

TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

October 12, 2010

TO: Internal File

THRU: Priscilla Burton, Environmental Scientist and Team Lead

FROM: James Owen, Reclamation Engineer 

RE: Incidental Boundary Change, Canyon Fuel Company, LLC, Skyline Mine, C007005, Task #3615

SUMMARY:

On September 16, 2010 the Utah Division of Oil Gas & Mining received an application from Canyon Fuel Company, LLC to amend the mine's MRP to include an Incidental Boundary Change (IBC). The IBC adds approximately 320 acres to the area approved for underground mining activities located north of the Winter Quarters Canyon graben.

The applicant states that the modification is necessary to maximize coal recovery by rotating the proposed longwall panels from a north-south to east-west orientation. Representatives for the applicant are pursuing acquisition of a private lease necessary for continued mining. Though final approval cannot be granted without complete Right-of-Entry information, Skyline requested that the technical review of the amendment be done during the interim. Information within the submittal includes modification to details concerning groundwater, surface water, aquatic life, vegetation, and subsidence. The applicant states that no surface disturbance will be associated with the modification.

The application also includes an Agapito Associates, Inc. engineering report providing a numerical modeling report evaluating subsidence in Woods Canyon. The applicant also states that plates needing certification will be certified when clean copies are submitted at final approval.

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TECHNICAL ANALYSIS:

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

The applicant states that potential subsidence in Woods Canyon has been considered with an addition to the 2004 gradient survey of the creek, installation of piezometers along the creek, and numeric modeling study of the anticipated subsidence. The subsidence modifications are included in Appendix A-1, Volume 2 (pages 4-92, 4-93, 494, 4-95a, 4-95c, Plates 4.17.1-1, 4.17.3-1A, Addition to GPS survey – Appendix A-1, Volume 2, Agapito subsidence study – Appendix A-1, Volume 2).

The mining plan was changed by rotating longwall panels by 90 degrees which was designed to extend mining further east. Agapito Associates, Inc. conducted an evaluation of the impacts to the surface based on extending mining to the east. The applicant states that the study indicated longwall mining can be safely conducted in areas with as little as 475 feet without having adverse affects to the surface. The modification will not impact any additional buildings, pipelines, perennial streams, or maintained roads.

Included with the submittal is a Subsidence Probability Survey for Woods Canyon. The survey was contracted by Agapito Associates, Inc (AAI) and was designed to evaluate the subsidence impacts of conducting full extraction mining in areas with as little as 400 feet of overburden. The AAI analysis utilizes a numerical model, Surface Deformation Prediction System (SDPS) that incorporates information from the Burnout Canyon Area study, local geology, mining data, and subsidence data

The AAI investigation was carried out as follows:

1. Develop subsidence input parameters based on the review and calibration of historic geologic, mining, and subsidence data.
2. Develop numerical models and perform back-analysis for James Canyon and Burnout Canyon, and forward analysis for Woods Canyon, using site-specific mining geometries and variable depth cover depths. Model results provide ground subsidence

- and associated surface deformation indices such as subsidence, strain, slope, and curvature.
3. Compare ground subsidence and deformation indices from historic mining to Woods Canyon indices to assess the potential impacts of surface deformation on Woods Canyon.
 4. Review western experience and surface water damage criteria regarding minimum depth of cover to minimize likelihood of communication between mine workings and the Woods canyon stream bed.

The study predicted less than five (5) feet of subsidence would occur in the Woods Canyon area and mining could safely be conducted in areas with 475 feet of overburden. Other items in the AAI study include:

- Average gradient analysis providing insight as to the potential of horizontal and tensile strain.
- US Bureau of Mines criteria for subsidence classifications according to geology and overburden.

The application does not include any variation or modification to the MRP in terms of mining method, subsidence effect prevention measures, mining vicinity beneath electric lake, overburden estimates, or subsidence factors.

The subsidence factors identified in the application suggest that subsidence can be expected in the range of seven (7) feet within the IBC area. This is assumed to be a conservative estimate as most subsidence that has been noted is approximately 4 feet in Winter Quarters Canyon. The AAI modeling report suggests subsidence will remain less than six (6) feet throughout the IBC area. The recommended horizontal strain value of 5 millistrain is predicted to be exceeded along certain segments of the Woods Canyon stream, the stream gradient is steep enough to accommodate such strains. Also, Burnout Canyon and James Canyon streams were predicted to have undergone similar or higher magnitude strains, and were successfully undermined without need for restoration.

The applicant makes the commitment that if it is determined that subsidence causes material damage or a loss of flow in a perennial stream, the Permittee will use the best technology currently available to mitigate the damage.

Included in Plate 1 are details and locations of GPS survey points that were utilized in 2010.

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Findings:

The application complies with the requirements of this section of the Coal Mining Rules and is complete in terms of research and presentation of predicted subsidence and effects. The IBC will not have a significant variance, in terms of subsidence, from the rest of the permit area. Therefore, the subsidence control plan is sufficient to accommodate the IBC.

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:

The application includes maps with the following information: land ownership, mine permit area, geology, abandoned adjacent workings, potentiometric surface information, hydrologic monitoring stations, north lease subsidence hydrologic monitoring points, macroinvertebrate sample site locations, mine 3 mine plan, five year projected mine plan, stream gradient profiles, pre-subsidence survey maps and a survey site plan.

Findings:

The submitted application is adequate in terms of maps providing details of resource, operational, and subsidence information that are relevant to the IBC. All maps are not complete, as a registered professional engineer has not certified all maps. The applicant commits that plates needing certification will be certified when clean copies are submitted at final approval.

RECOMMENDATIONS:

This amendment complies with the requirements of the Coal Mining Rules and is recommended for conditional approval upon receipt of certified plates and maps.