CHECKLIST ENVIRONMENTAL ASSESSMENT

COMPANY NAME: **Big Sky Mine** **Project:** **Application 00180**
OPERATING PERMIT #: 88004B
LOCATION: **County:** **Rosebud**
PROPERTY OWNERSHIP: **[ ] Federal [ ] State [X] Private**

TYPE AND PURPOSE OF ACTION:

Reclamation Plan: Big Sky Mine Major Revision Application 00180 proposes a reclamation plan revision to Area B for alternative land use in Lee Coulee and Marmot Mound Tributary. The proposed alternative land use centers on leaving two post-mining ponds within final pit areas in upper Lee Coulee (Lee Coulee Pond, approximately 63.3 acre-feet of storage) and Marmot Mound tributary (B-3 Reservoir, with approximate storage of 147.31 acre-feet), and includes changes to post-mine topography (PMT) and hydrologic reclamation plans for both drainages. The revised topography incorporating the two final pit ponds and associated bluff replacement features would alter the approved PMT, reclamation plan and post-mine land use of native rangeland. The proposed Lee Coulee Pond and B-3 Reservoir are primarily fed by upgradient groundwater with limited local surface water contributions. The ponds were designed to provide additional water sources for livestock and wildlife, to mitigate loss of pre-mine water sources removed by mining, and to provide additional water and wetlands in support of a 'higher and better post-mine land use' as allowed by Montana regulations (e.g. ARM 17.24.821). A higher or better use is defined as "*post-mining land uses that have a higher economic value or noneconomic benefit to the landowner or the community than the pre-mining land uses*" [ARM 17.24.301(50) and 82-4-203(23), MCA].

IMPACTS ON THE PHYSICAL ENVIRONMENT	
RESOURCE	
1. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE: Are soils present which are fragile, erosive, susceptible to compaction, or unstable? Are there unusual or unstable geologic features? Are there special reclamation considerations?	[N] The areas upgradient of the two proposed impoundments are native, undisturbed rangeland are relatively stable when considering erosion potential. The areas adjacent to and down-gradient from the proposed impoundments have been mined and would be reclaimed per the approved reclamation plan, including regrading, soiling and seeding/planting. Using existing reclaimed areas as a reference, the erosion potential for these areas is considered low. With the exception of the two bluff replacement features, the regraded areas would be vegetated using the approved seed mixes, further stabilizing the areas. The two proposed bluff replacement features would meet or exceed the slope stability requirements of ARM 17.24.515(2)(b) – e.g. a minimum long-term static safety factor of 1.3.
2. WATER QUALITY, QUANTITY AND DISTRIBUTION: Are important surface or groundwater resources present? Is there potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality?	[Y] Surface water – The proposed revision would only alter final topography and reclamation in the vicinity of the two permanent impoundments, and would result in less surface disturbance than currently approved. The revised topography incorporating the two final pit ponds and associated bluff replacement features would alter the approved PMT and reclamation plans and the post-mine land use of native rangelands. The ponds would provide additional water sources for livestock and wildlife, mitigate loss of pre-mine water sources removed by mining, and provide additional water and wetlands. The proposed ponds are primarily fed by upgradient groundwater with limited local surface water contributions. Lee Coulee includes mostly ephemeral tributaries, but also some notable intermittent stream reaches, with smaller perennial pond and wet reaches, extending upstream from the McKay and Rosebud coal croplines about two

miles in Lee Coulee and about a half mile in Marmot Mound tributary. A Lee Coulee wet reach study area and buffer zone was established early in the mine permitting process and included most of the pre-mining subirrigated alluvial reaches.

Although the proposed Area B reclamation plan revision would result in some changes to the local topography and hydrologic character of Lee Coulee and Marmot Mound tributary and associated subirrigated wet reaches, the proposed revision would not change reclamation in the remainder of Area B, which consists primarily of valley bottom and upland ephemeral tributary basins within the main Lee Coulee and Fossil Fork sub-basins. The proposed Lee Coulee Pond and B-3 Reservoir would fit into local watershed topography as side tributary basins, intercepting only local surface water runoff. The ponds intercept only a small portion of Lee Coulee and Marmot Mound drainage basins and should not significantly affect downstream surface water runoff.

The reconstructed reach of Lee Coulee ties into undisturbed reaches upstream and downstream in an overall concave longitudinal profile with a valley bottom cross section similar to pre-mine. Post-mine valley bottom topography approximates the overall character of pre-mine floodplain and terraces, but differs from individual pre-mine cross sections, being simpler overall, with a broader valley bottom in the final pit area. In addition to blending reconstructed and undisturbed channel reaches in acceptable geomorphic plan view, profile and cross sectional patterns, the constructed floodplain elevations would also approximate those in the pre-mining Lee Coulee valley bottom to help approximate pre-mining wet reach characteristics (in particular, intermittent and perennial baseflows) once groundwater levels recover.

