

**CHECKLIST ENVIRONMENTAL ASSESSMENT**

**COMPANY NAME:** RX Exploration, Inc.

**Project:** Drumlummon Mine

**PERMIT OR LICENSE:** 00674

**LOCATION:** 12N 6W sec. 36 and 12N 5W sec. 31

**County:** Lewis & Clark

**PROPERTY OWNERSHIP:**  Federal  State  Private

**TYPE AND PURPOSE OF ACTION:** RX Exploration, Inc., (RX) operating under DEQ Exploration License No. 00674, has been core drilling on the 400 level of the Drumlummon mine since February 2008. The mine is flooded to the 400 level. There is a need to access lower levels of the mine, down to the 800 level, to continue exploration drilling from the lower levels. RX proposes to dispose of groundwater pumped from the Drumlummon No.1 shaft by infiltration to groundwater in a 2,000 ft. long, perforated pipe, bedded in gravel and buried to depth of approximately 24 inches, along an abandoned Northern Pacific Railroad roadbed.

The initial pumping rate would be 40 gpm. Following a trial period, pumping would be increased to 100 gpm, and then by 100 gpm increments from 100 to a maximum 400 gpm. Percolation tests have indicated a maximum rate of 500 gpm would be possible, but the lower rate provides a margin of safety.

Water pumped from the No. 1 shaft would be treated as needed to remove arsenic in a treatment plant located underground, to meet the non-degradation standard for arsenic, which is the level of arsenic found in Silver Creek of 2-3 parts per billion.

RX has established surface water monitoring points along Silver Creek, both above the mine and below the proposed infiltration line. These are being sampled quarterly for many constituents, including arsenic, and would be monitored monthly during infiltration. Water leaving the treatment plant would be monitored weekly for arsenic during infiltration.

**Reclamation Plan:** The ground disturbed by construction of the infiltration line would be seeded upon completion to an aggressive grass seed mix designed to compete with the spotted knapweed that infests the area. Spotted knapweed would be aggressively controlled during the life of the operation. Upon closure of the operation, the pipe would be removed and the disturbed ground seeded again.

N = Not present or No Impact will occur.

Y = Impacts may occur (explain under Potential Impacts).

IMPACTS ON THE PHYSICAL ENVIRONMENT	
RESOURCE	[Y/N] POTENTIAL IMPACTS AND MITIGATION MEASURES
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?	<p>[N] The Drumlummon mine is located in the immediate vicinity of the Marysville batholith. All of the known precious metal concentrations in the vicinity of Marysville are described as being epithermal type deposits. They occur as veins filling fissures marginal to the Marysville batholith.</p> <p>The Marysville batholith is exposed over a two square mile area and is thought to be an offshoot of the much larger Boulder Granite batholith which extends from Helena to Butte. The large intrusive is thought to be the source of the copper mineralization in the Butte area, while the small offshoot produced the precious metal concentrations in the Marysville camp.</p> <p>The batholiths are of Cretaceous era and intruded Pre-Cambrian sediments of the Belt Series. In the Marysville area, the batholith is a quartz diorite which intruded the Empire Shale and the Helena Limestone, altering them into a hard, dense hornstone around its rim. All of the known deposits are contained in the zone of contact metamorphism or within the outer limits of the granite intrusive.</p> <p>It is believed that the structural openings within which the veins were subsequently deposited were due to contraction effects on the margins of the granitic mass during the period of cooling.</p> <p>The veins are strong features, sometimes traceable for miles. The best deposits were in the hornstone, but some good ore extended into the intrusive. The ore occurred in definite shoots within the vein and sometimes ended abruptly in both lateral and</p>

**IMPACTS ON THE PHYSICAL ENVIRONMENT**

vertical directions. They displayed many of the characteristics of typical epithermal deposits including vertical zoning, clay alteration and quartz-calcite gangue.

The ore minerals are very fine native gold which was only visible in particularly high grade areas and silver bearing tetrahedrite in the form of very fine veinlets. The mined out deposits averages approximately 0.5 oz. gold and 5 oz. silver per ton.

The principal sulfides were reported to be pyrite, chalcopyrite, sphalrite, and galena. They amounted to approximately 1% of the material in the high grade ore and increased in volume with depth.

