CHAPTER 2. ALTERNATIVES

Introduction

This chapter describes and compares the alternatives considered for the Project, summarizes how the alternatives meet the Purpose and Need and address the issues presented in Chapter 1. The alternatives represent a range of possible actions determined by the major issues, the Purpose and Need, Salmon National Forest Land and Resource Management Plan (Forest Plan), and federal and state laws and regulations. A range of reasonable alternatives was developed by the Project's EIS team (EIS Team), Forest Service (FS) Interdisciplinary Team (ID Team), and other state and federal agency members of the Idaho Joint Review Process (JRP) and consultation with technical staff of the Nez Perce and Shoshone – Bannock Tribes. In addition to the alternatives considered in detail a number of alternatives were considered but eliminated from further analysis.

Alternatives Considered In Detail

The agencies developed alternatives (including "No Action") that have been considered in detail along with the proponent's plan (Alternative II). The agency alternatives (III, IV and V) were developed in response to FCC's proposed Plan of Operations using issues raised by the public, the FS ID Team, Tribal Governments, other participating state and federal agencies and organizations and analysis of the proposed action by the EIS Team. A description of the five alternatives evaluated in detail in this FEIS follows. All alternatives considered in detail are consistent with the management direction identified in the Salmon National Forest Plan (USFS, 1988). A number of design modifications, changes to operational components and mitigation measures have been developed by the agencies for Alternatives III, IV and V to address issues raised in the scoping process, to minimize impacts to resources or to provide an analysis of a wide range of reasonable alternatives.

The agencies' objectives used to guide the development of the modifications and mitigation measures contained in the agency alternatives include:

- Ensure that the ICP does not interfere with the Blackbird CERCLA site cleanup and natural resources restoration.
- Ensure compliance with relevant state and federal laws and regulations.
- Ensure compliance with the Forest Plan.
- Minimize impacts to surface and groundwater quantity and quality and ensure that there are no material negative impacts to surface waters or groundwater quality.
- Provide for reclamation that returns disturbed lands to stable natural vegetation communities as quickly as practical.
- Minimize waste streams that would require treatment or disposal.
- Address uncertainties to minimize long-term risks to the environment.
- Minimize surface disturbance to the extent practical.
- Ensure that monitoring and reporting requirements allow efficient and effective oversight of project activities.

Alternative I - No Action

The National Environmental Policy Act (NEPA) requires consideration of a "No Action" alternative. However, under Forest Service mining regulations at Title 36 Code of Federal Regulations (CFR) 228 Subpart A, this option can only be considered for comparison purposes in processing a Plan of Operation, provided that it has been properly submitted under the authority of the U.S. Mining Laws. For example, some proposed plans or parts of proposed plans of operation may not represent logical and sequential development of mineral property, may not be feasible, may not comply with applicable

state or federal laws, or may not be reasonably incident to mining. In such cases, the Forest Service may not simply deny approval of the Plan, but has the obligation to notify the operator as required under 36 CFR 228.5, of changes to be made that are necessary for its approval. Ultimately, in accordance with law and regulation, holders of valid mining claims have a legal right to develop their claims and a reasonable Plan of Operations would be identified and approved.

Alternative II - Formation Capital Corporation's Proposed Plan Of Operations

This alternative is Formation Capital Corporation U.S.'s (FCC or Formation) proposed Plan of Operations (POO) for the Idaho Cobalt Project. The proposed Plan submitted by FCC would allow for mineral development of FCC mining claims located in the Panther Creek drainage on the Salmon-Cobalt Ranger District, Salmon-Challis National Forest. The FCC property is composed of several mineral deposits acquired by locating and filing mining claims. The property consists of 146 unpatented mining claims for a total of 2529 acres of mineral rights. FCC's proposed Plan of Operations consists of an underground cobalt-copper-gold mine consisting of two separate ore bodies, a processing plant, and associated facilities **(Figure 2-1)**.

