

TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

April 21, 2004

TO: Internal File

THRU: Joe Helfrich, Team Lead

FROM: James D. Smith, Environmental Scientist

RE: South Crandall Lease Revision, Andalex Resources, Inc., Crandall Canyon Mine, C/015/0032, Task # 1903

SUMMARY:

Little Bear Spring in Little Bear Canyon, located adjacent to the South Crandall Lease Revision, is an important source of water for the Castle Valley Special Services District (CVSSD), supplying 65 percent of the culinary water to the residents of Huntington, Cleveland, and Elmo. It is probably the largest and most consistently flowing spring in the region, and the only water-treatment required before use is chlorination. CVSSD has great concerns about protecting this important water supply from mining related damage. The South Crandall Canyon Coal Lease Tract was deleted from the Mill Fork Tract because of concerns that were raised regarding Little Bear Spring.

The South Crandall Canyon area was reevaluated and was leased to Andalex in June 2003 (lease UTU-78953). Access to the South Crandall Lease Revision will be through new portals (under construction in 2003) on the south side of Crandall Canyon in fee coal (often referred to as the "Dellenbach" lease) owned by IPA and Andalex. The South Crandall Lease Revision covers 880 acres.

The proposed amendment should not be approved at this time. Additional geologic and hydrologic information are needed to meet the requirements of the Coal Mining Rules and for the Division to upgrade of the CHIA.

Permittee's Action		DOGM's Action	
Original submittal	09/16/2003		
		ACR Determination	10/07/2003
		Tech Memo – Geology - Task # 1698	11/07/2003
		TA - Task # 1698	11/25/2003
Response to TA - Task # 1698	01/30/2004		
		Tech Memo - Geology - Task # 1826	03/03/2004
		TA - Task # 1826	03/04/2004
Response to TA – Task # 1826	04/05/2004		
		Tech Memo – Geology - Task # 1903	Due 04/30/2004
		TA - Task # 1903	Due 04/30/2004

TECHNICAL ANALYSIS:

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

GEOLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR 784.22; R645-301-623, -301-724.

Analysis:

There is geologic information for the permit and adjacent areas in the current MRP, including the proposed South Crandall Lease Revision. Additional geologic information on the South Crandall Lease Revision has been added. Maps showing geologic information have been updated to include the South Crandall Lease Revision, including the 40-acre SITLA-PacifiCorp sub lease.

Test borings and coal sampling; coal seams, overburden, and strata

Borehole HC-4 (Appendix 6-6) provides the only information on coal seam thicknesses in the South Crandall Lease Revision. A paragraph about drill hole and geological information for the South Crandall Lease Revision was added to page 6-5. It includes the statement, "There is only one drill hole on the South Crandall lease, DH-4.": this is incorrect. DH-4 is located at least a mile away (nw/4, sw/4, ne/4, Sec. 1, T. 16 S., R. 6 E.) in the area of the Crandall Canyon #1 Mine. This paragraph also contains the statement, "The driller's log for DH-4 is in Appendix 6-6.": this also is incorrect. The log for HC-4 is in Appendix 6-6. Also, the title page of Appendix 6-6 incorrectly states that Appendix 6-6 contains the driller's log for DH-4.

The lowest coal seam in the Blackhawk Formation is the Hiawatha, characteristically on or just above the Star Point Sandstone. This seam has been mined in the Cottonwood/Wilberg, Deer Creek, Des-Bee-Dove, Huntington #4, and Genwal #1 Mines. The Hiawatha Seam thins to less than 5 feet in the north end of the Cottonwood/Wilberg Mine, but then thickens again to the north. The Hiawatha Seam reaches a thickness of 12 feet in the Crandall Canyon permit area, located mainly north and west of the #1 Mine portal. For the Hiawatha Seam in the South Crandall Lease Revision, thickness of the coal seam and cover are shown on Plate 5-2 (H), along with the Hiawatha to Blind Canyon interburden thickness. Seam thickness and cover for the Crandall Canyon #1 Mine area are on Plates 6-3 and 6-6.