The ephemeral surface flow and water chemistry characteristics of Lee Coulee and Marmot Mound tributary should begin to recover to approximate pre-mining conditions as vegetative reclamation progresses from bare cover to conditions similar to pre-mining, and as upstream sediment ponds are reclaimed once no longer needed. The intermittent to perennial character of the stream and ponded reaches of Lee Coulee and Marmot Mound tributary are expected to recover to approximate pre-mine characteristics. However, there would be prolonged effects on flow, water levels and water chemistry after mining, as contributing groundwater sources recover more slowly than surface runoff, and spoils aquifer material contributes to increased total dissolved solids (TDS).

Additional monitoring would be required to adequately assess hydrologic recovery, and any mitigation efforts. Big Sky has committed to resuming a post reclamation hydrologic monitoring plan (including wet reach and pond monitoring) that would provide information similar to pre-mining and operational data to monitor hydrologic recovery of surface and groundwater systems in the Lee Coulee drainage basin and associated aquifers.

Groundwater – A hydrologic balance was computed for B-3 Reservoir and Lee Coulee Pond. Calculations for inflow of groundwater and other, relatively negligible water sources are in excess of all water losses such as evaporation and seepage from the ponds. Consumptive groundwater losses amounting to some 81 acre-feet per year occurred within 53 acres of naturally subirrigated land within the stream buffer zone of the pre-mining Lee Coulee valley floor. A projected 44 acres of subirrigated lands will exist in the post-mining valley floor. Applying the pre-mining consumptive loss rate of 1.5 acre-feet/acre/ year to the

post-mining subirrigated acreage, the consumptive loss rate is approximately 15 acre-feet per year less than pre-mining. Based on this comparison, it appears that the volume of ground water not consumptively lost to post-mining subirrigation in Lee Coulee valley would be nearly equivalent to the combined evaporative losses expected from the ponds. In general, this means that there would be no net pre-mining-to-post-mining change in ground water usage within Area B.

The stage elevations of the ponds would be expressions of aquifer elevations. Under normal precipitation scenarios, both Lee Coulee Pond and B-3 Reservoir would be expected to discharge annually. Lee Coulee Pond is predicted to discharge 8.85 acre-feet/year and B3 Reservoir is predicted to discharge 0.11 acre-feet/year. Fresh water input sources (precipitation, runoff, groundwater inflow) are predicted to exceed annual evaporative losses in the ponds, which would help protect water quality in the ponds.

Predicted water quality in B-3 Reservoir and Lee Coulee Pond was evaluated using analytical results of samples collected in each impoundment, water quality analyses of the overburden and alluvial aquifers, mass-balance calculations, and, for comparison, water quality data from the existing DNR impoundment in Area A, which is an old pre-law final pit impoundment. The two water quality components of greatest concern identified for livestock water consumption were TDS and sulfate. Upper limits of concentrations safe for livestock consumption are 3,000 mg/L TDS and 2,000 mg/L sulfate.

Historic water quality data collected from overburden monitoring wells in the vicinity of B-3 Reservoir show TDS concentrations ranged from 441 mg/L to 1360 mg/L and sulfate concentrations ranged from 114 mg/L to 625 mg/L. A simple mass-balance calculation predicts a seasonally low TDS concentration of about 2,200 mg/L once the B-3 Reservoir reaches dynamic hydrostatic equilibrium. Evaporative losses would cause TDS concentration to be some 200 mg/L greater in summer than winter.

In Lee Coulee Pond, TDS has ranged between 1950 mg/L and 2290 mg/L, and sulfate has ranged between 988 mg/L and 1170 mg/L. An alluvial monitoring well which stood at the current pond spillway, upgradient of mining, had TDS concentrations that ranged from 1630 mg/L to 2050 mg/L. These concentrations are a good predictor of future water quality for the pond. Mass-balance calculations place average TDS concentrations at 1,700 mg/L and sulfate concentrations at 850 mg/L, once dynamic hydrostatic equilibrium of pond elevation has been met.

Analyses of recent water quality samples from both ponds indicate all constituent concentrations are within those recommended safe for livestock drinking water. Water quality would be expected to remain suitable for livestock consumption once the ponds have achieved dynamic hydrologic equilibrium.

