APPENDIX C – M-PIT EXPANSION PLAN

The Montana Tunnels mine is located in Jefferson County, Montana, approximately 25 miles south of the city of Helena. The mine has been in continuous operation since Operating Permit #00113 was approved on February 20, 1986. Montana Tunnels mines a polymetallic ore body from a single open pit mine and produces gold, silver, lead, and zinc in the forms of bullion and metal-sulfide concentrates for sale into commerce. The products are recovered from the ore by conventional milling and flotation processes and gravity concentrating techniques. Montana Tunnels is also permitted to process gold ore from the Diamond Hill Mine using a combination of conventional flotation and leach recovery processes.

Development drilling programs at Montana Tunnels have delineated additional ore that extends beneath the existing open pit mine in the pipe of an ancient volcano. The ore body provides a large reserve for mining and milling beyond the current plan of operations. Montana Tunnels proposes to extend its life-of-mine plan to access this reserve by open pit mining methods. The added ore reserve would lengthen mining and milling operational life by about 5 years. The current mining plan would sustain operations into 2007. Development of the new ore reserve would extend operations into 2011. To ensure an uninterrupted supply of ore to the mill between the current plan and the mine expansion plan, overburden stripping from the open pit highwall layback must begin in 2006.

Underground mining methods have previously been evaluated by Montana Tunnels as an alternative to open pit mining. Further examination of underground extraction of the large volumes of the low grade ore in this deposit that would be necessary to sustain a viable milling operation has been determined to be unfeasible. The Montana Tunnels ore body does not contain high grade ore zones or veins that provide the type of reserve for effective underground mining methods. However, underground mining of pit wall abutment ores in conjunction with open pit mining may be considered during the open pit operations to provide supplemental mill ore.

Alterations that are necessary to mine the additional reserve include increasing the plan area and depth of the open pit mine, expanding waste rock storage areas, raising the tailings embankment for additional tailings storage, providing staging areas for soil and gravel, diverting the courses of two stream channels, and re-routing a portion of the mine access road around the tailings impoundment. Ore handling and processing facilities would continue to operate as currently permitted, and the geologic and geochemical characteristics of the ore and waste rock of the extended reserve are the same as material already mined. The proposed modifications would require some adjustments to the alignment of the permit boundary and new disturbances would result for the open pit mine, waste rock disposal, additional tailings storage, and staging areas for soil and gravel. Reclamation of disturbance areas would be consistent with current permitted reclamation specifications and methods. The majority of modifications proposed in this application are consistent with the conditions, areas, and alternatives

analyzed in Montana Tunnels's 1986 EIS. Some changes to the current final reclamation plan are proposed for the management of water to accelerate flooding of the open pit to form a pit lake with good water quality.

The total proposed mine plan area would increase from 1,176.4 acres to 1,347.2 acres, resulting in new disturbance of 170.8 acres of previously undisturbed surfaces. An overlap of additional waste rock storage area on existing waste rock areas would result in the redisturbance of 147.1 acres of previously reclaimed waste dump slopes and tops. As a result of enlargement of several facilities, 64.6 acres of existing permitted disturbance would be converted to a different type of disturbance. The affected areas would be the gravel pit, open pit mine perimeter disturbance, and different types of stockpile areas. Table 1 illustrates the current permitted disturbance by area and the changes that would result from the proposed actions. Several additional contingency areas are also identified in the proposed plan to provide extended waste rock storage areas and potential soil borrow areas if required for final reclamation. Contingency areas are listed in Table 2.

Table 1: Disturbance Areas

Area	Current Permitted Acres 9/19/2003	Proposed Expansion M-Pit (acres)	Net Area Change (acres)	New Disturbance Area (acres)	Redisturbance Area (acres)
Waste Rock Disposal	432.6	540.3	107.7	60.5	147.1
Cap Rock & Stockpiles	77.2	70.0	(7.2)	0.0	0.0
Ponds and Dam Top	22.7	24.7	2.0	3.5	0.0
Tailings Pond	243.9	270.9	27.0	21.3	0.0
Open Pit	212.1	274.9	62.8	44.6	0.0
Pit Perimeter	26.6	13.3	(13.3)	0.0	0.0
Facilities	37.6	37.6	0.0	0.0	0.0
Gravel Pit Area	28.1	0.0	(28.1)	0.0	0.0
Soil/Gravel Piles	63.3	65.9	2.6	19.0	0.0
Roads & Misc.	32.3	49.6	17.3	18.8	0.0
Total	1176.4	1347.2	170.8	170.8	147.1

