 KV powerline, Phillip Petroleum's gas well and pipeline corridor, and Hidden Splendor shop facility. BLM determined the final 270 acre configuration in part to "square up" the boundary for administrative purposes. Being a non-exclusive right-of-way means there is no conflict among grantees, and no inherent liability from one grantee to the next, as long as each grantee's activities are within the terms of their respective right-of-way.)*

The disturbed area shown on Plates 1B is 74.46 acres, which includes 26.11 acres on the west side of the railroad tracks

and 48.35 acres on the east side of the tracks. ~~including 17.51 acres of ASCA's and excluding 2.78 acres of Utah Railway track. The disturbed area shown on those maps is 60.94 acres.~~ This acreage represents all actual disturbed areas within the site, and does not include the ASCA's or the Utah Railway track. ~~The 60.94 acres of disturbed area also represents the area where topsoil (or substitute topsoil) will be placed upon final reclamation. ASCA's are excluded from this figure since topsoil has not been removed from those areas. The track is excluded since it will remain after reclamation~~

Coal storage, topsoil storage, loading areas, coal preparation waste areas are all depicted on the surface facilities map. Additional detail on topsoil, diversions, and ponds can be found on Plates 1, *2, 13, and 3A-3H.*

There is no storage of explosives at the Wildcat Loadout.

The final surface configurations will be similar to the surface prior to Andalex's involvement at Wildcat. Cross sections and a surface configuration plate are included in Volume II as 10 and 9 respectively.

Surface water monitoring locations are shown on Plate 2A.

After the completion of activities at this facility, no structures will remain with the exception of the railroad grade, the tracks, and it's associated drainage structures.

All maps requiring certifications by a registered person have been done so. Included are stamps from experts in related fields such as surveying.

Maps and Plans

The following is a list of maps and plans included with this application as Volume II. Those maps which require certification by a registered professional engineer bear that mark. These maps and plans, when used in conjunction with Volume I (the text), will constitute a complete plan for the Wildcat Loadout Facility. As this facility has already been completely constructed, the maps do not include any "as proposed" facilities, only existing ones. Along with the facilities, plates are included, environmental resource maps, and reclamation plans. It should be noted that a wildlife distribution map is not included based on the State Division of Wildlife Resources' comments (please see Appendix F).

PLATES

PLATE #	PLATE TITLE
Plate 1	Existing Surface Facility Map
Plate 1A	Proposed Surface Facility Map, Response to DO-04
Plate 1B	Disturbed Areas
Plate 2	Deleted
Plate 2A	Drainage Map, Response to Division Order
Plate 3A	Sediment Pond A
Plate 3B	Deleted
Plate 3C	Sediment Pond C
Plate 3D	Sediment Pond D
Plate 3E	Sediment Pond E
Plate 3F	Sediment Pond F
Plate 3G	Sediment Pond G
Plate 3H	Permanent Impoundment
Plate 4	Deleted
Plate 5	Deleted
Plate 6	Deleted
Plate 7	Deleted
Plate 8	Final Reclamation Hydrology, Phase 1
Plate 9	Final Reclamation Contours & Revegetation, Phase 2
Plate 10	Cross Sections
Plate 11	Soils Map
Plate 12	Geology Map
Plate 13	Topsoil Piles
Plate 14	Cross Section Reference Map
Plate 15	Watershed Map
Plate 16	Surface and Subsurface Ownership Map
Plate 17	Typical Road Cross-sections
Plate 18	Deleted
Plate 19	Deleted
Plate 20	Deleted

R645-301-511. GENERAL REQUIREMENTS

See R645-301-510.

R645-301-511.100. PROPOSED COAL MINING AND RECLAMATION OPERATIONS

See R645-301-510.

R645-301-511.200. POTENTIAL IMPACTS TO THE ENVIRONMENT

See R645-301-510.

R645-301-511.300. RECLAMATION

See R645-301-240.

R645-301-512. CERTIFICATION

See Volume II and R645-301-510.

R645-301-512.100. CROSS SECTIONS AND MAPS

See R645-301-510.

R645-301-512.110. MINE WORKINGS TO THE EXTENT KNOWN

N/A - There are no mine workings associated with this project.

R645-301-512.120. SURFACE FACILITIES AND OPERATIONS

See Volume II, Plates 1 and 2. All applicable maps are certified.

R645-301-512.130. SURFACE CONFIGURATIONS

See Volume II, Plates 1 and 2. All applicable maps are certified.

R645-301-512.140. HYDROLOGY (Also R645-301-722)

Refer to Appendix R

R645-301-512.150. GEOLOGIC CROSS SECTIONS AND MAPS

See Volume II, Plate 12. All applicable maps are certified.

R645-301-512.200. PLANS AND ENGINEERING DESIGNS

Applicable plans, such as for impoundments and primary roads have been certified by a qualified, registered professional engineer and are included in the following sections.

R645-301-512.210. EXCESS SPOIL

N/A - There are no plans for excess spoil at this facility.

R645-301-512.220. DURABLE ROCK FILLS

N/A - There are no plans for durable rock fills at this facility.

R645-301-512.230. COAL MINE WASTE

This is strictly a surface facility, there will be no underground development wastes.

Coal Processing Waste **(Also R645-301-513.800, 536, and relevant portions of Sections R645-301-735, 736, 737, 745, 746, 747, and 754)**

During processing, a small amount of boney material and rock is removed from the lump coal product. It is currently proposed to dispose of this material on the west side of Wildcat in a previously disturbed area which reports to the sedimentation ponds.

In accordance with requirements of 30 CFR 77.215-2, a refuse disposal plan has been filed with MSHA. An MSHA I.D. number has been issued for this pile - 1211-UT-09-01864-01. The required disposal plan and maps are included as Appendix O of this M.R.P.

If it is determined through testing that this material is acid- or toxic-forming, then the disposal will consist of burial on the west side of Wildcat (Plate 1) or haulage to another approved coal processing waste disposal area. The Division will be notified if the coal processing waste is to be moved off-site to another approved disposal area. All coal processing waste piles shall be inspected at least quarterly, by a qualified registered engineer. This person will be responsible for inspecting visual factors such as

steepness of slopes and seepage. Copies of inspections will be maintained at the site and should any potential hazards be observed, the Division shall be notified and remedial action taken. The coal processing waste piles shall be spread in layers no more than 24 inches in thickness; however, because of the nature of this "boney" material and its size (5 to 8 inches in diameter) compaction is not possible. Observations will be made regarding stability of the pile. This section shall comply with UMC 817.81-.88. Andalex Resources' coal processing waste is very small in volume. Andalex's hydrologic studies have indicated that groundwater does not exist within a zone of impact created by this facility. Drainage from coal processing waste, until such time as the material is buried with four feet of the best available non-toxic and non-combustible material and revegetation has occurred, will report to sedimentation ponds as shown on the surface drainage map. Drainage from the pile is carried to Pond F via disturbed ditch D-32, D-33, and D-34, which is sized to carry runoff from the pile from a 100 year - 6 hour event as required. ~~(See Table IV-13).~~ Slope protection will be provided as required and banks will have a minimum static safety factor of 1.5. In the unlikely event spontaneous combustion occurs within the coal processing waste pile, the fire will be extinguished through means of compaction which is standard operating procedure (not to imply that the waste pile will be compacted as it is built). All personnel at Wildcat Loadout are familiar with this procedure. No burned coal processing waste or coal refuse will be removed from the disposal area except if it is moved to another approved coal processing disposal area. Coal processing waste from the Wildcat Loadout will not be returned to underground mine workings.

This material has been tested according to requirements for acid and toxic-forming materials and the results of these tests have been submitted to the Division. The intention of the testing was to determine whether the material had any toxic or acid-forming characteristics. Our results show that this material may be used in fill situations within our approved permit area. It is Andalex's intention to use this material as substitute fill for the expansion plans at the Wildcat loadout. It is clear that this material will have to be reclaimed as a separate operation from an ordinary fill situation. Andalex has committed to covering this material with four feet of native fill prior to redistribution of topsoil. This refuse material, which is used in a fill situation, will be reclaimed separately and covered with native material. Andalex makes this commitment for all of the refuse material which is used as fill.

It should be emphasized that upon final reclamation any refuse material which has been used in a fill situation will be removed and placed in the approved refuse disposal area. It will not be reclaimed in-place.

It is estimated that there are presently approximately 54,500 cubic yards of coal waste material on site. Of this, approximately 10,000 cubic yards of material were used in fills, and the remaining 44.500 cubic yards are in the refuse pile.

R645-301-512.240. IMPOUNDMENTS

Complete sizing and design details for all impoundments are included in Appendix R, "Wildcat Loadout Sedimentation and Drainage Control Plan". All impoundments are shown on Plates 2. Impoundment plans and details are shown on Plates 3A through 3H.

~~Please note that this section also addresses all, or relevant portions of, the following main sections in Chapter 7:~~

~~R645-301-722, 723, 724, 725, 728, 731, 732, 733, 734, 740, 741, 742, 743, 744, 752, 753, 763 and 764.~~

~~The Sedimentation and Drainage Control Plan has been designed according to OSM regulations and the design criteria and construction certified by a Utah Registered Professional Engineer. No other embankments or other impoundments have been built nor are any proposed except similar sedimentation control structures at the facility.~~

~~There are six sedimentation ponds constructed at the Wildcat Loadout Site. The pond locations are shown on Plate 2 and each pond is detailed on Plates 3 through 7. An additional 2-celled pond called the Permanent Impoundment is also constructed. This impoundment is meant to capture only natural drainage from the canyon above.~~

~~All ponds are constructed with proper embankment slopes, each is equipped with a principal and emergency spillway. All ponds are presently adequate for the design runoff from a 10 year - 24 hour precipitation event (or larger).~~

~~The disturbed area draining to the ponds has been divided into a series of sub-drainages designated A through F. Runoff from each of these sub-drainages is directed to the corresponding pond via surface flow paths (ditches) and culverts as shown on Plate 2. One area of disturbance, in the northwest corner of the permit~~

~~area, is an old stockpile area and is a large depression. This area is shown on Plates 1 and 2. The area does not drain and does not receive runoff except for direct precipitation and a small amount of undisturbed runoff from the hillside to the northwest as shown on Plate 2; therefore, it is not included in any of the pond sizing calculations.~~

~~There are seven small areas on the site which do not drain to the sediment ponds. These areas are all equipped with alternate sediment control consisting of straw bales, berms and/or vegetation. The areas are designated ASCA Areas and are shown on Plate 2. Complete descriptions of each of the areas is provided in this chapter.~~

~~All sediment ponds are sized to contain the complete runoff from a 10 year - 24 hour precipitation event. If ponds need to be dewatered, this will be accomplished by a small pump or siphon, in accordance with the discharge permit. The ponds meet a theoretical detention time of at least 24 hours, since they will totally contain runoff from the 10 year - 24 hour event without overflow and any release from the pond is at the discretion of the operator, after a 24 hour settling period. All ponds are covered by a UPDES Discharge Permit.~~

~~Maximum sediment levels for each pond is shown on the corresponding Plates 3 through 7. Each pond will be equipped with a sediment marker (as shown). The marker will consist of a steel rod or pipe painted with a red stripe to delineate the maximum sediment accumulation level in each pond.~~

~~Certifications of the design and construction inspections are provided in Appendix H.~~

~~Ponds will be inspected on a quarterly basis for safety, condition, and operation, and results recorded at the office for inspection.~~

~~All ponds are temporary and will be removed in two phases during final reclamation with the exception of the Permanent Impoundment, shown on Plate 2. During Phase I, Ponds B and E will be removed. This will occur during initial reclamation and revegetation of the property. Ponds A, C, D, and F will remain in place until revegetation standards are reached on the reclaimed site. At that time, during Phase II, all ponds will be removed except for the Permanent Impoundment and the pond areas reclaimed.~~

~~R-69 forms for each of the sediment ponds have been submitted to the State Engineer, as required. Copies of the forms are included in Appendix H of this plan.~~

~~All ponds have been constructed according to the design criteria under "Construction Specifications for Sedimentation Ponds".~~

~~Construction Specifications for Sedimentation Ponds~~

~~The following design criteria were used in the construction of all sedimentation ponds at the Wildcat Loadout. The certifications found in Appendix H reflect these design criteria.~~

~~All construction of sedimentation ponds will be performed under the direction of a qualified registered professional engineer.~~

~~Dams shall be constructed with primary overflows a minimum of two feet from the top, and emergency overflows at least one foot from the top.~~

~~The areas of pond construction shall be examined for topsoil, and where present in removable quantities, such soil shall be removed separately and stored in an approved topsoil storage location.~~

~~In areas where fill is to be placed, natural ground shall be removed for at least 12" below the base of the structure.~~

~~Native materials will be used where practical. Fill will be placed in lifts not to exceed 15" and compacted prior to placement of next lift. Compaction of all fill materials shall be at least 95%.~~

~~Rip-rap or other protection (belting, culverts, etc.) will be placed at all inlets and outlets to prevent scouring. Rip-rap will consist of substantial (non-slaking) rock material of 6" or greater size.~~

~~Each pond shall be fitted with an inverted inlet to the primary overflow, to prevent the passage of oil into the discharge.~~

~~Slopes of the dams shall not be steeper than 2h:1v, inside and outside, with a total of the inslope and outslope not less than 5:1.~~

~~Tops and external slopes of the dams shall be planted with an approved seed mix to prevent erosion and promote stability. Compaction of the slopes shall be at least 95%.~~

~~Top width of dams shall be not less than (H + 35)/5.~~

~~Design Parameters~~

~~Precipitation~~

~~The precipitation - frequency values for the area were taken from "NOAA, Precipitation - Frequency Atlas of the Western U.S., Volume 6".~~

~~Frequency - Duration~~	~~Precipitation~~
~~10 year - 24 hour~~	~~1.85"~~
~~25 year - 24 hour~~	~~2.15"~~
~~100 year - 24 hour~~	~~2.75"~~
~~100 year - 6 hour~~	~~1.91"~~

~~Flow~~

~~Flows for the property were calculated using the SCS-TR55 Method as described on page 114 of "Applied Hydrology and Sedimentology for Disturbed Areas", Barfield, Warner and Haan, 1983. Peak discharge in CSM per inch of runoff was taken from Figure 2.40, page 115 of that same reference.~~

~~Time of concentration of storm events was calculated for each sub-drainage using the following formula:~~

$$t_L \text{ (hrs.)} = \frac{L^{0.8}(S+1)^{0.7}}{1900y^{0.5}} \quad ; \quad t_L = 0.6t_c$$

~~where: t_c = Time of concentration (hrs.)~~
~~t_L = Lag Time (hrs.)~~

~~L = Hydraulic Length of Watershed (ft.)~~
~~y = Average Land Slope (%)~~
~~$S = \frac{1,000}{CN} - 10$~~

~~Estimated Return Periods for Short Duration Precipitation in Utah U.S.U., page 53~~

~~Velocity~~

~~Flow velocities for each sub-drainage were calculated using Manning's Formula:~~

$$V = \frac{1.49}{n} R^{2/3} S^{1/2}$$

~~where: v = Velocity in feet per second~~
~~r = Hydraulic radius in feet~~
~~s = slope in feet per foot~~
~~n = Manning's n, Table 3.1, page 159, "Applied Hydrology and Sedimentology for Disturbed Areas", Barfield, Warner & Haan, 1983.~~

~~Small Drainage Ditches - 0.025*~~
~~Corrugated Metal Pipe - 0.025~~

~~*Based on DOGM recommendation.~~

~~Areas~~

~~All areas were planimetered directly from the Watershed Map, Plates 2 and 15.~~

~~Slopes~~

~~All slopes were measured directly from the topography on the Watershed Map, Plates 2 and 15.~~

~~Runoff~~

~~Runoff was calculated using the SCS formula.~~

$$Q = \frac{(P-0.2S)^2}{P+0.8S}$$

~~where: Q = Runoff in inches~~
~~P = Precipitation in inches~~
~~S = 1,000 - 10~~
~~CN~~
~~CN = Runoff curve number~~

~~note: A runoff curve number of 90 was used for all disturbed areas. This is a conservative number based on the SCS determinations for Runoff Curve Numbers for Antecedent Moisture Condition II. A runoff curve number of 65 was used for undisturbed areas. this number is based on the SCS determinations for Runoff Curve Numbers for Antecedent Moisture Condition II, Soil Group B, Range Land in Fair to Good Condition.~~

~~The selection of the curve number is also based on field observations and subsequent discussions with DOGM personnel.~~

~~The native soil in the area is quite sandy and porous in nature, resulting in a relatively low runoff potential. This was the basis for the selection of SCS Soil Group B.~~

~~The runoff numbers were also checked against the chart in Figure 2.26, page 85, "Applied Hydrology and Sedimentology for Disturbed Areas", Barfield, Warner, and Haan, 1983.~~

~~Sediment Yield~~

~~The Universal Soil Loss Equation (USLE) was used to estimate sediment yield from disturbed areas. All soil loss from disturbed sub-areas was assumed to be delivered to, and deposited in the respective ponds.~~

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

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

~~The variables R, K, LS, and CP are defined as follows:~~

~~Variable "R" is the rainfall factor which can be estimated from $R = 27P^{2.2}$, where P is the 2 year, 6 hour precipitation value. P for the Gordon Creek Area is 0.85 inches as shown on Figure 5.4, page 315, "Applied Hydrology and Sedimentology for Disturbed Areas", Barfield, Warner, and Haan, 1983. Therefore, the estimated value of "R" for this area is 18.88.~~

~~Variable "K" is the soil erodibility factor. For disturbed areas, the "K" value was conservatively estimated to be 0.5. This value is representative of compacted disturbed areas such as roads, embankments, and parking areas.~~

~~Variable "LS" is the length - slope factor. This figure was determined by applying the slope length and percentage for each sub-drainage area to the chart in Figure 5.15, page 334, "Applied Hydrology and Sedimentology for Disturbed Areas", Barfield, Warner, and Haan, 1983.~~

~~Variable "CP" is the control practice factor, which can be divided into a cover and a practice factor. For purposes of these calculations, no cover or control practice was assumed, and therefore, the "CP" factor was used as the maximum value of 1.~~

~~The results of the sediment yield calculations are summarized on Table V-4, Sediment Yield. A unit weight of 100 pounds per cubic foot was used to convert sediment yield to volume capacity requirements. Sediment storage values shown on the Sediment Pond Specification Tables are for a 3-year period.~~

~~Pond Volumes~~

~~All pond volumes shown in the Sediment Pond Specification Tables are from measurements taken directly from the "As Constructed" drawings of the sediment ponds, Plates 3 through 7 and Plate 18. Areas of the top and bottom of the ponds were planimetered, and depths were measured directly.~~

~~The following tables will summarize the drainage areas, sediment yield, and sediment pond specifications. Methods of calculations are detailed in Design Parameters.~~

~~STAGE-VOLUME DATA~~
~~FOR~~
~~DEPRESSION AREA~~

Elevation	Area (ft.^{2})	Volume (ac. ft.)	Accum. Volume (ac. ft.)
6172 (Bottom)	4,500	-	-
6174	46,000	1.16	1.16
6176 (Top)	121,000	3.83	4.99

~~Note: Water would impound to an elevation of 6,178 before actually going over the track area. This would increase the total storage volume by an additional 6.54 acre feet, allowing for an absolute maximum of 11.53 acre feet of storage before discharging. The 6,176 elevation used would not result in damage.~~

~~TABLE V-2~~

~~Drainage Areas/Flow Calculations~~

~~Drainage Area~~	~~Area (acres)~~	~~Length (ft.)~~	~~Elev. Diff. (ft.)~~	~~Slope (%)~~	~~tc (hrs)~~	~~Q (cfs)~~
~~A~~	~~7.85~~	~~800~~	~~38~~	~~4.75~~	~~0.14~~	~~6.96~~
~~B~~	~~2.29~~	~~600~~	~~18~~	~~3.27~~	~~0.14~~	~~2.03~~
~~C~~	~~18.03~~	~~1200~~	~~52~~	~~4.33~~	~~0.21~~	~~15.31~~
~~D~~	~~6.61~~	~~400~~	~~18~~	~~4.50~~	~~0.08~~	~~6.45~~
~~E~~	~~7.69~~	~~1250~~	~~52~~	~~4.16~~	~~0.22~~	~~6.50~~
~~F~~	~~7.50~~	~~1200~~	~~38~~	~~3.17~~	~~0.24~~	~~6.26~~

~~TABLE V-2A~~

~~Post-Mining~~
~~Drainage Areas/Flow Calculations~~

~~Drainage Area~~	~~Area (acres)~~	~~Length (ft.)~~	~~Elev. Diff. (ft.)~~	~~Slope (%)~~	~~tc (hrs)~~	~~Q (cfs)~~
~~A~~	~~10.14~~	~~800~~	~~38~~	~~4.75~~	~~0.14~~	~~14.26~~
~~C~~	~~30.59~~	~~1200~~	~~52~~	~~4.33~~	~~0.21~~	~~37.04~~
~~D~~	~~8.04~~	~~1250~~	~~52~~	~~4.16~~	~~0.22~~	~~9.42~~
~~F~~	~~7.50~~	~~1200~~	~~38~~	~~3.17~~	~~0.24~~	~~8.79~~

~~TABLE V-3~~

~~Runoff Calculations~~

~~Area/Pond~~	~~A~~	~~B~~	~~C~~	~~D~~	~~E~~	~~F~~
~~Drainage Area (ac.)~~						
~~Precipitation~~	~~7.85~~	~~2.29~~	~~18.03~~	~~6.61~~	~~7.69~~	~~7.50~~
~~10 yr.-24 hr. (in.)~~	~~1.85~~	~~1.85~~	~~1.85~~	~~1.85~~	~~1.85~~	~~1.85~~
~~25 yr.-24 hr. (in.)~~	~~2.15~~	~~2.15~~	~~2.15~~	~~2.15~~	~~2.15~~	~~2.15~~
~~100 yr.-24 hr. (in.)~~	~~2.75~~	~~2.75~~	~~2.75~~	~~2.75~~	~~2.75~~	~~2.75~~
~~Runoff CN~~	~~90~~	~~90~~	~~90~~	~~90~~	~~90~~	~~90~~
~~Runoff to Pond.~~						
~~10 yr.-24 hr. (ac. ft.)~~	~~0.654~~	~~0.191~~	~~1.503~~	~~0.551~~	~~0.641~~	~~0.625~~
~~25 yr.-24 hr. (ac. ft.)~~	~~0.820~~	~~0.239~~	~~1.883~~	~~0.690~~	~~0.803~~	~~0.783~~
~~100 yr.-24 hr. (ac. ft.)~~	~~1.143~~	~~0.333~~	~~2.624~~	~~0.962~~	~~1.119~~	~~1.092~~
~~Peak Flow.~~						
~~10 yr.-24 hr. (cfs)~~	~~6.96~~	~~2.03~~	~~15.31~~	~~6.45~~	~~6.50~~	~~6.26~~
~~25 yr.-24 hr. (cfs)~~	~~8.72~~	~~2.54~~	~~19.29~~	~~8.04~~	~~8.20~~	~~7.90~~

~~TABLE V-3A~~

~~Post-Mining~~
~~Runoff Calculations~~

~~Area/Pond~~	~~A~~	~~C~~	~~D~~	~~F~~
~~Drainage Area (ac.)~~	~~10.14~~	~~30.59~~	~~8.04~~	~~7.50~~
~~10 yr. - 24 hr. (in.)~~	~~1.85~~	~~1.85~~	~~1.85~~	~~1.85~~
~~25 yr. - 24 hr. (in.)~~	~~2.15~~	~~2.15~~	~~2.15~~	~~2.15~~
~~Runoff CN~~	~~90~~	~~90~~	~~90~~	~~90~~
~~Runoff to Pond:~~				
~~10 yr. - 24 hr. (ac. ft.)~~	~~0.845~~	~~2.549~~	~~0.670~~	~~0.625~~
~~25 yr. - 24 hr. (ac. ft.)~~	~~1.059~~	~~3.193~~	~~0.839~~	~~0.783~~
~~Peak Flow:~~				
~~10 yr. - 24 hr. (ac. ft.)~~	~~14.26~~	~~37.04~~	~~9.42~~	~~8.79~~
~~25 yr. - 24 hr. (ac. ft.)~~	~~17.11~~	~~44.45~~	~~11.31~~	~~10.93~~

~~TABLE V-4~~

~~Sediment Yield~~

~~Area/Pond~~	~~A~~	~~B~~	~~C~~	~~D~~	~~E~~	~~F~~
~~Area (ac.)~~	~~7.85~~	~~2.29~~	~~18.03~~	~~6.61~~	~~7.69~~	~~7.50~~
~~Length~~	~~800~~	~~600~~	~~1200~~	~~400~~	~~1250~~	~~1200~~
~~Slope (%)~~	~~4.75~~	~~3.27~~	~~4.33~~	~~4.50~~	~~4.16~~	~~3.17~~
~~LS Factor~~	~~1.30~~	~~0.56~~	~~1.30~~	~~0.85~~	~~1.30~~	~~0.60~~
~~Sed. Yield (tons/ac/yr.)~~	~~12.27~~	~~5.29~~	~~12.27~~	~~8.02~~	~~12.27~~	~~5.664~~
~~Unit Weight (lbs./ft.^{3})~~	~~100~~	~~100~~	~~100~~	~~100~~	~~100~~	~~100~~
~~Sed. Yield (ac. ft./yr.)~~	~~0.044~~	~~0.006~~	~~0.102~~	~~0.024~~	~~0.043~~	~~0.019~~
~~Sed. Yield (ac. ft./3 yrs.)~~	~~0.132~~	~~0.018~~	~~0.306~~	~~0.072~~	~~0.129~~	~~0.057~~

~~Note: Calculations based on Universal Soil Loss Equation~~

~~R = 18.88 inches~~

~~K = 0.5~~

~~CP = 1~~

~~TABLE V-4A~~

~~Post-Mining~~
~~Sediment Yield~~

~~Area/Pond~~	~~A~~	~~C~~	~~D~~	~~E~~
~~Area (ac.)~~	~~10.14~~	~~30.59~~	~~8.04~~	~~7.50~~
~~Length (ft.)~~	~~800~~	~~1200~~	~~1250~~	~~1200~~
~~Slope (%)~~	~~4.75~~	~~4.33~~	~~4.16~~	~~3.17~~
~~LS Factor~~	~~1.30~~	~~1.30~~	~~1.20~~	~~0.60~~
~~Sed. Yield (tons/ac./yr.)~~	~~12.27~~	~~12.27~~	~~11.33~~	~~5.664~~
~~Unit Wt. (lbs/ft.^{3})~~	~~100~~	~~100~~	~~100~~	~~100~~
~~Sed. Yield (ac. ft./yr.)~~	~~0.057~~	~~0.172~~	~~0.042~~	~~0.019~~
~~Sed. Yield (ac. ft./3 yrs.)~~	~~0.171~~	~~0.516~~	~~0.126~~	~~0.057~~

~~Note: Calculations based on Universal Soil Loss Equation~~

~~R = 18.88 inches~~

~~K = 0.5~~

~~CP = 1~~

~~TABLE V-5~~

~~Direct Precipitation to Ponds~~

~~Pond~~	~~A~~	~~B~~	~~C~~	~~D~~	~~E~~	~~F~~
~~Precipitation (in.):~~						
~~10 yr.-24 hr.~~	~~1.85~~	~~1.85~~	~~1.85~~	~~1.85~~	~~1.85~~	~~1.85~~
~~25 yr.-24 hr.~~	~~2.15~~	~~2.15~~	~~2.15~~	~~2.15~~	~~2.15~~	~~2.15~~
~~100 yr.-24 hr.~~	~~2.75~~	~~2.75~~	~~2.75~~	~~2.75~~	~~2.75~~	~~2.75~~
~~Surface Area (ac.)~~	~~0.66~~	~~0.13~~	~~0.86~~	~~0.29~~	~~0.17~~	~~0.18~~
~~Precipitation to Ponds (ac. ft.):~~						
~~10 yr.-24 hr.~~	~~0.055~~	~~0.011~~	~~0.072~~	~~0.024~~	~~0.031~~	~~0.015~~
~~25 yr.-24 hr.~~	~~0.069~~	~~0.014~~	~~0.090~~	~~0.030~~	~~0.039~~	~~0.019~~
~~100 yr.-24 hr.~~	~~0.096~~	~~0.019~~	~~0.125~~	~~0.042~~	~~0.055~~	~~0.026~~

~~TABLE V-5A~~

~~Post-Mining~~
~~Direct Precipitation to Ponds~~

~~Pond~~	~~A~~	~~C~~	~~D~~	~~F~~
~~Precipitation (in.):~~				
~~10 yr. - 24 hr.~~	~~1.85~~	~~1.85~~	~~1.85~~	~~1.85~~
~~25 yr. - 24 hr.~~	~~2.15~~	~~2.15~~	~~2.15~~	~~2.15~~
~~Surface Area (ac.)~~	~~0.66~~	~~0.86~~	~~0.29~~	~~0.18~~
~~Precipitation to Ponds (ac. ft.):~~				
~~10 yr. - 24 hr.~~	~~0.055~~	~~0.072~~	~~0.024~~	~~0.015~~
~~25 yr. - 24 hr.~~	~~0.069~~	~~0.090~~	~~0.030~~	~~0.019~~

~~TABLE V-6~~

~~Pond Volume Summary~~
~~(10 year - 24 hour event)~~

~~Pond~~	~~A~~	~~B~~	~~C~~	~~D~~	~~E~~	~~F~~
~~Runoff (ac. ft.)~~	~~0.654~~	~~0.191~~	~~1.503~~	~~0.551~~	~~0.641~~	~~0.625~~
~~Direct Precipitation~~	~~0.055~~	~~0.011~~	~~0.072~~	~~0.024~~	~~0.014~~	~~0.015~~
~~3 yr. Sed. Storage (ac. ft.)~~	~~0.132~~	~~0.018~~	~~0.306~~	~~0.072~~	~~0.129~~	~~0.057~~
~~Required Pond Vol. (ac. ft.)~~	~~0.841~~	~~0.220~~	~~1.881~~	~~0.647~~	~~0.784~~	~~0.697~~
~~Actual Pond Vol. (ac. ft.)~~	~~2.410~~	~~0.310~~	~~4.430~~	~~0.880~~	~~0.849~~	~~0.700~~
~~Excess Capacity (ac. ft.)~~	~~1.569~~	~~0.090~~	~~2.549~~	~~0.233~~	~~0.065~~	~~0.003~~

~~TABLE V-6A~~

~~Post-Mining~~
~~Pond Volume Summary~~
~~(10 year - 24 hour event)~~

~~Pond~~	~~A~~	~~C~~	~~D~~	~~F~~
~~Runoff (ac. ft.)~~	~~0.845~~	~~2.549~~	~~0.670~~	~~0.625~~
~~Direct Precip. (ac. ft.)~~	~~0.055~~	~~0.072~~	~~0.024~~	~~0.015~~
~~3 yr. Sed. Storage (ac. ft.)~~	~~0.171~~	~~0.516~~	~~0.126~~	~~0.057~~
~~Req'd Pond Volume (ac. ft.)~~	~~1.071~~	~~3.137~~	~~0.820~~	~~0.697~~
~~Actual Pond Volume (ac. ft.)~~	~~2.410~~	~~4.430~~	~~0.880~~	~~0.700~~
~~Excess Capacity (ac. ft.)~~	~~1.339~~	~~1.293~~	~~0.060~~	~~0.003~~

~~TABLE V-7~~

~~Pond Specification Summary~~
~~(10 year - 24 hour event)~~

~~Pond~~	~~A~~	~~B~~	~~C~~	~~D~~	~~E~~	~~F~~
~~Drainage Area (ac.)~~	~~7.85~~	~~2.29~~	~~18.03~~	~~6.61~~	~~7.69~~	~~7.50~~
~~Required Volume (ac. ft.)~~	~~0.841~~	~~0.220~~	~~1.881~~	~~0.647~~	~~0.784~~	~~0.697~~
~~Existing Volume (ac. ft.)~~	~~2.410~~	~~0.310~~	~~4.430~~	~~0.880~~	~~0.849~~	~~0.700~~
~~Excess Volume (ac. ft.)~~	~~1.569~~	~~0.090~~	~~2.549~~	~~0.233~~	~~0.065~~	~~0.003~~
~~*Sed. Cleanout Level (ft.)~~	~~2.50~~	~~0.75~~	~~3.50~~	~~1.25~~	~~0.50~~	~~0.50~~
~~Embankment Slopes (%):~~						
~~Inside~~	~~3:1~~	~~5:1~~	~~3:1~~	~~3:1~~	~~3:1~~	~~2:1~~
~~Outside~~	~~2:1~~	~~2:1~~	~~2:1~~	~~2:1~~	~~2:1~~	~~3:1~~
~~Overflow Structures:~~						
~~Principal~~	~~18"cmp~~	~~12"cmp~~	~~18"cmp~~	~~18"cmp~~	~~18"cmp~~	~~12" cmp~~
~~Emergency~~	~~1'x 4'~~	~~1'x 4'~~	~~18"cmp~~	~~18"cmp~~	~~1'x 4'~~	~~1'x 4'~~

~~* Sediment Cleanout Levels are based on 60% of sediment storage for 3 years plus excess pond volume~~

~~NOTE: In the event any of the ponds or the impoundment need to be decanted, Andalex will provide pumps.~~

~~TABLE V-7A~~

~~Permanent Impoundment~~

~~*Drainage Area~~	~~86.32 acres~~
~~10 year - 24 hour event~~	~~1.85 inches~~
~~100 year - 6 hour event~~	~~1.91 inches~~
~~Runoff Curve Number~~	~~65~~
~~Required Pond Volume (10/24)~~	~~0.70 ac. ft.~~
~~Required Pond Volume (100/6)~~	~~0.81 ac. ft.~~
~~** Upper Cell Volume~~	~~0.43 ac. ft.~~
~~** Lower Cell Volume~~	~~0.53 ac. ft.~~
~~Total Storage Volume~~	~~0.96 ac. ft.~~

~~NOTE: Ponds are adequate for the 10 year - 24 hour event and the 100 year - 6 hour event.~~

~~* Planimetered from Plate 15~~
~~** Planimetered from Plate 18~~

~~TABLE V-7B~~

~~Permanent Impoundment~~
~~Overflow Structures~~

	~~Upper Cell~~		
~~Structure~~	~~Primary 18" CMP~~	~~Emergency 18" CMP~~	~~Lower Cell Emergency Overflow~~
~~Drainage Area~~	~~86.32~~	~~86.32~~	~~86.32~~
~~10 yr.-24 hr. event (in.)~~	~~1.85~~	~~---~~	~~1.85~~
~~100 yr.-6 hr. event (in.)~~	~~---~~	~~1.91~~	~~1.91~~
~~Time of Conc. (hrs.)~~	~~0.50~~	~~0.50~~	~~0.50~~
~~Runoff Curve Number~~	~~65~~	~~65~~	~~65~~
~~Structure Slope (%)~~	~~5.00~~	~~5.00~~	~~4.00~~
~~Peak Flow (10/24)~~	~~6.67~~	~~---~~	~~6.67~~
~~Peak Flow (100/6)~~	~~---~~	~~7.70~~	~~7.70~~
~~Min. Structure Area (ft^2)~~	~~1.77~~	~~1.77~~	~~4.50~~
~~Req'd Area (10/24)~~	~~0.80~~	~~---~~	~~1.74~~
~~Req'd Area (100/6)~~	~~---~~	~~0.92~~	~~1.92~~
~~Velocity (fps)~~	~~8.34~~	~~8.37~~	~~4.02~~
~~Rip-Rap Req'd (Y/N)~~	~~Y~~	~~Y~~	~~N~~
~~* Rip-Rap D_{50}~~	~~Belting~~	~~Belting~~	~~6"~~

~~* Rip-Rap D_{50} based on Figure V-4.~~

~~Depression Area:~~

~~This area is located below the 2-celled Permanent Impoundment, between the Permanent Impoundment and the railroad tracks. The area receives a very small amount of water from direct precipitation, and would otherwise receive larger amounts of water only through overflow or failure of the Permanent Impoundment. Calculations show the Depression Area to have a capacity of 4.99 acre feet at an elevation 2' below the tracks - this is 616% of the capacity of the Permanent Impoundment requirements for a 100 year - 6 hour storm event. The Depression Area, however, does not have an overflow, therefore, the following monitoring and de-watering plan is proposed in the unlikely event of significant water accumulation.~~

~~(1) Monitoring - A steel post will be set at the low point of the depression area. This post will be marked at an elevation of 2' above ground level. This elevation will mark the point at which the area will be dewatered.~~

~~(2) Dewatering - If water should accumulate to the mark on the monitoring post, the area will be dewatered using the pump system approved for decanting the sediment ponds on the property.~~

~~Diversion Structures~~

~~Flow within the disturbed area is diverted to the ponds by the use of ditches and culverts. These are temporary structures and will be removed on final reclamation of the site. Undisturbed drainage runoff is diverted around the site by existing channels as shown on Plate 2. These existing channels are permanent and will not be disturbed nor reclaimed during the life of this facility. Since Andalex does not intend to re-establish the drainage through the facility and under the railroad tracks upon final reclamation, these channels will remain after final reclamation.~~

~~Undisturbed Diversions~~

~~UD-1 - Undisturbed runoff from the west of the property is captured by a pre-existing diversion and conveyed to the south and east into the Garley Canyon Drainage. This diversion is shown on Plate 2 as UD-1. The natural drainage into which it drains is designated ND-2. This is a natural drainage and will not be maintained, disturbed, or reclaimed in connection with this operation. A typical section of UD-1 is shown in Figure V-1. This diversion was installed by a previous operator and is meant to replace the original channel through the area, which was rendered useless by the height of the Utah Railway grade. UD-1 intercepts undisturbed runoff from approximately 10.29 acres. This will become a permanent diversion, and as shown on Plate 15 and on Table V-12, will be capable of carrying runoff from a 100 year-6 hour event from this area. Andalex Resources, Inc. will maintain this diversion at the minimum cross-sectional area shown on Figure V-1.~~

~~It was previously proposed to extend UD-1 some 650 feet up the canyon to intercept the majority of the drainage, but during construction, it was determined not feasible due to topography, slope requirements and environmental destruction. The diversion has been pulled back to its original location, and the construction disturbance is being reclaimed.~~

~~Upper Diversion - The farthest reach of the previous UD-1 extension intercepted a small natural drainage coming off the rim of the small canyon. To re-establish the drainage pattern, a berm will be constructed as recommended by the Division. The berm will be 4 feet high with a top width of 2 feet, 2:1 side slopes, and will utilize existing available riprap material on the upstream face. In addition, Andalex will commit to the use of additional erosion control measures approved by the Division if erosion becomes apparent on the upstream face of the berm. Details of the berm design are shown on Figure IV-1A. Upon completion of the berm, any areas disturbed by the construction~~

~~will be regraded and seeded according to the approved plan.~~

~~Lower Diversion - The mid-section of the previous UD-1 extension also blocked a natural drainage ditch. To re-establish the natural drainage pattern, the channel will be reconstructed through the blocked drainage ditch, as recommended by the Division. The channel will be 2 feet deep, 2 feet wide and will have side slopes of 2:1. Details of this channel design are shown on Figure IV-1B. Upon completion of the channel construction, any disturbance will be regraded, and the area will be reseeded according to the approved plan in the MRP.~~

~~Figure V-1~~
~~Undisturbed Diversion UD-1~~

~~Figure V-1A~~
~~Berm Details for Upper Diversion~~

~~Figure V-1B~~
~~Channel Details for Lower Diversion~~

~~Figure V-1C~~
~~Disturbed Flow Ditch~~
~~Typical Section~~

~~It is proposed to leave UD-1 as a permanent diversion for the following reasons:~~

1. ~~The diversion has been in place for more than five years without any sign of failure or overflow;~~

2. ~~The diversion was installed by others and is necessitated by the height of the Utah Railway grade to the east;~~

3. ~~The original drainage, if restored, would drain into a large depression carved out for previous coal storage;~~

4. ~~To restore the original channel would require a massive amount of non-available fill material, the installation of a large culvert beneath the Utah Railway, and a restored channel through the middle of the reclaimed loadout area;~~

5. ~~The proposed, post-mining diversion is adequately sized to convey the runoff from a 100 year - 6 hour and even a 100 year - 24 hour precipitation event.~~

~~Permanent Impoundment - The permanent impoundment shown on Plate 2 is a 2-celled structure that catches most of the main canyon drainage from the west. The upper cell is a vegetated basin constructed by a previous owner. Upon surveying the upper cell, it was determined to be inadequate to contain runoff from a 100 year - 6 hour event for the area; therefore, a second, lower cell was constructed in the fall of 1991. The structures were resurveyed after completion, and now have adequate capacity (0.96 acre feet) to fully contain the runoff from a 100 year - 6 hour event (0.81 acre feet).~~

~~The upper cell is fitted with two 18" cmp overflows, one for primary overflow and one for emergency overflow. These culverts pass beneath the road between the cells and discharge into the lower cell via erosion - protected channels. The lower cell is equipped with an adequately sized open-notch overflow, protected by rip-rap. This overflow is for emergency purposes only, and will be used only for discharge of runoff beyond the design event (100 year - 6 hour). Details of the "As-Constructed" Permanent Impoundment are shown on Plate 18. Volume calculations and requirements are summarized on Tables V-7A and V-7B.~~

~~Upon final reclamation of the area, the two 18" cmp culverts between cells will be replaced by an open-notch overflow of the same size and design of that existing in the lower cell. The area will be reseeded according to the approved methodology and specifications in the MRP. The 2-celled pond will then be left~~

~~inplace as a permanent feature and allowed to go through natural succession. The upper cell of the impoundment has been inplace since approximately 1971, and has never overflowed or breached since that time. The lower cell will simply add to that level of protection. Leaving the impoundment inplace will provide for wildlife enhancement as well as runoff protection, through the establishment of a permanent waterhole to capture runoff.~~

~~The permanent impoundment will meet the requirements of R645-301-552.200 to allow authorization by the Division, based on the following:~~

1. ~~The quality of the water will be suitable for wildlife watering, since it will contain only natural runoff;~~

2. ~~The level of water will vary directly with runoff events, evaporation, and usage;~~

3. ~~The impoundment will be in an area of controlled public access; however, the area will not be restricted to wildlife use;~~

4. ~~No diminution of water quality or quantity is expected from this impoundment - it will be strictly runoff water, which has been captured in this impoundment for many years prior to the filing of this permit;~~

5. ~~The impoundment does not meet the criteria or size of MSHA 30 CFR 77.216 (a);~~

6. ~~The size of the impoundment is adequate for wildlife watering;~~

7. ~~The impoundment has been, and will continue to be, suitable for the post-mining land use, which is wildlife watering;~~

8. ~~Perimeter slopes are stable and do not exceed 2v:1h. Slopes are vegetated, as is the inlet area for erosion protection;~~

9. ~~The impoundment is mostly incised, and does not have outlet structures; however, no discharge is expected since the pond is well oversized for a 100 year - 6 hour event (See Table V-7A).~~

10. ~~The impoundment shall be maintained as necessary during the mining operation;~~

11. ~~The impoundment design and construction is certified by~~

~~a registered, professional engineer.~~

~~ND-1 - Undisturbed runoff from the north and east is diverted through an existing drainage south of the main Gordon Creek Road. This is also a pre-existing drainage; however, this drainage is considered "natural", having been in existance for more than 20 years. The drainage shows signs of active erosion, typical of other natural drainages in this area; however, the source of the erosive flows is completely out of the area disturbed by the Wildcat Loadout. The drainage is ephemeral and flows southeast into the Garley Canyon Drainage (which shows similar signs of erosion from natural forces). This drainage is shown on Plate 2 as ND-2 (Natural Drainage 2). There are no plans to disturb, maintain, or reclaim these drainages in connection with this operation. The drainage ND-1 does pass through a culvert beneath the haul road. This culvert will be maintained and removed during reclamation, and the culvert area restored to natural conditions.~~

~~Upon final reclamation (Phase II) culverts C-33 and C-34 will be removed, and the drainage channels restored. Since both culverts are on undisturbed or natural drainage channels, it is proposed to establish a compatible channel dimension at the time of reclamation, since the channels will likely change in the interim. At the initiation of Phase I Reclamation, a typical cross section of the undisturbed diversion (UD-2) and natural channel (ND-1) will be established for 100' above and below the culverts. The restored channels will then be constructed (during Phase II) using the average dimension and area of the cross-sections as a minimum. Peak flows and velocities for the reconstructed drainages shall be those from Table IV-9A for culverts C-33 and C-34. The velocities indicate the expected flows to be marginally erosive; however, rip-rap protection will be provided through the area of reconstruction as described on Table V-14.~~

~~UD-2 - Drainage from the Beaver Creek property to the west is collected in a ditch on their property, conveyed to the north and then west beneath their access road and the railroad. This drainage then goes through access road culvert C-33 and into the natural drainage ND-1, as shown on Plate 2. This drainage is from areas outside the control of Andalex, and is therefore considered undisturbed; however, Andalex will maintain culvert C-33 to ensure proper operation and protection of its access road. Beaver Creek has reconstructed the ditch and culverts on its property, and is expected to be responsible for maintenance of those structures.~~

~~Undisturbed Diversion UD-2 will convey drainage from a portion of Small Area Exemption 1 as shown on Plate 2. This drainage is~~

~~also from a portion of the Beaver Creek property which is unused and to which Beaver Creek has granted Andalex the right of use (see letter of agreement in Appendix B). This area drains approximately 2.30 acres through three culverts and also empties into access road culvert C-33 and to ND-1. Andalex has included this diversion within its permit boundary and agrees to maintain the culverts C-30, C-31, C-32 (and C-33), along with the diversion to provide for design flows as shown on Tables V-9A and V-12. Erosive protection will be provided for culvert C-33 as per specifications in Table V-14. Unless the B.L.M. and Utah Railway prefer a different scenario, the diversion will be left in place upon final reclamation.~~

~~The diversion will be maintained to the minimum cross-sectional area shown on Table V-12; however, shape and configuration may vary due to maintenance, regrading, etc.~~

~~UD-3 through UD-7 - The undisturbed diversions UD-3 through UD-7 are shown on Plate 2. These "diversions" are primarily natural drainage areas into which the various sediment ponds would discharge. The diversions are out of the area of operation and disturbance; however, since they may convey drainage from the site, they are considered diversions to the permit boundary.~~

~~There are no plans to disturb these diversions; however, Andalex will maintain the diversions to the extent necessary to assure they have required minimum flow areas and to prevent erosion. The diversions will be restored if necessary during final reclamation, when the sediment ponds are removed. The diversions may vary in size, depth, and configuration; however, they will be maintained to the minimum cross-sectional areas shown on Table V-12.~~

~~Diversions UD-3 and UD-4 have potentially erosive velocities as shown on Table V-12; therefore, these diversions will be fitted with rip-rap erosion protection according to the specifications on Table V-14.~~

~~Rip-rap size is based on velocities in Table V-12 and the rip-rap chart in Figure V-4. See Figure V-2A for typical section.~~

~~UD-8 - Undisturbed diversion UD-8 as shown on Plate 2 is a small diversion to carry natural runoff from the hillside to the northwest into the depression area. This diversion will be maintained to the minimum cross-sectional area shown on Table V-12. The depression area does not drain; however, it is more than adequate in size to contain runoff from this diversion and drainage area.~~

~~Culverts~~

~~There are 20 culverts located on the Wildcat Loadout Facility for drainage control. In addition, each pond uses culverts for principal spillways and two for emergency spillways. All culverts are shown on Plate 2, each is listed by number designation and size. The culverts, along with flow characteristics and sizing requirements, are summarized on the following tables, V-8 and V-9 Culvert Specifications. All culverts within a given drainage area are sized in accordance with the maximum peak flow calculated for that area. In addition, culverts noted for pond outlets are sized for peak flows from the respective drainage areas.~~

~~Culvert flow capabilities are based on the "Culvert Nomograph", Figure V-2.~~

~~Erosion protection requirements are discussed on Tables V-8 and V-9 and in this section under "Erosion Protection".~~

~~TABLE V-8~~

~~Drainage Culvert Specifications~~

~~Culvert~~	~~Size (in.)~~	~~Drainage Area~~	~~Design Flow (cfs)~~	~~[1]Capacity Flow (cfs)~~	~~[2]Velocity (fps)~~	~~[5]Erosion Protec. (y/n)~~
~~C1~~	~~18~~	~~E~~	~~4.66~~	~~9.00~~	~~3.12~~	~~N~~
~~C2~~	~~24~~	~~E~~	~~4.66~~	~~18.00~~	~~1.76~~	~~N~~
~~C3~~	~~24~~	~~C~~	~~5.64~~	~~18.00~~	~~1.80~~	~~[3]Y~~
~~C4~~	~~24~~	~~C~~	~~5.64~~	~~18.00~~	~~3.59~~	~~N~~
~~C4A~~	~~24~~	~~C~~	~~5.64~~	~~18.00~~	~~3.59~~	~~N~~
~~C4B~~	~~24~~	~~C~~	~~11.27~~	~~18.00~~	~~3.59~~	~~N~~
~~C5~~	~~12~~	~~C~~	~~2.82~~	~~3.20~~	~~3.59~~	~~N~~
~~C5A~~	~~12~~	~~C~~	~~2.82~~	~~3.20~~	~~3.59~~	~~N~~
~~C6~~	~~15~~	~~C~~	~~5.64~~	~~5.50~~	~~4.59~~	~~[3]Y(cmp)~~
~~C7~~	~~15~~	~~A~~	~~2.75~~	~~5.50~~	~~2.36~~	~~[3]Y(rock)~~
~~C7A~~	~~12~~	~~A~~	~~2.75~~	~~3.20~~	~~3.50~~	~~N~~
~~C8~~	~~12~~	~~A~~	~~2.75~~	~~3.20~~	~~3.50~~	~~N~~
~~C9A~~	~~15~~	~~A~~	~~4.43~~	~~5.50~~	~~3.80~~	~~N(belt)~~
~~C10~~	~~12~~	~~B~~	~~3.22~~	~~3.20~~	~~4.10~~	~~N~~
~~C11~~	~~18~~	~~C~~	~~7.51~~	~~9.00~~	~~4.24~~	~~N~~
~~C12~~	~~18~~	~~E~~	~~4.66~~	~~9.00~~	~~2.63~~	~~N~~
~~C24~~	~~15~~	~~E~~	~~4.66~~	~~5.50~~	~~3.79~~	~~N~~
~~C25~~	~~15~~	~~E~~	~~4.66~~	~~5.50~~	~~3.79~~	~~N~~
~~C26~~	~~12~~	~~E~~	~~2.33~~	~~3.20~~	~~2.97~~	~~N~~
~~C27~~	~~12~~	~~A~~	~~2.75~~	~~3.20~~	~~3.50~~	~~N~~

~~[1]Based on a minimum of H/D = 1.5 (See Figure V-2)~~
~~[2]Velocity based on Q = AV~~
~~Culverts on 3% Slope (minimum)~~
~~[3]Rip-rap protection provided or required~~
~~[5]Erosion protection may prove to be required at any or all locations. Outfalls will be checked for erosion and protection provided as needed. A "Y" on Erosion Protection means protection will be provided "as necessary", to be determined by field inspections.~~

~~TABLE V-8 (con't)~~

~~Additional Notes~~

~~[6]Flow in culvert C 4b is controlled by inlet conditions. The culvert is 400 feet long, and will be fitted with a trash rack at the inlet. The rack will consist of a steel frame 30" x 30" with 3/4" rebar (or steel rods) welded vertically on 4" centers.~~

~~TABLE V-9~~

~~Pond Culvert Specifications~~

Culvert	Size (in.)	Pond	Design Flow (cfs)	[1]Capacity Flow (cfs)	[2]Velocity (fps)	[3]Erosion Protection (y/n)
C13	18	A	6.96	11.00	3.94	Y
C14	12	B	2.93	4.00	2.59	Y
C15	18	C	15.31	11.33	8.66	Y
C16	18	C	19.29	22.00	10.92	Y
C17	18	D	6.45	11.00	3.65	Y
C18	18	D	8.04	22.00	4.55	Y
C19	18	E	6.50	11.00	3.68	Y
C20	18	F	6.26	*6.30	7.47	Y

~~[1]Based on headwater depth H/D = 2.0 (See Figure IV-2)~~

~~[2]Based on V = Q/A~~
~~Culverts on 3% Slope (minimum)~~

~~[3]Y on Erosion Protection means protection will be provided "as necessary", to be determined by field inspections.~~

~~*Based on H/D=4.0; adequate headwater depth available.~~

~~TABLE V-9A~~

~~Access Road and UD-2 Culverts~~

Culvert	Size (in.)	Drainage	Design Flow (cfs)	**** Capacity Flow (cfs)	***Velocity (fps)	Erosion Prot. (y/n)
C-30	15	UD-2	0.67	5.51	3.49	N
C-31	12	UD-2	0.67	3.20	0.85	N
C-32	24	UD-2	0.67	18.00	0.21	N
C-32A	12	UD-2	0.67	3.20	0.85	N
* C-33	24	UD-2	8.76	18.00	6.95	Y
**C-34	36	ND-1	32.39	48.50	4.58	N

~~* Access Road Culvert - Includes drainage from UD-2 and 44.5 acres from Beaver Creek Property.~~

~~** Access (Haul) Road Culvert - Runoff area planimetered from Plate 15.~~

~~*** Based on V = Q/A~~

~~**** 1.5 foot minimum headwall~~

~~NOTE: Y on Erosion Protection means protection will be provided "as necessary", to be determined by field inspections.~~

~~Figure V-2~~
~~Culvert Nomograph~~

~~Figure V-2A~~
~~Sediment Pond Outlet Protection~~

~~Figure V-2B~~

~~Typical Section of Emergency Spillways~~

~~Disturbed Flow Ditches~~

~~Disturbed area runoff is diverted to the ponds through a series of ditches and culverts as shown on Plate 2. The disturbed flow ditches are designated as D-1, D-2, ..., and the culverts are noted as C1, C2, ... The disturbed flow ditches will vary in depth and configuration; however, all ditches will be maintained at the minimum cross-sectional area shown on Table V-13, "Disturbed Flow Ditch Summary". A typical section of the Disturbed Flow Ditches is shown in Figure V-1C. As shown on Table V-13, most velocities are expected to be less than 5 fps, with the majority less than 4 fps. These velocities are considered moderately erosive, and as a result, erosion protection may prove to be necessary. Andalex will continue to observe potential erosion locations throughout the life of the loadout. Where erosion has become evident as demonstrated by observation, energy dissipators have been installed and erosion protection has been installed to reduce flow velocities, as discussed under Section 5 "Erosion Control" below.~~

~~To date energy dissipators have consisted of straw bales, spaced adequately to help control the erosion. More permanent energy dissipators are not proposed for the disturbed area ditches, due to the frequency of cleaning and regrading ditches.~~

~~Disturbed area diversions are designed, constructed, and maintained to prevent additional contributions of suspended solids to streamflow and to runoff outside the permit area. Appropriate gradients and energy dissipators as required, will be used to control sediment contributions. All diversions will be maintained with a minimum freeboard of at least 0.3 feet. Excess or cleaned material shall be disposed of in an approved refuse disposal area with material cleaned from the sediment ponds.~~

~~It should be noted that the junction of drainages to Ponds A, B, and C, shown on Plate 2, represent the "worst case" scenario for drainages to these points from this area. This is a coal pad area, and is in a constant state of change - as a result, drainage patterns within the pad are subject to frequent change. Temporary ditches, such as the one recently placed in the Pond B drainage, may be placed to direct runoff over the short-term, however, such ditches are only temporary and are likely to be changed or eliminated with changes in the pile.~~

~~One ditch, designated D-17, is located adjacent to the waste coal area, and will carry the runoff from this area to Pond F. Under the new regulations, this ditch must be sized to carry runoff from a 100 year - 6 hour event, therefore, the calculations on Table V-13 reflect the 100 year - 6 hour design for this ditch only. The calculated runoff is based on a 100 year - 6 year~~

~~event of 1.91", a CN of 90 and an area of 1.47 acres for the refuse/waste coal area.~~

~~All ditches are shown on Plate 2.~~

~~Erosion Control~~

~~The majority of calculated velocities of culverts and ditches fall between 3 and 5 fps. Although it has been common practice to consider flows less than 5 fps as non-erosive, the Division has recommended that 3 fps be used on this site as the limit for non-erosive flow. Andalex will therefore commit to the following.~~

~~Constant observation of all ditches and in particular those which may have an erosive flow will be made periodically as well as following precipitation events to determine whether excessive erosion has occurred. Those ditches which may have an erosive flow according to the calculations are noted below.~~

~~Ditch D-3~~	~~Near Pond D Inlet~~
~~Ditch D-7~~	~~Near Pond C Inlet~~
~~Ditch D-9~~	~~Mid-Point~~
~~Ditch D-11~~	~~Upper Portion of Ditch~~
~~Ditch D-13~~	~~Mid-Point~~
~~Ditch D-14~~	~~Mid-Point~~
~~Ditch D-17~~	~~Upper Portion of Ditch~~

~~Observations of these ditches were made periodically and following precipitation events. It was determined that erosion was going to be a constant problem in many of these ditches due to the nature of the soil material at Wildcat. Therefore, where erosion was consistently observed, the ditches were lined either with conveyor belt or half-round culvert. The following specific actions were taken after these observations were made. Diversion D-3 has shown erosion at the sedimentation pond inlet and therefore 24" half round culvert has been installed. Diversion D-7 has also shown erosion at the Sediment Pond C inlet and therefore 24" half round culvert has been installed. Erosion has not been noted in Diversion D-9; in fact, Diversion D-9 has to be regularly cleaned out. Similarly Diversion D-11 must be periodically cleaned; erosion has not been observed. Erosion has also not been observed in Diversion D-13 except at the inlet to Sediment Pond A where the inlet culverts now spill onto conveyor belting. Diversion D-14 is also periodically cleaned; erosion has not been noted. The same note may be made on D-14 regarding the Sediment Pond A inlet. Diversion D-17 is periodically cleaned; the erosion which was noted is at the inlet to Sediment Pond F where 24" half round culvert has been installed. Plate 2 reflects all of these installations. It should also be noted~~

~~that in addition to those ditches mentioned above, all pond inlets are equipped with erosion control. Also, Diversion D-1 has been lined entirely with 24" half round culvert. Diversion UD-1 near SAE 4 is equipped with 24" half round on one particularly steep slope. None of the other diversions have erosion problems but are cleaned periodically.~~

~~In addition, erosion protection is already in place at various culvert outlets and on disturbed ditch D-1 (see Plate 2). Rip-rap protection and specifications are summarized in Table V-14.~~

~~Erosion protection on diversions may consist of the following:~~

~~1. Rip-rap~~
~~a. Installed per Table V-14.~~

~~2. Half-round culverts or full culverts.~~
~~(See Plate 2)~~

~~3. Velocity Controls~~
~~a. Straw Bales~~

~~4. Revegetation~~

~~5. Other proven or approved structures.~~
~~a. Upon consultation with the Division.~~

~~Erosion protection is also provided at all pond emergency spillways as shown in Figure V-2B.~~

~~Inlets on Pond F (Plate 7) are equipped with conveyor belting below the half round culverts to aid in erosion protection.~~

~~The main form of erosion control used on the property in addition to half round culvert is revegetation. All topsoil piles, sediment pond embankments, and other disturbed areas no longer needed for the operation have been reseeded using an interim seed mix for this site.~~

~~Effects of Operation on Surface Water~~

~~Since this is a surface processing and loadout operation, no mining or extraction will be done at this site; therefore, the only effects from this operation on surface water would be from disturbed area runoff. The control plans described earlier in this chapter are designed to direct and control runoff and to prevent erosion as required by regulation. Adequate maintenance of these facilities will ensure proper operation and minimize effects on surface water.~~

~~Since the area on which the loadout facility is located was previously disturbed by another lessee, the implementation of approved drainage controls will likely have a positive effect on the quality of surface water within and below the permit area.~~

~~Mitigation and Control Plans~~

~~The permit area and adjacent area contain no renewable groundwater or surface water resources; therefore, water right protection or mitigation measures are not anticipated to be required at this operation. The sediment control structures are adequate to prevent impacts to the hydrologic regime. These structures will be maintained to function as designed for the life of the operation. Failure or malfunction of any of the control structures will be corrected as soon as practicable after discovery and any adverse impacts (erosion, structure damage, etc.) will be repaired as soon as practicable thereafter.~~

Water Monitoring Plans (Also R645-301-722.300, 723, 724, 731.200)

Four surface water monitoring stations will be established as shown on Plate 15. Two of the stations will be located in undisturbed drainage above the site and two stations will be in the same drainages below the site. This configuration will show any affects of the operation on the drainage of the area.

Since this is a new permit and no baseline data has been gathered, the stations will be monitored according to the Baseline Criteria (parameters and frequency) listed in Table V-10, "Surface Water Baseline and Operational Water Quality Parameter List", for the first two years. After that time, the stations will be monitored according to the parameter and frequency requirements of the operational portion of Table V-10. Reclamation monitoring will also follow the requirements of the Postmining portion of Table V-11.

Water monitoring stations will be designated as WCW-1 through WCW-4 for surface monitoring points. In addition, each pond discharge will be monitored according to N.P.D.E.S. requirements. These station numbers will be designated WCW-A through WCW-F for Ponds A through F respectively (see Plates 2A and 15).

Monitoring results will be submitted to the Division quarterly, within sixty days following the end of the reporting quarter.

Samples will be collected during or shortly after precipitation events to establish baseline parameters.

Baseline monitoring will consist of eight samples analyzed for

the baseline chemical parameters on Table IV-10 (four per annum, collected quarterly during precipitation events). A rain gauge will also be installed at the site, and a log of precipitation events will be maintained on site.

It should be noted that Andalex and its designated laboratory will follow the "Standard Methods for the Examination of Water and Wastewater" for all of the above water samples.

TABLE V-10

Surface Water Baseline and Operational
Water Quality Parameter List

Field Measurements:

* - Water Levels or Flow
* - pH
* - Specific Conductivity (umhos/cm)
* - Temperature (C°)

Laboratory Measurements: (mg/1) IONS AND METALS ANALYSES ARE DISSOLVED, EXCEPT AS NOTED

* - Total Settleable Solids
* - Total Suspended Solids
* - Total Dissolved Solids
* - Total Hardness (as $CaCO_3$)
* - Acidity
- Aluminum (A1)
- Arsenic (As)
- Barium (Ba)
- Boron (B)
* - Carbonate (CO_3^{-2})
* - Bicarbonate ($HCO_3^{-)}$
- Cadmium (Cd)
* - Calcium (Ca)
* - Chloride ($C1^{-)}$
- Chromium (Cr)
- Copper (Cu)
- Fluoride ($F^{-)}$
* - Iron (FE) (TOTAL)
* - Iron (Fe) (DISSOLVED)
- Lead (Pb)
* - Magnesium (Mg)
* - Manganese (Mn) (Total)
* - MANGANESE (MN) (Dissolved)
- Mercury (Hg)
- Molybdenum (Mo)
- Nickel (Ni)
- Nitrogen: Ammonia (NH_3)
- Nitrate ($NO_3^{-)}$
- Nitrite (NO_2)
* - Potassium (K)
- Phosphate (PO_4^{-3})
- Selenium (Se)
* - Sodium (Na)
* - Sulfate (SO_4^{-2})
- Sulfide ($S^{-)}$

	-	Zinc (Zn)
*	-	Oil and Grease
*	-	Cation-Anion Balance

-Baseline *Operational

TABLE V-11

Surface Water Sampling

	Baseline	Operational	Postmining
Type of Sampling Site	Surface Water Bodies	Surface Water Bodies	Surface Water Bodies
Field Measurements (See Table V-10)	Performed during water level/flow measurements	Performed during water level/flow measurements	Performed during water level/flow measurements
Sample Frequency	Quarterly for lakes, reservoirs, and impoundments (water level and quality); monthly flow measurements and quarterly water quality measurements (one sample at low flow and high flow each) for perennial streams. Monthly flow and water quality measurements during period of flow for intermittent streams. Sampling for ephemeral streams determined at predesign conference.	Quarterly for lakes, reservoirs, and impoundments (water level and quality); monthly flow measurements and quarterly water quality measurements (one sample at low flow and high flow each) for perennial streams. Monthly flow and water quality measurements during period of flow for intermittent streams. Sampling for ephemeral streams determined at predesign conference.	Two per annum for perennial streams (high & low flow); two per annum during snowmelt and rainfall for intermittent streams.

TABLE V-11 (con't)

Surface Water Sampling

	Baseline	Operational	Postmining
Sampling Duration	Two years (one complete year of data before submission of PAP.	Yearly until two years after surface reclamation activities have ceased.	Until termination of bonding.
Type of Data Collected & Reported	Flow and/or water levels and water quality.	Flow and/or water levels and water quality.	Flow and/or water levels and water quality per operational parameters.
Comments	All field measurements should be performed concurrently with water level/flow measurements.	All field measurements should be performed concurrently with water level/flow measurements.	All field measurements should be performed concurrently with water level/flow measurements.
Comments		For every fifth year preceding re-permitting, one sample at low flow and and high flow each should be taken for base-line water quality parameters.	

~~TABLE V-12~~

~~Undisturbed Diversion Summary~~

~~Structure~~	~~UD-1 (Overall)~~	~~**UD-1 (Near Pond F)~~	~~UD-2~~	~~*UD-3~~	~~*UD-4~~
~~Drainage Area (ac.)~~	~~10.29~~	~~10.29~~	~~2.30~~	~~6.61~~	~~18.03~~
~~10 yr.-24 hr. event (in.)~~	~~1.85~~	~~1.85~~	~~1.85~~	~~1.85~~	~~1.85~~
~~25 yr.-24 hr. event (in.)~~	~~2.15~~	~~2.15~~	~~2.15~~	~~2.15~~	~~2.15~~
~~100 yr.-24 hr. event (in.)~~	~~2.75~~	~~2.75~~	~~2.75~~	~~2.75~~	~~2.75~~
~~Time of Conc. (hrs.)~~	~~0.10~~	~~0.10~~	~~0.13~~	~~-~~	~~-~~
~~Curve Number~~	~~65~~	~~65~~	~~65~~	~~-~~	~~-~~
~~Manning's Number~~	~~.025~~	~~.032~~	~~.025~~	~~.025~~	~~.025~~
~~Ditch Slope (%)~~	~~4.00~~	~~7.00~~	~~6.67~~	~~13.85~~	~~12.86~~
~~Peak Flow/10 (cfs)~~	~~1.45~~	~~1.45~~	~~0.67~~	~~10.33~~	~~22.54~~
~~Peak Flow/25 (cfs)~~	~~3.05~~	~~3.05~~	~~1.00~~	~~12.84~~	~~28.02~~
~~Peak Flow/100 (cfs)~~	~~6.43~~	~~6.43~~	~~1.83~~	~~N/A~~	~~N/A~~
~~Min. Str. Area (ft.^{2})~~	~~4.00~~	~~4.00~~	~~1.00~~	~~2.00~~	~~3.75~~
~~Req'd Area/10 (ft.^{2})~~	~~0.37~~	~~0.19~~	~~0.16~~	~~0.94~~	~~1.71~~
~~Req'd Area/25 (ft.^{2})~~	~~0.65~~	~~0.63~~	~~0.21~~	~~1.10~~	~~2.02~~
~~Req'd Area/100 (ft.^{2})~~	~~1.13~~	~~1.10~~	~~0.34~~	~~N/A~~	~~N/A~~
~~Velocity (fps)~~	~~3.92~~	~~4.02~~	~~4.24~~	~~11.04~~	~~13.15~~
~~Hydraulic Length (ft.)~~	~~1600~~	~~-~~	~~400~~	~~N/A~~	~~N/A~~
~~Elev. Diff. (ft.)~~	~~64~~	~~-~~	~~16~~	~~N/A~~	~~N/A~~
~~Channel Bottom Width (ft.)~~	~~0.10~~	~~0.10~~	~~0.10~~	~~0.10~~	~~1.00~~
~~Channel Top Width (ft.)~~	~~6.00~~	~~6.00~~	~~2.00~~	~~3.00~~	~~4.00~~
~~Channel Depth (ft.)~~	~~1.50~~	~~1.50~~	~~1.00~~	~~1.50~~	~~1.50~~
~~Flow Depth/10 (ft.)~~	~~0.41~~	~~0.40~~	~~0.35~~	~~0.59~~	~~0.90~~
~~Flow Depth/25 (ft.)~~	~~0.54~~	~~0.54~~	~~0.41~~	~~0.66~~	~~1.01~~
~~Flow Depth/100 (ft.)~~	~~0.73~~	~~0.72~~	~~0.53~~	~~N/A~~	~~N/A~~

~~* Ditches conveying sediment pond outflow to natural drainage.~~

~~** Erosion-controlled portion of diversion - may be fitted with rip-rap or 1/2 - round, 24" cmp culvert.~~

~~TABLE V-12 (con't)~~

~~Undisturbed Diversion Summary~~

~~Structure~~	~~*UD-5~~	~~*UD-6~~	~~*UD-7~~	~~UD-8~~
~~Drainage Area (ac.)~~	~~2.29~~	~~7.85~~	~~7.50~~	~~13.79~~
~~10 yr.-24 hr. event (in.)~~	~~1.85~~	~~1.85~~	~~1.85~~	~~1.85~~
~~25 yr.-24 hr. event (in.)~~	~~2.15~~	~~2.15~~	~~2.15~~	~~2.15~~
~~100 yr.-24 hr. event (in.)~~	~~2.75~~	~~2.75~~	~~2.75~~	~~2.75~~
~~Time of Conc. (hrs.)~~	~~-~~	~~-~~	~~-~~	~~0.10~~
~~Curve Number~~	~~-~~	~~-~~	~~-~~	~~65~~
~~Manning's Number~~	~~.025~~	~~.025~~	~~.025~~	~~.025~~
~~Ditch Slope (%)~~	~~6.67~~	~~10.00~~	~~11.25~~	~~2.00~~
~~Peak Flow/10 (cfs)~~	~~3.22~~	~~11.03~~	~~8.79~~	~~4.31~~
~~Peak Flow/25 (cfs)~~	~~4.00~~	~~13.71~~	~~10.93~~	~~6.46~~
~~Peak Flow/100 (cfs)~~	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~
~~Min. Str. Area (ft.^{2})~~	~~2.00~~	~~2.00~~	~~2.00~~	~~2.00~~
~~Req'd Area/10 (ft.^{2})~~	~~0.52~~	~~1.11~~	~~0.90~~	~~1.00~~
~~Req'd Area/25 (ft.^{2})~~	~~0.61~~	~~1.30~~	~~1.05~~	~~1.35~~
~~Req'd Area/100 (ft.^{2})~~	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~
~~Velocity (fps)~~	~~6.15~~	~~10.54~~	~~9.80~~	~~4.30~~
~~Hydraulic Length (ft.)~~	~~N/A~~	~~N/A~~	~~N/A~~	~~300~~
~~Elev. Diff. (ft.)~~	~~N/A~~	~~N/A~~	~~N/A~~	~~80~~
~~Channel Bottom Width (ft.)~~	~~1.00~~	~~1.00~~	~~1.00~~	~~1.00~~
~~Channel Top Width (ft.)~~	~~3.00~~	~~3.00~~	~~3.00~~	~~3.00~~
~~Channel Depth (ft.)~~	~~1.00~~	~~1.00~~	~~1.00~~	~~1.00~~
~~Flow Depth/10 (ft.)~~	~~0.38~~	~~0.66~~	~~0.57~~	~~0.62~~
~~Flow Depth/25 (ft.)~~	~~0.43~~	~~0.75~~	~~0.64~~	~~0.77~~
~~Flow Depth/100 (ft.)~~	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~

~~* Ditches conveying sediment pond outflow to natural drainage.~~

~~TABLE V-13~~

~~Disturbed Flow Ditch Summary~~

~~Ditch~~	~~Min. X-Sect. Area (ft.²)~~	~~Drainage Area~~	~~Design Flow (cfs)~~	~~Slope (%)~~	~~Velocity (fps)~~
~~D-1a~~	~~1.00~~	~~E~~	~~2.33~~	~~3.33~~	~~4.44~~
~~D-1b~~	~~1.00~~	~~E~~	~~2.33~~	~~2.50~~	~~3.99~~
~~D-1c~~	~~1.96~~	~~E~~	~~4.66~~	~~2.54~~	~~4.76~~
~~D-1d~~	~~1.00~~	~~E~~	~~2.33~~	~~3.75~~	~~4.64~~
~~D-1~~	~~1.96~~	~~E~~	~~4.66~~	~~5.20~~	~~6.23~~
~~D-2~~	~~1.96~~	~~E~~	~~4.66~~	~~3.33~~	~~5.27~~
~~D-3~~	~~1.96~~	~~D~~	~~5.16~~	~~4.00~~	~~5.79~~
~~D-4a~~	~~1.96~~	~~C~~	~~5.64~~	~~2.80~~	~~5.18~~
~~D-4~~	~~1.96~~	~~C~~	~~5.64~~	~~8.00~~	~~7.68~~
~~D-5a~~	~~1.96~~	~~C~~	~~2.82~~	~~2.00~~	~~3.84~~
~~D-5b~~	~~1.96~~	~~C~~	~~2.82~~	~~2.00~~	~~3.84~~
~~D-5~~	~~1.96~~	~~C~~	~~5.64~~	~~4.55~~	~~6.21~~
~~D-6~~	~~1.69~~	~~C~~	~~2.82~~	~~2.67~~	~~4.28~~
~~D-7~~	~~1.00~~	~~C~~	~~2.82~~	~~5.33~~	~~5.56~~
~~D-8~~	~~1.00~~	~~C~~	~~2.82~~	~~3.66~~	~~4.82~~
~~D-9~~	~~1.96~~	~~C~~	~~5.64~~	~~2.85~~	~~5.21~~
~~D-10a~~	~~1.00~~	~~A~~	~~1.87~~	~~2.00~~	~~3.47~~
~~D-10~~	~~1.69~~	~~A~~	~~1.87~~	~~1.00~~	~~2.67~~
~~D-11a~~	~~1.00~~	~~A~~	~~1.87~~	~~2.00~~	~~3.47~~
~~D-11~~	~~1.00~~	~~A~~	~~1.87~~	~~6.67~~	~~5.46~~
~~D-12~~	~~1.96~~	~~A~~	~~2.75~~	~~1.67~~	~~3.57~~
~~D-13~~	~~2.16~~	~~A~~	~~4.43~~	~~2.62~~	~~4.72~~
~~D-15~~	~~1.69~~	~~B~~	~~3.22~~	~~3.57~~	~~4.94~~
~~D-16~~	~~1.00~~	~~B~~	~~1.61~~	~~3.00~~	~~3.90~~
~~D-17a~~	~~1.00~~	~~F~~	~~2.20~~	~~3.28~~	~~4.35~~
~~D-17~~	~~1.96~~	~~F~~	~~4.40~~	~~2.50~~	~~4.66~~
~~D-18~~	~~1.96~~	~~F~~	~~4.40~~	~~2.45~~	~~4.63~~
~~D-15T*~~	~~1.69~~	~~B~~	~~3.22~~	~~3.57~~	~~4.94~~

~~Note: (1) Velocities are based on Manning's Formula:~~

$$\cancel{V = \frac{1.49}{n} R^{2/3} S^{1/2}}\text{~~, where~~}$$

~~n = 0.025, s = slope ft./ft.~~

~~(2) Erosion protection may prove necessary for any or all ditches. Erosion will be monitored and protection provided as necessary.~~

~~(3) See Figure IV-1C for typical ditch section.~~

~~* Temporary Ditch~~

~~TABLE V-13 (Con't)~~
~~Undisturbed Flow Ditch Summary~~

Ditch	Bottom Width (ft.)	Top Width (ft.)	Channel Depth (ft.)	Flow Depth (ft.)	Erosion Protection Y/N
D-1a	0.10	2.00	1.00	0.68	Y
D-1b	0.10	2.00	1.00	0.72	N
D-1c	0.10	2.80	1.40	0.94	Y
D-1d	0.10	2.00	1.00	0.66	Y
D-1	0.10	2.80	1.40	0.82	Y
D-2	0.10	2.80	1.40	0.89	Y
D-3	0.10	2.80	1.40	0.90	Y
D-4a	0.10	2.80	1.40	0.99	Y
D-4	0.10	2.80	1.40	0.81	Y
D-5a	0.10	2.80	1.40	0.81	N
D-5b	0.10	2.80	1.40	0.81	N
D-5	0.10	2.80	1.40	0.90	Y
D-6	0.10	2.60	1.30	0.76	Y
D-7	0.10	2.00	1.00	0.66	Y
D-8	0.10	2.00	1.00	0.72	Y
D-9	0.10	2.80	1.40	0.99	Y
D-10a	0.10	2.00	1.00	0.69	N
D-10	0.10	2.60	1.30	0.79	N
D-11a	0.10	2.00	1.00	0.69	N
D-11	0.10	2.00	1.00	0.54	Y
D-12	0.10	2.80	1.40	0.83	N
D-13	0.10	3.00	1.50	1.00	Y
D-14	0.10	2.80	1.40	0.93	Y
D-15	0.10	2.60	1.30	0.76	Y
D-16	0.10	2.00	1.00	0.59	N
D-17a	0.10	2.00	1.00	0.66	Y
D-17	0.10	2.80	1.40	0.92	Y
D-18	0.10	2.80	1.40	0.93	Y
D-15T	0.10	2.60	1.30	0.76	N/A

~~TABLE V-13A~~

~~Post-Mining Ditch Summary~~

Ditch	Min. X-Sect. Area (ft.^{2})	Drainage Area	Design Flow (cfs)	Capacity Flow (cfs)	Slope (%)	[3]Vel. (fps)	Erosion Prot. (y/n)
RD-1	4.00	D	9.42	30.24	6.67	7.56	Y
RD-2	4.00	D	9.42	20.92	3.20	5.23	Y
RD-3	4.00	[1]C	9.26	37.00	10.00	9.25	Y
RD-4	4.00	[2]C	18.52	37.00	10.00	9.25	Y
RD-5	4.00	[1]C	9.26	25.52	4.76	6.38	Y
RD-6	4.00	A	14.26	29.28	6.25	7.32	Y
RD-7	4.00	F	8.79	26.84	5.26	6.71	Y
RD-8	4.00	F	8.79	35.28	9.09	8.82	Y

~~Notes:~~

~~[1] 1/4 Drainage Area "C" Runoff~~

~~[2] 1/2 Drainage Area "C" Runoff~~

~~[3] Velocities based on Manning's Formula:~~

$$V = \frac{1.49\ R^{2/3}\ S^{1/2}}{n}$$ ~~, where~~

~~n = 0.032 (Rip-rap), s = slope in ft./ft.~~

~~TABLE V-14~~

~~Rip-Rap Specifications~~

~~Structure~~	~~Rip-Rap Size (in.) D15~~	~~D50~~	~~D85~~	~~Minimum Depth (in.)~~	~~Filter Blanket Depth (in.) (-3/4" Gravel)~~
~~UD-1 (Berms)~~	~~3.75~~	~~9.00~~	~~14.50~~	~~13.5~~	~~13.5~~
~~UD-1 (New Pond F)~~	~~7.50~~	~~18.00~~	~~28.75~~	~~27.0~~	~~27.0~~
~~UD-2 (C-33)~~	~~2.50~~	~~6.00~~	~~9.50~~	~~9.0~~	~~9.0~~
~~ND-1 (C-34)~~	~~2.50~~	~~6.00~~	~~9.50~~	~~9.0~~	~~9.0~~
~~UD-3 (Outfall)~~	~~7.50~~	~~18.00~~	~~28.75~~	~~27.0~~	~~27.0~~
~~UD-4 (Outfall)~~	~~10.00~~	~~24.00~~	~~38.50~~	~~36.0~~	~~36.0~~
~~C-6~~	~~2.50~~	~~6.00~~	~~9.50~~	~~9.0~~	~~9.0~~
~~C-9B~~	~~2.50~~	~~6.00~~	~~9.50~~	~~9.0~~	~~9.0~~
~~C-13 thru C-20~~	~~3.75~~	~~9.00~~	~~14.50~~	~~13.5~~	~~13.5~~
~~*D-1C~~	~~2.50~~	~~6.00~~	~~9.50~~	~~9.0~~	~~9.0~~
~~**D-1~~	~~2.50~~	~~6.00~~	~~9.50~~	~~9.0~~	~~9.0~~
~~*D-3~~	~~2.50~~	~~6.00~~	~~9.50~~	~~9.0~~	~~9.0~~
~~*D-4a~~	~~2.50~~	~~6.00~~	~~9.50~~	~~9.0~~	~~9.0~~
~~*D-4~~	~~3.75~~	~~9.00~~	~~14.50~~	~~13.5~~	~~13.5~~
~~*D-5~~	~~2.50~~	~~6.00~~	~~9.50~~	~~9.0~~	~~9.0~~
~~*D-7~~	~~2.50~~	~~6.00~~	~~9.50~~	~~9.0~~	~~9.0~~
~~*D-9~~	~~2.50~~	~~6.00~~	~~9.50~~	~~9.0~~	~~9.0~~
~~*D-11~~	~~3.75~~	~~9.00~~	~~14.50~~	~~13.5~~	~~13.5~~
~~*D-13~~	~~2.50~~	~~6.00~~	~~9.50~~	~~9.0~~	~~9.0~~
~~*D-14~~	~~2.50~~	~~6.00~~	~~9.50~~	~~9.0~~	~~9.0~~
~~*D-17~~	~~2.50~~	~~6.00~~	~~9.50~~	~~9.0~~	~~9.0~~
~~*D-18~~	~~2.50~~	~~6.00~~	~~9.50~~	~~9.0~~	~~9.0~~
~~RD-1 Thru RD-8~~	~~5.00~~	~~12.00~~	~~19.25~~	~~18.0~~	~~18.0~~

~~* To be installed only if erosion is evident. Other erosion protection may also be provided, such as half-round culverts, belting, downspouts, etc.~~

~~** Conveyor Belting presently used.~~

~~Other Sediment Control - ASCA~~

~~All topsoil piles are equipped with berms and have been revegetated. Andalex will not allow any topsoil pile to report directly to a sedimentation pond. This would result in a loss of topsoil material. The areas around these topsoil piles have been graded and revegetated to prevent erosion. A straw dike has been placed downstream from Pond B to prevent waterborne coal fines from leaving the permit area. This dike will be maintained throughout the life of the project.~~

~~There are seven (7) small areas which do not drain to sedimentation ponds (alternate sediment control areas {ASCA}). These are designated ASCA and all are shown on Plate 2. The areas each have an alternate sediment control method, consisting of strawbales, berms, vegetation or a combination of each. The total ASCA for this site is 17.51 acres or 26.07% of the total disturbed area. Drainage from each of these areas will be monitored for compliance with State and Federal limitations, to the extent possible. This will be accomplished by attempting to collect samples (as available) from points of discharge below the strawbales or other sediment controls. Topsoil piles with earth berms, which are ASCA's, will also be designed so that water will not be impounded. That is, berms will be notched so that water can flow through the notch. The straw berm will be placed in the notch and will function as alternate sediment control. The topsoil piles have berms only so that topsoil in the piles will not be lost.~~

~~Strawbales are placed on the ground to prevent undercutting or routing of flows around the bales. Berms and bales are maintained on a regular basis and cleaned, repaired or changed out as needed. All control structures will be removed upon final reclamation of the site.~~

~~Table V-15 is a summary of each of the ASCA along with size, runoff volume and treatment methods.~~

~~TABLE V-15~~
~~ASCA~~

~~ASCA Area*~~	~~Area (Acres)~~	~~*Runoff Volume (ac. ft.)~~	~~Treatment Method~~
~~1~~	~~0.84~~	~~0.07~~	~~Vegetation~~
~~2~~	~~0.44~~	~~0.04~~	~~Vegetation~~
~~3~~	~~9.98~~	~~0.84~~	~~Straw Bales/Vegetation~~
~~4~~	~~3.42~~	~~0.29~~	~~Straw Bales/Vegetation~~
~~5~~	~~2.00~~	~~0.17~~	~~Straw Bales/Vegetation/Berm~~
~~6~~	~~0.57~~	~~0.05~~	~~Vegetation~~
~~7(F)~~	~~0.26~~	~~0.02~~	~~Vegetation/Berm~~
~~Totals~~	~~17.51~~	~~1.48~~	~~---~~

~~*Runoff Volumes are based on a 10 year - 24 hour event and a runoff CN of 90.~~

~~Post Mining Hydrology~~

~~Introduction~~

~~The purpose of this section is to describe the plan for control of the permit and adjacent area hydrology during and after reclamation until bond release.~~

~~Methodology~~

~~The plans herein described are based on requirements of the regulations and on proven, accepted reclamation techniques used in the Carbon-Emery area. The post-reclamation hydrology is designed to protect the reclaimed site from erosion, to protect the hydrologic regime from adverse impacts, and to meet requirements of DOGM and the landowner, BLM.~~

~~Reclamation Hydrology~~

~~Upon completion of operations, all structures will be removed and the area will be recontoured as shown on Plate 8. All culverts and unnecessary ditches and ponds will be removed at that time. The post-reclamation drainage will be as shown on Plates 8 and 9.~~

~~Undisturbed diversions will remain in place, since these were installed prior to the operation, and they have been shown to be adequate to carry a 100 year, 24 hour precipitation event.~~

~~Sedimentation Ponds A, C, D, and F will remain in place until revegetation standards are reached (Phase I). At that time, the ponds will be removed and reclaimed (Phase II). Disturbed drainage flow paths will be reconstructed during reclamation to direct reclaimed area runoff to the various ponds. The reconstructed flow paths are shown on Plates 8 and 9, and are designated RD-1, RD-2, ... for Reconstructed Ditch. Design specifications for the reconstructed interior ditches are shown on Table V-13A, "Post-Mining Ditch Summary". All reconstructed ditches will be built to a minimum cross-sectional area of 4 ft.^{2}, and will be rip rapped with a minimum of 12" D50 rock overlying a filter blanket of 3/4" gravel. A typical section of the restored channel is shown on Figure V-3. Rip-rap design is based on the chart in Figure V-4. Once the ponds are removed, the drainage flow paths will be extended as shown on Plate 9. The retained ponds are shown "dotted" on Plate 8 to show the pond in relation to the reclaimed drainage pattern prior to and after its' removal. Ponds B and E will be eliminated during the first phase of reclamation. These are small ponds and the drainage is redirected to Ponds A, C, and D respectively, which are adequately oversized to contain the extra runoff. As shown on Table V-6A, all retained ponds have adequate capacity. Post-~~

~~mining pond sizing is shown on Tables V-2A through V-6A. For additional information including detail on removal of surface structures, please refer to this chapter, re: Reclamation.~~

~~As shown on Plate 8, berms will be employed to direct drainage during Phase I Reclamation. Berms will consist of straw bales (1 bale high) or native earth a minimum of 24" high x 36" minimum at the base x 12" minimum across the top. All berms will be removed during Phase II Reclamation, and any disturbed areas will be regraded as necessary and reseeded along with removal of the sediment ponds (See Plate 9 for final configuration).~~

~~Access roads will not be reclaimed until Phase II. At this time, roads and culverts will be removed and the areas revegetated. Straw bale berms will be placed along the downstream ends of the reclaimed roads to control sediment.~~

~~During Phase I reclamation, when Ponds B and E are removed, diversion UD-5 will also be eliminated to the permit boundary. This will be accomplished by filling in the diversion with adjacent material. Straw bales will be placed as necessary to control sediment from the reclaimed pond and diversion.~~

~~As sediment ponds are removed, any contaminated material will be hauled off to an approved disposal site. The ponds will be recontoured and drainage through the area re-established as shown on Plate 9. Longitudinal profiles of the reclaimed ponds are shown on Plates 3, 4, 5, 6, and 7. As indicated earlier, the 2-celled Permanent Impoundment will be left inplace for wildlife enhancement.~~

~~Reclamation Water Monitoring~~

~~Water monitoring of the surface stations and remaining ponds will continue after reclamation, until bond release. The frequency of monitoring will be as shown on Table V-11 for "Postmining". Parameters monitored will be the same as those for operational sampling.~~

~~Figure V-3~~
~~Post Mining Ditch~~
~~Typical Section~~

~~Figure V-4~~
~~Size of Riprap to be used Downstream from Stilling Basins~~

Water Monitoring Plans (Also R645-301-722.300, 723, 724, 731.200)

Four surface water monitoring stations will be established as shown on Plate 15. Two of the stations will be located in undisturbed drainage above the site and two stations will be in the same drainages below the site. This configuration will show any affects of the operation on the drainage of the area.