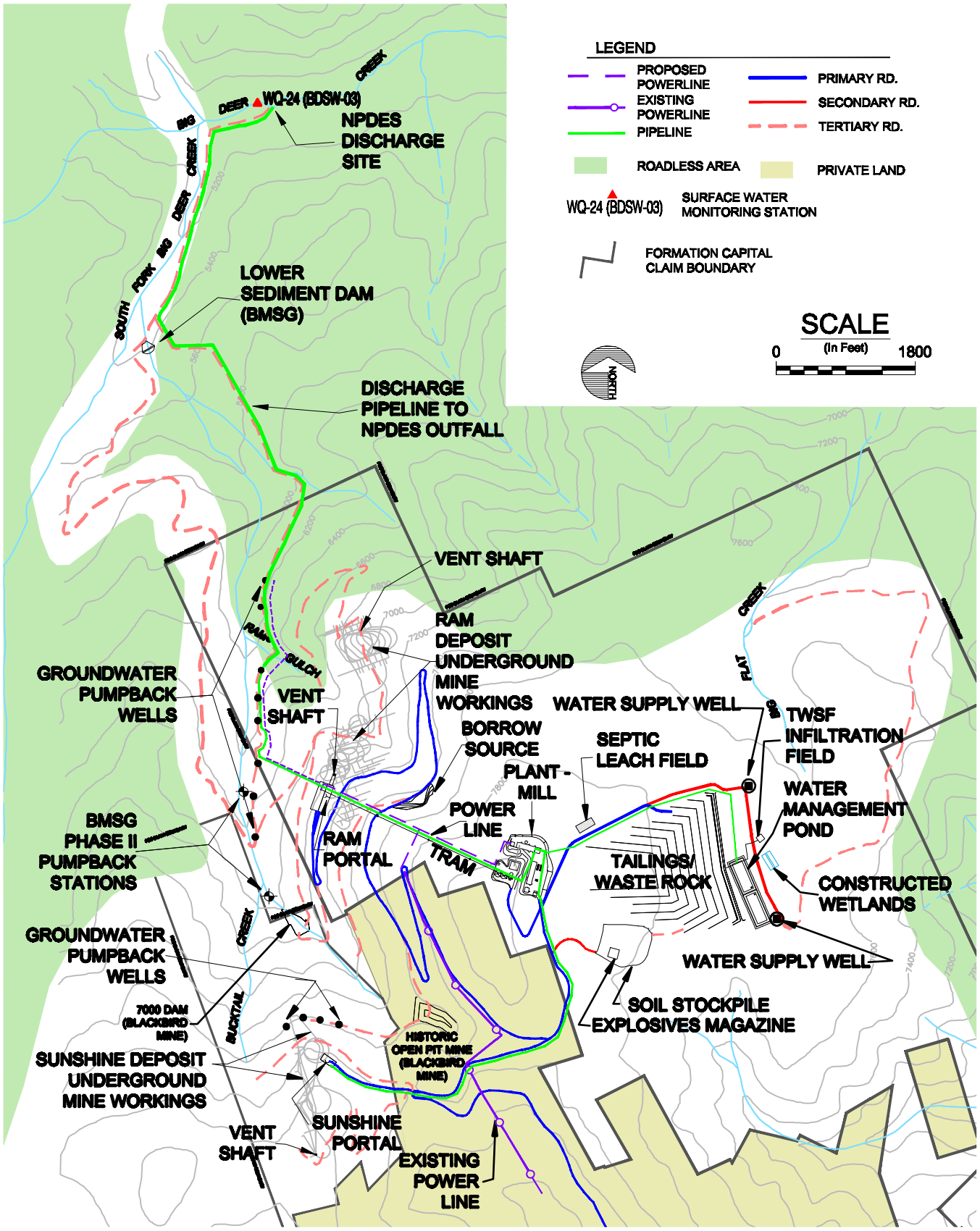
The proposed POO was described in the following documents provided by FCC to the Forest Service beginning in 2001:

- FCC Proposed Plan of Operations, January 22, 2001.
- FCC Proposed Plan of Operations, February 4, 2005.
- FCC Proposed Plan of Operations, replacement pages, February 18, 2005.
- FCC Revised Plan of Operations April 2006.
- FCC Revised Plan of Operations June 2006.
- NPDES Application, May 22, 2007.
- NPDES Application Revision, November 21, 2007.

A list of additional reports submitted by FCC in support of the proposed Plan of Operations is provided in Appendix A of this DEIS.

The following bullet statements provide a summary of FCC's proposed Plan. Under the proposed Plan (see **Figure 2-1**), FCC would:

- Develop two separate underground mining operations to extract ore from two deposits, the Ram and the Sunshine.
- Transport Ram ore and waste rock from the Ram portal to a mill (ore processing) facility located on the Big Flat area initially by haul truck and potentially later by overhead tram.
- Transport the Sunshine ore and waste rock via haul trucks to the mill and tailing and waste rock storage facility (TWSF).
- Construct and operate an ore processing mill (flotation) and ancillary facilities located on the Big Flat between the drainages of Big Deer Creek and Little Deer Creek. Ancillary facilities would include water treatment, offices, warehouse, change rooms, shipping and receiving docks, emergency sleep quarters, and other structures.
- Dewater tailings prior to placing them in the TWSF.
- Place stabilized water treatment waste in the TWSF during operations and post-closure water treatment as necessary.
- Utilize cemented paste tailings in backfilling the Ram underground workings.
- Discharge excess treated water via a pipeline to Big Deer Creek in accordance with a discharge permit.



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GENERAL FACILITY LOCATION ALTERNATIVE II

Nov., 2007

FIGURE
2-1

- At the end of the operational mining period, the mine workings would be allowed to fill with groundwater and groundwater and minewater from the mines would be released to the watershed. If operational water quality monitoring indicates that release of mine-water would cause unacceptable water quality impacts, a bedrock groundwater capture well system would be used to capture mine water that flows out of the mine workings during the closure period. Captured water would be treated and discharged via a pipeline to Big Deer Creek.
- Provide replacement wetlands during operations to mitigate impacts to non-jurisdictional wetlands impacted by the TWSF.
- Conduct a comprehensive operational and post-operational (closure) surface water and groundwater quality monitoring and reporting program.
- Use a year around transportation route as shown on **Figure 2-2** for employees and transportation of concentrate, equipment, reagents, and other freight.
- Post a bond or other financial security sufficient to allow the Forest Service to reclaim the Project should the company be unable or unwilling to do so.
- Obtain agreements with Noranda to utilize existing roads and power lines on private property.

Project Development Schedule

There would be three main phases in the life of the ICP: the construction phase (approximately 2 years), the operating phase (10 to 12 years), and the reclamation/closure phase (2 years for surface reclamation and post-mine water monitoring and treatment for as long as is required to meet water quality objectives). There would also be concurrent reclamation in the construction and operating phases as existing disturbed areas or new disturbances are reclaimed post-use except if the TWSF remains open for disposal of stabilized water treatment waste.