Table 2: Contingency Disturbance Areas

Area	Plan Area (acres)
West Extension Waste Rock Storage Area	40.5
Soil Borrow Area North of Open Pit	20.3
Soil Borrow Area North of Mill Facility	33.4
Wetlands Replacement Area on Clancy Creek (Included in Table 1)	8.7*
Wetlands Replacement Area on Pen Yan Creek	10.1*

(Included in Table 1)	
Total Contingency Area	94.2

* Footprint of wetland replacement areas counted in total disturbance in Table 1 Miscellaneous Areas - not included in Contingency Total. The final area for wetlands replacement, if required, is not yet determined.

Open Pit Mine

The planned disturbance footprint of the open pit mine would increase by 62.8 acres to access deeper ore reserves. The total footprint area of the expanded open pit would be 274.9 acres, which includes disturbance associated with a diversion of Clancy Creek around the northwest side of the pit rim. The maximum elevation of the open pit disturbance would be on the south side of the mine at 6,450 feet above mean sea level. The ultimate pit bottom would reach the 4,050-foot elevation. About 127 million tons of overburden and waste rock and 25 million tons of ore would be removed.

Open pit mining practices would remain the same as current operations with drilling, blasting, loading, and hauling generally taking place on benches separated by 20-foot highwalls. Mining would begin with a stripping phase to salvage surface soils, which would be stockpiled for future reclamation or direct hauled to concurrent reclamation when applicable. Overburden rock would be removed from the ore body. Rock-fall catch benches varying in width from 25 to 60 feet would be constructed on the pit walls at approximately 100-foot-elevation increments as mining progresses to the pit bottom. When the layback of the upper area of the mine has been completed, a single 90-foot wide haul road at 12% grade would be used to access the open pit, entering on the east side of the mine at an elevation of 5,650 feet. The haul road would switch back on north to south headings on the east side of the mine to reach ore and waste rock at depth. Waste rock would be transported to new and existing waste rock storage locations. Ore would be transported to existing crushing and stockpile areas for processing.

The open pit mine would be reclaimed by development of a lake following mine closure. Montana Tunnels proposes to add water to the filling pit lake from on-site water sources and Clancy Creek stream water, with an ultimate flow-through lake in the future. To achieve a full pit lake, water would be added to the flooding pit from Montana Tunnels's water rights on Clancy Creek. In addition, post mining drainage from all surrounding surface areas would be directed to the open pit to supplement the filling rate.

Waste Rock Storage Areas

Approximately 127 million tons of overburden rock and waste rock would be removed from the expanded open pit over a 5-year mining period. Waste rock storage areas have been identified to contain the total volume of anticipated waste rock with contingency for excess storage. The primary waste rock storage area for the mine expansion would be a southward extension and crowning of the main waste rock dump. The footprint of the waste rock dump extension would overlay 147.1 acres of permitted disturbance that has previously been reclaimed, and 44.1 acres of other permitted disturbance that is not reclaimed. The south extension waste rock disturbance would

include a storm water drainage ditch around the base of the dump to convey surface runoff from the waste rock dump slope to an existing sedimentation pond. Flows received into the sedimentation pond are diverted into a freshwater storage pond through a pipe. Potential overflows from the sedimentation pond over a constructed spillway are regulated by MPDES permit MT0028428.

The south extension waste rock storage area would be constructed and reclaimed similar to existing permitted design and methods, but with higher dump lifts proposed. Waste rock would be staged in 150-foot lifts beginning at the base area, as opposed to the 50-foot lifts in the current operating plan. The outside perimeter of each lift would continue to be constructed with waste rock characterized by positive net neutralizing potentials. Each incremental lift would be set back a specific distance to facilitate reduction of the dump slope to a 2.5:1 grade for reclamation. At each 150-foot elevation interval, the waste rock lift would be set back an additional amount to provide sufficient area to construct storm water drainage ditches. The drainage ditches would be sized to convey the 1:100 year runoff event from the dump surfaces to the freshwater makeup pond. A service road would be constructed on the dump slope to maintain access from the upper mine areas to ponds and stockpiles at the base of the dump. The service road would also be used to provide access to the new dump slope surfaces for reclamation and maintenance. The service road would be reclaimed during the closure period.