Since this is a new permit and no baseline data has been gathered, the stations will be monitored according to the Baseline Criteria (parameters and frequency) listed in Table V-10, "Surface Water Baseline and Operational Water Quality Parameter List", for the first two years. After that time, the stations will be monitored according to the parameter and frequency requirements of the operational portion of Table V-10. Reclamation monitoring will also follow the requirements of the Postmining portion of Table V-11.

Water monitoring stations will be designated as WCW-1 through WCW-4 for surface monitoring points. In addition, each pond discharge will be monitored according to N.P.D.E.S. requirements. These station numbers will be designated WCW-A through WCW-F for Ponds A through F respectively (see Plates 2A and 15).

Monitoring results will be submitted to the Division quarterly, within sixty days following the end of the reporting quarter.

Samples will be collected during or shortly after precipitation events to establish baseline parameters.

Baseline monitoring will consist of eight samples analyzed for the baseline chemical parameters on Table IV-10 (four per annum, collected quarterly during precipitation events). A rain gauge will also be installed at the site, and a log of precipitation events will be maintained on site.

It should be noted that Andalex and its designated laboratory will follow the "Standard Methods for the Examination of Water and Wastewater" for all of the above water samples.

TABLE V-10

Surface Water Baseline and Operational
Water Quality Parameter List

Field Measurements:

* - Water Levels or Flow
* - pH
* - Specific Conductivity (umhos/cm)
* - Temperature (C°)

Laboratory Measurements: (mg/1) IONS AND METALS ANALYSES ARE DISSOLVED, EXCEPT AS NOTED

* - Total Settleable Solids
* - Total Suspended Solids
* - Total Dissolved Solids
* - Total Hardness (as $CaCO_3$)
* - Acidity
- Aluminum (A1)
- Arsenic (As)
- Barium (Ba)
- Boron (B)
* - Carbonate (CO_3^{-2})
* - Bicarbonate ($HCO_3^{-)}$
- Cadmium (Cd)
* - Calcium (Ca)
* - Chloride ($C1^{-)}$
- Chromium (Cr)
- Copper (Cu)
- Fluoride ($F^{-)}$
* - Iron (FE) (TOTAL)
* - Iron (Fe) (DISSOLVED)
- Lead (Pb)
* - Magnesium (Mg)
* - Manganese (Mn) (Total)
* - MANGANESE (MN) (Dissolved)
- Mercury (Hg)
- Molybdenum (Mo)
- Nickel (Ni)
- Nitrogen: Ammonia (NH_3)
- Nitrate ($NO_3^{-)}$
- Nitrite (NO_2)
* - Potassium (K)
- Phosphate (PO_4^{-3})
- Selenium (Se)
* - Sodium (Na)
* - Sulfate (SO_4^{-2})
- Sulfide ($S^{-)}$

- Zinc (Zn)
* - Oil and Grease
* - Cation-Anion Balance

-Baseline *Operational

TABLE V-11

Surface Water Sampling

	Baseline	Operational	Postmining
Type of Sampling Site	Surface Water Bodies	Surface Water Bodies	Surface Water Bodies
Field Measurements (See Table V-10)	Performed during water level/flow measurements	Performed during water level/flow measurements	Performed during water level/flow measurements
Sample Frequency	Quarterly for lakes, reservoirs, and impound-ments (water level and quality); monthly flow measurements and quarterly water quality measurements (one sample at low flow and high flow each) for perennial streams. Monthly flow and water quality measurements during period of flow for intermittent streams. Sampling for ephemeral streams deter-mined at pre-design conference.	Quarterly for lakes, reservoirs, and impound-ments (water level and quality); monthly flow measurements and quarterly water quality measurements (one sample at low flow and high flow each) for perennial streams. Monthly flow and water quality measurements during period of flow for intermittent streams. Sampling for ephemeral streams deter-mined at pre-design conference.	Two per annum for perennial streams (high & low flow); two per annum during snowmelt and rainfall for intermittent streams.

TABLE V-11 (con't)

Surface Water Sampling

	Baseline	Operational	Postmining
Sampling Duration	Two years (one complete year of data before submission of PAP.	Yearly until two years after surface reclamation activities have ceased.	Until termination of bonding.
Type of Data Collected & Reported	Flow and/or water levels and water quality.	Flow and/or water levels and water quality.	Flow and/or water levels and water quality per operational parameters.
Comments	All field measurements should be performed concurrently with water level/flow measurements.	All field measurements should be performed concurrently with water level/flow measurements.	All field measurements should be performed concurrently with water level/flow measurements.
Comments		For every fifth year preceding re-permitting, one sample at low flow and and high flow each should be taken for base-line water quality parameters.	

Reclamation Water Monitoring

Water monitoring of the surface stations and remaining ponds will continue after reclamation, until bond release. The frequency of monitoring will be as shown on Table V-11 for "Postmining". Parameters monitored will be the same as those for operational sampling.

R645-301-512.250. PRIMARY ROADS (Also R645-301-527 and R645-301-534)

All roads within the permit area are classified as "Primary Roads" in accordance with R614-301-527.100. Primary roads on the site are of 2 typical designs:

1. Single-lane, gravel-surfaced roads approximately 16' wide; and

2. Double-lane, either gravel or asphalt surfaced roads, approximately 26' wide.

Although all roads on site are not used for coal hauling, each road is constructed to the respective typical design and dimensions shown on Plates 17.

Because of the variance in road types, widths and lengths, the primary roads have been designated on Plate 1 with numbers (i.e. PR-1= Primary Road 1) to facilitate the description of each:

Primary Road 1 (PR-1) - This section is a double-lane, asphalt surfaced road connecting the county road to the Wildcat Facilities. The road serves as both a main access and a coal haul road. This section of road is approximately 800' long and runs on a grade of approximately 4.875%. The finished width of the road is approximately 26', as shown on the typical section on Plate 17.

Primary Road 2 (PR-2) - This section is a single-lane, gravel surfaced road connecting the Mine Run Coal Storage Truck Loop to the previously described Primary Road 1. This road is used primarily by coal trucks bringing coal onto the site. This road section is approximately 2050' long and runs on a grade of 1.25% to a maximum of 8,000% a the top of the loop. The top width of the road is approximately 16' as shown on Plate 17.

Primary Road 3 (PR-3) - This section of road is a double-lane, asphalt surfaced road connecting the truck scale area to the county road on the northeast end of the site. The road is used primarily for coal haulage exiting the site; however, it is also used as a secondary access to the property. The road is approximately 490' long and is on a grade of approximately 0.20%. The finished width of the road is approximately 26' as shown on Plate 17.

Primary Road 4 (PR-4) - This section is a double-lane gravel-surfaced road leading from the Beaver Creek Shop/Warehouse Road to the northern truck dump at the Wildcat Facility, and single-lane around the truck loop. This road is used primarily for coal haulage, but also provides access to the permit area north of the

railroad. The double-lane portion of the road is approximately 700' long and is on a grade averaging less the 2.10%. The single-lane portion is approximately 550' long around the truck loop, and also averages less than 4% in grade, with the maximum grade at 7.06%. The double-lane road width is approximately 26' as shown on Plate 17, and the single-lane portion is approximately 16' wide as shown on Plate 17.

Primary Road 5 (PR-5) - This road leads from the Primary Road 2 (Mine Run Truck Loop) along the eastern perimeter of the main coal pile to the Loadout Tower. Much of the road is used primarily for access by support equipment. This is a single-lane road, approximately 2100' long and runs on an average grade of 2.5%. The finished road width is approximately 16' as shown on Plate 17.

Primary Road 6 (PR-6) - This road runs from the Loadout Tower area along the east edge of the railroad to the Truck Scale Area. This road is also used primarily for access by support equipment, although the northern portion is occasionally used for coal haulage. This is a single-lane, gravel-surfaced road, approximately 2150' long and runs on an average grade of 2.26%, with a maximum grade of 9.80% for less than 100'.

Primary Road 7 (PR-7) - This road lends from the northern truck dump around to the Permanent Impoundment Area and south to the Waste Coal Storage Area. This road is used primarily for support equipment access and occasionally for waste coal haulage. The road is approximately 1300' long and runs on a grade of a minimum of 0.09% on the southern area to a maximum of 2.00% between the truck dump and impoundment area. The road width is approximately 16' as shown on Plate 17.

Primary Road 8 (PR-8) - This road leads from the northern truck dump, through the "Depression Area" and connects to Primary Road 7 near the southern end. The road is used primarily for access to the west property and "Depression Area" by support vehicles and loaders; however, coal and coal refuse are also occasionally hauled here. The road is approximately 800' long and runs on a grade from a minimum of 0% on the southern end to a maximum of 9.26% for approximately 100' near the truck loop. The road width is approximately 16', single-lane, gravel-surface as shown on Plate 17.

Primary Road 9 (PR-9) - This road runs between Primary Road 5 and Primary Road 6, and provides access to the Coal Stockpile as well as to other facilities. The road is used primarily for access by support vehicles. The road is approximately 740' long and runs on an average grade of 2.00%. Road width is approximately 16'; single-lane, grave-surfaced as shown on Plate 17.

Primary Road 10 (PR-10) - This road connects Primary Road 5 to Primary Road 6 near the Loadout Tower. This is a single-lane, gravel-surfaced road, approximately 380' long. The grade on this road runs from 0% to a maximum of 2.86%. The road is used primarily for support vehicle access. Road width is approximately 16' as shown on Plate 17.

Actual coal haul roads are those designated Primary Roads 1 through 5; however, since all roads are classified as primary, and since each was constructed according to a standard design as shown on Plates 17, the following information is applicable to all roads at this site.

All primary roads at this site have been designed and constructed to meet the requirements of R614-301-534.300 and R614-301-742.420, and are certified as such.

All roads are located on the most stable surface available, generally on natural ground. There are no stream fords at this site; however, ephemeral channel crossings are provided by approved, adequately sized culverts. Drainage control is provided along all roads by the use of adequately sized ditches and culverts as necessary.

All roads are constructed and maintained to minimize disturbance and adverse impacts on fish, wildlife and related environmental values. This is accomplished through the use of current, prudent engineering design practices, proper drainage control, dust control, speed control and frequent maintenance. Roads are maintained to meet applicable design standards throughout their use by blading, watering, treatment with dust control agents such as magnesium chloride, and resurfacing as necessary.

Roads are located, designed, constructed, used, maintained, and will be reclaimed so as to prevent or control damage to public or private property; they will use non-acid and non-toxic forming substances in surfacing; and they will have a static safety factor or 1.3 or greater for all embankments.

Roads will be reclaimed immediately after they are no longer required for the operations. Road reclamation will take place simultaneously with the property reclamation, during Phases I and II. Roads will be reclaimed as per the plan, including: (1) Restoring natural drainage patterns; (2) Reshaping cut fill slopes to be compatible with the post-mining land use; (3) Removal of all structures (culverts, bridges, etc.); (4) Revegetation. No roads are planned to be left at this site after final reclamation.

R645-301-512.260. VARIANCE FROM APPROXIMATE ORIGINAL CONTOUR

N/A - The site will be reclaimed to approximate original contour.

R645-301-513. COMPLIANCE WITH MSHA REGULATIONS AND MSHA APPROVALS

A great emphasis is put on assuring a safe mine operation and the mine and surface facilities will be operated within prudent standards to insure the health and safety of all employees. The facilities will be carefully inspected by company-trained safety engineers and state and federal mine inspectors.

The operation will abide by Utah State Coal Mine Regulations and the 1969 Federal Coal Mine Health and Safety Act. In addition, these regulations will be supplemented by a company safety policy. Various training programs will be utilized such as the following:

Methane Measurements
Roof and Rib Control
Oxygen Deficiency Testing
Ventilation
First Aid
Mine Rescue
Mine Electrical Certification
Self Rescue Training
Use of Personal Protective Equipment
Recognition of Electrical Hazards
General Accident Prevention
Mine Communications
Job Safety Training

Many of the training programs will run continuously, such as those involving roof control and ventilation. Other programs are held annually with many oriented toward new employees.

R645-301-513.100. COAL PROCESSING WASTE DAMS AND EMBANKMENTS

N/A - See R645-301-512.230

R645-301-513.200. IMPOUNDMENTS AND SEDIMENTATION PONDS MEETING MSHA CRITERIA

N/A

R645-301-513.300. WASTE DISPOSED IN UNDERGROUND

MINE WORKINGS

N/A

R645-301-513.400. REFUSE PILES

A refuse pile is permitted at the Wildcat Loadout facility for disposal of coal processing waste and sediment cleaned from sediment ponds. This pile is permitted by MSHA with I.D. number 1211-UT-09-01864-01.

The pile is constructed, maintained and inspected in accordance with MSHA regulations, 30 CFR 77.214 and CFR 77.215.

Pile design and operation are detailed in Section R645-301-512-230 and Appendix O.

R645-301-513.500. MINE OPENINGS

N/A

R645-301-513.600. DISCHARGES INTO AN UNDERGROUND MINE

N/A

R645-301-513.700. SURFACE COAL MINING CLOSER THAN 500 FEET TO AN ACTIVE UNDERGROUND MINE

N/A

R645-301-513.800. COAL MINE WASTE FIRES

See R645-301-512.230

R645-301-514. INSPECTIONS

All engineering inspections, excepting those described under R645-301-514.330, will be conducted by a qualified registered professional engineer or other qualified professional specialist under the direction of the professional engineer.

R645-301-514.100. EXCESS SPOIL

N/A - There are no excess spoil piles.

R645-301-514.200. REFUSE PILES

The refuse pile is inspected quarterly by a registered professional engineer in accordance with this section and as required by 30 CFR 77.215.2. The disposal plan is detailed in Appendix O.

R645-301-514.210. REGULAR INSPECTIONS

See R645-301-514.200 and Appendix O.

R645-301-514.220. CRITICAL CONSTRUCTION PERIODS

See R645-301-514.200 and Appendix O.

R645-301-514.221. FOUNDATION PREPARATION AND TOPSOIL REMOVAL

Completed. There are no plans for additional foundation preparation or topsoil removal.

R645-301-514.222. UNDERDRAINS

N/A - There are no underdrains.

R645-301-514.223. FINAL SURFACE DRAINAGE SYSTEMS

As required by R645-301-514.210.

R645-301-514.224. FINAL GRADING AND REVEGATATION

As required by R645-301-514.210.

R645-301-514.230. CERTIFIED REPORT

A certified report is provided for Division review promptly after each inspection. The report includes appearances of instability, structural weakness and other hazardous conditions, as well as condition of surface drainage.

R645-301-514.240. SEPARATE CERTIFICATION FOR EACH PHASE OF CONSTRUCTION

N/A - There are no underdrains or protective filters.

R645-301-514.250. ON-SITE COPY OF CERTIFICATION

REPORTS

A copy of each inspection report is maintained on-site.

R645-301-514.300. IMPOUNDMENTS

See R645-301-512.240.

R645-301-514.310. CERTIFIED INSPECTION

This is performed annually by a registered P.E.

R645-301-514.311. COMPLETION OF CONSTRUCTION AND YEARLY INSPECTIONS

See R645-301-514.310.

R645-301-514.312. CERTIFIED REPORTS

Certified reports are kept on-site, and submitted with Annual Reports.

R645-301-514.313. ON-SITE COPY OF CERTIFICATION REPORTS

See R645-301-514.312.

R645-301-514.320. WEEKLY INSPECTIONS

N/A

R645-301-515. REPORTING AND EMERGENCY PROCEDURES

R645-301-515.100. SLIDES AND OTHER DAMAGE

The Wildcat Loadout is located on relatively flat ground, making the probability of a slide extremely remote.

If a slide should occur which may have a potential adverse effect on public, property, health, safety, or the environment, Andalex will notify the Division by the fastest available means and comply with any remedial measures required by the Division

R645-301-515.200. IMPOUNDMENT HAZARDS

Safety Precautions

The ponds were built as per specifications and under supervision of a qualified, registered professional engineer. The ponds are inspected quarterly for safety and compliance. Inspection reports are maintained on-site, and submitted to the Division on an annual basis. Ponds will be cleaned at minimum when sediment reaches 60% of designed sediment volume. Measuring devices will be installed in the ponds to show when the ponds have filled with sediment to the clean-out level.

R645-301-515.300. TEMPORARY CESSATION OF OPERATIONS

Whenever it is known that operations are to be temporarily ceased for more than 30 days, Andalex Resources will submit to the Division a notice of intention to cease or abandon the operations, in accordance with R645-301-515.320 and to MSHA standards.

This notice will describe mitigation measures to be employed in accordance with the terms and conditions of the permit approval, such as a statement of the number of surface areas involved in the cessation, prior reclamation efforts accomplished on the property, and identification of all backfilling, regrading, revegetation, environmental monitoring, underground opening closures and water treatment activities that will continue during the temporary cessation.

R645-301-515.310. TEMPORARY ABANDONMENT

See R645-301-515.300.

R645-301-515.311. SUPPORT AND MAINTENANCE

N/A

R645-301-515.312. SECURING SURFACE FACILITIES

Locked gates will be employed to prevent access to the site during temporary closures.

R645-301-515.320. NOTICE OF INTENT TO CEASE OR ABANDON OPERATIONS

See R645-301-515.300.

R645-301-515.321. STATEMENT OF CONDITIONS PRIOR TO

CESSATION OR ABANDONMENT, UNDERGROUND

See R645-301-515.300.

R645-301-515.322. STATEMENT OF CONDITIONS PRIOR TO CESSATION OR ABANDONMENT, SURFACE

See R645-301-515.300.

R645-301-516. PREVENTION OF SLIDES

Andalex has agreed to interim stabilization of all slopes and embankments within the disturbed area and has done so. Andalex will notify the Division in the event of any slides or other damage.

R645-301-520. OPERATION PLAN (Also R645-301-526)

R645-301-521. GENERAL

Overview of Project

General Description

The new unit train loadout facility at Wildcat Junction is approaching the three million ton mark. To date, close to 350 unit trains have been loaded with no operating failures or significant difficulties.

The facility is designed to provide rapid train loading with an automatic sampling system meeting ASTM standards. The sampling system is a Redding Three Stage Sampler. The bulk weighing system is accurate to 0.1% and is certified by the State of Utah, Bureau of Weights and Measures every six months.

The stockpiling and reclaim system is designed to reduce handling and consequently degradation. It provides segregated stockpiles for each of the three seams which will be mined simultaneously from Andalex's Centennial Project. With segregated stockpiles, Andalex will have the capability of either a single seam shipment or a blended seam shipment meeting any customer's requirements. The stockpile has been designed to provide adequate live storage to allow multiple unit-trains to be discharged from Wildcat successively in order to meet the demands of ship-loading and the export market.

Summary Description

Loadout Structure

5,000 tph loading rate, 300 ton surge bin, 120 ton weigh bin, programmable batch weighing system, 3 stage automatic sampler, operator control room.

Reclaim Conveyor

72" belt, 815 fpm, 1,200 hp, length = 1,035'. Four each 100' truss sections, 2 each support bents, vertical gravity take-up tower.

Reclaim Transfer Conveyor (3 each)

54" belt, 75 hp, length = 75'

Under-pile Reclaim

Nine each storage pile activators, 2,500 tph capacity each, flow control by double bladed slide gates, 30' diameter inlet cones, pile activators connected by 13' diameter multiplate tunnel. Total tunnel length = 700'.

Storage Pile

Height = 85', crest length = 468'. Three segregated piles: total storage = 106,000 t, live storage = 55,000 t. Extended (co-mingled) pile: total storage = 135,000 t, live storage = 70,000 t.

Radial Stacker

Underslung truss design, 110° arc of swing, 247' long, 36" Conv, 600 tph, 600 fpm, 100 hp drive.

Yard Conveyor From Crusher to Stacker Building (Conv Y)

36" belt. 600 tph, 450 fpm, 75 hp drive, length = 470', transfer structure at radial stacker supporting drive unit and electrical control room.

Crusher Building

600 tph impact crusher (125 hp), 2" x 0" product, 4' x 14' double deck screen, Conv T drive unit, electrical control room.

Conveyor From Truck Dump To Crusher Building (Conv T)

48" belt, 600 tph, 250 fpm, 75 hp, length = 150'. Belt scale, metal detector, tramp iron magnet.

Truck Dump

100 ton surge capacity, drive-over grizzley for end or bottom dump trucks, dozer trap opening for reclaim of run of mine storage area with a capacity of 150,000 tons.

Unit-Train Loading Track

115 lb. rail, total length = 10,133', 1 each turnout, 3 each cross overs, 1 each bumper, 2 each high stand throw switches, 3 each spring switches.

Office Building

30' x 40' containing office, small warehouse, and lab. A small temporary change room trailer is located next to the office.

Scale House

14' x 60' trailer, 60' platform scales.

Shop Building

40' x 40' metal building, concrete foundation

Magnesium Chloride Storage Tank

8' x 20' metal tank, concrete stand

<u>Electrical</u>

Substation

2,500 KVA, 46,000 V to 4,160 V transformers, capacitors for power factor correction, designed to comply with appropriate MSHA and UP&L requirements

Yard Power

4,160 V distribution reduced to 480 V at crusher building, stacker, reclaim tunnel exit and loadout structure, transmission line = 2,600', 45' poles.

Electrical Control Rooms

Crusher Building

Motor controls, switchgear, and associated electrical controls for crusher, screen, Conv "T" drive, reclaim vent fan, scale, magnet, metal detector, water pump, and area lighting

Stacker Area (Control Room Located On Transfer Structure)

Motor controls, switchgear, and associated electrical controls for Conv "Y" drive, conveyor "S" drive, stacker propelling drive, water pump, office building, mobile equipment servicing station and area lighting

Reclaim Area (Control Room Located Near Tunnel Exit On West Side of Conv "R")

Motor controls, switchgear, and associated electrical controls for Conv "RT" drive, all storage pile activators, hydraulic power pack drives (for gate actuation), reclaim sensor scale, gate position feedback controls, methane monitors, and area lighting (including reclaim tunnel)

Loadout Area (Electrical Controls Located In Operators Control Room)

Motor controls, switchgear, and associated electrical controls for Conv "R" drive (4,160 V), batch weighing system, sampling system, car spotter, and area lighting

Electrical Class

All motors, starters, switchgear, and controls can be Class II, Div. II, even in the reclaim tunnel. However, 2 each methane monitors are to be installed in the reclaim tunnel and 1 each in the truck dump which will deactivate all electrics in the tunnel if methane is detected. Lighting in the tunnels must meet Class I, Div. I requirements.

<u>Water</u>

Tanks

2 ea., 10,000 gal., treated for culinary, 35 hp centrifugal pump, enclosed tankside pump houses

Tank Location

- At crusher building to serve crusher building and truck dump
- At office building (culinary usage)

<u>Area of Operations</u>

Proposed Permit Area

The proposed permit area is located within BLM right-of-way U-48027 and is shown on Plates 1 and 1A.

Surface Area to be Disturbed

The permit area has been previously impacted by mining and loading. The entire permit area at Wildcat has been used for loading and coal storage previously. The total existing surface area disturbed is ~~60.94~~ 74.46 acres excluding the ASCA Areas and Utah Railway Tracks. Facilities are indicated on Plate 1.

The disturbed area boundary has been modified to include additional area to the east of the main stockpile (radial stacker) in order to accommodate the cleanup of wind-blown fines as required by Division Order DO-04. Additional details regarding this cleanup plan can be found in Appendix P. ~~This area has been lightly covered by wind-carried coal fines over the nine year history of Wildcat.Therefore, it is necessary to include this additional 3.7 acres as part of Andalex's disturbed area. It should be noted that this additional acreage does not constitute a significant revision (6%). Upon final reclamation this area will be cleaned of wind-carried coal fines and revegetated in a similar fashion to existing disturbed areas. Runoff from this area is currently passed through straw dikes. These dikes will be maintained on an annual basis as necessary.~~

~~Andalex has used, from time to time, a vacuuming system to pick up wind-carried coal fines at the minesite. Andalex proposes to clean as many coal fines as is practical at the Wildcat Loadout in the area east of the main stockpile. This vacuum system will be utilized in the Spring of 1994 and thereafter as necessary.~~

~~It should also be noted that due to the reoccurring situation regarding wind-carried coal fines, Andalex proposes to construct additional drift-fences near the eastern boundary of the disturbed area. Drift-fences have proven to be effective in the past at Wildcat and, therefore, additional fences will aid in controlling wind-carried coal fines. These additional fences are depicted on the revised Plate 22.~~

Life of Project

The life of the project has been estimated at 30 years.

Schedule of Construction, Mine Development,Mining, and Reclamation

All surface facilities have been constructed for the Wildcat Loadout, Reclamation efforts, including, but not limited to, backfilling, grading, topsoil replacement, and revegetation, of all land that is disturbed by surface operations shall occur as contemporaneously as practicable with mining operations. Upon the conclusion of loading activities, the scheduled reclamation phase will begin immediately. Please refer to Part F of this Chapter re Reclamation.

Cessation of Operations

Temporary

Andalex will inform the division if it intends to cease operations for a period of more than thirty days. This notice will include information on any activities which may continue while the facility is not in use (water monitoring, etc.).

Permanent

Upon permanent cessation of operations, Andalex will reclaim all affected areas according to its' approved MRP and return the land to its' pre-mining conditions.

Wildcat Operations

Exploration and Development Drill Sites

Shallow holes for bedrock determination were drilled for foundation studies. Please see Appendix C.

Blasting

No blasting will occur at this facility.

Water Supply

Water is trucked into the facility by a local contractor and stored in 2 - 10,000 gallon storage tanks. One tank is used to supply culinary water to the bathhouse facilities and the other tank provides water for dust suppression for the preparation and loading operations.

There is no on-site development of surface or underground water for this facility. There are no wells.

Power Supply and Communication Facilities

Power and communications were pre-existing at this location. Andalex tapped the 46 KV powerline serving Beaver Creek Coal Company's mines and via an onsite substation, distributing 4160,

440, 220, and 110 V lines throughout the facility.

Landscaping

All disturbed areas are relatively flat, and vegetative cover has been promptly re-established to stabilize erosion.

Signs, Markers, Fences, and Gates

Signs of a uniform design, showing the company name, business address, and telephone number as well as the identification number of the current regulatory program permit authorizing the underground mining activities, have been placed at all access points to the permit area. These signs have been placed to be easily seen, are made of a durable material, and conform to local laws and regulations. The topsoil storage area is clearly marked.

As there are no perennial streams or a stream with a biological community on the permit area, buffer zone markers will not be necessary. The perimeters of all areas affected by surface operations and facilities are clearly marked. These signs and markers shall be maintained during all activities and retained and maintained until after the release of all bonds for the permit area.

Coal Handling Facilities

Please refer to this chapter, re: Description of Facilities.

Removal of Surface Structures

Upon completion of activities, all surface facilities will be removed. This includes all the facilities outlined in this chapter, re: Description of Facilities. Please refer to this chapter, re: Reclamation for the detailed plans. Also refer to this chapter, re: Reclamation Hydrology.

Operation Plan: Existing Structures

Construction and Design of Surface Facilities

Existing Structures

All existing structures are situated on Right-of-Way U-48027. Please refer to this chapter, re: Description of Facilities. Upon completion of loading activities, all buildings and structures not being utilized as part of the reclamation sequence, will be removed, according to the Reclamation Plan outlined in this chapter.

Construction

All of the above structures have been completed. Construction began in the spring of 1984 and was completed in the spring of 1985. Construction has been located and carried out so as to prevent and control erosion, siltation, water pollution, and damage to property in accordance with the regulations. 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 (particularly as this relates to powerline structures, regarding Fish and Wildlife). Andalex has also designed and constructed and will be maintained in a manner which prevents additional contributions of suspended solids outside the permit area. All activities shall be conducted in a manner which minimizes damage to railroads, electric and telephone lines, and water and sewage lines, which pass over or through the permit area. Andalex Resources realizes that maintenance of the facilities is a key to optimum operation. Constant upkeep of all surface facilities and structures has resulted in their maintaining excellent condition.

Construction Methods

Major Equipment

The building sites were leveled using dozers and graders. Excavations for foundations was accomplished with backhoes and scrapers. Leveling was required at all the building sites; however, cut and fill was not implemented to a large degree because the area is relatively flat lying. Topsoil was removed and transported to a nearby area for storage. Topsoil was gathered using scrapers and graders. All topsoil storage piles are located within the permit area.

All surface pads have been stabilized and all other disturbed areas (pond embankments, other slopes, etc.) have been reseeded. Where possible, a rangeland seed drill was used.

R645-301-521.100. CROSS SECTIONS AND MAPS

See R645-301-510, Volume II

R645-301-532.110. PREVIOUSLY MINED AREAS

See R645-301-510, Volume II

R645-301-521.111. LOCATION AND EXTENT OF KNOWN WORKINGS

N/A

R645-301-521.112. EXISTING OR PREVIOUSLY SURFACE MINED AREAS

See R645-301-510 and Volume II.

R645-301-521.120. EXISTING SURFACE AND SUBSURFACE FACILITIES AND FEATURES

See R645-301-510.

R645-301-521.121. BUILDINGS IN AND WITHIN 1000 FEET OF THE PERMIT AREA

There are no buildings within 1,000 feet of the permit area except those used as part of the operation. They are shown on Plates 1 and 2.

R645-301-521.122. SURFACE AND SUBSURFACE MAN-MADE FEATURES WITHIN THE PERMIT AREA

There are no surface or subsurface man-made features within, passing through or passing over the permit area except the railroad, powerline, telephone cables, culverts, and etc., installed for the operation of this mine. See Plates 1 and 2 for their locations.

R645-301-521.123. PUBLIC ROADS IN OR WITHIN 100 FEET OF THE PERMIT AREA

The Consumers county road (Formerly State Highway 139) starts at highway 6 in Gordon Creek and bypasses the Andalex Resources' Wildcat Loadout (Plate 1). There are 2 entrances from the County Road into the permit area, as shown on Plate 1.

R645-301-521.124. EXISTING FACILITIES WITHIN THE PERMIT AREAS

There are no surface or subsurface man-made features within, passing through or passing over the permit area except the powerline, telephone cables, culverts, and etc., installed for the operation of this mine. See Plates 1 and 2 for their locations.

R645-301-521.125. SEDIMENTATION PONDS AND IMPOUNDMENTS

See R645-301-512.240.

R645-301-521.130. LANDOWNERS AND RIGHT OF ENTRY AND PUBLIC INTEREST MAPS

The right-of-way for which we have the legal right of entry is shown on Plate 1.

R645-301-521.131. SURFACE AND SUBSURFACE OWNERS

Owners of Record of Surface and Subsurface Contiguous Areas

All surface and subsurface areas contiguous to the permit area are owned by the United States. The name and address of the responsible authority representing the federal government is as follows:

Bureau of Land Management
Utah State Office
Federal Building
Salt Lake City, Utah 84111
(801) 524-3004

R645-301-521.132. RIGHT TO ENTER AND CONDUCT MINING ACTIVITIES

See R645-301-114.230.

R645-301-521.133.1 OPERATIONS WITHIN 100 FEET OF ROAD RIGHT-OF-WAY

See R645-301-521.123.

R645-301-521.133.2 RELOCATING A PUBLIC ROAD

N/A

R645-301-521.140. MINE AND PERMIT AREA MAPS

Cross Sections, Maps, and Plans **(Also R645-301-510 and Volume II)**

The lands affected by this operation (surface only) are clearly shown on Plate 1. Plate 1 depicts all buildings, utilities, and facilities. All of the land within this permit area which is to be affected already has been. This is a surface facility only and involves no underground workings. The bond required by the Division is for the entire affected area including all the surface facilities.

Coal storage, topsoil storage, loading areas, coal preparation waste areas are all depicted on the surface facilities map. Additional detail on topsoil, diversions, and ponds can be found in Volume II on Plates 13, 2, and 3 respectively.

There is no storage of explosives at the Wildcat Loadout.

The final surface configurations will be similar to the surface prior to Andalex's involvement at Wildcat.

Surface water monitoring locations are shown on Plate 15.

After the completion of activities at this facility, no structures will remain with the exception of the railroad grade, the tracks, and it's associated drainage structures.

All maps requiring certifications by a registered person have been done so. Included are stamps from experts in related fields such as surveying.

PLATES

PLATE #	PLATE TITLE
Plate 1	Existing Surface Facility Map
Plate 1A	Proposed Surface Facility Map, Response to DO-04
Plate 1B	Disturbed Areas
Plate 2	Deleted
Plate 2A	Drainage Map, Response to Division Order
Plate 3A	Sediment Pond A
Plate 3B	Deleted
Plate 3C	Sediment Pond C
Plate 3D	Sediment Pond D
Plate 3E	Sediment Pond E
Plate 3F	Sediment Pond F
Plate 3G	Sediment Pond G
Plate 3H	Permanent Impoundment
Plate 4	Deleted
Plate 5	Deleted
Plate 6	Deleted
Plate 7	Deleted
Plate 8	Final Reclamation Hydrology, Phase 1
Plate 9	Final Reclamation Contours & Revegetation, Phase 2
Plate 10	Cross Sections
Plate 11	Soils Map
Plate 12	Geology Map
Plate 13	Topsoil Piles
Plate 14	Cross Section Reference Map
Plate 15	Watershed Map
Plate 16	Surface and Subsurface Ownership Map
Plate 17	Typical Road Cross-sections
Plate 18	Deleted
Plate 19	Deleted
Plate 20	Deleted

N/A

R645-301-529.400. SURFACE MINING OPERATIONS

N/A

R645-301-530. OPERATIONAL DESIGN CRITERIA AND PLANS

All required surface structures for the Wildcat Loadout are presently in place and operating. Any additions, modifications or deletions will be submitted as amendments or revisions to this plan.

R645-301-531. GENERAL

All structures have been properly designed, approved and constructed. Sediment ponds, dams and impoundments are detailed in Section R645-301-512.240. Roads are discussed in Section R645-301-512.250. Refuse disposal is detailed in Section R645-301-512.230 and Appendix O.

R645-301-532. SEDIMENT CONTROL

See Appendix R

R645-301-532.100. MINIMIZING DISTURBANCES

The permit area has been previously impacted by mining-related and processing activities. The present disturbed acreage at this site is ~~60.94~~ 74.46 acres. This site represents a very compact and efficient use of space when compared to similar processing sites in the area. This is also the smallest practicable area of disturbance for the existing operations.

R645-301-532.200. STABILIZING BACKFILLED MATERIAL

Whenever possible, areas such as embankments, topsoil piles and other non-traffic sites, area revegetated to stabilize the site and reduce runoff.

All disturbed areas will be backfilled and graded to as near as possible the approximate original contour, and to the most moderate slope possible. Slopes shall not exceed the angle of repose or such lessor slopes as required by the regulatory authority to maintain stability. Fill material will be compacted except for the last few

lifts, to assure stability.

R645-301-533. IMPOUNDMENTS

See Appendix R

R645-301-533.100. STABILITY

See Appendix R

R645-301-533.110. MSHA IMPOUNDMENTS

N/A

R645-301-533.200. FOUNDATION DESIGN

Appendix C

R645-301-533.210. STABILITY

Appendix C

R645-301-533.220. PREPARATION

Appendix C

R645-301-533.300. SLOPE PROTECTION

See R645-301-532.200.

R645-301-533.400. VEGETATION OF EMBANKMENTS

See R645-301-532.200.

R645-301-533.500. SUBMERGED HIGHWALLS

N/A

R645-301-533.600. MSHA IMPOUNDMENTS

N/A

R645-301-533.610. GEOTECHNICAL INVESTIGATIONS

N/A

R645-301-533.611. CERTIFICATION

N/A

R645-301-533.612. DESIGN AND CONSTRUCTION REQUIREMENTS

N/A

R645-301-533.613. OPERATION AND MAINTENANCE

N/A

R645-301-533.614. PLANS FOR REMOVAL

N/A

R645-301-533.620. ENGINEERING DESIGN

See R645-301-512.240 *and Appendix R*

R645-301-533.700. NON-MSHA IMPOUNDMENTS DESIGN REQUIREMENTS

See R645-301-512.240 *and Appendix R*

R645-301-533.710. DESIGN PLAN FOR NON-MSHA IMPOUNDMENTS

See Appendix R

R645-301-533.711. CERTIFICATION

See Plates 3A through 3H, and see Appendix R

R645-301-533.712. DESIGN AND CONSTRUCTION REQUIREMENTS

See Appendix R

R645-301-533.713. OPERATION AND MAINTENANCE

See Appendix R

R645-301-533.714. PLANS FOR REMOVAL

See Appendix R

R645-301-534. ROADS

See R645-301-512.250.

R645-301-521.141. AFFECTED AREA

R645-301-521.142. UNDERGROUND WORKINGS AND SUBSIDENCE AREAS

N/A

R645-301-521.143. WASTE DISPOSAL SITES

See R645-301-510, Volume II.

R645-301-521.150. LAND SURFACE CONFIGURATION MAPS

See R645-301-510, Volume II.

R645-301-521.151. REQUIREMENTS

See R645-301-510, Volume II.

R645-301-521.152. PREVIOUSLY MINED AREAS

See R645-301-510, Volume II.

R645-301-521.160. MAPS OR CROSS SECTIONS OR PROPOSED FEATURES

See R645-301-510, Volume II.

R645-301-521.161. BUILDINGS, UTILITY CORRIDORS AND FACILITIES

See R645-301-510, Volume II.

R645-301-521.162. AREA AFFECTED ACCORDING TO SEQUENCE AND TIMING OF OPERATIONS

See R645-301-510, Volume II.

R645-301-521.163. BONDED AREA

See R645-301-510, Volume II.

R645-301-521.164. COAL HANDLING FACILITIES

See R645-301-510, Volume II.

R645-301-521.165. TOPSOIL AND WASTE STORAGE AREAS

See R645-301-510, Volume II.

R645-301-521.166. WASTE SOURCES AND DISPOSAL FACILITIES

See R645-301-510, Volume II.

R645-301-521.167. EXPLOSIVES STORAGE AND HANDLING FACILITIES

N/A

R645-301-521.168. AIR POLLUTION CONTROL FACILITIES

N/A

R645-301-521.169. COAL PROCESSING WASTE FACILITIES

See R645-301-510, Volume II.

R645-301-521.170. TRANSPORTATION FACILITIES MAPS

See R645-301-510, Volume II.

R645-301-521.180. OTHER INFORMATION

See R645-301-510, Volume II.

R645-301-521.190. OTHER RELEVANT INFORMATION REQUIRED BY THE DIVISION.

At this time, there has been no other information required by the division.

R645-301-521.200. SIGNS AND MARKERS SPECIFICATIONS

Signs of a uniform design, showing the company name, business address, and telephone number as well as the identification number of the current regulatory program permit authorizing the underground mining activities, have been placed at all access points to the permit area. These signs have been placed to be easily seen, are made of a durable material, and conform to local laws and regulations. The topsoil storage area is clearly marked.

As there are no perennial streams or a stream with a biological

community on the permit area, buffer zone markers will not be necessary. The perimeters of all areas affected by surface operations and facilities are clearly marked. These signs and markers shall be maintained during all activities and retained and maintained until after the release of all bonds for the permit area.

R645-301-521.210. PLACEMENT AND REMOVAL

See R645-301-521.200.

R645-301-521.220. DESIGN

See R645-301-521.200.

R645-301-521.230. MAINTENANCE

See R645-301-521.200.

R645-301-521.240. MINE AND PERMIT IDENTIFICATION SIGNS

See R645-301-521.200.

R645-301-521.241. LOCATION, UNDERGROUND MINING

See R645-301-521.200.

R645-301-521.242. LOCATION, SURFACE MINING

N/A

R645-301-521.243. INFORMATION

See R645-301-521.200.

R645-301-521.244. REQUIREMENTS

See R645-301-521.200.

R645-301-521.250. PERIMETER MARKERS

See R645-301-521.200.

R645-301-521.251. SURFACE AFFECTED AREAS FOR UNDERGROUND MINING OPERATIONS

See R645-301-521.200.

R645-301-521.252. PERMIT AREA PERIMETER FOR SURFACE MINING OPERATIONS

N/A

R645-301-521.260. BUFFER ZONE MARKERS

N/A

R645-301-521.261. BOUNDARY MARKERS FOR SURFACE ACTIVITIES OF UNDERGROUND OPERATIONS

They consist of orange "Tee" posts which are clearly visible from one marker to the next.

R645-301-521.262. BOUNDARY MARKERS FOR SURFACE MINING OPERATIONS

N/A

R645-301-521.270. TOPSOIL MARKERS

See R645-301-521.200.

R645-301-522. COAL RECOVERY

N/A

R645-301-523. MINING METHOD

N/A

R645-301-523.100. SURFACE MINING OPERATIONS WITHIN 500 FEET OF AN UNDERGROUND MINE

N/A

R645-301-523.200. EXCEPTIONS TO SURFACE MINING OPERATIONS WITHIN 500 FEET OF UNDERGROUND WORKINGS

N/A

R645-301-523.210. RESOURCE RECOVERY OF ELIMINATION OF HAZARDS

N/A

R645-301-523.220. APPROVAL BY DIVISION AND MSHA

Appendix B; Appendix O

R645-301-524. BLASTING AND EXPLOSIVES

N/A - There will be no blasting conducted at this site.

R645-301-525. SUBSIDENCE

N/A - There is no mining at this location.

R645-301-526. MINE FACILITIES

See R645-301-520 and Volume II.

R645-301-526.100. MINE STRUCTURES AND FACILITIES

See R645-301-520 and Volume II.

R645-301-526.110. EXISTING STRUCTURES

See R645-301-520 and Volume II.

R645-301-526.111. LOCATION

See R645-301-520 and Volume II.

R645-301-526.112. PLANS OR PHOTOGRAPHS

See R645-301-520.

645-301-526.113. DATES OF CONSTRUCTION OF EXISTING STRUCTURES

See R645-301-520.

R645-301-526.114. MONITORING DATA

N/A

R645-301-526.115. COMPLIANCE PLAN

N/A

R645-301-526.115.1 DESIGN SPECIFICATION

See R645-301-520.

R645-301-526.115.2 CONSTRUCTION SCHEDULE

See R645-301-520.

R645-301-526.115.3 MONITORING SCHEDULES

N/A

R645-301-526.115.4 MINIMIZING RISK OR HARM TO ENVIRONMENT, HEALTH OR PUBLIC SAFETY

N/A

R645-301-526.116. PROTECTION OF PUBLIC AND LANDOWNERS

See R645-301-510 and R645-301-520.

R645-301-526.116.1 MINING OPERATIONS WITHIN 100 FEET OF THE RIGHT-OF-WAY OF A PUBLIC ROAD

N/A

R645-301-526.116.2 RELOCATING A PUBLIC ROAD

N/A

R645-301-526.200. UTILITY INSTALLATION AND SUPPORT FACILITIES

See R645-301-520.

R645-301-526.210. DESCRIPTION

See R645-301-520.

R645-301-526.220. COMPLIANCE REQUIREMENTS

See R645-301-520.

R645-301-526.221. PROTECTION

See R645-301-520.

R645-301-526.222. MINIMIZATION OF ENVIRONMENTAL IMPACT AND COMPLIANCE WITH EFFLUENT LIMITATIONS

See R645-301-423.200 for details, and R645-301-512.240, R645-301-512.250, R645-301-520, and R-645-301-521 for designs.

R645-301-526.300. WATER POLLUTION CONTROL FACILITIES

See R645-301-520.

R645-301-526.400. AIR POLLUTION CONTROL FACILITIES

Appendix B - Air Quality Permit.

R645-301-527. TRANSPORTATION FACILITIES

Roads

All roads within the permit area are classified as "Primary Roads" in accordance with R614-301-527.100.

See R645-301-512.250 for details.

Railroad

The rail siding roughly bisects the permit area and runs in a north-south direction. The siding is part of a Utah Railroad lease agreement with the B.L.M.

Other Transportation Facilities

Transportation facilities will be designed, constructed, or reconstructed, and maintained to prevent, to the extent possible,

damage to fish, wildlife, and related environmental values; and will control to the extent possible, additional contributions outside the permit area. This has been accomplished on the railroad siding through slope stabilization, revegetation, and adequate drainage. Andalex will minimize diminution or degradation of water quality and quantity; control and minimize erosion and siltation; control and minimize pollution; and prevent damage to public or private property to the extent possible. Please note that Andalex's rail siding parallels the existing Utah Railroad mainline and is owned by the Utah Railroad.

R645-301-527.100. ROAD CLASSIFICATION

R645-301-527.110. DESIGNATION OF ALL ROADS

See R645-301-527.

R645-301-527.120. PRIMARY ROADS

See R645-301-527.

R645-301-527.121. USED FOR TRANSPORTING COAL OR SPOIL;

See R645-301-527

R645-301-527.122. FREQUENT USE OR FOR PERIODS IN EXCESS OF 6 MONTHS

See R645-301-527.

R645-301-527.123. RETAINED FOR POSTMINING LAND USE

See R645-301-527.

R645-301-527.130. ANCILLARY ROADS

See R645-301-527.

R645-301-527.200. TRANSPORTATION FACILITIES

See R645-301-527.

R645-301-527.210. DESIGNS AND SPECIFICATIONS

See R645-301-527.

R645-301-527.220. RELOCATION OF A NATURAL

DRAINAGEWAY

N/A

R645-301-527.230. MAINTENANCE AND REPAIRS

N/A

R645-301-527.240. GEOTECHNICAL ANALYSIS

N/A

R645-301-527.250. ALTERNATE SPECIFICATIONS OR STEEP CUT SLOPES

N/A

R645-301-528. HANDLING AND DISPOSAL OF COAL, OVERBURDEN, EXCESS SPOIL, AND COAL MINE WASTE

See R645-301-512.230 and R645-301-520.

R645-301-528.100. COAL REMOVAL, HANDLING, STORAGE, CLEANING, AND TRANSPORTATION AREAS AND STRUCTURES

See R645-301-512.230.

R645-301-528.200. OVERBURDEN

N/A

R645-301-528.300. SPOIL, COAL PROCESSING WASTE, MINE DEVELOPMENT WASTE, AND NON-COAL WASTE REMOVAL

Coal Refuse

See R645-301-512.230

Acid and Toxic-Forming Materials **(Also R645-301-711.100 and R645-301-731.300)**

Please refer to Section R645-301-512-230, re: coal processing waste and re: leachate testing for potential acid- and toxic-forming materials. If it is determined through leach testing that the coal

processing waste material is acid- or toxic-forming, then the disposal will consist of burial on the west side of Wildcat under four feet of fill material or haulage to another approved coal processing waste disposal area. Disposal will take place within 30 days after the acid or toxic forming materials are identified. The Division will be notified if the coal processing waste is to be moved off-site to another approved disposal area. If acid or toxic forming material is identified it will be buried as described above within 60 days of its discovery. There is no potential for any other acid- or toxic-forming materials within this permit area.

Non-Coal Waste

All combustibles (paper, garbage, paints, wood, etc.) are collected in trash containers and hauled to the local land fill. Non-coal wastes will be placed and stored in a controlled manner in a designated position of the permit area and will comply with R645 regulation. Please refer to Plate 1 for dumpster location.

Contingency Plans to Prevent Sustained Combustion

All which could burn would be small in quantity and consist of normal trash (cardboard, paper, etc.). The quantity would not exceed the volume of a small dumpster. The trash facility is segregated from any buildings or other structures and if ignited accidentally, could be extinguished quickly using either water or fire extinguishers. Spontaneous coal stockpile fires are generally quite small and are extinguished by frontend loaders immediately.

R645-301-528.310. EXCESS SPOIL

N/A

R645-301-528.320. COAL MINE WASTE

See R645-301-528.300.

R645-301-528.321. RETURN OF COAL PROCESSING WASTE TO ABANDONED UNDERGROUND WORKINGS

N/A

R645-301-528.322. REFUSE PILES

See R645-301-512.230 and R645-301-528.300.

R645-301-528.323. BURNING AND BURNED WASTE UTILIZATION

N/A

R645-301-528.323.1 **COAL MINE WASTE FIRES**

See R645-301-512.230.

R645-301-528.323.2 **BURNING OR BURNED COAL MINE WASTE REMOVAL PLAN**

See R645-301-512.230.

R645-301-528.330. **NON-COAL MINE WASTE**

See R645-301-528.300.

R645-301-528.331. **DESIGNATION OF NON-COAL MINE WASTE MATERIALS**

See R645-301-528.300.

R645-301-528.332. **FINAL DISPOSAL OF NON-COAL MINE WASTES**

See R645-301-528.300.

R645-301-528.333. **RESTRICTIONS ON DISPOSAL ON NON-COAL MINE WASTE MATERIAL**

See R645-301-528.300.

R645-301-528.334. **HAZARDOUS WASTE MATERIALS**

See R645-301-528.300.

R645-301-528.340. **UNDERGROUND DEVELOPMENT WASTE**

N/A

R645-301-528.350. **DISPOSAL REQUIREMENTS**

N/A

R645-301-528.400. **DAMS, EMBANKMENTS AND OTHER IMPOUNDMENTS**

See R645-301-512.240.

R645-301-529. **MANAGEMENT OF MINE OPENINGS**

R645-301-534.100. DESIGN, USE AND RECLAMATION

See R645-301-512.250.

R645-301-534.110. DAMAGE TO PUBLIC OR PRIVATE PROPERTY

See R645-301-512.250.

R645-301-534.120. NON-ACID OR NONTOXIC FORMING SUBSTANCES IN ROAD SURFACING

No acid or toxic-forming substances will be used for road surfacing.

R645-301-534.130. FACTOR OF SAFETY FOR ROAD EMBANKMENTS

See R645-301-512.250.

R645-301-534.140. REMOVAL AND RECLAMATION OF ROADS

See R645-301-512.250.

R645-301-534.150. VEGETATION/STABILIZATION EXPOSED SURFACES

See R645-301-512.250.

R645-301-534.200. SAFETY AND ENVIRONMENTAL PROTECTION

See R645-301-512.250.

R645-301-534.300. PRIMARY ROADS

See R645-301-512.250.

R645-301-534.310. LOCATION

See R645-301-512.250.

R645-301-534.320. SURFACING

See R645-301-512.250.

R645-301-534.330. MAINTENANCE

See R645-301-512.250.

R645-301-534.340. CULVERT DESIGN

See R645-301-512.240 and R645-301-512.250.

R645-301-535. SPOIL

N/A

R645-301-535.100. DISPOSAL OF EXCESS SPOIL

N/A

R645-301-535.110. MINIMUM FACTOR OF SAFETY

N/A

R645-301-535.111. LOCATION

N/A

R645-301-535.112. FOUNDATION INVESTIGATIONS

N/A

R645-301-535.113. KEYWAY CUTS OR ROCK TOE BUTTRESSES

N/A

R645-301-535.120. EXCESS SPOIL DISPOSED OF IN UNDERGROUND MINE WORKINGS

N/A

R645-301-535.130. PLACEMENT OF EXCESS SPOIL

The only spoil material generated at the Wildcat Loadout is coal processing waste or refuse and sediment cleaned from the ponds. This material is placed in the refuse pile as described in Section R645-301-512.230 and Appendix O.

R645-301-535.140. **SURFACE COAL OPERATIONS**

N/A

R645-301-536. **COAL MINE WASTE**

See R645-301-512.230.

R645-301-536.100. **DISPOSAL FACILITY**

See R645-301-512.230.

R645-301-536.110. **STABILITY**

See R645-301-512.230.

R645-301-536.120. **FOUNDATION DESIGN**

See R645-301-512.230.

R645-301-536.200. **PLACEMENT**

See R645-301-512.230.

R645-301-536.210. **CONSTRUCTION**

See R645-301-512.230.

R645-301-536.220. **PUBLIC HAZARDS**

See R645-301-512.230.

R645-301-536.230. **PREVENT COMBUSTION**

See R645-301-512.230.

R645-301-536.300. **COAL MINE WASTE DISPOSED OF IN EXCESS SPOIL FILLS**

N/A

R645-301-536.310. **REQUIREMENTS**

N/A

R645-301-536.320. **NONTOXIC AND NON-ACID FORMING**

N/A

R645-301-536.330. DESIGN STABILITY

N/A

R645-301-536.400. OTHER REQUIREMENTS

N/A

R645-301-536.410. RESTRICTIONS

N/A

R645-301-536.420. DESIGN PLAN

N/A

R645-301-536.500. DISPOSAL OF COAL MINE WASTE IN SPECIAL AREAS

See R645-301-512.230.

R645-301-536.510. OUTSIDE A PERMIT AREA

N/A

R645-301-536.520. UNDERGROUND DISPOSAL

N/A

R645-301-536.600. UNDERGROUND DEVELOPMENT WASTE

N/A

R645-301-536.700. COAL PROCESSING WASTE

See R645-301-512.230.

R645-301-536.800. COAL PROCESSING WASTE EMBANKMENTS

See R645-301-512.230.

R645-301-536.810. REQUIREMENTS

See R645-301-512.230.

R645-301-536.820. MSHA REQUIREMENTS

See R645-301-512.230 and Appendix O.

R645-301-536.821. BORINGS AND TEST PITS

N/A

R645-301-536.822. FOUNDATION DESIGN

See R645-301-512.230.

R645-301-536.823. SEEP AND SPRING SURVEYS

See R645-301-512.230.

R645-301-536.824. HAZARDS

See R645-301-512.230.

R645-301-536.900. REFUSE PILES

See R645-301-512.230 and Appendix O.

R645-301-537. REGRADED SLOPES

N/A

R645-301-540. RECLAMATION PLAN

R645-301-541. GENERAL (Also R645-301-533)

Reclamation will be uncomplicated since this area is flat lying and topographically simple. All disturbed areas no longer required for the conduct of operations were immediately revegetated. In the future, any areas no longer required for operations will also be immediately revegetated.

When buildings and final site preparation was completed, the topsoil was revegetated to prevent erosion.

When the project is expired, perhaps in 30 years, extraneous material will be removed. Roads will be regraded and using the most advanced technology at the time, Andalex will re-establish the terrain to as nearly the original as practical.

Reclamation Timetable

Reclamation will be accomplished in two phases. Phase I will commence immediately after the project has expired. Phase I involves the majority of the reclamation steps. It will bring the site to nearly complete with the exception of sedimentation ponds which will be left in place until revegetation has been determined complete. Prior to revegetation being complete, there is a possibility for runoff within the disturbed area to accumulate a sediment load. These ponds left in place will prevent this runoff from leaving the disturbed area. Once the vegetation has been established which will probably take a minimum of two years, Phase II of the reclamation will commence. This phase involves the removal of the four sediment ponds which were left, regrading, and revegetating these areas, and finally, Andalex's commitment to monitoring.

Phase I

The first step will be to remove structures. Since none of the structures will remain on site, this will be the largest part of the Phase I effort and will also be the most expensive. The following is a list of structures which will be brought down and removed either complete or as scrap/salvage.

1. 14 x 60 Scale House Trailer
2. Truck Scales
3. Substation
4. Truck Dump (west side)*
5. Crushing Plant (west side)*
6. Radial Stacker (west side)*
7. Reclaim Tunnel (west side)
8. Loadout Conveyor (west side)*
9. Control Building (west side)
10. Truck Dump & Reclaim (2 each)
11. Conveyor T
12. Crusher and Screening Plant
13. Lump Coal Belt
14. Stoker Radial Stacker
15. Conveyor Y, Y-1
16. Main Radial Stacker (2 each)

17. Loadout Reclaim Tunnel, port supports, hoppers
18. Conveyor R
19. Loadout Tower
20. Miscellaneous (Guard Rails, Office, Water Tanks, Motor Control Centers)
21. Powerline
22. 40' x 40' Shop Building and foundation

* Portable

The next step will be to remove any coal remaining on the various storage areas. This will not amount to a large volume of material and it will either be hauled to an approved storage area off-site or it will be disposed of within the loadout permit area by burial. This will include the coal refuse pile currently stored at Wildcat. The refuse pile will be flattened and buried according to the reclamation plan regarding coal mine refuse.

Once the coal has been removed, then the recontouring and regrading portion will commence. It is anticipated that the structure removal will take approximately one year to complete so at this point, we would be into the reclamation about thirteen months. The first step in the recontouring and regrading would be the removal of the culverts. They have been left in until this point so the disturbed area would drain properly. The recontouring would primarily involve the primary and secondary roads, the loadout pad, and the coal stockpile areas. The undisturbed diversion west of the facility would become permanent at this point and would be capable of passing a 100 year precipitation event. The original natural drainage could not be restored because of the Utah Railroad. This natural drainage has been either blocked or diverted for the last 30 years by predecessors to Andalex.

It is estimated by the cross sections that approximately 74,000 cubic yards of material will have to be moved in this process of recontouring and grading (please see Tables II-1 and II-1A re Mass Balance Summary). This part of Phase I will include the removal of ponds G and E and establishing new drainages to Ponds A, C, and D. Recontouring will take one month.

TABLE V-1

Mass Balance Summary

	Cut	Fill
1 + 00	740.8	926.0
0 + 00	1,111.2	
1 + 00	3,333.6	
2 + 00	1,481.6	2,963.2
3 + 00	1,852.0	5,185.6
4 + 00		5,926.4
5 + 00	1,111.2	4,074.4
6 + 00		4,444.8
7 + 00		1,481.6
8 + 00	7,037.6	4,444.8
9 + 00	6,667.2	2,963.2
10 + 00	7,037.6	2,222.4
11 + 00	4,444.8	2,963.2
12 + 00	8,519.2	4,444.8
13 + 00	1,481.6	6,296.8
14 + 00		8,148.8
15 + 00	7,408.0	4,444.8
16 + 00	6,667.2	3,704.0
17 + 00	2,222.4	5,185.6
18 + 00	5,926.4	2,222.4
19 + 00	1,481.6	1,852.0
20 + 00		740.8
21 + 00	5,185.6	
Total	73,709.6	74,635.6

Note: Refer to Plate 14 for cross-section locations.

TABLE V-1A

Mass Balance
Expanded Wildcat Pad Cross Sections

	Cut	Fill
0+00 - 0+60	0	0
0+80	24.0	0
1+00	22.9	0
1+20	26.1	0
1+40	24.5	0
1+60	58.7	0
1+80 - 3+80	0	0
4+00	0	78.4
4+20	0	250.4
4+40	0	302.3
4+60	181.0	301.3
4+80	157.2	310.1
5+00	139.9	273.5
5+20	132.4	272.7
5+40	135.5	271.7
5+60	153.2	251.3
5+80	169.7	204.9
6+00	171.4	194.7
6+20	173.5	148.0
6+40	185.7	109.3
6+60	227.3	88.4
6+80	234.7	35.0
7+00	211.9	17.0
7+20	0	0
Totals	2,429.6	3,109.0
x 20% swell =	485.9	
	2,915.5	

Note: Refer to Plate 14 for cross-section locations.

At the request of the Division, no extraordinary compaction will be applied to the last few lifts during the recontouring/grading, to provide a relatively loose rooting zone of four feet. This loose application of fill will eliminate the need for ripping prior to topsoil placement. During this operation, if it is determined that additional sediment control measures are needed for the diversions leading to the four ponds, they will be put in at this time. These measures might include rock check dams or straw dikes.

The next steps in Phase I will not take place until the fall of whatever year we are in at this point. So far the project has taken 14 to 15 months. The next two steps in the process are topsoil redistribution, where additional substitute will be hauled in if necessary, and revegetation. Once the topsoil is spread, the area will be roughened by gouging, and the area will be hydroseeded and hydromulched. The entire revegetation procedure is described in this chapter.

Finally in Phase I, monitoring will commence. Observations of revegetation success and slope stability will be observed. If any part of this is unsuccessful, corrective measures will be taken.

Since Andalex estimates a minimum of two years before vegetation has taken hold to prevent erosion, then the entire Phase I project will take at least 3-1/2 years.

Phase II

Phase II of the reclamation will commence as soon as the monitoring of Phase I allows.

All that is left at this point is the removal (recontouring) of Ponds A, C, D, and F and the removal of the field fence surrounding the permit area. Once the areas have been graded, they will be prepared with loose filling of the upper lifts, (as described in Phase I above), prior to topsoil redistribution. At this point, if it is not already the fall season, Andalex will wait before redistributing the topsoil and revegetating. The same methods for revegetation will be used as in the Phase I reclamation.

Monitoring will then continue until the release of the bond.

Please note that earthwork will be done in both Phase I and II as much as possible during the dry seasons to avoid unnecessary erosion to the regraded areas. If dust becomes a

problem, water will be used to control it.

Reclamation Cost and Bonding

Bond information and detailed costs are provided in Appendix B.

R645-301-541.100. CESSATION OF MINING OPERATIONS

See R645-301-541.

R645-301-541.200. REMOVAL OF FACILITIES

See R645-301-541.

R645-301-541.300. POSTMINING FACILITIES AND MONITORING

See R645-301-541.

R645-301-541.400. COMPLIANCE REQUIREMENTS FOR RECLAMATION

See R645-301-240.

R645-301-542. NARRATIVES, MAPS AND PLANS

See R645-301-510.

R645-301-542.100. TIMETABLE

See R645-301-240 and R645-301-541.

R645-301-542.200. BACKFILLING AND GRADING PLAN

See R645-301-532.200.

R645-301-542.300. FINAL SURFACE CONFIGURATION MAPS

Plates 8,9 and 10.

R645-301-542.310. CERTIFICATION REQUIREMENTS

See R645-301-510 and Volume II.

R645-301-542.320. PERMANENT FACILITIES

The only permanent facilities to remain at the Wildcat Loadout after reclamation will be the Undisturbed Diversion (UD-1), Permanent Impoundment and the railroad. The undisturbed diversion and permanent impoundment are being left to provide drainage control for a drainage that was blocked off over 30 years ago by the railroad.

These structures are sized to carry runoff from a 100 year - 24 hour storm, as detailed in *Appendix R.*

R645-301-542.400. FINAL ABANDONMENT OR BOND RELEASE

Reclamation Cost and Bonding

Cost of Reclamation

Introduction

The major elements in the reclamation of Wildcat will be the dismantling and removal of the large structures. This will be accomplished primarily with manpower and some large equipment including cranes. The major structures to be removed are the loadout tower, the two loadout conveyors, the reclaim tunnel, the two radial stackers, the yard conveyor, the crushing and screening plant, and the truck dump. Also, the coal refuse pile will be flattened and covered with suitable fill material.

Andalex forsees that the removal of these structures will be done in conjunction with a salvaging project as these structures and equipment will retain a great deal of value after they are dismantled. Therefore, the cost of removing these structures may be largely absorbed by the person or persons participating in the salvage operation. However, this savings was not considered in the bond estimate.

Bond or Surety Arrangement

Andalex has procured a reclamation bond (Irrevocable Letter of Credit) in the amount of $651,000, as established by the Division. (See Appendix B) This bond is based on detailed calculations provided by the Division. A copy of the calculations are also included in Appendix B.

Wildcat Loadout Facility

Restoration to the pre-mining land use will require:

~~PHASE I:~~

A. Removal of Structures:
   1. 14 x 60 Scale House Trailer and Truck Scales
   2. Substation
   3. Truck Dump (west side)
   4. Crushing Plant (west side)*
   5. Radial Stacker (west side)*
   6. Reclaim Tunnel (west side)
   7. Loadout Conveyor (west side)*
   8. Control Building (west side)
   9. Truck Dump & Reclaim
   10. Conveyor T
   11. Crusher and Screening Plant
   12. Lump Coal Belt
   13. Stoker Radial Stacker
   14. Conveyor Y
   15. Main Radial Stacker
   16. Loadout Reclaim Tunnel, port supports,
   17. Conveyor R
   18. Loadout Tower
   19. Miscellaneous (Guard Rails, Office, Water and Mag. Tanks, Motor Control Centers)
   20. Powerline
   21. 40" x 40" Shop
       Total

   * Portable

B. Cleanup Coal Piles:
   1. Radial Stacker
   2. Stoker, Lump
   3. Mine Run and Lump
   4. West Side Stoker
   5. West Side Storage Pad

C. Recontouring and Regrading:
   (including covering of coal refuse storage pile)
   1. Culvert Removal
   2. *Removal of sediment ponds*
   3. Move 77,000 yds.^{3}

D. Compaction and Scarification:

E. Topsoil Redistribution:

F. Revegetation:

G. Monitoring Costs:
Years 1, 2, 3, 5, 9, and 10
Water
Revegetation
Erosion

Phase II:

A. Recontouring, Grading, Compaction, Topsoil Redistribution, Revegetation
1. Ponds A, C, D, and F

B. Monitoring Costs:
Years 9 and 10
Revegetation
Erosion

Productivity will be sampled only during years 9 and 10. The reference area will be sampled during years 9 and 10.

Casing and Sealing of Drill Holes

All drill holes within the permit area have been sealed with cement from bottom to top (eight test holes referred to in Appendix C). No new holes will be drilled.

R645-301-542.500. IMPOUNDMENTS AND EMBANKMENTS

See R645-301-512.240, R645-301-541, *and Appendix R*

R645-301-542.600. ROADS

All roads will be removed and reclaimed per Section R645-301-541.

R645-301-542.610. CLOSURE

See R645-301-541.

R645-301-542.620. REMOVAL OF BRIDGES AND CULVERTS

See R645-301-541.

R645-301-542.630. TOPSOIL REPLACEMENT AND REVEGATATION

See R645-301-541.

R645-301-542.640. **REMOVAL OF ROAD SURFACING MATERIALS**

See R645-301-541

R645-301-542.700. **FINAL ABANDONMENT OF MINE OPENINGS AND DISPOSAL AREAS**

Plates 8 & 9.

R645-301-542.710. **DESCRIPTION**

N/A

R645-301-542.720. **DISPOSAL OF EXCESS SPOIL**

N/A

R645-301-542.730. **DISPOSAL OF COAL MINE WASTE**

See R645-301-512.230.

R645-301-542.740. **DISPOSAL OF NON-COAL MINE WASTES**

See R645-301-541.

R645-301-542.741. **PLACEMENT AND STORAGE**

See R645-301-541.

R645-301-542.742. **FINAL DISPOSAL**

See R645-301-541.

R645-301-542.800. **RECLAMATION COST ESTIMATE**

See R645-301-240, R645-301-542.400 and Appendix B.

R645-301-550. **RECLAMATION DESIGN CRITERIA AND PLANS**

See R645-301-240.

R645-301-551. CASING AND SEALING OF UNDERGROUND OPENINGS

N/A

R645-301-552. PERMANENT FEATURES

See Section R645-301-542.320.

R645-301-552.100. SMALL DEPRESSIONS

See Section R645-301-542.320.

R645-301-552.200. PERMANENT IMPOUNDMENTS

See Sections R645-301-512.240, R645-301-542.320 *and Appendix R*

R645-301-553. BACKFILLING AND GRADING

See Section R645-301-541.

R645-301-553.100. DISTURBED AREAS

See Section R645-301-541.

R645-301-553.110. AOC REQUIREMENTS

See Section R645-301-541.

R645-301-553.120. HIGHWALL AND SPOILS PILE ELIMINATION

See Section R645-301-541.

R645-301-553.130. SLOPE PROTECTION AND STABILITY

See Section R645-301-541.

R645-301-553.140. EROSION AND WATER POLLUTION

See Section R645-301-541.

R645-301-553.150. SUPPORT POSTMINING LAND USE

Upon completion of Andalex Resources' mining operation, the land will continue to be used for grazing and hunting. The limited

resources, both physical and scenic, will dictate no future change in the land status. The nature of an underground mine of this size requires minimal surface disturbance. All disturbed areas shall be restored in a timely manner to conditions that are capable of supporting the uses which they were capable of supporting before any mining including high priority wildlife habitat. Andalex is not proposing an alternate post-mining land use. Andalex is not requesting an approval for an alternate post-mining land use. The anticipated post-mining land use is likely to be achieved and does not present any actual or probable hazard to public health or safety or threat of water diminution or pollution. The post-mining land use is practical and can be implemented immediately following reclamation and will not result in any violation of federal, state, or local law.

