

TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

March 3, 2006

TO: Internal File

THRU: D. Wayne Hedberg, Permit Supervisor
Karl R. Houskeeper, Environmental Scientist/Engineering, Team Lead

FROM: Steve K. Christensen, Environmental Scientist/Hydrology

RE: Revised Appendix X and Gob Vent Holes #5A, #7, #8, and #9, Andalex Resources, Inc., Centennial Mine, C/007/0019, Task ID #2420

SUMMARY:

This Technical Memo addresses the hydrologic aspects of the Revised Appendix X and proposed Gob Vent Holes (GVH) 5A, 7, 8, and 9 for the Centennial Mine. This project is a "Ventilation Assistance Program", wherein hazardous "gob gas" from the longwall will be partially vented to the surface.

Andalex Resources, Inc. submitted an amendment to the Utah Division of Oil, Gas and Mining (the Division) containing the revised Appendix X on October 20, 2005. The revised appendix contained as built information for previously installed gob vent holes GVH-1, GVH-3, GVH-4, GVH-5 and GVH-6. In addition, the amendment also contained information on four additional proposed holes, GVH-5A, GVH-7, GVH-8 and GVH-9. This request was assigned Task ID #2359. Task ID #2359 was sent back deficient on December 27, 2005. Andalex Resources, Incorporated (Inc.) submitted the revisions to Appendix X on January 27th, 2006 to the Division. This application was assigned Task ID #2420. This memo addresses the hydrologic section of the revised amendment.

Hydrologic information provided in the Revised Appendix X meets the requirements of the Coal Mining Rules and should be approved.

TECHNICAL ANALYSIS:

ENVIRONMENTAL RESOURCE INFORMATION

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GENERAL

Regulatory Reference: 30 CFR 783.12; R645-301-411, -301-521, -301-721.

Analysis:

The revised Appendix X meets the minimum General Information requirements as provided in R645-301-721. A description of the existing, pre-mining hydrologic resources within the proposed gob vent hole project area is provided in Section 721 of the revised Appendix X and further discussed in Appendix L of the approved MRP.

Findings:

The revised Appendix X meets the General Information requirements as provided in R645-301-721.

CLIMATOLOGICAL RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.18; R645-301-724.

Analysis:

Climatological information is provided in Section 724.400 of the current MRP and further discussed in Appendix L.

Findings:

The revised Appendix X meets the Climatological Resource Information requirements as provided in R645-301-724.400.

ALLUVIAL VALLEY FLOORS

Regulatory Reference: 30 CFR 785.19; 30 CFR 822; R645-302-320.

Analysis:

Alluvial Valley Floor Determination

Information in Appendix L of the MRP shows that the area for a radius of two miles around the original Tower Mine does not meet the criteria for the presence of Alluvial Valley Floors (AVF). Depending upon where the two-mile radius was measured from, i.e., the mine portal versus the permit area boundary, the Gob Gas Vent Holes may possibly be located outside the area covered by that original AVF determination. However, the high-elevation, mountainous terrain where the holes will be bored is an unlikely area for an AVF. In addition, the Gob Gas Vent Holes will be located out of the channel bottoms.

Findings:

The revised Appendix X meets the Alluvial Valley Floor requirements as provided in R645-301-320.

GEOLOGIC RESOURCE INFORMATION

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

Analysis:

Geologic information related to the Gob Gas Vent Holes sites and adjacent areas is presented in Chapter 6 of Appendix X. Additional information is in the current MRP. Plate 21 of the current MRP shows the geology associated with the entire permit area, including the proposed Gob Gas Vent Holes locations. The borehole sites will be built on Flagstaff Formation. No test boring or drill cores are planned for the Gob Gas Vent Holes. Additional geologic data will not be collected. The Permittee has not requested a sampling waiver.

Findings:

The information provided meets the requirements of the Geologic Resource Information section of the regulations as provided in **R645-301-724**.

HYDROLOGIC RESOURCE INFORMATION

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

Analysis:

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Sampling and Analysis

Sampling and analysis are discussed in Appendix L of the MRP.

