



COLORADO

Division of Reclamation,
Mining and Safety

Department of Natural Resources

1313 Sherman Street, Room 215
Denver, CO 80203

INTEROFFICE MEMORANDUM

TO: FILE
FROM: JASON MUSICK
SUBJECT: C1981-038 BOWIE NO. 1 MINE TR-62
DATE: 12/6/2016

Bowie Resources, LLC's (BRL) TR-62 application proposes to remove sediment ponds 1-4 and the gob pile pond at the East Mine. The TR-62 application compares pre and post mining sediment yields by calculating the expected sediment yields for both conditions. BRL used the USLE calculation method based in part on the 2016 Vegetation Inventory using vegetation data collected during the summer of 2016. The USLE calculates expected average annual soil loss per acre of land of the reclaimed area and a similar undisturbed adjacent area.

USLE Comparison: Only the "LS" and the "C" factors are varied between the undisturbed adjacent area and the reclaimed area calculations; all other variables are constant for adjacent and reclaimed areas. The adjacent area calculation uses baseline vegetation cover values from the permit application (volume 9A). The reclaimed area calculation uses vegetation cover data for the disturbed area collected in 2016. The variables used in the calculations appear reasonable for making the comparison. The comparison therefore appears technically valid. A chief cause of soil loss is transport of solids in suspension, therefore, the comparison indicates the untreated drainage, currently, does not yield more suspended solids than prior to mining.

The USLE is an empirical formula that can be expected to give a rough approximation of the expected sediment yield from a parcel of land. It is reasonable to believe that the USLE is useful for discriminating between two yield rates that are significantly different, but is not useful for discriminating between two yield rates of similar magnitude. For the reclaimed east mine areas reporting to Ponds 1-4 and the gob pile pond, BRL calculated an adjacent area sediment yield rate of 3.82 tons per acre per year for the Upper East Mine and 2.86 tons per acre per year for the Lower East Mine and an adjacent undisturbed area rate of 21.18 tons per acre per year for the Upper East Mine and 17.84 tons per acre per year for the Lower East Mine. The considerable difference between these two calculated rates indicates the reclaimed area rate is likely less than



the adjacent area rate. This conclusion is only valid if BRL used reasonable variables in the USLE calculations.

BRL's basis for selecting each variable and the Divisions review of each variable is in the table below. The Division believes the variables BRL selected are reasonable. The variables are similar to those the Division has found to be reasonable in past pond removal demonstrations and Phase II Bond Release applications.

Adjacent East Mine Area			
Variable	BRL Selection	BRL Source	Division's Comment
R	30	NRCS map of R factors for Colorado	Reasonable based on Bowie No. 1 Mine location on the R factor map
K	0.17	USDA Soil Survey for 20-Cerro stony loam for the East Mine Area	Reasonable based on the soil types on the bond release blocks located on map M-29
LS	24.25 (Upper) 20.42 (Lower)	NRCS LS table for 255 ft. slope length, 2.7H:1V avg. slope	Reasonable based on the 2.7:1 slope and 255 ft slope length accurately represented for reclaimed slopes
C	0.171 (Upper) 0.171 (Lower)	NRCS C factor table for specified conditions	Reasonable based on undisturbed adjacent conditions and applicable table for C value
P	1.0	NRCS P factor table for specified conditions	Reasonable based the 1.0 erosion control practice factor corresponding to up and down hill farming (rather than contour tillage), consistent with the land use.
Reclaimed East Mine			
Variable	BRL Selection	BRL Source	Division's Comment
R	30	NRCS map of R factors for Colorado	Reasonable based on Bowie No. 1 Mine location on the R factor map
K	0.17	USDA Soil Survey for 20-Cerro stony loam for the East Mine Area	Reasonable based on the soil types on the bond release blocks located on map M-29
LS	23.44 (Upper) 17.51 (Lower)	NRCS LS table for 255 slope length, 2.5H:1V avg. slope	Reasonable based on the 2.5:1 slope and 255 ft slope length accurately represented for reclaimed slopes

C	0.032 (Upper) 0.032 (Lower)	NRCS C factor for permanent pasture, rangeland, idle land, and grazed woodland - no canopy, 80% herbaceous cover, grass type (Table 1.2-1 of bond release submittal)	Reasonable based on the vegetation data presented in the TR-62 application
P	1.0	NRCS P factor table for specified conditions	Reasonable, as no control practices were utilized, compared to the premining contour tillage

Observations made during past Division inspections indicate that the vegetation on the reclaimed slopes had stabilized the soil. There are no major erosional instability features observed. The Division's field observations appear to corroborate BRL's hydrologic modeling results of reclaimed area sediment yields being less than similar undisturbed adjacent area yields.

Instream Numeric Standards (CWQCC 35)

The Bowie No. 1 East Mine area discharges surface runoff into one Segment of the North Fork of the Gunnison River in CWQCC's Region 11 of the North Fork of the Gunnison River Basin, Segment 6b (Stevens Gulch and tributaries).

The Bowie No. 1 Mine is required to monitor 24 of the parameters in Segment 6b per CWQCC and CDRMS. A review of the statistical summary of the water quality data provided in Bowie No. 1 Mine's Annual Hydrology Reports and specifically for the past three years was conducted for the mine's NPDES Outfall (001) and stream sites SW05.

No discharge was noted at 001 for the past 3 years and no exceedances were noted at 001 or SW05.

Permit Requirements of the Colorado Discharge Permit System (CDPS)

The Bowie No. 1 Mine maintains one outfall which collects runoff from the East Mine reclaimed area (NPDES 001) which is monitored under the CPDS Permit No. COG-850043. Sample data have been reported on a quarterly basis in discharge monitoring reports filed with the CDPHE and the CDRMS. These DMRs indicate that no discharge has occurred within the last three years and no exceedance has occurred within the last 10 years.

Clean Water Act Effluent Limitations (40 CFR Part 434)

Monitoring data for the past three years indicate that the Bowie No. 1 Mine has not caused exceedances of either limitation identified in 40 CFR Part 434 that is applicable to reclamation areas on coal mines (settleable solids of 0.5 ml/l and pH of 6.0 to 9.0). The Bowie No. 1 Mine only notes settleable solids values that are at or above the detection limit of 0.4 ml/l; no exceedances of 0.4 ml/l were noted.