R645-301-553.200. SPOIL AND WASTE

N/A

R645-301-553.210. REQUIREMENTS FOR DISPOSAL

N/A

R645-301-553.220. SPOIL PLACEMENT OUTSIDE MINED-OUT AREA

N/A

R645-301-553.221. CLEARING AND GRUBBING

N/A

R645-301-553.222. TOPSOIL REMOVAL AND STORAGE

N/A

R645-301-553.223. BACKFILLING AND GRADING

N/A

R645-301-553.230. FINAL SURFACE GRADING

See R645-301-541.

R645-301-553.240. FINAL CONFIGURATION

Plates 8 & 9.

R645-301-553.250. REFUSE PILES

See section R645-301-512.230; Plates 8 & 9.

R645-301-553.251. FINAL CONFIGURATION

See section R645-301-512.230 and Appendix O.

R645-301-553.252. COVER REQUIREMENTS

See section R645-301-512.230 and Appendix O.

R645-301-553.260. DISPOSAL OF COAL PROCESSING WASTES IN MINED-OUT SURFACE AREAS

N/A

R645-301-553.300. RESTRICTIONS AND REQUIREMENTS

N/A

R645-301-553.400. CUT-AND-FILL TERRACES

N/A

R645-301-553.410. COMPATIBILITY

N/A

R645-301-553.420. SPECIALIZED FACILITIES FOR IMPLEMENTING POSTMINING LAND USE

N/A

R645-301-553.500. PREVIOUSLY MINED AREAS

N/A

R645-301-553.510. RE-MINING AREAS CONTAINING HIGHWALLS

N/A

R645-301-553.520. HIGHWALL ELIMINATION

N/A

R645-301-553.530. REMAINING HIGHWALLS

N/A

R645-301-553.540. SPOIL ON OUTSLOPES

N/A

R645-301-553.600. APPROXIMATE ORIGINAL CONTOUR

See R645-301-523.200.

R645-301-553.610. HIGHWALL VARIANCE REQUIREMENTS

N/A

R645-301-553.611. SPOIL AND BACKFILL

N/A

R645-301-553.612. AVAILABLE SPOIL

N/A

R645-301-553.650. HIGHWALL MANAGEMENT

See R645-301-511.100.

R645-301-553.650.100 REMAINING HIGHWALL - SIZE

N/A

R645-301-553.650.200 REMAINING HIGHWALL - APPEARANCE

N/A

R645-301-553.650.300 REMAINING HIGHWALL - MODIFICATION

N/A

R645-301-553.650.400 REMAINING HIGHWALL - LAND USE

N/A

R645-301-553.650.500 REMAINING HIGHWALL -COMPATIBILITY

N/A

R645-301-553.700. BACKFILLING AND GRADING: THIN OVERBURDEN

N/A

R645-301-553.710. AVAILABLE SPOIL MATERIALS

N/A

R645-301-553.720. REQUIREMENTS

N/A

R645-301-553.800. BACKFILLING AND GRADING: THICK OVERBURDEN

N/A

R645-301-553.810. FINAL GRADING

N/A

R645-301-553.820. REQUIREMENTS

N/A

R645-301-553.830. EXCESS SPOIL

N/A

R645-301-553.900. SETTLED AND REVEGETATED FILLS

N/A

R645-301-560. PERFORMANCE STANDARDS

See R645-301-510 and R645-301-541.

ANDALEX RESOURCES, INC.

WILDCAT LOADOUT

MINING AND RECLAMATION PLAN

CHAPTER 6, GEOLOGY

CHAPTER 6

TABLE OF CONTENTS

R645-301-600.	GEOLOGY	6-1
R645-301-610.	INTRODUCTION	6-1
R645-301-611.	GENERAL REQUIREMENTS	6-1
R645-301-612.	CROSS SECTION, MAPS AND PLANS	6-4
R645-301-620.	ENVIRONMENTAL DESCRIPTION	6-4
R645-301-621.	GENERAL REQUIREMENTS	6-4
R645-301-622.	CROSS SECTIONS, MAPS AND PLANS	6-4
R645-301-623.	GEOLOGIC INFORMATION	6-5
R645-301-624.	GEOLOGIC INFORMATION	6-5
R645-301-625.	ADDITIONAL INFORMATION	6-7
R645-301-626.	WAIVER FROM COLLECTION AND ANALYSIS	6-7
R645-301-627.	OVERBURDEN	6-7
R645-301-630.	OPERATION PLAN	6-7
R645-301-631.	CASING AND SEALING OF EXPLORATION HOLES AND BOREHOLES	6-7
R645-301-632.	SUBSIDENCE MONITORING	6-8
R645-301-640.	PERFORMANCE STANDARDS	6-8
R645-301-641.	ALL EXPLORATION HOLES AND BOREHOLES	6-8
R645-301-642.	MONUMENTS AND SURFACE MARKERS	6-8

CHAPTER 6, GEOLOGY

HISTORICAL NOTE: In 2004, the Division issued an Order DO-04 for wind-blown fines which had accumulated outside the disturbed area, primarily in the area southwest of the main coal storage pile below sediment Pond B. A complete description of the mitigation plan proposed for DO-04 is included in Appendix P.

R645-301-600. GEOLOGY

R645-301-610. INTRODUCTION

R645-301-611. GENERAL REQUIREMENTS

R645-301-611.100. GEOLOGY WITHIN AND ADJACENT TO THE PERMIT AREA

Introduction

The Wildcat Loadout is in the Gordon Creek area of the Wasatch Plateau which is one of the major physiographic features in the region. The plateau rises from a base at approximately 6,000 feet in elevation to over 9,000 feet.

Spring Canyon and Ford Ridge (Forge Mountain) are the major topographic features of the area. The Price River Canyon and Spring Canyon are the major area drainages.

Geologic Setting (Stratigraphy and Structure)

The permit area sits on the Masuk Member of the Mancos Shale. The Mancos Shale in this area is in access of 5,000 feet thickness. The Mancos Shale in the area is mainly dark bluish, gray shale which becomes sandy towards the top.

The oldest unit of the Mesa Verde Group is the Star Point Sandstone. It lacks coal and consists of three sandstone tongues. The beds of sandstone range in thickness from one to ten feet in most parts. The Mesa Verde Group immediately overlies the Mancos Shale. Overlying the starpoint sandstone, is the Blackhawk formation, also of the Mesa Verde Group. The major coal seams of the entire region lie within the Blackhawk formation. The Blackhawk formation consists of cliffy sandstone beds and lagoonal sediments.

Immediately, but disconformably overlying the Blackhawk formation, is the Castlegate sandstone, also of the Mesa Verde Group. It is a single bed of massive sandstone about 450 to 500 feet thick. Above the Castlegate sandstone are 900 to 1,000 feet of sandstone, shale, and sandy shale beds, a unit called the Price River Formation which is also a member of the Mesa Verde Group.

Structure

In the Wasatch Plateau, the cliff fronts roughly parallel the strike of the beds with gentle dips to the northwest. The Mancos Shale in this area exhibits the same trends.

The Wasatch Plateau contains three complex north trending fault zones of large lateral extent. This has a tendency to disrupt mining activities on the Wasatch Plateau but will have no impact on the Wildcat Loadout Facility as this is strictly a surface facility.

History of Mining

Mining and its' related activities have been the main industry in this region for many years.

Coal was discovered in the Wasatch Plateau as early as 1874. Coal exploration eventually spread to the Book Cliffs. As early as 1889, mines started operating in the area. The Castlegate and Sunnyside area was developed first. As the coal way usually discovered away from settled areas, the companies built houses for their employees.

There was increased production until 1920, thereafter declining during the 1920's and 1930's. However, as a result of the second World War, production bounced back to the 1920 levels and this production increase went up until 1957 when production once again declined.

Up to 75 percent of Utah's annual coal production has come from mines in the Book Cliffs.

Coal already extracted from the coal measures of the area is well over 200 million tons. Much coal remains and many mines are presently operating in the area.

Historically, coal loading activities had been the sole use for this permit area, even prior to being leased to Andalex Resources.

Geologic and Tectonic History

During the Triassic and Jurassic periods, the area of the Book Cliffs was relatively stable, but gradually subsided and received sediments. The area, assumed to have been a relatively flat lowland, was occasionally covered by a shallow sea of short geologic duration. A thick red bed sequence suggests tropical conditions. During the Triassic times, the sediments probably came from all directions but, during the Jurassic time, the major source areas were mainly to the south and west.

During the early Cretaceous, a trough developed in the Colorado Rockies and the sea invaded the area. Gradually, the sea crept westward as the trough continued to subside, reaching the east edge of the Colorado Plateau by the early part of the Upper Cretaceous.

Unconformities and thinning of various members indicate that volcanic activity to the west caused sediments to fill the basin faster than it could subside, causing the shoreline to be pushed eastward. When hills developed as a result of this activity, the incoming sediments diminished, causing the sea to move westward once more. With each pulse, the boundaries of the depositional environments moved eastward and then returned westward. This was the period the sandstone tongues of the Mesa Verde group which project into the Mancos, were deposited. This is known as the Star Point Sandstone.

Despite the fact that the sea retreated, the area continued to receive sediments under continual conditions, a condition known to have lasted well into the Eocene time. The area began to rise in full earnest during Oligocene time. Erosion attacked the previously deposited formations, and in consequence, forming the present mountain ranges and cliffs.

Geologic Hazard

Although there are faults present in the area, they will have no impact on the Wildcat Loadout Surface Facility.

Detailed Description of Strata to be Disturbed by Surface Operations

Identification of Strata

The strata disturbed by surface operations consists of a slightly sandy shale. Surface disturbance was primarily in loose sediments and coal dumps.

R645-301-611.200. PROPOSED OPERATIONS

See R645-301-551. and R645-301-529.100.

R645-301-612. CROSS SECTION, MAPS AND PLANS

See R645-301-510.

R645-301-620. ENVIRONMENTAL DESCRIPTION

See R645-301-510.

R645-301-621. GENERAL REQUIREMENTS

See R645-301-510.

R645-301-622. CROSS SECTIONS, MAPS AND PLANS

Plate 12

R645-301-622.100. TEST BORINGS AND CORE SAMPLINGS

Appendix C

R645-301-622.200. COAL SEAMS AND BURDEN

N/A

R645-301-622.300. COAL OUTCROPS

N/A

R645-301-622.400. GAS AND OIL WELLS

There are no oil or gas wells within the permit area. In 2002, a drill pad was constructed by Conoco Phillips Company for a gas well adjacent to the east permit boundary, and actually encroached on the permit as shown on Plates 1 and 2; however, to date, no drilling has been done and future drilling will not occur within the permit boundary.

R645-301-623. GEOLOGIC INFORMATION

See R645-301-611.100.

R645-301-623.100. POTENTIALLY ACID OR TOXIC FORMING STRATA

Appendix C

R645-301-623.200. RECLAMATION REQUIREMENTS

See R645-301-240.

R645-301-623.300. SUBSIDENCE CONTROL PLAN

N/A

R645-301-624. GEOLOGIC INFORMATION

See R645-301-611.100.

R645-301-624.100. DESCRIPTION

See R645-301-611.100.

R645-301-624.110. CROSS SECTIONS, MAPS AND PLANS

See R645-301-510.

R645-301-624.120. OTHER INFORMATION

Alternative Water Supply Information

The Wildcat activities will not result in any contamination, diminution, or interruption of any surface water sources within the proposed permit area. Naturally drainages have been diverted around the disturbed area. It should be noted that these are ephemeral drainages. As no springs or seeps exist on or near the permit area, there are no groundwater sources to be disrupted. Andalex has water rights on the seep in Garley Creek and upon completion of activities this water right could be transferred for another use. To date, Andalex has not developed this water. If developed, it will be used for dust suppression.

R645-301-624.130. GEOLOGIC LITERATURE AND PRACTICES

See R645-301-611.100.

R645-301-624.200. SAMPLING AND ANALYSIS

Appendix C

R645-301-624.210. LOGS

Appendix C

R645-301-624.220. CHEMICAL ANALYSES

Appendix C

R645-301-624.230. ACID OR TOXIC FORMING MATERIALS

Appendix C, R645-301-513.300.

R645-301-624.300. TEST BORINGS AND DRILL CORES

Appendix C

R645-301-624.310. LOGS

Appendix C

R645-301-624.320. **ACID OR TOXIC FORMING MATERIALS**

Appendix C, R645-301-513.300.

R645-301-624.330. **CHEMICAL ANALYSES**

Appendix C

R645-301-624.340. **ROOF AND FLOOR MATERIALS**

N/A

R645-301-625. **ADDITIONAL INFORMATION**

Appendix C

R645-301-626. **WAIVER FROM COLLECTION AND ANALYSIS**

N/A

R645-301-627. **OVERBURDEN**

N/A

R645-301-630. **OPERATION PLAN**

See R645-301-511.100.

R645-301-631. **CASING AND SEALING OF EXPLORATION HOLES AND BOREHOLES**

See R645-301-551.

R645-301-631.100. **TEMPORARY CASING AND SEALING OF DRILLED HOLES**

N/A

R645-301-631.200. **PERMANENT CASING AND SEALING OF EXPLORATION HOLES AND BOREHOLES**

See R645-301-551.

R645-301-632. SUBSIDENCE MONITORING

N/A

R645-301-632.100. DEGREE OF SUBSIDENCE

N/A

R645-301-632.200. MONITORING LOCATIONS

N/A

R645-301-640. PERFORMANCE STANDARDS

See R645-301-551 and R645-301-529.100.

R645-301-641. ALL EXPLORATION HOLES AND BOREHOLES

See R645-301-551 and R645-301-529.100.

R645-301-642. MONUMENTS AND SURFACE MARKERS

N/A

ANDALEX RESOURCES, INC.

WILDCAT LOADOUT

MINING AND RECLAMATION PLAN

CHAPTER 7, HYDROLOGY

CHAPTER 7

TABLE OF CONTENTS

R645-301-700.	HYDROLOGY	7-1
R645-301-710.	INTRODUCTION	7-1
R645-301-711.	GENERAL REQUIREMENTS	7-2
R645-301-712.	CERTIFICATION	7-8
R645-301-713.	INSPECTION	7-9
R645-301-720.	ENVIRONMENTAL DESCRIPTION	7-9
R645-301-721.	GENERAL REQUIREMENTS	7-9
R645-301-722.	CROSS SECTIONS AND MAPS	7-9
R645-301-723.	SAMPLING AND ANALYSIS	7-9
R645-301-724.	BASELINE INFORMATION	7-15
R645-301-725.	BASELINE CUMULATIVE IMPACT AREA INFORMATION	7-23
R645-301-726.	MODELING	7-24
R645-301-727.	ALTERNATIVE WATER SOURCE INFORMATION	7-24
R645-301-728.	PROBABLE HYDROLOGIC CONSEQUENCES (PHC) DETERMINATION	7-24
R645-301-729.	CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT (CHIA)	7-25
R645-301-730.	OPERATION PLAN	7-26
R645-301-731.	GENERAL REQUIREMENTS	7-26
R645-301-732.	SEDIMENT CONTROL MEASURES	7-32
R645-301-733.	IMPOUNDMENTS	7-33
R645-301-734.	DISCHARGE STRUCTURES	7-37
R645-301-735.	DISPOSAL OF EXCESS SPOIL	7-37
R645-301-736.	COAL MINE WASTE	7-37

R645-301-737. NON-COAL MINE WASTE 7-38

R645-301-738. TEMPORARY CASING AND SEALING OF WELLS . 7-38

R645-301-740. DESIGN CRITERIA AND PLANS 7-38

R645-301-741. GENERAL REQUIREMENTS 7-38

R645-301-742. SEDIMENT CONTROL MEASURES 7-38

R645-301-743. IMPOUNDMENTS 7-45

R645-301-744. DISCHARGE STRUCTURES 7-47

R645-301-745. DISPOSAL OF EXCESS SPOIL 7-47

R645-301-746. COAL MINE WASTE 7-49

R645-301-747. DISPOSAL OF NON-COAL MINE WASTE 7-51

R645-301-748. CASING AND SEALING OF WELLS 7-51

R645-301-750. PERFORMANCE STANDARDS 7-51

R645-301-751. WATER QUALITY STANDARDS AND EFFLUENT LIMITATIONS 7-52

R645-301-752. SEDIMENT CONTROL MEASURES 7-52

R645-301-753. IMPOUNDMENTS AND DISCHARGE STRUCTURES . 7-53

R645-301-754. DISPOSAL OF EXCESS SPOIL, COAL MINE WASTE AND NON-COAL MINE WASTE 7-53

R645-301-755. CASING AND SEALING OF WELLS 7-53

R645-301-760. RECLAMATION 7-53

R645-301-761. GENERAL REQUIREMENTS 7-53

R645-301-762. ROADS 7-53

R645-301-763. SILTATION STRUCTURES 7-53

R645-301-764. STRUCTURE REMOVAL 7-54

R645-301-765. PERMANENT CASING AND SEALING OF WELLS . 7-54

CHAPTER 7, HYDOLOGY

HISTORICAL NOTE: In 2004, the Division issued an Order DO-04 for wind-blown fines which had accumulated outside the disturbed area, primarily in the area southwest of the main coal storage pile below sediment Pond B. A complete description of the mitigation plan proposed for DO-04 is included in Appendix P.

R645-301-700. HYDROLOGY

R645-301-710. INTRODUCTION

It should be noted that the entire sedimentation and control plan, including impoundments, diversions and *reclamation hydrology* are discussed in *Appendix R, Sedimentation and Drainage Control Plan.* ~~the Engineering Chapter 5 under Section R645-301-512.240. To prevent duplication and possible omissions during amendments, references are made from this chapter to that section wherever applicable.~~

~~Section R645-301-512.240 addresses all, or relevant portions of, the following main sections in Chapter 7.~~

~~R645-301-722, 723, 724, 725, 728, 731, 732, 733, 734, 740, 741, 742, 743, 744, 752, 753, 763 and 764~~

R645-301-711. GENERAL REQUIREMENTS

See Sections R645-301-711.100 through R645-301-711.500

R645-301-711.100. EXISTING HYDROLOGIC RESOURCES

Existing Groundwater Resources

Regional Groundwater Hydrology

The groundwater resources of the Wasatch Plateau have not been studied to any great extent. The region has been characterized generally as one of regional groundwater recharge.[1] The lithologic nature of the upper cretaceous strata generally makes them unsuitable as significant aquifers. Much of the precipitation that falls in the Wasatch Plateau is removed by overland flow and evapotranspiration. The water that does enter the ground moves only short distances before discharging as springs and seeps, generally in the higher elevation areas. The regional water table

[1]Price and Arnow, 1974

is probably several hundred feet below the surface,[1] and probably coincides with the bottoms of the major streams, i.e., Price River.

The principal water bearing formations of the Wasatch Plateau are the sandstone units of the Mancos Shale Group. These include the Emery and Ferron Sandstones.[1] These sandstone units occur in the southern part of Emery County and probably do not extend into the Gordon Creek area.[2] The basal unit of the Mesa Verde Group, the Star Point Sandstone, is probably the principal aquifer in the Gordon Creek area; however, this unit is stratigraphically located several hundred feet in elevation higher than the loadout facility. Price and Arnow (1979) do not identify the Gordon Creek area as a region for potential large scale groundwater development.

The Mancos formation consists of approximately 5,000 feet of dark blue-gray shale with several prominent members. The loadout facility is located in the Upper or Masuk Shale Member of the Mancos. This formation is characterized as a yellow to blue-gray sandy shale and is not regarded as an aquifer (please see Figure VII-1). Little data is available on the groundwater potential of the shales in the Lower Gordon Creek Area, since they are located below the minable coal seams and above the river bottoms, and thus have not been studied specifically. The extremely low groundwater potential of the general area, however, is supported by a field reconnaissance of the surrounding area. The drainages within a 1/2 mile radius of the loadout site are all ephemeral and no springs or seeps are known to exist within this distance, indicating a complete lack of groundwater in the shale unit in this area. The nearest water to be found in the general area is in a small seep in Garley Canyon about 1/2 mile to the southwest, and the Gordon Creek drainage located some 1-1/2 miles to the south. The flows are generally intermittent and are characterized by poor quality and a high salt content, typical of low volume flow in the Mancos Shale. Some groundwater has been measured in the Lower Mancos Shale units in Castle Valley, i.e., C.V. Spur. These areas are below the water tables of the Price River and various canals, and are likely fed by those units. An examination of available data in the MRP show groundwater quality in these areas is inconsistent and highly alkaline, commonly containing total dissolved solids in excess of 10,000 mg/l.

The spring/seep in Garley Canyon is located in the NW 1/4 NW 1/4 of Section 4, Township 13 South, Range 9 East, S.L.B.M., approximately 3/4 miles southwest of the loadout facility, as shown on Plate 15. The spring outcrops at an elevation of approximately 6,155.0 feet, in the main drainage of Garley Canyon, near the Utah Railroad Crossing. The spring is located in the Quarternary Alluvium; however, it is likely the recharge is from the alluvial terraces to the northwest, with the water surfacing near the point where the

---

[2]Fisher, 1960

alluvium meets the more impermeable Mancos Shale below. The flow from the spring is extremely low - approximately 5 g.p.m. - and the quality is typically poor for water in this area. Andalex has filed for the water rights to this spring, and a copy of the certificate of water right is included as Appendix G. Also included in the appendix is a water sample analysis of the spring. The spring is presently used only for occasional wildlife and stock watering; however, this use is highly limited since the spring has not been developed for any specific purpose. Future use of the spring may include industrial water if Andalex decided to develop and utilize the water for its loadout operation.

Mine Plan Area Groundwater Hydrology

The processing/loadout facility is located on a low slope within the Masuk Shale Member of the Mancos Formation. Ridges adjacent to the area are capped by a loose deposit of boulders and gravels derived from the sandstones and limestones of the eroded plateaus. These gravel deposits are believed to be late tertiary or early quaternary in age.[3] Eight holes were drilled on site for a geotechnical analysis of soil foundation characteristics. Locations of the holes are shown on Figure No. 1 in Appendix C. The holes reached depths of 45', and show the top 15' to 20' to be a clayey silt and a gray shale below that depth. None of the holes intercepted any groundwater. Two additional holes were drilled up to 60' to set piling below the loadout, and no groundwater was intercepted in this drilling.

At the recommendation of the foundation consultant, Rollins, Brown, and Gunnell, the two deeper holes were left open to be monitored for groundwater infiltration. The 2-60' deep holes were left open for a period of two months and checked on a weekly basis. After two months, no groundwater had been detected in either hole and it was therefore concluded that groundwater did not exist in the area of drilling. No other data is available.

The drainages within, and adjacent to the permit area, are all ephemeral and there are no springs or seeps in this area.

There are no groundwater resources present on or adjacent to the permit area. This conclusion is based on the following:

1. Regional groundwater evaluations show minor perched aquifers in the upper (Mesa Verde Group) formations and minor groundwater occurrances in the Mancos in the valley floor below the river and canal water tables.

---

[3]Spieker, 1931

The permit area lies within the Masuk Shale Member of the Mancos Formation, which is in between the recorded groundwater areas. This shale member is not regarded as a regional or localized aq uifer;

2. The drainages within and adjacent to the permit area are all ephemeral. The presence of groundwater would likely be shown by springs, seeps, or at least intermittent flows in some of the deeply eroded natural drainages;

3. There are no springs or seeps known to exist within or adjacent to the permit area;

4. On-site drilling reached depths of 60' and encountered absolutely no groundwater.

Effects of Operations on Groundwater

Regional and on-site studies, reconnaissance, and drilling indicate a complete lack of groundwater in the permit area and surrounding area. If groundwater does exist below the permit area, it is likely several hundred feet down, near the level of the valley floor. Since the operations at this site are confined to the immediate surface and since no mining extraction or subsidence will occur here, there will be no effect of the operation on groundwater.

Mitigation and Control Plans

Since there are no groundwater resources or impacts expected at this site, there will be no need for mitigation and control plans for groundwater protection. The operation will, however, be conducted in a sound and environmentally conscious manner. There will be mitigation and control plans for surface water and these plans will ensure protection of surface water which may become recharge for groundwater sources elsewhere.

Groundwater Monitoring

Since groundwater does not occur on or adjacent to the permit area, there is no baseline water quality or quantity information available, other than the drilling information on the site that confirmed no groundwater is present. As a result, no groundwater monitoring program is proposed for this operation.

Andalex Resources, Inc. will, however, perform a leachate test on the coal and reject materials stored on site as requested by the

Division. Andalex will gather a special sample of the coal processing waste material for a special one time characterization. Andalex proposes to take this sample at approximately the center of the pile at a depth of approximately one foot. The sample will be a grab type sample unless the size of the specimen recovered is too large. If so, Andalex will form a composite sample from four separate locations in a radius approximately 50 feet from the center of the pile. Only one sample will be required from this depth because in an ordinary coal processing waste year, only one two foot lift is added to the reject pile. As soon as this procedure has been approved by the Division, it will be implemented. The test will consist of saturating a representative sample of material with water for a period of 24 hours and then extracting a fluid sample. The leachate will then be analyzed for the normal surface water baseline parameters. This information will then be incorporated into the probable hydrologic consequences document for the facility.

The material to be leached will also be tested for acid- or toxic-forming potential at this time. The analysis will include the following parameters: pH, Ec, SAR, Se, B, Acid-Base Potential, % Organic Carbon, Saturation Percent, and Texture. If toxic- or acid-forming materials are found to occur, a plan will be developed to ensure that drainage from these materials will not be detrimental to vegetation or adversely affect surface waters.

The above described leachate analysis was conducted in 1994 and results were submitted to the Division in the Annual Report for that year. Additional sampling of the refuse material was also conducted in 2004 and analyzed for acid and toxic properties. The results of these tests are included in Appendix D.

Surface Water Hydrology

This section will provide a review of the surface water hydrology relevant to the Andalex Wildcat Loadout Facility, as well as methods and designs to control surface waters within compliance of DOGM regulations.

Methodology

The hydrologic study is based on a review of literature and available data obtained from the USGS, NOAA Atlas, and other mine permit applications. A field reconnaissance was also conducted to confirm the location and characteristics of surface water courses. Designs of control structures are based on requirements of the regulations.

Existing Surface Water Resources

Regional Surface Water Hydrology

Most of the regional area is drained by tributaries to the Green and Colorado Rivers. Principal tributaries are the Price and San Rafael Rivers and Muddy Creek. The Green River flows through the eastern edge of the Central Utah Region.

A USGS Report entitled "Hydrologic Reconnaissance of the Wasatch Plateau - Book Cliffs Coal Field Area, Utah" considers the development of coal resources in Central Utah.[4] The Andalex Loadout Facility lies near the coal resource areas, below the head waters of tributaries to the Price River. Much of the water from the Price River is diverted for irrigation use.

Approximately 50 to 70 percent of the stream flow occurs during the May - July snowmelt runoff period.[4] Summer precipitation does not usually produce more runoff than the snowmelt, although intense rainfall may produce high runoff in localized areas. Storms in this area are usually intense, but of relatively short duration. The 100 year -6 hour precipitation event is approximately 2.5 inches in the mountain areas, and only slightly less in the valleys (1.91 inches).

Water quality in the Price River and its' tributaries is good at the higher elevations. In most cases, surface waters at higher elevations have dissolved solid concentrations of less than 250 mg/l and are of a calcium bicarbonate type. At lower elevations, the surface water degrades to a sodium sulfate type with dissolved solids ranging from 250 to more than 6,000 mg/l.[4] These changes are caused by irrigation return flows and natural runoff from areas underlain by Mancos Shale.

Mine Plan Area Surface Water Hydrology

There are no principal surface water courses found within 1/4 mile of the permit area, and no perennial streams within 1 mile of the permit area.

Wildcat Canyon, located approximately 3/8 mile to the north of the permit area, is an ephemeral drainage that drains a large portion of the area north of the Gordon Creek Road and leads into the Price River. No runoff from the permit area flows to Wildcat Canyon.

---

[4]Waddell and Others, 1981

The North Fork of Gordon Creek is a perennial, low flow, and low quality stream, and is located approximately 1-1/4 miles to the south of the facility. No runoff from the permit area reaches this drainage.

A small ephemeral drainage known as Garley Canyon runs south of the permit area and eventually drains into the Price River approximately 3-1/2 miles southeast of the permit area. Runoff from the permit area would flow into the Garley Canyon drainage and eventually into the Price River but not before passing through a sedimentation pond.

Garley Canyon is a drainage formed in the eroding Mancos slopes below Pinyon - Juniper covered plateaus located west of the permit area. The natural drainage is highly eroded, due to the sparse vegetative groundcover and resulting rapid runoff through the weathered Mancos Shale. This is typical of drainages within the Mancos Shale in this area, and results in a high sulfate, low quality water. Most of the water below the point where Garley Canyon meets the Price River, is diverted and used for irrigation.

The general drainage pattern of the area is shown on Plate 15.

Surface Water Quality

Surface water quality is described in Appendix J, Appendix M and in R645-301-512.240.

R645-301-711.200. POTENTIAL IMPACTS TO THE HYDROLOGIC BALANCE

See Appendix J - Probable Hydrologic Consequences and R645-301-711.100.

R645-301-711.300. COMPLIANCE WITH HYDROLOGIC DESIGN CRITERIA

Andalex will follow its approved Sedimentation and Drainage Control Plan and comply with the UPDES Permit No. UTG-040008, issued May 31, 2003 (see Appendix K).

Water monitoring plans, as well as all hydrologic design details, are discussed in Section R645-301-512.240. *All hydrologic design details are discussed in Appendix R.*

Andalex will comply with the Clean Water Act (33 U.S.C. Section 1251 et. seq.)and all other applicable water quality laws and health and safety standards.

R645-301-711.400. APPLICABLE HYDROLOGIC PERFORMANCE STANDARDS

All applicable hydrologic performance standards will be met.

R645-301-711.500. RECLAMATION ACTIVITIES

Reclamation and post-mining hydrology are discussed under Sections R645-301-512.240 and R645-301-541 *and Appendix R.*

R645-301-712. CERTIFICATION

All cross-sections, maps and plans required have been prepared and certified according to R645-301-512.

R645-301-713. INSPECTIONS

All impoundment inspections are performed according to, and described under, Section R645-301-514.300.

R645-301-720. ENVIRONMENTAL DESCRIPTION

See R645-301-711.100.

R645-301-721. GENERAL REQUIREMENTS

See R645-301-711.100.

R645-301-722. CROSS SECTIONS AND MAPS

See R645-301-510.

R645-301-722.100. LOCATION AND EXTENT OF SUBSURFACE WATER

See R645-301-711.100.

R645-301-722.200. LOCATION OF SURFACE WATER BODIES

See R645-301-711.100.

R645-301-722.300 MONITORING STATIONS

See R645-301-723 and Plates 2A and 15.

R645-301-722.400. **WATER WELLS**

N/A

R645-301-722.500. **EXISTING LAND SURFACE CONFIGURATION**

Plate 1 and 2A

R645-301-723. **SAMPLING AND ANALYSIS**

See R645-301-512.240

R645-301-724. **BASELINE INFORMATION**

See R645-301-512.240

R645-301-724.100. **GROUND WATER INFORMATION**

See R645-301-711.100.

R645-301-724.200. **SURFACE WATER INFORMATION**

See R645-301-711.100.

R645-301-724.300. **GEOLOGIC INFORMATION**

See R645-301-711.100.

R645-301-724.310. **PROBABLE HYDROLOGIC CONSEQUENCES**

Appendix J

R645-301-724.320. **RECLAIMABILITY**

See R645-301-541

R645-301-724.400. **CLIMATOLOGICAL INFORMATION**

Introduction

The permit area, which is near part of the Wasatch Plateau Coal Field, is located in a mid-latitude steppe climate with the land below the cliffs approaching desert conditions. The nearest weather recording station is located approximately seven miles southeast of the Loadout in Price, Utah.

Temperatures at the site are 3 to 5°F cooler than at Price, seven miles southeast and 1,500 feet lower.

Average monthly temperatures at Price range from 36.9°F in January to 90° in July. Extreme temperatures of record are -31° and 108°F. Due to the elevation and a predominance of clear skies and dry air, daily temperature ranges are rather large, averaging 24° in winter and 32° in summer. Average annual precipitation is 9.31 inches at Price. The 100-year 6-hour precipitation event is 1.9 inches. (Table VII-2). Snowfall is generally light, averaging 21.1 inches annually, at Price. Potential evaporation is about 36 inches per year. The area is almost completely surrounded by mountains which act as a barrier to storms approaching from every direction except south.

Source of Data

National Oceanic and Atmospheric Administration, National Climatic Center, Asheville, North Carolina.

Western Regional Climate Center, Reno, Nevada.

Climatological Factors

Precipitation

The precipitation in the area, which is largely controlled by elevation, varies from 0.50 inches per month to 1.22 inches per month, with an annual average of 9.31 inches.

The principal rainfall is in late summer/early fall when the area is occasionally subjected to thunderstorm activity associated with moisture-laden air masses moving in from the Gulf of Mexico.

Snowfall is generally light, averaging less than 22 inches annually.

The Monthly Climate Summary for the Period of Record (9/1/1968 - 6/30/2004) is shown below on Table VII-1.

TABLE VII-1

PRICE WAREHOUSES, UTAH (427026)

Period of Monthly Climate Summary

Period of Record: 9/1/1968 to 6/30/2004

	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	36.9	42.8	52.5	63.2	72.5	83.8	90.0	88.4	79.5	64.8	49.5	40.1	63.7
Average Min. Temperature (F)	13.4	19.7	27.6	34.6	42.9	52.1	58.3	57.0	48.1	37.5	25.7	16.7	36.1
Average Total Precipitation (in.)	0.76	0.73	0.73	0.50	0.66	0.57	0.89	1.04	1.10	1.22	0.59	0.51	9.31
Average Total Snowfall (in.)	8.0	4.1	1.0	0.3	0.0	0.0	0.0	0.0	0.0	0.2	2.2	5.3	21.1
Average Snow Depth (in.)	3	2	0	0	0	0	0	0	0	0	0	1	1

Percent of possible observations for period of record.

Max. Temp.: 77.6% Min. Temp.: 77.7% Precipitation: 94.5% Snowfall: 93.1% Snow Depth: 88.3%

Check Station Metadata or Metadata graphics for more detail about data completeness.

Western Regional Climate Center, wrcc@dri.edu

TABLE VII-2

ESTIMATED RETURN PERIODS FOR SHORT DURATION PRECIPITATION
(inches)

Station: Price Elevation: 5680
Latitude: 39° 37' Longitude: 110° 50'

DURATION

Years	5 Min	10 Min	15 Min	30 Min	1 Hr	2 Hr	3 Hr	6 Hr	12 Hr	24 Hr
1	.08	.13	.17	.23	.29	.37	.44	.62	.78	.95
2	.12	.18	.23	.32	.40	.49	.58	.80	1.00	1.20
5	.16	.25	.32	.44	.56	.68	.79	1.07	1.32	1.58
10	.20	.31	.39	.54	.68	.81	.94	1.25	1.53	1.82
25	.24	.37	.47	.65	.82	.98	1.13	1.50	1.83	2.18
50	.28	.43	.54	.75	.95	1.12	1.29	1.71	2.08	2.47
100	.31	.49	.62	.85	1.08	1.27	1.45	1.91	2.32	2.74

Table VII-3 shows the average monthly precipitation for the period 1936-1976.

The climatology summary by month for period 1936-1965 is given in Table VII-4.

Temperature

The average annual maximum temperature for the period 1968 - 2004 was 63.7 degrees. The annual mean temperature was 49.9 degrees and the annual minimum temperature was 36.1 degrees. See Table VII-1.

Summers are characterized by hot days and cool nights. However, the high temperatures are not oppressive since the relative humidity is low. The hottest month is July with the maximum temperature on most days nears 90 degrees and the lows in the upper 50's.

The winters are cold and uncomfortable, but usually not severe, due in part to the protecting influence of the mountain ranges to the north and east which prevent cold arctic air masses from moving into the area.

Temperatures of 100 degrees or higher during summer or 15 degrees below zero or colder during winter are likely to occur once every three years.

The freeze-free period, or growing season, averages about five months in length, from early May to early October.

Average Temperature values are given on Table VII-1.

Wind

The prevailing wind direction for the Price-Carbon County area for the period 1992-2002 is from the North for all months of the year.(Table VII-3) The average wind speed for this same period is shown to be 6.2 mph, with the lowest average speed of 4.7 mph in December, and the highest average speed of 7.7 mph in April, (Table VII-4).

TABLE VII-3

UTAH
Prevailing Wind Directions

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
BRYCE CANYON AP, UT (KBCE).	W	W	W	W	W	W	W	W	W	W	W	W	W
CANYONLANDS AP-MOAB, UT	NW	W	W	W	W	SW	SE	E	W	W	W	NW	W
CEDAR CITY AP, UT (KCDC).	SSW	SW	SSW	SSW	SSW	SSW	SW	SSW	SSW	SW	N	SSW	SSW
LOGAN AIRPORT, UT (KLGU).	N	N	N	N	N	N	N	S	N	N	N	N	N
MILFORD AIRPORT, UT (KMLF).	S	SSW	S	SSW	S	SSW	SSW	S	S	S	S	S	S
OGDEN AIRPORT, UT (KOGD).	SSE	S	SSE	S	S	S	S	S	S	S	S	S	S
OGDEN-HILL AFB, UT (KHIF).	E	E	E	E	E	E	E	E	E	E	E	E	E
PRICE-CARBON COUNTY AP, UT	N	N	N	N	N	N	N	N	N	N	N	N	N
PROVO MUNI AP, UT (KPVU).	NW	NW	NW	NW	NW	NW	SE	SE	SE	SE	SSE	SSE	NW
SALT LAKE CITY AP, UT (KSLC)	S	S	SSE	SSE	SSE	S	SSE	SSE	SSE	SE	SE	S	SSE
ST. GEORGE MUNI AP, UT(KSGU)	E	ENE	ENE	W	W	W	W	ENE	ENE	ENE	E	E	ENE
VERNAL AIRPORT, UT (KVEL).	W	W	WNW	W	W	W	W	W	W	W	WNW	W	W
WENDOVER AP, UT (KENV).	NW	NW	E	NW	E	E	E	E	E	E	E	E	E

Prevailing wind direction is based on the hourly data from 1992-2002 and is defined as the direction with the highest percent of frequency. Many of these locations have very close secondary maximum which can lead to noticeable differences month to month.
Http://www/wrcc/dri/edu/htmlfiles/westwinddir.html

TABLE VII-4

UTAH
Prevailing Wind Speed (mph)

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
BRYCE CANYON AP, UT (KBCE).	8.4	8.9	9.1	10.6	10.0	10.1	8.5	8.5	8.7	8.4	8.2	6.9	8.8
CANYONLANDS AP-MOAB, UT	4.0	5.3	6.9	9.1	9.2	8.5	7.4	6.9	6.3	5.2	4.0	3.5	6.2
CEDAR CITY AP, UT (KCDC).	7.2	7.6	8.4	9.1	9.4	9.3	8.5	8.2	7.5	6.7	6.5	6.6	7.9
LOGAN AIRPORT, UT (KLGU).	3.2	3.8	4.9	6.1	5.8	5.7	5.9	5.2	4.3	4.1	3.4	3.0	4.5
MILFORD AIRPORT, UT (KMLF).	10.5	10.4	10.8	11.6	11.6	12.3	11.9	11.0	9.9	10.0	9.5	9.9	10.7
OGDEN AIRPORT, UT (KOGD).	5.3	6.2	7.3	8.0	7.6	7.7	7.2	7.4	6.7	6.4	5.9	5.8	6.8
OGDEN-HILL AFB, UT (KHIF).	8.7	9.5	9.8	9.7	9.1	9.5	9.8	9.7	9.3	9.0	8.9	9.1	9.3
PRICE-CARBON COUNTY AP, UT	5.0	5.1	7.1	7.7	7.5	7.4	6.5	6.1	6.2	6.1	5.4	4.7	6.2
PROVO MUNI AP, UT (KPVU).	4.8	5.7	7.2	7.9	7.2	7.6	6.7	6.7	6.3	5.8	5.4	5.2	6.4
SALT LAKE CITY AP, UT (KSLC)	7.0	7.5	8.7	9.3	9.1	9.5	9.6	9.9	8.9	8.0	7.7	7.5	8.6
ST. GEORGE MUNI AP, UT(KSGU)	3.5	4.5	5.7	7.5	8.3	8.5	7.9	7.3	6.0	4.4	3.4	3.1	5.8
VERNAL AIRPORT, UT (KVEL).	3.2	4.0	5.9	7.3	7.5	7.0	5.8	5.6	5.3	4.9	4.0	3.0	5.3
WENDOVER AP, UT (KENV).	1.8	5.5	7.2	8.9	8.8	8.7	8.1	7.4	6.4	5.9	5.0	4.7	6.8

The above monthly average wind speeds are based on hourly observations from all reporting airports in the Western United states and based on data from 1992-2002. Some stations have at least 2 years of hourly data used for the averages. Averages for first order stations may differ from data seen in the LCD's due to a different period of record used and a possible change in the height of the wind instruments. The standard anemometer height for all current stations is 10 meters.
Http://www/wrcc/dri/edu/htmlfiles/westwinddir.html

R645-301-724.410. **CLIMATOLOGICAL FACTORS**

See R645-301-724.400.

R645-301-724.411. **AVERAGE SEASONAL PRECIPITATION**

See R645-301-724.400.

R645-301-724.412. **PREVAILING WINDS**

See R645-301-724.400.

R645-301-724.413. **SEASONAL TEMPERATURE RANGES**

See R645-301-724.400.

R645-301-724.420. **OTHER INFORMATION**

N/A

R645-301-724.500. **SUPPLEMENTAL INFORMATION**

N/A

R645-301-724.700. **STREAMS**

See R645-301-711.100.

R645-301-725. **BASELINE CUMULATIVE IMPACT AREA INFORMATION**

See R645-301-512.240

R645-301-725.100. **INFORMATION FROM FEDERAL OR STATE AGENCIES**

See R645-301-512.240

R645-301-725.200. **INFORMATION FROM APPLICANT**

See R645-301-512.240

R645-301-725.300. RESTRICTIONS ON PERMIT

N/A

R645-301-726. MODELING

N/A

R645-301-727. ALTERNATIVE WATER SOURCE INFORMATION

The permit area and adjacent areas contain no renewable ground water or surface water resources; therefore water right protection or mitigation measures are not anticipated to be required at this operation. Also, this is a surface operation, with no underground mining or subsidence potential. All water used on site is hauled in.

R645-301-728. PROBABLE HYDROLOGIC CONSEQUENCES (PHC) DETERMINATION

Appendix J

R645-301-728.100. DETERMINATION OF PHC

Appendix J

R645-301-728.200. BASIS OF DETERMINATION

Appendix J

R645-301-728.300. PHC DETERMINATION FINDINGS

Appendix J

R645-301-728.310. ADVERSE IMPACTS TO HYDROLOGIC BALANCE

Appendix J

R645-301-728.320. ACID FORMING OR TOXIC FORMING MATERIALS

Appendix J

R645-301-728.330. IMPACT OF OPERATIONS

See R645-301-512.240

R645-301-728.331. SEDIMENT YIELD FROM DISTURBED AREA

See R645-301-512.240

R645-301-728.332. WATER QUALITY PARAMETERS

R645-301-512.240

R645-301-728.333. FLOODING OR STREAM-FLOW ALTERATION

N/A

R645-301-728.334. GROUND WATER AND SURFACE WATER AVAILABILITY

See R645-301-711.100 and Appendix J.

R645-301-728.335. OTHER CHARACTERISTICS

Appendix J

R645-301-728.340. IMPACT ON SURFACE OR GROUND WATER

Appendix J

R645-301-728.350. IMPACT ON STATE-APPROPRIATE WATER

Appendix J

R645-301-728.400. PERMIT REVISIONS

Appendix J

R645-301-729. CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT (CHIA)

(BY DIVISION)

R645-301-729.100. DIVISION ASSESSMENT

(BY DIVISION)

R645-301-729.200. PERMIT REVISIONS

N/A

R645-301-730. OPERATION PLAN

See R645-301-511.100.

R645-301-731. GENERAL REQUIREMENTS

See R645-301-511.100.

R645-301-731.100. HYDROLOGIC BALANCE PROTECTION

See R645-301-711-300.

R645-301-731.110. GROUND WATER PROTECTION

Appendix J and R645-301-711.100.

R645-301-731.111. GROUND WATER QUALITY

Appendix J and R645-301-711.100.

R645-301-731.112. SURFACE MINING OPERATIONS

N/A

R645-301-731.120. SURFACE WATER PROTECTIONS

Appendix J and R645-301-711.100.

R645-301-731.121. SURFACE WATER QUALITY

Appendix J, Appendix M and R645-301-711.100.

R645-301-731.122. SURFACE WATER QUANTITY PLAN

Appendix J and R645-301-711.100.

R645-301-731.200. WATER MONITORING

See R645-301-512.240.

R645-301-731.210. GROUND WATER MONITORING

There is no ground water monitoring at this site. See R645-301-711.100.

R645-301-731.211. GROUND WATER MONITORING PLAN

There is no ground water monitoring at this site. See R645-301-711.100.

R645-301-731.212. SAMPLING AND REPORTING DATA

See R645-301-512.240.

R645-301-731.213. NON-ESSENTIAL AQUIFERS

N/A

R645-301-731.214. DURATION

See R645-301-512.240

R645-301-731.214.1 SUITABILITY

See R645-301-512.240

R645-301-731.214.2 COMPLIANCE

See R645-301-512.240

R645-301-731.215. EQUIPMENT, STRUCTURES AND OTHER DEVICES USED IN CONJUNCTION WITH MONITORING

See R645-301-512.240

R645-301-731.220. SURFACE WATER MONITORING

See R645-301-512.240

R645-301-731.221. SURFACE WATER MONITORING PLAN

See R645-301-512.240

R645-301-731.222 DESCRIPTION

See R645-301-512.240

R645-301-731.222.1 PARAMETERS

See R645-301-512.240

R645-301-731.222.2 POINT SOURCE DISCHARGES

See R645-301-512.240 and Appendix K

R645-301-731.223. SAMPLING AND REPORTING DATA

See R645-301-512.240

R645-301-731.224. DURATION

See R645-301-512.240

R645-301-731.224.1 SUITABILITY

See R645-301-512.240

R645-301-731.224.2 COMPLIANCE

See R645-301-512.240

R645-301-731.225. EQUIPMENT, STRUCTURES AND OTHER DEVICES USED IN CONJUNCTION WITH MONITORING

See R645-301-512.240

R645-301-731.300. ACID AND TOXIC FORMING MATERIALS

See R645-301-711.100, R645-301-528.300 and Appendix J.

R645-301-731.310. DRAINAGE INTO SURFACE AND GROUND WATER

See R645-301-512.240

R645-301-731.311. MATERIAL ADVERSELY AFFECTING WATER QUALITY

See R645-301-512.240

R645-301-731.312. STORING MATERIALS

See R645-301-512.240

R645-301-731.320. DISPOSAL PROVISIONS

See R645-301-512.240

R645-301-731.400. TRANSFER OF WELLS

No transfer of wells has taken place, nor is any transfer anticipated.

R645-301-731.500. DISCHARGES

See R645-301-512.240

R645-301-731.510. DISCHARGES INTO AN UNDERGROUND MINE

N/A

R645-301-731.511. DEMONSTRATION

N/A

R645-301-731.511.1 PREVENTION OF DAMAGE

N/A

R645-301-731.511.2 VIOLATION OF WATER QUALITY STANDARDS OR EFFLUENT LIMITATIONS

N/A

R645-301-731.511.3 COMPLIANCE REQUIREMENTS

N/A

R645-301-731.511.4 MEET WITH THE APPROVAL OF MSHA

N/A

R645-301-731.512. DISCHARGE LIMITATIONS

N/A

R645-301-731.512.1 WATER

N/A

R645-301-731.512.2 COAL PROCESSING WASTE

N/A

R645-301-731.512.3 FLY ASH

N/A

R645-301-731.512.4 SLUDGE FROM ACID MINE DRAINAGE TREATMENT

N/A

R645-301-731.512.5 FLUE-GAS DESULFURIZATION SLUDGE

N/A

R645-301-731.512.6 INERT MATERIALS USED FOR STABILIZING UNDERGROUND MINES

N/A

R645-301-731.512.7 UNDERGROUND MINE DEVELOPMENT WASTE

N/A

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

N/A

R645-301-731.520. GRAVITY DISCHARGES FROM MINE WORKINGS

N/A

R645-301-731.521. DISCHARGE CONTROL

See Appendix R.

R645-301-731.522. PREVENTION OF DISCHARGE

N/A

R645-301-731.530. REPLACEMENT OF STATE-APPROPRIATED WATER SUPPLY

N/A

R645-301-731.600. STREAM BUFFER ZONES

N/A

R645-301-731.610. BUFFER ZONE LOCATIONS

N/A

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

Coal processing 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.

R645-301-731.612. STREAM DIVERSIONS

See Appendix R, Culvert Design

R645-301-731.620. BUFFER ZONE SIGNS AND MARKERS

N/A

R645-301-731.700. CROSS SECTIONS AND MAPS

Plate 2A.

R645-301-731.710. WATER SUPPLY INTAKES

N/A

R645-301-731.720. WATER HANDLING AND STORAGE FACILITIES

Water is trucked from Price for culinary use and is stored in one 12,000-gallon tank on the property.

R645-301-731.730. MONITORING LOCATIONS

See R645-301-512.240 and Plate 15.

R645-301-731.740. MAPS

See Volume II, R645-301-510.

R645-301-731.750. CROSS SECTIONS

See Volume II, R645-301-510.

R645-301-731.760. OTHER RELEVANT DRAWINGS

See Appendix R.

R645-301-731.800. WATER RIGHTS AND REPLACEMENT

Appendix G

R645-301-732. SEDIMENT CONTROL MEASURES

See Appendix R.

R645-301-732.100. SILTATION STRUCTURES

See Appendix R.

R645-301-732.200. SEDIMENTATION PONDS

See Appendix R.

R645-301-732.210. COMPLIANCE REQUIREMENTS

See Appendix R.

R645-301-732.220. MSHA REQUIREMENTS

N/A

R645-301-732.300. DIVERSIONS

See Appendix R.

R645-301-732.400. ROAD DRAINAGE

See Appendix R, *Plate 2A*, also R645-301-512.250.

R645-301-732.410. ALTERATION OR RELOCATION OF A NATURAL DRAINAGEWAY

See Appendix R.

R645-301-732.420. INLET PROTECTIONS

See Appendix R.

R645-301-733. IMPOUNDMENTS

See Appendix R.

R645-301-733.100. GENERAL PLANS

See Appendix R.

R645-301-733.110. CERTIFICATION

See Appendix R and Appendix H, *also Plates 3A thru 3H*

R645-301-733.120. MAPS AND CROSS SECTIONS

See Plates 3A thru 3H., also R645-301-510.

R645-301-733.130. NARRATIVE

See Appendix R.

R645-301-733.140. SURVEY RESULTS

Appendix J

R645-301-733.150. HYDROLOGIC IMPACT

Appendix J

R645-301-733.160. DESIGN PLANS AND CONSTRUCTION SCHEDULE

See Appendix R.

R645-301-733.200. PERMANENT AND TEMPORARY IMPOUNDMENTS

See Appendix R

R645-301-733.210. REQUIREMENTS

See R645-301-512.240

R645-301-733.220. DEMONSTRATION FOR PERMANENT IMPOUNDMENTS

See R645-301-512.240

R645-301-733.221. ADEQUACY FOR INTENDED USE

See R645-301-512.240

R645-301-733.222. WATER QUALITY AND EFFLUENT LIMITATIONS

See R645-301-512.240

R645-301-733.223. WATER LEVEL

See R645-301-512.240

R645-301-733.224. FINAL GRADING

See R645-301-512.240

R645-301-733.225. **DIMINUTION OF QUALITY AND QUANTITY OF WATER UTILIZED BY OTHERS**

See R645-301-512.240

R645-301-733.226. **SUITABILITY FOR POSTMINING LAND USE**

See R645-301-512.240

R645-301-733.230. **TEMPORARY IMPOUNDMENTS**

See R645-301-512.240

R645-301-733.240. **HAZARD NOTIFICATIONS**

See R645-301-512.240

R645-301-734. **DISCHARGE STRUCTURES**

See R645-301-512.240

R645-301-735. **DISPOSAL OF EXCESS SPOIL**

See R645-301-512.230.

R645-301-736. **COAL MINE WASTE**

See R645-301-512.230.

R645-301-737. **NON-COAL MINE WASTE**

See R645-301-512.230.

R645-301-738. **TEMPORARY CASING AND SEALING OF WELLS**

N/A

R645-301-740. **DESIGN CRITERIA AND PLANS**

See Appendix R.

R645-301-741. **GENERAL REQUIREMENTS**

See Appendix R.

R645-301-742. **SEDIMENT CONTROL MEASURES**

See Appendix R.

R645-301-742.100. **GENERAL REQUIREMENTS**

See Appendix R.

R645-301-742.110. **DESIGN**

See Appendix R.

R645-301-742.111. **PREVENTION**

See Appendix R.

R645-301-742.112. **EFFLUENT LIMITATIONS**

Appendix K

R645-301-742.113. **EROSION PROTECTION**

See Appendix R.

R645-301-742.120. **MEASURES AND METHODS**

See Appendix R.

R645-301-742.121. **RETAINING SEDIMENT WITHIN DISTURBED AREAS**

See Appendix R.

R645-301-742.122. **DIVERTING RUNOFF AWAY FROM DISTURBED AREAS**

See Appendix R.

R645-301-742.123. DIVERTING RUNOFF USING PROTECTED CHANNELS

See Appendix R.

R645-301-724.124. PHYSICAL TREATMENT TO REDUCE FLOW OR TRAP SEDIMENT

See Appendix R.

R645-301-742.125. CHEMICAL TREATMENT

N/A

R645-301-742.126. IN-MINE TREATMENT

N/A

R645-301-742.200. SILTATION STRUCTURES

See Appendix R.

R645-301-742.210. GENERAL REQUIREMENTS

See Appendix R.

R645-301-742.211. DESIGN

See Appendix R.

R645-301-742.212. REQUIREMENTS

See Appendix R.

R645-301-742.213. SILTATION STRUCTURES WHICH IMPOUND WATER

See Appendix R.

R645-301-742.214. POINT SOURCE DISCHARGES

See R645-301-512.240 and Appendix K.

R645-301-742.220. SEDIMENTATION PONDS

See Appendix R.

R645-301-742.221. USE

See Appendix R.

R645-301-742.221.1 INDIVIDUALLY OR IN SERIES

See Appendix R.

R645-301-742.221.2 LOCATION

See Appendix R., Plate 2A

R645-301-742.221.3 DESIGN, CONSTRUCTION AND MAINTENANCE

See Appendix R.

R645-301-742.221.31 SEDIMENT STORAGE VOLUME

See Appendix R.

R645-301-742.221.32 DETENTION TIME

See Appendix R.

R645-301-742.221.33 DESIGN EVENT

See Appendix R.

R645-301-742.221.34 DEWATERING DEVICE

See Appendix R.

R645-301-742.221.35 SHORT CIRCUITING

See Appendix R.

R645-301-742.221.36 SEDIMENT REMOVAL

See Appendix R.

R645-301-742.221.37 EXCESSIVE SETTLEMENT

See Appendix R.

R645-301-742.221.38 EMBANKMENT MATERIAL

See Appendix R.

R645-301-742.221.39 COMPACTION

See Appendix R.

R645-301-742.222. MSHA SEDIMENTATION PONDS

N/A

R645-301-742.223. OTHER SEDIMENTATION PONDS

See Appendix R.

R645-301-745.223.1 OPEN CHANNEL SPILLWAY

See Appendix R.

R645-301-742.223.2 LINING

See Appendix R.

R645-301-742.224. TEMPORARY IMPOUNDMENT - EXCEPTION

N/A

R645-301-742.225. EXCEPTION TO LOCATION

N/A

R645-301-742.225.1. IMPOUNDMENTS MEETING 30 CFR SEC.77.216(a)

N/A

R645-301-742.225.2. OTHER MSHA IMPOUNDMENTS

N/A

R645-301-742.230. OTHER TREATMENT FACILITIES

N/A

R645-301-742.231. DESIGN EVENT

N/A

R645-301-742.232. REQUIREMENTS

N/A

R645-301-742.240. EXEMPTIONS

N/A

R645-301-742.300. DIVERSIONS

See Appendix R.

R645-301-742.310. GENERAL REQUIREMENTS

See Appendix R.

R645-301-742.311. REQUIREMENTS

See Appendix R.

R645-301-742.312. DESIGN

See Appendix R.

R645-301-742.312.1 STABILITY

See Appendix R.

R645-301-742.312.2 FLOOD PROTECTION

See Appendix R.

R645-301-742.312.3 SUSPENDED SOLIDS

See Appendix R.

R645-301-742.312.4 COMPLY WITH OTHER REGULATIONS

See Appendix R.

R645-301-742.313. TEMPORARY AND PERMANENT DIVERSIONS

See Appendix R.

R645-301-742.314. ADDITIONAL DESIGN CRITERIA

See Appendix R.

R645-301-742.320. DIVERSION OF PERENNIAL AND INTERMITTENT STREAMS

N/A

R645-301-742.321. BUFFER ZONE REQUIREMENTS

N/A

R645-301-742.322. DESIGN CAPACITY

N/A

R645-301-742.323. DESIGN EVENT

N/A

R645-301-742.324. CERTIFICATION

N/A

R645-301-742.330. DIVERSION OF MISCELLANEOUS FLOWS

See Appendix R.

R645-301-742.331. REQUIREMENTS

See Appendix R.

R645-301-742.332. DESIGN

See Appendix R.

R645-301-742.333. DESIGN EVENT

See Appendix R.

R645-301-742.400. ROAD DRAINAGE

See Appendix R.

R645-301-742.410. ALL ROADS

See Appendix R.

R645-301-742.411. PROTECTION AND SAFETY

See Appendix R.

R645-301-742.412. INTERMITTENT OR PERENNIAL STREAM RESTRICTION

N/A

R645-301-742.413. DOWNSTREAM SEDIMENTATION AND FLOODING

See Appendix R.

R645-301-742.420. PRIMARY ROADS

See Appendix R.,

R645-301-742.421. EROSION PROTECTION

See Appendix R.

R645-301-742.422. STREAM FORDS

N/A

R645-301-742.423. DRAINAGE CONTROL

See Appendix R.

R645-301-742.423.1 PRIMARY ROAD DESIGN CRITERIA

See R645-301-512.250.

R645-301-742.423.2 DRAINAGE PIPES AND CULVERTS

See Appendix R.

R645-301-742.423.3 DRAINAGE DITCHES

See Appendix R.

R645-301-742.423.4 NATURAL STREAM CHANNELS

See Appendix R.

R645-301-742.423.5 REQUIREMENTS

See Appendix R.

R645-301-743. IMPOUNDMENTS

See Appendix R.

R645-301-743.100. GENERAL REQUIREMENTS

See Appendix R.

R645-301-743.110. MSHA IMPOUNDMENTS

N/A

R645-301-743.120. CERTIFICATION AND FREEBOARD REQUIREMENTS

See Appendix R.

R645-301-743.130. SPILLWAYS

See Appendix R.

R645-301-743.131. APPROVAL OF SINGLE OPEN CHANNEL SPILLWAY

See Appendix R

R645-301-743.131.1. NON-ERODIBLE CONSTRUCTION

See Appendix R

R645-301-743.131.2. EARTH- OR GRASS-LINED WITH NON-EROSIVE FLOWS

N/A

R645-301-743.131.3. REQUIRED DESIGN EVENT

See Appendix R

R645-301-743.131.4. NRCS CLASS B OR C DAMS

N/A

R645-301-743.131.5. MSHA IMPOUNDMENTS

N/A

R645-301-743.131.6. NON-MSHA IMPOUNDMENTS

See Appendix R

R645-301-743.132. ALTERNATE SEDIMENT POND CRITERIA

N/A

R645-301-743.140. INSPECTIONS

See Appendix R.

R645-301-743.200. SPILLWAY DESIGN EVENT FOR PERMANENT IMPOUNDMENTS

See Appendix R.

R645-301-743.300. **SPILLWAY DESIGN EVENT FOR TEMPORARY IMPOUNDMENTS**

See Appendix R.

R645-301-744. **DISCHARGE STRUCTURES**

See Appendix R.

R645-301-744.100. **EROSION CONTROL**

See Appendix R.

R645-301-744.200. **DESIGN**

See Appendix R.

R645-301-745. **DISPOSAL OF EXCESS SPOIL**

See R645-301-512.230.

R645-301-745.100. **GENERAL REQUIREMENTS**

See R645-301-512.230.

R645-301-745.110. **DISPOSAL AREA**

See R645-301-512.230.

R645-301-745.111. **EFFECTS ON SURFACE AND GROUND WATER**

See R645-301-512.230.

R645-301-745.112. **IMPOUNDMENTS ON FILL**

N/A

R645-301-745.113. **COVER**

See R645-301-512.230.

R645-301-745.120. DRAINAGE CONTROL

N/A

R645-301-745.121. DIVERSIONS

N/A

R645-301-745.122. UNDERDRAINS

N/A

R645-301-745.200. VALLEY FILLS AND HEAD-OF-HOLLOW FILLS

N/A

R645-301-745.210. REQUIREMENTS

N/A

R645-301-745.220. DRAINAGE CONTROL

N/A

R645-301-745.221. RESTRICTIONS

N/A

R645-301-745.222. RUNOFF CONTROL

N/A

R645-301-745.300. DURABLE ROCK FILLS

N/A

R645-301-745.310. REQUIREMENTS

N/A

R645-301-745.320. UNDERDRAINS

N/A

R645-301-745.330. RUNOFF CONTROL

N/A

R645-301-745.400. PRE-EXISTING BENCHES

N/A

R645-301-746. COAL MINE WASTE

See R645-301-512.230.

R645-301-746.100. GENERAL REQUIREMENTS

See R645-301-512.230.

R645-301-746.110. PLACEMENT

See R645-301-512.230.

R645-301-746.120. EFFECTS ON SURFACE AND GROUND WATER

See R645-301-512.230.

R645-301-746.200. REFUSE PILES

See R645-301-513.400.

R645-301-746.210. REQUIREMENTS

See R645-301-513.400.

R645-301-746.211. SEEPS AND SPRINGS

N/A

R645-301-746.212. UNCONTROLLED SURFACE DRAINAGE

N/A

R645-301-746.213. UNDERDRAINS

N/A

R645-301-746.220. SURFACE AREA STABILIZATION

N/A

R645-301-746.221. SLOPE PROTECTION

N/A

R645-301-746.222. IMPOUNDMENT RESTRICTIONS

N/A

R645-301-746.300. IMPOUNDING STRUCTURES

N/A

R645-301-746.310. COAL MINE WASTE

See R645-301-512.230.

R645-301-746.311. REQUIREMENTS

See R645-301-512.230.

R645-301-746.312. MSHA IMPOUNDING STRUCTURE

N/A

R645-301-746.320. SPILLWAYS AND OUTLET WORK

N/A

R645-301-746.330. DRAINAGE CONTROL

N/A

R645-301-746.340. WATER STORAGE

N/A

R645-301-746.400. **RETURN OF COAL PROCESSING WASTE TO ABANDONED UNDERGROUND WORKINGS**

N/A

R645-301-746.410. **HYDROLOGIC IMPACTS**

N/A

R645-301-746.420. **MONITORING WELLS**

N/A

R645-301-746.430. **PNEUMATIC BACKFILLING**

N/A

R645-301-747. **DISPOSAL OF NON-COAL MINE WASTE**

See R645-301-512.230.

R645-301-747.100. **REQUIREMENTS**

See R645-301-512.230.

R645-301-747.200. **PLACEMENT AND STORAGE**

See R645-301-512.230.

R645-301-747.300. **FINAL DISPOSAL**

See R645-301-512.230.

R645-301-748. **CASING AND SEALING OF WELLS**

N/A

R645-301-750. **PERFORMANCE STANDARDS**

All coal mining and reclamation operations will be conducted to minimize disturbance to the hydrologic balance within the permit and adjacent areas, to prevent material damage to the hydrologic balance outside the permit area and support approved postmining land uses in accordance with the terms and conditions of the

approved permit and the performance standards of R645-301 and R645-302.

R645-301-751. WATER QUALITY STANDARDS AND EFFLUENT LIMITATIONS

Discharges or water from areas disturbed by coal processing and reclamation operations will be made in compliance with all Utah and federal water quality laws and regulations and with effluent limitations for coal mining promulgated by the U.S. Environmental Protection Agency set forth in 40 CFR Part 434.

R645-301-752. SEDIMENT CONTROL MEASURES

Sediment control measures must be located, maintained, constructed and reclaimed according to plans and designs given under R645-301-512.240,R645-301-732, R645-301-742 and R645-301-760.

R645-301-752.100. SILTATION STRUCTURES AND DIVERSIONS

See Appendix R.

R645-301-752.200. ROAD DRAINAGE

See R645-301-512.250.

R645-301-752.210. CONTROL OF EROSION AND POLLUTION

See Appendix R.

R645-301-752.220. CONTROL OF SUSPENDED SOLIDS

See Appendix R.

R645-301-752.230. COMPLIANCE WITH EFFLUENT STANDARDS

See Appendix R.

R645-301-752.240. MINIMIZE DIMINUTION OF DEGRADATION OF WATER QUALITY

See Appendix R.

R645-301-752.250. **ALTERATION OF STREAM FLOW OR CHANNELS**

See Appendix R.

R645-301-753. **IMPOUNDMENTS AND DISCHARGE STRUCTURES**

See Appendix R.

R645-301-754. **DISPOSAL OF EXCESS SPOIL, COAL MINE WASTE AND NON-COAL MINE WASTE**

See R645-301-512.230.

R645-301-755. **CASING AND SEALING OF WELLS**

N/A

R645-301-760. **RECLAMATION**

See R645-301-240.

R645-301-761. **GENERAL REQUIREMENTS**

See R645-301-240.

R645-301-762. **ROADS**

See R645-301-512.250.

R645-301-762.100. **RESTORING NATURAL DRAINAGE PATTERNS**

N/A

R645-301-762.200. **REGRADING**

See R645-301-532.200.

R645-301-763. **SILTATION STRUCTURES**

See Appendix R.

R645-301-763.100. RESTRICTIONS

See Appendix R.

R645-301-763.200. REQUIREMENTS

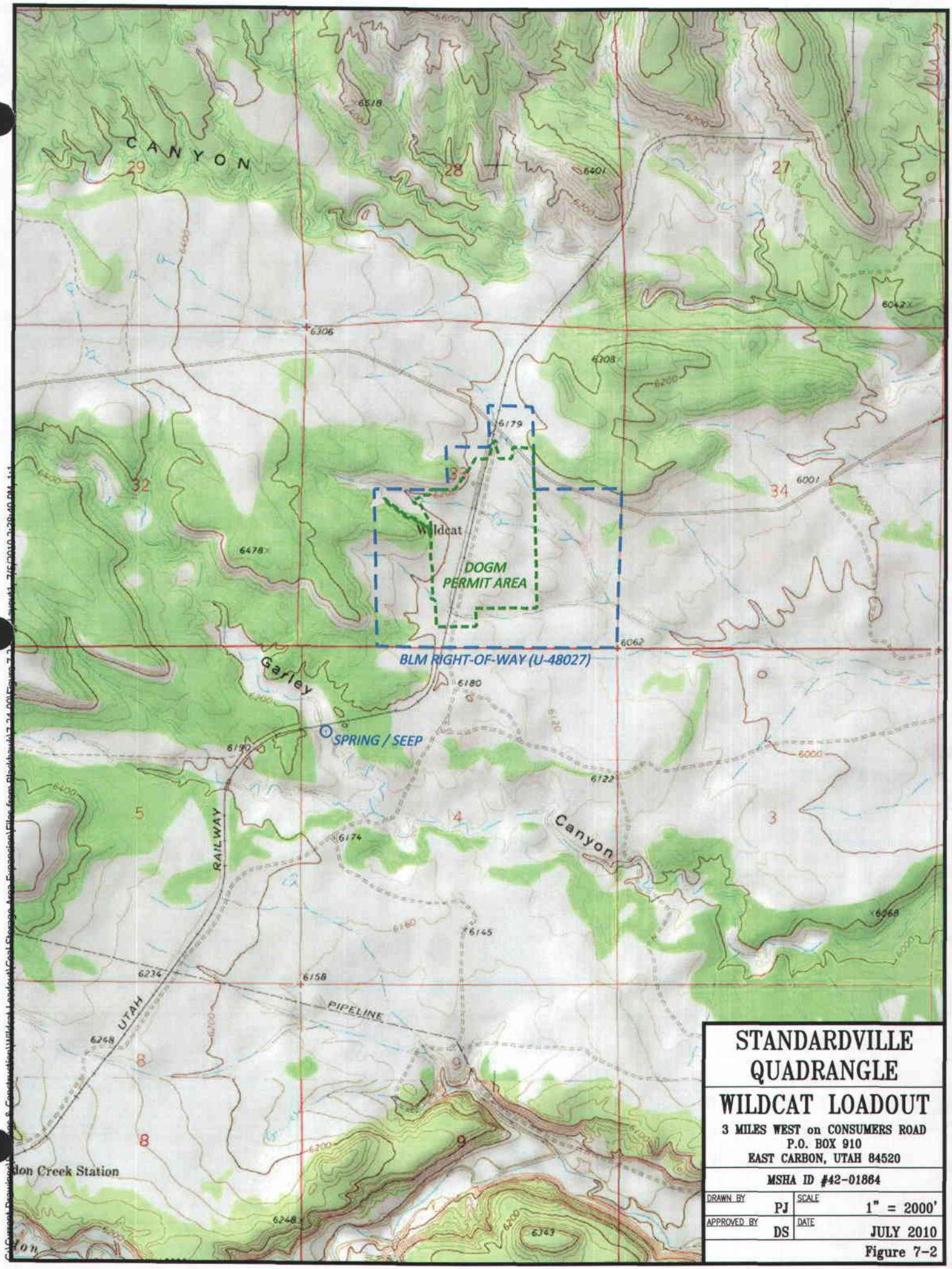
See Appendix R.

R645-301-764. STRUCTURE REMOVAL

See R645-301-240.

R645-301-765. PERMANENT CASING AND SEALING OF WELLS

N/A



STANDARDVILLE QUADRANGLE

WILDCAT LOADOUT

3 MILES WEST on CONSUMERS ROAD
P.O. BOX 910
EAST CARBON, UTAH 84520

MSHA ID #42-01864

DRAWN BY	PJ	SCALE	1" = 2000'
APPROVED BY	DS	DATE	JULY 2010

Figure 7-2

GENERALIZED STRATIGRAPHIC SECTION
FOR THE
CENTRAL AND SOUTHERN PART
OF THE
WASATCH PLATEAU

(AFTER DOELLING, 1972 MONOGRAPH SERIES)

System		Stratigraphic Unit	Thickness (feet)	Description
Tertiary	WASATCH GROUP	North Horn Formation	500 - 2,500	Variegated shales with subordinate sandstone, conglomerate and fresh-water limestone, slope former; sandstone and limestone units may supply limited quantities of ground water.
Cretaceous	MESA VERDE GROUP	Price River Formation	600 - 1,000	Gray to white gritty sandstone interbedded with subordinate shale and conglomerate, ledge and slope former, little potential for ground water.
		Castlegate Sandstone (Unconformity)	150 - 500	White to gray, coarse-grained often conglomeratic sandstone, cliff former, weathers to shades of brown, good aquifer material, ground water not present if outcrops occur nearby.
		Blackhawk Formation MAJOR COAL SEAMS	700 - 1,000	Yellow to gray, fine-to-medium-grained sandstone, interbedded with subordinate gray and carbonaceous shale, several thick coal seams; perched ground water may occur in sandstone units, springs and seeps common.
		Star Point Sandstone	90 - 1,000	Yellow-gray massive cliff-forming sandstone, often in several tongues separated by Masuk Shale; ground water present, but generally a poor aquifer.
	MANCOS SHALE	Masuk Shale	300 - 1,300	Yellow to blue-gray sandy shale, slope former.
		Emery Sandstone COAL	50 - 800	Yellow-gray friable sandstone tongue, cliff former. Coal present in subsurface; major regional aquifer.
		Blue Gate Member	1,500- 2,400	Pale blue-gray, nodular and irregularly bedded marine mudstone and siltstone with several arenaceous beds, weathers into low rolling hills and badlands.
		Ferron Sandstone Member MAJOR COAL SEAMS	50 - 950	Alternating yellow-gray sandstone, sandy shale and gray shale with important coal beds of Emergy coal field, resistant cliff former; major regional aquifer.
		Tununk Shale Member	400 - 650	Blue-gray to black sandy marine shale slope forming mudston

INCORPORATED
MAY 17 2006
Div. of Oil, Gas & Mining

Figure VII-1

ANDALEX RESOURCES, INC.

WILDCAT LOADOUT

MINING AND RECLAMATION PLAN

CHAPTER 8, BONDING

CHAPTER 8

TABLE OF CONTENTS

R645-301-800. BONDING AND INSURANCE 8-1

R645-301-810. BONDING DEFINITIONS AND DIVISION RESPONSIBILITIES 8-2

R645-301-820. REQUIREMENT TO FILE A BOND 8-2

R645-301-830. DETERMINATION OF BOND AMOUNT 8-2

R645-301-840. GENERAL TERMS AND CONDITIONS OF THE BOND 8-2

R645-301-850. BONDING REQUIREMENTS FOR UNDERGROUND MINING OPERATIONS 8-2

R645-301-860. FORMS OF BONDS 8-3

R645-301-870. REPLACEMENT OF BONDS 8-3

R645-301-880. REQUIREMENT TO RELEASE PERFORMANCE BONDS 8-3

R645-301-890. TERMS AND CONDITIONS FOR LIABILITY INSURANCE 8-3

CHAPTER 8, BONDING

HISTORICAL NOTE: In 2004, the Division issued an Order DO-04 for wind-blown fines which had accumulated outside the disturbed area, primarily in the area southwest of the main coal storage pile below sediment Pond B. A complete description of the mitigation plan proposed for DO-04 is included in Appendix P.

R645-301-800. BONDING AND INSURANCE

Andalex Resources, Inc. currently holds a bond ~~in the form of an irrevocable Letter of Credit~~, calculated and approved by the Division, in the amount of $1,148,000. This bond, and all supporting calculations, is included in this MRP in Appendix B, Part D.

It should be noted that only major headings and information specific to the Andalex Wildcat Bond and Insurance are included in this chapter. If a major heading is noted "N/A" or "By Division" all subsequent headings in that series are also assumed "N/A" or "By Division".

R645-301-810. BONDING DEFINITIONS AND DIVISION RESPONSIBILITIES

BY DIVISION

R645-301-820. REQUIREMENT TO FILE A BOND

Andalex currently holds a bond ~~(irrevocable letter of credit)~~, approved by UDOGM in the amount of $1,148,000 and it is included in this MRP in Appendix B, Part D.

R645-301-830. DETERMINATION OF BOND AMOUNT

The bond amount has been determined through joint effort by Andalex Resources, Inc. and the Division. The present amount of bond is $1,144,000.00. Complete calculations are included in Appendix B, Part D. Bonded areas are shown on Plates *1, 1A*, and 1B and further described in R645-301-542

R645-301-840. **GENERAL TERMS AND CONDITIONS OF THE BOND**

All pertinent bond information and details are included in Appendix B, Part D.

R645-301-850. **BONDING REQUIREMENTS FOR UNDERGROUND MINING OPERATIONS**

Appendix B, Part D

R645-301-860. **FORMS OF BONDS**

Appendix B - Letter of Credit

R645-301-860.200 **COLLATERAL BONDS**

Appendix B - Letter of Credit

R645-301-860.220 **LETTERS OF CREDIT**

Appendix B - Letter of Credit

(Note: All other sections of R645-301-860 except those noted are N/A).

R645-301-870. **REPLACEMENT OF BONDS**

N/A

R645-301-880. **REQUIREMENT TO RELEASE PERFORMANCE BONDS**

N/A -- UNTIL FINAL RECLAMATION

R645-301-890. **TERMS AND CONDITIONS FOR LIABILITY INSURANCE**

Required Liability Insurance Policy and information is included in Appendix B, Part C

VERIFICATION STATEMENT

STATE OF UTAH)
SS:
COUNTY OF CARBON)

I, David E Shaver, having been duly sworn, depose and attest that all of the representations contained in the foregoing application and true, accurate and complete to the best of my knowledge; that I am authorized to complete and file this application on behalf of the Applicant and this application has been executed as required by law.

Signed: _____

Taken, subscribed and sworn to me before the undersigned authority in my said county, this _____ day of _____, 20___.