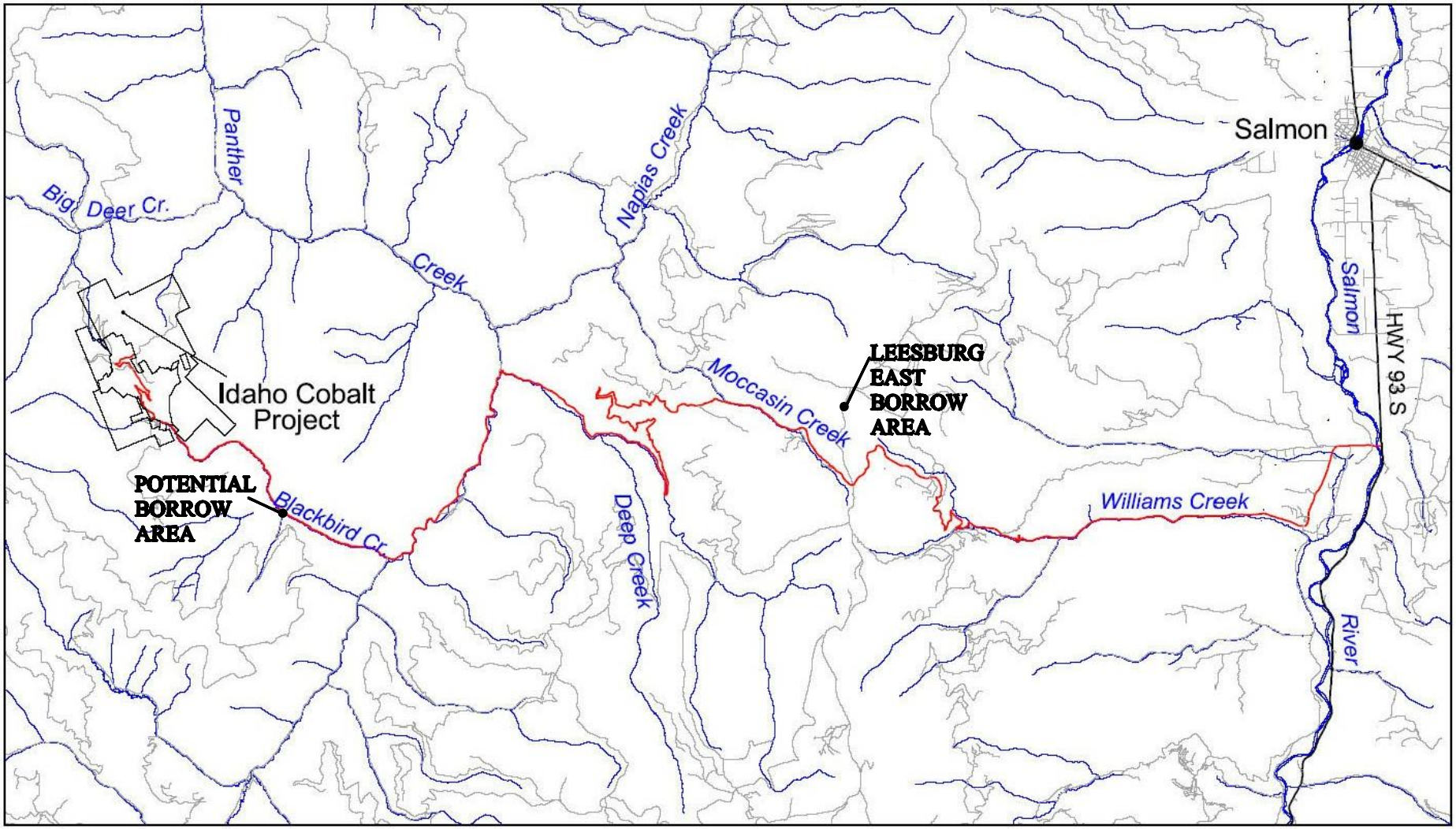
The construction phase would include improving existing roads, constructing new roads, constructing the Ram portal, mill, and powerline and substation, constructing additional groundwater monitoring wells and groundwater capture wells, constructing the first phase of the TWSF and preparing and constructing the water treatment plant.

The operating phase would bring the mill on line at 400 tons per day; increasing to 800 tons per day as the underground Ram Mine expands. Ongoing mine development would include constructing the Sunshine portal and developing the underground Sunshine Mine. The TWSF would be expanded to final capacity.

The reclamation and closure phase would focus on reclaiming lands disturbed by FCC's mining activities and providing for long-term management of the reclaimed facilities and mine water following cessation of mining and dewatering. There would be limited concurrent reclamation during the operations phase, primarily on completed portions of the TWSF. The reclamation phase would include final shaping, covering, and vegetation of the TWSF, sealing mine portals and demolishing the mill and tram system. Ultimately as they are no longer needed the water treatment system, power line, substation, and roads would be reclaimed.

Transportation

FCC's proposed transportation route for employees and supplies is via Williams Creek Road to the Williams Creek Summit, from there to the Deep Creek Road, then to the Morgan - Panther Creek Road, and Blackbird Creek Road (**Figure 2-2**). FCC estimates that 10 vans would be required daily to transport employees to and from the site. In addition to the above, four pickup trucks are anticipated to be required daily for management personnel. FCC's proposed employee transportation route is also proposed to be used for the transportation of concentrate, equipment, reagents, and other freight. **Table 2-1** outlines FCC's anticipated list of chemicals, reagents and operating supplies that would be transported to and from the mine.