A section of an unmaintained public access road at the base of the southwest extension waste rock area would also be covered by the dump extension. The affected section of road would be replaced with approximately 4,000 feet of gravel road parallel to the base of the waste rock dump. The new road would cross over a culvert on the relocated Pen Yan Creek channel, and the road would reconnect with the dirt roads that cross Wood Chute Flats and provide access to Blue Bird Ridge by way of the Pen Yan valley dirt road. The road would be constructed by removing the thin layer of colluvial soil from the underlying glacial outwash material and then spreading and grading screened road mix gravel to form the roadway. The gravel road would be a two-track surface approximately 16 feet wide and would have an average grade of 4% over its entire length.

The buttress dump downstream of the tailings embankment and modification of the access route to the mill area would provide additional waste rock storage areas for the expanded open pit mine. Waste rock would be added to the embankment buttress dump to fill any unused area that is already permitted for waste rock disposal. Additional waste rock would be added to the buttress as the tailings embankment is incrementally raised. Waste rock would also be used to construct an access road switchback on the east side of the embankment buttress dump and to raise the existing access road above the ultimate tailings elevation.

This application also proposes a contingency area to store additional waste rock as a west extension to the main waste rock dump. The footprint of the west extension

contingency storage area is 43 acres on lands owned by Montana Tunnels. This storage area can contain up to 15 million tons of waste rock with final slopes graded at 2.5:1 for final reclamation. Storage in this area is not anticipated with the calculated volumes projected in the mining plan.

Tailings Impoundment

The surface elevation and the plan area of the tailings impoundment would increase to contain the additional 25 million tons of tailings from ore processing. All tailings from the life-of-mine expansion project would be stored in the existing impoundment area by incrementally raising the tailings embankment in staged lifts. All of the features for tailings disposal would be consistent with current operations. Tailings would be discharged to the impoundment through pipes and spigots, and tailings reclaim water would be recovered using a floating barge pumping system. The ultimate tailings surface area would increase from 243.9 acres to 270.9 acres, and the tailings elevation would rise approximately 60 feet. New tailings impoundment disturbance would affect 21.3 acres of previously undisturbed surface, and 5.7 acres of adjacent unreclaimed waste rock dump slope surface would be converted to tailings impoundment disturbance surface.

The tailings embankment is designed to reach a maximum elevation of 5,710 feet to provide ample volume for tailings storage with 7 feet of freeboard for the 24-hour PMP design storm event. The increased crest elevation of the embankment is 70 feet higher than the previously permitted crest elevation at 5,640 feet. The waste rock storage area that buttresses the embankment would continue to be filled as incremental embankment raises are constructed.

At mine closure, the tailings impoundment surface would discharge supernatant water and post closure storm water runoff toward the open pit mine. A post mining runoff channel would be constructed on the west side of the tailings impoundment to direct all impoundment surface runoff into the open pit lake.

Roads and Miscellaneous Areas

A portion of the main access road would be realigned around the tailings embankment. The east side of the embankment and the associated embankment waste rock storage area would be built up with additional waste rock to create a switchback to gain elevation over the ultimate embankment crest at 5,710 feet. The lower section of the existing access road would connect to the constructed switchback road. The straight sections of the switchback extension would be constructed at a 5% grade with a 4.2% grade at the wide switchback curve. Permanent access road construction would take place on the east side of the tailings impoundment hillside at an elevation of 5,710 feet. The existing road upstream of the tailings embankment and the constructed switchback would be backfilled with waste rock to provide the required elevation along the full length of the realigned roadway.

Soil and Gravel Stockpiles

Two new areas are proposed for staging soil for reclamation and gravel for construction purposes. Montana Tunnels plans to direct haul as much soil to concurrent reclamation as possible. However, waste rock dump extensions would require some stockpiled soil to be relocated, and stripping of new surfaces and previously reclaimed surfaces would generate more soil than can be used for concurrent reclamation purposes. The proposed plan provides a 15.9-acre soil stockpile location within the existing operating permit boundary on the south side of the mine site. The stockpile footprint can contain up to 1 million cubic yards of soil. This stockpile would be used primarily for waste rock dump surface reclamation and other disturbance reclamation requirements at the base of the waste rock storage area.