Notary Public: _____

My Commission Expires: _____

APPENDIX A
PART 1

OWNERSHIP AND CONTROL

OWNERSHIP AND CONTROL

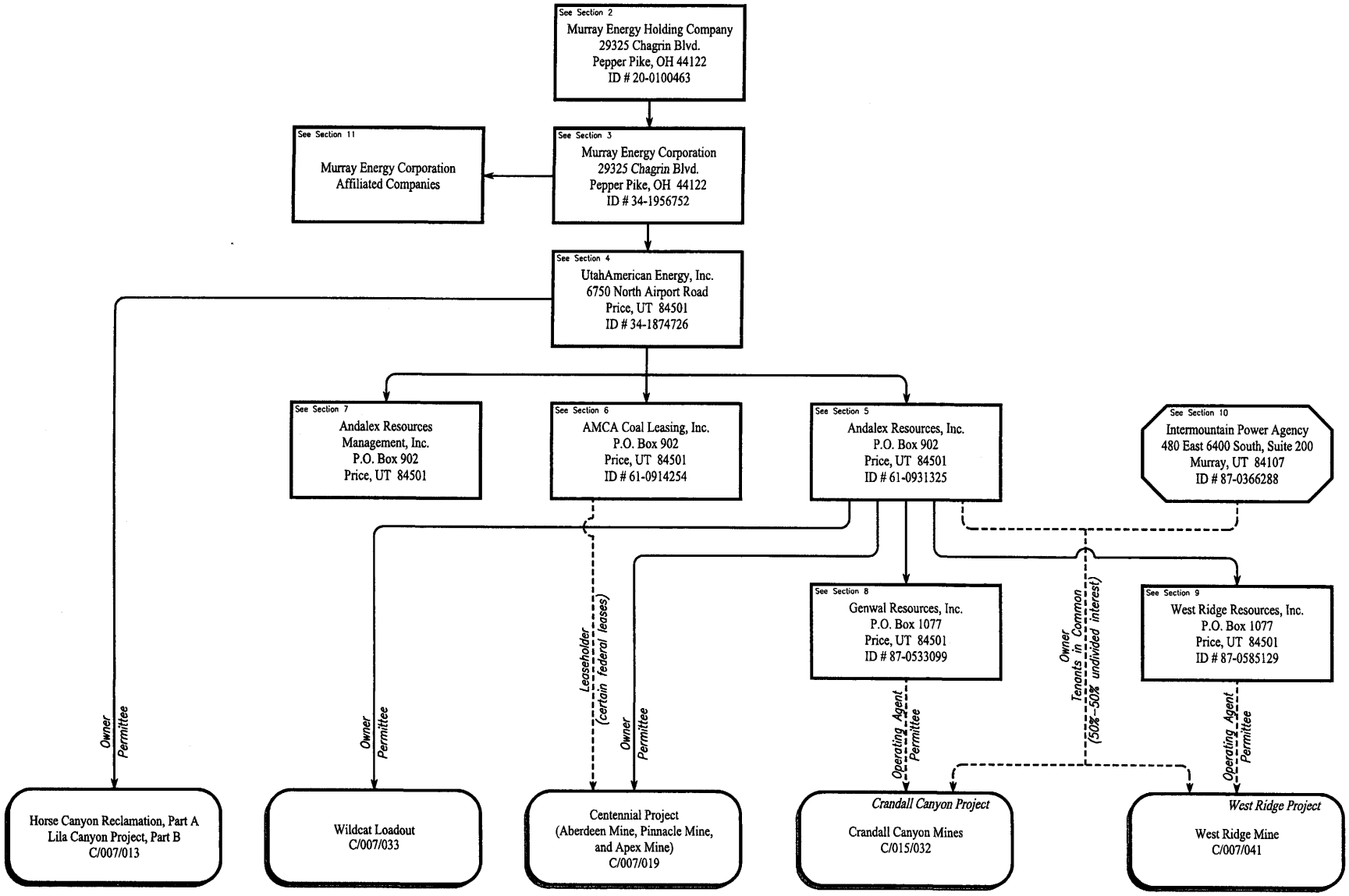
REVISED 6/15/2010

Section 1

Insert
Family Tree

OWNERSHIP AND CONTROL

Section 1



Section 2

MURRAY ENERGY HOLDINGS CO.
29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

Officers:

		Begin	End
Robert E. Murray	President & CEO	06/30/03	11/29/05
Michael D. Loiacono	Treasurer	01/10/05	
		06/30/03	
Michael O. McKown	Secretary	06/30/03	
Robert D. Moore	Chief Financial Officer	04/23/07	

Incorporation Information:

State of Incorporation	Delaware; Charter No. 3676958
Date of Incorporation	June 27, 2003
ID #	20-0100463

Shareholders:	Robert E. Murray, Trustee	05/10/2010	
	Robert Edward Murray		
	Jonathan Robert Murray		
	Ryan Michael Murray		
	Fifth Third Bank of Northeast Ohio, Trustee		
Directors:	Robert E. Murray	06/30/03	
	Michael D. Loiacono	06/30/03	04/23/07
	Michael O. McKown	06/30/03	
	Robert D. Moore	04/23/07	

Section 3

MURRAY ENERGY CORPORATION
29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

Appointment of Officers

		Begin	End
Robert E. Murray	Chairman, President &	02/23/01	
	Chief Executive Officer	02/23/01	
John R. Forrelli	Vice President	09/11/07	
Robert D. Moore	Executive Vice President &	08/01/08	
	Chief Financial Officer	08/01/08	
Robert Edward Murray	Vice President	09/11/07	
Ryan M. Murray	Vice President	09/11/07	
Roy A. Heidelbach	Asst. Vice President	09/11/07	
P. Bruce Hill	Vice President - Human Resources	12/18/03	11/05/09
B.J. Cornelius	Vice President	08/01/08	
Michael D. Loiacono	Treasurer	02/23/01	
Michael D. Loiacono	Chief Financial Officer	12/20/05	04/23/07
Michael O. McKown	Senior Vice President,		
	General Counsel & Secretary	08/01/08	
	Senior VP – HR & Legal	03/23/10	
G. Christopher Van Bever	Asst. Secretary	10/22/07	

Incorporation Information:

State of Incorporation	Ohio; Charter No. 1211519
Date of Incorporation	February 23, 2001
ID#	34-1956752

Shareholder:

	Begin	End
Murray Energy Holdings Co. (100%)	10/21/03	
Robert E. Murray	02/23/01	10/21/03

Directors:

Robert E. Murray	02/23/01	
Michael D. Loiacono	12/20/05	04/23/07
Henry W. Fayne	01/28/05	
Richard L. Lawson	01/28/05	
Andrew D. Weissman	10/23/03	08/27/09
Robert D. Moore	04/23/07	

Section 4

UTAHAMERICAN ENERGY, INC.
P.O. Box 910
East Carbon, Utah 84520

Officers:

		Begin	End
David W. Hibbs	President	12/11/09	
Peter J. Vuljanic	Interim President	11/06/09	12/11/09
P. Bruce Hill	Chief Executive Officer	08/18/06	11/05/09
P. Bruce Hill	President	12/16/06	11/05/09
Douglas H. Smith	President	08/18/06	12/16/06
Clyde I. Borrell	President	07/31/98	05/19/06
Robert D. Moore	Treasurer	08/18/06	
Michael O. McKown	Secretary	08/18/06	
Marsha Baker Kocinski	Secretary	07/31/98	06/25/02
Barbara Boyce	Secretary	07/31/98	11/01/99
Jay Marshall	Manager	07/31/98	08/18/06
B. J. Cornelius	Senior Vice President	09/12/06	

Directors:

Robert E. Murray	07/31/98	
P. Bruce Hill	08/18/06	11/05/09
David W. Hibbs	11/05/09	

Owner:

Murray Energy Corp.

Section 5

ANDALEX RESOURCES, INC.
P.O. Box 910
East Carbon, Utah 84520

Officers:

		Begin	End
David W. Hibbs	President	12/11/09	
Peter J. Vuljanic	Interim President	11/06/09	12/11/09
P. Bruce Hill	President and Chief Executive Officer	12/16/06	11/05/09
Douglas H. Smith	President	03/07/94	12/16/06
Robert D. Moore	Treasurer	08/18/06	
Michael O. McKown	Secretary	08/18/06	

Former Officers/Directors:

Peter B. Green	Director	01/05/98	08/18/06
Peter B. Green	CB	05/11/90	08/18/06
Peter B. Green	CEO	05/11/90	08/18/06
Ronald C. Beedie	Director	01/05/88	08/18/06
John Bradshaw	Secretary	02/05/90	08/18/06
John Bradshaw	Vice-President	02/05/90	08/18/06
Douglas H. Smith	Director	03/07/94	08/18/06
Samuel C. Quigley	Vice-President	02/24/95	08/18/06
Andalex Hungary Ltd.	Shareholder	12/28/20	08/18/06
Alexander Harold Samuel Green	Director	01/11/02	08/18/06

Directors:

Robert E. Murray	08/18/06	
P. Bruce Hill	08/18/06	11/05/09
David W. Hibbs	12/11/09	

Owner:

UtahAmerican Energy, Inc.	100%	08/18/06

MSHA Numbers

Apex Mine	42-01750
Pinnacle Mine	42-01474
Aberdeen Mine	42-02028
Wildcat Loadout	42-01864

Section 6

AMCA COAL LEASING, INC.
P.O. Box 910
East Carbon, Utah 84520

Appointment of Officers:

		Begin	End
David W. Hibbs	President	12/11/09	
Peter J. Vuljanic	Interim President	11/06/09	12/11/09
P. Bruce Hill	President and Chief Executive Officer	12/16/06	11/05/09
Douglas H. Smith	President	08/18/06	12/16/06
Robert D. Moore	Treasurer	08/18/06	
Michael O. McKown	Secretary	08/18/06	

Directors:

Robert E. Murray	08/18/06	
P. Bruce Hill	08/18/06	11/05/09
David W. Hibbs	12/11/09	

Owner:

Andalex Resources, Inc., 100% ownership

Section 7

ANDALEX RESOURCES MANAGEMENT, INC.
P.O. Box 910
East Carbon, Utah 84520

Appointment of Officers:

		Begin	End
Davis W. Hibbs	President	12/11/09	
Peter J. Vuljanic	Interim President	11/06/09	12/11/09
Douglas H. Smith	President	08/18/06	12/16/06
P. Bruce Hill	President and Chief	12/16/06	11/05/09
Robert D. Moore	Treasurer	08/18/06	
Michael O. McKown	Secretary	08/18/06	

Directors:

Robert E. Murray	08/18/06	
P. Bruce Hill	08/18/06	11/05/09
David W. Hibbs	12/11/09	

Shareholders:

Andalex Resources, Inc.	100%

Section 8

GENWAL RESOURCES, INC.
P.O. Box 910
East Carbon, Utah 84520

Officers:		Begin	End
David W. Hibbs	President	12/11/09	
Peter J. Vuljanic	Interim President	11/06/09	12/11/09
Douglas H. Smith	President	08/18/06	12/16/06
P. Bruce Hill	President and Chief Executive Officer	12/16/06	11/05/09
Robert D. Moore	Treasurer	08/18/06	
Michael O. McKown	Secretary	08/18/06	

Directors:			
Robert E. Murray		08/18/06	
P. Bruce Hill		08/18/06	11/05/09
David W. Hibbs		12/11/09	

Former Directors:		
Peter B. Green		08/09/06
Ronald C. Beedie		08/09/06
Douglas H. Smith		08/18/06
Gordon Ulrich		10/30/96

Former Officers:		
Peter B. Green	Chairman & CEO	08/09/06
Samuel C. Quigley	Vice President	08/18/06
John Bradshaw	Vice President	05/17/05
John Bradshaw	Secretary & Treasurer	08/18/06
Douglas H. Smith	President	12/16/06

Owner:

ANDALEX Resources, Inc. is and remains the sole shareholder of Genwal Resources, Inc.[I]

MSHA Numbers

Crandall Canyon Mine	42-01715

I Intermountain Power Agency holds, as a tenant in common, an undivided 50% interest in certain real property interests regarding the Crandall Canyon Mine.

Section 9

WEST RIDGE RESOURCES, INC.[I]
P.O. Box 910
East Carbon, Utah 84520

Officers:		Begin	End
David W. Hibbs	President	12/11/09	
Peter J. Vuljanic	Interim President	11/06/09	12/11/09
Douglas H. Smith	President	08/18/06	12/16/06
P. Bruce Hill	President and CEO	12/16/06	11/05/09
Robert D. Moore	Treasurer	08/18/06	
Michael O. McKown	Secretary	08/18/06	
Directors:			
Robert E. Murray		08/18/06	
P. Bruce Hill		08/18/06	11/05/09
David W. Hibbs		12/11/09	
Owner:			
Andalex Resources, Inc.[II]	100%		
Former Directors[III]		Begin Date	End Date
Peter B. Green		04/01/98	08/09/06
Ronald C. Beedie		04/01/98	08/09/06
Douglas H. Smith		04/01/98	09/18/06
Former Officers[VV]	Position	Begin Date	End Date
Peter B. Green	Chairman & CEO	04/15/98	08/09/06
Samuel C. Quigley	Vice President	04/15/98	08/18/06
John Bradshaw	Secretary	04/15/98	08/18/06
Douglas H. Smith	President	04/15/98	12/16/06
MSHA Number	West Ridge Mine 42-022444		

I WEST RIDGE Resources, Inc. ("WRRI") was formed on March 10, 1998. No actions of WRRI occurred before that date.

II ANDALEX Resources is (and remains) the sole shareholder of WRRI. WRRI and the Intermountain Power Agency hold certain real property interests as tenants in common, each owning a 50% interest therein.

III The initial directors of WRRI (as shown above) were appointed on April 1, 1998; the "Begin Date[s]" for each such director shown on the OFT form are incorrect.

VV The initial officers of WRRI (as shown above) were appointed on April 15, 1998; the "Begin Date[s]" for each such officer shown on the OFT form are incorrect. Also, Christopher G. Van Bever never served as an officer of WRRI; the information shown on the OFT form to the contrary is incorrect.

Section 10

INTERMOUNTAIN POWER AGENCY
(Tenant in Common, 50% undivided interest; West Ridge Mine Permit C/007/041; Crandall Canyon Mine Permit C/015/032)[I]
10653 South River Front Parkway, Suite 120
South Jordan, Utah 84095
(801) 938-1333

Appointment of Officers:

Ray Farrell	Chairman	12/1998
R. Leon Bowler	Vice-Chairman	12/1984
Ted L. Olson	Secretary	01/2002
Russell F. Fjeldsted	Treasurer	03/2007

Directors:	Begin Date	End Date
R. Leon Bowler	06/1977	
Ray Farrell	11/1978	
Clifford C. Michaelis[II]	01/1988	06/2007
Ted L. Olson	01/1990	
Russell F. Fjeldsted	01/1992	
Walter Meacham	01/1999	
Gary O. Merrill	01/2002	06/2007
Robert O. Christiansen	06/2007	
Ed Collins	06/2007	

I Intermountain Power Agency holds, as a tenant in common, an undivided 50% interest in certain real property interests regarding the West Ridge Mine and the Crandall Canyon Mine.
II Replacing controller Dan R. Eldredge, serving from April 11, 1988 to January 1990.

Name and address of IPA's general manager:

Jim Hewlett
Intermountain Power Agency
10653 South River Front Parkway, Suite 120
South Jordan, Utah 84095
Telephone (801) 938-1333
Assumed position December 1, 2007

Resident Agent for IPA:

Mark Buchi
Holme, Roberts, and Owen
299 South Main, Suite 1800
Salt Lake City, Utah 84111
Assumed position January, 1988

IPA Designated representative to the Crandall Canyon Project and West Ridge Project Management Boards:

Nick Kezman
Operating Agent
Los Angeles Department of Water & Power
111 North Hope Street, Room 1263
Los Angeles, California 90012-2694
Telephone (213) 367-0286

Principle Shareholders of IPA:

IPA has no shareholders. IPA is a political subdivision of the State of Utah created under the Interlocal Cooperation Act, Title II, Chapter 13, Utah Code Ann. 1953, as amended, and as such, has not issued stock.

Section 11

MURRAY ENERGY AFFILIATE COMPANIES

A. **AMCOAL HOLDINGS, INC.**
101 Prosperous Place, Suite 125
Lexington, Kentucky 40509

B. **THE AMERICAN COAL COMPANY**
P. O. Box 727
Harrisburg, Illinois 62946

C. **THE AMERICAN COAL SALES COMPANY**
29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

D. **AMERICAN COMPLIANCE COAL, INC.**
29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

E. **AMERICAN ENERGY CORPORATION**
43521 Mayhugh Hill Road
Township Highway 88
Beallsville, Ohio 43716

F. **ANCHOR LONGWALL AND REBUILD, INC.**
One Industrial Park Drive
Wheeling, West Virginia 26003

G. **AVONMORE RAIL LOADING, INC.**
125 Old Farm Drive,
Pittsburgh, PA 15239

H. **BELMONT COAL, INC.**
P. O. Box 146
Powhatan, Ohio 43942

I. **CANTERBURY COAL COMPANY**
125 Old Farm Drive
Pittsburgh, PA 15239

J. **COAL RESOURCES HOLDINGS CO.**
29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

K. **COAL RESOURCES, INC.**
29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

L. **CONSOLIDATED LAND COMPANY**
29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

M. **ENERGY RESOURCES, INC.**
P. O. Box 259
R. D.#2, Fermantown Road
Brockway, PA 15824

N. **KENAMERICAN RESOURCES, INC.**
101 Prosperous Place, Suite 125
Lexington, Kentucky 40509

O. **MAPLE CREEK MINING, INC.**
981 Route 917
Bentleyville, Pennsylvania 15314

P. **MILL CREEK MINING COMPANY**
P. O. Box 259
R. D. #2, Fermantown Road
Brockway, PA 15824

Q. **MONVALLEY TRANSPORTATION CENTER, INC.**
P. O. Box 135
1060 Ohio Avenue
Glassport, Pennsylvania 15045

R. **OHIOAMERICAN ENERGY INCORPORATED**
29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

S. **THE OHIO VALLEY COAL COMPANY**
29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

T. **OHIO VALLEY RESOURCES, INC.**
29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

U. **THE OHIO VALLEY TRANSLOADING COMPANY**
56854 Pleasant Ridge Road
Alledonia, Ohio 43902

V. **THE OKLAHOMA COAL COMPANY**
29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

W. **ONEIDA COAL COMPANY, INC.**
29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

X. **PENNAMERICAN COAL, INC.**
125 Old Farm Drive
Pittsburgh, PA 15239

Y. **PENNAMERICAN COAL LP**
125 Old Farm Drive
Pittsburgh, PA 15239

Z. **PENNSYLVANIA TRANSLOADING, INC.**
29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio

AA. **PINSKI CORP.**
125 Old Farm Drive
Pittsburgh, PA 15239

BB. **SPRING CHURCH COAL COMPANY**
125 Old Farm Drive
Pittsburgh, PA 15239

CC. SUNBURST RESOURCES, INC.
586 National Road
Wheeling, West Virginia 26003

DD. TDK COAL SALES, INCORPORATED
P. O. Box 259
R. D. #2, Fermantown Road
Brockway, PA 15824

EE. UMCO ENERGY, INC.
29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

FF. WEST VIRGINIA RESOURCES, INC.
953 National Road, Suite 207
Wheeling, West Virginia 26003

GG. MURRAY AMERICAN ENERGY, INC.
29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

A. AMCOAL HOLDINGS, INC.
101 Prosperous Place, Suite 125
Lexington, Kentucky 40509

Officers:

		Begin	End
Robert E. Murray	President	05/23/03	
P. Bruce Hill	Vice President – Human Resources	10/01/98	10/03/09
Robert D. Moore	Treasurer	10/01/98	
Michael O. McKown	Secretary	03/01/05	
Jeffrey L. Cash	Assistant Treasurer	11/01/99	

Incorporation Information:

State of Incorporation: Ohio;
Charter No. 1007981

Date of Incorporation: June 12, 1998

ID #34-1867389

Shareholders: Murray Energy Corporation

Directors: Robert E. Murray

B. THE AMERICAN COAL COMPANY
P. O. Box 727
Harrisburg, Illinois 62946

Officers:

Robert E. Murray	President	11/02/02
John R. Forrelli	Vice President	09/07/04
Michael O. McKown	Vice President, General Counsel and Secretary	03/15/99 03/01/05
Robert D. Moore	Treasurer	10/01/98
Jeffrey L. Cash	Assistant Treasurer and Assistant Secretary	11/01/99 06/01/01

Incorporation Information:

State of Incorporation	Delaware; Charter No. 2881631
Date of Incorporation	June 2, 1998

ID #73-1543124

Shareholders:	AmCoal Holdings, Inc.
Directors:	Robert E. Murray

C. THE AMERICAN COAL SALES COMPANY

29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

Officers:

		Begin	End
Robert E. Murray	Chief Executive Officer	11/11/88	
B. J. Cornelius	President	09/08/95	
Edwin D. Lane	Vice President	11/01/99	
William E. Hollars	Vice President	03/01/05	
Richard Rice	Vice President	11/11/88	11/01/99
Michael O. McKown	Secretary	03/01/05	
Steven C. Ellis	Secretary	11/10/88	03/01/05
James R. Turner, Jr.	Treasurer and Assistant Secretary	03/01/05	
Duane A. Smith	Assistant Treasurer and Assistant Secretary	06/25/01 06/25/01	01/03/06
Brenda L. Murray	Assistant Secretary	090/8/95	06/25/01

Incorporation Information:

State of Incorporation — Ohio; Charter No. 727836

Date of Incorporation — June 29, 1988

ID #34-1603699

Shareholder: Coal Resources, Inc.

Directors: Robert E. Murray 09/08/95

D. AMERICAN COMPLIANCE COAL, INC.

29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

Officers:

		Begin	End
Stanley T. Piasecki	President	03/01/05	
Charles E. Shestak	Vice President	03/10/03	
Michael O. McKown	Secretary	03/01/05	
Robert D. Moore	Treasurer and	06/25/01	
	Assistant Secretary	06/25/01	
Elmer A. Mottillo	Assistant Treasurer	08/22/03	05/31/08
Robert L. Putsock	Assistant Treasurer	06/01/08	

Former Officers:

Clyde I. Borrell	President	06/02/97	03/01/05
William W. Taft	Secretary	05/24/94	03/01/05

Incorporation Information:

State of Incorporation	Colorado; Charter No. 19941059260
Date of Incorporation	May 24, 1994
ID #34-1797161	

Shareholder:	Murray Energy Corporation (100%)	06/1/01	
	Robert E. Murray	05/24/94	06/01/01
Director:	Robert E. Murray	05/24/94	

E. AMERICAN ENERGY CORPORATION

43521 Mayhugh Hill Road
Township Highway 88
Beallsville, Ohio 43716

Officers:

		Begin	End
Robert E. Murray	President	12/15/04	
Robert D. Moore	President	06/25/01	12/15/04
Michael O. McKown	Secretary	11/01/99	
James R. Turner, Jr.	Treasurer	03/1/05	
Robert D. Moore	Treasurer	06/25/01	12/15/04
Robert L. Putsock	Assistant Treasurer	01/27/04	

Incorporation Information:

State of Incorporation — Ohio; Charter No. 00842695

Date of Incorporation — April 12, 1993
ID #31-1550443

Shareholder: Murray Energy Corporation (100%)

Director:

Robert E. Murray	12/15/04	
P. Bruce Hill	07/02/01	12/15/04

F. ANCHOR LONGWALL AND REBUILD, INC.

One Industrial Park Drive
Wheeling, West Virginia 26003

Officers:

		Begin	End
P. Bruce Hill	President and	02/16/99	11/10/06
	Assistant Secretary	02/16/99	
Chad Underkoffler	President	11/10/06	
Michael O. McKown	Secretary	11/01/99	
James R. Turner, Jr.	Treasurer	09/16/05	
Duane A. Smith	Assistant Secretary	11/01/99	01/03/06

Incorporation Information:

State of Incorporation — West Virginia; Charter No. 00961100093212818

Date of Incorporation — April 18, 1996

ID #55-0749933

Shareholder: Coal Resources, Inc.
I.D. # 34-1586390
Address: 29325 Chagrin Boulevard
Suite 300
Pepper Pike, OH 44122

Director: Charles E. Shestak 11/01/99

G. AVONMORE RAIL LOADING, INC.

125 Old Farm Drive,
Pittsburgh, PA 15239

Officers:

		Begin	End
[VACANT]	President		
Robert D. Moore	Treasurer	06/25/01	
Michael O. McKown	Secretary	03/1/05	
Robert L. Putsock	Assistant Treasurer	01/02/03	
James R. Turner, Jr.	Assistant Secretary	05/31/08	
Elmer A. Mottillo	Assistant Secretary	01/02/03	05/31/08

Incorporation Information:

State of Incorporation	Delaware; Charter No. 0798860
Date of Incorporation	February 19, 1974
Qualified	May 6, 1974 Pennsylvania; PA Entity #000302999

ID #25-1253970

Shareholder:	Mill Creek Mining Company
Director:	Charles E. Shestak

H. BELMONT COAL, INC.

P. O. Box 146
Powhatan, Ohio 43942

Officers:

		Begin	End
Robert D. Moore	President	06/25/01	
Maynard St. John	Vice-President	01/02/02	06/26/02
James R. Turner, Jr.	Secretary/Treasurer	09/16/05	
Kristi D. Brown	Secretary/Treasurer	11/08/01	09/16/05

Incorporation Information:

State of Incorporation	Ohio; Charter No. 00842697
Date of Incorporation	April 12, 1993

ID #31-1536602

Shareholder:	Murray Energy Corporation (100%)	06/01/01	
	Robert E. Murray	04/19/93	06/01/01
Director:	Duane A. Smith	04/12/93	12/15/06
	Robert E. Murray	12/15/06	

I. CANTERBURY COAL COMPANY

125 Old Farm Drive
Pittsburgh, PA 15239

Officers:

Robert D. Moore	President & Treasurer	05/26/07
Michael O. McKown	Secretary	05/26/07
Robert L. Putsock	Asst Treasurer	01/02/03
James R. Turner, Jr.	Asst Secretary	06/01/08
Neil M. Kok	Vice President	03/08/2010

Incorporation Information:

State of Incorporation	Pennsylvania; PA Entity #000055242
Date of Incorporation	July 26, 1963

ID #25-1127473

Shareholder:	Mill Creek Mining Company (100%)
Director:	Charles E. Shestak

J. COAL RESOURCES HOLDINGS CO.

29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

Officers:

		Begin	End
Robert E. Murray	President, CEO, Chairman	03/01/05	
Michael D. Loiacono	Treasurer	01/28/05	
	CFO	12/20/05	04/23/07
Robert D. Moore	CFO	04/23/07	
Scott A. Boyle	Chief Financial Officer	10/29/05	12/20/05
P. Bruce Hill	Secretary	03/01/05	11/01/05
Michael O. McKown	Secretary	11/06/09	
Robert L. Putsock	Assistant Secretary and Assistant	06/25/01	
	Treasurer	06/25/01	
Michael D. Loicano	Treasurer	01/28/05	

Incorporation Information:

State of Incorporation	Delaware; Charter No. 3676954	
Date of Incorporation	June 27, 2003	
ID #20-0100479		
Shareholder:	Murray American Energy, Inc.	
Director:	Robert E. Murray	06/27/03

K. COAL RESOURCES, INC.

29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

Officers:

		Begin	End
Robert E. Murray	Chairman, President and Chief Executive Officer	03/01/05	
Michael D. Loiacono	Treasurer	06/27/03	
	CFO	12/20/05	04/23/07
Robert D. Moore	Senior Vice President & CFO	09/11/07	
Scott A. Boyle	Chief Financial Officer	10/17/05	12/20/05
P. Bruce Hill	Secretary	03/01/05	11/01/05
Michael O. McKown	Vice President, General Counsel & Secretary	07/16/07	
Robert L. Putsock	Assistant Secretary and Assistant Treasurer	06/25/01 06/25/01	
Robert Edward Murray	Vice President	09/11/07	
Ryan M. Murray	Vice President	09/11/07	
John R. Forrelli	Vice President	09/11/07	
Roy A. Heidelbach	Asst. Vice President	09/11/07	
G. Christopher Van Bever	Asst. Secretary	10/22/07	

Incorporation Information:

State of Incorporation: Ohio;
Charter No. 717546

Date of Incorporation: January 29, 1988

ID #34-1586390

Shareholder:	Coal Resources Holdings Co.	10/21/03	
	Robert E. Murray	01/29/88	10/21/03
Directors:	Robert E. Murray	05/24/88	
	Henry W. Fayne	02/05	
	Richard L. Lawson	02/05	
	Robert D. Moore	04/23/07	
	Andrew Weissman	10/20/03	08/27/09

L. CONSOLIDATED LAND COMPANY

29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

Officers:

		Begin	End
Robert D. Moore	President	08/11/04	
Robert D. Moore	Treasurer	06/25/01	
Robert L. Putsock	Assistant Secretary	06/08/08	
Michael O. McKown	Secretary	03/01/05	
Elmer A. Mottillo	Assistant Secretary	08/22/03	05/31/08

Incorporation Information:

State of Incorporation	Ohio; Charter No. 00842696
Date of Incorporation	April 12, 1993
ID #34-1769562	

Shareholder:	Murray Energy Corporation (100%)	06/01/01
Director:	Robert D. Moore	08/11/04

M. ENERGY RESOURCES, INC.
P. O. Box 259
R. D.#2, Fermantown Road
Brockway, PA 15824

Officers:

		Begin	End
Stanley T. Piasecki	President and Chief Executive Officer	08/11/04	
Elmer A. Mottillo	Treasurer	08/22/03	05/30/08
James R. Turner	Treasurer	06/01/08	
Michael O. McKown	Secretary	03/01/05	
Charles E. Shestak	Assistant Secretary	04/30/93	

Incorporation Information:

State of Incorporation — Pennsylvania; PA Entity #762734

Date of Incorporation — September 14, 1982

ID #31-1044044

Shareholder: Mill Creek Mining Company

Director: Stanley T. Piasecki 08/11/04

N. **KENAMERICAN RESOURCES, INC.**
101 Prosperous Place, Suite 125
Lexington, Kentucky 40509

Officers:

		Begin	End
Mark Nelson	President	03/18/09	
Robert N. Sandidge	President	12/16/06	12/08/08
Dennis W. Bryant	President/Manager	10/01/05	12/16/06
B. J. Cornellius	Senior Vice-President--Sales	11/01/05	
James R. Turner, Jr.	Treasurer	03/01/05	
Robert D. Moore	Assistant Treasurer	03/01/05	
Michael O. McKown	Secretary	02/13/06	

Incorporation Information:

State of Incorporation — Kentucky; Charter No. 0331655

Date of Incorporation — June 9, 1994

ID #61-1264385

Shareholder: Mill Creek Mining Company

Director: Robert E. Murray 06/01/05

O. MAPLE CREEK MINING, INC.

981 Route 917
Bentleyville, Pennsylvania 15314

Officers:

		Begin	End
[VACANT]	President	11/02/09	
Paul B. Piccolini		04/28/06	09/11/08
Ronnie D. Dietz	Vice President and Treasurer	03/01/05	
[VACANT]	Secretary		
Michael B. Gardner	Secretary	03/01/05	05/01/07
Roberta K. Heil	Assistant Secretary	11/01/99	

Incorporation Information:

State of Incorporation — Pennsylvania; PA Entity #2607113

Date of Incorporation — November 9, 1994

ID #25-1755305

Shareholder: Sunburst Resources, Inc. 01/11/95

Director: Robert E. Murray

P. MILL CREEK MINING COMPANY
P. O. Box 259
R. D. #2, Fermantown Road
Brockway, PA 15824

Officers:

		Begin	End
Charles E. Shestak	President	08/18/98	
James R. Turner, Jr.	Treasurer	03/1/05	
Robert D. Moore	Treasurer	06/25/01	03/01/05
Robert D. Moore	Assistant Treasurer	03/01/05	
Michael O. McKown	Secretary	03/01/05	
Michael E. Elliott	Secretary	08-18-98	03/01/05
Robert L. Putsock	Assistant Secretary and	06/25/01	
	Assistant Treasurer	06/25/01	

Incorporation Information:

State of Incorporation	Pennsylvania; PA Entity #0007447787
Date of Incorporation	December 1, 1981
Certificate of Amendment	July 7, 1988; #8854525

ID #31-1040986

Shareholder:	Coal Resources, Inc.	
Director:	Robert E. Murray	05/14/04

Q. MONVALLEY TRANSPORTATION CENTER, INC.
P. O. Box 135
1060 Ohio Avenue
Glassport, Pennsylvania 15045

Officers:

Paul B. Piccolini	President	04/28/06
James R. Turner, Jr.	Secretary and Treasurer	03/01/05

Incorporation Information:

State of Incorporation	Pennsylvania; PA Entity #856918
Date of Incorporation	February 15, 1985

ID #25-1490495

Shareholders:	Pennsylvania Transloading, Inc.	
Directors:	Robert E. Murray and	08/28/05
	Michael D. Loiacono	11/01/99

R. OHIOAMERICAN ENERGY INCORPORATED
29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

Officers:

		Begin	End
[VACANT]	President		
D. Michael Jamison		05/01/05	12/01/07
Stanley T. Piasecki	Vice President	12/01/07	
Mark D. Nelson	Vice President	12/01/07	
Michael O. McKown	Secretary	05/02/05	
Robert D. Moore	Treasurer	05/02/05	
Robert L. Putsock	Assistant Treasurer	06/01/08	
Elmer A. Mottillo	Assistant Treasurer	06/30/06	06/01/08

Incorporation Information:

State of Incorporation	Ohio	
Date of Incorporation	February 1, 2005	
ID # 20-3044610	Ohio Charter No. 1518533	
Director:	Robert E. Murray	05/01/05
Shareholder:	Murray Energy Corporation	05/01/05

S. **THE OHIO VALLEY COAL COMPANY**
29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

Officers:

		Begin	End
[VACANT]	President	11/04/05	
Paul B. Piccolini	Vice President	01/01/07	
Ronnie D. Dietz	Treasurer, Assistant Secretary, Corporate Comptroller	03/01/05	
[VACANT]	Secretary	05/01/07	
Michael B. Gardner	Secretary	03/01/05	05/01/07
Roberta K. Heil	Assistant Secretary	11/01/99	
Bonnie M. Froehlich	Assistant Secretary and Assistant Treasurer	06/25/01 06/25/01	

Incorporation Information:

State of Incorporation	Ohio; Charter No. 384971
Date of Incorporation	June 6, 1969
Certificate of Amendment	October 4, 1988; #201274

ID #34-1041310

Shareholder:	Ohio Valley Resources, Inc.	
Director:	Robert E. Murray	03/10/95

T. **OHIO VALLEY RESOURCES, INC.**
29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

Officers:

		Begin	End
Paul B. Piccolini	President	04/28/06	
John Forrelli	President	11/01/99	04/28/06
Ronnie D. Dietz	Treasurer, Assistant Secretary, Corporate Comptroller	03/01/05	
Michael D. Loiacono	Treasurer, Assistant Secretary, Corporate Comptroller	03/10/95	04/28/06
[VACANT]	Secretary	05/01/07	
Stephen Ellis	Secretary	03/10/95	03/01/05

Incorporation Information:

State of Incorporation	Ohio; Charter No. 721514		
Date of Incorporation	March 29, 1988		
ID #34-1586391			
Shareholders:	Murray Energy Corporation (100%)	06/01/01	
	Robert E. Murray	03/10/95	06/01/01
Director:	Robert E. Murray	11/01/99	

U. THE OHIO VALLEY TRANSLOADING COMPANY

56854 Pleasant Ridge Road
Alledonia, Ohio 43902

Officers:

		Begin	End
[VACANT]	President	11/04/05	
Paul B. Piccolini	Vice-President	01/01/07	
Ronnie D. Dietz	Treasurer, Assistant Secretary, Corporate Comptroller	03/01/05	
Michael B. Gardner	Secretary	03/01/05	05/01/07
Roberta K. Heil	Assistant Secretary	9/01/00	no end date

Incorporation Information:

State of Incorporation: Ohio; Charter No. 727835

Date of Incorporation: June 29, 1988

ID #34-1611209

Shareholder: Ohio Valley Resources, Inc.

Director: Robert E. Murray 04/06/93

V. THE OKLAHOMA COAL COMPANY

29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

Officers:

		Begin	End
Paul B. Piccolini	President	04/28/06	
Gregory C. Smith	President	11/01/99	04/28/06
Michael O. McKown	Secretary	03/01/05	
Gregory A. Gorospe	Secretary	09/15/94	11/01/99
James R. Turner, Jr.	Treasurer and Assistant Secretary	03/01/05	
Kathleen Bednarek	Treasurer	06/20/00	06/26/00
Robert L. Putsock	Assistant Secretary	01/10/03	
Kathleen Bednarek	Assistant Secretary	09/03/96	06/26/00

Incorporation Information:

State of Incorporation	Oklahoma; Charter No. DB00477836
Date of Incorporation	April 17, 1989
Licensed in Ohio	February 27, 1991; FL 790739

ID #34-1673480

Shareholder: The American Coal Sales Company

Director: Robert E. Murray 04/17/92

W. ONEIDA COAL COMPANY, INC.

29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

Officers:

		Begin	End
Robert D. Moore	President and Treasurer	06/25/01 11/01/99	
Robert L. Putsock	Assistant Secretary	06/25/01	
Michael O. McKown	Secretary	03/1/05	

Former Officers:

John Blaine Earles	Vice-President	02/28/92	07/02/93
Tivis Arnold Graybeal	Secretary	02/28/92	04/28/94
Anthony Carl Laplaca	Secretary	04/28/94	11/1/99
Joseph R. Bourgo	Vice-President	09/01/92	10/20/00
Joseph R. Bourgo	Treasurer	04/28/94	10/20/00
Norma Jean Mccourt	Assistant Secretary	04/28/94	11/01/99

Incorporation Information:

State of Incorporation — West Virginia; Charter No. 00000020004097TAX

Date of Incorporation — August 29, 1983

ID #62-1011712

Shareholder: West Virginia Resources, Inc. (100%) — 2/28/92

Director: Robert E. Murray — 02/18/92

X. PENNAMERICAN COAL, INC.

125 Old Farm Drive
Pittsburgh, PA 15239

Officers:

Robert D. Moore	President,	08/28/07
	Treasurer and Secretary	06/25/01
Robert L. Putsock	Assistant Secretary	06/25/01

Incorporation Information:

State of Incorporation	Pennsylvania; PA Entity #2545905
Date of Incorporation	September 13, 1993
ID #25-1722115	

Shareholder:	Mill Creek Mining Co.	11/08/93
Director:	Robert E. Murray	

Y. PENNAMERICAN COAL LP
125 Old Farm Drive
Pittsburgh, PA 15239

Partners:

Pinski Corp.	Managing Partner	08/19/96
PennAmerican Coal, Inc.	Limited Partner	07/08/98

EIN# 25-1800809
Partnership Effective 07/08/98

Z. PENNSYLVANIA TRANSLOADING, INC.

29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

Officers:

		Begin	End
Paul B. Piccolini	President	04/28/06	
		09/01/08	
James R. Turner, Jr.	Treasurer	03/01/05	
Michael O. McKown	Secretary	03/01/05	

Incorporation Information:

State of Incorporation	Ohio; Charter No. 736747
Date of Incorporation	November 18, 1988
Qualified:	Pennsylvania; December 28, 1988
Certificate of Authority	No. 8898868

ID #34-1603748

Shareholder:	Sunburst Resources, Inc. (100%)	04/01/96
Director:	Robert E. Murray	11/18/88

I

I Sunburst Resources, Inc. has always been a shareholder and has no relation to Consolidated Land Company.

AA. PINSKI CORP.
125 Old Farm Drive
Pittsburgh, PA 15239

Officers:

[VACANT]	President and General Manager	
Robert D. Moore	Treasurer and	06/25/01
	Secretary	06/25/01
Robert L. Putsock	Assistant Treasurer and	06/25/01
	Assistant Secretary	06/25/01

Incorporation Information:

State of Incorporation	Pennsylvania; PA Entity #002710766
Date of Incorporation	August 19, 1996
ID #25-1800870	

Shareholder:	PennAmerican Coal, Inc.
Director:	Charles E. Shestak

BB. SPRING CHURCH COAL COMPANY
125 Old Farm Drive
Pittsburgh, PA 15239

Officers:

Robert D. Moore	President	05/26/07
Robert S. Moore	Treasurer	06/25/01
Michael O. McKown	Secretary	05/26/07
Robert L. Putsock	Asst Treasurer	01/02/03
James R. Turner, Jr.	Asst Secretary	06/01/08

Incorporation Information:

State of Incorporation — Pennsylvania;
PA Entity #000696663

Date of Incorporation — November 2, 1979

ID #25-1372128

Shareholder: Mill Creek Mining Company

Director: Charles E. Shestak

CC. SUNBURST RESOURCES, INC.
586 National Road
Wheeling, West Virginia 26003

Officers:

		Begin	End
Paul B. Piccolini	President	04/28/06	
Ronnie D. Dietz	Treasurer	03/01/05	
Ronnie D. Dietz	Secretary	10/26/09	
Michael B. Gardner	Secretary	03/01/05	05/01/07

Incorporation Information:

State of Incorporation — Pennsylvania;
PA Entity #2616384

Date of Incorporation — January 10, 1995

ID #25-1766427

Shareholder: Ohio Valley Resources, Inc. 04/01/97

Director: Robert E. Murray

DD. TDK COAL SALES, INCORPORATED
P. O. Box 259
R. D. #2, Fermantown Road
Brockway, PA 15824

Officers:

		Begin	End
Stanley T. Piasecki	President and Chief Executive Officer	08/11/04	
Elmer A. Mottillo	Treasurer	08/22/03	05/31/08
James R. Turner, Jr.	Treasurer	06/01/08	
Michael O. McKown	Secretary	03/01/05	
Charles E. Shestak	Assistant Secretary	02/01/99	

Incorporation Information:

State of Incorporation: Pennsylvania; PA Entity #00758582

Date of Incorporation: June 28, 1982

ID #25-1422374

Shareholder: Energy Resources, Inc.

Director: Stanley T. Piasecki 08/11/04

EE. UMCO ENERGY, INC.
29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

Officers:

		Begin	End
[VACANT]	President	11/02/09	
Paul B. Piccolini		04/28/06	09/11/08
Ronnie D. Dietz	Treasurer and Assistant Secretary	03/01/05	
[VACANT]	Secretary	05/01/07	
Michael B. Gardner		03/01/05	05/01/07
[VACANT]	Vice-President	05/01/07	
Michael B. Gardner		05/03/05	05/01/07

Incorporation Information:

State of Incorporation	Pennsylvania; PA Entity #1072295
Date of Incorporation	December 29, 1988
ID #52-1615668	
Shareholder:	Maple Creek Mining, Inc. and Toni J. Southern
Director:	Robert E. Murray

FF. WEST VIRGINIA RESOURCES, INC.
953 National Road, Suite 207
Wheeling, West Virginia 26003

Officers:

		Begin	End
Neil Kok	President	10/2/06	
Robert D. Moore	President	10/20/00	10/20/00
Robert E. Murray	President, CEO	12/27/91	10/20/00
Charles E. Shestak	Vice President	12/21/07	
Anne Besece	Treasurer and Secretary	10/2/06	12/01/07
Robert L. Putsock	Treasurer and Secretary	12/01/07	
	Assistant Secretary	06/25/01	10/02/06
Robert E. Murray	Treasurer	12/27/91	06/25/01
Michael O. McKown	Secretary	03/01/05	10/2/06
Anthony Carl Laplaca	Secretary	12/27/91	03/01/05

Incorporation Information:

State of Incorporation: West Virginia; Charter No. 00913610154813604

Date of Incorporation: December 27, 1991

ID #55-0713676

Shareholder: Mill Creek Mining Company (100%) 12/27/91

Director: Robert E. Murray

GG. MURRAY AMERICAN ENERGY, INC.
29325 Chagrin Boulevard, Suite 300
Pepper Pike, Ohio 44122

Officers:

Robert D. Moore	President, Treasurer and Secretary	05/03/06

Incorporation Information:

State of Incorporation	Wyoming; Charter No. 1998003378171
Date of Incorporation	September 22, 1998

ID #34-1875051

Shareholder:	Murray Energy Corporation
Director:	Robert E. Murray

SECRETARY'S CERTIFICATE

I, Michael O. McKown, Secretary of UtahAmerican Energy, Inc. ("**Company**"), confirm as follows:

1. I am the duly elected and incumbent Secretary of the Company and am authorized to execute this certificate on behalf of the Company; and

2. That the enclosed ownership and control information is true and complete to the best of my information as of the date hereof.

IN WITNESS WHEREOF, I have hereunto signed my name.

Michael O. McKown

Name: Michael O. McKown
Title: Secretary

SECRETARY'S CERTIFICATE

I, Michael O. McKown, Secretary of West Ridge Resources, Inc. ("**Company**"), confirm as follows:

1. I am the duly elected and incumbent Secretary of the Company and am authorized to execute this certificate on behalf of the Company; and

2. That the enclosed ownership and control information is true and complete to the best of my information as of the date hereof.

IN WITNESS WHEREOF, I have hereunto signed my name.

Name: Michael O. McKown
Title: Secretary

SECRETARY'S CERTIFICATE

I, Michael O. McKown, Secretary of Genwal Resources, Inc. ("**Company**"), confirm as follows:

1. I am the duly elected and incumbent Secretary of the Company and am authorized to execute this certificate on behalf of the Company; and

2. That the enclosed ownership and control information is true and complete to the best of my information as of the date hereof.

IN WITNESS WHEREOF, I have hereunto signed my name.

Michael O. McKown

Name: Michael O. McKown
Title: Secretary

SECRETARY'S CERTIFICATE

I, Michael O. McKown, Secretary of Andalex Resources, Inc. ("**Company**"), confirm as follows:

1. I am the duly elected and incumbent Secretary of the Company and am authorized to execute this certificate on behalf of the Company; and

2. That the enclosed ownership and control information is true and complete to the best of my information as of the date hereof.

IN WITNESS WHEREOF, I have hereunto signed my name.

Michael O. McKown

Name: Michael O. McKown
Title: Secretary

SECRETARY'S CERTIFICATE

I, Michael O. McKown, Secretary of Andalex Resources Management, Inc. ("**Company**"), confirm as follows:

1. I am the duly elected and incumbent Secretary of the Company and am authorized to execute this certificate on behalf of the Company; and

2. That the enclosed ownership and control information is true and complete to the best of my information as of the date hereof.

IN WITNESS WHEREOF, I have hereunto signed my name.

Michael O. McKown

Name: Michael O. McKown
Title: Secretary

SECRETARY'S CERTIFICATE

I, Michael O. McKown, Secretary of AMCA Coal Leasing, Inc. ("**Company**"), confirm as follows:

1. I am the duly elected and incumbent Secretary of the Company and am authorized to execute this certificate on behalf of the Company; and

2. That the enclosed ownership and control information is true and complete to the best of my information as of the date hereof.

IN WITNESS WHEREOF, I have hereunto signed my name.

Michael O. McKown

Name: Michael O. McKown
Title: Secretary

APPENDIX A
PART 2

CURRENT AND PREVIOUS PERMITS

CURRENT AND PREVIOUS

COAL MINING PERMITS

Company	Andalex Resources, Inc.		EIN: 61-0931325		
Address:	Permit #	State	Regulator Authority	MSHA #	Date Issued
10 miles NE Airport Road, Price, Utah 84501 P.O. Box 902 Price, Utah 84501	C/007/019 Centennial Project	Utah	Division of Oil, Gas and Mining	42-02028 42-01474 42-01750	
	C/007/033 Wildcat Loadout	Utah	Division of Oil, Gas and Mining	42-01864	

Company	West Ridge Resources, Inc.		EIN: 87-0585129		
Address:	Permit #	State	Regulator Authority	MSHA #	Date Issued
794 C Canyon Road East Carbon, Utah 84520 P.O. Box 1077 Price, Utah 84501	C/007/041 West Ridge Mine	Utah	Division of Oil, Gas and Mining	42-02233	March 12, 1999

Company	Genwal Resources, Inc.		EIN: 87-0533099		
Address:	Permit #	State	Regulator Authority	MSHA #	Date Issued
794 C Canyon Road East Carbon, Utah 84520 P.O. Box 1077 Price, Utah 84501	C/015/032 Crandall Canyon Mines	Utah	Division of Oil, Gas and Mining	42-02356 42-01715	Nov 21, 1991

Company	Utah American Energy Inc.		EIN: 31-153-6602		
Address:	Permit #	State	Regulator Authority	MSHA #	Date Issued
794 C Canyon Road East Carbon, Utah 84520 P.O. Box 986 Price, Utah 84501	C/007/013 Horse/Lila Canyon	Utah	Division of Oil, Gas and Mining	42-00100 42-02241	

Company	Belmont Coal, Inc.		EIN: 31-153-6602		
Address:	Permit #	State	Regulator Authority	MSHA #	Date Issued
Belmont Coal, Inc. Box 156 30799 PineTree Road Pepper Pike, Ohio 44124	D-0241	Ohio	ODNR	33-04397	7-31-97
	D-1020	Ohio	ODNR	33-03048	7-2-93
Company	KenAmerican Resources Inc.		EIN: 61-1264385		
Address:	Permit #	State	Regulator Authority	MSHA #	Date Issued
KenAmerican Resources Inc. 1008 South Broadway Lexington Kentucky 40504	889-5009	KY	DSMRK	1517606	10-25-94
Company	Onieda Coal Company Inc.		EIN: 62-1011712		
Address:	Permit #	State	Regulator Authority	MSHA #	Date Issued
Onedia Coal Co. Inc., 29525 Chagrin Boulevard, Suite 111 Pepper Pike, Ohio 44122	U0-359	WV	DEP	46-05243	2-20-92
	U0-524	WV	DEP	46-06043	2-28-92
	U0-620	WV	DEP	46-06213	2-28-92
	D-7-82	WV	DEP	46-06557	2-28-92
	D-47-81	WV	DEP	46-06557	2-28-92
	D-46-82	WV	DEP	46-06522	2-28-92
	U-2016-89	WV	DEP	46-07757	2-28-92
	P-154-81	WV	DEP	N/A	N/A
	P-62-81	WV	DEP	N/A	N/A
	P-2043-89	WV	DEP	N/A	N/A
	S-2004-87	WV	DEP	46-06766	2-28-92
	S-71-85	WV	DEP	46-06766	2-28-92

Company	**MonValley Transportation Center Inc.**		EIN: **62-1011712**		
Address:	Permit #	State	Regulator Authority	MSHA #	Date Issued
MonValley Trans Center Inc. P.O. Box 135 1060 Ohio Avenue Glassort, PA 15045	02851602	PA	DEP	N/A	N/A
Company	**Oklahoma Coal Co.**		EIN: **34-1673480**		
Address:	Permit #	State	Regulator Authority	MSHA #	Date Issued
The Oklahoma Coal Co. Suite 111, 29525 Chagrin Blvd Pepper Pike, Ohio 44122	D-0230	OH	DOR	N/A	N/A
Company	**Maple Creek Mining Inc.,**		EIN: **25-1755305**		
Address:	Permit #	State	Regulator Authority	MSHA #	Date Issued
Maple Creek Mining Inc. 981 Route 917 Bentleyville, Pa 15314	63841302	PA	PA DEP	36-00970	1970
	63733706	PA	PA DEP	1211-PA20-0058-03	1970
	63723707	PA	PA DEP	1211-PA20-0058-04	1970

Company	**Energy Resources, Inc.**		EIN: **25-1755305**		
Address:	Permit #	State	Regulator Authority	MSHA #	Date Issued
Energy Resources Inc. P.O. Box 259 Brockway, PA 15824	33840125	PA	DEP	36-02695	5-25-88
	33860102	PA	DEP	36-02695	5-25-88
	17880102	PA	DEP	36-02695	5-25-88
	33870113	PA	DEP	36-02695	5-25-88
	33830115	PA	DEP	36-02695	5-25-88
	24880101	PA	DEP	36-02695	5-25-88
	24880103	PA	DEP	36-02695	5-25-88
	24890108	PA	DEP	36-02695	5-25-88
	24900102	PA	DEP	36-02695	5-25-88
	24900104	PA	DEP	36-02695	5-25-88
	24900103	PA	DEP	36-02695	5-25-88
	24890101	PA	DEP	36-02695	5-25-88
	24890102	PA	DEP	36-02695	5-25-88
	24960101	PA	DEP	36-02695	5-25-88
Company	**Canterbury Coal Company**		EIN: **25-112473**		
Address:	Permit #	State	Regulator Authority	MSHA #	Date Issued
Canterbury Coal Company R.D. No. 1, Box 119 Avonmore, PA 15618	SMP # 039000112	PA	DEP	3600813	N/A
	SMP # 03940111	PA	DEP	3605708	N/A
	CMAP 03841302	PA	DEP	N/A	N/A
	CRDA 03743701	PA	DEP	N/A	N/A
	CRDA 03950701	PA	DEP	N/A	N/A

Company	**The Ohio Valley Coal Company**		EIN: **34-1041310**		
Address:	Permit #	State	Regulator Authority	MSHA #	Date Issued
The Ohio Valley Coal Company 56854 Pleasant Ridge Road Alledonia, OH 43902	D-3060	OH	ODNR	33-01159	25-May-88

Company	**UMCO Energy, Inc.**		EIN: **52-1615668**		
Address:	Permit #	State	Regulator Authority	MSHA #	Date Issued
UMCO Energy, Inc. 29525 Chagrin Boulevard, Suite 111 Pepper Pike, OH 44122	63-921301	PA	DEP	N/A	N/A

Company	**The American Coal Company**		EIN: **73-1543124**		
Address:	Permit #	State	Regulator Authority	MSHA #	Date Issued
The American Coal Company P.O. Box 727 Harrisburg, IL 62946	No. 2	IL	IDNR	11-02752	N/A
	No. 255	IL	IDNR	N/A	N/A
	No. 257	IL	IDNR	N/A	N/A
	No. 306	IL	IDNR	N/A	N/A
	No. 165804AAA	IL	IDNR	N/A	N/A
	No. 110061727	IL	IDNR	N/A	N/A

Company	**PennAmerican Coal, L.P.**		EIN: **25-1800809**		
Address:	Permit #	State	Regulator Authority	MSHA #	Date Issued
PennAmerican Coal, L.P. R.D. No. 1, Box 119A Avonmore, PA 15618	32951301	PA.	MCM	36-00970	

Company	**American Energy, Corporation**		EIN: **31-1550443**		
Address:	Permit #	State	Regulator Authority	MSHA #	Date Issued
American Energy Corp. 43521 Mayhugh Hill Road Township Highway 88 Beallsville, Ohio 43716	D-0425	Ohio	ODNR	33-01070	
	D-1159	Ohio	ODNR		

Company	**TDK Coal Sales, Inc.**		EIN: **25-1422374**		
Address:	Permit #	State	Regulator Authority	MSHA #	Date Issued
TDK Coal Sales, Inc. P.O. Box 259 R.D. #2, Fermantown Road Brockway, PA. 15824	16910104	PA	PaDep	3608867	
	33960109	PA	PaDep		
	24970104	PA	PaDep		

APPENDIX B
PART A-12

BLM RIGHT-OF-WAY
AMENDMENT NO. 5
FEBRUARY 5, 2007

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Price Field Office
125 South 600 West
Price, Utah 84501
http://www.blm.gov/utah/price/

TAKE PRIDE IN AMERICA

Hand Delivered

2/5/07
Date

2800
UTU-48027 (mr)
(UT-070)

Andalex Resources, Inc.
PO Box 902
Price, Utah 84501

Re: Wildcat Loadout Extension

DECISION

:
:
:

Amendment Approved
Rental Determined

Right-of-way (ROW) UTU-48027 is hereby amended to authorize an extension of the existing Wildcat coal storage and loadout facility, in accordance with the enclosed Plan of Development (Exhibit A) and the map (Exhibit B). This amendment will encumber an additional 149.650 acres for a right-of-way total of 250 acres.

The amendment is legally described as:

T. 13 S., R. 09 E., Salt Lake Meridian, Carbon County, Utah
Section 33: SE¼SW¼NE¼, E½SW¼, SE¼.

This amendment is granted under the authority of Title V of the Federal Land Policy and Management Act of October 21, 1976 (90 Stat. 2776 43 U.S.C. 1761). It is amended subject to all valid existing rights, the terms and conditions of the original grant approved January 12, 1982, and 43 CFR 2800. The rental for the amendment was figured to coincide with the original grant. The rental due through December 31, 2007, is $17,820.83.

mR

The enclosed Plan of Development and the map are made a part of this amendment as terms and conditions. Additional Terms and Conditions to the right-of-way grant are attached as well. The term of this amendment to the right-of-way grant is being established to coincide with the original grant and expires on December 31, 2012.

The cost reimbursement provisions of 43 CFR 2805.16 and 2885.23, establish a cost recovery fee schedule for monitoring fees. It has been determined that your application falls under Category II. Under this category, you are required to pay a non-refundable monitoring fee in the amount of $368.00 before we can issue this an authorization. The total payment required at this time is $18,188.83.

The issuance of this ROW amendment constitutes a final decision by the Bureau of Land Management in this matter.

This decision may be appealed to the Interior Board of Land Appeals, Office of the Secretary, in accordance with the regulations contained in 43 CFR, Part 4, and the enclosed Form 1842-1. If an appeal is taken, your notice of appeal must be filed in this office (at the above address) within 30 days from receipt of this decision. The appellant has the burden of showing that the decision appealed from is in error.

If you wish to file a petition pursuant to regulation 43 CFR 4.21 (58 FR 4939, January 19, 1993) or 43 CFR 2801.10 for a stay of the effectiveness of this decision during the time that your appeal is being reviewed by the Board, the petition for a stay must accompany your notice of appeal. A petition for a stay is required to show sufficient justification based on the standards listed below. Copies of the notice of appeal and petition for a stay **must** also be submitted to each party named in this decision and to the Interior Board of Land Appeals and to the appropriate Office of the Solicitor (see 43 CFR 4.413) at the same time the original documents are filed with this office. If you request a stay, you have the burden of proof to demonstrate that a stay should be granted.

Standards for Obtaining a Stay

Except as otherwise provided by law or other pertinent regulation, a petition for a stay of a decision pending appeal shall show sufficient justification based on the following standards:

(1) The relative harm to the parties if the stay is granted or denied;

(2) The likelihood of the appellant's success on the merits;

(3) The likelihood of immediate and irreparable harm if the stay is not granted; and

(4) Whether the public interest favors granting the stay.

Should you appeal, you must still pay the rental requested. Failure to pay on time may result in termination of the right-of-way [see 43 CFR 2805.12(f) and 2806.13(c) or 2885.17(c)].

Please note, however, that under the regulations in 43 CFR Group 2800, this decision is effective even if an appeal is filed.

You have 30 days from receipt of this letter to submit the above-mentioned rental payment. Should the rental not be received within the time allowed, the application will be rejected.

If you have any questions, please contact Mike Robinson, Realty Specialist, at the above address or call (435) 636-3630.

Sincerely,

Roger L Bankert

Roger Bankert
Field Manager

4 Enclosures:

1 - Exhibit A Plan of Development
2 - Exhibit B Map
3 - Exhibit C Additional Terms & Conditions
4 - Appeals Information (Form #1842-1)

EXHIBIT A

Andalex Resources, Inc.
Wildcat Loadout Expansion Project
Plan of Development

Andalex Resources, Inc. (ARI) currently maintains a ROW (U-48027) for the Wildcat Loadout (Loadout) on 100.350 acres of land utilized as a coal preparation and loading facility for a number of mines located within the area. Of the 100.350 acres, approximately 12.5 acres are under lease to Utah Railway (U-52065) by the BLM). The Loadout site is permitted under Utah Division of Oil Gas and Mining (UDOGM). The facility has three truck dumps, a unit train loading track, and numerous conveyor belts, as well as numerous structures to facilitate reclaiming, crushing, storage and loadout of coal.

The Loadout facility is located on federal land in Carbon County, Utah (Plate 1). The current ROW is not large enough to facilitate total coal fine containment (primarily airborne dust from the coal piles). ARI needs to expand their facility site to create two new drainage ditches that would run into a new sediment pond for coal fine containment. The area is located in Section (Sec.) 33, Township (T.) 13 South (S.), Range (R.) 9 East (E.) of the Salt Lake Base and Meridian (SLB&M) (Plate 1). The Wildcat Loadout Expansion Project would necessitate expanding the ROW to include the E½SW¼ and the entire SE ¼ of Sec. 33, approximately 150 acres.

In the event the pond required decanting, a gas powered pump would be utilized. The pond would act as a retention basin to capture surface deposits of coal fines that currently could enter the existing drainages. The coal fines would be removed periodically or when the material reaches 60 percent of designed capacity. The fines would be hauled to an approved UDOGM refuse disposal site. The existing natural drainages serve as an undisturbed bypass to allow runoff from adjacent undisturbed land to bypass the pond.

It is important to note that a portion of the area is a recently reclaimed well pad location leased by ConocoPhillips Company. Roads within the project area would require no upgrading. No new fencing or culverts would be installed.

Construction of Storm Drainage – The Proposed Project would create two drainage ditches located inside of the 2 large natural washes (Plate 2). These drainage ditches would be approximately 36 inches deep with a 2:1 side slope (approximately 20 feet in width)(Figure 1). The southern most ditch would be approximately 1,930 feet (0.88 acres) in length and the northern most ditch would be approximately 2,067 feet (0.94 acres) in length. Construction of the ditches would require the utilization of a conventional trackhoe and road grader for a period of three to five days.

The two drainage ditches would meet at a central sediment pond. The approximate size of the pond would be 150 feet by 150 feet (0.52 acres) with an embankment approximately 10 feet in width and 11 feet in height. The pond may necessitate the use of a D-6 class crawler

tractor. The pond is designed to contain all runoff from the lands encompassed by the existing natural drainages (Figure 2). The pond would be constructed in the lowest quadrant of the ROW area whereby most loadout site disturbed area drainage would drain into the pond. The capacity of the pond would be well in excess of the 10-year, 24-hour precipitation event requirement.

One advantage of the pond is its proposed location adjacent to the roadway. This would greatly simplify sediment monitoring and cleanout. The culverted primary spillway would be constructed with an oil skimmer and built to pass the 10-year, 24-hour storm event. The emergency spillway would be lined with concrete or grouted rip-rap and have a bottom width of two feet; a freeboard depth of two feet and 2:1 side slopes and capable of handling a 25-year, 24-hour storm event. Riprap would be installed at the outlet of the open channel spillways to protect the earthen structures from erosional forces.

Topsoil Removal, Salvage and Stockpiling – Available soil over the area ranges from about 6 to 8 inches, of which an average soil layer of about 8 inches thick would be removed and stockpiled as topsoil. The upper 6 to 12 inches is the most suitable soil, however, the subsoils over much of the area support root growth to depths of about 48 inches. Topsoil would be salvaged with backhoes, trackhoes and/or front-end loaders and hauled by dump trucks to the designated topsoil storage area within the disturbed area. As much as 2,129 cubic yards of topsoil could be salvaged.

The topsoil storage area is proposed in the southeast corner of the facilities site near the sediment pond. The stockpile would be protected from erosion and sediment production by roughening the surface, revegetation, berms and silt fences. Subsoil materials would be used over the area for facilities site development and then retrieved for soil reconstruction during reclamation.

Stabilization, Maintenance and Operation Plan – Construction procedures would be consistent with those described within the Utah Nonpoint Source Best Management Plan for Hydrologic Modification. Where runoff and drainage controls would be required, they would be constructed to BLM standards. The hydrologic regime would be protected by the installation and implementation of protection measures at all proposed drainage modifications.

Maintenance would include the periodic cleaning of the pond and drainage control ditches in order to maintain their function. Clean out material would be disposed of off-site in an approved solid waste disposal facility, such as East Carbon Development Corporation (approximately 30 miles southwest of the surface facility). A Spill Prevention Control and Countermeasure Plan (SPCC Plan) has been developed to protect the undisturbed drainages from accidental spills of oil or other petroleum products within the disturbed area. This plan would be available for review at the loadout site.

In the event of spills of petroleum-based products during the construction of the PA, procedures outlined in the SPCC Plan would be followed. The BLM, as well as the Utah

Department of Environmental Quality, would be notified if the release meets the definition of a hazardous waste as defined in 40 CFR 261.

To maintain the cultural, historical and paleontological resource integrity of the area, construction crews and staff would be provided with instructional materials regarding the identification, value, legal protection and treatment of these resources. If any cultural, archeological or paleontological resources are discovered during construction or any operations associated with the railroad, conveyor or surface loadout facilities, all activities would cease at the area of the manifestation. The authorized agency would then be contacted to evaluate the importance and potential of the site. Mitigation measures would, at that time, be made for the value of the resource site. Construction and/or maintenance crews would avoid the site until the resource potential has been determined.

Potential measures to help improve air quality for construction activities include proper maintenance of the construction equipment and limited travel on the construction ROW and dirt access roads. Dust generation from disturbed areas would be reduced through interim watering of active construction areas. An enzyme armor coating on the access road would minimize dust generated by traffic during construction or eliminating it all together. Final reclamation, which included revegetation of all disturbed areas, would eliminate further impacts.

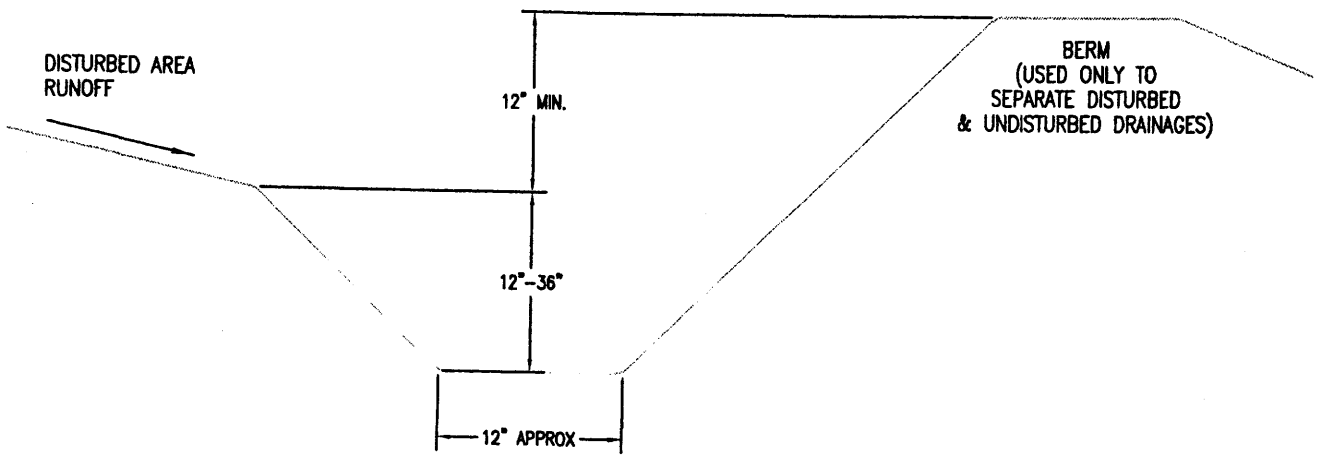
Vegetation removal necessitated by the PA would be confined to the ROW. Vegetation removed would be set-aside during construction activities, and/or left in place upon completion of construction where possible. Reclamation would be completed as stated in the Wildcat M&RP.

Prior to construction and operation of the PA, an awareness and appreciation of wildlife would be taught to all employees associated with the project. All activities associated with the PA development would be coordinated to avoid optimal habitat use periods and areas for all wildlife species. The May 2006 raptor survey conducted by the Utah Division of Wildlife Resources did not find any active nests within 0.5 mile of the proposed project area. However, if active/occupied raptor nests are located within 0.5 mile of any portion of the project area, construction would not begin within that area during the period of February 1 to July 15.

Abandonment and Reclamation The existing Wildcat Loadout Facility would be reclaimed according to the M&RP.

EXHIBIT B

DISTURBED FLOW DITCH
TYPICAL



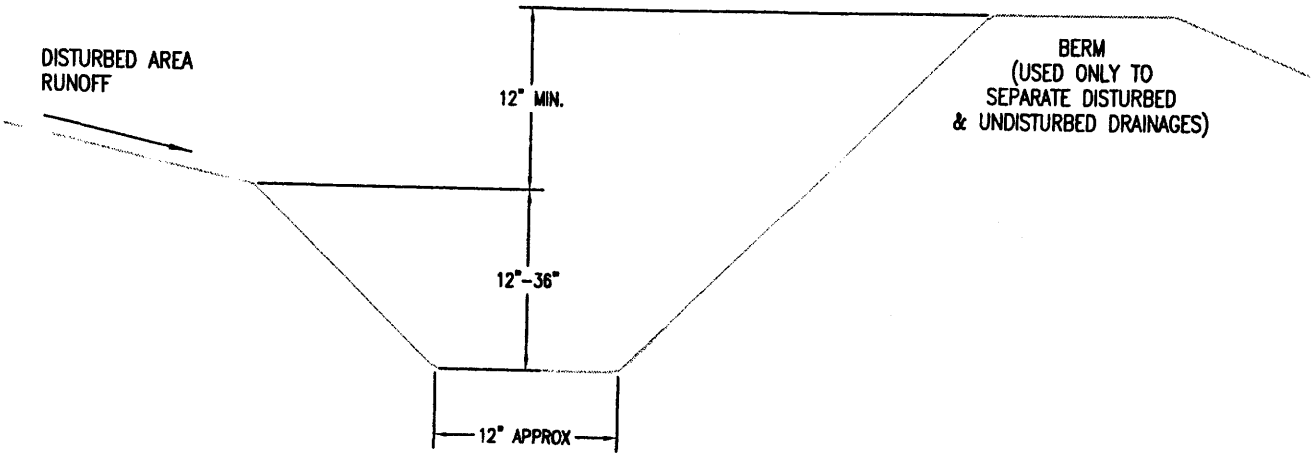
TYPICAL SECTION

NOTE:

DITCHES ARE TYPICALLY UNLINED. WHERE FLOW VELOCITIES EXCEED 5 fps, DITCHES ARE LINED WITH RIP-RAP FOR EROSION PROTECTION.

FIGURE 1

DISTURBED FLOW DITCH
TYPICAL

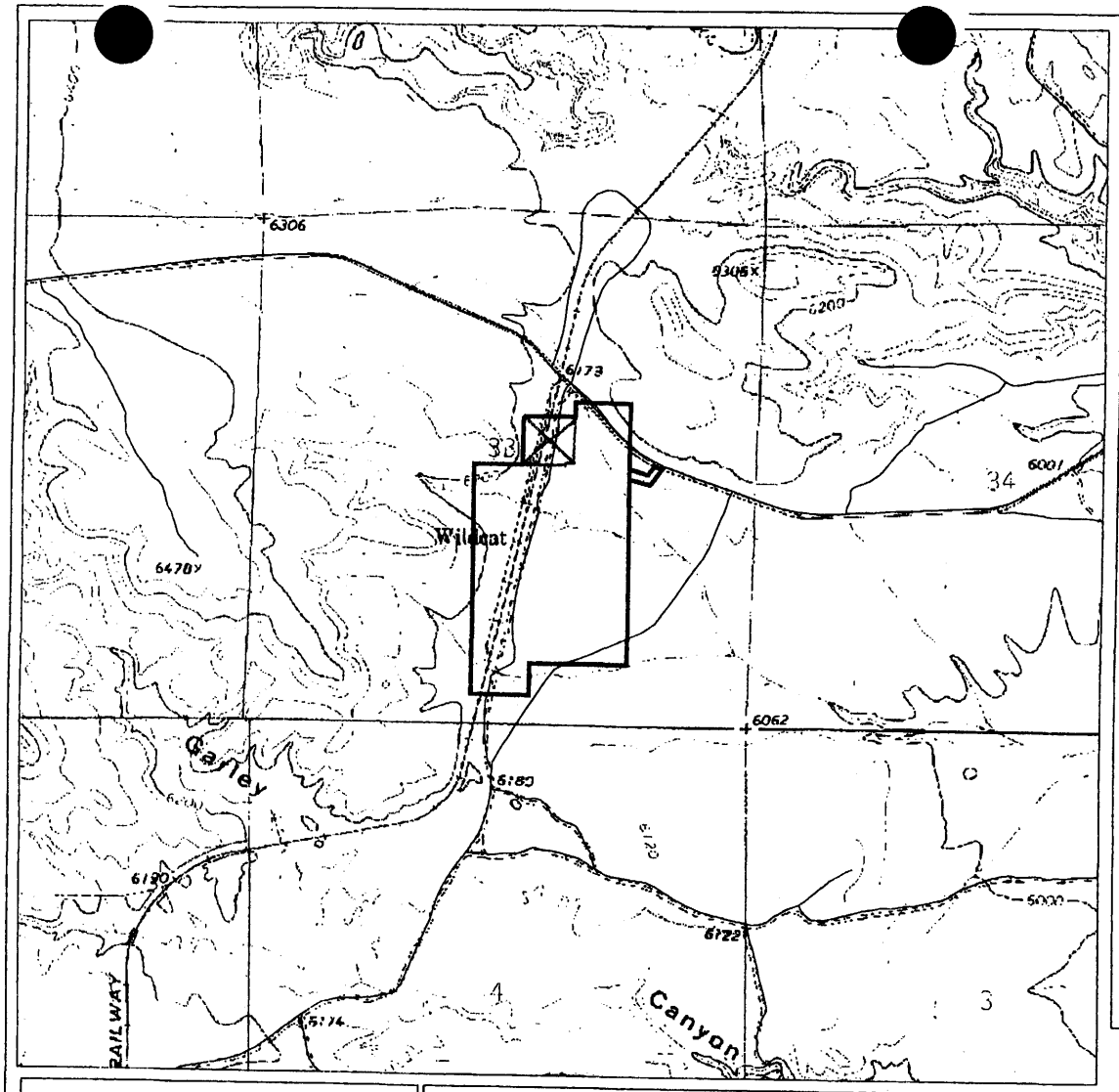


TYPICAL SECTION

NOTE:

DITCHES ARE TYPICALLY UNLINED. WHERE FLOW VELOCITIES EXCEED 5 fps, DITCHES ARE LINED WITH RIP-RAP FOR EROSION PROTECTION.