Anticipation of long-term suitability of water in B-3 Reservoir and Lee Coulee Pond for livestock and wildlife is bolstered by the water quality in the DNR pond in Area A. Like the two ponds proposed to be left in the post-mining landscape, the DNR impoundment is a groundwater fed pond that was left in a final mining cut. Water samples collected from the DNR pond between

IMPACTS ON THE PHYSICAL ENVIRONMENT	
	1984 and 1990 show fairly consistent TDS concentrations that average about 1,836 mg/L, and mean sulfate concentrations of 1,410 mg/L. Below the impoundments, eventual saturation of the spoil backfill would cause increased TDS concentration in groundwater and diminished water quality in Lee Coulee as spoil water discharges into the drainage. Upon sufficient flushing of the spoil, water quality is expected to improve, although the length of time required for adequate flushing is speculative. The proposed ponds would not be affected by spoil water, as the ponds would lie upgradient of the backfilled pits. B3 Reservoir and Lee Coulee Pond are not expected to impact existing water rights. Big Sky Coal Company has acquired the requisite water rights for the two impoundments.
3. AIR QUALITY: Will pollutants or particulate be produced? Is the project influenced by air quality regulations or zones (Class I airshed)?	[N] Ponded water would replace some of the currently approved reclamation; therefore, there is potential for a reduction in the overall amount of dust produced from the area. There are no air quality regulations for the proposed impoundments and associated bluff replacement features.
4. VEGETATION COVER, QUANTITY AND QUALITY: Will vegetative communities be significantly impacted? Are any rare plants or cover types present?	[Y] The currently approved reclamation plan would be revised to incorporate the proposed impoundments and bluff replacement features. The side slopes adjacent to the B-3 impoundment would be steeper than those in the approved PMT plan. Adjustments to the revegetation plan would include a reduction in vegetated acres as a result of construction of the two post-mine impoundments and bluff replacement features. Wetland vegetation would be present in approximately the same location and extent as pre-mine. Both submergent and emergent vegetation is expected along the shorelines of the two impoundments. The area under consideration is totally within the disturbance limit for mining operations and the potential for the presence of rare plants is minimal.
5. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS: Is there substantial use of the area by important wildlife, birds or fish?	[N] Wetlands would be replaced to the approximate extent as the pre-mine distribution. Therefore, the wildlife species utilizing these habitats would not be adversely impacted. The incorporation of two post-mine impoundments would provide dependable water sources for both livestock and wildlife use.
6. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES: Are any federally listed threatened or endangered species or identified habitat present? Any wetlands? Species of special concern?	[N] As stated above, wetlands would be replaced to the approximate extent and distribution as pre-mine. No threatened or endangered animals or plants are known to inhabit the area. The bluff features were designed to replace pre-mine bluffs destroyed by mining operations. Incorporation of these replacement features would provide a better approximation of the original contours (AOC).
7. HISTORICAL AND ARCHAEOLOGICAL SITES: Are any historical, archaeological or paleontological resources present?	[N] The areas under consideration are entirely within the disturbance area related to mining in Area B, Big Sky Mine. The affected areas were previously surveyed for the presence of historical and archeological sites.
8. AESTHETICS: Is the project on a prominent topographic feature? Will it be visible from populated or scenic areas? Will there be excessive noise or light?	[N] The proposed projects have been designed to appropriately blend into the adjacent native and reclaimed habitats. The two bluff features would be replacements for pre-mine bluffs that were mined through. Both features would be located in isolated portions of Area B, Big Sky Mine, and would not be visible from any populated or scenic areas. The proposed activity involves reclamation of mined areas to post-mine topographic features and ponds; therefore, no excessive noise or light would be produced.
9. DEMANDS ON ENVIRONMENTAL	[N] The proposed impoundments would result in additional exposed water

IMPACTS ON THE PHYSICAL ENVIRONMENT	
RESOURCES OF LAND, WATER, AIR OR ENERGY: Will the project use resources that are limited in the area? Are there other activities nearby that will affect the project?	surface area. The use of the ground water resource would increase due to additional evaporation, as well as use by livestock and wildlife. Big Sky Coal Company has obtained the requisite water rights for this anticipated increase in water use. The increased use of the ground water associated with the impoundment is off-set by the reduction in the overall amount of subirrigated areas in Lee Coulee and Marmot Mound tributary, resulting in no significant change in the use of the ground water resource (see above discussion of ground water in Section 2). There is a potential that future, unplanned development of the Rosebud Mine may have an adverse impact on the ground water recharge. This impact would be addressed as future mine development is proposed and evaluated.
10. IMPACTS ON OTHER ENVIRONMENTAL RESOURCES: Are there other activities nearby that will affect the project?	[N]