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PROPOSED TRANSPORTATION ROUTE

Nov, 2007

FIGURE

2-2

TABLE 2-1. Chemicals, Reagents and Operating Supplies – Idaho Cobalt Project

Reagent / Chemical or Product	Annual Use	Container Type	Container Size	Trucks/Year (per day)[1]
AERO® 343 Xanthate	280 tons	Flo Bin	1 0	14
AERO® 350 Xanthate	308 tons	Flo Bin	1 ton	16
Copper Sulfate	208 tons	Super Sack	1 ton	20[2]
AEROFROTH® 65 Frother	42 tons	Plastic Barrel	55 gallons	3
Sodium Sulfide	100 tons	Sacks	50 pounds	1 – 5
Superfloc	24 tons	Sacks	50 pounds	Ship w/frother
Lime	75 tons	Super Sack	1000 pounds	4
Diesel	750,000 gallons	Fuel Truck	4,500 gallons	150
Gasoline	5,000 gallons	Fuel Truck	4,500 gallons	Ship w/diesel
Cement	2,500 tons	Bulk Container	94 pounds	115
Oils, Lubricants, Grease, Antifreeze	10,000 gallons	Barrel	55 gallons	Ship w/diesel
Propane	40,000 gallons	Fuel Truck	9,400 gallons	5
Antiscalant	4,000 gallons	250 gallon tote	4,000 gallons	1
Ammonium Nitrate	450 tons	Bulk Container	10 tons	45
Bulk Concentrate	11,200 tons	Sealed Container	16 tons	700 (2)
Water Treatment Chemicals and Reagents				
Polymer Flocculant	20 gallons	Sealed Pail	5 gallons	0[3]
Hydrated Lime	2 tons	Super Sack	1,000 pounds	1
Sodium Hypochlorite	200 gallons	Plastic Drum	55 gallons	0[3]
Sodium Bisulfite	500 gallons	Plastic Drum	55 gallons	2
Hydrochloric Acid	400 gallons	Plastic Drum	55 gallons	2
RO Scale Inhibitor	50 gallons	Sealed Pail	5 gallons	0[3]
Methanol	500 gallons	Plastic Drum	55 gallons	2
RO Alkaline Cleaner	1.5 tons	Sealed Pail	5 gallons	0[3]
RO Acid Cleaner	1.5 tons	Sealed Pail	5 gallons	0[3]
Cement	520 tons	Sacks/bulk	94 pounds	24
Bentonite	145 tons	Sacks/bulk	50 pounds	7
Employees				
		Vans		3500 (10)
		Pickups		1400 (4)

(1) Average values and actual truck count will vary.
(2) Does not add to truck count, as the product would be backhauled from the refinery. More fully described in FCC's Storm Water Management Plan for the Idaho Cobalt Project (Telesto, 2006a).
(3) Does not add to truck count, as the small quantity would be transported with other materials.

Transportation Plan

FCC has developed Transportation Procedures and Plans (Appendix 12 of the Transportation Baseline Report and Transportation Plan, TTE, 2006) for access to and from the ICP site for personnel, contractors, equipment, and supplies, including transportation of concentrate.

Site Roads

Site roads, which are primarily on public lands, are shown on **Figure 2-1**. New project operations roads would be constructed to conform to Forest Service and Mine Safety and Health Administration (MSHA) regulations, as appropriate. Existing roads would be improved as necessary to handle ore haulage, larger trucks and increased traffic. Storm water ditches and sediment control measures on all roads would be constructed in accordance with Best Management Practices (BMP's) for Mining in Idaho guidelines (Idaho Department of Lands, 1992) to control storm water runoff. Site roads are classified as primary, secondary, and tertiary roads:

- Primary roads are all main access roads and roads over which ore or waste rock would be hauled.
- Secondary roads are roads that are proposed for daily, year around use in the operations but are not ore haul routes or main Access Routes.
- Tertiary roads are site roads that are proposed for seasonal use or intermittent use such as roads required to access surface water and groundwater monitoring locations.

Primary Roads

Turnouts would be constructed in appropriate locations along the primary roads to allow safe passage of vehicles. Existing and proposed primary roads include:

- A road from the Big Flat to the Ram portal. This road requires improvements, as well as construction of approximately 0.6 miles of new road in two segments. Road distance from the Ram portal to the mill site is approximately 2.8 miles.
- An existing road is proposed for access to the Sunshine portal. The haul distance from the Sunshine portal to the mill site is approximately 1.0 miles.
- About 0.7 mile of new road is proposed for access from the mill site to the TWSF.

FCC proposes to obtain approval to upgrade and use the existing Blackbird Mine road on private land through the Blackbird Mine CERCLA site to the Meadow Creek/Bucktail Creek divide. FCC, for the duration of use, would maintain BMPs, channels, culverts and other sediment/storm water control facilities that exist on sections of Noranda property that would be used by FCC. FCC would upgrade the road from the Blackbird water treatment plant gate to the top of the ridge (5.8 miles), including realignment of a 0.3 mile section known as Buddy's Grade.

Secondary Roads

Approximately 0.7 miles of new secondary road construction is proposed for access to the TWSF, soil stockpile, and water management ponds. Where possible, existing roads would be used for proposed secondary roads.