FIGURE 1



LEGEND

- U-48027
- U-52065

Section 33
Township 13 South,
Range 9 East
Salt Lake Base & Meridian

Proposed Wildcat Loadout
Expansion Project

General Location Area

Created For:

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

Environmental Industrial Services
Environmental & Engineering Consulting

31 North Main Street
Helper, Utah 84526
(435) 472-3814
Fax- (435) 472-8780
knash@preciscom.net

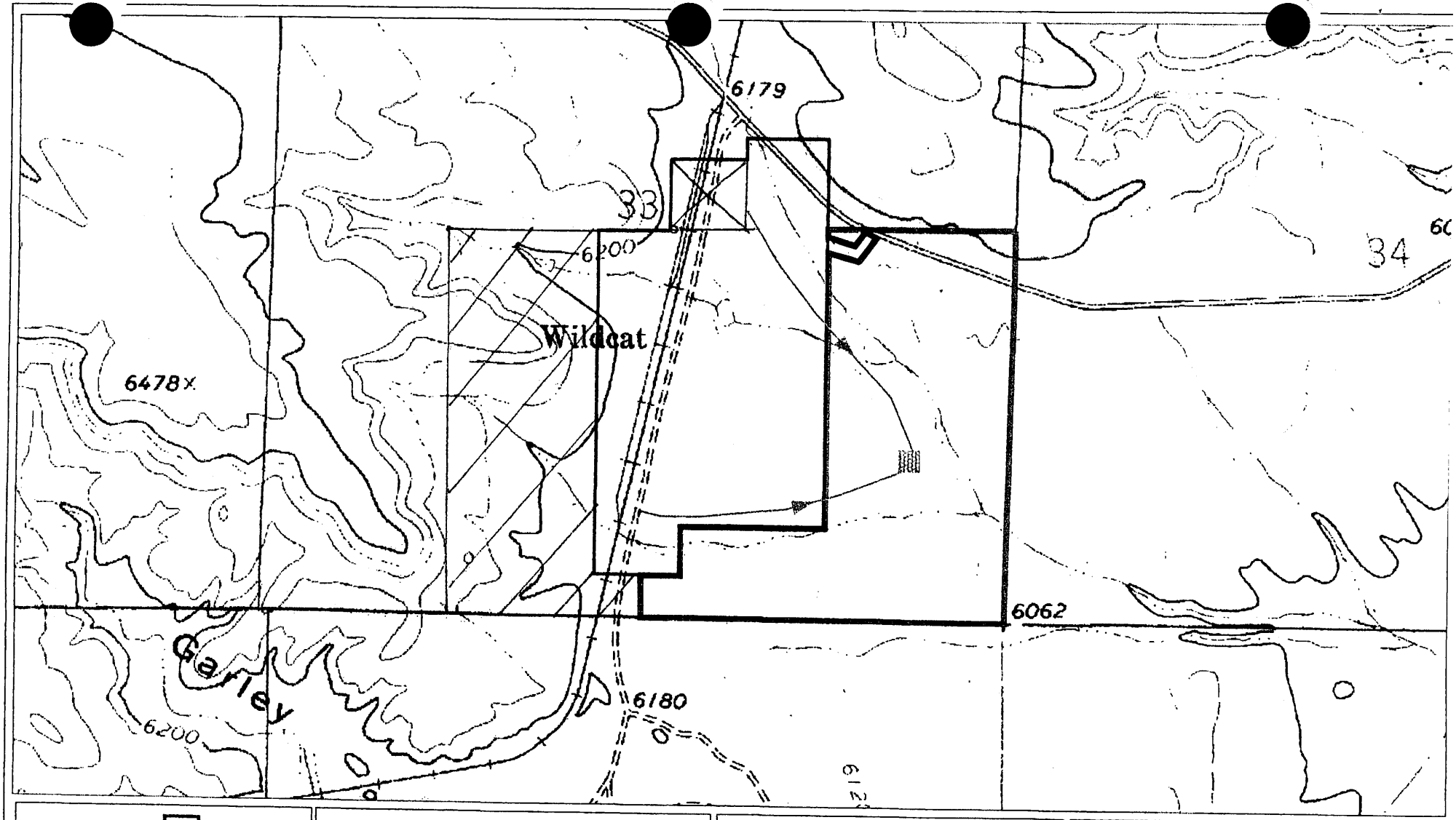
N

Created By: Katie Nash
Date: October 11, 2006

Scale 1" = 2,000'

DISCLAIMER:
EIS is not responsible for any errors or omissions.
All topographic maps were downloaded from:
http://www.waterrights.utah.gov
EIS 2006

PLATE 1



LEGEND

- U-48027
- U-52065
- Additional ROW Requested
- Proposed Sediment Pond
- Proposed Drainage Ditch

Section 33
Township 13 South,
Range 9 East
Salt Lake Base & Meridian

Proposed Wildcat Loadout
Expansion Project
Proposed Location

Created For:

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

Environmental Industrial Services
Environmental & Engineering Consulting
31 North Main Street
Helper, Utah 84526
(435) 472-3814
Fax- (435) 472-8780
knash@preciscom.net

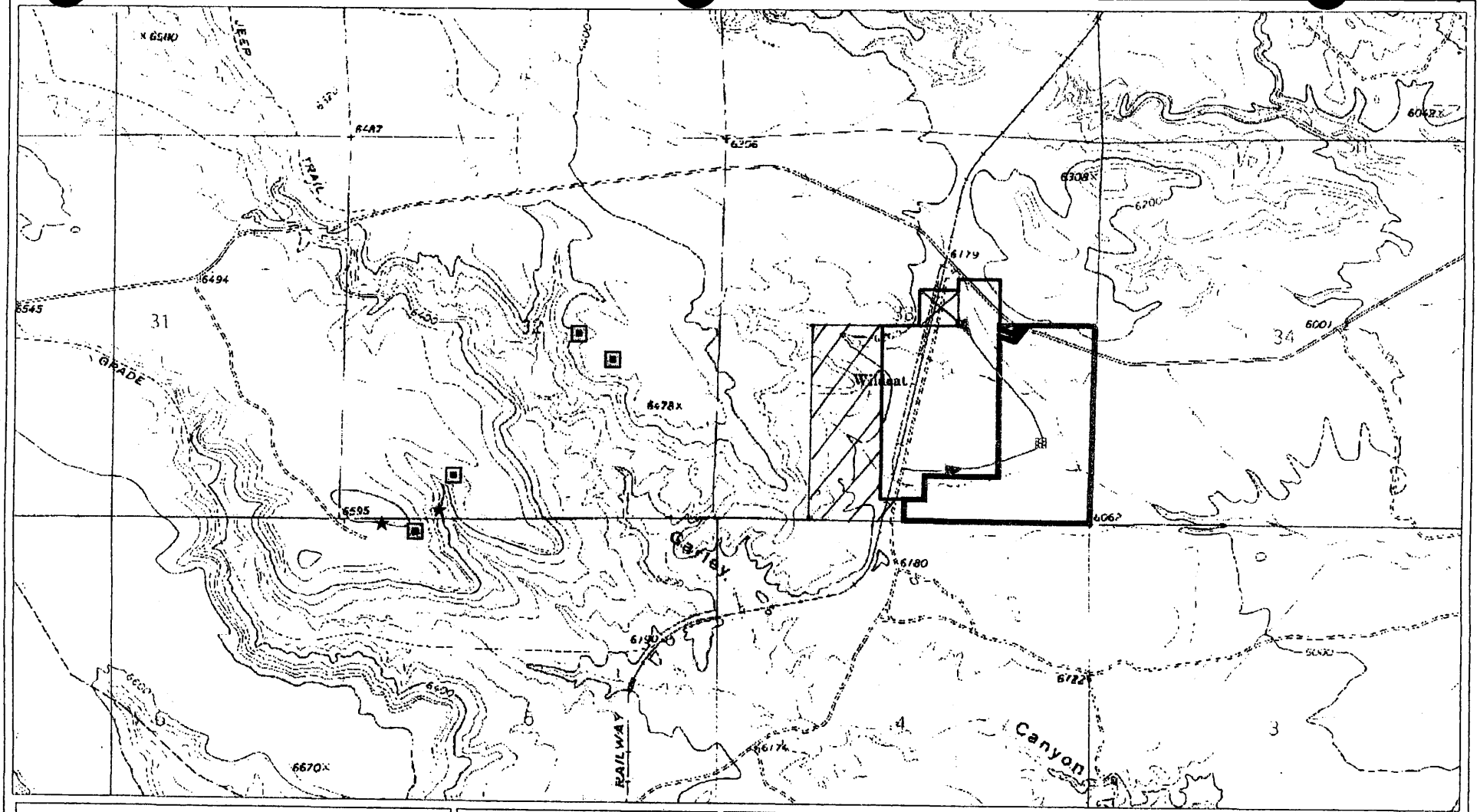
N

Created By: Katie Nash
Date: October 11, 2006

Scale 1" = 1,000'

DISCLAIMER:
EIS is not responsible for any errors or omissions.
All topographic maps were downloaded from:
http://www.waterrights.utah.gov
EIS 2006

PLATE 2



LEGEND

- Additional ROW Requested
- Proposed Sediment Pond
- Proposed Drainage Ditch
- U-48027
- U-52065
- Golden Eagle
- Red-tailed Hawk

Section 33
Township 13 South,
Range 9 East,
Salt Lake Base & Meridian

Proposed Wildcat Loadout
Expansion Project
2006 Raptor Survey

Created For:

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

Environmental Industrial Services
Environmental & Engineering Consulting

31 North Main Street
Helper, Utah 84526
(435) 472-3814
Fax- (435) 472-8780
knash@preciscom.net

N

Created By: Katie Nash
Date: October 11, 2006

Scale 1" = 1,000'

DISCLAIMER:
EIS is not responsible for any errors or omissions.
All topographic maps were downloaded from:
http://www.waterrights.utah.gov
EIS 2006

PLATE 3

Y - Final 1.1 // - T 1 1 1 1. 1. T 13 S R 9 E. 633. SE¼ SW¼ NE¼ E½ SW¼ SE¼

Exhibit C

Additional Terms and Conditions

Wildcat Loadout Extension, UTU-48027

Andalex Resources, Inc.

T. 13 S., R. 09 E., Salt Lake Meridian, Carbon County, Utah

Section 33: SE¼SW¼NE¼, E½SW¼, SE¼.

Stipulations

a. The holder shall construct, operate, and maintain the facilities, improvements, and structures within this right-of-way in strict conformity with the plan of development which was approved and made part of this grant by this amendment. Any relocation, additional construction, or use that is not in accord with the approved plan of development, shall not be initiated without the prior written approval of the authorized officer. A copy of the complete right-of-way amendment, including all stipulations, map and approved plan of development, shall be made available on the right-of-way area during construction, operation, and termination to the authorized officer. 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.

b. Any cultural and/or paleontological resource (historic or prehistoric site or object) discovered by the holder, or any person working on his behalf, on public or Federal land shall be immediately reported to the authorized officer. Holder shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the authorized officer. An evaluation of the discovery will be made by the authorized officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The holder will be responsible for the cost of evaluation and any decision as to proper mitigation measures will be made by the authorized officer after consulting with the holder.

c. Use of pesticides shall comply with the applicable Federal and state laws. Pesticides shall be used only in accordance with their registered uses and within limitations imposed by the Secretary of the Interior. Prior to the use of pesticides, the holder shall obtain from the authorized officer written approval of a plan showing the type and quantity of material to be used, pest(s) to be controlled, method of application, location of storage and disposal of containers, and any other information deemed necessary by the authorized officer. Emergency use of pesticides shall be approved in writing by the authorized officer prior to such use.

d. The holder shall be responsible for weed control on disturbed areas within the limits of the right-of-way. The holder is responsible for consultation with the authorized officer and/or local authorities for acceptable weed control methods (within limits imposed in the grant stipulations).

e. The holder shall protect all survey monuments found within the right-of-way. Survey monuments include, but are not limited to, General Land Office and Bureau of Land Management Cadastral Survey Corners, reference corners, witness points, U.S. Coastal and Geodetic benchmarks and triangulation stations, military control monuments, and recognizable civil (both public and private) survey monuments. In the event of obliteration or disturbance of any of the above, the holder shall immediately report the incident, in writing, to the authorized officer and the respective installing authority if known. Where General Land Office or Bureau of Land Management right-of-way monuments or references are obliterated during operations, the holder shall secure the services of a registered land surveyor or a Bureau cadastral surveyor to restore the disturbed monuments and references using surveying procedures found in the Manual of Surveying Instructions for the Survey of the Public Lands in the United States, latest edition. The holder shall record such survey in the appropriate county and send a copy to the authorized officer. If the Bureau cadastral surveyors or other Federal surveyors are used to restore the disturbed survey monument, the holder shall be responsible for the survey cost.

f. The holder shall comply with all Federal, State, and local regulations whether or not specifically mentioned within this grant.

g. The holder of this right-of-way grant or the holder's successor in interest shall comply with Title VI of the Civil Rights Act of 1964 (42 U.S.C. 2000d et seq.) and the regulations of the Secretary of the Interior issued pursuant thereto.

h. The holder shall comply with the construction practices and mitigating measures established by 33 CFR 323.4, which sets forth the parameters of the "nationwide permit" required by Section 404 of the Clean Water Act. If the proposed action exceeds the parameters of the nationwide permit, the holder shall obtain an individual permit from the appropriate office of the Army Corps of Engineers and provide the authorized officer with a copy of same. Failure to comply with this requirement shall be cause for suspension or termination of this right-of-way grant.

i. No construction or routine maintenance activities shall be performed during periods when the soil is too wet to adequately support construction equipment. If such equipment creates ruts in excess of four inches deep, the soil shall be deemed too wet to adequately support construction equipment.

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

k. The holder shall permit free and unrestricted public access to and upon the right-of-way for all lawful purposes except for those specific areas designated as restricted by the authorized officer to protect the public, wildlife, livestock or facilities constructed within the right-of-way.

l. All above-ground structures, production equipment, tanks, transformers, insulators, not subject to safety requirements shall be painted to blend with the natural color of the landscape. The paint used shall be a color which simulates "Standard Environmental Colors." The color selected is Shale Green (5Y 4/2).

m. The holder will comply with all pertinent state and federal permitting requirements.

n. The holder(s) shall comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated. In any event, the holder(s) shall comply with the Toxic Substances Control Act of 1976, as amended (15 U.S.C. 2601, et seq.) with regard to any toxic substances that are used, generated by or stored on the right-of-way or on facilities authorized under this right-of-way grant. (See 40 CFR, Part 702-799 and especially, provisions on polychlorinated biphenyls 40 CFR 761.1-761.193). Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR, Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation and Liability Act of 1980, Section 102b. A copy of any report required or requested by any Federal agency or State government as a result of a reportable release or spill of any toxic substances shall be furnished to the authorized officer concurrent with the filing of the reports to the involved Federal agency or State government.

o. The holder shall comply with all federal, state, and local laws and regulations pertaining to disposal of human and solid wastes.

p. Hazardous substances specifically listed as a hazardous waste under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) of 1980, as amended 42 U.S.C. 9601 et seq., and the regulations issued under CERCLA, or demonstrating a character of a hazardous waste (see 40 CFR 261) will not be stored or disposed of on the right-of-way.

q. A minimum of 6 inches of topsoil will be stripped from the location (including areas of cut, fill, and/or subsoil storage areas) and stockpiled for future reclamation.

b. Suitable topsoil material removed in conjunction with clearing and stripping shall be conserved in stockpiles within the right-of-way.

r. For the protection of livestock and wildlife, the entire right-of-way south of Consumers Road shall be fenced. Fencing shall be in accordance with BLM specifications.

s. Topsoil stockpiled for more than three months will be protected from erosion by reducing piles to less than three feet in height and by seeding and possibly mulching. Topsoil stockpiles shall be seeded by the first appropriate period (late autumn or early spring) after their construction.

t. Restoration and seeding should be done either late in the autumn (September 15 to November 15, before freeze up) or as early as possible the following spring to take advantage of available ground moisture. Seeding will be repeated until a satisfactory stand is established as determined by the Authorized Officer. If the seed is broadcast, twice the proposed drilled rate will be used.

u. All disturbed areas shall be recontoured by grading to return the site to approximate the original contour of the ground by forming natural, rounded slopes.

v. The surface soil material will be plowed to form longitudinal depressions 12-18 inches deep and the entire reclamation area will be uniformly covered with the depressions constructed perpendicular to the natural flow of water and/or prevailing wind. Either the above method or some comparable technique (i.e. snow fencing) will be used to roughen the surface and help increase soil moisture retention.

w. Waterbars will be constructed on all disturbed areas to: (1) simulate the imaginary contour lines of the slope with a grade of one or two percent; (2) drain away from the disturbed area; and (3) begin and end in undisturbed vegetation or soil.

x. All equipment and miscellaneous trash must be removed from the location prior to final reclamation operations.

y. The holder shall seed all disturbed areas with an appropriate seed mixture(s) for the area. There shall be <u>no</u> primary or secondary noxious weed seed 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 two 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.

z. 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. (Smaller/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 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 first growing season after seeding. The authorized officer is to be notified a minimum of three days prior to seeding of the project.

aa. The holder shall be responsible for the prevention and suppression of fires on public lands caused by its employees, contractors, or subcontractors. During conditions of extreme fire danger, surface use operations may be either limited or suspended in specific areas, or additional measures may be required by the authorized officer.

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

(Signature of Holder)	(Signature of BLM Authorized Officer)
PRES & CEO (Title)	Field Manager, Price Field Office (Title)
1/26/07 (Date)	1/29/07 (Effective Date of Grant)

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
Price Field Office
125 South 600 West
Price, Utah 84501
http://www.blm.gov/utah/price/

TAKE PRIDE IN AMERICA

MAR 23 2007

In Reply Refer to:
2800
UTU-48027
(UT-070)

CERTIFIED MAIL NO. 7006 0100 0001 0304 9212
RETURN RECEIPT REQUESTED

Dave Shaver
Andalex Resources, Inc.
PO Box 902
Price, Utah 84501

Re: Wildcat Loadout Extension

Non-Substantial Deviation Approved, Right-of-Way Grant Modified, Rental Reviewed and Proposed Material Storage Area Determined.

We are in receipt of your letter dated March 12, 2007, regarding the proposed changes to the Wildcat Extension amendment dated February 5, 2007. The proposal is in the SE¼, Section 33, T. 13 S., R. 09 E., Salt Lake Meridian, Carbon County, Utah.

The letter submitted detailing the changes to the original application is not considerably different from the approved amendment. The three ponds detailed and the drainages attached thereof will not change the Environmental document that originally analyzed this project. Therefore, it has been determined to be a non-substantial deviation.

In discussions with your company it was found that there was confusion as to what the actual legal description of the right-of-way was as well as the actual boundaries of the ROW on the ground. We reviewed the file and found that the acreages were in error. The Legal description for this file should read:

T. 13 S., R. 9 E. Salt Lake Meridian, Carbon County, Utah
Section 33: NE¼SW¼NE¼, S½SW¼NE¼, E½SW¼, SE¼.

As such the acreage for this ROW is 270 acres. See map enclosed for the details of your original ROW and the newest amendment. Please note these changes on your records.

The original ROW amendment charged you $17,820.83 for rental on 250 acres. Upon further review, it was found that the BLM had overbilled you for rent. The enclosed spreadsheet details this error. We will be issuing you a refund in the amount of $5,233.68 in the coming weeks.

We are also in receipt of your letter dated March 21, 2007 concerning your proposal to develop a material and equipment storage area for your operations. As stated in the original grant's Terms and Conditions:

> "9. If at any time hereafter the holder wishes to reconstruct, remodel or relocate any portion of the right-of-way hereby granted, or any of the improvements thereon, the prior written approval of the Authorized Officer must be obtained. No such approval will be given unless the request is fully justified by the holder and is authorized by law. Where necessary, the holder shall make application under appropriate regulations."

Since this proposal was not on the original application for amendment, a new application for amendment will be required even though it is on your present right-of-way. This new application will need to contain an SF-299, a Plan of Development and a 1:2000 scale map depicting this proposal. The BLM will then be able to further analyze the proposal and any environmental documents needed.

If you have any questions, please contact Mike Robinson, Realty Specialist, at the above address or call (435) 636-3630.

Sincerely,

Roger Bankert
Field Manager

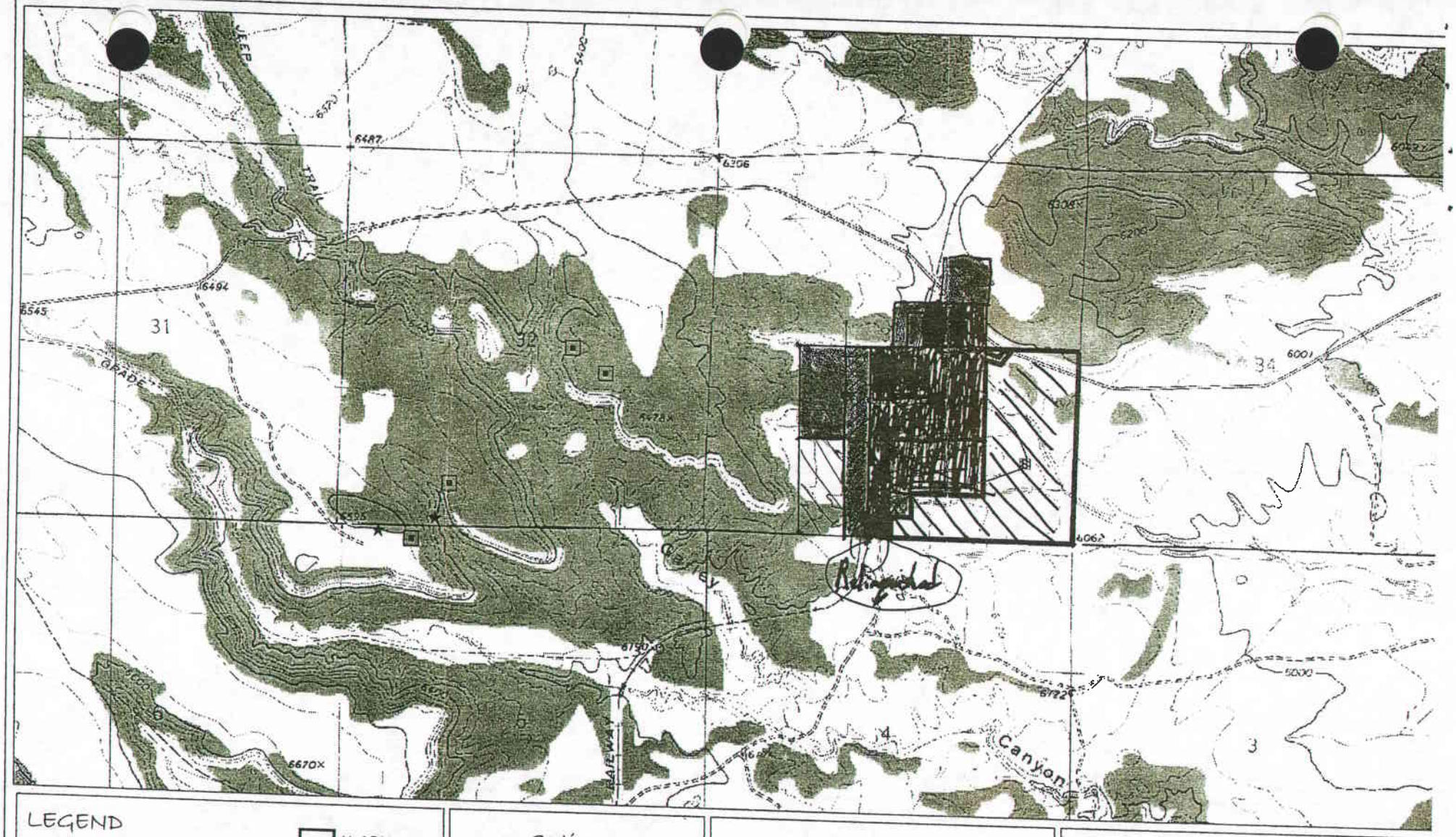
Enclosures:
1 - Rental Calculation
2 – Map

Wildcant Loadout Rentals

Year		**2007**		
Date Paid	**Paid**		**2nd Payment for Amendment**	**Total Paid**
12/21/2006		$8,584.00	$17,820.83	$26,404.83

Acres	**Per Acre**		**Prorated from February approval**	**Due**
270		$85.54	0.92	$21,171.15

Balance
$5,233.68



LEGEND

- Additional ROW Requested
- Proposed Sediment Pond
- Proposed Drainage Ditch
- U-48027
- U-52065
- Golden Eagle
- ★ Red-tailed Hawk

Section 33
Township 13 South,
Range 9 East,
Salt Lake Base & Meridian

Proposed Wildcat Loadout
Expansion Project
2006 Raptor Survey

Created For:

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

Environmental Industrial Services
Environmental & Engineering Consulting
31 North Main Street
Helper, Utah 84526
(435) 472-3814
Fax- (435) 472-8780
knash@preciscom.net

N

Created By: Katie Nash
Date: October 11, 2006

Scale 1" = 1,000'

DISCLAIMER:
EIS is not responsible for any errors or omissions.
All topographic maps were downloaded from:
http://www.waterrights.utah.gov
EIS 2006

PLATE 3

Shaded is Original |\\\| - New Amend. +

APPENDIX B
PART B

HISTORY OF VIOLATIONS

VIOLATION INFORMATION

Information updated to April 29, 2010

Name of Operation	Identifying number for operation	Federal or State Permit Number	MSHA ID Number
Centennial		007/019	42-01750 42-01474 42-02028 42-01864

Date Issued	Violation Number	Name of Issuing Agency	Person Issued To	Permit Number	Brief Description of Violation	Status (Abated, Term. etc.)	Abatement Action	Appeal Y or N
9/27/2006	10000	DOGM			Failure to renew	9/29/2006	terminated	N
10/6/2006	10002	DOGM			Failure to submit fan plan	12/4/2006	terminated	N
2/7/2007	10003	DOGM			Non coal Waste	2/12/2007	terminted	N
7/6/2007	10007	DOGM			Vehicle in ditch	7/06/07	terminated	N
8/27/2007	10008	DOGM			vehicle in ditch	8/28/2007	terminated	N
8/27/2007	10009	DOGM			no sed pond inspection	8/27/07	terminated	N
6/18/2007	10024	DOGM			non coal waste	6/18.08	terminated	N
10/28/2008	10030	DOGM			guard shack		terminated	N
1/21/09	10032	DOGM			Rocks in ditch		Term	N
7/2/09	10040	DOGM			Failure to maintain sediment control, GVH			N

Name of Operation	Identifying number for operation	Federal or State Permit Number	MSHA ID Number
Crandall		015/032	42-01715

Date Issued	Violation Number	Name of Issuing Agency	Person Issued To	Permit Number	Brief Description of Violation	Status (Abated, Term. etc.)	Abatement Action	Appeal Y or N
8/19/2004	Nov4-49-4-1	DOGM			Parking in Forest	Term	moved vehicle	N
9/13/2004	Nov4-49-5-1	DOGM			non-coal waste	Term	moved waste	N
9/8/2005	Nov5-49-2-1	DOGM			Failure annual subsidene	Term		N
10/4/2006	#10001	DOGM			Culvet Plugged	TErm	Unplugged	N
9/6/2007	10014	DOGM			no sed pond inspection	TERM	Inspected	N
9/10/2007	10015	DOGM			plugged culvert	term	unplugged	N
1/14/2008	10016	DOGM			mine water stored in pond	Term	rerouted water	N
1/14/2008	10017	DOGM			grvity flow fro m portals	Term	stopped flow	N
2/06/2008	10019	DOGM			failure to request permit renewal	Term	submitted renewal	N
5/28/2008	10021	DOGM			Plugged culverts	Term	Unplugged	N
5/28/2008	10022	DOGM			Failure to maintain silt fence	Term	Cleaned fence	N
8/10/2009	10043	DOGM			High iron discharge in Crandall Creek			N
8/10/2009	10044	DOGM			No macroinvertebrate studies			N
10/29/2009	10046	DOGM			Failure to clean out sediment pond			N

Name of Operation	Identifying number for operation	Federal or State Permit Number	MSHA ID Number
West Ridge		007/041	42-02233

Date Issued	Violation Number	Name of Issuing Agency	Person Issued To	Permit Number	Brief Description of Violation	Status (Abated, Term. etc.)	Abatement Action	Appeal Y or N
1/22/2004	Nov4-49-1-1	DOGM			Failure to request renewal	Term		N
4/6/2005	Nov5-39-1-1	DOGM			Failure to submit 4qtr water	Term		N
7/31/2008	10025	DOGM			coal pushed on topsoil	Term		N
1/29/2009	10033	DOGM			sediment in stream	Yes		N
4/29/2010	10051	DOGM			storage shed CO	yes		
4/29/2010	10052	DOGM			plugged culvert	yes		

Name of Operation	Identifying number for operation	Federal or State Permit Number	MSHA ID Number
Horse Cyn.		007/013	42-00100

Date Issued	Violation Number	Name of Issuing Agency	Person Issued To	Permit Number	Brief Description of Violation	Status (Abated, Term. etc.)	Abatement Action	Appeal Y or N
3/17/2009	10035	DOGM		007/013	failure to change bond	term		N
3/19/2009	10036	DOGM			working in closure period	pending		Y

Name of Operation			Identifying number for operation			Federal or State Permit Number	MSHA ID Number
Canterbury Coal Inc.			644			D-024-1/S-1020	3600813/3605708
Date Issued	**Violation Number**	**Name of Issuing Agency**	**Person Issued To**	**Permit Number**	**Brief Description of Violation**	**Abatement Action**	**Appeal Y or N**
5/13/2004	143419	PADEP		3743701	90.124		N
7/29/2004	165278	PADEP		3743701	90.106		N
7/29/2004	165278	PADEP		3743701	90.152		N
7/29/2004	169136	PADEP		3743701	90.152		N
7/29/2004	165279	PADEP		3743701	89.68		N
7/29/2004	165279	PADEP		3743701	89.83		N
8/13/2004	169138	PADEP		3743701	90.124		N
9/7/2004	169139	PADEP		3743701	89.81		N
5/13/2004	143416	PADEP		3743701	86.13 CO		N
6/15/2004	145872	PADEP		3743701	89.52 CO		N
2/8/2005	182734	PADEP		3743701	90.124		N
8/5/2005	199322	PADEP		3743701	90.159		N

Name of Operation			Identifying number for operation				Federal or State Permit Number	MSHA ID Number
UMCO			74645				PA 63921301	3608375
Date Issued	Violation Number	Name of Issuing Agency	Person Issued To	Permit Number	Brief Description of Violation	Status (Abated, Term. etc.)	Abatement Action	Appeal Y or N
9/1/2004	426787	DMRM		63921301	86.13	No resolution		N
9/3/2004	426786	DMRM		63921301	89.142a(b)	No resolution		N
9/20/2004	427936	DMRM		63921301	89.142a(b)	No resolution		N
1/4/2005	445603	Air Quality		63921301	25.127.25	ADM. Close Out		N
1/13/2005	445603	Air Quality		63921301	25.127.25	ADM Close Out		N
3/18/2005	445603	Air Quality		63921301	25.127.25	ADM Close Out		N
6/10/2005	466153	DEP		63921301	25.89.21	No resolution		N
7/15/2005	448412	DEP		63921301	25.89.68	Abated		N
7/15/2005	448413	DEP		63921301	25.89.83(a)	Abated		N
10/10/2006	499479	PADEP		63921301	89.142a(f)	No resolution		Y

Name of Operation			Identifying number for operation				Federal or State Permit Number	MSHA ID Number
Maple Creek			4244				63723707	36-00970
Date Issued	Violation Number	Name of Issuing Agency	Person Issued To	Permit Number	Brief Description of Violation	Status (Abated, Term. etc.)	Abatement Action	Appeal Y or N
5/7/2004	394440	MCM		63841302	89.142A.F.1	Abated		N
5/12/2004	394880	MCM		63841302	89.142A.F.1	No resolution		N
5/13/2004	395344	MCM		63841302	89.142A.F.1	No resolution		N
5/13/2004	395345	MCM		63841302	89.142A.F.1V	No resolution		N
5/13/2004	395346	MCM		63841302	89.142A.E	Abated		N
5/7/2004	394440	MCM		63841302	89.142A.F.1	Abated		N
7/7/2004	401714	MCM		63841302	89.142A.F.1	No resolution		N
7/30/2004	421806	MCM		63841302	SMCRA.18.6	Abated		N
8/26/2004	425804	MCM		63841302	89.142A.F.1	No resolution		N
8/13/2004	426148	MCM		63723707	86.13	Abated		N
9/8/2004	427302	MCM		63723707	90.102	Abated		N
9/10/2004	427564	MCM		63723707	90.102	Abated		N
9/13/2004	427565	MCM		63723707	90.102	Abated		N
9/14/2004	427566	MCM		63723707	90.102	Abated		N
9/14/2004	427567	MCM		63723707	90.112	Abated		N
10/19/2004	432068	MCM		63723707	90.102	Abated		N
7/29/2005	469866	DEP		63723707	89.142a(b)(1)(iii)	No Resolution		N
12/1/2005	478486	PADEP		63841302	89.145a(b)	No Resolution		N
12/1/2005	478487	PADEP		63841302	89.145a(f)(1)(v)	No Resolution		N
12/1/2005	478488	PADEP		63841302	89.145a(b)	No Resolution		N
1/9/2006	480660	PADEP		63841302	1396.18(f)	Abated		N
6/12/2006	491619	PADEP		6381302	89.142a(e)	No Resolution		Y

Name of Operation	Identifying number for operation	Federal or State Permit Number	MSHA ID Number
PENNAMERICAN COAL LP	93081	32951301	36-00970

Kim Betcher

Date Issued	Violation Number	Name of Issuing Agency	Person Issued To	Permit Number	Brief Description of Violation	Status (Abated, Term. etc.)	Abatement Action	Appeal Y or N

Name of Operation	Identifying number for operation	Federal or State Permit Number	MSHA ID Number
Ohio American Coal, Inc.	N/A	N/A	3304550/3304569

Kim Betcher

Date Issued	Violation Number	Name of Issuing Agency	Person Issued To	Permit Number	Brief Description of Violation	Status (Abated, Term. etc.)	Abatement Action	Appeal Y or N
8/9/2006	21861	ODNR	OAEI	D-2180	outside of perrmit bndry	Abadted	IBR	N
3/1/2007	13101	ODNR	OAEI	D-2291	mining without a permit	Abadted	Permit issued	N

Name of Operation	Identifying number for operation	Federal or State Permit Number	MSHA ID Number
Energy Resources, Inc.	470	License # 1465	360 269 5

Charlie Shestak

Date Issued	Violation Number	Name of Issuing Agency	Person Issued To	Permit Number	Brief Description of Violation	Status (Abated, Term. etc.)	Abatement Action	Appeal Y or N
5/11/2004	143258	PaDEP	ERI	24010101	87.147	Abated	Corrected	N
8/26/2004	167665	PaDEP	ERI	24010101	87.140	Abated	Corrected	N
8/30/2004	168590	PaDEP	ERI	24970102	87.147	Abated	Corrected	N
7/6/2004	147120	PaDEP	ERI	33901602	89.52	Abated	Corrected	N
7/31/2006	211989	PaDEP	ERI	17841607	86.152	Abated	Corrected	N
4/11/2006	486936	PaDEP	ERI	17930120	87.157	Abated	Corrected	N

Name of Operation	Identifying number for operation	Federal or State Permit Number	MSHA ID Number
TDK Coal Sales, Inc.	27182	17910124	3608867

Charlie Shestak

Date Issued	Violation Number	Name of Issuing Agency	Person Issued To	Permit Number	Brief Description of Violation	Status (Abated, Term. etc.)	Abatement Action	Appeal Y or N
5/13/2004	143257	PaDEP	TDK	24970104	87.147	Abated	Waved	N
6/1/2004	144659	PaDEP	TDK	03940101	87.148	Abated	Corrected	N
9/15/2004	169382	PaDEP	TDK	03940102	87.106	Abated	Corrected	N
9/20/2004	169388	PaDEP	TDK	24970104	87.14	Abated	Corrected	N
10/7/2004	170575	PaDEP	TDK	24970104	87.106	Abated	Corrected	N
4/11/2006	486945	PaDEP	TDK	17900143	87.157	Abated	Corrected	N

Name of Operation	Identifying number for operation	Federal or State Permit Number	MSHA ID Number
Belmont Coal Company		D-0241/D-1020	33-04397/33-03048

David Bartsch

Date Issued	Violation Number	Name of Issuing Agency	Person Issued To	Permit Number	Brief Description of Violation	Status (Abated, Term. etc.)	Abatement Action	Appeal Y or N
2/24/2004	24541	DMR	Mine	D-0241	Gullies exis in regraded	Terminated	regraded	N

Name of Operation	Identifying number for operation	Federal or State Permit Number	MSHA ID Number
The Ohio Valley Coal Co.	Powhatan No. 6 Mine	State – D-0360	33-01159

David Bartsch

Date Issued	Violation Number	Name of Issuing Agency	Person Issued To	Permit Number	Brief Description of Violation	Status (Abated, Term. etc.)	Abatement Action	Appeal Y or N
8/2/2004	19662	DMRM	Mine	D-0360	Failure to maintain sediment control	Terminated	Cleaned Ditch	N
5/23/2006	19656	DMRM	Mine	D-0360	Failure to maintain the perimeter of diversion ditch	Terminated	Cleaned Ditch	N
11/30/2006	28473	DMRM	Mine	D-0360	Undirected Drainage	Terminated	Cleaned Ditch	N
11/30/2006	28484	DMRM	Mine	D-0360	Coal Blocking Diversion Ditch	Terminated	Cleaned Ditch	N

Name of Operation			Identifying number for operation				Federal or State Permit Number	MSHA ID Number
American Energy Corp							D-0425	33-01070
Date Issued	**Violation Number**	**Name of Issuing Agency**	**Person Issued To**	**Permit Number**	**Brief Description of Violation**	**Status (Abated, Term. etc.)**	**Abatement Action**	**Appeal Y or N**
1/25/2005	21807	ODNR		D-0425	subsided residnet ran out of water	Terminated	filled tank with water	N
4/27/2005	19696	ODNR		D-0425	Coal located outside stockpile area	Terminated	cleaned coal	N
4/29/2005	19695	ODNR		D-0425	Maintenance on pond 018	Terminated	cleaned out pond	N
4/27/2005	19697	ODNR		D-0425	drainage from property not entering sumps	Terminated	construct sumps	N
10/3/2005	21871	ODNR		D-0425	Failure to sub specific repairs (landowner)	Active		N
6/15/2006	21860	ODNR		D-1159	Segregate Prim Farmland soils	Active	Waiting on ODNR, All information submitted	N
Aug-05	CO-1726	ODNR		D-0425	Uncontroled discharge (Slurry)	Avtive	Will submit revised Plan Mid Month	N

Name of Operation			Identifying number for operation				Federal or State Permit Number	MSHA ID Number
The American Coal Co.					Galatia Mine & Millennium Portal		IDNR Mining Pemrit #2 and #352	11-02752
Date Issued	**Violation Number**	**Name of Issuing Agency**	**Person Issued To**	**Permit Number**	**Brief Description of Violation**	**Status (Abated, Term. etc.)**	**Abatement Action**	**Appeal Y or N**
9/27/2004	37-1-04	IDNR	DeNeal	Permit #2	Failure to submit groundwater report on schedule	Terminited		N
4/13/2005	37-01-05	IDNR	DeNeal	Permit #2	Failure to submit u/g mining maps	Terminited		N
5/12/2005	37-02-05	IDNR	DeNeal	Shadow Area 9	failure to complete subsidence mitigation in	Modified		N
					contemporaneous manner.			
6/1/2005	37-03-05	IDNR	DeNeal	352	broken waterline-fialure to prevent minepumpage from passing through sediment pond before going offsite	Terminated		N

The following companies either did not have any violations in the last three years or do not have permits.

Oklahoma Coal Company

KenAmerican Resources, Inc.

Onieda Coal, Inc.

MonValley Transportation Center, Inc.

Mill Creek Mining Co.

Pinski Corp

American Compliance Coal Inc.

Coal Resources Inc.

PA Transloading, Inc.

West Virginia Resources Inc.

WildCat Loadout

American Coal Sales Co.

Hocking Valley Resources Co..

APPENDIX B
PART C

INSURANCE

ACORD CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY) 5/21/2010

PRODUCER (724)349-1300, Fax(724)349-1446
Reschini Agency Inc
922 Philadelphia Street
P.O. Box 449
Indiana PA 15701

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURERS AFFORDING COVERAGE	NAIC #
INSURER A: Federal Insurance Company	
INSURER B:	
INSURER C:	
INSURER D:	
INSURER E:	

INSURED
Andalex Resources, Inc.
A Subsidiary of UtahAmerican Energy, Inc.
6750 N. Airport Road
Price UT 84501

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	ADD'L INSRD	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
A		GENERAL LIABILITY X COMMERCIAL GENERAL LIABILITY CLAIMS MADE X OCCUR X Includes XCU GEN'L AGGREGATE LIMIT APPLIES PER: POLICY PRO-JECT X LOC	37104410	06/01/2010	06/01/2011	EACH OCCURRENCE	$ 1,000,000
						DAMAGE TO RENTED PREMISES (Ea occurrence)	$ 1,000,000
						MED EXP (Any one person)	$ 10,000
						PERSONAL & ADV INJURY	$ 1,000,000
						GENERAL AGGREGATE	$ 2,000,000
						PRODUCTS - COMP/OP AGG	$ 2,000,000
		AUTOMOBILE LIABILITY ANY AUTO ALL OWNED AUTOS SCHEDULED AUTOS HIRED AUTOS NON-OWNED AUTOS				COMBINED SINGLE LIMIT (Ea accident)	$
						BODILY INJURY (Per person)	$
						BODILY INJURY (Per accident)	$
						PROPERTY DAMAGE (Per accident)	$
		GARAGE LIABILITY ANY AUTO				AUTO ONLY - EA ACCIDENT	$
						OTHER THAN AUTO ONLY: EA ACC	$
						AGG	$
		EXCESS/UMBRELLA LIABILITY OCCUR CLAIMS MADE DEDUCTIBLE RETENTION $				EACH OCCURRENCE	$
						AGGREGATE	$
							$
							$
							$
		WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? If yes, describe under SPECIAL PROVISIONS below				WC STATU-TORY LIMITS / OTH-ER	
						E.L. EACH ACCIDENT	$
						E.L. DISEASE - EA EMPLOYEE	$
						E.L. DISEASE - POLICY LIMIT	$
		OTHER					

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/EXCLUSIONS ADDED BY ENDORSEMENT/SPECIAL PROVISIONS

Wildcat Loadout Act 007/033 - Cancellation Clause revised as follows: Should any of the above described policies be changed and/or cancelled before the expiration date thereof, the issuing company will mail (certified) 45 days written notice to the certificate holder named to the left.

CERTIFICATE HOLDER

State of Utah Dept of Natural Resources
Division of Oil, Gas & Mining/STE1210
Attn: Daron Haddock
1594 W N. Temple, Box 145801
Salt Lake City, UT 84114-5801

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL 45 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE
Karen Williams/KAREN Karen Williams

© ACORD CORPORATION 1988

IMPORTANT

If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

DISCLAIMER

The Certificate of Insurance on the reverse side of this form does not constitute a contract between the issuing insurer(s), authorized representative or producer, and the certificate holder, nor does it affirmatively or negatively amend, extend or alter the coverage afforded by the policies listed thereon.

APPENDIX B
PART D

BOND INFORMATION

Bonding Calculations

Direct Costs		
Subtotal Demolition and Removal	$192,761.00	
Subtotal Backfilling and Grading	$220,847.00	
Subtotal Revegetation	$359,746.00	
Direct Costs	$773,354.00	
Indirect Costs		
Mob/Demob	$77,335.00	10.0%
Contingency	$38,668.00	5.0%
Engineering Redesign	$19,334.00	2.5%
Main Office Expense	$52,588.00	6.8%
Project Mainagement Fee	$19,334.00	2.5%
Subtotal Indirect Costs	$207,259.00	26.8%
Total Cost	$980,613.00	
Escalation factor		0.032
Number of years		5
Escalation	$167,266.00	
Reclamation Cost Escalated	$1,147,879.00	
Bond Amount (rounded to nearest $1,000) 2006 dollars	$1,148,000.00	
Bond Posted 2006 dollars	$1,144,000.00	
Difference Between Cost Estimate and Bond	-$4,000.00	
Percent Difference	-0.35%	

RECEIVED
2007
Div. of Oil, Gas & Mining

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Loading Bin 01																			1305
	Scales 02																			6489
	Substation 03																			5245
	Truck Dump West 04																			3723
	Crushing Plant West 05																			1138
	Radial Stacker West 06																			3892
	Reclaim Tunnel West 07																			8677
	Loadout Conveyor West 08																			1434
	Control Building West 09																			1426
	Truck Dump Reclaim 10																			4416
	Conveyor T 11																			1646
	Crusher Screen Plant 12																			8958
	Lump Coal Belt 13																			526
	Stoker Radial Stacker 14																			3289
	Conveyor Y 15																			3214
	Main Radial Stacker 16																			19230
	Loadout Reclaim 17																			17392
	Loadout Tower 18																			26287
	Office 19																			3184
	Powerline 20																			2500
	Shop 21																			12144
	GuardRails 22																			12800
	Culverts 23																			2250
	Miscellaneous 24																			7110
	Truck Dump New 25																			4416
	Conveyor New 26																			1335
	Radial Stacker New 27																			18386
	Conveyor R 28																			10349
	Total																			192761

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Loading Bin 01																			
	Structure's Demolition Cost	Steel Bid. Large	02 41 16 13 0012	0.28	/CF	15	15	12												
	Structure's Vol. Demolished															FT		2700	CF	756
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			758
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	30	18	1												
	Concrete's Vol. Demolished															FT		20	CY	196
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY												1.3	26	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. md. tri	31 23 23 17 0320	3.79	/CY													26	CY	39
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													26	CY	99
	Subtotal																	26	CY	215
																				549
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			1305

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Scales 02																			
	Structure's Demolition Cost	Mixed Materials Bld. Large	02 41 16 13 0100	0.3	/CF	14	60	8												
	Structure's Vol. Demolished															FT		6720	CF	2016
	Rubble's Weight (exclude steel)																0.35	87	CY	
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	City Services	City Service Price	4	/CY															
	Steel's Weight																	87	CY	348
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
																				2364
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	14	60	8												
	Structure's Vol. Demolished															FT		6720	CF	1882
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
																				1882
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	14	70	0.5												
	Concrete's Vol. Demolished															FT		18	CY	177
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY												1.3	23	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													23	CY	35
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													23	CY	87
	Subtotal																	23	CY	190
																				489
	Asphalt's Demolition Cost																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	10	12	0.25												
	Concrete's Vol. Demolished															FT		1	CY	10
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY												1.3	1	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													1	CY	2
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													1	CY	4
	Subtotal																	1	CY	8
																				24
	Road's Demolition Cost																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	340	20	0.25												
	Concrete's Vol. Demolished															FT		63	CY	619
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY												1.3	82	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													82	CY	123
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													82	CY	311
	Subtotal																	82	CY	677
																				1730
	Total																			6489

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Substation 03																			
	Structure's Demolition Cost	Mechanical equipment heavy	25 05 05 10 3600	890	/ton															
	Structure's Vol. Demolished												3			ton		3	ton	2670
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			2670
	Dismantling Cost	Chain link remove 8'-10'	02 41 13 60 1700	3.57	/LF	250														
	Equipment 's Vol. Demolished															FT		250	FT	893
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Equipment 's Disposal Cost																			893
	Dismantling Cost	Powerpole	Hiawatha	100	EA															
	Equipment 's Vol. Demolished														13	Ea		13	EA	1300
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			1300
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	25	15	0.5												
	Concrete's Vol. Demolished																	7	CY	69
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY												1.3	9	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. md. tri	31 23 23 17 0320	3.79	/CY													9	CY	14
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													9	CY	34
	Subtotal																	9	CY	74
	Concrete Demolition																			191
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	25	15	0.5												
	Concrete's Vol. Demolished																	7	CY	69
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY												1.3	9	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. md. tri	31 23 23 17 0320	3.79	/CY													9	CY	14
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													9	CY	34
	Subtotal																	9	CY	74
																				191
	Total																			5245

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Truck Dump West 04																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	40	14	15												
	Structure's Vol. Demolished															FT		8400	CF	2352
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			2352
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY						50					CY		50	CY	491
	Concrete's Vol. Demolished																1.3	65	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													65	CY	98
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. md. tri	31 23 23 17 0320	3.79	/CY													65	CY	246
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													65	CY	536
	Subtotal																			1371
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			3723

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Crushing Plant West 05																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	20	15	10								FT		3000	CF	840
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			840
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished	Concrete demolition	ConcreteDemo1	9.82	/CY	20	15	1								FT		11	CY	108
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY												1.3	14	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. tri	31 23 23 17 0320	3.79	/CY													14	CY	21
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													14	CY	53
	Subtotal																	14	CY	116
																				298
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			1138

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Radial Stacker West 06																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	150	8	8												
	Structure's Vol. Demolished															FT		9600	CF	2688
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			2688
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	150	8	1												
	Concrete's Vol. Demolished															FT		44	CY	432
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY												1.3	57	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. md. tri	31 23 23 17 0320	3.79	/CY													57	CY	86
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													57	CY	216
	Subtotal																	57	CY	470
																				1204
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			3892

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Reclaim Tunnel West 07																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	190	14	8												
	Structure's Vol. Demolished															FT		21280	CF	5958
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			5958
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	190	14	1												
	Concrete's Vol. Demolished															FT		99	CY	972
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY												1.3	129	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. tri	31 23 23 17 0320	3.79	/CY													129	CY	194
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													129	CY	489
	Subtotal																	129	CY	1064
																				2719
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			8677

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Loadout Conveyor West 08																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	320	4	4												
	Structure's Vol. Demolished															FT		5120	CF	1434
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			1434
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			1434

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Control Building West 09																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	30	15	8								FT		3600	CF	1008
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			1008
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished	*Concrete demolition*	ConcreteDemo1	9.82	/CY	40	20	0.5												
	Loading Cost															FT		15	CY	147
	Transportation Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY												1.3	20	CY	
	Disposal Costs	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													20	CY	30
	Subtotal	Disposal on site	02 41 16 17 4200	8.25	/CF													20	CY	76
																		20	CY	165
	Concrete Demolition																			418
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			1426

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Truck Dump Reclaim 10																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	40	14	15												
	Structure's Vol. Demolished															FT		8400	CF	2352
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			2352
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY															
	Concrete's Vol. Demolished										75					CY		75	CY	737
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY												1.3	98	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. md. tri	31 23 23 17 0320	3.79	/CY													98	CY	147
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													98	CY	371
	Subtotal																	98	CY	809
																				2064
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			4416

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Conveyor T 11																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	250	4	4								FT		4000	CF	1120
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			1120
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	15	35	1								FT		19	CY	187
	Concrete's Vol. Demolished																1.3	25	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													25	CY	38
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													25	CY	95
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													25	CY	206
	Subtotal																			526
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			1646

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Crusher Screen Plant 12																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	44	20	15												
	Structure's Vol. Demolished															FT		13200	CF	3696
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	35	30	8												3696
	Structure's Vol. Demolished															FT		8400	CF	2352
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Concrete Demolition																			2352
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	57	50	1												
	Concrete's Vol. Demolished															FT		106	CY	1041
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY												1.3	138	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													138	CY	207
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													138	CY	523
	Subtotal																	138	CY	1139
																				2910
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			8958

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Lump Coal Belt 13																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	100	3	3												
	Structure's Vol. Demolished															FT		900	CF	252
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			252
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished	Concrete demolition	ConcreteDemo1	9.82	/CY						10					CY		10	CY	98
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY												1.3	13	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. md. tri	31 23 23 17 0320	3.79	/CY													13	CY	20
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													13	CY	49
	Subtotal																	13	CY	107
																				274
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			526

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Stoker Radial Stacker 14																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	100	10	10												
	Structure's Vol. Demolished															FT		10000	CF	2800
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			2800
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	60	8	1								FT		18	CY	177
	Concrete's Vol. Demolished																1.3	23	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													23	CY	35
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. md. tri	31 23 23 17 0320	3.79	/CY													23	CY	87
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													23	CY	190
	Subtotal																			489
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			3289

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Conveyor Y 15																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	600	4	4										9600	CF	2688
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			2688
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	35	15	1										19	CY	187
	Concrete's Vol. Demolished																1.3	25	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													25	CY	36
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. tri	31 23 23 17 0320	3.79	/CY													25	CY	95
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													25	CY	206
	Subtotal																			526
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			3214

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Main Radial Stacker 16																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	260	15	15								FT		58500	CF	16380
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			16380
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	280	10	1								FT		104	CY	1021
	Concrete's Vol. Demolished																1.3	135	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													135	CY	203
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. md. tri	31 23 23 17 0320	3.79	/CY													135	CY	512
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													135	CY	1114
	Subtotal																			2850
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			19230

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Loadout Reclaim 17																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	750	4	8								FT		24000	CF	6720
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			6720
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	750	14	1								FT		389	CY	3820
	Concrete's Vol. Demolished																1.3	506	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													506	CY	759
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. md. trip	31 23 23 17 0320	3.79	/CY													506	CY	1918
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													506	CY	4175
	Subtotal																			10672
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			17392

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Loadout Tower 18																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	35	40	60												
	Structure's Vol. Demolished															FT		84000	CF	23520
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			23520
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	12	8	1												
	Concrete's Vol. Demolished															FT		4	CY	39
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY												1.3	5	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. tri	31 23 23 17 0320	3.79	/CY													5	CY	8
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													5	CY	19
	Subtotal																	5	CY	41
																				107
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	12	18	1												
	Concrete's Vol. Demolished															FT		8	CY	79
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY												1.3	10	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. tri	31 23 23 17 0320	3.79	/CY													10	CY	15
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													10	CY	38
	Subtotal																	10	CY	83
																				215
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	40	60	1												
	Concrete's Vol. Demolished															FT		89	CY	874
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY												1.3	116	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. tri	31 23 23 17 0320	3.79	/CY													116	CY	174
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													116	CY	440
	Subtotal																	116	CY	957
																				2445
	Total																			
																				26287

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Office 19																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	40	30	8												
	Structure's Vol. Demolished															FT		9600	CF	2688
	Rubble's Weight (exclude steel)																0.35	124	CY	
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel	City Services	City Service Price	4	/CY															
	Steel's Weight																	124	CY	496
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			3184
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	66	30	0.5												
	Concrete's Vol. Demolished															FT		37	CY	363
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY												1.3	48	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. md. tri	31 23 23 17 0320	3.79	/CY													48	CY	72
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													48	CY	182
	Subtotal																	48	CY	396
																				1013
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	70	35	0.5												
	Concrete's Vol. Demolished															FT		45	CY	442
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY												1.3	59	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. md. tri	31 23 23 17 0320	3.79	/CY													59	CY	89
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													59	CY	224
	Subtotal																	59	CY	487
																				1242
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			5439

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Powerline 20																			
	Structure's Demolition Cost	Powerpole	Hiawatha	100	EA										25	EA		25	EA	2500
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			2500
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			2500

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Shop 21																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	40	45	20												
	Structure's Vol. Demolished															FT		36000	CF	10080
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			10080
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	45	45	1												
	Concrete's Vol. Demolished															FT		75	CY	737
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY												1.3	98	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													98	CY	147
	Disposal Costs	*Disposal on site*	02 41 16 17 4200	8.25	/CF													98	CY	371
	Subtotal																	98	CY	809
																				2064
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			12144

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	GuardRails 22																			
	Structure's Demolition Cost	Guiderail remove	02 41 13 33 0800	12.8	LF	1000										FT		1000	FT	12800
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			12800
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			12800

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Culverts 23																			
	Excavate Culvert 12"	Excavation Bulk Bank 2 CY (322BL)	31 23 16 32 0260	1.86	/CY	650	1	2								FT		48	CY	89
	Backfill Culvert 12"	Backfill Trench Mininal Haul 2 1/4 CY	31 23 16 13 3080	1.71	/CY	650	1	2								FT		48	CY	82
	Excavate Culvert 15"	Excavation Bulk Bank 2 CY (322BL)	31 23 16 32 0260	1.86	/CY	400	1.3	2.6								FT		50	CY	93
	Backfill Culvert 15"	Backfill Trench Mininal Haul 2 1/4 CY	31 23 16 13 3080	1.71	/CY	400	1.3	2.6								FT		50	CY	86
	Excavate Culvert 18"	Excavation Bulk Bank 2 CY (322BL)	31 23 16 32 0260	1.86	/CY	310	1.5	3								FT		52	CY	97
	Backfill Culvert 18"	Backfill Trench Mininal Haul 2 1/4 CY	31 23 16 13 3080	1.71	/CY	310	1.5	3								FT		52	CY	89
	Excavate Culvert 24"	Excavation Bulk Bank 2 CY (322BL)	31 23 16 32 0260	1.86	/CY	1440	2	4								FT		427	CY	794
	Backfill Culvert 24"	Backfill Trench Mininal Haul 2 1/4 CY	31 23 16 13 3080	1.71	/CY	1440	2	4								FT		427	CY	730
	Excavate Culvert 36"	Excavation Bulk Bank 2 CY (322BL)	31 23 16 32 0260	1.86	/CY	80	3	6								FT		53	CY	99
	Backfill Culvert 36"	Backfill Trench Mininal Haul 2 1/4 CY	31 23 16 13 3080	1.71	/CY	80	3	6								FT		53	CY	91
	Subtotal																			
	Equipment 's Disposal Cost																			2250
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			2250

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Miscellaneous 24																			
	Structure's Demolition Cost																			
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Water Tank																			
	Equipment 's Disposal Cost	6000 gal. to 8000 gal. tank	02 65 10 30 0120	915	Ea.															
	Dismantling Cost										8000					GAL		1	EA	915
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs	9000 gal to 12000 gal tank	02 65 10 30 0130	1375	Ea.															
	Disposal Costs										8000					GAL		1	EA	1375
	Subtotal																			2290
	Water Tank																			
	Equipment 's Disposal Cost	6000 gal. to 8000 gal. tank	02 65 10 30 0120	915	Ea.															
	Dismantling Cost										6000					GAL		1	EA	915
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs	9000 gal to 12000 gal tank	02 65 10 30 0130	1375	Ea.															
	Disposal Costs										6000					GAL		1	EA	1375
	Subtotal																			2290
	Water Tank																			
	Equipment 's Disposal Cost	9000 gal to 12000 gal tank	02 65 10 30 0130	1375	Ea.															
	Dismantling Cost										10000					GAL		1	EA	1375
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs	9000 gal to 12000 gal tank	02 65 10 30 1029	1155	Ea.															
	Disposal Costs										10000					GAL		1	EA	1155
	Subtotal																			2530
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			7110

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Truck Dump New 25																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	40	14	15												
	Structure's Vol. Demolished															FT		8400	CF	2352
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			2352
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY															
	Concrete's Vol. Demolished										75					CY		75	CY	737
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY												1.3	98	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. tri	31 23 23 17 0320	3.79	/CY													98	CY	147
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													98	CY	371
	Subtotal																	98	CY	809
																				2064
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			4416

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Conveyor New 26																			
	Structure's Demolition Cost	Steel Bld, Large	02 41 16 13 0012	0.28	/CF	250	4	4												
	Structure's Vol. Demolished															FT		4000	CF	1120
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			1120
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	15	15	1												
	Concrete's Vol. Demolished															FT		8	CY	79
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY												1.3	10	CY	
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. md. tri	31 23 23 17 0320	3.79	/CY													10	CY	15
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													10	CY	38
	Subtotal																	10	CY	83
																				215
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			1335

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Radial Stacker New 27																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	250	15	15								FT		56250	CF	15750
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			15750
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete demolition	ConcreteDemo1	9.82	/CY	260	10	1								FT		96	CY	943
	Concrete's Vol. Demolished																1.3	125	CY	
	Loading Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY													125	CY	188
	Transportation Cost	12 CY (16 Ton) Dump Truck 1/2 mi. md. trip	31 23 23 17 0320	3.79	/CY													125	CY	474
	Disposal Costs	Disposal on site	02 41 16 17 4200	8.25	/CF													125	CY	1031
	Subtotal																			2636
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			18386

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Conveyor R 28																			
	Structure's Demolition Cost	Steel Bld. Large	02 41 16 13 0012	0.28	/CF	1250	7	4												
	Structure's Vol. Demolished															FT		35000	CF	9800
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck																			
	Transportation Cost Non Steel Drive																			
	Disposal Cost Non Steel																			
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			
	Equipment 's Disposal Cost																			9800
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished	Concrete demolition	ConcreteDemo1	9.82	/CY															
	Loading Cost										20					CY		20	CY	196
	Transportation Cost	Front end loader 3 CY	31 23 16 42 1300	1.5	/CY												1.3	26	CY	
	Disposal Costs	12 CY (16 Ton) Dump Truck 1/2 mi. rnd. trip	31 23 23 17 0320	3.79	/CY													26	CY	39
	Subtotal	Disposal on site	02 41 16 17 4200	8.25	/CF													26	CY	99
																		26	CY	215
	Concrete Demolition																			549
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			10349

	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Units	Cost
Cleanup 01															
Wildcat Loadout Cleanup Coal Pile															
D9R Semi-U EROPS (9-50) (2H2006)	19530	90.4	0.1	57.85	279.35	1	279.35	$/HR	1500	CY	187	CY/HR	8	HR	2235
988G EROPS (9-34) (2nd2006) 2005	15505	77.35	0.1	57.85	239.84	1	239.84	$/HR	1500	CY	187	CY/HR	8	HR	1919
CLAB					44.75	1	44.75	$/HR					16	HR	716
Foreman Average, Outside					62.25	1	62.25	$/HR					16	HR	996
5,000 gal H2O truck Diesel (20-17) (2nd2006)	5170	55	0.1	45.65	138.46	1	138.46	$/HR					16	HR	2215
Pickup Truck Crew 4x4 1 ton (20-17) (2nd2006)	1070	13.1	0.1	0	21.1	1	21.1	$/HR					16	HR	338
															8419

	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Units	Cost
Regrading 02															
Wildcat Loadout Recontour/Regrade															
D9R Semi-U EROPS (9-50) (2H2006)	19530	90.4	0.1	57.85	279.35	1	279.35	$/HR	38872	CY	187	CY/HR	207.9	HR	58077
627G EROPS (9-47) (2nd2006)	17460	113.05	0.1	57.85	291.33	1	291.33	$/HR	38872	CY	332.6	CY/HR	116.9	HR	34056
988G EROPS (9-34) (2nd2006) 2005	15505	77.35	0.1	57.85	239.84	1	239.84	$/HR							
CLAB					44.75	1	44.75	$/HR					207.9	HR	49863
Foreman Average, Outside					62.25	1	62.25	$/HR					207.9	HR	9304
5,000 gal H2O truck Diesel (20-17) (2nd2006)	5170	55	0.1	45.65	138.46	1	138.46	$/HR					207.9	HR	12942
Pickup Truck Crew 4x4 1 ton (20-17) (2nd2006)	1070	13.1	0.1	0	21.1	1	21.1	$/HR					207.9	HR	28786
													207.9	HR	4387
															197415

	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Units	Cost
Topsoil 03															
Wildcat Loadout TopSoil															
627G EROPS (9-47) (2nd2006)	17460	113.05	0.1	57.85	291.33	2	582.66	$/HR	15549	CY	566	CY/HR	27.5	HR	16023
D9R Semi-U EROPS (9-50) (2H2006)	19530	90.4	0.1	57.85	279.35	1	279.35	$/HR	10000	CY	187	CY/HR	27.5	HR	7682
CLAB					44.75	1	44.75	$/HR					27.5	HR	1231
Foreman Average, Outside					62.25	1	62.25	$/HR					27.5	HR	1712
5,000 gal H2O truck Diesel (20-17) (2nd2006)	5170	55	0.1	45.65	138.46	1	138.46	$/HR					27.5	HR	3808
Pickup Truck Crew 4x4 1 ton (20-17) (2nd2006)	1070	13.1	0.1	0	21.1	1	21.1	$/HR					27.5	HR	580
															15013

	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Units	Cost
Cleanup 01															8419
Regrading 02															197415
Topsoil 03															15013
Total															220847

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Revegetation Costs																			
	Ground Preparation	Excavation Bulk Bank 2 CY (322BL)	31 23 16 32 0260	1.86	/CY					69						AC		23460	CY	43636
	Seeding	Hydro Spreader (equip. & labor) B-81	Reveg005	20.95	/MSF					69						AC		3005.6	MSF	62967
	Seeding	Wildcat Loadout Seed Mix	Wildcat 001	1381.23	/AC					69						AC		69	AC	95305
	Mulch	Hay bale	Reveg007	166.1	/ton					69						AC		138	ton	22922
	Mulch	Hydro Spreader (equip. & labor) B-81	Reveg005	20.95	/MSF					69						AC		3005.6	MSF	62967
	Subtotal																			287797
	25% Revegetation Rate																			71949
	Subtotal																			71949
	Total																			359746

APPENDIX D
(Supplement)

SOILS REPORT
(JAMES NYENHUIS)

SOIL SURVEY FOR THE TWELVE-ACRE EXPANSION AREA AT THE WILDCAT LOADOUT

INCORPORATED
MAY 17 2006
Div. of Oil, Gas & Mining

Prepared by

MT. NEBO SCIENTIFIC, INC.
330 East 400 South, Suite 6
Springville, Utah 84663
(801) 489-6937

James H. Nyenhuis
Certified Professional Soil Scientist
(ARCPACS #2753)

for

ANDALEX RESOURCES, INC
P.O. Box 902
Price, UT 84501

July 2003

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

TABLE OF CONTENTS

INTRODUCTION 1

METHODS 2

RESULTS 3

Map Unit A: Hernandez loam, 1 to 6% slopes 4
Hernandez Pedon WC1 Site and Profile Description 5
Hernandez Pedon WC2 Site and Profile Description 5
Hernandez Pedon WC3 Site and Profile Description 6
Hernandez Pedon WC6 Site and Profile Description 7
Hernandez Pedon WC7 Site and Profile Description 8
Hernandez Pedon WC10 Site and Profile Description 9
Hernandez Range of Characteristics 9
Hernandez Soil Suitability and Salvage Depth Recommendations 10
Initial One-Acre Study Area 10
Larger Eleven-Acre Study Area 11

Map Unit B: Haverdad loam, 2 to 8% slopes 11
Haverdad Pedon WC4 Site and Profile Description 12
Haverdad Pedon WC8 Site and Profile Description 12
Haverdad Range of Characteristics 14
Haverdad Soil Suitability and Salvage Depth Recommendations 14

Map Unit C: Strych Variant, shallow to moderately deep, 2 to 6% slopes 15
Strych Variant Pedon WC5 Site and Profile Description 16
Strych Variant Pedon WC9 Site and Profile Description 17
Strych Variant Range Characteristics 18
Strych Variant Soil Suitability and Salvage Depth Recommendation 18

Map Unit DL: Disturbed Land 19

REFERENCES 19

SOIL SURVEY MAP 20

LABORATORY DATA . . . . . Appendix

INCORPORATED

MAY 17 2005

Div. of Oil, Gas & Mining

INTRODUCTION

Andalex Resources needs to expand their coal storage area at the Wildcat Loadout facility located just south of Consumers Road about four miles west of Helper in Carbon County. The site is located in a portion of Section 33, T.14S., R.9E. as shown on the Standardville 7.5 minute USGS topographic quadrangle. A detailed Order 1-2 soil survey was conducted in March 2003 on approximately 12 acres of land immediately adjacent to the east of the current coal storage piles. A one acre site within the current Wildcat permit area but not part of the original to-be-affected disturbance area was previously mapped, sampled, and reported in April, 2003. The current report includes the one acre but expands to include a total of approximately 12 acres all located immediately adjacent to the east of the current coal piles.

Andalex wants to utilize the one acre site for coal storage immediately and the additional eleven acres at a later time. The identification and proper management of topsoil resources on the study area is essential for the success of future reclamation and the achievement of the post-disturbance land use. The information presented in this report is designed to aid in formulating a practical and successful reclamation plan.

INCORPORATED
MAY 17 2006
Div. of Oil, Gas & Mining

METHODS

Standard soil survey methods were used throughout the project. Andalex provided a site photo-map to Patrick Collins. Dr. Collins conducted field work at the site on March 5 and designated three locations as representative of the soil on the one acre study area. A backhoe pit was dug at each of the three sites. Dr. Collins examined the three soil profiles and sampled two of them, WC1 and WC2. Samples were subsequently delivered to Brigham Young University's soil testing laboratory for standard analysis as described in the "Guidelines for Management of Topsoil and Overburden" (State of Utah, 2002). Dr. Collins also investigated the extent of coal fines deposition on the one acre site by means of numerous spade holes dug on a grid transect basis.

The site was then visited on March 11 by Patrick Collins and Jim Nyenhuis, a Certified Professional Soil Scientist. Dr. Collins described his sampling rationale and Mr. Nyenhuis concurred that it was appropriate for the Hernandez soil. The next day, March 12, seven additional backhoe pits were sited and dug on the larger twelve acre study area. Ms. Priscilla Burton (UDOGM soil scientist and reclamation specialist) was present for the day and observed all ten backhoe pits and assisted in the description and sampling of several soil profiles. She observed all three pits on the primary one acre study area. Mr. Nyenhuis concluded the soils description and sampling of the larger area on the following day, March 13, 2003.

The twenty-three soil samples collected from the additional seven soil backhoe pits were delivered to Colorado State University's Soil Testing Laboratory for analysis. The following parameters

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

were analyzed: pH; electrical conductivity (EC); saturation percent; percent calcium carbonate equivalent; organic matter percent; texture (sand, silt, clay, and very fine sand as a part of total sand); meq/L of Ca, Mg, Na, and K; SAR; and AB-DTPA extractable nitrate nitrogen (NO3-N), P, K, Zn, Fe, Mn, and Cu.

RESULTS

Ten backhoe pits were dug in representative locations across the 12 acre study area (see "Soil Survey Map" included with this report). Soils were described at each of the pits, and eight of the ten pits were sampled for laboratory analysis. Sample sites WC1 and WC2 were sampled as part of the one acre study, and samples sites WC4, WC6, WC7, WC8, WC9, and WC10 were sampled as part of the larger 12 acre study. The soil laboratory data is attached to this report. Three soil map units were delineated across the 12 acre study area: (A) Hernandez loam, 1 to 6 percent slopes, (B) Haverdad loam, 2 to 8% slopes, and (C) Strych Variant, shallow to moderately deep, 2 to 6% slopes.

Average elevation of the study area is about 6,100 to 6,155 feet MSL. Average annual precipitation is about 10 to 12 inches (ustic-aridic soil moisture regime). Average annual air temperature is about 47 to 49 degrees F. (mesic soil temperature regime). The average freeze-free period is 110 to 135 days per year (Jansen and Borchert, 1988).

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

Map Unit A: Hernandez loam, 1 to 6% slopes

Hernandez loam was described and sampled at five representative locations (WC1, WC2, WC6, WC7, and WC10). Hernandez was also described but not sampled at WC3. Although there are some differences among the six sites, each soil classifies as the Hernandez series. The Hernandez family, Map Unit 52, was also mapped for the area by NRCS on Sheet 8 of its Soil Survey of Carbon Area, Utah (Jansen and Borchert, 1988).

Hernandez family is a very deep, well drained soil mapped on uplands in the general area. The soil is developing in local alluvium derived dominantly from sandstone and shale. Site vegetation includes Wyoming big sagebrush and mixed grasses. Based on NRCS data, Hernandez has moderate permeability, high available water capacity (9.0 to 10.5 inches), slow runoff, and water supplying capacity of 5.5 to 6.5 inches. Effective rooting depth is 60 inches or more, the organic matter content of the surface layer is generally 1 to 3 percent, and the hazard of wind and water erosion is moderate (Jansen and Borchert, 1988). The Range Site for Hernandez is Semidesert Loam (Wyoming Big Sagebrush).

Hernandez is classified as a "Fine-loamy, mixed, superactive, mesic Ustic Haplocalcid". Hernandez is an established soil series of moderate extent. The most recent NRCS official soil series description, dated October 2002, is on file at Mt. Nebo Scientific. Hernandez sites WC1, WC2, and WC3 were previously described in the one acre study area report, and are also included in the current report.

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

Hernandez Pedon WC1 Site and Profile Description:

Map Unit A; 3% slope, east-southeast aspect; Wyoming big sagebrush and mixed grasses vegetation; local alluvium; fan uplands; no erosion; soil slightly moist to 8 inches; 3 inches of coal fines deposition from the adjacent Wildcat Loadout facility; sampled for laboratory characterization.

Coal Fines – 3 to 0 inches (3 inches thick)

A horizon – 0 to 3 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; moderate medium granular structure; soft dry consistence, very friable moist consistence, slightly sticky and slightly plastic wet consistence; common coarse, medium and many fine and very fine roots to 13 inches; moderately effervescent, slightly alkaline (pH 7.7); gradual smooth boundary.

Bw (cambic) horizon – 3 to 13 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; slightly hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; strongly effervescent, slightly alkaline (pH 7.7); clear wavy boundary.

Bk (calcic) horizon – 13 to 23 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; massive structure; slightly hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; few coarse, medium, fine and very fine roots; violently effervescent, slightly alkaline (pH 7.8); gradual wavy boundary.

Ck horizon – 23 to 60 inches; pale brown (10YR 6/3) clay loam, brown (10YR 5/3) moist; massive structure; very hard dry consistence, firm moist consistence, sticky and slightly plastic wet consistence; strongly effervescent, moderately alkaline (pH 8.2); did not hit bedrock.

Hernandez Pedon WC2 Site and Profile Description:

Map Unit A; 4% slope; east-southeast aspect; Wyoming big sagebrush and mixed grasses vegetation; local alluvium; fan uplands; no erosion; soil slightly moist to 3 inches; 3 inches of coal fines deposition from adjacent Wildcat Loadout facility; sampled for laboratory characterization.

Coal Fines – 3 to 0 inches (3 inches thick)

A horizon – 0 to 3 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; strong, medium platy structure (mechanically compacted); hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; few to common coarse and medium and many fine and very fine roots to 10 inches; strongly effervescent, moderately alkaline (pH 7.8); gradual smooth boundary.

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

Bw (cambic) horizon – 3 to 10 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; moderate medium platy structure (mechanically compacted); hard dry consistence, firm moist consistence, slightly sticky and slightly plastic wet consistence; strongly effervescent, moderately alkaline (pH 7.8); clear wavy boundary.

Bk (calcic) horizon – 10 to 32 inches; very pale brown (10YR 7/3) loam, brown (10YR 5/3) moist; massive structure; extremely hard dry consistence; very firm moist consistence; sticky and slightly plastic wet consistence; few medium, fine, and very fine roots; violently effervescent, moderately alkaline (pH 7.8); gradual wavy boundary.

Ck horizon – 32 to 60 inches; light yellowish brown (10YR 6/4) loam, dark yellowish brown (10YR 4/4) moist; massive structure; very hard dry consistence, firm moist consistence, sticky and slightly plastic wet consistence; violently effervescent, strongly alkaline (pH 8.5); did not hit bedrock.

Hernandez Pedon WC3 Site and Profile Description:

Map Unit A; 3% slope' east-southeast aspect; Wyoming big sagebrush and mixed grasses vegetation; local alluvium; fan uplands; soil slightly moist to 9 inches; no erosion; 3 inches of coal fines deposition from adjacent wildcat Loadout facility; not sampled for laboratory characterization.

Coal Fines – 3 to 0 inches (3 inches thick).

A horizon – 0 to 3 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; moderate medium granular structure; soft dry consistence, very friable moist consistence, slightly sticky and slightly plastic wet consistence; common medium, fine, and very fine and few coarse roots to 9 inches; strongly effervescent; gradual smooth boundary.

Bw horizon – 3 to 9 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; slightly hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; strongly effervescent; clear wavy boundary.

Bk1 horizon – 9 to 18 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; massive structure parting to moderate medium subangular blocky; slightly hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; commmon fine and very fine and few coarse and medium roots; strongly effervescent; gradual wavy boundary.

Bk2 horizon – 18 to 32 inches; very pale brown (10YR 7/3) loam, brown (10YR 5/3)

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

moist; massive structure; very hard dry consistence, firm moist consistence, sticky and slightly plastic wet consistence; few medium, fine, and very fine roots; violently effervescent; gradual wavy boundary.

Ck horizon – 32 to 52 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; massive structure; very hard dry consistence, very firm moist consistence, sticky and slightly plastic wet consistence; violently effervescent; gradual wavy boundary.

C horizon – 52 to 64 inches; brown (10YR 5/3) loam, dark brown (10YR 4/3) moist; massive structure; hard dry consistence, firm moist consistence, slightly sticky and slightly plastic wet consistence; did not hit bedrock.

Hernandez Pedon WC6 Site and Profile Description:

Map Unit A; 4% slope; east aspect; mixed grasses, dead Wyoming big sagebrush vegetation; local alluvium; fan uplands; no erosion; soil slightly moist to 18 inches at time of sampling, 3-12-03; 3 inches of coal fines deposition from adjacent wildcat loadout facility; sampled for laboratory characterization.

Coal fines – 3 to 0 inches (3 inches thick)

A horizon- 0 to 3.5 inches; brown (10YR 5/3) clay loam, brown (10YR 4/3) moist; weak medium granular structure; soft dry consistence, very friable moist , slightly sticky and slightly plastic wet consistence; common medium, fine, very fine, and few coarse roots to 13 inches; moderately effervescent, moderately alkaline (pH 7.9); gradual smooth boundary.

Bw horizon – 3.5 to 13 inches; yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 4/40 moist; moderate medium subangular blocky structure; slightly hard dry consistence, friable moist consistence, sticky and slightly plastic wet consistence; moderately effervescent, slightly alkaline (pH 7.8); gradual wavy boundary.

Bk horizon – 13 to 25 inches; light yellowish brown (10YR 6/4) loam, yellowish brown (10YR 5/4) moist; massive structure; hard dry consistence, friable moist consistence; slightly sticky and slightly plastic wet consistence; common fine and very fine, and few coarse and medium roots 13 to 18 inches, few coarse, medium, fine, and very fine roots 18 to 25 inches; strongly effervescent, moderately alkaline (pH 8.0); gradual wavy boundary.

Ck horizon – 25 to 38 inches; light yellowish brown (10YR 6/4) loam, yellowish brown (10YR 5/4) moist; massive structure; very hard to extremely hard dry consistence; firm moist consistence, sticky and slightly plastic wet consistence; strongly effervescent, moderately alkaline (pH 8.4); gradual wavy boundary.

C horizon – 38 to 64 inches; yellowish brown (10YR 5/4) clay loam, dark yellowish

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

brown (10YR 4/4) moist; massive structure; hard dry consistence, firm moist consistence, sticky and slightly plastic wet consistence; moderately effervescent, strongly alkaline (pH 8.5); did not hit bedrock.

Hernandez Pedon WC7 Site and Profile Description:

Map Unit A; 4% slope; east aspect; Wyoming big sagebrush and mixed grasses vegetation; local alluvium; fan uplands; no erosion; soil slightly moist to10 inches at time of sampling, 3-13-03; 2 inches of coal fines deposition from adjacent Wildcat Loadout facility; sampled for laboratory characterization.

Coal Fines – 2 to 0 inches (2 inches thick)

A horizon – 0 to 3 inches; brown (10YR 5/3) loam with some areas with coal fines mixed in, brown (10YR 4/3) moist; weak medium granular structure; soft dry consistence, very friable moist consistence, sticky and slightly plastic wet consistence; many fine and very fine, and few coarse and medium roots to 10 inches; moderately effervescent, moderately alkaline (pH 7.9); gradual smooth boundary.

Bw horizon – 3 to 10 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; slightly hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; moderate to strongly effervescent, slightly alkaline (pH 7.8); gradual wavy boundary.

Bk1 horizon – 10 to 22 inches; very pale brown (10YR 7/3) clay loam, brown (10YR 5/3) moist; massive structure; hard-very hard dry consistence, firm moist consistence, sticky and slightly plastic wet consistence; common fine and very fine, and few medium and coarse roots 10 to 22 inches; strongly effervescent, moderately alkaline (pH 7.9); common krotovinas from 10 to 38 inches; gradual wavy boundary.

Bk2 horizon – 22 to 38 inches; very pale brown (10YR 7/3) clay loam, brown (10YR 5/3) moist; massive structure; extremely hard dry consistence, very firm moist consistence, slightly sticky and nonplastic wet consistence; few fine and very fine roots 22 to 38 inches; violently effervescent, moderately alkaline (pH 8.3); gradual wavy boundary.

C horizon – 38 to 56 inches; light yellowish brown (10YR 6/4) loam, yellowish brown (10YR 5/4) moist; massive structure; hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; strongly effervescent, strongly alkaline (pH 8.6); did not hit bedrock.

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

Hernandez Pedon WC10 Site and Profile Description:

Map Unit A; 6% slope; east aspect; rabbitbrush and mixed grasses vegetation; local alluvium; fan uplands; no erosion; soil slightly moist to 12 inches at time of sampling, 3-13-03; 1.5 inches of coal fines deposition from the adjacent Wildcat Loadout facility; sampled for laboratory characterization; sample site is just outside of the 12 acre study area but in an area for a future sedimentation pond.

Coal Fines – 1.5 to 0 inches (1.5 inches thick)

A horizon - 0 to 3 inches; light yellowish brown (10YR 6/4) loam, yellowish brown (10YR 5/4) loam, weak medium granular structure; soft dry consistence, very friable moist consistence, slightly sticky and slightly plastic wet consistence; common few and very few, and few coarse and medium roots to 12 inches; strongly effervescent, moderately alkaline (pH 8.0); gradual smooth boundary.

Bw horizon – 3 to 12 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; slightly hard dry consistence; friable moist consistence, slightly sticky and slightly plastic wet consistence; strongly effervescent, moderately alkaline (pH 8.0); gradual wavy boundary.

Bky horizon – 12 to 30 inches; very pale brown (10YR 7/4) clay loam, light yellowish brown (10YR 6/4) moist; massive structure; very hard dry consistence, firm moist consistence, sticky and plastic wet consistence; few medium, fine, and very fine roots 12 to 24 inches; violently effervescent, moderately alkaline (pH 8.0); gradual wavy boundary.

C horizon – 30 to 62 inches; light yellowish brown (10YR 6/4) loam/sandy loam, pale brown (10YR 6/3) moist; massive structure; hard dry consistence, firm moist consistence, slightly sticky and slightly plastic wet consistence; strongly effervescent, moderately alkaline (pH 8.0); did not hit bedrock.

Hernandez Range of Characteristics:

The described and sampled pedons WC-1, WC-2, WC-3, WC-6, WC-7, and WC-10 are typical of Hernandez, and are within the range of characteristics for the Hernandez official soil series description (NRCS, October 2002).