Soils are extremely stony sandy loams and very channery loams on slopes of 25 to 60 percent, developed on a north facing slope. A 4 inch thick organic horizon of duff and litter is underlain by a 6 inch thick, poorly developed, grey B horizon grading into decomposed rock and colluvium. There is no evidence of erosion or slope instability. RX will monitor the slope for springs, seeps, or any evidence of instability on a monthly basis during infiltration.

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?

[N] Silver Creek originates at the confluence of Ottawa and Rawhide Gulches, about 2,000 feet west of the mine and flows approximately 6 miles east before exiting the mountains. The creek has been roughly handled by historic mining activities. Most of the creek below Marysville, past the Drumlummon Mine, and on down valley has been placered, leaving a severely altered channel. A series of small and large tailing impoundments have been placed in the valley bottom, displacing the natural stream course. Beavers have established on parts of the creek, including on the reach below the proposed infiltration line. The ponds trap sediment moving down valley, providing deposition of sediments and attenuation of metals. Water quality in Silver Creek is generally acceptable, arsenic, copper, iron, lead, mercury, and zinc occur at detectable levels but within human and aquatic health standard levels. Aluminum occasionally exceeds aquatic life levels, particularly during spring runoff. There is a fish consumption advisory on the creek due to mercury levels found in the sediments, that are subsequently ingested by fish.

Arsenic values are slightly elevated in the mine water, averaging 20 parts per billion, as against the water quality standard of 10 parts per billion, and as against the arsenic value in Silver Creek of 2 parts per billion, which would be the standard to which the mine water must be treated. The treatment plant at the underground pumping station would be the compliance point for water quality monitoring. Water that enters the infiltration line would meet State water quality standards.

RX has established monitoring points on the creek, above and below the proposed infiltration line that will detect any changes to water quality in the creek that may be caused by the discharge.

RX has proposed an incremental increase in rate of discharge, beginning at 40 gpm, increasing to 100 gpm, then increasing by 100 gpm increments to 400 gpm. The slope would be monitored for developing springs at each increment and monthly during discharge. The development of new springs would not of themselves create a stability or water quality problem provided they did not result in surficial erosion, wasting, or contamination of surface water with pollutants.

Groundwater elevation and flow in Drumlummon Hill is variable and fracture controlled. There are no springs or seeps on the north-facing slope up-gradient of Silver Creek in the area of the proposed 2000-foot-long infiltration system. The ground surface between the railroad grade and Silver Creek appears to be well-drained and evenly-timbered.

Depth to bedrock beneath the infiltration system, based on projections from old mine workings in the area, ranges approximately from 30 to 50 feet, suggesting an adequate depth of colluvium to accept the proposed discharge rate. The subsurface weathered bedrock is expected to be irregular due to jointing and bedding planes in the sedimentary rock. Where exposed, this rock indicates a steep to medium incline eastward. These bedding planes may have the effect of inducing flow away from Silver Creek.