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The Blind Canyon Seam lies approximately 40 to 100 feet above the Hiawatha Seam. The Blind Canyon Seam has been mined in the Deer Creek, Huntington #4, and Des-Bee-Dove Mines, but is too thin to mine economically at the Cottonwood/Wilberg Mines. The Blind Canyon Seam is too thin for economic recovery from the Crandall Canyon #1 Mine, but this seam will be mined in the South Crandall Lease Revision. For the Blind Canyon Seam in the South Crandall Lease Revision, thickness of the coal seam and cover are shown on Plate 5-2 (BC), along with the Hiawatha to Blind Canyon interburden thickness. Plate 5-2 (BC) shows that the seam is just under 5 feet thick at HC-4 but thickens to the west. Blind Canyon Seam thickness for the Crandall Canyon #1 Mine area is on Plate 6-4.

The Bear Canyon Seam is too thin to mine economically in either the Crandall Canyon #1 Mine or South Crandall Lease Revision. Plate 6-5 is the Bear Canyon Seam thickness isopach map for the #1 Mine area. Borehole HC-4 provides the only information on the Bear Canyon Seam in the South Crandall Lease Revision (Appendix 6-6). On page 6-5, the Bear Canyon Seam thickness is stated to be 2 feet at the South Crandall Lease Revision: borehole DH-4, rather than HC-4, is incorrectly identified as the source of this information.

Information on Test Borings and Coal Sampling (section 6.22.1, page 6-4) discusses only the Crandall Canyon #1 Mine area and does not mention the South Crandall Lease Revision, does not mention drill hole HC-4, does not discuss coal sampling for the Blind Canyon Seam or the quality of the Blind Canyon coal, and only mentions the Blind Canyon Seam to say it is not mineable. These omissions need to be corrected.

The first paragraph on page 6-5 refers to Appendices 6-1 and 6-5 for information on the nature, depth and thickness of coal seams, rider seams, overburden and interburden for the permitted area, based on drilling completed to date. Appendix 6-6 needs to be added to the referenced appendices because it contains the only information on these characteristics for the South Crandall Lease Revision.

The Permittee states in the last paragraph on page 6-5 that the thickness of the Blind Canyon Seam is, respectively, 59 and 40 inches at in-mine drill holes DH-1 and DH-2 (these drill holes and coal thicknesses are not shown on Plate 6-4; Plates 5-2 (H) and (BC) indicate a thickness of 56 inches at both drill holes) and 54 and 40 inches in surface drill-holes DH-3 and DH-4. The Permittee has mapped a relatively small area (the text states 60 acres, Plate 6-4 shows approximately 150 acres) where the Blind Canyon Seam has a thickness of 5 feet or more, and indicates the seam is fairly continuous across the property. The Permittee concludes that the Blind Canyon Seam does not contain sufficient coal (approximately 418,000 tons) for economic mining: although the text does not make it clear, this conclusion is valid only for the #1 Mine area and does not apply to the South Crandall Lease Revision. The Blind Canyon Seam will be mined in the South Crandall Lease Revision. The Permittee needs to clarify that information in the last paragraph on page 6-5 applies only to the #1 Mine area.

Drill-hole locations for the South Crandall Lease Revision are shown on Plates 5-2 (BC) and 5-2 (H). Reference is made in several places to Plate 5-2, which can be understood to cover 5-2 (H) and 5-2 (BC). On page 6-5 is the statement “DH-2 in Federal lease SL-062648 its location is unknown and is not shown on any Plate.”: a location for DH-2 is shown on Plates 5-2 (H) and (BC), so this statement needs to be corrected.

The first paragraph on page 6-6 refers to the State leases only, so the information regarding the coal seams in the State leases is sufficient.

Acid- and toxic-forming materials

For the Crandall Canyon #1 Mine, acid- and toxic-forming characteristics for strata immediately over and under the Hiawatha and Blind Canyon Seams in the #1 Mine area are discussed on pages 6-8 and 6-9. Analysis results for the Hiawatha coal also are discussed on page 6-9. The Permittee has not provided analyses for acid- and toxic-forming characteristics for the Blind Canyon Seam, in either the #1 Mine area or the South Crandall Lease Revision. The Permittee states on page 6-9 of the proposed amendment that there is currently no access to unweathered Blind Canyon materials (the cores taken in 1981 at HC-4 are apparently not available for analysis); however, coal and adjacent strata will be analyzed when the rock tunnels reach the Blind Canyon Seam.