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

Hernandez Soil Suitability and Salvage Depth Recommendation:

Initial One-Acre Study Area

Based on an evaluation of the field and laboratory data (see Appendix), the Hernandez soil is entirely suitable throughout its profile depth to 54 inches or more. Soil textures are good with loam dominating the upper profile, and loam to clay loam in the lower profile. Soil salinity is low with electrical conductivity (EC) values less than 1 in the upper profile and 2 to 3 in the lower profile. Sodium Adsorption Ratio (SAR) is low throughout the profile with values less than 1 for all samples except the 32 to 54 inch depth interval of WC-2 (SAR=6.5). Soil reaction (pH) is slightly to moderately alkaline with values in the high 7's and low 8's (range of pH 7.7 to 8.5). Calcium carbonate content ranges from 9.7 to 18.7 percent and averages 13.9 percent across all samples. Organic matter content is somewhat high in the upper profile (2.8 to 3.6 percent) and generally low in the lower profile (0.5 to 0.9 percent).

If needed, the entire profile to 54 inches or more could be salvaged for use in reclamation activities. The better soil material is in the approximate upper 24 inches. Soil texture is loam and organic matter content is somewhat high in this upper 2 feet. EC and SAR values are low. Soil texture is good and the soil material can be easily handled. If a more limited amount of soil material is needed, the upper 24 inches can be salvaged as Topsoil. Additional underlying material could be salvaged, as needed, for use as Subsoil.

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

Larger Eleven-Acre Study Area

Soil description and sample sites WC6, WC7, and WC10 were evaluated for suitability and salvage depth recommendation for the remaining 11 acre study area. WC10 is located in a proposed sedimentation pond area just outside the 11 acre study area but was included in the evaluation of Hernandez. The upper 25 inches of WC6 is good rated. The depth between 25 and 38 inches is good rated except both EC (5.5) and SAR (9.1) are fair rated. The lower zone between 38 and 64 inches has poor EC (10.1) and unacceptable SAR (16.7). The upper 38 inches of WC7 is good rated; between 38 and 56 inches is good rated except for fair rated SAR (6.8). The upper 12 inches of WC10 is good rated; between 12 and 30 inches has fair to poor EC (8.5) and fair SAR (8.4). Both EC (12) and SAR (10.4) are poor rated for the zone between 30 and 62 inches. For laboratory reports, refer to the Appendix of this document.

Given that WC10 is located outside the 11 acre study area, it is recommended that the upper 38 inches of Map Unit A be salvaged as Topsoil. The underlying material has good to poor rated EC and fair to unacceptable SAR. If additional material is needed and can be somewhat mixed during salvage, it is possible to salvage this lower material between 38 and about 62 inches as Subsoil.

Map Unit B: Haverdad loam, 2 to 8% slopes

Haverdad loam was described and sampled at two representative locations, WC4 and WC8. Haverdad loam was previously mapped by NRCS as a soil inclusion along drainageways in Map

INCORPORATED
MAY 17 2006
Div. of Oil, Gas & Mining

Unit 52 of the Soil Survey of Carbon Area, Utah (Jansen and Borchert, 1988). Haverdad loam is a very deep, well drained soil mapped in small upland drainageways in the general area. The soil is developing in local alluvium derived dominantly from sandstone and shale. Site vegetation includes mixed grasses, sagebrush, and occasional scattered greasewood.

Permeability of Haverdad is moderate. Available water capacity is about 10 inches. Effective rooting depth is 40 inches or more. Runoff is slow, and the hazard of wind and water erosion is moderate (Jansen and Borchert, 1988). The Range Site for Borchert is Semidesert Loam (Wyoming Big Sagebrush).

Haverdad is classified as a "Fine-loamy, mixed, superactive, calcareous, mesic Ustic Torrifluvent". Haverdad is an established soil series of moderate extent. The most recent NRCS official soil series description, dated June 2002, is on file at Mt. Nebo Scientific. Haverdad site and profile descriptions for WC4 and WC8 follow.

Haverdad Pedon WC4 Site and Profile Description:

Map Unit B; 3% slope; east aspect; mixed grasses and few scattered greasewood vegetation; fine-loamy local alluvium with <1% coarse fragments; small fan on side of small upland drainage; no erosion; soil slightly moist to 14 inches at time of sampling, 3-12-03; 3 inches of coal fines deposition from adjacent Wildcat Loadout facility; sampled for laboratory characterization.

Coal Fines – 3 to 0 inches (3 inches thick)

A horizon – 0 to 4 inches; yellowish brown (10YR 5/6) loam, dark yellowish brown (10YR 4/6) moist; moderate medium granular structure; slightly hard dry consistence,

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

friable moist consistence, slightly sticky and slightly plastic wet consistence; many medium, fine, and very fine, and few coarse roots to 14 inches; strongly effervescent, moderately alkaline (pH 8.3); gradual smooth boundary.

Bw horizon – 4 to 14 inches; light yellowish brown (10YR 6/4) loam, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; slightly hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; strongly effervescent, strongly alkaline (pH 8.5); gradual wavy boundary.

Bk horizon – 14 to 28 inches; light yellowish brown (10YR 6/4) loam, brown (10YR 4/3) moist; massive structure; hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; common fine and very fine and few medium roots; strongly effervescent, moderately alkaline (pH 8.3); gradual wavy boundary.

C horizon – 28 to 58 inches; yellowish brown (10YR 5/4) loam to sandy loam, brown (10YR 4/3) moist; massive structure; slightly hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; few fine and very fine roots 28 to 44 inches; strongly effervescent, moderately alkaline (pH 8.0); gradual wavy boundary.

2C "red" horizon – 58 to 70+ inches; brown (7.5YR 5/4) gravelly loam, dark brown (7.5YR 4/4) moist; massive structure; slightly hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; slightly effervescent; this horizon not sampled.

Haverdad Pedon WC8 Site and Profile Description:

Map Unit B; 2% slope; east aspect; big sagebrush and mixed grasses (mostly dead) vegetation; fine-loamy local alluvium with < 2% sandstone gravels; small upland drainage; no erosion; 3 inches of coal fines deposition from adjacent Wildcat Loadout facility; soil slightly moist to 26 inches at time of sampling, 3-13-03; sampled for laboratory characterization.

Coal Fines – 3 to 0 inches (3 inches thick)

A horizon – 0 to 4 inches; light yellowish brown (10YR 6/4) loam, dark yellowish brown (10YR 4/4) moist; weak medium platy structure; soft dry consistence, very friable moist consistence, slightly sticky and slightly plastic wet consistence; common coarse, medium, fine, and very fine roots to 12 inches; moderately effervescent, slightly alkaline (pH 7.7); gradual smooth boundary.

Bw horizon – 4 to 12 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; slightly hard dry consistence, very friable moist consistence, slightly sticky and slightly plastic wet

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

consistence; moderately effervescent, slightly alkaline (pH 7.8); gradual wavy boundary.

Bk horizon – 12 to 26 inches; light yellowish brown (10YR 6/4) loam, brown (10YR 4/3) moist; massive structure; hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; common fine and very fine, and few coarse and medium roots; strongly effervescent, slightly alkaline (pH 7.8); gradual wavy boundary.

Ck horizon – 26 to 38 inches; light yellowish brown (10YR 6/4) loam, yellowish brown (10YR 5/4) moist; massive structure; hard dry consistence, firm moist consistence, slightly sticky and slightly plastic wet consistence; few coarse, medium, fine, and very fine roots; krotovinas present; moderately effervescent, moderately alkaline (pH 7.9); gradual wavy boundary.

C horizon – 38 to 64 inches; yellowish brown (10YR 5/4) loam-sandy loam, brown (10YR 4/3) moist; massive structure; hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; moderately effervescent, moderately alkaline (pH 7.9); did not hit bedrock.

Haverdad Range of Characteristics:

The described and sampled pedons WC4 and WC8 are typical of Haverdad and are within the range of characteristics for the Haverdad official soil series description (NRCS, June 2002).

Haverdad Soil Suitability and Salvage Depth Recommendations:

Based on an evaluation of the field and laboratory data (see Appendix), Haverdad loam is entirely suitable throughout its profile depth to 54 inches or more. Soil textures are good with loam dominating the upper profile to about 38 inches, and loam to sandy loam to gravelly loam present in the lower substratum. Soil salinity is low with electrical conductivity (EC) values about 0.5 to 2 in the upper profile, and about 0.5 to 4 in the lower "C" horizon. Sodium Adsorption Ratio (SAR) is generally less than 1.0 but can range up to about 4.5 to 6.0 below 14 inches in some

INCORPORATED

MAY 17 2003

Oil, Gas & Mining

pedons. Soil reaction (pH) is slightly to strongly alkaline with values between 7.7 and 8.5. Calcium carbonate content ranges from about 6 to 11 percent. Organic matter content ranges from about 1.2 to 1.9 percent in the surface layer, to about 0.9 to 1.5 percent at depth in the profile.

If needed, the entire profile to 54 inches or more could be salvaged for use in reclamation activities. The better soil material is in the approximate upper 28 inches. Soil texture is loam and organic matter is about 1 to almost 2 percent. EC and SAR are generally low. Soil texture is good and the soil material can be easily handled. If a more limited amount of soil material is needed, the upper 28 inches can be salvaged as Topsoil. Additional underlying material could be salvaged, as needed, for use as Subsoil.

Map Unit C: Strych Variant, shallow to moderately deep, 2 to 6% slopes

Strych Variant was described and sampled at two representative locations (WC5 and WC9). Strych (deep) was previously mapped in the area as a 10% soil inclusion in NRCS Map Unit 52 (Jansen and Borchert, 1988). Although the official Strych soil series is deep to very deep, the site-specific Strych Variant soil on the Wildcat study area is shallow to moderately deep (10 inches to slightly greater than 20 inches to sandstone bedrock). Strych Variant is developing in thin slopewash alluvium and residuum from calcareous sandstone. Vegetation is open, scattered Pinyon-Juniper woodland with a mixed grass understory.

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

Strych Variant is shallow to moderately deep and well drained. Strych Variant typically has a pale brown to yellowish brown gravelly to very gravelly loam surface layer about 3 inches thick. The "Bw" cambic upper subsoil layer is a pale brown to light yellowish brown gravelly to very gravelly loam to a depth of about 8 or 9 inches. The underlying "Bk" calcic horizon is a pale to very pale brown very to extremely gravelly loam to sandy loam to a depth of about 15 or 16 inches. The substratum is a mixture of "C" horizon and paralithic "Cr" extremely gravelly loam to bedrock encountered at about 20 to 23 inches in depth.

Strych Variant has moderately rapid permeability, low available water capacity, and an effective rooting depth equal to the depth to bedrock. The organic matter content of the surface layer is about 1 to 3 percent. Runoff is medium, and the water erosion hazard is moderate. The Range Site is Semidesert Bouldery Loam (Jansen and Borchert, 1988). Strych Variant is classified as a "Loamy-skeletal, mixed, superactive, mesic, shallow Ustic Haplocalcid". The most recent NRCS official soil series description for Strych, dated October 2002, is on file at Mt. Nebo Scientific.

Strych Variant Pedon WC5 Site and Profile Description:

Map Unit C; 8% slope; south aspect; Pinyon-Juniper and scattered mixed grasses vegetation; thin residuum from sandstone; upland low ridge; slight erosion; 2 inches of coal fines deposition from adjacent Wildcat Loadout facility; soil slightly moist at time of sampling, 3-12-03; not sampled for laboratory analysis.

Coal Fines – 2 to 0 inches (2 inches thick, varies up to 6 inches thick)

A horizon – 0 to 3 inches; pale brown (10YR 6/3) gravelly loam with about 20% sandstone gravels, brown (10YR 5/3) moist; moderate medium granular structure; soft dry consistence, very friable moist consistence, slightly sticky and slightly plastic wet

INCORPORATED

MAY 17 2003

Div. of Oil, Gas & Mining

consistence; many fine and very fine, common medium and coarse roots to 8 inches; strongly effervescent; gradual smooth boundary.

Bw horizon – 3 to 8 inches; pale brown (10YR 6/3) gravelly loam with about 25% sandstone gravels, brown (10YR 4/3) moist; moderate fine subangular blocky structure; slightly hard dry consistence; friable moist consistence, slightly sticky and slightly plastic wet consistence; strongly effervescent; gradual wavy boundary.

Bk horizon – 8 to 15 inches; very pale brown (10YR 7/30 very gravelly silt loam to light silty clay loam with about 45% sandstone gravels; massive structure; very hard dry consistence, firm moist consistence, sticky and slightly plastic wet consistence; few coarse, medium, fine, and very fine roots; violently effervescent; gradual wavy boundary.

C/Cr mixed horizon (weathered, fractured sandstone with calcium carbonate and soil fines in cracks and beneath rock fragments) – 15 to 20 inches; pale brown (10YR 6/3) extremely gravelly loam with about 65% sandstone gravels, brown (10YR 5/3) moist; massive structure; very hard dry consistence, firm moist consistence, slightly sticky and slightly plastic wet consistence; few roots in cracks and beneath rock fragments; violently effervescent.

Strych Variant Pedon WC9 Site and Profile Description:

Map Unit C; 8% slope; south aspect; Pinyon-Juniper and mixed grasses vegetation; thin eolian over thin residuum from sandstone; low weathered ridge; slight erosion; 1 inch of coal fines deposition from adjacent Wildcat Loadout facility; soil slightly moist to 9 inches at time of sampling, 3-12-03; sampled for laboratory analysis.

Coal Fines – 1 to 0 inches (1 inch thick)

A horizon – 0 to 3 inches; yellowish brown (10YR 5/4) very gravelly loam with about 25% gravel size sandstone chips, dark yellowish brown (10YR 4/4) moist; weak medium granular structure; slightly hard dry consistence, friable moist consistence; slightly sticky and slightly plastic wet consistence; many medium, fine, and very fine roots to 9 inches; strongly effervescent, slightly alkaline (pH 7/6); clear smooth boundary.

Bw horizon – 3 to 9 inches; light yellowish brown (10YR 6/4) very gravelly loam with about 55% gravel size sandstone chips, brown (10YR 5/3) moist; moderate medium subangular blocky structure; slightly hard-hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; strongly effervescent, slightly alkaline (pH 7.5); gradual wavy boundary.

Bk horizon – 9 to 16 inches; pale brown (10YR 6/3) extremely gravelly loam-sandy loam with about 75% gravel size sandstone chips, brown (10YR 5/3) moist; massive structure; hard-very hard dry consistence, friable moist consistence, slightly sticky and slightly plastic

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

wet consistence; common to few medium, fine and very fine roots; violently effervescent, slightly alkaline (pH 7.8); gradual wavy boundary.

C/Cr mixed horizon (weathered, fractured sandstone with calcium carbonate and soil fines in cracks and beneath rock fragments) – 16 to 23 inches; pale brown (10YR 6/3) extremely gravelly sandy loam with over 75% gravel and cobble size sandstone chips, brown (10YR 5/3) moist; massive structure; very hard dry consistence, firm moist consistence, slightly sticky and slightly plastic wet consistence; few roots in cracks and beneath rock fragments; violently effervescent; horizon not sampled for laboratory analysis.

Strych Variant Range of Characteristics:

Depth to the weathered sandstone contact ranges from about 15 to16 inches. Coarse fragment content ranges from 20 to 25% for the surface layer, from 25 to 55% for the upper subsoil layer (Bw), from 45 to 75% for the lower subsoil layer (Bk), and over 65% for the weathered substratum. Reaction (pH) is typically slightly alkaline (pH from 7.5 to 7.8). Soil fines are typically loam to sandy loam.

Strych Variant Soil Suitability and Salvage Depth Recommendation:

Strych Variant is entirely suitable for salvage. EC and SAR are very low, organic matter content ranges from 2.6% in the surface layer, to 2.3% in the upper subsoil, to 0.9% in the lower subsoil. Calcium carbonate content is fair rated with values ranging from 21 to 27 percent. Soil texture (fines) are loam to sandy loam. Coarse fragment content can be moderate to very high. The upper 12 inches can be salvaged as Topsoil, with the underlying material left in place to aid reclamation after mining activities are completed. For laboratory reports, refer to the Appendix

INCORPORATED
MAY 17 2005
Div. of Oil, Gas & Mining

of this document.

Map Unit DL: Disturbed Land

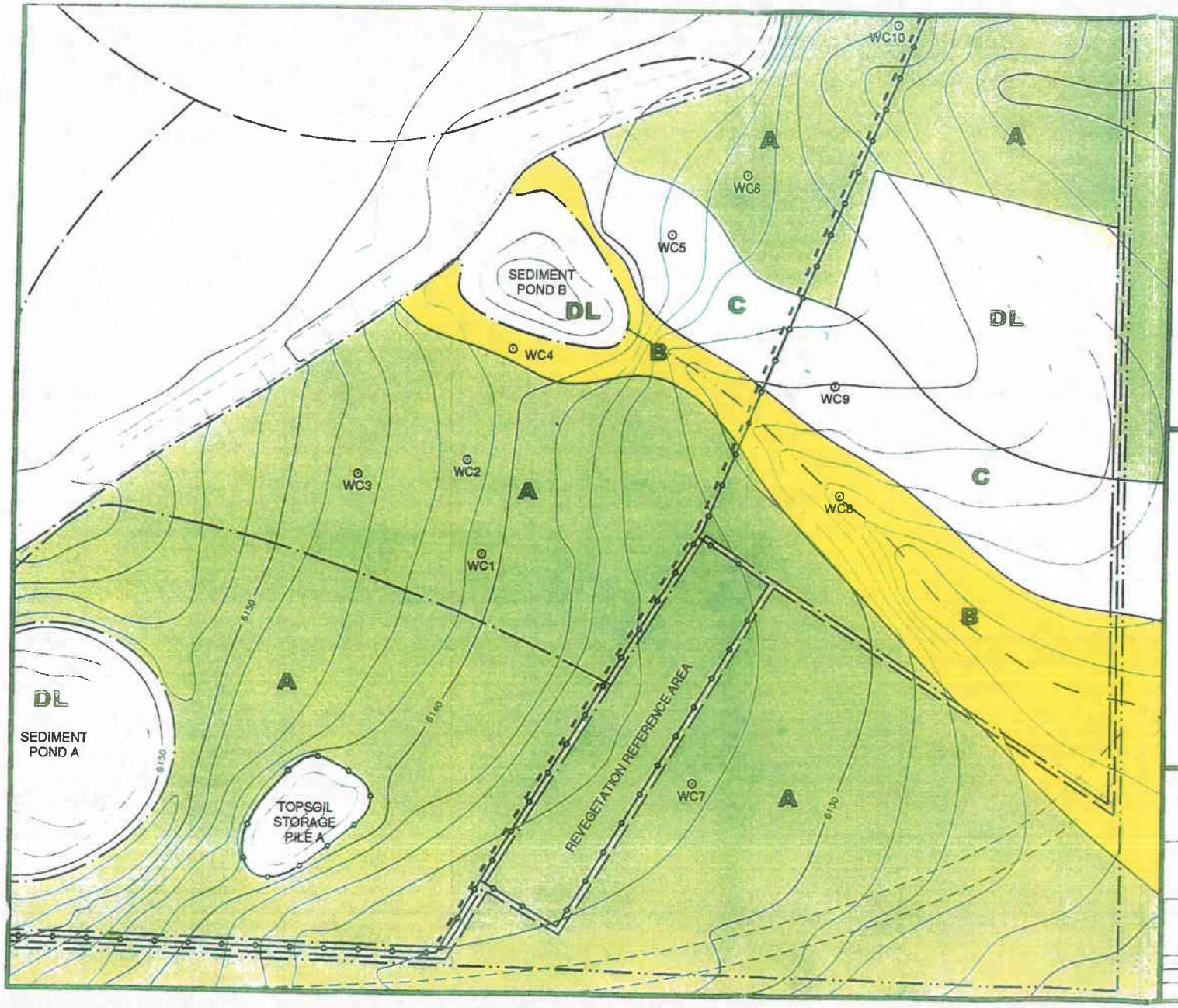
One sedimentation pond is present in the study area, and it is mapped as Disturbed Land. It is immediately adjacent to the current Wildcat Loadout facility. Soil salvage was not evaluated and is not recommended due to the amount of coal fines deposition in the pond. In addition, there is another Disturbed Land delineation in the study area – a recent oil and gas drilling pad. This bladed and highly compacted pad area is in the south-central to south-east portion of the study area, and has no soil available for salvage. It appears that topsoil was not salvaged during the construction of the pad because no soil stockpile was evident near the pad during the current soil survey.

REFERENCES

Jansen, Earl H. and James W. Borchert. 1988. Soil Survey of Carbon Area, Utah. USDA-Soil Conservation Service (now NRCS).

State of Utah, Division of Oil, Gas & Mining. 2002. Guidelines for Management of Topsoil and Overburden (*Draft*). Revised by Priscilla Burton and Robert Davidson. Department of Natural Resources, Salt Lake City, UT.

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining



LEGEND

- A — MAP UNIT A HERNANDEZ LOAM, 1 TO 6% SLOPES
- B — MAP UNIT B HAVERDAD LOAM, 2 TO 8% SLOPES
- C — MAP UNIT C STRYCH VARIANT, SHALLOW TO MODERATELY DEEP, 2 TO 6% SLOPES
- DL — MAP UNIT D DISTURBED LAND
- ⊙ — SOIL SAMPLE LOCATIONS

SOIL SURVEY MAP

12 ACRE STUDY AREA

ANDALEX RESOURCES, INC.
WILDCAT LOADOUT

MT NEBO SCIENTIFIC, INC
RESEARCH & CONSULTING

FIELD MAPPED [illegible]	CHECKED [illegible]
DRAWN [illegible]	DATE [illegible]
FILE [illegible]	

APPENDIX
(Laboratory Data)

INCORPORATED

MAY 17 2006

Div. of Oil, Gas & Mining

Soil and Plant Analysis Lab
255 WIDB
Brigham Young University
Provo, Utah 84602
801-378-2147

Name: Rick Collins/Mt. Nebo
Address: P.O. Box 337
City, ST, ZIP: Springville, UT 84663
Date: 3/14/03

SOIL ID: Wildcat

Customer Sample ID	ppm P	ppm NO3-N	%OM	pH	EC dS\M	%Sand	%Clay
Wildcat 1 East 0-13"	4.52	4.39	2.79	7.68	0.65	43.84	24.72
Wildcat 1 East 13-23"	0.03	5.32	0.56	7.83	0.58	47.84	16.72
Wildcat 1 East 23-54"	1.51	2.07	0.67	8.18	2.00	26.56	29.72
Wildcat 2 North 0-12"	3.77	4.13	3.64	7.81	0.62	38.56	24.72
Wildcat 2 North 12-32"	0.79	2.67	0.90	7.83	0.60	32.20	25.72
Wildcat 2 North 32-54"	4.99	1.23	0.48	8.46	3.00	32.56	23.72

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

Soil and Plant Analysis Lab
255 WIDB
Brigham Young University
Provo, Utah 84602
801-378-2147

Name: Rick Collins/Mt. Nebo
Address: P.O. Box 337
City, ST, ZIP: Springville, UT 8466:
Date: 3/14/03

SOIL ID: Wildcat

Customer Sample ID	%Silt	ppm Ca-SAR	ppm Mg-SAR	ppm K-SAR	ppm Na-SAR	SAR
Wildcat 1 East 0-13"	31.44	129.20	29.44	40.65	13.51	0.28
Wildcat 1 East 13-23"	35.44	97.56	36.75	6.90	17.34	0.38
Wildcat 1 East 23-54"	43.72	49.15	142.00	6.10	60.82	0.99
Wildcat 2 North 0-12"	36.72	115.10	21.62	10.87	16.31	0.36
Wildcat 2 North 12-32"	42.08	92.96	30.80	9.29	21.07	0.48
Wildcat 2 North 32-54"	43.72	32.78	220.40	22.23	469.70	6.46

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

Soil and Plant Analysis Lab
255 WIDB
Brigham Young University
Provo, Utah 84602
801-378-2147

Name: Rick Collins/Mt. Nebo
Address: P.O. Box 337
City, ST, ZIP: Springville, UT 8466
Date: 3/14/03

SOIL ID: Wildcat

Customer Sample ID	%Moisture Sat.	%CaCO3	ppm HCO3
Wildcat 1 East 0-13"	35.17	9.66	270.25
Wildcat 1 East 13-23"	33.50	18.68	181.90
Wildcat 1 East 23-54"	39.56	15.55	161.11
Wildcat 2 North 0-12"	36.60	10.77	187.10
Wildcat 2 North 12-32"	37.29	13.75	174.11
Wildcat 2 North 32-54"	34.70	15.11	166.31

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

Mr Patrick Collins/Mt Nebo Scientific Inc
330 East 400 South Suite 6
P O Box 337
Springville UT 84663

FAX 375-0372

Copy to [redacted]es Nyenhuis, Certified Soil Scientist

Colorado State University
Soil, Water and Plant Testing Laboratory
Natural & Environmental Sciences Bldg - A319
Fort Collins, CO 80523-1120

(970) 491-5061 FAX: 491-2930

DATE RECEIVED: 03-17-2003
DATE REPORTED: 04-15-2003

BILLING: S B19592

RESEARCH SOIL ANALYSIS

ANDALEX RESOURCES, WILDCAT LOADOUT, HELPER, UTAH

Lab #	Sample ID #	paste pH	paste EC mmhos/cm	% saturation	Lime Estimate	% OM	AB-DTPA Extract ppm NO_3-N	P	K	Zn	Fe	Mn	Cu
R3518	WC4 0-4	8.3	0.9	37.2	High	1.2	1.4	5.2	176	<0.01	4.49	1.05	0.63
R3519	WC4 4-14	8.5	0.7	36.7	High	1.0	1.5	4.5	147	<0.01	3.52	0.83	0.57
R3520	WC4 14-28	8.3	1.7	33.4	High	1.0	1.2	2.6	141	<0.01	4.11	0.72	0.87
R3521	WC4 28-58	8.0	4.2	36.2	High	0.9	0.9	3.4	117	<0.01	2.52	0.56	0.71
R3522	WC6 0-3½	7.9	0.6	36.4	High	2.1	3.0	11.0	360	0.16	4.06	2.10	1.50
R3523	WC6 3½-13	7.8	0.5	41.3	High	1.6	3.2	0.5	192	<0.01	3.81	0.97	0.93
R3524	WC6 13-25	8.0	0.5	37.7	High	1.2	2.3	0.5	84.9	<0.01	6.19	0.97	0.95
R3525	WC6 25-38	8.4	5.5	39.8	High	1.2	1.4	1.4	97.9	<0.01	7.03	0.83	0.77
R3526	WC6 38-64	8.5	10.1	45.6	High	1.7	1.6	4.5	174	0.07	6.12	0.77	1.14
R3527	WC7 0-3	7.9	0.5	35.1	High	2.6	1.8	7.5	274	0.29	4.62	1.78	1.54
R3528	WC7 3-10	7.8	0.5	36.5	High	2.1	2.2	0.5	273	0.05	4.27	0.95	1.29
R3529	WC7 10-22	7.9	0.4	41.1	High	1.9	3.0	0.4	103	<0.01	4.72	1.03	1.14
R3530	WC7 22-38	8.3	1.7	47.2	High	1.8	1.7	1.4	116	<0.01	4.77	1.10	0.91
R3531	WC7 38-56	8.6	2.4	36.5	High	1.2	1.4	4.0	106	<0.01	4.42	0.77	0.64
R3532	WC8 0-12	7.7	0.9	36.1	High	1.9	18.9	3.3	207	0.23	4.34	1.14	1.44
R3533	WC8 12-26	7.8	0.6	37.1	High	1.7	7.5	0.5	159	<0.01	3.51	0.74	0.93
R3534	WC8 26-54	7.9	0.4	33.5	High	1.5	2.6	0.6	81.5	<0.01	4.68	0.81	1.06
R3535	WC9 0-3	7.6	0.6	42.5	High	2.6	6.1	2.5	171	0.18	6.91	1.80	1.38
R3536	WC9 3-9	7.5	1.0	45.9	High	2.3	11.5	0.6	104	<0.01	5.51	1.28	1.04
R3537	WC9 9-16	7.8	0.5	43.4	High	0.9	6.1	0.6	55.3	0.01	3.18	0.86	1.03
R3538	WC10 0-12	8.0	1.7	38.1	High	1.5	1.2	1.7	91.5	<0.01	4.36	0.72	0.64
R3539	WC10 12-30	8.0	8.5	42.5	High	1.9	0.9	4.4	115	0.04	5.14	0.81	0.63
R3540	WC10 30-62	8.0	12.0	35.0	High	1.2	0.9	3.8	84.7	0.08	2.49	0.67	0.35

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

Mr Patrick Collins/Mt Nebo Scientific Inc
330 East 400 South Suite 6
P O Box 337
Springville UT 84663

Copy to [illegible]es Nyenhuis, Certified Soil Scientist

Colorado State University
Soil, Water and Plant Testing Laboratory
Natural & Environmental Sciences Bldg - A319
Fort Collins, CO 80523-1120

(970) 491-5061 FAX: 491-2930

DATE RECEIVED: 03-17-2003
DATE REPORTED: 04-15-2003

BILLING: S B19592

RESEARCH SOIL ANALYSIS

ANDALEX RESOURCES, WILDCAT LOADOUT, HELPER, UTAH

Lab #	Sample ID #	% Sand	% Silt	% Clay	Texture	% very fine sand from hydrometer	% $CaCO_3$ equiv	meq/L Ca	meq/L Mg	meq/L Na	meq/L K	SAR
R3518	WC4 0-4	42	35	23	Loam	38	11.8	2.0	6.8	2.2	0.6	1.0
R3519	WC4 4-14	42	38	20	Loam	42	12.8	0.9	5.9	1.4	0.6	0.7
R3520	WC4 14-28	40	40	20	Loam	38	13.6	2.7	5.4	11.3	0.6	5.6
R3521	WC4 28-58	48	36	16	Loam/Sandy Loam	46	11.3	15.4	17.9	18.8	<0.1	4.6
R3522	WC6 0-3½	36	36	28	Clay Loam	31	10.5	3.5	1.5	1.7	0.9	1.1
R3523	WC6 3½-13	30	40	30	Clay Loam	30	14.2	2.9	1.4	0.8	0.4	0.5
R3524	WC6 13-25	38	39	23	Loam	38	11.6	1.8	2.3	1.3	0.2	0.9
R3525	WC6 25-38	38	41	21	Loam	38	11.8	4.1	21.5	32.5	0.1	9.1
R3526	WC6 38-64	28	40	32	Clay Loam	24	11.8	4.8	29.8	69.3	0.2	16.7
R3527	WC7 0-3	40	34	26	Loam	38	6.40	3.8	1.2	0.7	0.3	0.5
R3528	WC7 3-10	38	46	16	Loam	38	7.10	2.9	1.1	0.7	0.4	0.5
R3529	WC7 10-22	30	42	28	Clay Loam	29	14.2	1.6	1.7	0.8	0.1	0.6
R3530	WC7 22-38	21	48	31	Clay Loam	18	16.6	1.8	9.4	6.8	0.2	2.9
R3531	WC7 38-56	40	41	19	Loam	40	12.3	1.0	8.6	14.9	0.5	6.8
R3532	WC8 0-12	36	45	19	Loam	36	6.17	6.3	1.6	0.5	0.2	0.3
R3533	WC8 12-26	39	39	22	Loam	39	9.43	3.4	1.1	0.7	0.3	0.4
R3534	WC8 26-54	42	39	19	Loam	42	8.15	1.7	1.2	0.7	0.1	0.6
R3535	WC9 0-3	48	29	23	Loam	37	27.1	3.6	1.1	0.5	0.3	0.3
R3536	WC9 3-9	49	30	21	Loam	47	21.7	4.5	2.0	0.5	1.6	0.3
R3537	WC9 9-16	52	30	18	Loam/Sandy Loam	51	21.8	2.8	1.4	0.4	0.1	0.3
R3538	WC10 0-12	34	44	22	Loam	33	14.4	7.2	7.8	1.3	<0.1	0.5
R3539	WC10 12-30	22	50	28	Clay Loam	17	10.7	17.4	25.7	38.9	<0.1	8.4
R3540	WC10 30-62	43	39	18	Loam/Sandy Loam	43	8.04	18.0	28.6	50.4	<0.1	10.4

APPROVED
TITLE Extension Soil Testing Specialist

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

APPENDIX P

RESPONSE TO DIVISION ORDER DO-04 (WIND-BLOWN FINES)

APPENDIX P

RESPONSE TO DIVISION ORDER DO-04

WIND-BLOWN FINES ACCUMULATIONS

CONTENTS:

1) NARRATIVE
2) FIGURE 1, COAL FINES ACCUMULATION MAP
3) FIGURE 2, CLEANUP PROJECT AREA
4) FIGURE 3, INTERIM SEED MIX
5) FIGURE 4, SEDIMENT POND G DESIGN DETAIL
5) EXHIBIT 5, SOILS REPORT, JAMES NYENHUIS

APPENDIX P

RESPONSE TO DIVISION ORDER DO-04

WIND-BLOWN FINES ACCUMULATIONS

In 2004, the Division issued an Order DO-04 for wind-blown fines which had accumulated outside the disturbed area, primarily in the area southwest of the main coal storage pile below sediment Pond B. The primary source of these coal-fines is from proximity to the main coal storage pile, and from truck traffic on the perimeter road between the coal storage area and existing Sediment Pond B. The accumulation area is directly down-wind and down-gradient from these sources, and over the past 30 years of operations has experienced an obvious accumulation of coal fines. Although the coal-fines accumulation is generally contained within the existing permit area, there is concern for the underlying topsoil in the area, and additional concern that some of the accumulation is down-drainage from Pond B, and therefore is not being properly contained and treated from a hydrologic standpoint. To address the concerns raised by this Order, Andalex proposes the following plan of action:

1) Remove the deeper coal fines in the area of greatest accumulations around and below Pond B (denoted as "Mechanical Cleanup Area" on Plate 1A) by utilizing heavy equipment,

2) Salvage topsoil from the Pond B - Pond G drainage area to prevent future soil contamination, and,

3) Eliminate Pond B, and replace it by constructing a new Pond G located approximately 450' southeast of (i.e., down-drainage and down-wind from) Pond B.

4) Remove the shallow coal fines in the adjacent area, north of Pond B (denoted as "Vacuum Cleanup Area" on Plate 1A), by utilizing truck-mounted vacuum equipment,

5) Gravel the portion of access road PR-5 leading to and ramping up to the coal storage pad.

6) Conduct future monitoring to assess the wind-blown fines situation.

7) Review of reclamation costs and bonding.

These items are discussed in greater detail in the following narrative:

1) Remove deeper coal fines: The area of greatest coal fines accumulations is generally shown on Plate 1A and is labeled "Mechanical Cleanup Area". Also, Figure 1 attached to this appendix shows the nature of the aerial extent of the accumulations. This exhibit was prepared by Environmental Industrial Services (E.I.S.) based upon on-site measurements. Prior to beginning any construction or clean-up activities in this area, "disturbed area" perimeter markers will be installed around the proposed construction site. The general area of interest is shown on Figure 2 of this appendix.

Prior to beginning any construction or clean-up activities in this area, "disturbed area" perimeter markers will be installed. Temporary sediment control measures will then be installed below the construction site. This will consist of installing a row of excelsior logs (filter logs) laid along the contour northwest side of the Trestle Road. The purpose of these filter logs is to prevent any sediment or coal fines from getting off the permit area while the area is being cleaned up, topsoil is being salvaged, and Pond G is being constructed.

Accumulated coal fines will be scraped up using an assortment of mechanical equipment such as a vacuum truck, grader, back-hoe and/or front end loader, down to the native soil. The equipment to be used will be selected so that the coal fines can be gathered up in a manner that minimizes the disturbance to the underlying topsoil. The coal-fines will then be hauled off to the main coal pile to be blended back into the coal sales product, or will be hauled to the mine refuse pile located on the west side of the loadout facility. The choice of where to dispose of the coal fines will be made by the loadout operators and will be made based on the quality of the collected material.

2) Salvage and stockpile topsoil: In July, 2003, a soils survey of the immediate area was conducted by James Nyenhuis. This report was incorporated into the MRP in May, 2006, appearing as a supplement to Appendix D. This report gives a complete description of the soils in this area, and is included in this appendix for ease of reference, as Exhibit 5.

After the coal fines have been cleaned up and removed from the site topsoil will be salvaged from the "mechanical cleanup area", as shown on Plate 1A. A minimum of 6" of topsoil will be

These items are discussed in greater detail in the following narrative:

1) Remove deeper coal fines: The area of greatest coal fines accumulations is generally shown on Plate 1A and is labeled "Mechanical Cleanup Area". Also, Figure 1 attached to this appendix shows the nature of the aerial extent of the accumulations. This exhibit was prepared by Environmental Industrial Services (E.I.S.) based upon on-site measurements. Prior to beginning any construction or clean-up activities in this area, "disturbed area" perimeter markers will be installed around the proposed construction site. The general area of interest is shown on Figure 2 of this appendix.

Prior to beginning any construction or clean-up activities in this area, "disturbed area" perimeter markers will be installed. Temporary sediment control measures will then be installed below the construction site. This will consist of installing a row of excelsior logs (filter logs) laid along the contour northwest side of the Trestle Road. The purpose of these filter logs is to prevent any sediment or coal fines from getting off the permit area while the area is being cleaned up, topsoil is being salvaged, and Pond G is being constructed.

Accumulated coal fines will be scraped up using an assortment of mechanical equipment such as a grader, back-hoe and/or front end loader, down to the native soil. The equipment to be used will be selected so that the coal fines can be gathered up in a manner that minimizes the disturbance to the underlying topsoil. The coal-fines will then be hauled off to the main coal pile to be blended back into the coal sales product, or will be hauled to the mine refuse pile located on the west side of the loadout facility. The choice of where to dispose of the coal fines will be made by the loadout operators and will be made based on the quality of the collected material.

2) Salvage and stockpile topsoil: In July, 2003, a soils survey of the immediate area was conducted by James Nyenhuis. This report was incorporated into the MRP in May, 2006, appearing as a supplement to Appendix D. This report gives a complete description of the soils in this area, and is included in this appendix for ease of reference, as Exhibit 5.

After the coal fines have been cleaned up and removed from the site topsoil will be salvaged from the "mechanical cleanup area", as shown on Plate 1A. A minimum of 6" of topsoil will be

salvaged and stockpiled nearby as an extension of existing Topsoil Pile A. Topsoil will be salvaged in this area to allow for the construction of new Sediment Pond G, and to provide a measure of protection of the topsoil resource in the future in the likely event that this area sees additional deposits of wind and/or water-borne coal fines. The mechanical cleanup area involves approximately 3.84 acres. At a 6" salvage depth it is estimated that approximately 3097 cubic yards of topsoil will be gathered up. This will be stored as an extension of Topsoil Pile A. Pile A presently has an estimated volume of 440 cu. yds. Therefore, the expanded pile should have a total storage volume of about 3500 cu. yds. The new pile will be kept at the pre-existing height of about 6', and is estimated to be about 250' long x 70' wide when completed. There will be no topsoil removed in the area directly underneath the extended topsoil pile.

After the topsoil is salvaged from the "mechanical cleaning area" the area will then be roughened. The purpose of this roughening is to help minimize erosion, and also to help capture any additional wind-blown fines and prevent them from migrating down-gradient.

3) **Replace Pond B with Pond G:** After the coal fines have been cleaned up and the topsoil salvaged from the mechanical cleanup area a new sediment pond will be constructed . This new pond is to be called Pond G. Pond G will be located within the existing permit area immediately northwest of the Trestle Road, and down-drainage from the existing Pond B, as shown on Plates 1A and 2A. Pond G will essentially be a replacement for Pond B but will also treat the expanded cleanup area, based on a 10 year-24 hour precipitation event. The design details for Pond G are included in Appendix R (Sedimentation and Drainage Control Plan) and also on Plate 3G. This plate is also presented as Figure 4 of this appendix for ease of reference.

The embankment for Pond G will be constructed using native material, compacted in 18" lifts. It will have a 20'wide crest with a 3H-1V outslope and a 2H-1V in slope. The Pond will include a 24" CMP primary spillway equipped with an inverted oil skimmer, and a 24" CMP emergency spillway. After construction, the crest and outslopes of the pond embankment will be re-seeded for interim reclamation. A row of excelsior filter logs will be installed around the perimeter (toe) of the outslope of the dam for interim sediment control.

4) Re-seeding:

After construction, the topsoil pile will be roughened and re-seeded with an approved interim reclamation seed mix as specified in Chapter 2 and Chapter 3. A copy of this seed mix is also included with this appendix as Figure 3 for ease of reference. The company will endeavor to utilize locally acquired seeds if possible. A retention berm and ditch will be constructed around the perimeter of the pile to prevent soil loss, and a row of excelsior filter logs will be installed around the perimeter to provide siltation control. The pile will also be equipped with an identification sign.

Establishment of vegetation on the topsoil piles at this site has previously required two seedings. Therefore, stabilization of the new expanded topsoil pile A will include the application of wood fiber hydromulch after or with seeding. Wood fiber mulch and tackifier application is an accepted practice that will protect the topsoil pile from slopes and will protect the soil from erosion during seed establishment.

The areas associated with and including the sediment pond G and the coal fines removal as shown on Plates 1A and 1B will be broadcast seeded using the interim seed mix described in Figure 3. Seeding will occur in the fall or as recommended by a DOGM biologist. The area immediately around the extended topsoil pile will not have topsoil removed, nor any coal fines removed, but this area will be disturbed simply by the movement of heavy equipment involved in constructing the topsoil pile. Therefore, after the pile is constructed, this area will be roughened and re-seeded in the approved manner similar to the topsoil pile and the coal fines removal area (a.k.a., "mechanical cleanup area").

According to the approved reclamation plan gouging is described as 18" deep x 2'-3' wide, spaced 6'-10' apart (Section R645-301-240). On such gentle slope, the gouges will serve less to control erosion and more to provide for water collection. The problems with creating gouges in this manner are that the gouges will be deeper than the replaced topsoil and the topsoil that is removed from the gouge brcomes a mound adjacent to the gouge, with steep slopes that will not retain seed, and the gouge may expose compacted fill soil. Gouging will be used during operations to promote vegetation growth in the drop zone and to collect coal fines.This method will be alternated with ripping of the surface to a depth of 12" and both measures can be qualitatively evaluated for success at final reclamation. Andalex commits to using the most effective roughening technique

(either ripping or gouging) at final reclamation.

5) Remove shallow coal fines: Immediately to the north of the area of heaviest accumulations is another area targeted for cleanup. The coal fines accumulations are less in this area and it is felt that this area can adequately be cleaned up by utilizing a truck mounted vacuum system. This area is shown on Plate 1A (and also Figure 2) and is denoted as the "Vacuum Cleanup Area". It occupies approximately 1.59 acres. The area depicted is the general area proposed for cleaning, although the company will seek concurrence from the Division regarding the final area.

There are a number of juniper-pinyon tress growing in this area, and the use of vacuum equipment will allow this area to be cleaned without adversely affecting these trees. To the extent practicable, the vacuum truck will utilize the existing adjacent roadway and use a long extension hose for the cleanup so as to minimize the on-ground disturbance. Because the accumulations are less in this area there are no plans to remove or salvage any topsoil after the coal fines have been cleaned up. Coal cleanup material vacuumed up from this area will be taken to the main coal storage area for re-sale, or will be taken to the coal refuse pile, depending on quality.

Input from Division representatives will be requested to make certain that the area targeted for vacuum cleanup is concurred with. Prior to doing any cleaning in this area, "disturbed area" perimeter markers will be installed around the proposed cleanup area. Although the area will not technically be considered "disturbed" for the purpose of sedimentation and drainage control or final reclamation, it will nevertheless be somewhat disturbed by the vacuum operation.

6) Gravel a portion of access road PR-5: Access road PR-5 runs between the main coal storage pile area and the coal-fines accumulation area, as shown on Plate 1A and Figure 2. PR-5 was originally constructed as a low volume road to provide thru-access around the base of the coal storage pad. As such it was constructed on the native Mancos Shale material existing in the area, and was never graveled. Subsequently, new sales contracts required that semi-trucks utilize this road to gain access to the coal storage pad where they could then be loaded with a front-end loader. This heavier truck traffic on this road has contributed to the wind-blown fines situation. Therefore, the company proposes to gravel a 570' segment of this road, including the

ramp up onto the coal storage pile, which is utilized by the larger trucks needing access the coal pad. The segment of road to be graveled is shown on Plate 1A. Once the graveled road is in operation, it will be watered as needed in the future to control fugitive dust emissions.

7) Conduct future monitoring of wind-blown fines: After the cleanup is completed and the construction is finished, the company will continue with an operational monitoring plan for the area. This will consist quarterly inspection of the area to assess the amounts of future coal-fines accumulation, augmented by digital photography.

8) Bonding: At present (July, 2010) the Wildcat reclamation bond is posted in the amount of $1,144,000. This bond was re-adjusted in December 2007. Under the DO-04 cleanup plan there will be no additional demolition cost during final reclamation. The earthwork regrading costs will cancel out because Pond B is being replaced by Pond G. There will be slightly higher topsoiling costs and re-vegetation costs due to the additional disturbed acreage associated the cleanup plan. The existing disturbed area is 66.91 acres; the estimated disturbed area after implementation of the plan will be 73.26 acres, or an increase of 6.35 acres. Using the presently approved reclamation costs, the additional costs are computed as follows:

1) Topsoil: $15,013/66.91 ac = $224/acre
$224/acre x 6.35 acres = $1422

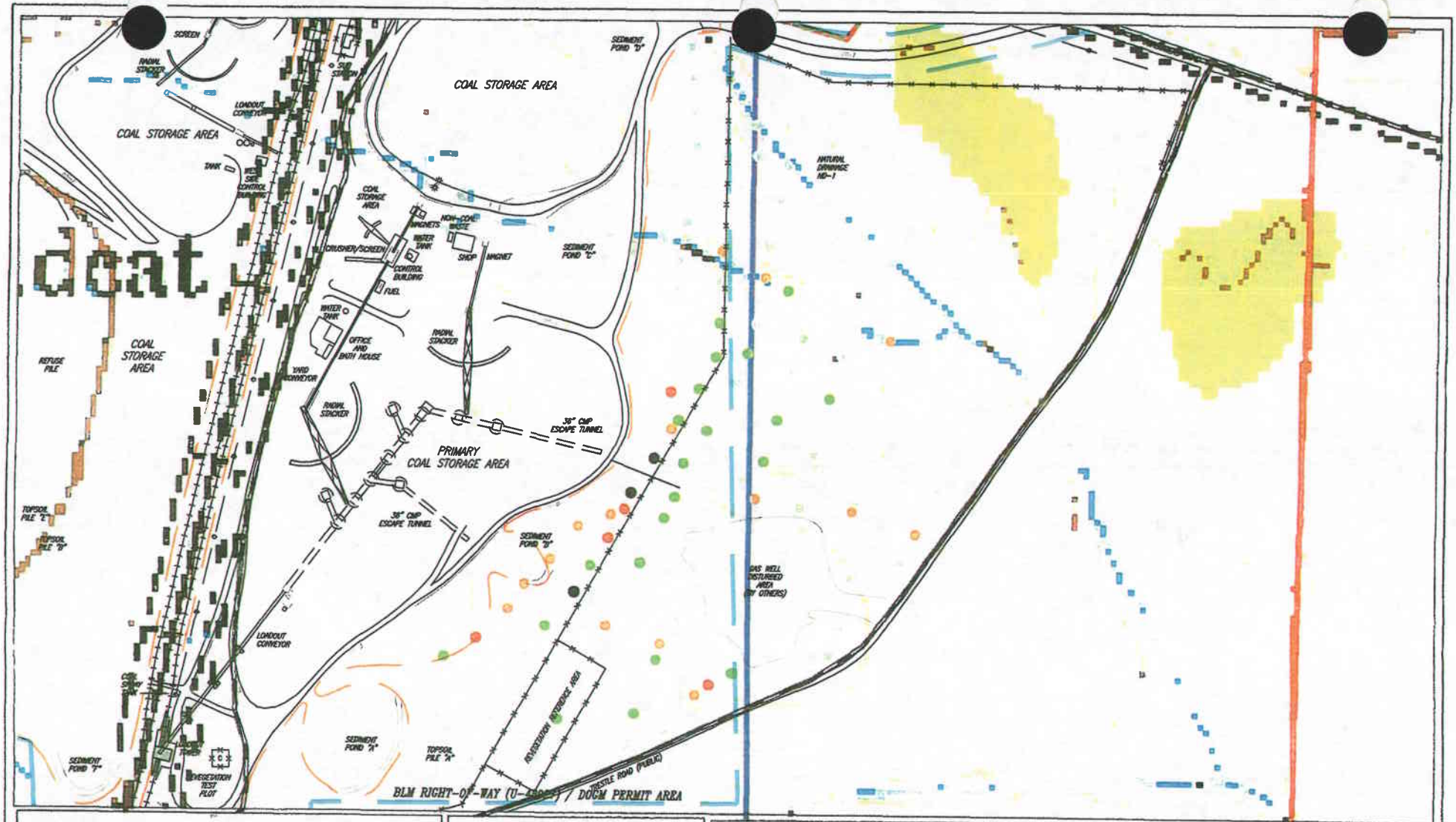
2) Reveg: $359,746/66.91 ac = $5377/acre
$5377/acre x 6.35 acres = $34,141

Total reclamation cost increase = $1422 + $34,141 = $35,563

Percent increase ($1,144,000 + $34,141)/$1,144,000 = 1.028

Therefore, implementation of the cleanup plan is estimated to increase the reclamation costs by less than 3% of the posted bond.

9) Construction Schedule: Construction will not begin until after July 1, 2010 or as recommended by a Division biologist based on site conditions.



LEGEND

- ROW Requested (98 Acres)
- U-48027 (78.5 Acres)
- U-52065 (12.5 Acres)
- Road

Section 33
Township 13 South,
Range 9 East,
Salt Lake Base & Meridian

COAL DEPTH IN INCHES

- 0 - 0.75
- 0.75 - 2
- 2 - 4.5
- 4.5 - 6.5
- 6.5 - 12

Created For:

ANDALEX RESOURCES, INC.

Environmental Industrial Services
Environmental & Engineering Consulting

31 North Main Street
Helper, Utah 84526
(435) 472-3814
Fax- (435) 472-8780
knash@preciscom.net

N

Created By: Katie Nash
Date: October 11, 2006

Scale 1" = 1,000'

DISCLAIMER:
EIS is not responsible for any errors or omissions.
All topographic maps were downloaded from:
http://www.waterrights.utah.gov
EIS 2006

PLATE 1

Figure 1

WILDCAT LOADOUT
COAL FINES CLEAN-UP AREA
RESPONSE TO DO-04
FIGURE 2

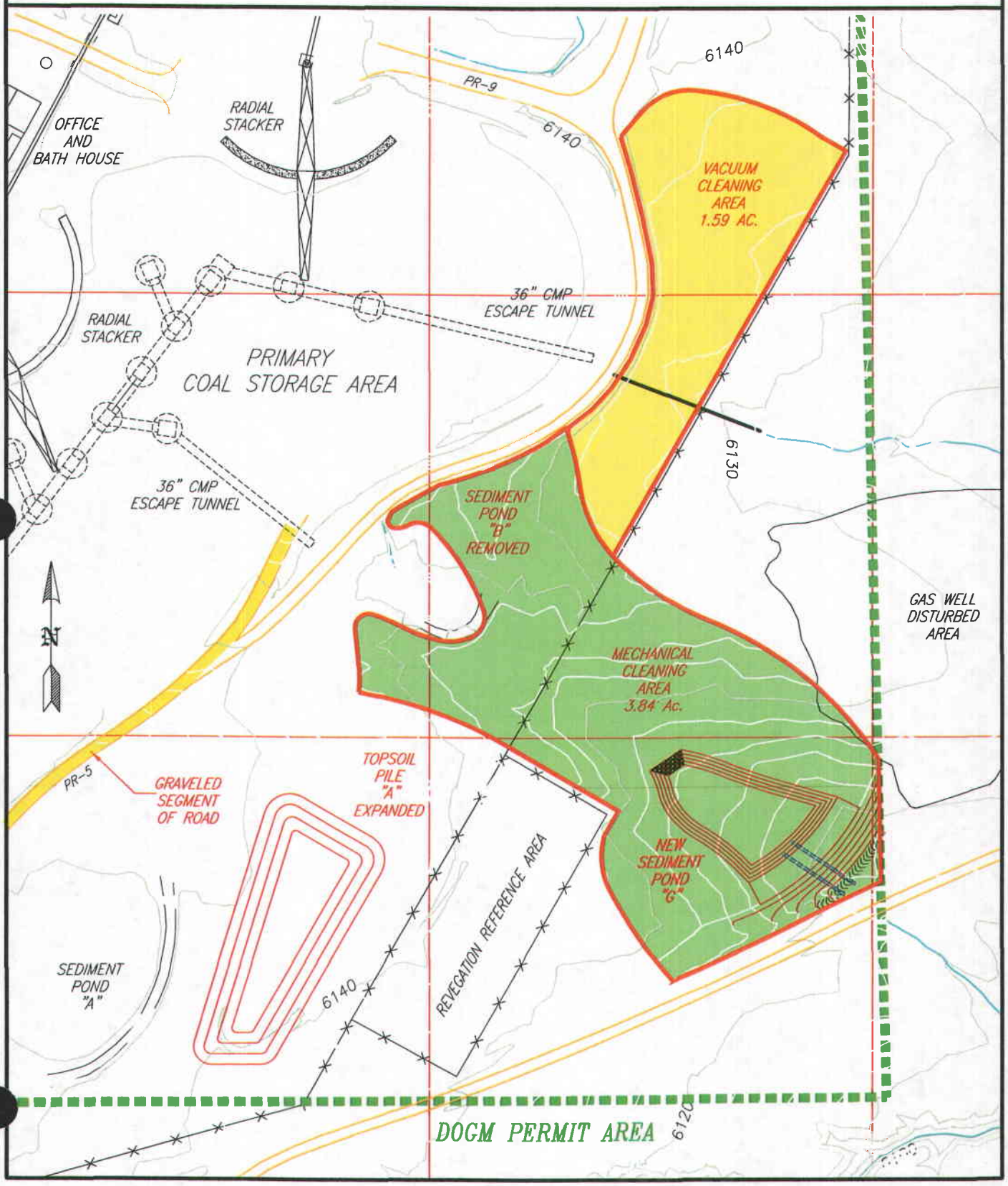


FIGURE 3

Interim Mix for broadcast seeding at Wildcat Loadout

Scientific Name	Common Name	PLS/ft
1) FORBS (Use 2 species from the list below to arrive at 7 PLS/ft2)		
Achillea millefolium var. occidentalis	Western yarrow	
Sphaeralcea ambigua	Desert globemallow	
Castilleja applegatei ssp. martinii	Early Indian paintbrush	
Baileya multiradiata	Desert marigold	
Oenothera speciosa	Showy evening primrose	
Penstemon eatonii	Firecracker penstemon	
Sub TOTAL for forbs		7.0
2) Cold Season GRASSES (Use Triticale and any other two cold season species to arrive at 18 PLS/ft2)		
Triticum aestivum x Secale cereale	Triticale (sterile rye)	3.0
Achnatherum hymenoides	Indian ricegrass	5.0
Bromus anomalus	Nodding brome	5.0
Elymus lanceolatus spp. lanceolatus	Thickspike wheatgrass	5.0
Elymus lanceolatus spp. lanceolatus	Slender wheatgrass	5.0
Pascopyrum smithii	Western wheatgrass	5.0
Sub TOTAL Cold Season Grasses		18.0

3) Warm Season GRASSES

(Use any three warm season species to arrive at 15 PLS/ft2)

Aristida pupurea	Purple threeawn	5.0
Bouteloua gracilis	Blue grama	5.0
Eragrostis trichodes	Sand lovegrass	5.0
Pleuraphis jamesii	Galleta grass	5.0
Sporobolus airoides	Alkali sacaton	5.0
Sporobolus cryptandrus	Sand drop seed	5.0

Sub TOTAL Warm Season Grasses 15.0

TOTAL Forbs and Grasses 40.0

Exhibit 5

SOIL SURVEY FOR THE TWELVE-ACRE EXPANSION AREA AT THE WILDCAT LOADOUT

INCORPORATED
MAY 17 2006
Div. of Oil, Gas & Mining

Prepared by

MT. NEBO SCIENTIFIC, INC.
330 East 400 South, Suite 6
Springville, Utah 84663
(801) 489-6937

James H. Nyenhuis
Certified Professional Soil Scientist
(ARCPACS #2753)

for

ANDALEX RESOURCES, INC
P.O. Box 902
Price, UT 84501

July 2003

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

TABLE OF CONTENTS

INTRODUCTION 1

METHODS 2

RESULTS 3

Map Unit A: Hernandez loam, 1 to 6% slopes 4
- Hernandez Pedon WC1 Site and Profile Description 5
- Hernandez Pedon WC2 Site and Profile Description 5
- Hernandez Pedon WC3 Site and Profile Description 6
- Hernandez Pedon WC6 Site and Profile Description 7
- Hernandez Pedon WC7 Site and Profile Description 8
- Hernandez Pedon WC10 Site and Profile Description 9
- Hernandez Range of Characteristics 9
- Hernandez Soil Suitability and Salvage Depth Recommendations 10
  - Initial One-Acre Study Area 10
  - Larger Eleven-Acre Study Area 11

Map Unit B: Haverdad loam, 2 to 8% slopes 11
- Haverdad Pedon WC4 Site and Profile Description 12
- Haverdad Pedon WC8 Site and Profile Description 12
- Haverdad Range of Characteristics 14
- Haverdad Soil Suitability and Salvage Depth Recommendations 14

Map Unit C: Strych Variant, shallow to moderately deep, 2 to 6% slopes 15
- Strych Variant Pedon WC5 Site and Profile Description 16
- Strych Variant Pedon WC9 Site and Profile Description 17
- Strych Variant Range Characteristics 18
- Strych Variant Soil Suitability and Salvage Depth Recommendation 18

Map Unit DL: Disturbed Land 19

REFERENCES 19

SOIL SURVEY MAP 20

LABORATORY DATA . . . . . Appendix

INCORPORATED

MAY 17 2005

Div. of Oil, Gas & Mining

INTRODUCTION

Andalex Resources needs to expand their coal storage area at the Wildcat Loadout facility located just south of Consumers Road about four miles west of Helper in Carbon County. The site is located in a portion of Section 33, T.14S., R.9E. as shown on the Standardville 7.5 minute USGS topographic quadrangle. A detailed Order 1-2 soil survey was conducted in March 2003 on approximately 12 acres of land immediately adjacent to the east of the current coal storage piles. A one acre site within the current Wildcat permit area but not part of the original to-be-affected disturbance area was previously mapped, sampled, and reported in April, 2003. The current report includes the one acre but expands to include a total of approximately 12 acres all located immediately adjacent to the east of the current coal piles.

Andalex wants to utilize the one acre site for coal storage immediately and the additional eleven acres at a later time. The identification and proper management of topsoil resources on the study area is essential for the success of future reclamation and the achievement of the post-disturbance land use. The information presented in this report is designed to aid in formulating a practical and successful reclamation plan.

INCORPORATED
MAY 17 2006
Div. of Oil, Gas & Mining

METHODS

Standard soil survey methods were used throughout the project. Andalex provided a site photo-map to Patrick Collins. Dr. Collins conducted field work at the site on March 5 and designated three locations as representative of the soil on the one acre study area. A backhoe pit was dug at each of the three sites. Dr. Collins examined the three soil profiles and sampled two of them, WC1 and WC2. Samples were subsequently delivered to Brigham Young University's soil testing laboratory for standard analysis as described in the "Guidelines for Management of Topsoil and Overburden" (State of Utah, 2002). Dr. Collins also investigated the extent of coal fines deposition on the one acre site by means of numerous spade holes dug on a grid transect basis.

The site was then visited on March 11 by Patrick Collins and Jim Nyenhuis, a Certified Professional Soil Scientist. Dr. Collins described his sampling rationale and Mr. Nyenhuis concurred that it was appropriate for the Hernandez soil. The next day, March 12, seven additional backhoe pits were sited and dug on the larger twelve acre study area. Ms. Priscilla Burton (UDOGM soil scientist and reclamation specialist) was present for the day and observed all ten backhoe pits and assisted in the description and sampling of several soil profiles. She observed all three pits on the primary one acre study area. Mr. Nyenhuis concluded the soils description and sampling of the larger area on the following day, March 13, 2003.

The twenty-three soil samples collected from the additional seven soil backhoe pits were delivered to Colorado State University's Soil Testing Laboratory for analysis. The following parameters

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

were analyzed: pH; electrical conductivity (EC); saturation percent; percent calcium carbonate equivalent; organic matter percent; texture (sand, silt, clay, and very fine sand as a part of total sand); meq/L of Ca, Mg, Na, and K; SAR; and AB-DTPA extractable nitrate nitrogen (NO3-N), P, K, Zn, Fe, Mn, and Cu.

RESULTS

Ten backhoe pits were dug in representative locations across the 12 acre study area (see "Soil Survey Map" included with this report). Soils were described at each of the pits, and eight of the ten pits were sampled for laboratory analysis. Sample sites WC1 and WC2 were sampled as part of the one acre study, and samples sites WC4, WC6, WC7, WC8, WC9, and WC10 were sampled as part of the larger 12 acre study. The soil laboratory data is attached to this report. Three soil map units were delineated across the 12 acre study area: (A) Hernandez loam, 1 to 6 percent slopes, (B) Haverdad loam, 2 to 8% slopes, and (C) Strych Variant, shallow to moderately deep, 2 to 6% slopes.

Average elevation of the study area is about 6,100 to 6,155 feet MSL. Average annual precipitation is about 10 to 12 inches (ustic-aridic soil moisture regime). Average annual air temperature is about 47 to 49 degrees F. (mesic soil temperature regime). The average freeze-free period is 110 to 135 days per year (Jansen and Borchert, 1988).

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

Map Unit A: Hernandez loam, 1 to 6% slopes

Hernandez loam was described and sampled at five representative locations (WC1, WC2, WC6, WC7, and WC10). Hernandez was also described but not sampled at WC3. Although there are some differences among the six sites, each soil classifies as the Hernandez series. The Hernandez family, Map Unit 52, was also mapped for the area by NRCS on Sheet 8 of its Soil Survey of Carbon Area, Utah (Jansen and Borchert, 1988).

Hernandez family is a very deep, well drained soil mapped on uplands in the general area. The soil is developing in local alluvium derived dominantly from sandstone and shale. Site vegetation includes Wyoming big sagebrush and mixed grasses. Based on NRCS data, Hernandez has moderate permeability, high available water capacity (9.0 to 10.5 inches), slow runoff, and water supplying capacity of 5.5 to 6.5 inches. Effective rooting depth is 60 inches or more, the organic matter content of the surface layer is generally 1 to 3 percent, and the hazard of wind and water erosion is moderate (Jansen and Borchert, 1988). The Range Site for Hernandez is Semidesert Loam (Wyoming Big Sagebrush).

Hernandez is classified as a "Fine-loamy, mixed, superactive, mesic Ustic Haplocalcid". Hernandez is an established soil series of moderate extent. The most recent NRCS official soil series description, dated October 2002, is on file at Mt. Nebo Scientific. Hernandez sites WC1, WC2, and WC3 were previously described in the one acre study area report, and are also included in the current report.

INCORPORATED

MAY 17 2003

Div. of Oil, Gas & Mining

Hernandez Pedon WC1 Site and Profile Description:

Map Unit A; 3% slope, east-southeast aspect; Wyoming big sagebrush and mixed grasses vegetation; local alluvium; fan uplands; no erosion; soil slightly moist to 8 inches; 3 inches of coal fines deposition from the adjacent Wildcat Loadout facility; sampled for laboratory characterization.

Coal Fines – 3 to 0 inches (3 inches thick)

A horizon – 0 to 3 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; moderate medium granular structure; soft dry consistence, very friable moist consistence, slightly sticky and slightly plastic wet consistence; common coarse, medium and many fine and very fine roots to 13 inches; moderately effervescent, slightly alkaline (pH 7.7); gradual smooth boundary.

Bw (cambic) horizon – 3 to 13 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; slightly hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; strongly effervescent, slightly alkaline (pH 7.7); clear wavy boundary.

Bk (calcic) horizon – 13 to 23 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; massive structure; slightly hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; few coarse, medium, fine and very fine roots; violently effervescent, slightly alkaline (pH 7.8); gradual wavy boundary.

Ck horizon – 23 to 60 inches; pale brown (10YR 6/3) clay loam, brown (10YR 5/3) moist; massive structure; very hard dry consistence, firm moist consistence, sticky and slightly plastic wet consistence; strongly effervescent, moderately alkaline (pH 8.2); did not hit bedrock.

Hernandez Pedon WC2 Site and Profile Description:

Map Unit A; 4% slope; east-southeast aspect; Wyoming big sagebrush and mixed grasses vegetation; local alluvium; fan uplands; no erosion; soil slightly moist to 3 inches; 3 inches of coal fines deposition from adjacent Wildcat Loadout facility; sampled for laboratory characterization.

Coal Fines – 3 to 0 inches (3 inches thick)

A horizon – 0 to 3 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; strong, medium platy structure (mechanically compacted); hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; few to common coarse and medium and many fine and very fine roots to 10 inches; strongly effervescent, moderately alkaline (pH 7.8); gradual smooth boundary.

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

Bw (cambic) horizon – 3 to 10 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; moderate medium platy structure (mechanically compacted); hard dry consistence, firm moist consistence, slightly sticky and slightly plastic wet consistence; strongly effervescent, moderately alkaline (pH 7.8); clear wavy boundary.

Bk (calcic) horizon – 10 to 32 inches; very pale brown (10YR 7/3) loam, brown (10YR 5/3) moist; massive structure; extremely hard dry consistence; very firm moist consistence; sticky and slightly plastic wet consistence; few medium, fine, and very fine roots; violently effervescent, moderately alkaline (pH 7.8); gradual wavy boundary.

Ck horizon – 32 to 60 inches; light yellowish brown (10YR 6/4) loam, dark yellowish brown (10YR 4/4) moist; massive structure; very hard dry consistence, firm moist consistence, sticky and slightly plastic wet consistence; violently effervescent, strongly alkaline (pH 8.5); did not hit bedrock.

Hernandez Pedon WC3 Site and Profile Description:

Map Unit A; 3% slope' east-southeast aspect; Wyoming big sagebrush and mixed grasses vegetation; local alluvium; fan uplands; soil slightly moist to 9 inches; no erosion; 3 inches of coal fines deposition from adjacent wildcat Loadout facility; not sampled for laboratory characterization.

Coal Fines – 3 to 0 inches (3 inches thick).

A horizon – 0 to 3 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; moderate medium granular structure; soft dry consistence, very friable moist consistence, slightly sticky and slightly plastic wet consistence; common medium, fine, and very fine and few coarse roots to 9 inches; strongly effervescent; gradual smooth boundary.

Bw horizon – 3 to 9 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; slightly hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; strongly effervescent; clear wavy boundary.

Bk1 horizon – 9 to 18 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; massive structure parting to moderate medium subangular blocky; slightly hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; commmon fine and very fine and few coarse and medium roots; strongly effervescent; gradual wavy boundary.

Bk2 horizon – 18 to 32 inches; very pale brown (10YR 7/3) loam, brown (10YR 5/3)

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

moist; massive structure; very hard dry consistence, firm moist consistence, sticky and slightly plastic wet consistence; few medium, fine, and very fine roots; violently effervescent; gradual wavy boundary.

Ck horizon – 32 to 52 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; massive structure; very hard dry consistence, very firm moist consistence, sticky and slightly plastic wet consistence; violently effervescent; gradual wavy boundary.

C horizon – 52 to 64 inches; brown (10YR 5/3) loam, dark brown (10YR 4/3) moist; massive structure; hard dry consistence, firm moist consistence, slightly sticky and slightly plastic wet consistence; did not hit bedrock.

Hernandez Pedon WC6 Site and Profile Description:

Map Unit A; 4% slope; east aspect; mixed grasses, dead Wyoming big sagebrush vegetation; local alluvium; fan uplands; no erosion; soil slightly moist to 18 inches at time of sampling, 3-12-03; 3 inches of coal fines deposition from adjacent wildcat loadout facility; sampled for laboratory characterization.

Coal fines – 3 to 0 inches (3 inches thick)

A horizon- 0 to 3.5 inches; brown (10YR 5/3) clay loam, brown (10YR 4/3) moist; weak medium granular structure; soft dry consistence, very friable moist , slightly sticky and slightly plastic wet consistence; common medium, fine, very fine, and few coarse roots to 13 inches; moderately effervescent, moderately alkaline (pH 7.9); gradual smooth boundary.

Bw horizon – 3.5 to 13 inches; yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 4/40 moist; moderate medium subangular blocky structure; slightly hard dry consistence, friable moist consistence, sticky and slightly plastic wet consistence; moderately effervescent, slightly alkaline (pH 7.8); gradual wavy boundary.

Bk horizon – 13 to 25 inches; light yellowish brown (10YR 6/4) loam, yellowish brown (10YR 5/4) moist; massive structure; hard dry consistence, friable moist consistence; slightly sticky and slightly plastic wet consistence; common fine and very fine, and few coarse and medium roots 13 to 18 inches, few coarse, medium, fine, and very fine roots 18 to 25 inches; strongly effervescent, moderately alkaline (pH 8.0); gradual wavy boundary.

Ck horizon – 25 to 38 inches; light yellowish brown (10YR 6/4) loam, yellowish brown (10YR 5/4) moist; massive structure; very hard to extremely hard dry consistence; firm moist consistence, sticky and slightly plastic wet consistence; strongly effervescent, moderately alkaline (pH 8.4); gradual wavy boundary.

C horizon – 38 to 64 inches; yellowish brown (10YR 5/4) clay loam, dark yellowish

INCORPORATED
MAY 17 2005
Div. of Oil, Gas & Mining

brown (10YR 4/4) moist; massive structure; hard dry consistence, firm moist consistence, sticky and slightly plastic wet consistence; moderately effervescent, strongly alkaline (pH 8.5); did not hit bedrock.

Hernandez Pedon WC7 Site and Profile Description:

Map Unit A; 4% slope; east aspect; Wyoming big sagebrush and mixed grasses vegetation; local alluvium; fan uplands; no erosion; soil slightly moist to10 inches at time of sampling, 3-13-03; 2 inches of coal fines deposition from adjacent Wildcat Loadout facility; sampled for laboratory characterization.

Coal Fines – 2 to 0 inches (2 inches thick)

A horizon – 0 to 3 inches; brown (10YR 5/3) loam with some areas with coal fines mixed in, brown (10YR 4/3) moist; weak medium granular structure; soft dry consistence, very friable moist consistence, sticky and slightly plastic wet consistence; many fine and very fine, and few coarse and medium roots to 10 inches; moderately effervescent, moderately alkaline (pH 7.9); gradual smooth boundary.

Bw horizon – 3 to 10 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; slightly hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; moderate to strongly effervescent, slightly alkaline (pH 7.8); gradual wavy boundary.

Bk1 horizon – 10 to 22 inches; very pale brown (10YR 7/3) clay loam, brown (10YR 5/3) moist; massive structure; hard-very hard dry consistence, firm moist consistence, sticky and slightly plastic wet consistence; common fine and very fine, and few medium and coarse roots 10 to 22 inches; strongly effervescent, moderately alkaline (pH 7.9); common krotovinas from 10 to 38 inches; gradual wavy boundary.

Bk2 horizon – 22 to 38 inches; very pale brown (10YR 7/3) clay loam, brown (10YR 5/3) moist; massive structure; extremely hard dry consistence, very firm moist consistence, slightly sticky and nonplastic wet consistence; few fine and very fine roots 22 to 38 inches; violently effervescent, moderately alkaline (pH 8.3); gradual wavy boundary.

C horizon – 38 to 56 inches; light yellowish brown (10YR 6/4) loam, yellowish brown (10YR 5/4) moist; massive structure; hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; strongly effervescent, strongly alkaline (pH 8.6); did not hit bedrock.

INCORPORATED
MAY 1 7 2003
Div. of Oil, Gas & Mining

Hernandez Pedon WC10 Site and Profile Description:

Map Unit A; 6% slope; east aspect; rabbitbrush and mixed grasses vegetation; local alluvium; fan uplands; no erosion; soil slightly moist to 12 inches at time of sampling, 3-13-03; 1.5 inches of coal fines deposition from the adjacent Wildcat Loadout facility; sampled for laboratory characterization; sample site is just outside of the 12 acre study area but in an area for a future sedimentation pond.

Coal Fines – 1.5 to 0 inches (1.5 inches thick)

A horizon - 0 to 3 inches; light yellowish brown (10YR 6/4) loam, yellowish brown (10YR 5/4) loam, weak medium granular structure; soft dry consistence, very friable moist consistence, slightly sticky and slightly plastic wet consistence; common few and very few, and few coarse and medium roots to 12 inches; strongly effervescent, moderately alkaline (pH 8.0); gradual smooth boundary.

Bw horizon – 3 to 12 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; slightly hard dry consistence; friable moist consistence, slightly sticky and slightly plastic wet consistence; strongly effervescent, moderately alkaline (pH 8.0); gradual wavy boundary.

Bky horizon – 12 to 30 inches; very pale brown (10YR 7/4) clay loam, light yellowish brown (10YR 6/4) moist; massive structure; very hard dry consistence, firm moist consistence, sticky and plastic wet consistence; few medium, fine, and very fine roots 12 to 24 inches; violently effervescent, moderately alkaline (pH 8.0); gradual wavy boundary.

C horizon – 30 to 62 inches; light yellowish brown (10YR 6/4) loam/sandy loam, pale brown (10YR 6/3) moist; massive structure; hard dry consistence, firm moist consistence, slightly sticky and slightly plastic wet consistence; strongly effervescent, moderately alkaline (pH 8.0); did not hit bedrock.

Hernandez Range of Characteristics:

The described and sampled pedons WC-1, WC-2, WC-3, WC-6, WC-7, and WC-10 are typical of Hernandez, and are within the range of characteristics for the Hernandez official soil series description (NRCS, October 2002).

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

Hernandez Soil Suitability and Salvage Depth Recommendation:

Initial One-Acre Study Area

Based on an evaluation of the field and laboratory data (see Appendix), the Hernandez soil is entirely suitable throughout its profile depth to 54 inches or more. Soil textures are good with loam dominating the upper profile, and loam to clay loam in the lower profile. Soil salinity is low with electrical conductivity (EC) values less than 1 in the upper profile and 2 to 3 in the lower profile. Sodium Adsorption Ratio (SAR) is low throughout the profile with values less than 1 for all samples except the 32 to 54 inch depth interval of WC-2 (SAR=6.5). Soil reaction (pH) is slightly to moderately alkaline with values in the high 7's and low 8's (range of pH 7.7 to 8.5). Calcium carbonate content ranges from 9.7 to 18.7 percent and averages 13.9 percent across all samples. Organic matter content is somewhat high in the upper profile (2.8 to 3.6 percent) and generally low in the lower profile (0.5 to 0.9 percent).

If needed, the entire profile to 54 inches or more could be salvaged for use in reclamation activities. The better soil material is in the approximate upper 24 inches. Soil texture is loam and organic matter content is somewhat high in this upper 2 feet. EC and SAR values are low. Soil texture is good and the soil material can be easily handled. If a more limited amount of soil material is needed, the upper 24 inches can be salvaged as Topsoil. Additional underlying material could be salvaged, as needed, for use as Subsoil.

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

Larger Eleven-Acre Study Area

Soil description and sample sites WC6, WC7, and WC10 were evaluated for suitability and salvage depth recommendation for the remaining 11 acre study area. WC10 is located in a proposed sedimentation pond area just outside the 11 acre study area but was included in the evaluation of Hernandez. The upper 25 inches of WC6 is good rated. The depth between 25 and 38 inches is good rated except both EC (5.5) and SAR (9.1) are fair rated. The lower zone between 38 and 64 inches has poor EC (10.1) and unacceptable SAR (16.7). The upper 38 inches of WC7 is good rated; between 38 and 56 inches is good rated except for fair rated SAR (6.8). The upper 12 inches of WC10 is good rated; between 12 and 30 inches has fair to poor EC (8.5) and fair SAR (8.4). Both EC (12) and SAR (10.4) are poor rated for the zone between 30 and 62 inches. For laboratory reports, refer to the Appendix of this document.

Given that WC10 is located outside the 11 acre study area, it is recommended that the upper 38 inches of Map Unit A be salvaged as Topsoil. The underlying material has good to poor rated EC and fair to unacceptable SAR. If additional material is needed and can be somewhat mixed during salvage, it is possible to salvage this lower material between 38 and about 62 inches as Subsoil.

Map Unit B: Haverdad loam, 2 to 8% slopes

Haverdad loam was described and sampled at two representative locations, WC4 and WC8. Haverdad loam was previously mapped by NRCS as a soil inclusion along drainageways in Map

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

Unit 52 of the Soil Survey of Carbon Area, Utah (Jansen and Borchert, 1988). Haverdad loam is a very deep, well drained soil mapped in small upland drainageways in the general area. The soil is developing in local alluvium derived dominantly from sandstone and shale. Site vegetation includes mixed grasses, sagebrush, and occasional scattered greasewood.

Permeability of Haverdad is moderate. Available water capacity is about 10 inches. Effective rooting depth is 40 inches or more. Runoff is slow, and the hazard of wind and water erosion is moderate (Jansen and Borchert, 1988). The Range Site for Borchert is Semidesert Loam (Wyoming Big Sagebrush).

Haverdad is classified as a "Fine-loamy, mixed, superactive, calcareous, mesic Ustic Torrifluvent". Haverdad is an established soil series of moderate extent. The most recent NRCS official soil series description, dated June 2002, is on file at Mt. Nebo Scientific. Haverdad site and profile descriptions for WC4 and WC8 follow.

Haverdad Pedon WC4 Site and Profile Description:

Map Unit B; 3% slope; east aspect; mixed grasses and few scattered greasewood vegetation; fine-loamy local alluvium with <1% coarse fragments; small fan on side of small upland drainage; no erosion; soil slightly moist to 14 inches at time of sampling, 3-12-03; 3 inches of coal fines deposition from adjacent Wildcat Loadout facility; sampled for laboratory characterization.