Baseline Information

Section 724 of the MRP references Appendix L for most baseline information. Appendix L includes a Surface and Ground Water Hydrologic Inventory plus PHC Determinations for the Graves Lease, the 240-acre IBC, the Summit Creek and North Mathis leases. Figures 4 and 5 in Appendix L show the locations of the surface-water bodies and existing or pending water rights. Appendix L includes Surface and Ground Water Inventories.

Baseline Cumulative Impact Area Information

The current Book Cliffs I CHIA (September 03, 2004) covers the well sites and adjacent areas. The Division used hydrologic and geologic information in the MRP in making the CHIA determination.

Modeling

Ground water and/or surface water modeling was not conducted in association with the Gob Gas Vent Holes submittal.

Probable Hydrologic Consequences Determination

Appendix X, Section 728 addresses the probable hydrologic consequences of construction and reclamation operations at the Gob Gas Vent Hole sites. Mitigation measures are discussed generally in Appendix X, Section 728 and in detail in Section 730 of the MRP.

Potential impacts of the Gob Gas Vent Holes on surface and ground waters include contamination from materials associated with the drilling of the wells. Hydrocarbon products will not be stored at the well sites; however, fuels, greases, and other oils may leak from equipment during drilling operations. Absorbent materials will be used for the collection of leaked fuels, greases, and other oils. The saturated absorbent materials will be disposed of at an appropriate landfill facility (Appendix X, Sections 728.100 and 728.300).

Ground water encountered during drilling of the wells will be affected. Drilling mud will be used to seal ground water zones. Once drilling is completed, the casing will be grouted in the well hole. This will seal the aquifers to prevent any groundwater from migrating down the outside of the casing into the mine (Appendix X, Section 728.300).

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No acid- or toxic-forming materials have been identified in the soils or strata of the Centennial Project (MRP Chapter 6) and no acid- or toxic-forming materials will originate at the Gob Gas Vent Holes sites (Appendix X, Section 623). Additional information on acid- or toxic-forming materials is located in Appendix E of the MRP.

Findings:

The information provided meets the hydrologic resource information requirements for baseline information as provided in regulation **R645-301-724**.

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:

Existing Surface Configuration Maps

Surface topography features at the Gob Gas Vent Holes and adjacent areas are shown in Figure 1-1 in Appendix X.

Monitoring and Sampling Location Maps

Figure 6 in Appendix L and Figure IV-II (both in the MRP) show the location of surface water and ground water monitoring stations.

Subsurface Water Resource Maps

Figures 4 and 5 of Appendix L of the MRP show the locations of the ground water bodies and water rights.

Surface Water Resource Maps

Figures 4 and 5 of Appendix L show the locations of the surface water bodies and water rights.

Well Maps

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The locations of the two water-monitoring wells are shown in Figure 4 of the MRP's Appendix L.

Findings:

The information provided meets the Environmental Resource Information hydrologic requirements for Maps, Plans and Cross Sections of Resource Information as provided in **R645-301-722 and -731**.

OPERATION PLAN

SPOIL AND WASTE MATERIALS

Regulatory Reference: 30 CFR Sec. 701.5, 784.19, 784.25, 817.71, 817.72, 817.73, 817.74, 817.81, 817.83, 817.84, 817.87, 817.89; R645-100-200, -301-210, -301-211, -301-212, -301-412, -301-512, -301-513, -301-514, -301-521, -301-526, -301-528, -301-535, -301-536, -301-542, -301-553, -301-745, -301-746, -301-747.

Analysis:

Disposal Of Noncoal Mine Wastes

All non-coal mine waste will be disposed of at an approved landfill (Appendix X, Section 747).

Coal Mine Waste.

The proposed amendment states no coal mine waste will be generated at the Gob Gas Vent Hole sites (Appendix X, Section 746.400). The Coal Mining Rules are not clear about the status of cuttings from boreholes, but based on precedents from exploration drilling, these cuttings do not need to be treated as coal mine waste. When the mud pits are reclaimed, the borehole cuttings will be mixed with sub-soils excavated from the pits. The mixture will be placed in the pits and covered with four feet of subsoil and then with topsoil at the same thickness as the rest of the site (Appendix X, Sections 242.100, 242.300, 528, and 553.200).