Tertiary Roads

Tertiary roads are proposed to provide access to the tram tower corridor, the soil stockpile, and surface water and groundwater monitoring locations. This class of roads, as proposed, includes use of about 9.5 miles of existing roads and the construction of approximately 0.6 miles of new roads.

A combination of newly constructed roads and existing improved roads are proposed to provide access to the ICP site. All roads would be constructed and improved in accordance with United

States Forest Service (USFS) guidelines for road construction. The specifications for road design are provided in the ICP Conceptual Road Design (TTE, 2006).

The primary and secondary roads on the Project site would be maintained year around, including snow removal during the winter months. Snow removal would generally be accomplished on these roads with the use of a rotary snow blower/plow. The snow would be thrown above or below the road corridor into areas where snowmelt would not create sedimentation or where the snowmelt would be addressed by Best Management Practices (BMPs). If snow removal by rotary snow blower/plow were not possible, a grader or loader and truck team would remove the snow.

Transportation of Personnel and Supplies

Personnel - All ICP personnel would carpool to the site in FCC vans or pickups. All ICP personnel and contractors would be instructed regarding the ICP Transportation Procedures and Plans and the requirements of the FS Road Use Permit to enhance the safety of access to the site and to reduce the impacts of travel to the site.

Construction Equipment and Supplies - During construction, large mobile equipment, large loads of construction materials, and large equipment being installed at the ICP facility sites would be transported to the site by tractor-trailer. Supplies would be transported by single-frame trucks whenever feasible, although this may not always be feasible. Pilot cars would lead tractor-trailer loads and fuel trucks to the site to reduce accident risk. The operators of tractor-trailer loads and fuel trucks would also be instructed regarding the requirements of the Transportation Procedures and Plans.

Operating Supplies - **Table 2-1** lists the type and quantity of operating supplies to be used by the ICP during operation. Single-frame trucks would be used to transport operating supplies. For materials transported via tractor-trailer, whenever possible, the tractor-trailer would be off-loaded in Salmon, Idaho, and supplies reloaded onto a single-frame truck for transport to the ICP.

Concentrate - Approximately 11,200 tons of concentrate is anticipated to be shipped from the ICP mill facility annually. Steel roll-off containers with locking lids would be used to transport the concentrate. Empty containers would be filled at the mill, sealed, and loaded on single-frame trucks for transport to Salmon, Idaho. In Salmon, concentrate containers would be transferred to tractor-trailer equipment for transportation to a processing facility.

Spill Control - FCC has prepared a spill control plan that addresses management of hazardous materials during shipping and storage. Their plan includes notification of the ICP facility prior to transport of fuels or chemicals, use of closed trucks, travel only during daylight hours, use of pilot vehicles, and continuous radio contact with pilot vehicle and facility during transport.

Mining Operation

Ore Reserves/Production Schedule

The ICP would consist of developing two deposits over the life of the Project, the Ram (with 2,230,000 tons of ore currently known) and the Sunshine (with 340,000 tons of ore currently known), totaling 2,570,000 tons of known ore. Development of each deposit would use underground mining methods. The average rate of mining production would be 280,000 tons per year (tpy), or 800 tons per day (tpd) based on mine operation of 350-days-per-year. During start-up the rate would be approximately 400 tpd in the first year, increasing to full production in the third year of operations. It is possible, however, that mine and mill throughput could reach 1,200 tpd. Mining would begin initially on the Ram deposit, and mining of the Sunshine deposit would occur in subsequent years.

Exploration for additional ore reserves is anticipated to continue through the life of the ICP operations. If additional ore tonnage is identified and defined, the production life of the ICP may be extended beyond the currently proposed mine and mill life schedule.

Mining Method

Mine access to the Ram would be via a road from the Big Flat to a portal at the 7,060 feet above mean sea level elevation (**Figure 2-1**) and then via an underground decline driven at approximately 12 percent to the ore zones (**Figure 2-3**). The decline would be used to transport people and materials in and out of the mine and as a haul route for the waste rock and ore to the overhead tram at the portal, as well as for a portion of the tailings to be brought back into the mine. Crosscuts from the decline would provide access to the ore body (**Figure 2-3**). Two ventilation raises, or airshafts, approximately 8 feet in diameter, would provide ventilation and emergency escape ways.

An overhead tram would potentially be constructed from the Ram portal to the mill located on the Big Flat (**Figure 2-1**). The conceptual design for the tram includes a tramcar or cars traveling on track cables and moved by a haul rope. Three or more towers, approximately 45 feet high, would support the track cables. The tramcar would be loaded with either waste rock or ore from a hopper at the Ram portal. Ore would be discharged onto an ore stockpile at the mill crusher. Waste rock would be discharged at the mill and trucked to the TWSF for final disposal.

At the Sunshine, an existing portal would be modified and an internal decline would be developed to access the ore. The decline would be used to transport people and materials in and out of the mine and as a haulage route for ore and waste rock. One airshaft, approximately 8 feet in diameter, would provide ventilation and an emergency escape way. Sunshine ore would be hauled directly to the mill in 20-ton trucks and placed in the ore stockpile. The trucks would then be used to haul tailings for use as backfill in the mine.

Diesel equipment and the associated fumes and dust from mining would dictate the amount of fresh air required to maintain a good working environment and to minimize health hazards. Air would intake at the main portals of both mines and exhaust through the airshafts. Additional ventilation would be provided by auxiliary fans and ventilation tubing to working areas.