Coal Fines – 3 to 0 inches (3 inches thick)

A horizon – 0 to 4 inches; yellowish brown (10YR 5/6) loam, dark yellowish brown (10YR 4/6) moist; moderate medium granular structure; slightly hard dry consistence,

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

friable moist consistence, slightly sticky and slightly plastic wet consistence; many medium, fine, and very fine, and few coarse roots to 14 inches; strongly effervescent, moderately alkaline (pH 8.3); gradual smooth boundary.

Bw horizon – 4 to 14 inches; light yellowish brown (10YR 6/4) loam, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; slightly hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; strongly effervescent, strongly alkaline (pH 8.5); gradual wavy boundary.

Bk horizon – 14 to 28 inches; light yellowish brown (10YR 6/4) loam, brown (10YR 4/3) moist; massive structure; hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; common fine and very fine and few medium roots; strongly effervescent, moderately alkaline (pH 8.3); gradual wavy boundary.

C horizon – 28 to 58 inches; yellowish brown (10YR 5/4) loam to sandy loam, brown (10YR 4/3) moist; massive structure; slightly hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; few fine and very fine roots 28 to 44 inches; strongly effervescent, moderately alkaline (pH 8.0); gradual wavy boundary.

2C "red" horizon – 58 to 70+ inches; brown (7.5YR 5/4) gravelly loam, dark brown (7.5YR 4/4) moist; massive structure; slightly hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; slightly effervescent; this horizon not sampled.

Haverdad Pedon WC8 Site and Profile Description:

Map Unit B; 2% slope; east aspect; big sagebrush and mixed grasses (mostly dead) vegetation; fine-loamy local alluvium with < 2% sandstone gravels; small upland drainage; no erosion; 3 inches of coal fines deposition from adjacent Wildcat Loadout facility; soil slightly moist to 26 inches at time of sampling, 3-13-03; sampled for laboratory characterization.

Coal Fines – 3 to 0 inches (3 inches thick)

A horizon – 0 to 4 inches; light yellowish brown (10YR 6/4) loam, dark yellowish brown (10YR 4/4) moist; weak medium platy structure; soft dry consistence, very friable moist consistence, slightly sticky and slightly plastic wet consistence; common coarse, medium, fine, and very fine roots to 12 inches; moderately effervescent, slightly alkaline (pH 7.7); gradual smooth boundary.

Bw horizon – 4 to 12 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; slightly hard dry consistence, very friable moist consistence, slightly sticky and slightly plastic wet

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

consistence; moderately effervescent, slightly alkaline (pH 7.8); gradual wavy boundary.

Bk horizon – 12 to 26 inches; light yellowish brown (10YR 6/4) loam, brown (10YR 4/3) moist; massive structure; hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; common fine and very fine, and few coarse and medium roots; strongly effervescent, slightly alkaline (pH 7.8); gradual wavy boundary.

Ck horizon – 26 to 38 inches; light yellowish brown (10YR 6/4) loam, yellowish brown (10YR 5/4) moist; massive structure; hard dry consistence, firm moist consistence, slightly sticky and slightly plastic wet consistence; few coarse, medium, fine, and very fine roots; krotovinas present; moderately effervescent, moderately alkaline (pH 7.9); gradual wavy boundary.

C horizon – 38 to 64 inches; yellowish brown (10YR 5/4) loam-sandy loam, brown (10YR 4/3) moist; massive structure; hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; moderately effervescent, moderately alkaline (pH 7.9); did not hit bedrock.

Haverdad Range of Characteristics:

The described and sampled pedons WC4 and WC8 are typical of Haverdad and are within the range of characteristics for the Haverdad official soil series description (NRCS, June 2002).

Haverdad Soil Suitability and Salvage Depth Recommendations:

Based on an evaluation of the field and laboratory data (see Appendix), Haverdad loam is entirely suitable throughout its profile depth to 54 inches or more. Soil textures are good with loam dominating the upper profile to about 38 inches, and loam to sandy loam to gravelly loam present in the lower substratum. Soil salinity is low with electrical conductivity (EC) values about 0.5 to 2 in the upper profile, and about 0.5 to 4 in the lower "C" horizon. Sodium Adsorption Ratio (SAR) is generally less than 1.0 but can range up to about 4.5 to 6.0 below 14 inches in some

INCORPORATED

MAY 17 2005

Oil, Gas & Mining

pedons. Soil reaction (pH) is slightly to strongly alkaline with values between 7.7 and 8.5. Calcium carbonate content ranges from about 6 to 11 percent. Organic matter content ranges from about 1.2 to 1.9 percent in the surface layer, to about 0.9 to 1.5 percent at depth in the profile.

If needed, the entire profile to 54 inches or more could be salvaged for use in reclamation activities. The better soil material is in the approximate upper 28 inches. Soil texture is loam and organic matter is about 1 to almost 2 percent. EC and SAR are generally low. Soil texture is good and the soil material can be easily handled. If a more limited amount of soil material is needed, the upper 28 inches can be salvaged as Topsoil. Additional underlying material could be salvaged, as needed, for use as Subsoil.

Map Unit C: Strych Variant, shallow to moderately deep, 2 to 6% slopes

Strych Variant was described and sampled at two representative locations (WC5 and WC9). Strych (deep) was previously mapped in the area as a 10% soil inclusion in NRCS Map Unit 52 (Jansen and Borchert, 1988). Although the official Strych soil series is deep to very deep, the site-specific Strych Variant soil on the Wildcat study area is shallow to moderately deep (10 inches to slightly greater than 20 inches to sandstone bedrock). Strych Variant is developing in thin slopewash alluvium and residuum from calcareous sandstone. Vegetation is open, scattered Pinyon-Juniper woodland with a mixed grass understory.

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

Strych Variant is shallow to moderately deep and well drained. Strych Variant typically has a pale brown to yellowish brown gravelly to very gravelly loam surface layer about 3 inches thick. The "Bw" cambic upper subsoil layer is a pale brown to light yellowish brown gravelly to very gravelly loam to a depth of about 8 or 9 inches. The underlying "Bk" calcic horizon is a pale to very pale brown very to extremely gravelly loam to sandy loam to a depth of about 15 or 16 inches. The substratum is a mixture of "C" horizon and paralithic "Cr" extremely gravelly loam to bedrock encountered at about 20 to 23 inches in depth.

Strych Variant has moderately rapid permeability, low available water capacity, and an effective rooting depth equal to the depth to bedrock. The organic matter content of the surface layer is about 1 to 3 percent. Runoff is medium, and the water erosion hazard is moderate. The Range Site is Semidesert Bouldery Loam (Jansen and Borchert, 1988). Strych Variant is classified as a "Loamy-skeletal, mixed, superactive, mesic, shallow Ustic Haplocalcid". The most recent NRCS official soil series description for Strych, dated October 2002, is on file at Mt. Nebo Scientific.

Strych Variant Pedon WC5 Site and Profile Description:

Map Unit C; 8% slope; south aspect; Pinyon-Juniper and scattered mixed grasses vegetation; thin residuum from sandstone; upland low ridge; slight erosion; 2 inches of coal fines deposition from adjacent Wildcat Loadout facility; soil slightly moist at time of sampling, 3-12-03; not sampled for laboratory analysis.

Coal Fines – 2 to 0 inches (2 inches thick, varies up to 6 inches thick)

A horizon – 0 to 3 inches; pale brown (10YR 6/3) gravelly loam with about 20% sandstone gravels, brown (10YR 5/3) moist; moderate medium granular structure; soft dry consistence, very friable moist consistence, slightly sticky and slightly plastic wet

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

consistence; many fine and very fine, common medium and coarse roots to 8 inches; strongly effervescent; gradual smooth boundary.

Bw horizon – 3 to 8 inches; pale brown (10YR 6/3) gravelly loam with about 25% sandstone gravels, brown (10YR 4/3) moist; moderate fine subangular blocky structure; slightly hard dry consistence; friable moist consistence, slightly sticky and slightly plastic wet consistence; strongly effervescent; gradual wavy boundary.

Bk horizon – 8 to 15 inches; very pale brown (10YR 7/30 very gravelly silt loam to light silty clay loam with about 45% sandstone gravels; massive structure; very hard dry consistence, firm moist consistence, sticky and slightly plastic wet consistence; few coarse, medium, fine, and very fine roots; violently effervescent; gradual wavy boundary.

C/Cr mixed horizon (weathered, fractured sandstone with calcium carbonate and soil fines in cracks and beneath rock fragments) – 15 to 20 inches; pale brown (10YR 6/3) extremely gravelly loam with about 65% sandstone gravels, brown (10YR 5/3) moist; massive structure; very hard dry consistence, firm moist consistence, slightly sticky and slightly plastic wet consistence; few roots in cracks and beneath rock fragments; violently effervescent.

Strych Variant Pedon WC9 Site and Profile Description:

Map Unit C; 8% slope; south aspect; Pinyon-Juniper and mixed grasses vegetation; thin eolian over thin residuum from sandstone; low weathered ridge; slight erosion; 1 inch of coal fines deposition from adjacent Wildcat Loadout facility; soil slightly moist to 9 inches at time of sampling, 3-12-03; sampled for laboratory analysis.

Coal Fines – 1 to 0 inches (1 inch thick)

A horizon – 0 to 3 inches; yellowish brown (10YR 5/4) very gravelly loam with about 25% gravel size sandstone chips, dark yellowish brown (10YR 4/4) moist; weak medium granular structure; slightly hard dry consistence, friable moist consistence; slightly sticky and slightly plastic wet consistence; many medium, fine, and very fine roots to 9 inches; strongly effervescent, slightly alkaline (pH 7/6); clear smooth boundary.

Bw horizon – 3 to 9 inches; light yellowish brown (10YR 6/4) very gravelly loam with about 55% gravel size sandstone chips, brown (10YR 5/3) moist; moderate medium subangular blocky structure; slightly hard-hard dry consistence, friable moist consistence, slightly sticky and slightly plastic wet consistence; strongly effervescent, slightly alkaline (pH 7.5); gradual wavy boundary.

Bk horizon – 9 to 16 inches; pale brown (10YR 6/3) extremely gravelly loam-sandy loam with about 75% gravel size sandstone chips, brown (10YR 5/3) moist; massive structure; hard-very hard dry consistence, friable moist consistence, slightly sticky and slightly plastic

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

wet consistence; common to few medium, fine and very fine roots; violently effervescent, slightly alkaline (pH 7.8); gradual wavy boundary.

C/Cr mixed horizon (weathered, fractured sandstone with calcium carbonate and soil fines in cracks and beneath rock fragments) – 16 to 23 inches; pale brown (10YR 6/3) extremely gravelly sandy loam with over 75% gravel and cobble size sandstone chips, brown (10YR 5/3) moist; massive structure; very hard dry consistence, firm moist consistence, slightly sticky and slightly plastic wet consistence; few roots in cracks and beneath rock fragments; violently effervescent; horizon not sampled for laboratory analysis.

Strych Variant Range of Characteristics:

Depth to the weathered sandstone contact ranges from about 15 to16 inches. Coarse fragment content ranges from 20 to 25% for the surface layer, from 25 to 55% for the upper subsoil layer (Bw), from 45 to 75% for the lower subsoil layer (Bk), and over 65% for the weathered substratum. Reaction (pH) is typically slightly alkaline (pH from 7.5 to 7.8). Soil fines are typically loam to sandy loam.

Strych Variant Soil Suitability and Salvage Depth Recommendation:

Strych Variant is entirely suitable for salvage. EC and SAR are very low, organic matter content ranges from 2.6% in the surface layer, to 2.3% in the upper subsoil, to 0.9% in the lower subsoil. Calcium carbonate content is fair rated with values ranging from 21 to 27 percent. Soil texture (fines) are loam to sandy loam. Coarse fragment content can be moderate to very high. The upper 12 inches can be salvaged as Topsoil, with the underlying material left in place to aid reclamation after mining activities are completed. For laboratory reports, refer to the Appendix

INCORPORATED
MAY 17 2005
Div. of Oil, Gas & Mining

of this document.

Map Unit DL: Disturbed Land

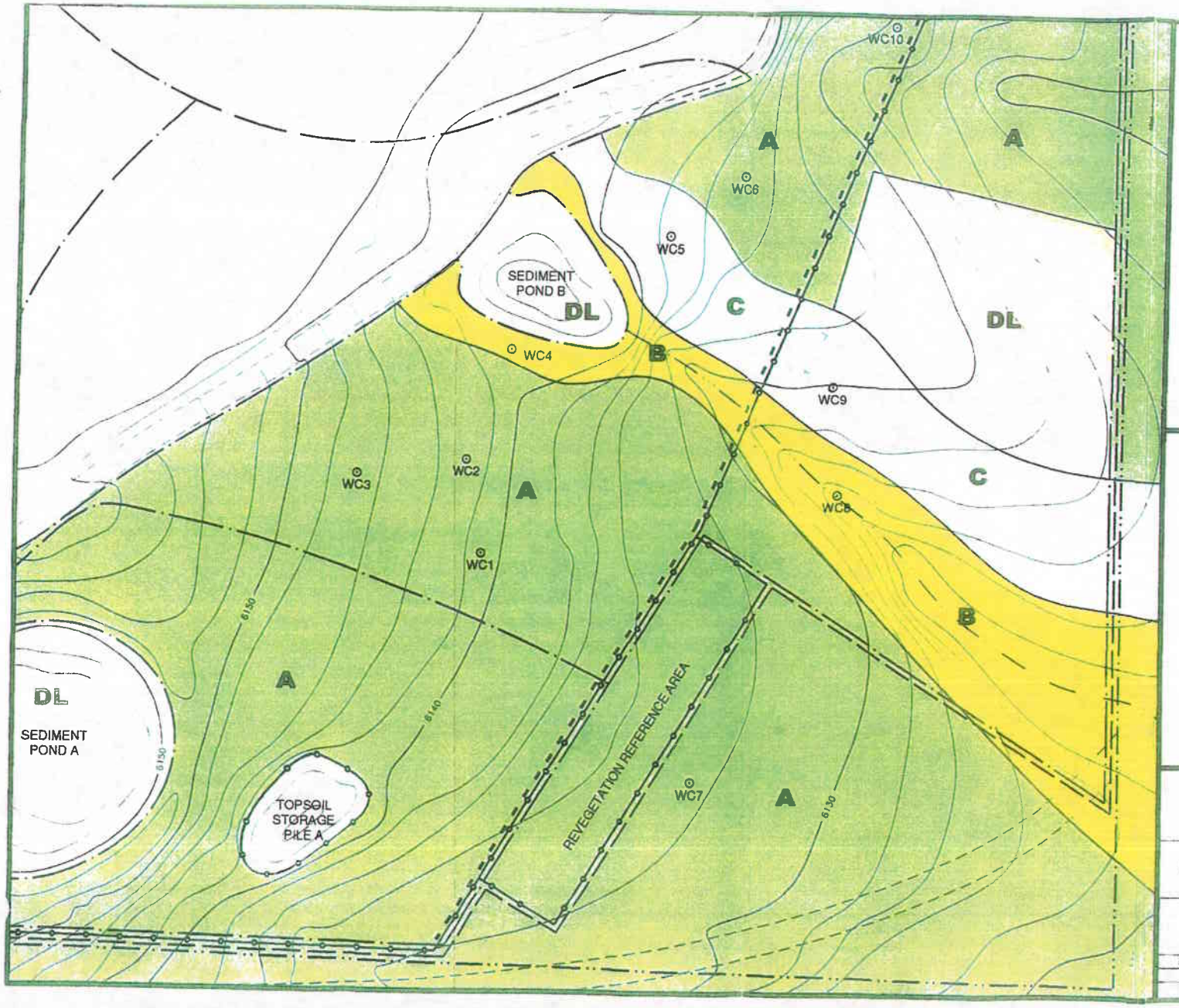
One sedimentation pond is present in the study area, and it is mapped as Disturbed Land. It is immediately adjacent to the current Wildcat Loadout facility. Soil salvage was not evaluated and is not recommended due to the amount of coal fines deposition in the pond. In addition, there is another Disturbed Land delineation in the study area – a recent oil and gas drilling pad. This bladed and highly compacted pad area is in the south-central to south-east portion of the study area, and has no soil available for salvage. It appears that topsoil was not salvaged during the construction of the pad because no soil stockpile was evident near the pad during the current soil survey.

REFERENCES

Jansen, Earl H. and James W. Borchert. 1988. Soil Survey of Carbon Area, Utah. USDA-Soil Conservation Service (now NRCS).

State of Utah, Division of Oil, Gas & Mining. 2002. Guidelines for Management of Topsoil and Overburden (*Draft*). Revised by Priscilla Burton and Robert Davidson. Department of Natural Resources, Salt Lake City, UT.

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining



LEGEND

- A — MAP UNIT A HERNANDEZ LOAM, 1 TO 6% SLOPES
- B — MAP UNIT B HAVERDAD LOAM, 2 TO 6% SLOPES
- C — MAP UNIT C STRYCH VARIANT, SHALLOW TO MODERATELY DEEP, 2 TO 6% SLOPES
- DL — MAP UNIT D DISTURBED LAND
- ⊙ SOIL SAMPLE LOCATIONS

SOIL SURVEY MAP

12 ACRE STUDY AREA

ANDALEX RESOURCES, INC.
WILDCAT LOADOUT

MT NEBO SCIENTIFIC, INC
RESEARCH & CONSULTING

FIELD MAPPED: [illegible]	CHECKED: [illegible]
DRAWN: [illegible]	DATE: [illegible]
FILE: [illegible]	[illegible]

APPENDIX
(Laboratory Data)

INCORPORATED
MAY 17 2006
Div. of Oil, Gas & Mining

Soil and Plant Analysis Lab
255 WIDB
Brigham Young University
Provo, Utah 84602
801-378-2147

Name: Rick Collins/Mt. Nebo
Address: P.O. Box 337
City, ST, ZIP: Springville, UT 84663
Date: 3/14/03

SOIL ID: Wildcat

Customer Sample ID	ppm P	ppm NO3-N	%OM	pH	EC dS\M	%Sand	%Clay
Wildcat 1 East 0-13"	4.52	4.39	2.79	7.68	0.65	43.84	24.72
Wildcat 1 East 13-23"	0.03	5.32	0.56	7.83	0.58	47.84	16.72
Wildcat 1 East 23-54"	1.51	2.07	0.67	8.18	2.00	26.56	29.72
Wildcat 2 North 0-12"	3.77	4.13	3.64	7.81	0.62	38.56	24.72
Wildcat 2 North 12-32"	0.79	2.67	0.90	7.83	0.60	32.20	25.72
Wildcat 2 North 32-54"	4.99	1.23	0.48	8.46	3.00	32.56	23.72

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

Soil and Plant Analysis Lab
255 WIDB
Brigham Young University
Provo, Utah 84602
801-378-2147

Name: Rick Collins/Mt. Nebo
Address: P.O. Box 337
City, ST, ZIP: Springville, UT 8466:
Date: 3/14/03

SOIL ID: Wildcat

Customer Sample ID	%Silt	ppm Ca-SAR	ppm Mg-SAR	ppm K-SAR	ppm Na-SAR	SAR
Wildcat 1 East 0-13"	31.44	129.20	29.44	40.65	13.51	0.28
Wildcat 1 East 13-23"	35.44	97.56	36.75	6.90	17.34	0.38
Wildcat 1 East 23-54"	43.72	49.15	142.00	6.10	60.82	0.99
Wildcat 2 North 0-12"	36.72	115.10	21.62	10.87	16.31	0.36
Wildcat 2 North 12-32"	42.08	92.96	30.80	9.29	21.07	0.48
Wildcat 2 North 32-54"	43.72	32.78	220.40	22.23	469.70	6.46

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

Soil and Plant Analysis Lab
255 WIDB
Brigham Young University
Provo, Utah 84602
801-378-2147

Name: Rick Collins/Mt. Nebo
Address: P.O. Box 337
City, ST, ZIP: Springville, UT 8466
Date: 3/14/03

SOIL ID: Wildcat

Customer Sample ID	%Moisture Sat.	%CaCO3	ppm HCO3
Wildcat 1 East 0-13"	35.17	9.66	270.25
Wildcat 1 East 13-23"	33.50	18.68	181.90
Wildcat 1 East 23-54"	39.56	15.55	161.11
Wildcat 2 North 0-12"	36.60	10.77	187.10
Wildcat 2 North 12-32"	37.29	13.75	174.11
Wildcat 2 North 32-54"	34.70	15.11	166.31

INCORPORATED
MAY 17 2003
Div. of Oil, Gas & Mining

Mr Patrick Collins/Mt Nebo Scientific Inc
330 East 400 South Suite 6
P O Box 337
Springville UT 84663

FAX 375-0372

Copy to [illegible]es Nyenhuis, Certified Soil Scientist

Colorado State University
Soil, Water and Plant Testing Laboratory
Natural & Environmental Sciences Bldg - A319
Fort Collins, CO 80523-1120

(970) 491-5061 FAX: 491-2930

DATE RECEIVED: 03-17-2003
DATE REPORTED: 04-15-2003

BILLING: S B19592

RESEARCH SOIL ANALYSIS

ANDALEX RESOURCES, WILDCAT LOADOUT, HELPER, UTAH

Lab #	Sample ID #	paste pH	paste EC mmhos/cm	% saturation	Lime Estimate	% OM	AB-DTPA Extract ppm NO_3-N	P	K	Zn	Fe	Mn	Cu
R3518	WC4 0-4	8.3	0.9	37.2	High	1.2	1.4	5.2	176	<0.01	4.49	1.05	0.63
R3519	WC4 4-14	8.5	0.7	36.7	High	1.0	1.5	4.5	147	<0.01	3.52	0.83	0.57
R3520	WC4 14-28	8.3	1.7	33.4	High	1.0	1.2	2.6	141	<0.01	4.11	0.72	0.87
R3521	WC4 28-58	8.0	4.2	36.2	High	0.9	0.9	3.4	117	<0.01	2.52	0.56	0.71
R3522	WC6 0-3½	7.9	0.6	36.4	High	2.1	3.0	11.0	360	0.16	4.06	2.10	1.50
R3523	WC6 3½-13	7.8	0.5	41.3	High	1.6	3.2	0.5	192	<0.01	3.81	0.97	0.93
R3524	WC6 13-25	8.0	0.5	37.7	High	1.2	2.3	0.5	84.9	<0.01	6.19	0.97	0.95
R3525	WC6 25-38	8.4	5.5	39.8	High	1.2	1.4	1.4	97.9	<0.01	7.03	0.83	0.77
R3526	WC6 38-64	8.5	10.1	45.6	High	1.7	1.6	4.5	174	0.07	6.12	0.77	1.14
R3527	WC7 0-3	7.9	0.5	35.1	High	2.6	1.8	7.5	274	0.29	4.62	1.78	1.54
R3528	WC7 3-10	7.8	0.5	36.5	High	2.1	2.2	0.5	273	0.05	4.27	0.95	1.29
R3529	WC7 10-22	7.9	0.4	41.1	High	1.9	3.0	0.4	103	<0.01	4.72	1.03	1.14
R3530	WC7 22-38	8.3	1.7	47.2	High	1.8	1.7	1.4	116	<0.01	4.77	1.10	0.91
R3531	WC7 38-56	8.6	2.4	36.5	High	1.2	1.4	4.0	106	<0.01	4.42	0.77	0.64
R3532	WC8 0-12	7.7	0.9	36.1	High	1.9	18.9	3.3	207	0.23	4.34	1.14	1.44
R3533	WC8 12-26	7.8	0.6	37.1	High	1.7	7.5	0.5	159	<0.01	3.51	0.74	0.93
R3534	WC8 26-54	7.9	0.4	33.5	High	1.5	2.6	0.6	81.5	<0.01	4.68	0.81	1.06
R3535	WC9 0-3	7.6	0.6	42.5	High	2.6	6.1	2.5	171	0.18	6.91	1.80	1.38
R3536	WC9 3-9	7.5	1.0	45.9	High	2.3	11.5	0.6	104	<0.01	5.51	1.28	1.04
R3537	WC9 9-16	7.8	0.5	43.4	High	0.9	6.1	0.6	55.3	0.01	3.18	0.86	1.03
R3538	WC10 0-12	8.0	1.7	38.1	High	1.5	1.2	1.7	91.5	<0.01	4.36	0.72	0.64
R3539	WC10 12-30	8.0	8.5	42.5	High	1.9	0.9	4.4	115	0.04	5.14	0.81	0.63
R3540	WC10 30-62	8.0	12.0	35.0	High	1.2	0.9	3.8	84.7	0.08	2.49	0.67	0.35

INCORPORATED
Div. of Oil, Gas & [illegible]

Mr Patrick Collins/Mt Nebo Scientific Inc
330 East 400 South Suite 6
P O Box 337
Springville UT 84663

Copy to [illegible]ics Nyenhuis, Certified Soil Scientist

Colorado State University
Soil, Water and Plant Testing Laboratory
Natural & Environmental Sciences Bldg - A319
Fort Collins, CO 80523-1120

(970) 491-5061 FAX: 491-2930

DATE RECEIVED: 03-17-2003
DATE REPORTED: 04-15-2003

BILLING: 5B19592

RESEARCH SOIL ANALYSIS

ANDALEX RESOURCES, WILDCAT LOADOUT, HELPER, UTAH

Lab #	Sample ID #	% Sand	% Silt	% Clay	Texture	% very fine sand from hydrometer	% $CaCO_3$ equiv	meq/L Ca	meq/L Mg	meq/L Na	meq/L K	SAR
R3518	WC4 0-4	42	35	23	Loam	38	11.8	2.0	6.8	2.2	0.6	1.0
R3519	WC4 4-14	42	38	20	Loam	42	12.8	0.9	5.9	1.4	0.6	0.7
R3520	WC4 14-28	40	40	20	Loam	38	13.6	2.7	5.4	11.3	0.6	5.6
R3521	WC4 28-58	48	36	16	Loam/Sandy Loam	46	11.3	15.4	17.9	18.8	<0.1	4.6
R3522	WC6 0-3½	36	36	28	Clay Loam	31	10.5	3.5	1.5	1.7	0.9	1.1
R3523	WC6 3½-13	30	40	30	Clay Loam	30	14.2	2.9	1.4	0.8	0.4	0.5
R3524	WC6 13-25	38	39	23	Loam	38	11.6	1.8	2.3	1.3	0.2	0.9
R3525	WC6 25-38	38	41	21	Loam	38	11.8	4.1	21.5	32.5	0.1	9.1
R3526	WC6 38-64	28	40	32	Clay Loam	24	11.8	4.8	29.8	69.3	0.2	16.7
R3527	WC7 0-3	40	34	26	Loam	38	6.40	3.8	1.2	0.7	0.3	0.5
R3528	WC7 3-10	38	46	16	Loam	38	7.10	2.9	1.1	0.7	0.4	0.5
R3529	WC7 10-22	30	42	28	Clay Loam	29	14.2	1.6	1.7	0.8	0.1	0.6
R3530	WC7 22-38	21	48	31	Clay Loam	18	16.6	1.8	9.4	6.8	0.2	2.9
R3531	WC7 38-56	40	41	19	Loam	40	12.3	1.0	8.6	14.9	0.5	6.8
R3532	WC8 0-12	36	45	19	Loam	36	6.17	6.3	1.6	0.5	0.2	0.3
R3533	WC8 12-26	39	39	22	Loam	39	9.43	3.4	1.1	0.7	0.3	0.4
R3534	WC8 26-54	42	39	19	Loam	42	8.15	1.7	1.2	0.7	0.1	0.6
R3535	WC9 0-3	48	29	23	Loam	37	27.1	3.6	1.1	0.5	0.3	0.3
R3536	WC9 3-9	49	30	21	Loam	47	21.7	4.5	2.0	0.5	1.6	0.3
R3537	WC9 9-16	52	30	18	Loam/Sandy Loam	51	21.8	2.8	1.4	0.4	0.1	0.3
R3538	WC10 0-12	34	44	22	Loam	33	14.4	7.2	7.8	1.3	<0.1	0.5
R3539	WC10 12-30	22	50	28	Clay Loam	17	10.7	17.4	25.7	38.9	<0.1	8.4
R3540	WC10 30-62	43	39	18	Loam/Sandy Loam	43	8.04	18.0	28.6	50.4	<0.1	10.4

APPROVED
TITLE Extension Soil Testing Specialist

A-5
INCORPORATED
Div. of Oil, Gas & Mining

APPENDIX R

SEDIMENTATION & DRAINAGE CONTROL PLAN

APPENDIX R

WILDCAT LOADOUT
SEDIMENTATION AND DRAINAGE CONTROL PLAN

UTAH REGISTERED
#154168
DAN W. GUY
7/6/10
PROFESSIONAL ENGINEER

PREPARED BY: DAN W. GUY, P.E.
BLACKHAWK ENGINEERING, INC.
JULY 2010

SEDIMENTATION AND DRAINAGE CONTROL PLAN
WILDCAT LOADOUT
TABLE OF CONTENTS

SECTION		PAGE NUMBER
1.	Introduction	1
2.	Design of Drainage Control Structures	3
	Design Parameters	
2.1	Precipitation	4
2.2	Flow	5
2.3	Velocity	6
2.4	Drainage Areas	6
2.5	Slopes, Lengths	6
2.6	Runoff	7
2.7	Runoff Curve Numbers	7
2.8	Culvert Sizing	8
2.9	Culverts	8
2.10	Ditches	9
2.11	Alternate Sediment Control Areas (ASCA)	10
2.12	Erosion Control	11
Table 1	Drainage Area Data	12
Table 2	Runoff Summary	14
Table 3	Drainage Structures	16
Table 4	Drainage Structure Flow Summary	19
Table 5	Ditch Data	22
Table 6	Ditch Design Summary	24
Table 7	Culvert Data	31
Table 8	Culvert Design Summary	33

Figures:

Figure 1	Culvert Nomograph
Figure 2	Rip-Rap Chart
Figure 3	Undisturbed and Disturbed Ditch, Typical Section

SEDIMENTATION AND DRAINAGE CONTROL PLAN
WILDCAT LOADOUT
TABLE OF CONTENTS (Continued)

SECTION		PAGE NUMBER
3.	Design of Sediment Control Structures	37
3.1	Design and Construction Specifications for Sedimentation Pond	38
3.2	Sediment Yield	40
3.3	Sediment Pond Volume	42
Table 9	Sediment Pond "C" Design	43
Table 10	Sediment Pond "E" Design	44
Table 11	Sediment Pond "F" Design	45
Table 12	Sediment Pond "G" Design	46
Table 13	Sediment Pond "A" Design	47
Table 14	Sediment Pond "D" Design	48
Table 15	Permanent Impoundment Design	49
Table 16	Depression Area Design	50
Table 17	Sediment Pond "C" Stage Volume Data (As-Constructed)	51
Table 18	Sediment Pond "E" Stage Volume Data (As-Constructed)	51
Table 19	Sediment Pond "F" Stage Volume Data (As-Constructed)	52
Table 20	Sediment Pond "G" Stage Volume Data (Proposed)	52
Table 21	Sediment Pond "A" Stage Volume Data (As-Constructed)	53
Table 22	Sediment Pond "D" Stage Volume Data (As-Constructed)	53
Table 23	Permanent Impoundment Stage Volume Data (As-Constructed)	54
Table 24	Depression Area Stage Volume Data (As-Constructed)	54
Table 25	Impoundment Discharge Data	55
Table 26	Sediment Ponds A, E and F Open-Channel Spillway Stage Discharge Data	56
3.4	Sediment Pond Summary	57

SEDIMENTATION AND DRAINAGE CONTROL PLAN
WILDCAT LOADOUT
TABLE OF CONTENTS (Continued)

SECTION		PAGE NUMBER
4.	Design of Drainage Control Structures for Reclamation Hydrology	58
4.1	General	59
4.2	Reclaimed Area Drainage Control	60
4.3	Restored Channels	61
4.4	Sediment Ponds	61
Table 27	Final Reclamation - Drainage Areas Contributing to Channels	62
Table 28	Final Reclamation - Drainage Structure Flow Summary	63
Table 29	Final Reclamation - Restored Channel Design Parameters	64
Table 30	Final Reclamation - Restored Channel Flow Calculations	65
Figure 4	Restored Channel, Typical Sections	

APPENDICES

Appendix 1 - Computer Backup Data

WILDCAT LOADOUT
SEDIMENTATION AND DRAINAGE CONTROL PLAN

1. Introduction

The Sedimentation and Drainage Control Plan for the Wildcat Loadout has been designed according to the State of Utah R645 - Coal Mining Rules, (revised August 1, 2001). This plan represents the proposed drainage control plan. All design criteria and construction has been certified by a Utah Registered Professional Engineer.

The entire drainage and control plan has been re-evaluated and updated for 2 main reasons:

(1) To evaluate the adequacy and provide up-to-date calculations for existing drainage controls, and;

(2) To provide an overall plan to accommodate the proposed modifications to the site.

The proposed changes to the site plan include the following:

(1) A 1.59 acre area east of the Primary Coal Storage Area will be cleaned by vacuuming coal fines from the surface. No topsoil will be removed from this area;

(2) A 3.84 acre area southeast of the Primary Coal Storage Area will be cleaned mechanically by removing coal fines and topsoil from the surface;

(3) Existing Sediment Pond "B" will be eliminated and replaced with a new, larger Sediment Pond "G" located in the SE corner of the property;

(4) Topsoil removed from the mechanically cleaned area and new Sediment Pond "G" will be placed on the existing Topsoil Pile "A" located in ASCA-4 east of Sediment Pond "A";

(5) One small ASCA (ASCA-8) will be added for the outslope of new Sediment Pond "G".

All existing and proposed structures are shown on updated Plates 1A and 2A.

The general surface water control plan for this site consists of the following:

(1) Wherever possible, undisturbed drainage is diverted around the site into natural channels;

(2) The entire disturbed area (except the 8 small ASCA's) and portions of the undisturbed area not diverted, are drained to one of the 6 sediment ponds, permanent impoundment or depression area, via properly sized ditches and culverts;

(3) There are 8 small Alternate Sediment Control Areas (A.S.C.A.). These areas are described in detail under Section 2.11.

(4) All sediment ponds are sized to contain the runoff from a 10 year - 24 hour precipitation event, plus a minimum of 3 years sediment storage as described in Section 3 of this Appendix. The Permanent Impoundment and Depression Area are sized to contain the runoff from a 100 year - 6 hour precipitation event.

DESIGN OF DRAINAGE CONTROL STRUCTURES

Design Parameters

2.1 Precipitation
2.2 Flow
2.3 Velocity
2.4 Drainage Area
2.5 Slope Lengths
2.6 Runoff
2.7 Runoff Curve Numbers
2.8 Culvert Sizing
2.9 Culverts
2.10 Ditches
2.11 ASCA Areas
2.12 Erosion Control

Table 1 Drainage Area Data
2 Runoff Summary
3 Drainage Structures
4 Drainage Structure Flow Summary
5 Ditch Data
6 Ditch Design Summary
7 Culvert Data
8 Culvert Design Summary

Figures

Figure 1 Culvert Nomograph
Figure 2 Rip-Rap Chart
Figure 3 Ditch, Typical Section (Unlined Ditch)
Figure 4 Ditch, Typical Section (Lined Ditch)

Design Parameters

2.1 Precipitation

The precipitation-frequency values for the area were taken from "NOAA, Precipitation-Frequency Atlas of the Western U.S., Atlas 2, Volume VI.

Frequency - Duration	Precipitation
2 year - 6 hour	0.85"
10 year - 6 hour	1.23"
10 year - 24 hour	1.85"
25 year - 6 hour	1.48"
25 year - 24 hour	2.15"
100 year - 6 hour	1.91"

Disturbed ditch and culvert designs for runoff control are based on the 10 year - 24 hour event of 1.85" and the 25 year - 6 hour event of 1.48", where required. Undisturbed culvert designs are based on the 10 year - 24 hour event of 1.85".

The sedimentation ponds are designed to contain the runoff from a 10 year - 24 hour event of 1.85" as required by the Division. Reclamation designs are based on the 100 year - 6 hour event of 1.91", where applicable for permanent structures.

ASCA areas are sized to contain or treat runoff from a 10 year - 24 hour precipitation event.

2.2 Flow

Peak flows, flow depths, areas and velocities were calculated using the computer program "Office of Surface Mining Watershed Model", Storm Version 6.20 by Gary E. McIntosh. (Trapezoidal Channel Flow). All flow is based on the SCS - TR55 Method for Type II storms.

Time of concentration of storm events was calculated for each drainage area using the following formula:

$$t_L = \frac{L^{0.8}(S+1)^{0.7}}{1900\,Y^{0.5}}$$

where:

t_c	=	Time of Concentration (hrs.)
t_L	=	Lag Time (hrs.) = 0.6 t_c
L	=	Hydraulic Length of Watershed (ft.)
Y	=	Average Land Slope (%)
S	=	$\frac{1000}{CN} - 10$

2.3 Velocity

Flow velocities for each ditch structure were calculated using the Storm computer program with Manning's Formula:

$$V = \frac{1.49}{n} R^{2/3} S^{1/2}$$

where:

V	=	Velocity (fps)
R	=	Hydraulic Radius (ft.)
S	=	Slope (ft. per ft.)
n	=	Manning's n; Table 3.1, p.159,

"Applied Hydrology and Sedimentology for Disturbed Areas", Barfield, Warner & Haan, 1983.

Note: The following Manning's n were used in the calculations:

Structure	Manning's n
Culverts (cmp)	0.020
Rip-rapped or Natural Drainage Channels	0.035 - 0.040
Unlined Disturbed Area Ditches	0.035 - 0.040
Bedrock Channels with Rubble	0.030
Concrete Lined Channels	0.015

2.4 Drainage Areas

All drainage areas are disignated with a DA-number (i.e. DA-2) as shown on Plate 2 and 15. All drainage areas were planimetered directly from As-Constructed Plate 2 (Drainage Map) and Plate 15 (Watershed Map).

2.5 Slopes, Lengths

All slopes and hydraulic lengths were measured directly from the topography on Plates 2 and 15.

2.6 Runoff

Runoff was calculated using the SCS Formula for Type II Storm:

$$Q = \frac{(P - 0.2\,S)^2}{P + 0.8\,S}$$

where:

Q	=	Runoff in inches
P	=	Precipitation in inches
S	=	$\frac{1000}{CN} - 10$
CN	=	Runoff Curve Number

2.7 Runoff Curve Numbers

A runoff curve number of 90 was used for all disturbed areas. This is a conservative number based on the SCS determinations for Runoff Curve Numbers for Antecedent Moisture Condition II. A runoff curve number of 65 was used for undisturbed areas. This number is based on the SCS determinations for Runoff Curve Numbers for Antecedent Moisture Condition II, Soil Group B, Range Land in Fair to Good Condition.

The selection of the curve number is also based on field observations and subsequent discussions with DOGM personnel.

The native soil in the area is quite sandy and porous in nature, resulting in a relatively low runoff potential. This was the basis for the selection of SCS Soil Group B.

The runoff numbers were also checked against the chart in Figure 2.26, page 85, "Applied Hydrology and Sedimentology for Disturbed Areas", Barfield, Warner, and Haan, 1983.

2.8 Culvert Sizing

All culverts were sized using the "Haestad Methods, Flowmaster I, Version 3.43" Computer Program.

Minimum culvert sizing is based on the following Manning's Equation:

$$D = \left(\frac{2.16\ Q\ n}{\sqrt{s}}\right)^{0.35}$$

where:	D	=	Required Diameter (ft.)
	Q	=	QP = Peak Discharge (cfs)
	n	=	Roughness Factor (0.020 for cmp)
	S	=	Slope (ft. per ft.)

Using the above formula, minimum required culvert sizes were calculated for each applicable area. Culverts were then selected above the required minimum, and these sizes were checked for adequacy against the Culvert Nomograph included as Figure 1 of this report.

2.9 Culverts

Culverts have been sized according to the calculations previously described, and are shown on Plate 2, Drainage Control Map.

All culverts are designated with C-number (i.e. C-2) as shown on Plate 2. All culverts are sized to carry the runoff from a 10 year - 24 hour storm, which is well in excess of the 10 year - 6 hour storm required by the regulations. The only exceptions to the above culvert sizing is for culverts used as sediment pond overflows - these culverts are sized to carry the 25 year - 6 hour flows as required for sediment pond designs.

Culverts will be inspected regularly, and cleaned as necessary to provide for passage of design flows. Inlets and outlets shall also be maintained so as to prevent plugging or undue restriction of water flow.

All disturbed area culverts are temporary, and will be removed upon final reclamation.

2.10 Ditches

Ditches are shown on the Minesite Drainage Plan, Plate 2, and are designated with a D-number (i.e., D-2).

All ditches are designed to carry the expected runoff from a 10 year - 24 hour event with a minimum freeboard of 0.5' (See Figures 3 and 4). The 0.5' freeboard represents a minimum of 20% of the flow depth in all disturbed area ditches.

Ditches which exhibit expected flow velocities greater than 5 fps, based on the 10 year - 24 hour runoff, will be lined with rip-rap, belting or ½ round culvert for erosion protection. Typical cross-sections, flow depths and areas for all lined and unlined ditches are shown on Figures 3 and 4 of this report.

Ditch slopes have been determined from Plate 2

All ditches will be inspected regularly, and maintained to the minimum dimensions for the required 10 year - 24 hour runoff to provide adequate capacity for the design flow. All ditches are temporary and will be removed as described under the reclamation hydrology section. (Section 4)

2.11 Alternate Sediment Control Areas (ASCA)

There will be 8 Alternate Sediment Control Areas (ASCA) remaining on this site. The ASCA designations are ASCA-1, ASCA-2, ASCA-3, ASCA-4, ASCA-5, ASCA-6, ASCA-7 and ASCA-8. Only areas not able to be drained to sediment ponds are included as ASCA's. All ASCA's are existing, except ASCA-8, which will be added for the outslope of new Sediment Pond "G".

The following are descriptions of each of the ASCA's and methods of treatment:

ASCA-1 - This is the area west of the railroad right-of-way and scale house access road. The area is approximately 0.76 acres and is treated for sediment control by vegetation.

ASCA-2 - This is an existing ASCA area on the outslope east of Sediment Pond E. The area is approximately 0.15 acres and is treated by vegetation.

ASCA-3 - This is an area north of new Sediment Pond"G", and includes the area proposed for vacuum cleaning. The area is approximately 2.32 acres and is treated for sediment by straw bales and vegetation.

ASCA-4 - This is the area surrounding Sediment Pond "A" and including Topsoil Storage Pile A. This is an area of approximately 2.73 acres and is treated by straw bales and vegetation.

ASCA-5 - This is the area south and west of Topsoil Storage Piles E and B, including those piles. The area is approximately 1.71 acres, and is treated by a combination of berms, straw bales and vegetation.

ASCA-6 - This is an area southeast of the train loading facility along the Disturbed Area boundary. It is approximately 1.08 acres and is treated by vegetation.

ASCA-7 - This is Topsoil Storage Pile F. It is approximately 0.30 acres and is treated by a berm and vegetation.

ASCA-8 - This will be a new ASCA located on the outslope of new Sediment Pond G. It will have an area of approximately 0.27 acres, and will be treated by vegetation and a berm.

2.12 Erosion Control

Wherever rip-rap is designated to be used, i.e. Culvert Outlets or Unlined Ditches, the following procedure shall be used:

(1) Rip-rap will consist of hard, non-slaking angular, material;

(2) Rip-rap shall meet the following size criteria:

Rip-Rap Sizing	Percent (+ or - 10%)
0.1 D_{50} - 0.5 D_{50}	20
0.5 D_{50} - 1.0 D_{50}	30
1.0 D_{50} - 2.0 D_{50}	50

(3) Rip-rap shall be placed over a filter bedding consisting of -3/4" gravel and placed to a depth of at least the D_{50} of the rip-rap;

(4) Rip-rap depth shall be at least 1.5 times the D_{50} of the material;

(5) Belting, ½ round culvert, concrete lining or grouting of rip-rap may be used in lieu of the above procedures.

TABLE 1
DRAINAGE AREA DATA

Area	Acres	Hydraulic Length	High Elev.	Low Elev.	Change Elev.	Slope %	Runoff CN
DA-1	1.58	250	6198	6184	14	5.60	90
DA-2	1.01	100	6184	6180	4	4.00	90
DA-3	0.80	130	6178	6172	6	4.61	90
DA-4	1.26	230	6176	6170	6	2.61	90
DA-5	1.31	420	6176	6159	17	4.05	90
DA-6	3.09	550	6176	6142	34	6.18	90
DA-7	1.33	400	6164	6142	22	5.50	90
DA-8	3.58	520	6174	6140	34	6.54	90
DA-9	3.45	460	6174	6140	34	7.39	90
DA-9a	0.61	350	6156	6142	14	4.00	90
DA-11	4.50	600	6196	6178	18	3.00	90
DA-12	0.42	480	6172	6172	2	0.50	90
DA-13	0.65	300	6174	6160	14	4.67	90
DA-14	0.76	600	6160	6156	4	0.67	90
DA-15	0.34	280	6168	6158	8	2.86	90
DA-16	3.05	640	6160	6138	22	3.44	90
DA-17	3.67	680	6160	6138	22	3.23	90
DA-18	5.04	480	6160	6134	26	5.42	90
DA-19	1.72	370	6188	6178	10	2.70	90
DA-20	2.48	250	6178	6158	20	8.00	90
DA-21	1.99	330	6162	6158	4	1.21	90
DA-22	3.79	400	6172	6152	20	5.00	90
DA-23	1.74	300	6162	6142	20	6.67	90
DA-24	5.24	770	6158	6128	30	3.90	90
DA-29	1.47	350	6214	6196	18	5.14	90

Area	Acres	Hydraulic Length	High Elev.	Low Elev.	Change Elev.	Slope %	Runoff CN
DA-30	1.35	400	6216	6196	20	5.00	90
DA-31	1.79	1100	6200	6176	24	2.18	90
DA-32	2.23	1100	6200	6176	24	2.18	90
DA-33	6.43	600	6190	6180	10	1.67	90
DA-34	85.40	2900	6460	6200	260	8.97	65
DA-35	3.05	200	6286	6200	86	43.00	65
DA-36	2.18	820	6286	6180	106	12.93	65
DA-37	202.76	5600	6420	6130	290	5.18	65
DA-38	15.30	1150	6330	6188	142	12.35	65
ASCA-1	0.76	500	6188	6172	16	3.20	90
ASCA-2	0.15	230	6150	6140	10	4.35	90
ASCA-3	2.32	400	6142	6132	10	2.50	90
ASCA-4	2.73	425	6156	6138	18	4.23	90
ASCA-5	1.71	425	6202	6180	22	5.18	90
ASCA-6	1.08	350	6176	6146	30	8.57	90
ASCA-7	0.30	75	6164	6152	12	16.00	90
ASCA-8	0.27	75	6128	6118	10	13.33	90

TABLE 2
RUNOFF SUMMARY

Drainage Area	10 yr - 6 hr 1.23"	10 yr - 24 hr 1.85"		25 yr- 6 hr 1.48"	100 yr - 6 hr 1.91"	Drains To:
	Peak Flow (cfs)	Peak Flow (cfs)	Runoff (ac.ft)	Peak Flow (cfs)	Peak Flow (cfs)	
DA-1	0.59	1.27	0.13	0.82	1.24	Pond E
DA-2	0.30	0.65	0.08	0.42	0.63	Pond E
DA-3	0.25	0.55	0.06	0.35	0.53	Pond E
DA-4	0.51	1.11	0.10	0.71	1.08	Pond E
DA-5	0.57	1.24	0.11	0.80	1.21	Pond E
DA-6	1.35	2.95	0.25	1.89	2.86	Pond E
DA-7	0.56	1.22	0.11	0.78	1.19	Pond E
DA-8	1.55	3.38	0.29	2.17	3.29	Pond D
DA-9	1.45	3.16	0.28	2.03	3.07	Pond D
DA-9a	0.26	0.56	0.05	0.36	0.55	Pond D
DA-11	1.94	4.31	0.36	2.73	4.17	Pond C
DA-12	0.15	0.36	0.03	0.22	0.34	Pond C
DA-13	0.26	0.57	0.05	0.36	0.55	Pond C
DA-14	0.27	0.65	0.06	0.39	0.62	Pond C
DA-15	0.14	0.31	0.03	0.20	0.30	Pond C
DA-16	1.32	2.92	0.25	1.85	2.83	Pond C
DA-17	1.55	3.45	0.30	2.18	3.33	Pond C
DA-18	2.19	4.77	0.41	3.06	4.63	Pond C
DA-19	0.75	1.64	0.14	1.05	1.60	Pond A
DA-20	0.88	1.91	0.20	1.23	1.85	Pond A
DA-21	0.89	1.95	0.16	1.24	1.89	Pond A
DA-22	1.61	3.51	0.31	2.25	3.41	Pond A
DA-23	0.66	1.43	0.14	0.92	1.40	Pond G
DA-24	2.19	4.89	0.42	3.09	4.73	Pond G
DA-29	0.61	1.32	0.12	0.85	1.28	Permanent Imp.
DA-30	0.57	1.25	0.11	0.8	1.21	Pond F

Drainage Area	10 yr - 6 hr 1.23"	10 yr - 24 hr 1.85"		25 yr- 6 hr 1.48"	100 yr - 6 hr 1.91"	Drains To:
	Peak Flow (cfs)	Peak Flow (cfs)	Runoff (ac.ft)	Peak Flow (cfs)	Peak Flow (cfs)	
DA-31	0.64	1.52	0.14	0.93	1.45	Pond F
DA-32	0.80	1.90	0.18	1.16	1.81	Pond F
DA-33	2.56	5.81	0.52	3.64	5.59	Depression Area
DA-34	0.39	1.81	0.69	1.27	3.13	Permanent Imp.
DA-35	0.01	0.06	0.02	0.03	0.07	UD-8
DA-36	0.01	0.07	0.02	0.03	0.09	UD-2
DA-37	0.71	3.42	1.64	2.66	6.89	ND-1
DA-38	0.08	0.43	0.12	0.24	0.61	UD-1
ASCA-1	0.34	0.74	0.06	0.47	0.72	ND-1
ASCA-2	0.06	0.12	0.01	0.08	0.12	ND-1
ASCA-3	1.02	2.23	0.19	1.43	2.17	ND-1
ASCA-4	1.19	2.58	0.22	1.66	2.51	ND-2
ASCA-5	0.73	1.60	0.14	1.02	1.55	ND-2
ASCA-6	0.42	0.90	0.09	0.58	0.87	ND-2
ASCA-7	0.07	0.14	0.02	0.09	0.14	ND-1
ASCA-8	0.06	0.13	0.02	0.09	0.13	ND-2

TABLE 3
DRAINAGE STRUCTURES

Structure	Drainage From:	Remarks:
C-1	DA-36	Flows to UD-2
C-2	C-1	Flows to UD-2
C-3	C-2	Flows to UD-2
UD-2	C-3	Flows to Natural Drainage ND-1
C-4	UD-2	Flows to Natural Drainage ND-1
C-5	DA-37 + UD-2	Flows to Natural Drainage ND-1
C-6	DA-1	Drains to Pond E
D-1	C-6 + DA-2	Drains to Pond E
C-7	D-1	Drains to Pond E
C-8	C-7	Drains to Pond E
D-2	C-8	Drains to Pond E
C-9	D-2	Drains to Pond E
C-10	DA-3	Drains to Pond E
C-11	DA-4	Drains to Pond E
D-3	C-10, C-11	Drains to Pond E
D-4	C-9 + D-3	Drains to Pond E
C-12	D-4 + DA-6	Drains to Pond E
D-5	DA-5	Drains to Pond E
C-13	D-5	Drains to Pond E
D-6	C-12 + C13	Inlet to Pond E
D-7	DA-7	Inlet to Pond E
C-14	Pond E	Principle Outlet from Pond E
C-15	DA-34, DA-35	Permanent Impoundment Principle Spillway
C-16	DA-34, DA-35	Permanent Impoundment Emergency Spillway
D-8	DA-8	Drains to Pond D
D-9	DA-9	Drains to Pond D
C-17	DA-9a	Drains to Pond D
C-17a	Pond D	Principle Outlet from Pond D
C-17b	Pond D	Emergency Outlet from Pond D

Structure	Drainage From:	Remarks:
C-18	DA-11	Flows to Pond C
D-11	C-18	Flows to Pond C
D-12	DA-12	Flows to Pond C
C-19	D-12	Flows to Pond C
D-13	C-19 + DA-13	Flows to Pond C
C-20	D-11 + D-13	Flows to Pond C
C-21	D-14	Flows to Pond C
D-14	DA-14	Flows to Pond C
C-22	D-14	Flows to Pond C
C-23	C-20 + C-22	Flows to Pond C
D-15	DA-15	Flows to Pond C
C-24	C-23 + D-15	Inlet to Pond C
C-25	DA-16	Flows to Pond C
D-16	C-25	Flows to Pond C
C-26	DA-17	Flows to Pond C
D-17	C-26	Flows to Pond C
C-27	D-16 + D-17	Flows to Pond C
C-28	DA-18	Flows to Pond C
D-18	C-28	Flows to Pond C
D-19	C-27 + D-18	Inlet to Pond C
C-29	Pond C	Principle Spillway Pond C
C-30	Pond C	Emergency Spillway Pond C
C-31	DA-19	Flows to Pond A
D-20	½ DA-20	Flows to Pond A
C-32	C-31 + D-20	Flows to Pond A
D-21	C-32	Flows to Pond A
D-22	½ DA-20	Flows to Pond A
C-33	D-22	Flows to Pond A
D-23	D-21 + C-33	Flows to Pond A
C-34	D-23 + DA-21	Flows to Pond A
D-24	1/4 DA-22	Flows to Pond A

Structure	Drainage From:	Remarks:
C-35	D-24	Flows to Pond A
C-35a	Pond A	Principle Spillway from Pond A
D-25	C-36, DA-24	Inlet to New Pond G
C-36	DA-23	Flows to New Pond G
D-31	DA-29	Flows to Permanent Impoundment
D-32	DA-30	Flows to Pond F
D-33	DA-31	Flows to Pond F
D-34	D-32 + D-33	Inlet to Pond F
D-35	DA-32	Inlet to Pond F
C-38	Pond F	Principle Spillway from Pond F
C-39	Pond G	Principle Spillway from Pond G
C-40	Pond G	Emergency Overflow Pond G
UD-1	DA-38	Natural Drainage ND-2
UD-8	DA-35	Flows to Permanent Impoundment
Permanent Impoundment	DA-34 + UD-8	Flows to Depression Area
Depression Area	DA-33 + Permanent Impoundment	No Outlet

TABLE 4
DRAINAGE STRUCTURE FLOW SUMMARY

Area	10/6 cfs	10/24 cfs	25/6 cfs	100/6 cfs	Flows to:
D-1	0.89	1.92	1.24	1.87	Pond E
D-2	0.89	1.92	1.24	1.87	Pond E
D-3	0.76	1.66	1.06	1.61	Pond E
D-4	1.65	3.58	2.30	3.48	Pond E
D-5	0.57	1.24	0.80	1.21	Pond E
D-6	3.57	7.77	4.99	7.55	Inlet to Pond E
D-7	0.56	1.22	0.78	1.19	Inlet to Pond E
D-8	1.55	3.38	2.17	3.29	Pond D
D-9	1.45	3.16	2.03	3.07	Pond D
D-11	1.94	4.31	2.73	4.17	Pond C
D-12	0.15	0.36	0.22	0.34	Pond C
D-13	0.41	0.93	0.58	0.89	Pond C
D-14	0.27	0.65	0.39	0.62	Pond C
D-15	0.14	0.31	0.20	0.30	Pond C
D-16	1.32	2.92	1.85	2.83	Pond C
D-17	1.55	3.45	2.18	3.33	Pond C
D-18	2.19	4.77	3.06	4.63	Pond C
D-19	5.06	11.14	7.09	10.79	Inlet to Pond C
D-20	0.44	0.96	0.62	0.93	Pond A
D-21	1.19	2.60	1.85	2.78	Pond A
D-22	0.44	0.96	0.62	0.93	Pond A
D-23	1.63	3.56	2.47	3.71	Pond A
D-24	0.40	0.88	0.56	0.85	Pond A
D-25	2.85	6.32	4.01	6.13	Inlet to Pond G
D-31	0.61	1.37	0.85	1.28	To Permanent Impoundment
D-32	0.57	1.25	0.80	1.21	To Pond F
D-33	0.64	1.52	0.93	1.45	To Pond F
D-34	1.21	2.77	1.73	2.66	Inlet to Pond F
D-35	0.80	1.90	1.16	1.81	Inlet to Pond F

Area	10/6 cfs	10/24 cfs	25/6 cfs	100/6 cfs	Flows to:
C-1	0.01	0.07	0.03	0.09	ND-1
C-2	0.01	0.07	0.03	0.09	ND-1
C-3	0.01	0.07	0.03	0.09	ND-1
C-4	0.01	0.07	0.03	0.09	ND-1
C-5	0.72	3.49	2.69	6.98	ND-1
C-6	0.59	1.27	0.82	1.24	Pond E
C-7	0.89	1.92	1.24	1.87	Pond E
C-8	0.89	1.92	1.24	1.87	Pond E
C-9	0.89	1.92	1.24	1.87	Pond E
C-10	0.25	0.55	0.35	0.53	Pond E
C-11	0.51	1.11	0.71	1.08	Pond E
C-12	3.00	6.53	4.19	6.34	Pond E
C-13	0.57	1.24	0.80	1.21	Pond E
C-14	4.13	8.99	5.77	8.74	Principle Spillway Outlet Pond E
C-15	1.01	3.19	2.15	4.48	Depression Area
C-16	1.01	3.19	2.15	4.48	Depression Area
C-17	0.26	0.56	0.36	0.55	Pond D
C-17a	3.26	7.10	4.56	6.91	Principle Spillway Pond D
C-17b	3.26	7.10	4.56	6.91	Emergency Spillway Pond D
C-18	1.94	4.31	2.73	4.17	Pond C
C-19	0.15	0.36	0.22	0.34	Pond C
C-20	2.35	5.24	3.31	5.06	Pond C
C-21	0.27	0.65	0.39	0.62	Pond C
C-22	0.27	0.65	0.39	0.62	Pond C
C-23	2.62	5.89	3.70	5.68	Pond C
C-24	2.76	6.20	4.00	5.98	Inlet to Pond C
C-25	1.32	2.92	1.85	2.83	Pond C
C-26	1.55	3.45	2.18	3.33	Pond C
C-27	2.87	6.37	4.03	6.16	Pond C
C-28	2.19	4.77	3.06	4.63	Pond C

Area	10/6 cfs	10/24 cfs	25/6 cfs	100/6 cfs	Flows to:
C-29	7.82	17.34	11.09	16.77	Principle Spillway Outlet
C-30	7.82	17.34	11.09	16.77	Emergency Spillway Outlet
C-31	0.75	1.64	1.05	1.60	Pond A
C-32	1.19	2.60	1.67	2.53	Pond A
C-33	0.44	0.96	0.62	0.93	Pond A
C-34	2.52	5.51	3.71	5.60	Pond A
C-35	0.40	0.88	0.56	0.85	Pond A
C-35a	4.13	9.01	5.77	8.75	Principle Spillway Outlet Pond A
C-36	0.66	1.43	0.92	1.40	Pond G
C-38	2.01	4.67	2.89	4.47	Principle Spillway Outlet Pond F
UD-1	0.08	0.43	0.24	0.61	Natural Drainage ND-2
UD-2	0.01	0.07	0.03	0.09	ND-1
UD-8	0.01	0.06	0.03	0.07	Permanent Impoundment
Permanent Impoundment	0.40	1.87	1.30	3.20	Depression Area
Depression Area	2.96	7.68	4.94	8.79	Depression Area
ASCA-1	0.34	0.74	0.47	0.72	ND-1
ASCA-2	0.06	0.12	0.08	0.12	ND-1
ASCA-3	1.02	2.23	1.43	2.17	Straw Bales/ND-1
ASCA-4	1.19	2.58	1.66	2.51	Berm/ND-2
ASCA-5	0.73	1.60	1.02	1.55	Berm/Straw Bales/ND-2
ASCA-6	0.42	0.90	0.58	0.87	Vegetation/ND-2
ASCA-7	0.07	0.14	0.09	0.14	Berm/ND-1
ASCA-8	0.06	0.13	0.09	0.13	Berm/ND-2
ND-1	0.71	3.42	2.66	6.89	-

TABLE 5
DITCH DATA

Area ID	Hydraulic Length	High Elevation	Low Elevation	Change Elevation	Slope %	Manning's No.
D-1	50	6180	6178	2	4.0	0.035
D-2	150	6166	6164	2	1.3	0.035
D-3	595	6170	6162	8	1.3	0.035
D-4	90	6162	6160	2	2.2	0.035
D-5	170	6164	6158	6	3.5	0.035
D-6	150	6156	6144	12	8.0	0.035
D-7	150	6154	6144	10	6.7	0.035
D-8	540	6160	6142	18	3.3	0.035
D-9	580	6168	6142	26	4.5	0.035
D-11	620	6162	6156	6	1.0	0.035
D-12	460	6176	6172	4	0.9	0.035
D-13	150	6162	6158	4	2.7	0.035
D-14	410	6162	6158	4	1.0	0.035
D-15	190	6162	6156	6	3.2	0.035
D-16	170	6141	6138	3	1.8	0.035
D-17	90	6140	6138	2	2.2	0.035
D-18	130	6140	6136	4	3.1	0.035
D-19	95	6136	6128	8	8.4	0.035
D-20	470	6176	6166	10	2.1	0.035
D-21	120	6162	6160	2	1.7	0.035
D-22	220	6163	6160	3	1.4	0.035
D-23	260	6160	6157	3	1.2	0.035
D-24	130	6178	6176	2	1.5	0.035
D-25	425	6142	6128	14	3.3	0.035
D-31	300	6211	6206	5	1.7	0.035

Area ID	Hydraulic Length	High Elevation	Low Elevation	Change Elevation	Slope %	Manning's No.
D-32	470	6211	6196	15	3.2	0.035
D-33	580	6102	6196	6	1.0	0.035
D-34	580	6196	6170	26	4.5	0.035
D-35	350	6181	6170	11	3.1	0.030
UD-1	1960	6234	6188	46	2.3	0.035
UD-2	325	6178	6174	4	1.2	0.035
UD-8	625	6200	6192	8	1.3	0.035

TABLE 6
DITCH DESIGN SUMMARY

Ditch Structure	D-1	D-2	D-3	D-4	D-5
10 yr - 6 hr event (in.)	1.23	1.23	1.23	1.23	1.23
Peak Flow (cfs)	0.89	0.89	0.76	1.65	0.57
Velocity (fps)	2.72	1.79	1.72	2.54	2.32
Required Area (ft^2)	0.33	0.50	0.44	0.65	0.25
Flow Depth (ft.)	0.40	0.50	0.47	0.57	0.35
10 yr - 24 hr event (in.)	1.85	1.85	1.85	1.85	1.85
Peak Flow (cfs)	1.92	1.92	1.66	3.58	1.24
Velocity (fps)	3.30	2.17	2.09	3.08	2.81
Required Area (ft^2)	0.58	0.89	0.80	1.16	0.44
Flow Depth (ft.)	0.54	0.67	0.63	0.76	0.47
Construction					
Minimum Area (ft^2)	2.16	2.74	2.55	3.18	1.88
Minimum Depth (ft.)	1.04	1.17	1.13	1.26	0.97
*Erosion Protection	N	N	N	N	N
Type	-	-	-	-	-

* Based on 10 year - 24 hour flow.

TABLE 6 (Continued)
DITCH DESIGN SUMMARY

Ditch Structure	D-6	D-7	D-8	D-9
10 yr - 6 hr event (in.)	1.23	1.23	1.23	1.23
Peak Flow (cfs)	3.57	0.56	1.55	1.45
Velocity (fps)	5.00	2.94	2.91	3.22
Required Area (ft^2)	0.71	0.19	0.53	0.45
Flow Depth (ft.)	0.60	0.31	0.52	0.47
10 yr - 24 hr event (in.)	1.85	1.85	1.85	1.85
Peak Flow (cfs)	7.77	1.22	3.38	3.16
Velocity (fps)	6.07	3.57	3.54	3.91
Required Area (ft^2)	1.28	0.34	0.96	0.81
Flow Depth (ft.)	0.80	0.41	0.69	0.64
Construction				
Minimum Area (ft^2)	3.38	1.66	2.83	2.60
Minimum Depth (ft.)	1.30	0.91	1.19	1.14
*Erosion Protection	Y	N	N	N
Type	½ Round Culvert	-	-	-

* Based on 10 year - 24 hour flow.

TABLE 6 (Continued)
DITCH DESIGN SUMMARY

Ditch Structure	D-11	D-12	D-13	D-14	D-15
10 yr - 6 hr event (in.)	1.23	1.23	1.23	1.23	1.23
Peak Flow (cfs)	1.94	0.15	0.41	0.27	0.14
Velocity (fps)	1.97	1.00	1.94	1.20	1.58
Required Area (ft^2)	0.99	0.15	0.21	0.22	0.09
Flow Depth (ft.)	0.70	0.27	0.33	0.34	0.21
10 yr - 24 hr event (in.)	1.85	1.85	1.85	1.85	1.85
Peak Flow (cfs)	4.31	0.36	0.93	0.65	0.31
Velocity (fps)	2.40	1.24	2.38	1.50	1.50
1.92Required Area (ft^2)	1.79	0.29	0.39	0.43	0.16
Flow Depth (ft.)	0.95	0.38	0.44	0.47	0.28
Construction					
Minimum Area (ft^2)	4.20	1.55	1.77	1.88	1.22
Minimum Depth (ft.)	1.45	0.88	0.94	0.97	0.78
*Erosion Protection	N	N	N	N	N
Type	-	-	-	-	-

* Based on 10 year - 24 hour flow.

TABLE 6 (Continued)
DITCH DESIGN SUMMARY

Ditch Structure	D-16	D-17	D-18	D-19	D-20
10 yr - 6 hr event (in.)	1.23	1.23	1.23	1.23	1.23
Peak Flow (cfs)	1.32	1.55	2.19	5.06	0.44
Velocity (fps)	2.23	2.50	3.10	5.55	1.79
Required Area (ft^2)	0.59	0.62	0.71	0.91	0.25
Flow Depth (ft.)	0.54	0.56	0.59	0.68	0.35
10 yr - 24 hr event (in.)	1.85	1.85	1.85	1.85	1.85
Peak Flow (cfs)	2.92	3.45	4.77	11.14	0.96
Velocity (fps)	2.72	3.05	3.76	6.76	2.18
Required Area (ft^2)	1.07	1.13	1.27	1.65	0.44
Flow Depth (ft.)	0.73	0.75	0.80	0.91	0.47
Construction					
Minimum Area (ft^2)	3.03	3.13	3.38	3.98	1.51
Minimum Depth (ft.)	1.23	1.25	1.30	1.41	0.87
*Erosion Protection	N	N	N	Y	N
Type	-	-	-	½ Round Culvert Belt	-

* Based on 10 year - 24 hour flow.

TABLE 6 (Continued)
DITCH DESIGN SUMMARY

Ditch Structure	D-21	D-22	D-23	D-24	D-25
10 yr - 6 hr event (in.)	1.23	1.23	1.23	1.23	1.23
Peak Flow (cfs)	1.19	0.44	1.63	0.40	2.85
Velocity (fps)	2.12	1.54	2.02	1.54	3.39
Required Area (ft^2)	0.56	0.29	0.81	0.26	0.84
Flow Depth (ft.)	0.53	0.38	0.64	0.36	0.65
10 yr - 24 hr event (in.)	1.85	1.85	1.85	1.85	1.85
Peak Flow (cfs)	2.60	0.96	3.56	0.88	6.32
Velocity (fps)	2.58	1.87	2.45	1.88	4.14
Required Area (ft^2)	1.01	0.51	1.45	0.47	1.53
Flow Depth (ft.)	0.71	0.51	0.85	0.48	0.87
Construction					
Minimum Area (ft^2)	2.93	2.04	3.65	1.92	3.75
Minimum Depth (ft.)	1.21	1.01	1.35	0.98	1.37
*Erosion Protection	N	N	N	N	N
Type	-	-	-	-	-

* Based on 10 year - 24 hour flow.

TABLE 6 (Continued)
DITCH DESIGN SUMMARY

Ditch Structure	D-31	D-32	D-33	D-34	D-35
10 yr - 6 hr event (in.)	1.23	1.23	1.23	1.23	1.23
Peak Flow (cfs)	0.61	0.57	0.64	1.21	0.80
Velocity (fps)	1.80	2.24	1.49	3.07	2.41
Required Area (ft^2)	0.34	0.25	0.43	0.39	0.33
Flow Depth (ft.)	0.41	0.36	0.46	0.44	0.41
10 yr - 24 hr event (in.)	1.85	1.85	1.85	1.85	1.85
Peak Flow (cfs)	1.32	1.25	1.52	2.77	1.90
Velocity (fps)	2.18	2.73	1.85	3.78	2.99
Required Area (ft^2)	0.61	0.46	0.82	0.73	0.64
Flow Depth (ft.)	0.55	0.48	0.64	0.61	0.56
Construction					
Minimum Area (ft^2)	2.21	1.92	2.60	2.46	2.69
Minimum Depth (ft.)	1.05	0.98	1.14	1.11	1.16
*Erosion Protection	N	N	N	N	N
Type	-	-	-	-	-

* Based on 10 year - 24 hour flow.

TABLE 6 (Continued)
DITCH DESIGN SUMMARY

Ditch Structure	UD-1	UD-2	UD-8
10 yr - 6 hr event (in.)	1.23	1.23	1.23
Peak Flow (cfs)	0.08	0.01	0.01
Velocity (fps)	1.21	0.56	0.58
Required Area (ft^2)	0.07	0.02	0.02
Flow Depth (ft.)	0.18	0.09	0.09
10 yr - 24 hr event (in.)	1.85	1.85	1.85
Peak Flow (cfs)	0.43	0.07	0.06
Velocity (fps)	1.84	0.92	0.91
Required Area (ft^2)	0.23	0.08	0.07
Flow Depth (ft.)	0.34	0.20	0.18
Construction			
Minimum Area (ft^2)	1.41	0.98	0.92
Minimum Depth (ft.)	0.84	0.70	0.68
*Erosion Protection	N	N	N
Type	-	-	-

* Based on 10 year - 24 hour flow.