Refuse Piles

According to the submittal, no refuse piles at the Gob Gas Vent Hole sites will be generated (Appendix X, Section 746.200).

Impounding Structures

No permanent impoundments will be utilized at the Gob Gas Vent Hole sites (Appendix X, Section 733.200).

Return of Coal Processing Waste to Abandoned Underground Workings

No coal processing waste will be generated at the Gob Gas Vent Hole sites (Appendix X, Section 746.400).

Excess Spoil

There will be no excess spoil or coal mine waste generated at the Gob Gas Vent Hole sites (Appendix X, Section 754).

Findings:

The information provided meets the Operational Plan hydrologic requirements as provided in **R645-301-745, -746 and -747.**

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

General

The Gob Gas Vent Hole submittal includes general well site plans that incorporate design criteria for the control of drainage (Appendix X, Section 741). The effect on groundwater at the well sites is expected to be minimal, and ground water encountered during drilling will be sealed off. To protect the hydrologic balance, the Permittee commits to handle earth materials and

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runoff during construction, maintenance, and reclamation operations in a manner that prevents, to the extent possible, additional contributions of suspended solids to stream flow outside the permit area, and otherwise prevent water pollution. (Appendix X, Sections 728.300 and 731.100).

Groundwater Monitoring

No additional water monitoring will be conducted at the Gob Gas Vent Hole sites (Appendix X, Section 731.200).

Surface Water Monitoring

No additional water monitoring will be conducted at the Gob Gas Vent Hole sites (Appendix X, Section 731.200).

Acid- and Toxic-Forming Materials and Underground Development Waste

No acid- or toxic-forming materials are anticipated at the Gob Gas Vent Hole sites. No acid- or toxic-forming materials have been identified in the soils or strata of the Centennial Project. Hydrocarbon products will not be stored at the well sites; however, fuels, greases, and other oils may leak from equipment during drilling operations. Absorbent materials will be used for the collection of leaked fuels, greases, and other oils. The saturated absorbent materials will be disposed of at an appropriate landfill facility (Appendix X, Sections 728.300 and 731.300).

Transfer of Wells

No wells have been transferred and no transfer is anticipated (Section 731.400 of the MRP).

Temporary Casing and Sealing of Wells

All openings will be sealed in accordance with Federal and State Regulations. The casings will be plugged at the bottom to hold concrete, and a lean concrete mixture will be poured into the casing until the concrete is within five feet of the surface. At that time, the casing will be cut off at ground level and the rest of the casing will be filled with lean concrete. The concrete will be allowed to harden before final reclamation is completed (Appendix X, Section 542.700).

Discharges Into An Underground Mine

There will be no discharge to underground workings (Appendix X, Section 731.500). Drilling mud will be used to seal ground water zones. Once drilling is completed, the casing will be grouted in the well hole, which will seal the aquifers to prevent any groundwater from migrating down the outside of the casing into the mine (Appendix X, Section 728.300).

Water-Quality Standards And Effluent Limitations

Water encountered during drilling and runoff water will be treated using silt fences and/or straw bales prior to leaving the site. Should it become necessary, the water encountered during drilling will be pumped into a tank and hauled from the site for disposal at a licensed facility (Appendix X, Section 751).

Diversions: General

No diversion ditches will be constructed as part of the drilling or operational phases, including along the roads leading to the well sites (Appendix X, Sections 742.300 and 732.400).

Diversions: Miscellaneous Flows

A berm at the top of cut slopes will divert runoff around the drilling pad (Appendix X, Section 731.100).

Stream Buffer Zones

None of the drilling sites are adjacent to a stream; therefore a stream buffer zone is not necessary (Appendix X, Section 731.600).

Sediment Control Measures

The Gob Gas Vent Hole sites have been designed to minimize erosion to the extent possible, and sediment control measures formulated to prevent additional contributions of sediment to stream flow or to runoff outside the well sites, minimize erosion to the extent possible, and otherwise prevent water pollution (Appendix X, Sections 732 and 742). Hydrologic calculations of runoff volume and peak flows from each of the previously installed gob vent holes as well as the proposed gob vent holes are contained in Attachment 7-1. The calculations were performed utilizing a 10-year/24-hour precipitation event of 1.82". Section R645-301-512.240 in the MRP discusses further criteria used in the hydrologic calculations.