Engineering properties - clays and soft rock

According to section 6.24.34 on page 6-9, strata immediately above and below the “seam to be mined” do not contain clays or soft rock. Those statements are based on information in Appendices 6-1 and 6-5 and apply to the Hiawatha Seam only.

Engineering properties of strata above and below the Blind Canyon Seam have not been evaluated in the current MRP or the proposed amendment. The lithology log of HC-4 in Appendix 6-6 shows claystone and shale immediately above and below the Blind Canyon Seam. The Blind Canyon Seam is not thick enough to allow the leaving of thick layers of coal on the roof and floor, and soft rock in the roof and floor increases the probability that there will be waste rock that will need to be disposed of. The Permittee must discuss the thickness and engineering properties of clays or soft rock in the roof and floor of the Blind Canyon Seam in the South Crandall Lease Revision.

Geologic information pertaining to hydrology (Little Bear Spring in particular)

Little Bear Spring is located adjacent to the South Crandall Lease Revision, and CVSSD has great concerns about protecting this important water supply from mining related damage. Information on how geology may affect the occurrence, availability, movement, quantity and quality of potentially impacted surface and ground water in the South Crandall

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Lease Revision and adjacent areas was studied extensively before the South Crandall Canyon lease was issued. Using these studies, the BLM and the Manti-La Sal National Forest concluded that mining in the South Crandall Lease Revision has a low potential to disrupt Little Bear Spring, and they signed a FONSI in February 2003. Copies of the reports prepared from these studies are included in the proposed amendment as appendices to Chapter 7, and the appendices number and title are listed on page 6-7a.

Findings:

Geologic Resource Information is not sufficient to meet the requirements of the Coal Mining Rules. Before the proposed amendment can be approved, the Permittee needs to provide the following information:

R645-301-121.220, The paragraph about drill hole and geological information for the South Crandall Lease Revision that was added to page 6-5 includes the statement, "There is only one drill hole on the South Crandall lease, DH-4." **This is not correct.** The Permittee must correct this. HC-4 is the drill hole in the South Crandall Lease Revision.

R645-301-121.220, The paragraph about drill hole and geological information for the South Crandall Lease Revision that was added to page 6-5 also contains the statement, "The driller's log for DH-4 is in Appendix 6-6." **This is not correct.** The Permittee must correct this. Appendix 6-6 contains the log for HC-4.

R645-301-121.220, The title page of Appendix 6-6 states that the appendix contains the driller's log for DH-4. **This is not correct.** Permittee must correct this. Appendix 6-6 contains the log for HC-4.

R645-301-121.220, Information on Test Borings and Coal Sampling (section 6.22.1, page 6-4) discusses only the Crandall Canyon #1 Mine area and does not even mention the South Crandall Lease Revision, does not mention drill hole HC-4, does not discuss coal sampling for the Blind Canyon Seam or the quality of the Blind Canyon coal in the South Crandall Lease Revision, and only mentions the Blind Canyon Seam to say it is not mineable. The Permittee must include information for the South Crandall Lease Revision in the Test Borings and Coal Sampling section (6.22.1) on page 6-4.

R645-301-121.220, The first paragraph on page 6-5 refers to Appendices 6-1 and 6-5 for information on the nature, depth and thickness of coal seams, rider seams, overburden and interburden for the permitted area, based on drilling completed to date. The Permittee must add Appendix 6-6 to the appendices referenced on page

6-5 because it contains the only information on these characteristics for the South Crandall Lease Revision.

R645-301-121.220, The Permittee must clarify that the last paragraph on page 6-5, which indicates that the Blind Canyon Seam is not sufficiently thick for economic recovery, refers only to the #1 Mine and does not apply to the South Crandall Lease Revision.

R645-301-121.220, On page 6-5 is the statement “DH-2 in Federal lease SL-062648 its location is unknown and is not shown on any Plate.” **This is not correct.** Permittee must correct this. A location for DH-2 is shown on Plates 5-2 (H) and (BC).