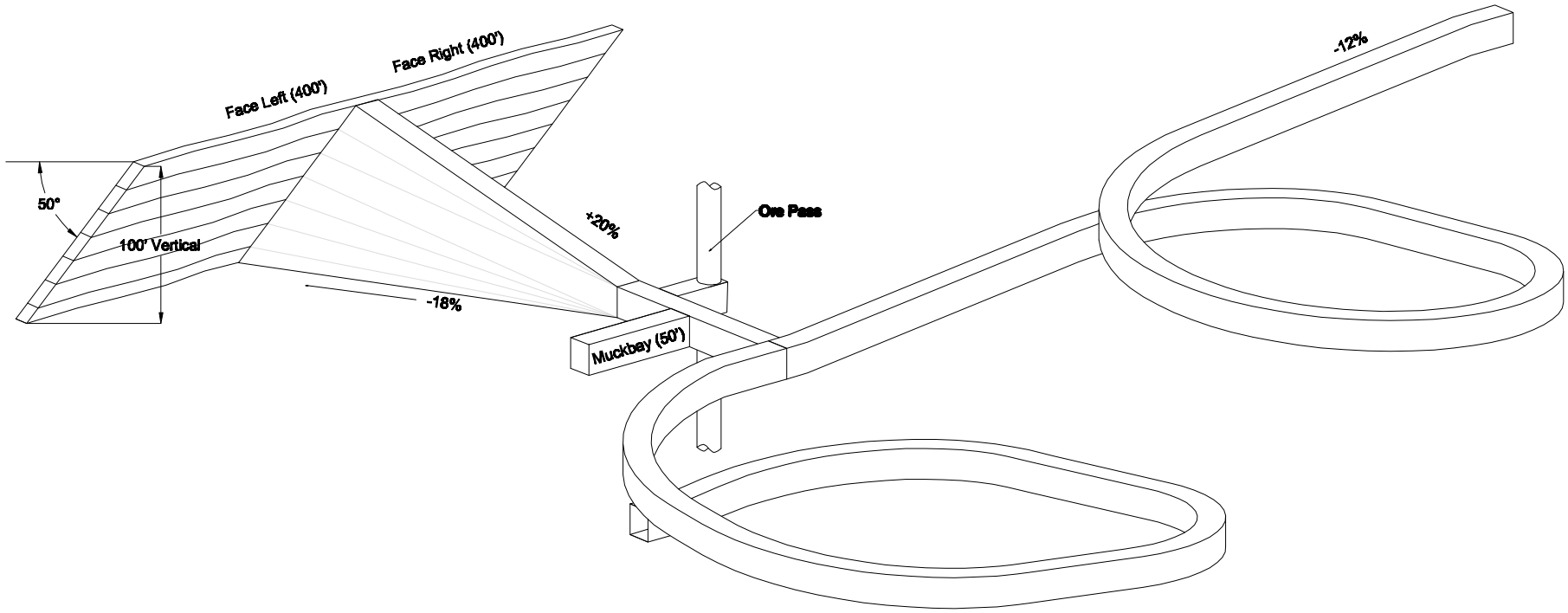
The mining methods for the Ram and Sunshine deposits would use cut and fill mining. The mining sequence would include drilling between 30 to 40 holes in the ore face, loading these holes with explosive, blasting, scaling loose rock from the back (ceiling) and ribs (walls), mucking the broken ore with a scoop tram, loading a haul truck with the scoop tram, and installing rock bolts for rib and back support. The openings (stopes) created from ore excavation would then be filled with paste tailings and waste rock while the access tunnels would be left open.

Air compressors would be located in the mine for operating pneumatic equipment, with service lines installed to the working areas. Maintenance of the mining equipment would be performed in underground shops.

Formation estimates that the mines at full development would produce an average of approximately 51 gallons per minute (gpm) of water. Mine water flows would be collected in sumps in the mine to allow suspended solids to settle. Water storage tanks would be located at the portals for storage of water pumped from the mines. The water would then be pumped to the mill for treatment and reuse, and then to the water management ponds for storage and handling. Water would also be used in the underground mine for dust suppression. Excess water would be treated and discharged to Big Deer Creek.

Tram Operation

The overhead tram would be built if and when economic conditions justify its construction. It would normally be operated in automatic mode. The loading and off-loading functions would be controlled



VIEW IN 3 DIMENSIONS

IDAHO COBALT PROPERTY FORMATION CAPITAL CORPORATION, U.S. LEMHI COUNTY, IDAHO	**DETAIL RAM WORKINGS OBLIQUE VIEW** January, 2006	**FIGURE** **2-3**

by sensors at the Ram portal and at the mill coarse ore stockpile and monitored in the mill control room. Prior to construction of the tram, ore and waste would be hauled to the mill and TWSF by truck.

Mine Workings

The Ram deposit would be accessed by a decline. Two airshafts connecting into the workings would provide ventilation. Additional drifts and crosscuts would be developed to provide access to the ore blocks. The total length of mine workings for the Ram deposit is estimated to be about 38,000 feet. There would be approximately 9,800 feet of open stope at any given time. The Ram underground workings would also include a chamber to accommodate tailings dewatering equipment.

The Sunshine deposit would be accessed from an existing portal connecting to an internal decline. Additional drifts would be developed to provide access to the ore blocks. The total length of mine workings for the Sunshine deposit is estimated to be about 13,000 feet.