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Sediment yields in the well permit area are minimized by disturbing the smallest practicable area during the construction of the well site and contemporaneously reclaiming areas suitable for such reclamation (Appendix X, Section 532). The drilling sites for the Gob Gas Vent Holes will not have sedimentation ponds (Appendix X, Section 732.200). Sediment control methods will include silt fences, berms, and straw bales to reduce runoff and trap sediment. Sediment control measures will be located, maintained, constructed and reclaimed according to plans and designs presented in Appendix X, Sections 732, 742, and 760.

Siltation structures will be installed before the topsoil is removed from the Gob Gas Vent Hole sites. Construction activities will not occur during major precipitation events (Appendix X, Section 742). Sites will be graded to ensure that storm runoff flows towards berms surrounding the drill pad. Berms and silt fences will direct runoff to the low points of the pad, where runoff will be treated by silt fences or straw bales. A berm at the top of cut slopes will divert runoff around the drilling pad. Berms at the top of fill slopes will direct runoff from the pad to silt fences or straw bales, and berms and silt fences will be installed at the toe of fill slopes. After drilling, the pad will be reduced in size and re-graded to direct storm runoff towards silt fences or straw bales. Silt fences and straw bales will be periodically inspected, and accumulated sediment will be removed as needed to maintain functionality and piled on the pad to be used for fill during final reclamation of the well site (Appendix X, Section 731.100).

Chapter 5 of the revised Appendix X contains pad design figures depicting the typical sedimentation structures that will be utilized during the installation of the gob vent holes (Figures 5-1, 5-2, and 5-3). In addition, as-constructed drawings have been submitted for gob vent holes GVH-1, GVH-3, GVH-4, GVH-5, and GVH-6 (Figures 5-7, 5-8, 5-9, 5-10, and 5-11 respectively)

Siltation Structures: General

Siltation structures will be located, maintained, constructed, and reclaimed according to plans and designs presented in Sections 732, 742, and 763 of Appendix X (Appendix X, Section 752.100).

Siltation Structures: Sedimentation Ponds

The drilling sites for the Gob Gas Vent Holes will not have sedimentation ponds (Appendix X, Section 732.200).

Siltation Structures: Exemptions

The Permittee has not requested any exemptions from the requirements of this section of the Coal Mining Rules.

Discharge Structures

No discharge structures have been planned or designed for the Gob Gas Vent Holes project (Appendix X, Section 734).

Impoundments

No impoundments, temporary or permanent, will exist at the Gob Gas Vent Hole sites (Appendix X, Sections 733.200, 743 and 753).

Road Drainage

The application states that no diversion ditches will be constructed as part of the drilling or operational phases, including along the roads leading to the well sites. Where needed on roads accessing the drill sites, water bars will be constructed to divert water away from the drill pad. The existing private access road up Deadman Canyon will be equipped with silt fences to control sediment. In addition to the water bars, 18-24 inch culverts will be installed on this road and left in place at the owner's request (Appendix X, Sections 742.300 and 732.400).

Approximately 800' of new road will be constructed in order to access site GVH-5A. The submittal states that the newly constructed road will be constructed with a berm on the downhill side and slightly sloping towards the pad area in order to facilitate the containment and treatment of sediment-laden runoff on the pad area.

Water Rights and Replacement

Under R645-301-525.480 and R645-301-731.530, there needs to be a plan in the MRP, before any damage actually occurs, to repair damage to surface facilities and promptly replace state-appropriated water supplies. If a state-appropriated water supply were to be diminished, contaminated, or interrupted by underground coal mining activities, even if there is no subsidence, the Permittee is still obligated to replace that water supply under R645-301-731.530.

The PHC determinations by Mayo and Associates and by Peterson Hydrologic in Appendix L acknowledge the requirement to replace State-appropriated water supplies that have been diminished, contaminated, or interrupted. Section R645-301-535 contains a commitment that should it be shown that mining related activities have adversely affected state-appropriated water supplies, the Permittee will attempt to repair or restore the affected water supply; specific repair and restoration methods are outlined. If the supply cannot be restored, the loss may be mitigated by replacement of equivalent water rights from those held by the Permittee.