Montana Tunnels proposes to excavate pit run gravel from the existing gravel pit and form a stockpile for life-of-mine operations. The base of the proposed waste rock dump would cover the existing gravel pit area. Montana Tunnels proposes to stockpile approximately 300,000 cubic yards of gravel in a 3.1-acre stockpile area within the existing permit boundary on the south side of the mine.

The new soil stockpile and the gravel stockpile areas are located on 19.0 acres of BLM land.

Permit Boundary

The operational boundary around the active mine areas would be expanded to encompass three new proposed disturbance areas. Areas requiring boundary change include the area around the open pit mine in the Clancy Creek drainage for mine expansion and wetlands replacement, the contingency waste rock storage area on the west side of the mine, and a replacement wetlands area on upper Pen Yan Creek. The change in permit area is presented in Table 3. All new areas encompassed by the extensions of the permit boundary are on land owned by Montana Tunnels Mining, Inc.

Table 3: Permit Area

Current Permit Area (Acres)	2116.0
Proposed Permit Area (Acres)	2382.2
Net Change in Permit Area (Acres)	266.2

BLM Land

Leased BLM land is contained within the operating permit boundary. The proposed expansions of the permit area are all on land owned by Montana Tunnels and would not incorporate additional BLM land within the adjusted perimeter. The area of BLM land within the existing and the proposed perimeter is 131.8 acres. The area of BLM within the footprint of the current disturbance area is 56.0 acres. Expansion of the footprint of

the main waste rock dump, realignment of the access road, and provision of new gravel and soil stockpile locations would increase BLM land within the disturbance footprint to 83.1 acres.

Clancy Creek Relocation

The expansion on the northwest side of the mine would remove the channel and the subsurface gravels of approximately 1,800 feet of the Clancy Creek drainage. Clancy Creek is a small perennial stream flowing adjacent to the northwest perimeter of the open pit. The stream originates from springs approximately 1 mile upstream of the mine in a steep, forested canyon with a total drainage area of approximately 1,000 acres. The upstream channel maintains seasonal flows in the range of 0.2 to 0.5 cfs. The channel flow is perched over alluvial materials that are 20 to 30 feet thick and overlie bedrock through the canyon narrows upstream of the mine. The stream channel is flanked by wooded and herbaceous riparian areas and has moderate sinuosity and moderate to steep gradient. A corresponding flow of groundwater moves through the alluvium from 5 to 25 feet below the ground surface.

Adjacent to the open pit mine, the floor of Clancy Creek valley broadens to widths of 200 to 400 feet. The stream channel courses through a meadow area and is flanked with an alder and willow fringe. At its closest point to the open pit mine, the channel of Clancy Creek is 95 feet from the pit rim at an elevation of 5,685 feet. Farther downstream, an unnamed ephemeral drainage tributary enters the meadow area from the northwest and perpendicular to the Clancy Creek stream channel. In the meadow area, soil and subsurface alluvial gravels overlie bedrock with combined thicknesses ranging from 20 to 35 feet. Groundwater in this area is generally measured at depths of 15 to 25 feet below ground surface.

During mining operations, upstream Clancy Creek surface water and groundwater flows would be diverted around the mine perimeter using a combination of a pipe and an open flow channel. The rerouted flow would rejoin the main Clancy Creek channel downstream of the mine a total distance of 2,600 feet from the upstream diversion. Groundwater from the upstream valley of Clancy Creek would be captured by constructing a concrete cutoff wall to bedrock in the canyon narrows. Subsurface water from the valley gravels would be directed into a head gate structure where combined surface water and groundwater flows would enter the diversion pipe. A 2,000-foot length of pipe sized to convey the 1:5 year flow event would extend from the head gate along a wide, sloping mine bench and would ultimately discharge into a constructed open channel at the ephemeral drainage on the northwest side of the mine. The pipe would be buried beneath the ground surface to provide protection from freezing and physical damage. The upstream head gate diversion on Clancy Creek would be constructed with a spillway to divert unusually large flows away from the diversion pipe intake. Stream flows exceeding the design event would be displaced into the open pit mine and managed as mine water.

The constructed open channel would carry flow from the pipe discharge and flows from the ephemeral drainage around the remaining 600-foot perimeter of the open pit mine to the downstream Clancy Creek valley. The open channel portion of the diversion would be lined to prevent water seepage in the area of the mine. A bedrock cutoff wall would be constructed across the alluvial channel of the ephemeral drainage to bring groundwater into the constructed channel.