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	<p>Culvert and gate closures of old mine adits were inspected and indicate an absence of groundwater in the colluvium and bedrock either on the level or below the elevation of the infiltration system. Depth to groundwater in the area of the infiltration system is estimated to be approximately 150 and 200 feet.</p> <p>The percolation test data show reasonably consistent results for colluvium, which by observation is a loose heterogeneous mix of rock fragments and soil mass. The infiltration system is located on the north-facing slope where chemical and physical weathering has penetrated deeply into the hill slope beneath the colluvium.</p> <p>The proposed infiltration line is approximately 200 feet above the valley floor. The infiltration system comprises a gravel-filled trench 2 feet wide at bottom and 2000 feet in length that will diffuse clear water at an even rate. The receiving groundwater is expected to be fracture controlled, at variable elevation, gently sloping northeastward. Percolating groundwater is not expected to mound beneath the infiltration system.</p> <p>Silver Creek is a losing stream in the vicinity of the Drumlummon mine. Surface water tends to flow into surrounding ground rather than receiving inflows from the groundwater system. Water that infiltrates into the groundwater system from the infiltration trench would not be expected to enter surface flows of Silver Creek.</p>
<p>3. AIR QUALITY: Will pollutants or particulate be produced? Is the project influenced by air quality regulations or zones (Class I airshed)?</p>	<p>[N]</p>
<p>4. VEGETATION COVER, QUANTITY AND QUALITY: Will vegetative communities be significantly impacted? Are any rare plants or cover types present?</p>	<p>[N] The old railroad grade has been invaded by spotted knapweed and now supports a thriving weed community. RX will seed the construction area after placement of the infiltration pipe and will begin a weed control effort in 2009, in conjunction with herbicide application that has been instituted on other areas of the mine.</p> <p>The slope downgradient of the infiltration trench is a Douglas fir community, apparently a Douglas fir/pinegrass habitat type, with some lodgepole. The understory is well developed providing an estimated 80% ground cover of vegetation and litter... A few colonies of quaking aspen are also found. There are no rare or endangered plants. There is no expectation that infiltration of the mine water to the ground water would have any impact on existing vegetation.</p>
<p>5. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS: Is there substantial use of the area by important wildlife, birds or fish?</p>	<p>[N] The area is used by mule deer and moose with some regularity and probably other wildlife as well. No threatened or endangered species are known to inhabit the area.</p>
<p>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?</p>	<p>[N]</p>
<p>7. HISTORICAL AND ARCHAEOLOGICAL SITES: Are any historical, archaeological or paleontological resources present?</p>	<p>[N] There are some boards from a collapsed cabin on private land along the railroad grade. These may be disturbed to some degree during construction.</p>
<p>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?</p>	<p>[N] The project site is in heavy timber. Construction equipment may be visible from the Marysville road during placement of the infiltration pipe but there will be no visible activity after construction is complete.</p>
<p>9. DEMANDS ON ENVIRONMENTAL 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?</p>	<p>[N] Groundwater would be removed from the Drumlummon mine and returned to the groundwater system.</p>

## IMPACTS ON THE PHYSICAL ENVIRONMENT

10. IMPACTS ON OTHER ENVIRONMENTAL RESOURCES: Are there other activities nearby that will affect the project?	[N]This project is a necessary part of the continuing exploration/evaluation of the Drumlummon mine.
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## IMPACTS ON THE HUMAN POPULATION

11. HUMAN HEALTH AND SAFETY: Will this project add to health and safety risks in the area?	[N]
12. INDUSTRIAL, COMMERCIAL AND AGRICULTURAL ACTIVITIES AND PRODUCTION: Will the project add to or alter these activities?	[N]This project would allow the continued exploration of the Drumlummon mine.
13. QUANTITY AND DISTRIBUTION OF EMPLOYMENT: Will the project create, move or eliminate jobs? If so, estimated number.	[N] This project would allow the continued employment of about two dozen miners, drillers, and professional staff. If exploration is successful, there may a significant increase in employment.
14. LOCAL AND STATE TAX BASE AND TAX REVENUES: Will the project create or eliminate tax revenue?	[N]There would be a small positive impact on local property and State income taxes from the earnings of mine employees and from taxes paid on equipment.
15. DEMAND FOR GOVERNMENT SERVICES: Will substantial traffic be added to existing roads? Will other services (fire protection, police, schools, etc.) be needed?	[N]
16. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS: Are there State, County, City, USFS, BLM, Tribal, etc. zoning or management plans in effect?	[N]
17. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES: Are wilderness or recreational areas nearby or accessed through this tract? Is there recreational potential within the tract?	[N]
18. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING: Will the project add to the population and require additional housing?	[N]A few professional staff have found temporary housing in Marysville. Most mine employees commute from homes or temporary housing in the Helena area.
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.	[N]

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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]
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/A]
24. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:	[N]

25. Alternatives Considered:

No Action: Under the No Action alternative the DEQ would deny the application to discharge underground mine water to the ground water system under the Exploration License. RX would then have the option of terminating the project.

Approval: Approval would allow continuation of the exploration phase of this project.

Approval with modification: No unresolved issues were identified which would require modification of the proposal.

26. Public Involvement: XXXXXXXXXXXXXXXXXXXXXXXXXX

27. Other Governmental Agencies with Jurisdiction: None

28. Magnitude and Significance of Potential Impacts: There would be no significant impacts associated with this proposal.

29. Cumulative Effects: None

**Recommendation for Further Environmental Analysis:**

EIS     More Detailed EA     No Further Analysis

**EA Checklist Prepared By:** Robert Cronholm  
Program Supervisor

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Signature

11-5-08  
Date