TABLE 7
CULVERT DATA

Culvert ID	Length	Slope %	Manning's No.
C-1	30	3.0	0.020
C-2	40	5.0	0.020
C-3	70	2.9	0.020
C-4	50	8.0	0.020
C-5	120	3.3	0.020
C-6	40	7.5	0.020
C-7	70	2.9	0.020
C-8	60	3.3	0.020
C-9	80	2.5	0.020
C-10	20	3.0	0.020
C-11	20	3.0	0.020
C-12	40	3.3	0.020
C-13	80	3.8	0.020
C-14	40	10.0	0.020
C-15	40	3.0	0.020
C-16	40	3.0	0.020
C-17	20	5.0	0.020
C-17a	80	3.0	0.020
C-17b	80	3.0	0.020
C-18	90	3.0	0.020
C-19	40	15.0	0.020
C-20	40	3.3	0.020
C-21	100	1.0	0.020
C-22	90	2.0	0.020
C-23	50	4.0	0.020

Culvert ID	Length	Slope %	Manning's No.
C-24	400	6.0	0.020
C-25	30	13.3	0.020
C-26	40	7.5	0.020
C-27	50	3.0	0.020
C-28	50	8.0	0.020
C-29	60	3.0	0.020
C-30	60	3.0	0.020
C-31	90	3.0	0.020
C-32	20	3.0	0.020
C-33	30	3.5	0.020
C-34	130	3.8	0.020
C-35	45	20.0	0.020
C-35a	40	3.0	0.020
C-36	30	3.0	0.020
C-38	40	3.3	0.020
C-39	60	3.0	0.020
C-40	60	3.0	0.020

TABLE 8
CULVERT DESIGN SUMMARY

Culvert	10 yr - 6 hr Event 1.23"			10 yr - 24 hr Event 1.85"			Actual Construction Diameter (ft.)	Flow Capacity (cfs)	Erosion Protection at Outlet Required Y/N	Type of Erosion Protection
	Peak Flow Cfs	Velocity fps	Min. Diam. Req'd ft.	Peak Flow Cfs	Velocity fps	Min. Diam. Req'd ft.				
C-1	0.01	1.14	0.11	0.07	1.86	0.22	1.0	4.01	N	-
C-2	0.01	1.38	0.10	0.07	2.25	0.20	1.0	5.18	N	-
C-3	0.01	1.13	0.11	0.07	1.83	0.22	2.0	25.04	N	-
C-4	0.01	1.65	0.09	0.07	2.68	0.18	2.0	41.59	N	-
C-5	0.72	3.45	0.52	3.49	5.11	0.93	3.0	78.76	Y	Natural
C-6	0.59	4.46	0.41	1.27	5.40	0.55	1.25	11.50	Y	6" D^{50} Rip-Rap
C-7	0.89	3.46	0.57	1.92	4.19	0.76	1.25	25.04	N	1.20
C-8	0.89	3.63	0.56	1.92	4.40	0.75	2.0	26.71	N	0.75
C-9	0.89	3.27	0.59	1.92	3.97	0.78	1.5	10.80	N	1.00
C-10	0.25	2.55	0.35	0.55	3.11	0.47	1.0	4.01	N	1.00
C-11	0.51	3.05	0.46	1.11	3.70	0.62	1.0	4.01	N	0.50
C-12	3.00	4.92	0.88	6.53	5.98	1.18	1.5	12.40	Y	½ Round Culvert
C-13	0.57	3.43	0.46	1.24	4.16	0.62	1.0	4.51	N	0.50
C-14	4.13	8.08	0.81	8.99	9.81	1.08	1.5	21.59	Y	9" D^{50} Rip-Rap
C-15	1.01	3.62	0.60	3.19	4.82	0.92	1.5	11.83	N	-
C-16	1.01	3.62	0.60	3.19	4.82	0.92	1.5	11.83	N	-
C-17	0.26	3.12	0.33	0.56	3.78	0.43	1.5	15.27	N	-

Culvert	10 yr - 6 hr Event 1.23"			10 yr - 24 hr Event 1.85"			Actual Construction Diameter (ft.)	Flow Capacity (cfs)	Erosion Protection at Outlet Required Y/N	Type of Erosion Protection
	Peak Flow Cfs	Velocity fps	Min. Diam. Req'd ft.	Peak Flow Cfs	Velocity fps	Min. Diam. Req'd ft.				
C-17a	3.26	4.85	0.93	7.10	5.89	1.24	1.5	11.83	Y	Belting
C-17b	3.26	4.85	0.93	7.10	5.89	1.24	1.5	11.83	Y	Belting
C-18	1.94	4.26	0.76	4.31	5.20	1.03	1.25	7.27	Y	6" D^{50} Rip-Rap
C-19	0.15	4.11	0.22	0.36	5.11	0.30	2.0	56.95	Y	6" D^{50} Rip-Rap
C-20	2.35	4.63	0.80	5.24	5.66	1.09	2.0	26.71	Y	Drop Inlet
C-21	0.27	1.72	0.45	0.65	2.15	0.62	1.0	2.32	N	-
C-22	0.27	2.23	0.39	0.65	2.78	0.55	1.0	3.28	N	-
C-23	2.62	5.11	0.81	5.89	6.26	1.09	2.0	29.41	Y	Drop Inlet
C-24	2.76	6.03	0.76	6.20	7.38	1.03	2.0	36.02	Y	Belting Pond Inlet
C-25	1.32	6.76	0.50	2.92	8.25	0.67	1.0	8.45	Y	6" D^{50} Rip-Rap
C-26	1.55	5.68	0.59	3.45	6.93	0.80	1.0	6.34	Y	6" D^{50} Rip-Rap
C-27	2.87	4.70	0.88	6.37	5.73	1.19	1.5	11.83	Y	½ Round Culvert
C-28	2.19	6.34	0.66	4.77	7.70	0.89	1.0	6.55	Y	6" D^{50} Rip-Rap
C-29	7.82	6.03	1.28	17.34	7.36	1.73	1.5	11.83	Y	9" D^{50} Rip-Rap
C-30	7.82	6.03	1.28	17.34	7.36	1.73	1.5	11.83	Y	9" D^{50} Rip-Rap
C-31	0.75	3.36	0.53	1.64	4.08	0.72	1.25	7.27	N	-
C-32	1.19	3.77	0.63	2.60	4.58	0.85	1.0	4.01	N	-
C-33	0.44	3.11	0.42	0.96	3.78	0.57	1.0	4.33	N	-

Culvert	10 yr - 6 hr Event 1.23"			10 yr - 24 hr Event 1.85"			Actual Construction Diameter (ft.)	Flow Capacity (cfs)	Erosion Protection at Outlet Required Y/N	Type of Erosion Protection
	Peak Flow Cfs	Velocity fps	Min. Diam. Req'd ft.	Peak Flow Cfs	Velocity fps	Min. Diam. Req'd ft.				
C-34	2.52	4.97	0.80	5.51	6.04	1.08	1.25	8.19	Y	Belting
C-35	0.40	5.85	0.30	0.88	7.12	0.40	1.0	10.36	Y	6" D^{50} Rip-Rap
C-35a	4.13	5.14	1.01	9.01	6.25	1.35	1.5	11.83	Y	6" D^{50} Rip-Rap
C-36	0.66	3.25	0.51	1.43	3.95	0.68	1.0	4.01	N	-
C-38	2.01	4.45	0.76	4.67	5.50	1.04	1.0	*4.21	Y	Belting
C-39	2.85	4.69	0.88	4.01	5.11	1.00	2.0	25.47	Y	6" D^{50} Rip-Rap
C-40	2.85	4.69	0.88	4.01	5.11	1.00	2.0	25.47	Y	6" D^{50} Rip-Rap

*** Adequate for 25/6 flow of 2.89 cfs.**

FIGURES

Figure 1 **Culvert Nomograph**

Figure 2 **Rip-Rap Chart**

Figure 3 **Undisturbed and Disturbed Ditch, Typical Section**

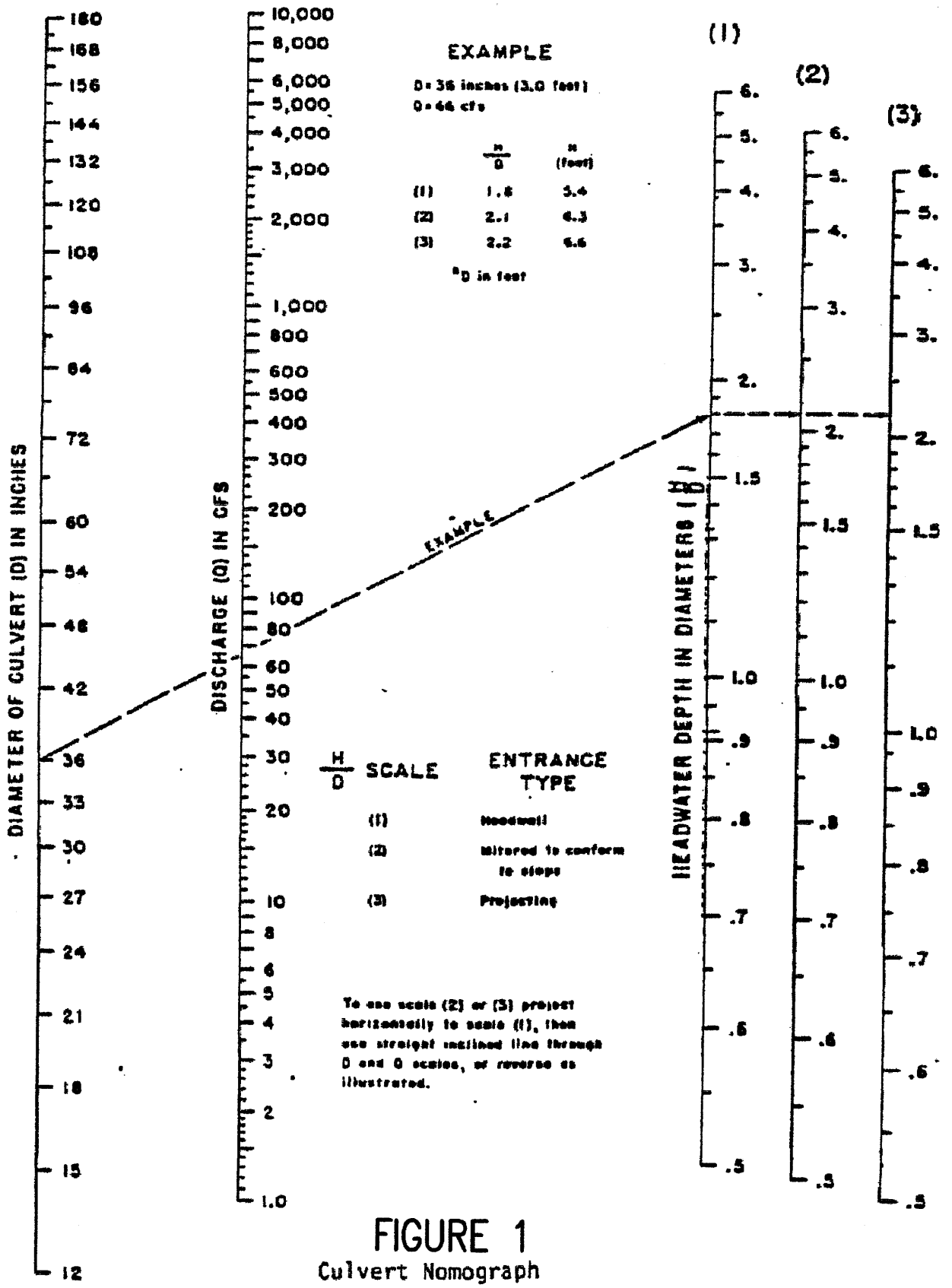
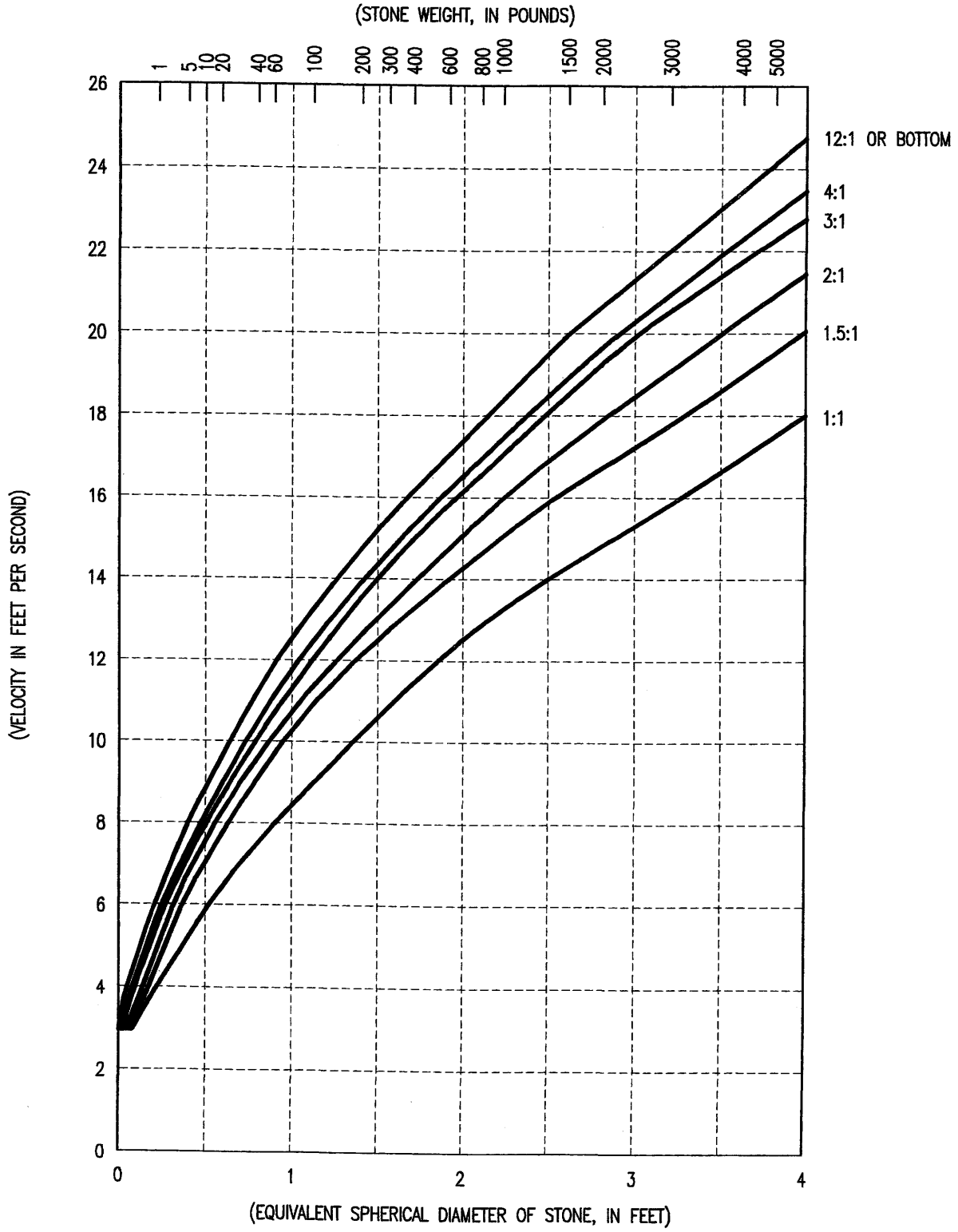


FIGURE 1
Culvert Nomograph

*Headwater depth for corrugated-metal pipe culverts with entrance control. (U.S. Bureau of Public Roads.) 288-D-2909.

RIP-RAP CHART



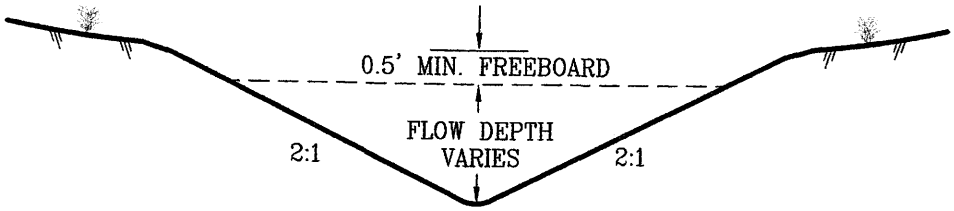
SIZE OF STONE THAT WILL RESIST DISPLACEMENT FOR VARIOUS VELOCITIES AND SIDE SLOPES

NOTE:

ADAPTED FROM REPORT OF SUBCOMMITTE ON SLOPE PROTECTION, AM. SOC. CIVIL ENGINEERS PROC. JUNE 1948.
FOR STONE WEIGHING 165 LBS. PER CUBIC FEET.

Figure 2

UNDISTURBED AND DISTURBED DITCH TYPICAL SECTION



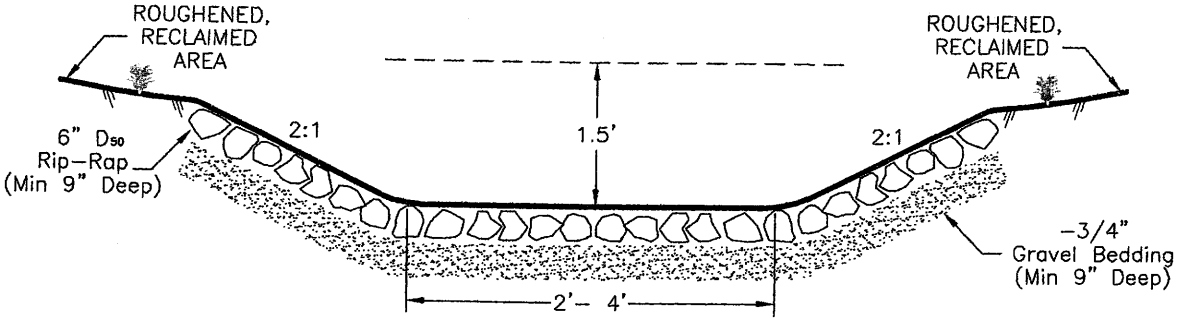
Note: Flows based on a 10 year – 24 hour event.

* *Used for calculation only. Side slopes may vary; however, minimum flow aea will be maintained.*

UTAH REGISTERED
#154168
DAN W. GUY
7/31/09
PROFESSIONAL ENGINEER

FIGURE 3

RESTORED CHANNEL TYPICAL SECTIONS



SUMMARY TABLE			
CHANNEL	*FLOW DEPTH (FT.)	FREEBOARD (FT.)	VELOCITY (FPS)
RC-1	0.38	1.12	3.53
RC-2	0.63	0.87	5.38
RC-3	0.13	1.37	2.46
RC-4	0.57	0.93	5.09
RC-5	0.51	0.99	5.08

* BASED ON 100 YEAR - 6 HOUR STORM RUNOFF.

FIGURE 4

DESIGN OF SEDIMENT CONTROL STRUCTURES

Design of Sediment Control Structures

3.1 Design and Construction Specifications for Sedimentation Pond

3.2 Sediment Yield

3.3 Sediment Pond Volume

Table 9 Sediment Pond "C" Design

Table 10 Sediment Pond "E" Design

Table 11 Sediment Pond "F" Design

Table 12 Sediment Pond "G" Design

Table 13 Sediment Pond "A" Design

Table 14 Sediment Pond "D" Design

Table 15 Permanent Impoundment Design

Table 16 Depression Area Design

Table 17 Sediment Pond "C" Stage Volume Data (As-Constructed)

Table 18 Sediment Pond "E" Stage Volume Data (As-Constructed)

Table 19 Sediment Pond "F" Stage Volume Data (As-Constructed)

Table 20 Sediment Pond "G" Stage Volume Data (Proposed)

Table 21 Sediment Pond "A" Stage Volume Data (As-Constructed)

Table 22 Sediment Pond "D" Stage Volume Data (As-Constructed)

Table 23 Permanent Impoundment Stage Volume Data (As-Constructed)

Table 24 Depression Area Stage Volume Data (As-Constructed)

Table 25 Impoundment Discharge Data

Table 26 Sediment Ponds A, E and F Open-Channel Spillway Stage Discharge Data

3.4 Sediment Pond Summary

3.1 Design and Construction Specifications for Sedimentation Pond

a) All construction of sedimentation ponds will be performed under the direction of a qualified, registered professional engineer.

b) Sediment Ponds A, C, D, E and F and the Permanent Impoundment and Depression Area are all existing impoundments with no changes proposed. Existing Sediment Pond "B" will be eliminated and replaced with new Sediment Pond "G". All ponds are equipped with a cmp principle overflow and an emergency spillway or cmp overflow. All emergency overflows will be at least 1.0' above the primary overflows, and at least 2.0' below the top of the dam.

c) The area of pond construction shall be examined for topsoil, and where present in removable quantities, such soil shall be removed separately and stored in an approved topsoil storage location.

d) In areas where fill is to be placed for the pond impoundment structures, natural ground shall be removed for at least 12" below the base of the structure.

e) Native materials shall be used where practical. Fill will be placed in lifts not to exceed 15" and compacted prior to placement of next left. Compaction of all fill materials shall be at least 95%.

f) Rip-rap or other protection (culverts, concrete, etc.) will be placed at all inlets and outlets to prevent scouring. Rip-rap will consist of substantial (non-slaking) rock material of adequate size.

g) **Decanting of the ponds, as required, will be accomplished by use of a portable pump with an inverted inlet, and a pumping capacity of 100 gpm or greater. Samples will be collected prior to decanting of the pond. If the quality of the water meets the requirements of the U.P.D.E.S. Permit, decanting will proceed. Discharge samples will be collected as per the approved U.P.D.E.S. Discharge Permit.**

h) **Slopes of the embankments shall not be steeper than 2h : 1v, inside or outside, with a total of the inslope and outslope not less than 5h : 1v, except where areas of the pond are incised.**

i) **Tops and external slopes of the impoundments will be planted with an approved seed mix to help prevent erosion and promote stability.**

j) **Top width of the embankments shall be not less than (H+35)/5, where H = Height of Dam in feet.**

3.2 Sediment Yield

The Universal Soil Loss Equation (USLE) was used to estimate sediment yield from drainage areas. All soil loss from this area was assumed to be delivered to, and deposited in the respective sedimentation pond.

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

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

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

Variable "R" is the rainfall factor which can be estimated from $R = 27P^{2.2}$; where P is the 2-year, 6-hour precipitation value. P for the Gordon Creek area is 0.85" as shown in Section 2.1. Therefore, the estimated value of "R" for this area is 18.88.

Variable "K" is the soil erodibility factor. For disturbed areas, the "K" value is conservatively estimated to be 0.5. "K" is estimated to be 0.035 for undisturbed areas.

Variable "LS" is the length-slope factor. This figure was determined by applying the slope length and percentage for each sub-drainage area to the chart in Figure 5.15, p. 334, "Applied Hydrology and Sedimentology for Disturbed Areas", Barfield, Warner and Haan, 1983.

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

Site	CP Factor
Disturbed Areas	1.20
Undisturbed Areas	0.15

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

Sediment Yield Calculations - USLE

Drainage	To:	R	K	Acres	Slope Length Feet	Slope (%)	LS	CP	A*	Yield**
DA-1	Pond E	18.88	0.5	1.58	250	5.60	0.95	1.20	10.76	0.008
DA-2	Pond E	18.88	0.5	1.01	100	4.00	0.40	1.20	4.53	0.002
DA-3	Pond E	18.88	0.5	0.80	130	4.61	0.52	1.20	5.98	0.002
DA-4	Pond E	18.88	0.5	1.26	230	2.61	0.32	1.20	3.62	0.002
DA-5	Pond E	18.88	0.5	1.31	420	4.05	0.75	1.20	8.50	0.005
DA-6	Pond E	18.88	0.5	3.09	550	6.18	1.70	1.20	19.26	0.027
DA-7	Pond E	18.88	0.5	1.33	400	5.50	1.15	1.20	13.03	0.008
DA-8	Pond D	18.88	0.5	3.58	520	6.54	1.60	1.20	18.12	0.030
DA-9	Pond D	18.88	0.5	3.45	460	7.39	1.80	1.20	20.39	0.032
DA-9a	Pond D	18.88	0.5	0.61	350	4.00	0.65	1.20	7.36	0.002
DA-11	Pond C	18.88	0.5	4.50	600	3.00	0.50	1.20	5.66	0.012
DA-12	Pond C	18.88	0.5	0.42	480	0.50	0.16	1.20	1.81	0.001
DA-13	Pond C	18.88	0.5	0.65	300	4.67	0.75	1.20	8.50	0.003
DA-14	Pond C	18.88	0.5	0.76	600	0.67	0.18	1.20	2.04	0.001
DA-15	Pond C	18.88	0.5	0.34	280	2.86	0.37	1.20	4.19	0.001
DA-16	Pond C	18.88	0.5	3.05	640	3.44	0.63	1.20	7.14	0.010
DA-17	Pond C	18.88	0.5	3.67	68	3.23	0.54	1.20	6.12	0.010
DA-18	Pond C	18.88	0.5	5.04	480	5.42	1.25	1.20	14.16	0.033
DA-19	Pond A	18.88	0.5	1.72	370	2.70	0.38	1.20	4.30	0.002
DA-20	Pond A	18.88	0.5	2.48	250	8.00	1.55	1.20	17.56	0.020
DA-21	Pond A	18.88	0.5	1.99	330	1.21	0.20	1.20	2.27	0.002
DA-22	Pond A	18.88	0.5	3.79	400	5.00	1.05	1.20	11.89	0.021
DA-23	Pond G	18.88	0.5	1.74	300	6.66	1.30	1.20	14.73	0.012
DA-24	Pond G	18.88	0.5	5.24	770	3.90	0.80	1.20	9.06	0.022
DA-30	Pond F	18.88	0.5	1.35	400	5.00	1.05	1.20	11.89	0.007
DA-31	Pond F	18.88	0.5	1.79	1100	2.18	0.44	1.20	4.98	0.004
DA-32	Pond F	18.88	0.5	2.23	1100	2.18	0.44	1.20	4.98	0.005

* A = tons/acre-year

** Yield = acre-ft/year

	Pond C	Pond E	Pond F	Pond G	Pond A	Pond D
Total Sediment - 1 yr. (ac. ft.)	0.071	0.054	0.016	0.034	0.045	0.064
Total Sediment - 3 yr. (ac. ft.)	0.213	0.162	0.048	0.102	0.135	0.192

3.3 Sediment Pond Volume

The volumes shown in Tables 9 through 14 are from the volumes calculated from the precipitation , runoff and sediment yield for a 10 year - 24 hour precipitation event. The volumes were calculated based on the disturbed areas (and contributing undisturbed areas) runoff values, developed using the design parameters described in this section.

TABLE 9
SEDIMENT POND "C" DESIGN

1-	Use 1.85" for 10 year - 24 hour event.		
2-	Disturbed Area Draining to Pond = 18.43 acres.		
3-	Runoff Curve Number = CN = 90 (Disturbed)		
4-	Disturbed Area Runoff = (From Table 2, 10 yr./24 hr.)	=	1.490 ac.ft.
5-	Sediment Storage Volume USLE - 0.213	=	0.213 ac.ft.
6-	Direct Precipitation into Pond 0.86 acres x 1.85" / 12 in./ft.	=	0.133 ac.ft.
7-	Total Required Pond Volume 1.490 + 0.213 + 0.133	=	1.836 ac.ft.
8-	Pond Actual Volume at Principal Spillway	=	4.732 ac.ft.
9-	Peak Flow (25 year - 6 hour event)	=	10.99 cfs

TABLE 10
SEDIMENT POND "E" DESIGN

1-	Use 1.85" for 10 year - 24 hour event.		
2-	Disturbed Area Draining to Pond = 10.38 acres.		
3-	Runoff Curve Number = CN = 90 (Disturbed)		
4-	Disturbed Area Runoff = (From Table 2, 10 yr./24 hr.)	=	0.840 ac.ft.
5-	Sediment Storage Volume USLE - 0.162	=	0.162 ac.ft.
6-	Direct Precipitation into Pond 0.17 acres x 1.85" / 12 in./ft.	=	0.026 ac.ft.
7-	Total Required Pond Volume 0.840 + 0.162 + 0.026	=	1.028 ac.ft.
8-	Pond Volume at Principal Spillway	=	1.092 ac.ft.
9-	Peak Flow (25 year - 6 hour event)	=	5.77 cfs

TABLE 11
SEDIMENT POND "F" DESIGN

1-	Use 1.85" for 10 year - 24 hour event.		
2-	Disturbed Area Draining to Pond = 5.37 acres.		
3-	Runoff Curve Number = CN = 90 (Disturbed)		
4-	Disturbed Area Runoff = (From Table 2, 10 yr./24 hr.)	=	0.430 ac.ft.
5-	Sediment Storage Volume USLE - 0.048	=	0.048 ac.ft.
6-	Direct Precipitation into Pond 0.18 acres x 1.85" / 12 in./ft.	=	0.028 ac.ft.
7-	Total Required Pond Volume 0.430 + 0.048 + 0.028	=	0.506 ac.ft.
8-	Pond Volume at Principal Spillway	=	0.869 ac.ft.
9-	Peak Flow (25 year - 6 hour event)	=	2.89 cfs

TABLE 12
SEDIMENT POND "G" DESIGN

1-	Use 1.85" for 10 year - 24 hour event.		
2-	Disturbed Area Draining to Pond = 6.98 acres.		
3-	Runoff Curve Number = CN = 90 (Disturbed)		
4-	Disturbed Area Runoff = (From Table 2, 10 yr./24 hr.)	=	0.560 ac.ft.
5-	Sediment Storage Volume USLE - 0.102	=	0.102 ac.ft.
6-	Direct Precipitation into Pond 0.35 acres x 1.85" / 12 in./ft.	=	0.054 ac.ft.
7-	Total Required Pond Volume 0.560 + 0.102 + 0.054	=	0.716 ac.ft.
*8-	Pond Volume at Principal Spillway	=	1.342 ac.ft.
9-	Peak Flow (25 year - 6 hour event)	=	4.01 cfs

* Proposed.

TABLE 13
SEDIMENT POND "A" DESIGN

1-	Use 1.85" for 10 year - 24 hour event.		
2-	Disturbed Area Draining to Pond = 9.98 acres.		
3-	Runoff Curve Number = CN = 90 (Disturbed)		
4-	Disturbed Area Runoff = (From Table 2, 10 yr./24 hr.)	=	0.810 ac.ft.
5-	Sediment Storage Volume USLE - 0.135	=	0.135 ac.ft.
6-	Direct Precipitation into Pond 0.66 acres x 1.85" / 12 in./ft.	=	0.102 ac.ft.
7-	Total Required Pond Volume 0.810 + 0.135 + 0.102	=	1.047 ac.ft.
8-	Pond Volume at Principal Spillway	=	2.972 ac.ft.
9-	Peak Flow (25 year - 6 hour event)	=	5.77 cfs

TABLE 14
SEDIMENT POND "D" DESIGN

1-	Use 1.85" for 10 year - 24 hour event.		
2-	Disturbed Area Draining to Pond = 7.64 acres.		
3-	Runoff Curve Number = CN = 90 (Disturbed)		
4-	Disturbed Area Runoff = (From Table 9, 10 yr./24 hr.)	=	0.620 ac.ft.
5-	Sediment Storage Volume USLE - 0.192	=	0.192 ac.ft.
6-	Direct Precipitation into Pond 0.29 acres x 1.85" / 12 in./ft.	=	0.045 ac.ft.
7-	Total Required Pond Volume 0.620 + 0.192 + 0.045	=	0.857 ac.ft.
8-	Pond Volume at Principal Spillway	=	1.131 ac.ft.
9-	Peak Flow (25 year - 6 hour event)	=	4.56 cfs

TABLE 15
PERMANENT IMPOUNDMENT DESIGN

1-	Use 1.91" for 100 year - 6 hour event.		
2-	Disturbed Area Draining to Pond = 1.47 acres.		
3-	Runoff Curve Number = CN = 90 (Disturbed)		
4-	Disturbed Area Runoff = (From Table 2, 100 yr./6 hr.)	=	0.120 ac.ft.
5-	Undisturbed Watershed = 85.40 Acres		
6-	Weighted Runoff Curve Number - 65		
7-	Undisturbed Area Runoff (From Table 2, 100 yr/6 hr)	=	0.790 ac.ft.
8-	Direct Precipitation into Pond 0.76 acres x 1.91" / 12 in./ft.	=	0.121 ac.ft.
9-	Total Required Pond Volume 0.120 + 0.790 + 0.121	=	1.031 ac.ft.
10-	Pond Actual Volume	=	1.114 ac.ft.
11-	Peak Flow (100 year - 6 hour event)	=	4.41 cfs

TABLE 16
DEPRESSION AREA DESIGN

1-	Use 1.91" for 100 year - 6 hour event.		
2-	Disturbed Area Draining to Pond = 6.43 acres.		
3-	Runoff Curve Number = CN = 90 (Disturbed)		
4-	Disturbed Area Runoff = (From Table 2, 100 yr./6 hr.)	=	0.550 ac.ft.
5-	Runoff from Permanent Impoundment	=	1.031 ac.ft.
6-	Direct Precipitation into Area 6.43 acres x 1.91" / 12 in./ft.	=	1.023 ac.ft.
7-	Total Required Volume 0.550 + 1.031 + 1.023	=	2.604 ac.ft.
8-	Actual Volume	=	4.990 ac.ft.

TABLE 17
SEDIMENT POND "C"
STAGE VOLUME DATA (AS-CONSTRUCTED)

Elevation	Area (ft^2)	Volume (ac. ft.)	Acc. Volume (ac. ft.)	Remarks
6127.0	2,870.5	0	0	Bottom of Pond
6130.0	18,075.7	0.721	0.721	
6131.5	-	0.700	1.421	Sediment Cleanout Level
6132.0	22,596.8	0.234	1.655	
6134.0	27,274.0	1.145	2.800	
6136.0	32,557.0	1.374	4.174	
6137.0	35,481.1	0.781	4.955	Principal Spillway
6138.0	38,405.1	0.848	5.803	Emergency Spillway
6140.0	45,286.6	1.921	7.724	Crest of Dam

TABLE 18
SEDIMENT POND "E"
STAGE VOLUME DATA (AS-CONSTRUCTED)

Elevation	Area (ft^2)	Volume (ac. ft.)	Acc. Volume (ac. ft.)	Remarks
6139.0	3,522.3	0	0	Bottom of Pond
6140.0	6,112.8	0.111	0.111	
6140.5	6,514.7	0.073	0.184	Sediment Cleanout Level
6142.0	7,720.3	0.245	0.429	
6144.0	10,256.0	0.413	0.842	
6145.0	11,552.2	0.250	1.092	Principal Spillway
6146.0	12,848.3	0.280	1.372	Emergency Spillway
6148.0	15,515.4	0.651	2.023	Crest of Dam

TABLE 19
SEDIMENT POND "F"
STAGE VOLUME DATA (AS-CONSTRUCTED)

Elevation	Area (ft^2)	Volume (ac. ft.)	Acc. Volume (ac. ft.)	Remarks
6166.0	2,811.6	0	0	Bottom of Pond
6168.0	4,180.9	0.161	0.161	Sediment Cleanout Level
6170.0	5,682.4	0.226	0.387	
6172.0	7,404.1	0.300	0.687	
6173.0	8,414.3	0.182	0.869	Principal Spillway
6174.0	9,424.5	0.204	1.073	Emergency Spillway
6176.0	11,497.2	0.480	1.553	Crest of Dam

TABLE 20
SEDIMENT POND "G"
STAGE VOLUME DATA (PROPOSED)

Elevation	Area (ft^2)	Volume (ac. ft.)	Acc. Volume (ac. ft.)	Remarks
6120.0	9,451.9	0	0	Bottom of Pond
6121.2	10,495.9	0.275	0.275	60% Sediment Cleanout Level
6122.0	11,191.9	0.199	0.474	Maximum Sediment Level
6124.0	13,054.7	0.557	1.031	
6125.0	14,048.0	0.311	1.342	Principal Spillway
6126.0	15,041.0	0.334	1.676	Emergency Spillway
6128.0	17,151.8	0.739	2.415	Crest of Dam

TABLE 21
SEDIMENT POND "A"
STAGE VOLUME DATA (AS-CONSTRUCTED)

Elevation	Area (ft^2)	Volume (ac. ft.)	Acc. Volume (ac. ft.)	Remarks
6142.0	9,003.8	0	0	Bottom of Pond
6144.0	13,714.8	0.522	0.522	
6146.0	19,531.8	0.763	1.285	Sediment Cleanout Level
6148.0	25,889.5	1.043	2.328	
6149.0	30,216.6	0.644	2.972	Principal Spillway
6150.0	34,543.7	0.743	3.715	Emergency Spillway
6152.0	45,662.9	1.841	5.556	Crest of Dam

TABLE 22
SEDIMENT POND "D"
STAGE VOLUME DATA (AS-CONSTRUCTED)

Elevation	Area (ft^2)	Volume (ac. ft.)	Acc. Volume (ac. ft.)	Remarks
6132.0	605.3	0	0	Bottom of Pond
6134.0	4,812.1	0.124	0.124	
6135.0	6,350.3	0.128	0.252	Sediment Cleanout Level
6136.0	7,888.5	0.164	0.416	
6138.0	11,213.8	0.438	0.854	
6139.0	12,942.0	0.277	1.131	Principal Spillway
6140.0	14,670.1	0.317	1.448	Emergency Spillway
6142.0	18,552.8	0.763	2.211	Crest of Dam

TABLE 23
PERMANENT IMPOUNDMENT
STAGE VOLUME DATA (AS-CONSTRUCTED)

Elevation	Area (ft^2)	Volume (ac. ft.)	Acc. Volume (ac. ft.)	Remarks
6192.0	571.8	0	0	Bottom of Upper Cell
6194.0	5,714.4	0.144	0.144	
6195.8	8,472.6	0.293	0.437	Principal Spillway
6196.3	9,238.7	0.102	0.539	Emergency Spillway
6183.5	9,148.3	0.000	0.437	Bottom of Lower Cell
6185.8	16,486.7	0.677	1.114	Overflow - Lower Cell

TABLE 24
DEPRESSION AREA
STAGE VOLUME DATA (AS-CONSTRUCTED)

Elevation	Area (ft^2)	Volume (ac. ft.)	Acc. Volume (ac. ft.)	Remarks
6172.0	16,674.8	0	0	Bottom
6174.0	33,854.8	1.160	1.160	
6176.0	132,985.0	3.830	4.990	Maximum Water Level
6178.0	152,100.6	6.544	11.534	Track Level

TABLE 25
IMPOUNDMENT
DISCHARGE DATA

IMPOUNDMENT POND	SPILLWAY	TYPE SIZE	25/6 FLOW (cfs)	FLOW DEPTH (ft)	REMARKS
C	Principal	18" cmp	11.30	1.17 (78% full)	Existing
C	Emergency	18" cmp	11.30	1.17 (78% full)	Existing
E	Principal	18" cmp	5.77	0.74 (49% full)	Existing
E	Emergency	Open Channel	5.77	0.47	Existing
F	Principal	12" cmp	2.89	0.63 (63% full)	Existing
F	Emergency	Open Channel	2.89	0.31	Existing
G	Principal	24" cmp	4.01	0.54 (27% full)	Proposed
G	Emergency	24" cmp	4.01	0.54 (27% full)	Proposed
A	Principal	18" cmp	5.47	0.74 (49% full)	Existing
A	Emergency	Open Channel	5.47	0.47	Existing
D	Principal	24" cmp	4.56	0.65 (43% full)	Existing
D	Emergency	24" cmp	4.56	0.65 (43% full)	Existing
PI	Principal	18" cmp	*4.48	0.64 (43% full)	Existing
PI	Emergency	18" cmp	*4.48	0.64 (43% full)	Existing

Notes:

1) Culverts are calculated on 3 % slope.
2) Open-Channel spillways are 5' wide x 1' deep with 2:1 side slopes. (See Table 26)
3) Depression Area has no overflow.

* 100 year/6 hr. Flow.

TABLE 26
SEDIMENT PONDS A, E AND F
OPEN-CHANNEL SPILLWAY
STAGE DISCHARGE DATA

STAGE (ft.)	DISCHARGE (cfs)
0.00	0.00
0.20	1.49
0.31	**2.99
0.47	*5.91
0.60	8.90
0.80	14.58
1.00	21.61

Notes: * 25 year - 6 hour Peak Flow from Ponds A and E = 5.77 cfs.
Flow will pass through spillway at a depth of 0.47'.

**** 25 year - 6 hour Peak Flow from Pond F = 2.89 cfs.
Flow will pass through spillway at a depth of 0.31'.

Calculations based on Broad Crested Weir Formula

$Q = 3.087\ bH^{1.5}$; Where b = Average Width = $\frac{5 + (5 + 4d)}{2}$

3.4 Sediment Pond Summary

a) The Sediment ponds have been designed to contain the disturbed area (and contributing undisturbed area) runoff from a 10 year - 24 hour precipitation event, along with 3 years of sediment storage capacity. The Permanent Impoundment and Depression Area are sized to contain the runoff from a 100 year - 6 hour precipitation event. Runoff to the ponds will be directed by various ditches and culverts as described in the plan.

b) There will be a total of 6 sediment ponds and 2 additional impoundments on this site. Existing Sediment Pond B will be eliminated and replaced with new pond G. Existing sediment ponds A, C, D, E and F, as well as the Permanent Impoundment and Depression Area will not be changed.

c) The ponds will meet a theoretical detention time of 24 hours. All sediment ponds are fitted with a combination of principal and emergency overflows sized to carry the runoff from a 25 year - 6 hour precipitation event. The Permanent Impoundment overflows are sized to carry runoff from a 100 year-6 hour event. Any discharge from the ponds will be in accordance with the approved UPDES Permit.

d) The pond inlets are protected from erosion. The principal spillways, and emergency spillways will also be protected from erosion by the use of culverts, rip-rap and/or belting.

e) The Permanent Impoundment and Depression Area are to be left in place.

f) The ponds have/will be constructed according to the design criteria listed under "Construction Specifications for Sedimentation Ponds".

DESIGN OF DRAINAGE CONTROL STRUCTURES
FOR
RECLAMATION HYDROLOGY

Reclamation Hydrology

4.1 General

4.2 Reclaimed Area Drainage Control

4.3 Restored Channels

4.4 Sediment Ponds

Table 27 Final Reclamation - Drainage Areas Contributing to Channels

Table 28 Final Reclamation - Drainage Structure Flow Summary

Table 29 Final Reclamation - Restored Channel Design Parameters

Table 30 Final Reclamation - Restored Channel Flow Calculations

Figure 4 Restored Channel, Typical Sections

Reclamation Hydrology

4.1 General

The purpose of this section is to describe the plan for control of the permit and adjacent area hydrology during and after reclamation until bond release.

The plans herein described are based on requirements of the regulations and on proven, accepted reclamation techniques used in the Carbon-Emery area. The post-reclamation hydrology is designed to protect the reclaimed site from erosion, to protect the hydrologic regime from adverse impacts, and to meet requirement of DOGM and the landowner, BLM.

Upon completion of operations, all structures will be removed and the area will be recontoured as shown on Plate 9. All culverts and unnecessary ditches and ponds will be removed at that time. The post-reclamation drainage will be as shown on Plate 9.

Undisturbed Diversion UD-2 will remain in place, since it was installed prior to the operation, and has been shown to be adequate to carry a 100 year, 6 hour precipitation event.

As described in the following section, all sediment ponds will be removed during final reclamation, and recontoured as shown on Plate 9.

As sediment ponds are removed, any contaminated material will be hauled off to an approved disposal site. The 2-celled Permanent Impoundment will be left in place for wildlife enhancement, and the Depression Area will also remain as a final containment for runoff which was never planned to drain under the pre-existing Utah Railway.

Reclaimed channels are noted with an RC-Numer (i.e. RC-2). Channels are shown on Plate 9, "Final Reclamation Contours, Phase 2".

A typical channel cross-section for each reclaimed channel is shown on Figure 4. Calculated flows for the applicable storm event were then routed through the channels to determine if reclaimed channel sizes were adequate for the design flows. (See Table 30). In all cases, the channels were adequately sized to safely carry the contributing area runoff.

4.2 Reclaimed Area Drainage Control

During final reclamation, all previously installed drainage controls, including the sediment ponds, will be removed. The reclaimed area will be roughened by discontinuous tilling and/or "gouging" the area with a trackhoe bucket. The roughening will create furrows or depressions at approximately 18" deep throughout the reclaimed area. In addition, straw or wood mulch will be used in final seeding of the area. Roughening will continue to the reclaimed channel banks, and the entire reclaimed area, including channels, will be reseeded according to the approved plan.

Prior to removal of the sediment ponds, a series of 3 silt fences will be installed across the main drainage channel below the pond area, as shown on Plate 9. These silt fences will remain as final treatment for runoff from the reclaimed site until Phase II Bond Release requirements are met. These are, however, only secondary sediment controls. The primary sediment control from the reclaimed site will be extensive roughening/gouging, use of mulch and revegetation.

4.3 Restored Channels

The restored channels will have a bottom width of approximately 2' - 4' with 2h : 1v side slopes, as shown on Table 29.

The restored channel sizes were checked for adequacy to carry runoff from a 100 year - 6 hour storm event. As shown on Table 30, all channels are adequately sized to carry the projected runoff with at least 0.5' of freeboard. See Figure 4 for a typical section of the reclaimed channels and summary of flow depths and velocities.

4.4 Sediment Ponds

As discussed in Section 4.1, the sediment ponds will be removed during final reclamation. Prior to removal of the pond, a series of 3 silt fences will be placed across the main canyon channel below the pond. Sediment control for the reclamation will be accomplished by extensive roughening/gouging and revegetation of the reclaimed area and installation of sediment traps in the restored channels. The silt fences will act as secondary, final sediment controls. These fences will be maintained until Phase II Bond Release. See Plate 9 "Final Reclamation Contours, Phase 2" for location and reclamation details.

TABLE 27
FINAL RECLAMATION
DRAINAGE AREAS CONTRIBUTING TO CHANNELS

RECLAIMED CHANNEL	DRAINAGE AREAS
RD-1	DA-30, DA-31, DA-32, DA-38
RD-2	DA-19, DA-20, DA-21, DA-22, DA-23, DA-24, ½DA-16, ½DA-17
RD-3	1/4 DA-16
RD-4	DA-11, ½DA-12, DA-14, DA-9, ½DA-17, 1/4 DA-16, DA-18
RD-5	1/3 DA-35, DA-36, DA-1, DA-2, DA-3, DA-4, DA-5, DA-6, DA-7, DA-8, ½ DA-12, DA-13, DA-15

Refer to Plate 2A for drainage areas and Plate 9 for reclamation channels.

TABLE 28
FINAL RECLAMATION
DRAINAGE STRUCTURE FLOW SUMMARY

Channel	100/6 cfs
RC-1	5.08
RC-2	17.97
RC-3	0.71
RC-4	15.04
RC-5	13.16

Flows from Table 2.

TABLE 29
FINAL RECLAMATION
RESTORED CHANNEL DESIGN PARAMETERS

Channel	Bottom Width (ft.)	Side Slope H:V	Slope %	Reclaimed Depth (ft.)	Manning's No.
RC-1	3	2:1	3.33	1.5	0.035
RC-2	4	2:1	4.17	1.5	0.035
RC-3	2	2:1	6.15	1.5	0.035
RC-4	4	2:1	4.14	1.5	0.035
RC-5	4	2:1	4.67	1.5	0.035

TABLE 30
FINAL RECLAMATION
RESTORED CHANNEL FLOW CALCULATIONS

Channel	RC-1	RC-2	RC-3	RC-4	RC-5
100 yr - 6 hr event (in.)	1.91	1.91	1.91	1.91	1.91
Peak Flow (cfs)	5.08	17.97	0.71	15.04	13.16
Velocity (fps)	3.53	5.38	2.46	5.09	5.08
Req'd Area ($ft.^2$)	1.44	3.33	0.29	2.96	2.59
Flow Depth (ft.)	0.38	0.63	0.13	0.57	0.51

APPENDIX 1

COMPUTER BACKUP

APPENDIX 1

COMPUTER BACKUP

Project Title = DA-1 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.6 acres
Hydraulic length = 250.00 feet
Elevation change = 14.0 feet.
Concentration time = 0.03 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.6 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.59 cfs
Discharge volume = 0.06 acre ft

Project Title = DA-1 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.6 acres
Hydraulic length = 250.00 feet
Elevation change = 14.0 feet.
Concentration time = 0.03 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.6 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 1.27 cfs
Discharge volume = 0.13 acre ft

Project Title = DA-1 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.6 acres
Hydraulic length = 250.00 feet
Elevation change = 14.0 feet.
Concentration time = 0.03 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.6 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.82 cfs
Discharge volume = 0.09 acre ft

Project Title = DA-1 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.6 acres
Hydraulic length = 250.00 feet
Elevation change = 14.0 feet.
Concentration time = 0.03 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.6 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.24 cfs
Discharge volume = 0.13 acre ft

Project Title = DA-2 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.0 acres
Hydraulic length = 100.00 feet
Elevation change = 4.0 feet.
Concentration time = 0.01 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.0 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.30 cfs
Discharge volume = 0.04 acre ft

Project Title = DA-2 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.0 acres
Hydraulic length = 100.00 feet
Elevation change = 4.0 feet.
Concentration time = 0.01 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.0 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 0.65 cfs
Discharge volume = 0.08 acre ft

Project Title = DA-2 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.0 acres
Hydraulic length = 100.00 feet
Elevation change = 4.0 feet.
Concentration time = 0.01 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.0 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.42 cfs
Discharge volume = 0.06 acre ft

Project Title = DA-2 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.0 acres
Hydraulic length = 100.00 feet
Elevation change = 4.0 feet.
Concentration time = 0.01 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.0 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.63 cfs
Discharge volume = 0.09 acre ft

Project Title = DA-3 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.8 acres
Hydraulic length = 130.00 feet
Elevation change = 6.0 feet.
Concentration time = 0.02 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.8 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.25 cfs
Discharge volume = 0.03 acre ft

Project Title = DA-3 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.8 acres
Hydraulic length = 130.00 feet
Elevation change = 6.0 feet.
Concentration time = 0.02 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.8 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 0.55 cfs
Discharge volume = 0.06 acre ft

Project Title = DA-3 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.8 acres
Hydraulic length = 130.00 feet
Elevation change = 6.0 feet.
Concentration time = 0.02 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.8 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.35 cfs
Discharge volume = 0.04 acre ft

Project Title = DA-3 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.8 acres
Hydraulic length = 130.00 feet
Elevation change = 6.0 feet.
Concentration time = 0.02 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.8 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.53 cfs
Discharge volume = 0.07 acre ft

Project Title = DA-4 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.3 acres
Hydraulic length = 230.00 feet
Elevation change = 6.0 feet.
Concentration time = 0.04 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.3 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.51 cfs
Discharge volume = 0.05 acre ft

Project Title = DA-4 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.3 acres
Hydraulic length = 230.00 feet
Elevation change = 6.0 feet.
Concentration time = 0.04 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.3 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 1.11 cfs
Discharge volume = 0.10 acre ft

Project Title = DA-4 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.3 acres
Hydraulic length = 230.00 feet
Elevation change = 6.0 feet.
Concentration time = 0.04 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.3 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.71 cfs
Discharge volume = 0.07 acre ft

Project Title = DA-4 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.3 acres
Hydraulic length = 230.00 feet
Elevation change = 6.0 feet.
Concentration time = 0.04 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.3 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.08 cfs
Discharge volume = 0.11 acre ft

Project Title = DA-5 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.3 acres
Hydraulic length = 420.00 feet
Elevation change = 17.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.3 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.57 cfs
Discharge volume = 0.05 acre ft

Project Title = DA-5 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.3 acres
Hydraulic length = 420.00 feet
Elevation change = 17.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.3 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 1.24 cfs
Discharge volume = 0.11 acre ft

Project Title = DA-5 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.3 acres
Hydraulic length = 420.00 feet
Elevation change = 17.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.3 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.80 cfs
Discharge volume = 0.07 acre ft

Project Title = DA-5 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.3 acres
Hydraulic length = 420.00 feet
Elevation change = 17.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.3 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.21 cfs
Discharge volume = 0.11 acre ft

Project Title = DA-6 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 3.1 acres
Hydraulic length = 550.00 feet
Elevation change = 34.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.1 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.35 cfs
Discharge volume = 0.12 acre ft

Project Title = DA-6 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 3.1 acres
Hydraulic length = 550.00 feet
Elevation change = 34.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.1 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 2.95 cfs
Discharge volume = 0.25 acre ft

Project Title = DA-6 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 3.1 acres
Hydraulic length = 550.00 feet
Elevation change = 34.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.1 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.89 cfs
Discharge volume = 0.17 acre ft

Project Title = DA-6 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 3.1 acres
Hydraulic length = 550.00 feet
Elevation change = 34.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.1 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 2.86 cfs
Discharge volume = 0.26 acre ft

Project Title = DA-7 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.3 acres
Hydraulic length = 400.00 feet
Elevation change = 22.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.3 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.56 cfs
Discharge volume = 0.05 acre ft

Project Title = DA-7 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.3 acres
Hydraulic length = 400.00 feet
Elevation change = 22.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.3 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 1.22 cfs
Discharge volume = 0.11 acre ft

Project Title = DA-7 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.3 acres
Hydraulic length = 400.00 feet
Elevation change = 22.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.3 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.78 cfs
Discharge volume = 0.07 acre ft

Project Title = DA-7 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.3 acres
Hydraulic length = 400.00 feet
Elevation change = 22.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.3 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.19 cfs
Discharge volume = 0.11 acre ft

Project Title = DA-8 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 3.6 acres
Hydraulic length = 520.00 feet
Elevation change = 34.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.6 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.55 cfs
Discharge volume = 0.14 acre ft

Project Title = DA-8 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 3.6 acres
Hydraulic length = 520.00 feet
Elevation change = 34.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.6 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 3.38 cfs
Discharge volume = 0.29 acre ft

Project Title = DA-8 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 3.6 acres
Hydraulic length = 520.00 feet
Elevation change = 34.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.6 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 2.17 cfs
Discharge volume = 0.20 acre ft

Project Title = DA-8 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 3.6 acres
Hydraulic length = 520.00 feet
Elevation change = 34.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.6 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 3.29 cfs
Discharge volume = 0.30 acre ft

Project Title = DA-9 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 3.5 acres
Hydraulic length = 460.00 feet
Elevation change = 34.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.5 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.45 cfs
Discharge volume = 0.14 acre ft

Project Title = DA-9 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 3.5 acres
Hydraulic length = 460.00 feet
Elevation change = 34.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.5 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 3.16 cfs
Discharge volume = 0.28 acre ft

Project Title = DA-9 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 3.5 acres
Hydraulic length = 460.00 feet
Elevation change = 34.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.5 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 2.03 cfs
Discharge volume = 0.19 acre ft

Project Title = DA-9 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 3.5 acres
Hydraulic length = 460.00 feet
Elevation change = 34.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.5 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 3.07 cfs
Discharge volume = 0.29 acre ft

Project Title = DA-9A (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.6 acres
Hydraulic length = 350.00 feet
Elevation change = 14.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.6 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.26 cfs
Discharge volume = 0.02 acre ft

Project Title = DA-9A (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.6 acres
Hydraulic length = 350.00 feet
Elevation change = 14.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.6 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 0.56 cfs
Discharge volume = 0.05 acre ft

Project Title = DA-9A (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.6 acres
Hydraulic length = 350.00 feet
Elevation change = 14.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.6 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.36 cfs
Discharge volume = 0.03 acre ft

Project Title = DA-9A (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.6 acres
Hydraulic length = 350.00 feet
Elevation change = 14.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.6 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 0.55 cfs
Discharge volume = 0.05 acre ft

Project Title = DA-11 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 4.5 acres
Hydraulic length = 600.00 feet
Elevation change = 18.0 feet.
Concentration time = 0.10 hours
Unit hydrograph type = Disturbed

-- Total Area = 4.5 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.94 cfs
Discharge volume = 0.18 acre ft

Project Title = DA-11 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 4.5 acres
Hydraulic length = 600.00 feet
Elevation change = 18.0 feet.
Concentration time = 0.10 hours
Unit hydrograph type = Disturbed

-- Total Area = 4.5 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 4.31 cfs
Discharge volume = 0.36 acre ft

Project Title = DA-11 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 4.5 acres
Hydraulic length = 600.00 feet
Elevation change = 18.0 feet.
Concentration time = 0.10 hours
Unit hydrograph type = Disturbed

-- Total Area = 4.5 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 2.73 cfs
Discharge volume = 0.25 acre ft

Project Title = DA-11 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 4.5 acres
Hydraulic length = 600.00 feet
Elevation change = 18.0 feet.
Concentration time = 0.10 hours
Unit hydrograph type = Disturbed

-- Total Area = 4.5 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 4.17 cfs
Discharge volume = 0.38 acre ft

Project Title = DA-12 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.4 acres
Hydraulic length = 480.00 feet
Elevation change = 2.0 feet.
Concentration time = 0.21 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.15 cfs
Discharge volume = 0.02 acre ft

Project Title = DA-12 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.4 acres
Hydraulic length = 480.00 feet
Elevation change = 2.0 feet.
Concentration time = 0.21 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 0.36 cfs
Discharge volume = 0.03 acre ft

Project Title = DA-12 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.4 acres
Hydraulic length = 480.00 feet
Elevation change = 2.0 feet.
Concentration time = 0.21 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.22 cfs
Discharge volume = 0.02 acre ft

Project Title = DA-12 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.4 acres
Hydraulic length = 480.00 feet
Elevation change = 2.0 feet.
Concentration time = 0.21 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.4 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.34 cfs
Discharge volume = 0.04 acre ft

Project Title = DA-13 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.6 acres
Hydraulic length = 300.00 feet
Elevation change = 14.0 feet.
Concentration time = 0.04 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.6 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.26 cfs
Discharge volume = 0.03 acre ft

Project Title = DA-13 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.6 acres
Hydraulic length = 300.00 feet
Elevation change = 14.0 feet.
Concentration time = 0.04 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.6 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 0.57 cfs
Discharge volume = 0.05 acre ft

Project Title = DA-13 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.6 acres
Hydraulic length = 300.00 feet
Elevation change = 14.0 feet.
Concentration time = 0.04 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.6 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.36 cfs
Discharge volume = 0.04 acre ft

Project Title = DA-13 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.6 acres
Hydraulic length = 300.00 feet
Elevation change = 14.0 feet.
Concentration time = 0.04 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.6 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.55 cfs
Discharge volume = 0.06 acre ft

Project Title = DA-14 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.8 acres
Hydraulic length = 600.00 feet
Elevation change = 4.0 feet.
Concentration time = 0.20 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.8 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.27 cfs
Discharge volume = 0.03 acre ft

Project Title = DA-14 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.8 acres
Hydraulic length = 600.00 feet
Elevation change = 4.0 feet.
Concentration time = 0.20 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.8 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 0.65 cfs
Discharge volume = 0.06 acre ft

Project Title = DA-14 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.8 acres
Hydraulic length = 600.00 feet
Elevation change = 4.0 feet.
Concentration time = 0.20 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.8 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.39 cfs
Discharge volume = 0.04 acre ft

Project Title = DA-14 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.8 acres
Hydraulic length = 600.00 feet
Elevation change = 4.0 feet.
Concentration time = 0.20 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.8 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.62 cfs
Discharge volume = 0.06 acre ft

Project Title = DA-15 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.3 acres
Hydraulic length = 280.00 feet
Elevation change = 8.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.14 cfs
Discharge volume = 0.01 acre ft

Project Title = DA-15 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.3 acres
Hydraulic length = 280.00 feet
Elevation change = 8.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 0.31 cfs
Discharge volume = 0.03 acre ft

Project Title = DA-15 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.3 acres
Hydraulic length = 280.00 feet
Elevation change = 8.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.20 cfs
Discharge volume = 0.02 acre ft

Project Title = DA-15 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.3 acres
Hydraulic length = 280.00 feet
Elevation change = 8.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.30 cfs
Discharge volume = 0.03 acre ft

Project Title = DA-16 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 3.0 acres
Hydraulic length = 640.00 feet
Elevation change = 22.0 feet.
Concentration time = 0.10 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.0 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.32 cfs
Discharge volume = 0.12 acre ft

Project Title = DA-16 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 3.0 acres
Hydraulic length = 640.00 feet
Elevation change = 22.0 feet.
Concentration time = 0.10 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.0 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 2.92 cfs
Discharge volume = 0.25 acre ft

Project Title = DA-16 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 3.0 acres
Hydraulic length = 640.00 feet
Elevation change = 22.0 feet.
Concentration time = 0.10 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.0 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.85 cfs
Discharge volume = 0.17 acre ft

Project Title = DA-16 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 3.0 acres
Hydraulic length = 640.00 feet
Elevation change = 22.0 feet.
Concentration time = 0.10 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.0 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 2.83 cfs
Discharge volume = 0.26 acre ft

Project Title = DA-17 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 3.7 acres
Hydraulic length = 680.00 feet
Elevation change = 22.0 feet.
Concentration time = 0.11 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.7 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.55 cfs
Discharge volume = 0.15 acre ft

Project Title = DA-17 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 3.7 acres
Hydraulic length = 680.00 feet
Elevation change = 22.0 feet.
Concentration time = 0.11 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.7 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 3.45 cfs
Discharge volume = 0.30 acre ft

Project Title = DA-17 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 3.7 acres
Hydraulic length = 680.00 feet
Elevation change = 22.0 feet.
Concentration time = 0.11 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.7 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 2.18 cfs
Discharge volume = 0.20 acre ft

Project Title = DA-17 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 3.7 acres
Hydraulic length = 680.00 feet
Elevation change = 22.0 feet.
Concentration time = 0.11 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.7 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 3.33 cfs
Discharge volume = 0.31 acre ft

Project Title = DA-18 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 5.0 acres
Hydraulic length = 480.00 feet
Elevation change = 26.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 5.0 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 2.19 cfs
Discharge volume = 0.20 acre ft

Project Title = DA-18 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 5.0 acres
Hydraulic length = 480.00 feet
Elevation change = 26.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 5.0 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 4.77 cfs
Discharge volume = 0.41 acre ft

Project Title = DA-18 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 5.0 acres
Hydraulic length = 480.00 feet
Elevation change = 26.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 5.0 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 3.06 cfs
Discharge volume = 0.28 acre ft

Project Title = DA-18 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 5.0 acres
Hydraulic length = 480.00 feet
Elevation change = 26.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 5.0 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 4.63 cfs
Discharge volume = 0.43 acre ft

Project Title = DA-19 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.7 acres
Hydraulic length = 370.00 feet
Elevation change = 10.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.7 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.75 cfs
Discharge volume = 0.07 acre ft

Project Title = DA-19 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.7 acres
Hydraulic length = 370.00 feet
Elevation change = 10.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.7 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 1.64 cfs
Discharge volume = 0.14 acre ft

Project Title = DA-19 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.7 acres
Hydraulic length = 370.00 feet
Elevation change = 10.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.7 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.05 cfs
Discharge volume = 0.10 acre ft

Project Title = DA-19 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.7 acres
Hydraulic length = 370.00 feet
Elevation change = 10.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.7 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.60 cfs
Discharge volume = 0.15 acre ft

Project Title = DA-20 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 2.5 acres
Hydraulic length = 250.00 feet
Elevation change = 20.0 feet.
Concentration time = 0.02 hours
Unit hydrograph type = Disturbed

-- Total Area = 2.5 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.88 cfs
Discharge volume = 0.10 acre ft

Project Title = DA-20 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 2.5 acres
Hydraulic length = 250.00 feet
Elevation change = 20.0 feet.
Concentration time = 0.02 hours
Unit hydrograph type = Disturbed

-- Total Area = 2.5 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 1.91 cfs
Discharge volume = 0.20 acre ft

Project Title = DA-20 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 2.5 acres
Hydraulic length = 250.00 feet
Elevation change = 20.0 feet.
Concentration time = 0.02 hours
Unit hydrograph type = Disturbed

-- Total Area = 2.5 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.23 cfs
Discharge volume = 0.14 acre ft

Project Title = DA-20 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 2.5 acres
Hydraulic length = 250.00 feet
Elevation change = 20.0 feet.
Concentration time = 0.02 hours
Unit hydrograph type = Disturbed

-- Total Area = 2.5 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.85 cfs
Discharge volume = 0.21 acre ft

Project Title = DA-21 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 2.0 acres
Hydraulic length = 330.00 feet
Elevation change = 4.0 feet.
Concentration time = 0.08 hours
Unit hydrograph type = Disturbed

-- Total Area = 2.0 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.89 cfs
Discharge volume = 0.08 acre ft

Project Title = DA-21 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 2.0 acres
Hydraulic length = 330.00 feet
Elevation change = 4.0 feet.
Concentration time = 0.08 hours
Unit hydrograph type = Disturbed

-- Total Area = 2.0 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 1.95 cfs
Discharge volume = 0.16 acre ft

Project Title = DA-21 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 2.0 acres
Hydraulic length = 330.00 feet
Elevation change = 4.0 feet.
Concentration time = 0.08 hours
Unit hydrograph type = Disturbed

-- Total Area = 2.0 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.24 cfs
Discharge volume = 0.11 acre ft

Project Title = DA-21 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 2.0 acres
Hydraulic length = 330.00 feet
Elevation change = 4.0 feet.
Concentration time = 0.08 hours
Unit hydrograph type = Disturbed

-- Total Area = 2.0 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.89 cfs
Discharge volume = 0.17 acre ft

Project Title = DA-22 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 3.8 acres
Hydraulic length = 400.00 feet
Elevation change = 20.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.8 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.61 cfs
Discharge volume = 0.15 acre ft

Project Title = DA-22 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 3.8 acres
Hydraulic length = 400.00 feet
Elevation change = 20.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.8 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 3.51 cfs
Discharge volume = 0.31 acre ft

Project Title = DA-22 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 3.8 acres
Hydraulic length = 400.00 feet
Elevation change = 20.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.8 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 2.25 cfs
Discharge volume = 0.21 acre ft

Project Title = DA-22 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 3.8 acres
Hydraulic length = 400.00 feet
Elevation change = 20.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.8 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 3.41 cfs
Discharge volume = 0.32 acre ft

Project Title = DA-23 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.7 acres
Hydraulic length = 300.00 feet
Elevation change = 20.0 feet.
Concentration time = 0.03 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.7 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.66 cfs
Discharge volume = 0.07 acre ft

Project Title = DA-23 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.7 acres
Hydraulic length = 300.00 feet
Elevation change = 20.0 feet.
Concentration time = 0.03 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.7 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 1.43 cfs
Discharge volume = 0.14 acre ft

Project Title = DA-23 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.7 acres
Hydraulic length = 300.00 feet
Elevation change = 20.0 feet.
Concentration time = 0.03 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.7 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.92 cfs
Discharge volume = 0.10 acre ft

Project Title = DA-23 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.7 acres
Hydraulic length = 300.00 feet
Elevation change = 20.0 feet.
Concentration time = 0.03 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.7 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.40 cfs
Discharge volume = 0.15 acre ft

Project Title = DA-24 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 5.2 acres
Hydraulic length = 770.00 feet
Elevation change = 30.0 feet.
Concentration time = 0.11 hours
Unit hydrograph type = Disturbed

-- Total Area = 5.2 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 2.19 cfs
Discharge volume = 0.21 acre ft

Project Title = DA-24 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 5.2 acres
Hydraulic length = 770.00 feet
Elevation change = 30.0 feet.
Concentration time = 0.11 hours
Unit hydrograph type = Disturbed

-- Total Area = 5.2 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 4.89 cfs
Discharge volume = 0.42 acre ft

Project Title = DA-24 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 5.2 acres
Hydraulic length = 770.00 feet
Elevation change = 30.0 feet.
Concentration time = 0.11 hours
Unit hydrograph type = Disturbed

-- Total Area = 5.2 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 3.09 cfs
Discharge volume = 0.29 acre ft

Project Title = DA-24 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 5.2 acres
Hydraulic length = 770.00 feet
Elevation change = 30.0 feet.
Concentration time = 0.11 hours
Unit hydrograph type = Disturbed

-- Total Area = 5.2 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 4.73 cfs
Discharge volume = 0.44 acre ft

Project Title = DA-29 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.5 acres
Hydraulic length = 350.00 feet
Elevation change = 18.0 feet.
Concentration time = 0.04 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.5 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.61 cfs
Discharge volume = 0.06 acre ft

Project Title = DA-29 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.5 acres
Hydraulic length = 350.00 feet
Elevation change = 18.0 feet.
Concentration time = 0.04 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.5 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 1.32 cfs
Discharge volume = 0.12 acre ft

Project Title = DA-29 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.5 acres
Hydraulic length = 350.00 feet
Elevation change = 18.0 feet.
Concentration time = 0.04 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.5 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.85 cfs
Discharge volume = 0.08 acre ft

Project Title = DA-29 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.5 acres
Hydraulic length = 350.00 feet
Elevation change = 18.0 feet.
Concentration time = 0.04 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.5 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.28 cfs
Discharge volume = 0.12 acre ft

Project Title = DA-30 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.4 acres
Hydraulic length = 400.00 feet
Elevation change = 20.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.4 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.57 cfs
Discharge volume = 0.05 acre ft

Project Title = DA-30 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.4 acres
Hydraulic length = 400.00 feet
Elevation change = 20.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.4 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 1.25 cfs
Discharge volume = 0.11 acre ft

Project Title = DA-30 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.4 acres
Hydraulic length = 400.00 feet
Elevation change = 20.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.4 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.80 cfs
Discharge volume = 0.08 acre ft

Project Title = DA-30 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.4 acres
Hydraulic length = 400.00 feet
Elevation change = 20.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.4 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.21 cfs
Discharge volume = 0.11 acre ft

Project Title = DA-31 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.8 acres
Hydraulic length = 1100.00 feet
Elevation change = 24.0 feet.
Concentration time = 0.21 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.8 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.64 cfs
Discharge volume = 0.07 acre ft

Project Title = DA-31 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.8 acres
Hydraulic length = 1100.00 feet
Elevation change = 24.0 feet.
Concentration time = 0.21 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.8 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 1.52 cfs
Discharge volume = 0.14 acre ft

Project Title = DA-31 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.8 acres
Hydraulic length = 1100.00 feet
Elevation change = 24.0 feet.
Concentration time = 0.21 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.8 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.93 cfs
Discharge volume = 0.10 acre ft

Project Title = DA-31 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.8 acres
Hydraulic length = 1100.00 feet
Elevation change = 24.0 feet.
Concentration time = 0.21 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.8 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.45 cfs
Discharge volume = 0.15 acre ft

Project Title = DA-32 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 2.2 acres
Hydraulic length = 1100.00 feet
Elevation change = 24.0 feet.
Concentration time = 0.21 hours
Unit hydrograph type = Disturbed

-- Total Area = 2.2 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.80 cfs
Discharge volume = 0.09 acre ft

Project Title = DA-32 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 2.2 acres
Hydraulic length = 1100.00 feet
Elevation change = 24.0 feet.
Concentration time = 0.21 hours
Unit hydrograph type = Disturbed

-- Total Area = 2.2 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 1.90 cfs
Discharge volume = 0.18 acre ft

Project Title = DA-32 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 2.2 acres
Hydraulic length = 1100.00 feet
Elevation change = 24.0 feet.
Concentration time = 0.21 hours
Unit hydrograph type = Disturbed

-- Total Area = 2.2 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.16 cfs
Discharge volume = 0.12 acre ft

Project Title = DA-32 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 2.2 acres
Hydraulic length = 1100.00 feet
Elevation change = 24.0 feet.
Concentration time = 0.21 hours
Unit hydrograph type = Disturbed

-- Total Area = 2.2 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.81 cfs
Discharge volume = 0.19 acre ft

Project Title = DA-33 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 6.4 acres
Hydraulic length = 600.00 feet
Elevation change = 10.0 feet.
Concentration time = 0.13 hours
Unit hydrograph type = Disturbed

-- Total Area = 6.4 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 2.56 cfs
Discharge volume = 0.26 acre ft

Project Title = DA-33 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 6.4 acres
Hydraulic length = 600.00 feet
Elevation change = 10.0 feet.
Concentration time = 0.13 hours
Unit hydrograph type = Disturbed

-- Total Area = 6.4 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 5.81 cfs
Discharge volume = 0.52 acre ft

Project Title = DA-33 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 6.4 acres
Hydraulic length = 600.00 feet
Elevation change = 10.0 feet.
Concentration time = 0.13 hours
Unit hydrograph type = Disturbed

-- Total Area = 6.4 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 3.64 cfs
Discharge volume = 0.36 acre ft

Project Title = DA-33 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 6.4 acres
Hydraulic length = 600.00 feet
Elevation change = 10.0 feet.
Concentration time = 0.13 hours
Unit hydrograph type = Disturbed

-- Total Area = 6.4 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 5.59 cfs
Discharge volume = 0.55 acre ft

Project Title = DA-34 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 65.0
Area = 85.4 acres
Hydraulic length = 2900.00 feet
Elevation change = 260.0 feet.
Concentration time = 0.27 hours
Unit hydrograph type = Disturbed

-- Total Area = 85.4 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.39 cfs
Discharge volume = 0.03 acre ft

Project Title = DA-34 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 65.0
Area = 85.4 acres
Hydraulic length = 2900.00 feet
Elevation change = 260.0 feet.
Concentration time = 0.27 hours
Unit hydrograph type = Disturbed

-- Total Area = 85.4 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 1.81 cfs
Discharge volume = 0.69 acre ft

Project Title = DA-34 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 65.0
Area = 85.4 acres
Hydraulic length = 2900.00 feet
Elevation change = 260.0 feet.
Concentration time = 0.27 hours
Unit hydrograph type = Disturbed

-- Total Area = 85.4 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.27 cfs
Discharge volume = 0.20 acre ft

Project Title = DA-34 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 65.0
Area = 85.4 acres
Hydraulic length = 2900.00 feet
Elevation change = 260.0 feet.
Concentration time = 0.27 hours
Unit hydrograph type = Disturbed

-- Total Area = 85.4 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 3.13 cfs
Discharge volume = 0.79 acre ft

Project Title = DA-35 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 65.0
Area = 3.0 acres
Hydraulic length = 200.00 feet
Elevation change = 86.0 feet.
Concentration time = 0.01 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.0 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.01 cfs
Discharge volume = 0.00 acre ft

Project Title = DA-35 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 65.0
Area = 3.0 acres
Hydraulic length = 200.00 feet
Elevation change = 86.0 feet.
Concentration time = 0.01 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.0 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 0.06 cfs
Discharge volume = 0.02 acre ft

Project Title = DA-35 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 65.0
Area = 3.0 acres
Hydraulic length = 200.00 feet
Elevation change = 86.0 feet.
Concentration time = 0.01 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.0 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.03 cfs
Discharge volume = 0.01 acre ft

Project Title = DA-35 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 65.0
Area = 3.0 acres
Hydraulic length = 200.00 feet
Elevation change = 86.0 feet.
Concentration time = 0.01 hours
Unit hydrograph type = Disturbed

-- Total Area = 3.0 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.07 cfs
Discharge volume = 0.03 acre ft

Project Title = DA-36 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 65.0
Area = 2.2 acres
Hydraulic length = 820.00 feet
Elevation change = 106.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 2.2 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.01 cfs
Discharge volume = 0.00 acre ft

Project Title = DA-36 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 65.0
Area = 2.2 acres
Hydraulic length = 820.00 feet
Elevation change = 106.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 2.2 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 0.07 cfs
Discharge volume = 0.02 acre ft

Project Title = DA-36 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 65.0
Area = 2.2 acres
Hydraulic length = 820.00 feet
Elevation change = 106.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 2.2 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.03 cfs
Discharge volume = 0.01 acre ft

Project Title = DA-36 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 65.0
Area = 2.2 acres
Hydraulic length = 820.00 feet
Elevation change = 106.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 2.2 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.09 cfs
Discharge volume = 0.02 acre ft

Project Title = DA-37 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 65.0
Area = 202.8 acres
Hydraulic length = 5600.00 feet
Elevation change = 290.0 feet.
Concentration time = 0.68 hours
Unit hydrograph type = Disturbed

-- Total Area = 202.8 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.71 cfs
Discharge volume = 0.07 acre ft

Project Title = DA-37 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 65.0
Area = 202.8 acres
Hydraulic length = 5600.00 feet
Elevation change = 290.0 feet.
Concentration time = 0.68 hours
Unit hydrograph type = Disturbed

-- Total Area = 202.8 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 3.42 cfs
Discharge volume = 1.64 acre ft

Project Title = DA-37 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 65.0
Area = 202.8 acres
Hydraulic length = 5600.00 feet
Elevation change = 290.0 feet.
Concentration time = 0.68 hours
Unit hydrograph type = Disturbed

-- Total Area = 202.8 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 2.66 cfs
Discharge volume = 0.47 acre ft

Project Title = DA-37 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 65.0
Area = 202.8 acres
Hydraulic length = 5600.00 feet
Elevation change = 290.0 feet.
Concentration time = 0.68 hours
Unit hydrograph type = Disturbed

-- Total Area = 202.8 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 6.89 cfs
Discharge volume = 1.89 acre ft

Project Title = DA-38 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 65.0
Area = 15.3 acres
Hydraulic length = 1150.00 feet
Elevation change = 142.0 feet.
Concentration time = 0.09 hours
Unit hydrograph type = Disturbed

-- Total Area = 15.3 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.08 cfs
Discharge volume = 0.01 acre ft

Project Title = DA-38 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 65.0
Area = 15.3 acres
Hydraulic length = 1150.00 feet
Elevation change = 142.0 feet.
Concentration time = 0.09 hours
Unit hydrograph type = Disturbed

-- Total Area = 15.3 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 0.43 cfs
Discharge volume = 0.12 acre ft

Project Title = DA-38 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 65.0
Area = 15.3 acres
Hydraulic length = 1150.00 feet
Elevation change = 142.0 feet.
Concentration time = 0.09 hours
Unit hydrograph type = Disturbed

-- Total Area = 15.3 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.24 cfs
Discharge volume = 0.04 acre ft

Project Title = DA-38 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 65.0
Area = 15.3 acres
Hydraulic length = 1150.00 feet
Elevation change = 142.0 feet.
Concentration time = 0.09 hours
Unit hydrograph type = Disturbed

-- Total Area = 15.3 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.61 cfs
Discharge volume = 0.14 acre ft

Project Title = A-1 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.8 acres
Hydraulic length = 500.00 feet
Elevation change = 16.0 feet.
Concentration time = 0.08 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.8 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.34 cfs
Discharge volume = 0.03 acre ft

Project Title = A-1 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.8 acres
Hydraulic length = 500.00 feet
Elevation change = 16.0 feet.
Concentration time = 0.08 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.8 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 0.74 cfs
Discharge volume = 0.06 acre ft

Project Title = A-1 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.8 acres
Hydraulic length = 500.00 feet
Elevation change = 16.0 feet.
Concentration time = 0.08 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.8 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.47 cfs
Discharge volume = 0.04 acre ft

Project Title = A-1 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.8 acres
Hydraulic length = 500.00 feet
Elevation change = 16.0 feet.
Concentration time = 0.08 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.8 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.72 cfs
Discharge volume = 0.06 acre ft

Project Title = A-2 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.2 acres
Hydraulic length = 230.00 feet
Elevation change = 10.0 feet.
Concentration time = 0.03 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.2 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.06 cfs
Discharge volume = 0.01 acre ft

Project Title = A-2 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.2 acres
Hydraulic length = 230.00 feet
Elevation change = 10.0 feet.
Concentration time = 0.03 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.2 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 0.12 cfs
Discharge volume = 0.01 acre ft

Project Title = A-2 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.2 acres
Hydraulic length = 230.00 feet
Elevation change = 10.0 feet.
Concentration time = 0.03 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.2 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.08 cfs
Discharge volume = 0.01 acre ft

Project Title = A-2 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.2 acres
Hydraulic length = 230.00 feet
Elevation change = 10.0 feet.
Concentration time = 0.03 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.2 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.12 cfs
Discharge volume = 0.01 acre ft

Project Title = A-3 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 2.3 acres
Hydraulic length = 400.00 feet
Elevation change = 10.0 feet.
Concentration time = 0.07 hours
Unit hydrograph type = Disturbed

-- Total Area = 2.3 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.02 cfs
Discharge volume = 0.09 acre ft

Project Title = A-3 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 2.3 acres
Hydraulic length = 400.00 feet
Elevation change = 10.0 feet.
Concentration time = 0.07 hours
Unit hydrograph type = Disturbed

-- Total Area = 2.3 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 2.23 cfs
Discharge volume = 0.19 acre ft

Project Title = A-3 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 2.3 acres
Hydraulic length = 400.00 feet
Elevation change = 10.0 feet.
Concentration time = 0.07 hours
Unit hydrograph type = Disturbed

-- Total Area = 2.3 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.43 cfs
Discharge volume = 0.13 acre ft

Project Title = A-3 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 2.3 acres
Hydraulic length = 400.00 feet
Elevation change = 10.0 feet.
Concentration time = 0.07 hours
Unit hydrograph type = Disturbed

-- Total Area = 2.3 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 2.17 cfs
Discharge volume = 0.20 acre ft

Project Title = A-4 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 2.7 acres
Hydraulic length = 425.00 feet
Elevation change = 18.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 2.7 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.19 cfs
Discharge volume = 0.11 acre ft

Project Title = A-4 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 2.7 acres
Hydraulic length = 425.00 feet
Elevation change = 18.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 2.7 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 2.58 cfs
Discharge volume = 0.22 acre ft

Project Title = A-4 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 2.7 acres
Hydraulic length = 425.00 feet
Elevation change = 18.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 2.7 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.66 cfs
Discharge volume = 0.15 acre ft

Project Title = A-4 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 2.7 acres
Hydraulic length = 425.00 feet
Elevation change = 18.0 feet.
Concentration time = 0.06 hours
Unit hydrograph type = Disturbed

-- Total Area = 2.7 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 2.51 cfs
Discharge volume = 0.23 acre ft

Project Title = A-5 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.7 acres
Hydraulic length = 425.00 feet
Elevation change = 22.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.7 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.73 cfs
Discharge volume = 0.07 acre ft

Project Title = A-5 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.7 acres
Hydraulic length = 425.00 feet
Elevation change = 22.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.7 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 1.60 cfs
Discharge volume = 0.14 acre ft

Project Title = A-5 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.7 acres
Hydraulic length = 425.00 feet
Elevation change = 22.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.7 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.02 cfs
Discharge volume = 0.10 acre ft

Project Title = A-5 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.7 acres
Hydraulic length = 425.00 feet
Elevation change = 22.0 feet.
Concentration time = 0.05 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.7 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 1.55 cfs
Discharge volume = 0.15 acre ft

Project Title = A-6 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.1 acres
Hydraulic length = 350.00 feet
Elevation change = 30.0 feet.
Concentration time = 0.03 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.1 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.42 cfs
Discharge volume = 0.04 acre ft

Project Title = A-6 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.1 acres
Hydraulic length = 350.00 feet
Elevation change = 30.0 feet.
Concentration time = 0.03 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.1 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 0.90 cfs
Discharge volume = 0.09 acre ft

Project Title = A-6 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.1 acres
Hydraulic length = 350.00 feet
Elevation change = 30.0 feet.
Concentration time = 0.03 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.1 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.58 cfs
Discharge volume = 0.06 acre ft

Project Title = A-6 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 1.1 acres
Hydraulic length = 350.00 feet
Elevation change = 30.0 feet.
Concentration time = 0.03 hours
Unit hydrograph type = Disturbed

-- Total Area = 1.1 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.87 cfs
Discharge volume = 0.09 acre ft

Project Title = A-7 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.3 acres
Hydraulic length = 75.00 feet
Elevation change = 12.0 feet.
Concentration time = 0.01 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.07 cfs
Discharge volume = 0.01 acre ft

Project Title = A-7 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.3 acres
Hydraulic length = 75.00 feet
Elevation change = 12.0 feet.
Concentration time = 0.01 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 0.14 cfs
Discharge volume = 0.02 acre ft

Project Title = A-7 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.3 acres
Hydraulic length = 75.00 feet
Elevation change = 12.0 feet.
Concentration time = 0.01 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.09 cfs
Discharge volume = 0.02 acre ft

Project Title = A-7 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.3 acres
Hydraulic length = 75.00 feet
Elevation change = 12.0 feet.
Concentration time = 0.01 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.14 cfs
Discharge volume = 0.03 acre ft

Project Title = A-8 (10/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.3 acres
Hydraulic length = 75.00 feet
Elevation change = 10.0 feet.
Concentration time = 0.01 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data
Total precipitation = 1.2 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.06 cfs
Discharge volume = 0.01 acre ft

Project Title = A-8 (10/24)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.3 acres
Hydraulic length = 75.00 feet
Elevation change = 10.0 feet.
Concentration time = 0.01 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS Type 2 storm, 24 hour storm
Peak Discharge = 0.13 cfs
Discharge volume = 0.02 acre ft

Project Title = A-8 (25/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.3 acres
Hydraulic length = 75.00 feet
Elevation change = 10.0 feet.
Concentration time = 0.01 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data
Total precipitation = 1.5 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.09 cfs
Discharge volume = 0.02 acre ft

Project Title = A-8 (100/6)
WATERSHED HYDROGRAPH
Inflow into structure # 1
Structure type: Null

-- Watershed data for watershed # 1
Curve number = 90.0
Area = 0.3 acres
Hydraulic length = 75.00 feet
Elevation change = 10.0 feet.
Concentration time = 0.01 hours
Unit hydrograph type = Disturbed

-- Total Area = 0.3 acres

-- Storm data
Total precipitation = 1.9 inches
Storm type = SCS 6 hour design storm
Peak Discharge = 0.13 cfs
Discharge volume = 0.02 acre ft