At the end of the life-of-mine, Montana Tunnels proposes to use part or all of the flow from Clancy Creek to assist with flooding of the open pit. The eventual full pit lake would provide a flow-through water body reconnecting with the downstream Clancy Creek valley.

Pen Yan Creek Relocation

Southward construction of the main waste rock dump extension would cover 3,950 feet of the Pen Yan Creek drainage. The present channel of Pen Yan Creek follows a path along the base of the existing waste rock storage area. Pen Yan Creek is ephemeral during dry years in the greater length of this reach of the stream. The creek's channel is utilized to convey stream flows and storm water to a sedimentation pond to recover water for the milling process. Any surface water flow in Pen Yan Creek does not leave the mine area. The waste rock dump expansion would require that the path of Pen Yan Creek be permanently relocated around the west side of the base of the waste rock dump extension. The relocated channel would be 4,784 feet long and would converge with the ephemeral Spring Gulch drainage approximately 6,700 feet upstream of the present Pen Yan channel confluence with Spring Gulch.

The relocated channel would be constructed in the colluvial material of the Wood Chute Flats glacial outwash and would be designed to be ephemeral, similar to the natural channel that is to be replaced. Groundwater in the Pen Yan Creek drainage would not be relocated by the proposed mine dump construction. Groundwater would be permitted to follow its natural flow path.

To prevent waste rock dump storm water runoff from entering the relocated Pen Yan Creek channel, a ditch would be constructed around the entire base of the extended waste rock dump. The ditch would be constructed in colluvial outwash material to infiltrate water as well as to route storm water to the existing sedimentation pond for freshwater makeup. The ditch would be sized to prevent discharge of storm water to the surroundings. The storm water capture ditch would be reclaimed to surrounding topography at the base of the dump following final stabilized reclamation of the waste rock dump surfaces.

Wetlands

Expansion of the open pit mine through the Clancy Creek drainage and construction of the main waste rock storage area extension across Pen Yen Creek would affect

wetlands and waters of the United States in each of these drainages. Jurisdictional wetlands regulations may apply to some or all of these proposed changes. Plans and areas for wetland mitigation are proposed with this amendment.

Clancy Creek Wetlands Disturbance

A wetlands inventory in the proposed area of the open pit expansion across Clancy Creek shows that 1.65 acres of delineated wetlands would be removed within the mine footprint. The area between the open pit rim and the convergence of the relocated channel with the downstream Clancy Creek channel would affect the water supply to an additional 0.54 acre of wetland area for a total of 2.19 acres of impacted wetlands. This amendment proposes to provide an area for wetlands replacement in an 8.7-acre footprint in the broad Clancy Creek valley downstream of the relocated Clancy Creek channel. The Clancy Creek mitigation area contains 3.4 acres of existing delineated wetlands leaving a net area of 5.3 acres for wetlands replacement.

The water supply for the replacement wetlands would be provided by surface water and groundwater flows from the Clancy Creek diversion and the ephemeral drainage by way of the relocated open channel. Following closure of the mine, a portion of the flow from Clancy Creek would continue to be diverted around the open pit to maintain the downstream wetlands. The entire groundwater and surface water flows from the ephemeral drainage would also flow to the wetland area continuously. The remaining part of the Clancy Creek flow would be diverted into the open pit mine to form a lake. When the open pit lake reaches its final outflow surface elevation at 5,640 feet, the entire flow of Clancy Creek would be directed into the lake to create a flow-through water body. The outlet area of the pit lake would have been excavated during mine closure to provide a flat marshy bench area connecting to the downstream wetlands.

Pen Yan Creek Wetlands Disturbance

The proposed relocation for Pen Yan Creek includes a 10.1-acre area upstream of the point of diversion to replace wetlands that would be filled by waste rock dump extension. Impacted wetlands in the section of the Pen Yan drainage that would be filled by waste rock dump construction are principally found along the banks of the stream channel.

The relocated Pen Yan Creek channel would extend through the downstream wetland mitigation area to a natural gully that feeds into Spring Gulch channel, a distance of about 360 feet. The length of the natural gully into the Spring Gulch gully is about 1,184 feet.