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Findings:

The Operational Plan hydrologic information meets the requirements of the R645 Coal Mining Rules.

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

Analysis:

Mining Facilities Maps

The proposed locations for the vent holes are shown on Figure 1-1 of Appendix X. In addition, Chapter 5 of the revised Appendix X contains pad design figures depicting the typical sedimentation structures that will be utilized during the installation of the gob vent holes (Figures 5-1, 5-2 and 5-3). As-constructed drawings have been submitted for gob vent holes GVH-1, GVH-3, GVH-4, GVH-5, and GVH-6 (Figures 5-7, 5-8, 5-9, 5-10, and 5-11 respectively)

Monitoring and Sampling Location Maps

The proposed Gob Gas Vent Hole amendment has not required any changes to monitoring and sample location maps.

Findings:

The application meets the Map, Plans and Cross Sections of Mining Operations hydrologic requirements as provided in R645-301-731.

RECLAMATION PLAN

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

Analysis:

Hydrologic Reclamation Plan

A general reclamation plan for the Gob Gas Vent Hole sites is presented in Sections 540 and 550 of Appendix X. Sealing of the boreholes is described in Appendix X, Section 542.700. The natural drainage patterns will be restored (Appendix X, Section 762). All siltation structures will be maintained until removed in accordance with the approved reclamation plan (Appendix X, Section 763.100). When a siltation structure is removed, the land on which the siltation structure was located will be regraded and revegetated in accordance with the reclamation plan in Section 540 (Appendix X, Section 763.200).

All siltation structures will be maintained until removed in accordance with the approved reclamation plan (Appendix X, Section 763.100). When a siltation structure is removed, the land on which the siltation structure was located will be regraded and revegetated in accordance with the reclamation plan presented in Section 540 (Appendix X, Section 763.200).

The Permittee commits to take care to guard against erosion during and after application of topsoil and to employ the necessary measures to ensure the stability on graded slopes. Erosion control measures will include silt fences, berms, seeding, straw bales, soil roughening, and mulching of the soils (Appendix X, Section 231.300).

No structures will remain at the Gob Gas Vent Hole sites. These sites will be returned to approximate original contour, but gouging the surface will create depressions and mounds to store and impede the movement of water. As vegetation becomes established on the reclaimed surface, erosion potential will be further minimized (Appendix X, Section 553.100).

Permanent Casing and Sealing of Wells

All openings will be sealed in accordance with Federal and State Regulations. The casings will be plugged at the bottom to hold concrete and a lean concrete mixture will be poured into the casing until the concrete is within five feet of the surface. At that time, the casing will be cut off at ground level and the rest of the casing will be filled with lean concrete. The concrete will be allowed to harden before final reclamation is completed (Appendix X, Section 542.700).

Restoring the Natural Drainage Patterns

The natural drainage patterns will be restored after degasification is completed (Appendix X, Section 762.100).

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Removal of Siltation Structures

When a siltation structure is removed, the land on which the siltation structure was located will be regraded and revegetated in accordance with the reclamation plan presented in Section 540 (Appendix X, Section 763.200).

Findings:

Information on the hydrologic Reclamation Plan for the Gob Gas Vent Holes meets the requirements of the R645 Coal Rules.

MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-323, -301-512, -301-521, -301-542, -301-632, -301-731.

Analysis:

Reclamation Monitoring And Sampling Location Maps

Reclamation monitoring and sampling location maps will not be affected by the addition of the Gob Gas Vent Holes.

Findings:

Maps, Plans and Cross Sections of Reclamation Operations for the Gob Gas Vent Holes meets the hydrologic requirements of the Coal Mining Rules.

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

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

Analysis:

The Division has evaluated the Gob Gas Vent Hole amendment and determined that construction and operation of these holes does not require revision of the CHIA determination.

Findings:

The proposed amendment does not require revision of the CHIA determination.

RECOMMENDATIONS:

Hydrologic information provided in this amendment meets the requirements of the Coal Mining Rules. The proposed amendment should be approved at this time.