Ram Portal Platform

The Ram portal is located in an area of steep slopes. A retaining wall for the portal platform would be constructed using an engineered soil reinforcing technique. The platform would contain an office, tool/maintenance shed, surge water tank/pump station, and hoppers for loading ore and waste rock onto trucks or into the tramcar (**Figure 2-4**). Other equipment located on the platform would include a transformer, emergency generator, and diesel storage tank.

Sunshine Portal Platform

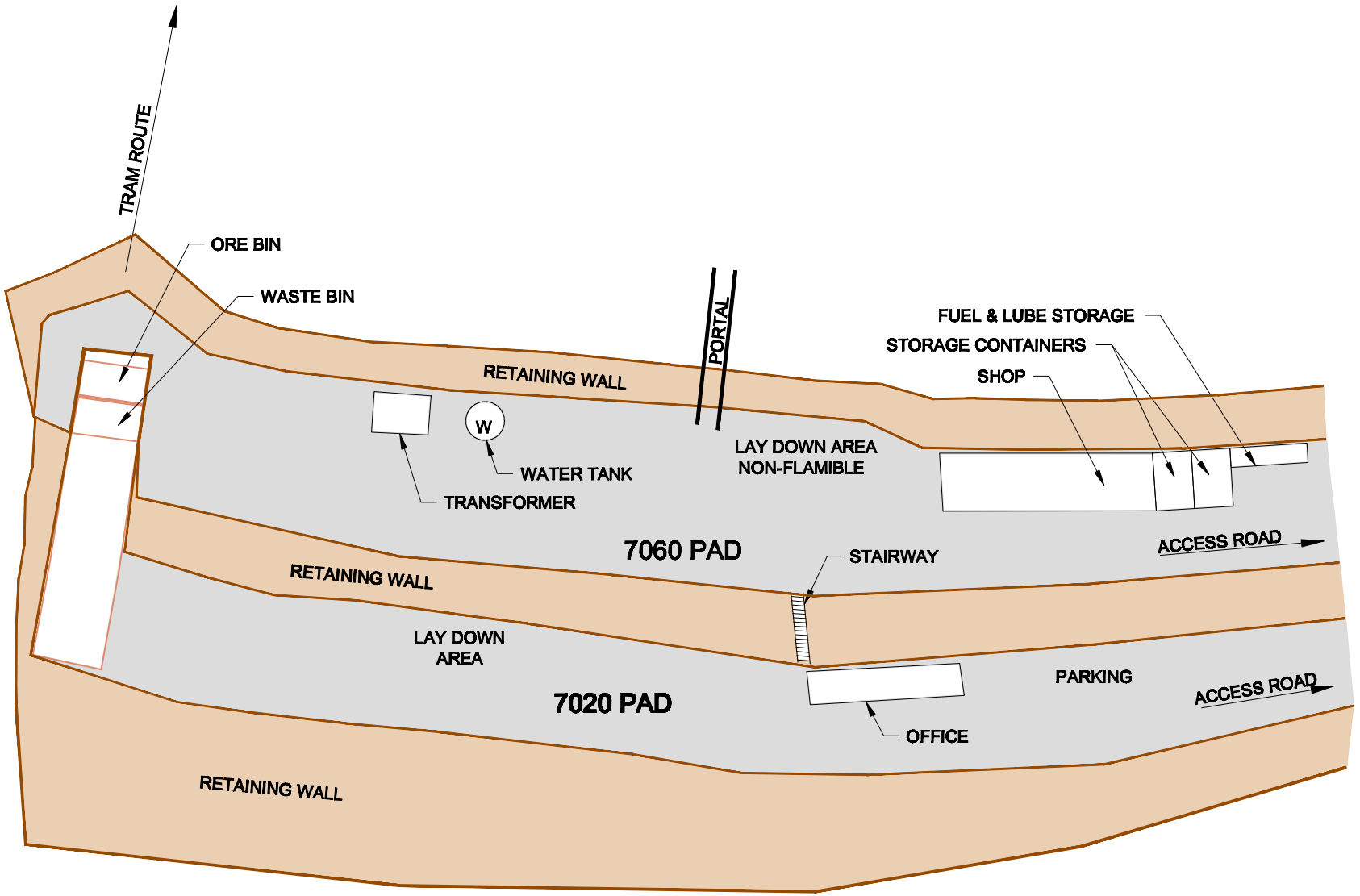
At the Sunshine, an existing portal would be upgraded to access the internal decline. The existing portal platform would be reshaped and backsloped to control runoff. An office, tool/maintenance shed, diesel storage tank, and water tank would be located on the platform.

Backfilling

A significant feature of the mining technology to be used for the ICP is the backfilling of paste tailings into the mined-out underground areas of the Ram Mine. Tailings backfill is not proposed for the Sunshine Mine. Backfilling serves the purpose of providing structural support in the mine while reducing the area required for surface tailings storage. Backfill is considered a construction material that is used to create a floor to mine on top of, a rib to mine next to, or a back to mine under. It provides important support to the surrounding rock mass, reducing the ground support requirements in active mining areas. Backfill reduces dilution of the ore by non-economic wall rock.

Tailings, for use as backfill, would have cement added to increase backfill strength and be delivered to the Ram as a paste. Cement would also add alkalinity that would reduce metals mobility in the backfill. The paste functions primarily as a void filler, and its strength need only be sufficient to support mine vehicles working in the stope. It would be a highly viscous mixture of mill tailings, water and cement. Nominal design parameters show a paste consisting of 65 to 70 percent solids and 30 to 35 percent water. Solids would include between 96 to 98 percent tailings and from 2 to 4 percent Portland cement. Testing shows that the paste would have a dry density of about 92 pounds per cubic foot and a permeability of $1x10^{-6}$ centimeters per second.