R645-301-624.340, The Permittee must discuss the thickness and engineering properties of clays or soft rock in the roof and floor of the Blind Canyon Seam in the South Crandall Lease Revision in section 6.24.34 on page 6-9.

HYDROLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

Analysis:

Baseline Cumulative Impact Area Information

The Division has updated the East Mountain CHIA to incorporate the expansion of the Crandall Canyon Mine into the South Crandall Canyon Lease Tract. There is no geologic structure map covering the South Crandall Lease Revision.

Findings:

Geologic baseline cumulative impact information is not sufficient to meet the requirements of the Coal Mining Rules. Before the proposed amendment can be approved, the Permittee needs to provide the following information:

R645-301-624.100, The Permittee needs to provide a geologic structure map covering the South Crandall Lease Revision.

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MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

Analysis:

Affected Area Boundary Maps

Maps showing the geologic characteristics of the permit and adjacent areas have been amended or augmented to include the boundary for the South Crandall Lease Revision.

Coal Resource and Geologic Information Maps

Subsidence projections for the South Crandall Lease Revision are on Plates 5-2 (H) and 5-2 (BC).

The Hiawatha Seam thickness isopach (Plate 6-3), Blind Canyon Seam thickness isopach (Plate 6-4), Bear Canyon Seam thickness isopach (Plate 6-5), Hiawatha Seam overburden thickness isopach (Plate 6-6), and structure contour map of the top of the Hiawatha Seam (Plate 6-7) do not include the South Crandall Lease Revision.

Hiawatha and Blind Canyon Seam thickness isopachs for the South Crandall Lease Revision are on Plates 5-2 (H) and 5-2 (BC), and information on interburden is also listed on these maps. Overburden thickness is shown on Plates 5-2 (H) and 5-2 (BC). Taking into consideration the inherent inaccuracy in the large contour interval needed to map the overburden thickness because of the steep topography, the difference between the Hiawatha and Bear Canyon overburden thicknesses is not significant. However, there is no geologic structure map covering the South Crandall Lease Revision.

Monitoring and Sampling Location Maps

Drill-hole locations are shown on Plates 5-2 (BC) and 5-2 (H).

Findings:

Maps, plans, and cross sections of resource information are not sufficient to meet the requirements of the Coal Mining Rules. Before the proposed amendment can be approved, the Permittee needs to provide the following information:

R645-301-624.100, The Permittee needs to provide a geologic structure map covering the South Crandall Lease Revision.

OPERATION PLAN

SUBSIDENCE CONTROL PLAN

Regulatory Reference: 30 CFR 784.20, 817.121, 817.122; R645-301-521, -301-525, -301-724.

Analysis:

Subsidence Control Plan

Subsidence projections for the South Crandall Lease Revision are on Plates 5-2 (H) and 5-2 (BC).

Findings:

Subsidence Control information is sufficient to meet the requirements of the Coal Mining Rules.

RECLAMATION PLAN

MINE OPENINGS

Regulatory Reference: 30 CFR Sec. 817.13, 817.14, 817.15; R645-301-513, -301-529, -301-551, -301-631, -301-748, -301-765, -301-748.

Analysis:

Plans for casing and sealing holes are covered in the current MRP. Drill-hole locations are shown on Plates 5-2 (BC) and 5-2 (H).

Findings:

Reclamation Mine Opening information is sufficient to meet the requirements of the Coal Mining Rules.

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CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

Regulatory Reference: 30 CFR Sec. 784.14; R645-301-730.

Analysis:

The Division needs to update the East Mountain CHIA to incorporate the expansion of the Crandall Canyon Mine into the South Crandall Canyon Lease Tract. Additional geologic and hydrologic information, as described in the Findings of other sections of this document, are needed before the Division can complete this update.

Findings:

The Division cannot complete the CHIA at this time.

R645-301-725.100, the Permittee needs to provide geologic and hydrologic information as described in the Findings of other sections.

RECOMMENDATIONS:

The proposed amendment should not be approved at this time. Additional geologic and hydrologic information are needed to meet the requirements of the Coal Mining Rules.