IMPACTS ON THE HUMAN POPULATION	
11. HUMAN HEALTH AND SAFETY: Will this project add to health and safety risks in the area?	[Y] While the incorporation of two impoundments and associated bluff replacement features pose a potential risk to human safety (e.g. drowning, rock falls, falls, etc.), the locations of the proposed features are within isolated tracts of private lands with limited access. Therefore, it is anticipated that the potential for additional risk to human safety would be minimal. Big Sky Coal Company also demonstrated to the satisfaction of the Department that the face of the coal seam was adequately covered using backfilled material. If the future water levels of the ponds drop, the coal seam would remain covered.
12. INDUSTRIAL, COMMERCIAL AND AGRICULTURAL ACTIVITIES AND PRODUCTION: Will the project add to or alter these activities?	[N] Incorporation of two post-mine impoundments into the final reclamation of Area B would result in additional, dependable water for use by livestock and wildlife.
13. QUANTITY AND DISTRIBUTION OF EMPLOYMENT: Will the project create, move or eliminate jobs? If so, estimated number.	[N] No additional employment would be anticipated with the approval of the proposed alternative post-mine land use.
14. LOCAL AND STATE TAX BASE AND TAX REVENUES: Will the project create or eliminate tax revenue?	[N] It is anticipated that there would be no affect on the local and state tax bases.
15. DEMAND FOR GOVERNMENT SERVICES: Will substantial traffic be added to existing roads? Will other services (fire protection, police, schools, etc.) be needed?	[N] The proposed developments are located on isolated tracts of private lands with no public access or services.
16. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS: Are there State, County, City, USFS, BLM, Tribal, etc. zoning or management plans in effect?	[N] The lands involved by the proposals are private with no development plans/goals/zoning, etc.
17. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES: Are wilderness or recreational areas nearby or accessed through this tract?	[N] There is a potential for an increase in recreational use of the areas, if the post-mine land owners further develop the impoundments (e.g. create a fisheries). It is anticipated, however, that access would be limited and controlled by the landowners; therefore, additional recreational use would be

IMPACTS ON THE HUMAN POPULATION	
Is there recreational potential within the tract?	limited. The proposed projects would not affect any wilderness activities.
18. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING: Will the project add to the population and require additional housing?	[N] No change in population density or distribution would occur as a result of the proposed project.
19. SOCIAL STRUCTURES AND MORES: Is some disruption of native or traditional lifestyles or communities possible?	[N]
20. CULTURAL UNIQUENESS AND DIVERSITY: Will the action cause a shift in some unique quality of the area?	[N]
21. PRIVATE PROPERTY IMPACTS: Are we regulating the use of private property under a regulatory statute adopted pursuant to the police power of the state? (Property management, grants of financial assistance, and the exercise of the power of eminent domain are not within this category.) If not, no further analysis is required.	[Y] The proposed changes to the approved reclamation plan would be implemented on private lands currently owned by Big Sky Coal Company. The two adjacent landowners with buy-back rights (Don Bailey and Doug McRae) have both indicated their approval for the proposed impoundments and bluff retention features.
22. PRIVATE PROPERTY IMPACTS: Does the proposed regulatory action restrict the use of the regulated person's private property? If not, no further analysis is required.	[N] The proposed changes to the post-mine topography and revegetation plan would provide a more dependable water source for both livestock and wildlife. The presence of dependable water sources would be a positive benefit to the livestock operations of the post-mine landowners.
23. PRIVATE PROPERTY IMPACTS: Does the agency have legal discretion to impose or not impose the proposed restriction or discretion as to how the restriction will be imposed? If not, no further analysis is required. If so, the agency must determine if there are alternatives that would reduce, minimize or eliminate the restriction on the use of private property, and analyze such alternatives.	[N] See Attachment 1
24. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:	[N]

25. Alternatives Considered:

No Action: The no action alternative would require the implementation of the currently approved PMT and revegetation plans. This would result in additional disturbance of native habitats during the final regrading of the area. Additionally, the two proposed post-mine impoundments would not be present to provide dependable water sources.

Approval: This alternative would result in the implementation of the revised PMT and revegetation plans for the two areas within Area B, Big Sky Coal Mine.

Approval with modification: The Department considered the potential to further the bluff features so that a rubble zone would be created at the base of the bluffs. While this may have provided access to all areas of the shoreline of the two impoundments, it was considered to be unnecessary, as the impoundments and bluff replacement features could be constructed as proposed and be in compliance with all applicable portions of MSUMRA and ARM.

26. Public Involvement: Availability of this Environmental Assessment was published in the Billings Gazette on June 18, 2007.

27. Other Governmental Agencies with Jurisdiction: None

28. Magnitude and Significance of Potential Impacts: Impacts of the entire operation were analyzed in the 1988 EIS for Big Sky Coal Mine, Area B. There would be no significant impacts associated with this revision.

29. Cumulative Effects: No other new activities have been identified in the area.

Recommendation for Further Environmental Analysis:

[ ] EIS [ ] More Detailed EA [X] No Further Analysis

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Approved By:

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Signature Date