A paste pipeline would enter the mine via a borehole and then be pumped to the location in the mine needing filling. Prior to receiving backfill, each stope would be prepared. Preparations would include cleaning the stope floor of any ore, installing pipe hangers and pipe to the far end of the stope, and installing a waste rock barricade at the stope entrance. Once the stope is prepared, backfilling can begin. A slug of water would be sent down the pipe from the paste plant to pre-wet the line. Paste would follow behind the water. It would discharge from the end of the pipe into the stope and accumulate on the stope floor. Periodically, as the stope fills, the pipe would be pulled back. When



SCALE IN FEET
0 50

After Turkey Tracks, 2006

IDAHO COBALT PROPERTY
FORMATION CAPITAL CORPORATION, U.S.
LEMHI COUNTY, IDAHO

RAM PORTAL
GENERAL ARRANGEMENT
January, 2006

FIGURE
2-4

the stope is full, the paste would be stopped and a slug of water sent through the pipe for final cleaning.

The backfill schedule indicates that backfill would be required within the first 6 months of mining of the Ram deposit. By the end of the first year of mining, approximately 400 tons of backfill would be required each day. After each cut in a stope is made (approximately 15 feet on the first cut and 10 feet thereafter) and the ore has been removed, backfill material would be placed into the void. Backfill would only be used in ore zones and would not be used in access ramps. By the end of mining the ore zone stopes would be approximately 90 percent filled with backfill. Approximately 30 percent of the mine consisting of ramps, access decline and ventilation raises would be left open.

A portion of the backfill would be waste rock (slash) from ramp construction. Some of the slash would be potentially acid generating (PAG). This waste rock would be trucked from the ramp being slashed to the mined out area being backfilled, placed on top of previously placed tailings backfill, and subsequently covered by additional tailings backfill. This backfilling sequence would provide a suitable working platform as well as partially isolate the slash.

FCC indicates that an alternative method of backfill may be used. This would involve dewatering the tailings, hauling the tailings to the stope to be filled in mine trucks and dumping the tailings into the opening requiring filling. If this alternative were to be implemented the company would be required to submit a plan that demonstrates that the tailings can be thoroughly mixed with cement or other neutralizing material at levels adequate to ensure long term pH control of the backfill material.

Mine Dewatering

Mine dewatering would be accomplished by a series of skid-mounted, self-contained pump units. Discharge from the mine dewatering system would be delivered to a holding tank on the portal pad. This tank would be sized to contain the entire backflow from draining the pipeline from the mill on the Big Flat. The tank would be housed in the heated portal pump station to prevent icing in the winter.

The pump station would also house pumps for lifting water to the mill from dewatering the mine and tailings. Pumping from the Ram portal to the mill would be accomplished via a steel pipe with secondary containment. To reach the 8,050 elevation high point at the mill site, this pipeline would be approximately 2,300 feet long. An air intake with a check valve at the high point would allow the line to be self-draining in the event of a pump shutdown. The pipeline would follow the tram right-of-way (**Figure 2-1**) and would be winterized to prevent freezing. During an emergency shutdown or production curtailment, the mine pumps would continue to operate.

Secondary containment would include pipe-in-pipe for all areas where the piping is not within the mine or other secondary containment such as the mill building. The system would include leak detection at all low points and at pipe-to-pipe connections. The pumps would have the capacity to handle short periods of high-yield mine inflows caused by structure dewatering. However, it is possible a flow event could occur that exceeds the capacity of the mine pumps. Should that occur, water would build up in the mine sumps until the inflow once again falls below the pumping capacity at which time water levels would begin to return to their long-term operating level.

The Sunshine Mine is not expected to produce enough water for dust suppression or drilling; makeup water would be supplied from the mill circuit. If excess water were produced, it would be pumped back to the mill.

Mine Equipment and Facilities

The mine facilities would consist of the mine office, change house, maintenance shop, emergency sleeping quarters, and warehouse. These facilities would be housed at the mill. Additionally, there would be a portable explosives magazine located in a suitable site with good access, but removed a

safe distance from the mine buildings, and a start-up/backup generator. A list of anticipated mining and mill equipment is given in **Table 2-2** and the plant site layout is shown on **Figure 2-5**.

Waste Rock Characterization

Three main waste rock units have been identified at the ICP: quartzite, mafic dikes/sills, and quartz veins. Quartzite is the dominant component of the waste rock and, as the term is used here, may contain metasedimentary and exhalite rock as well. Waste rock was characterized in the baseline geochemical testing program (Telesto, 2004) by the analysis of 239 waste rock samples. The majority of the waste rock (approximately 80 percent) is not expected to present an acid generation problem as the quartzite has a low pyritic sulfide content. However, approximately 20 percent of the waste rock is predicted to generate slightly acidic solutions containing variable concentrations of soluble arsenic, cobalt, copper, and zinc.

Tailings and Waste Rock Storage Facility

FCC would develop a surface disposal facility to store and contain tailings and waste rock material not otherwise disposed of underground, termed the tailings and waste rock storage facility (TWSF). The TWSF would be constructed east of and downslope from the mill on the Big Flat. This location was chosen because of its relatively flat topography, soil characteristics, and distance from active drainages and streams. Specific design elements of the TWSF are:

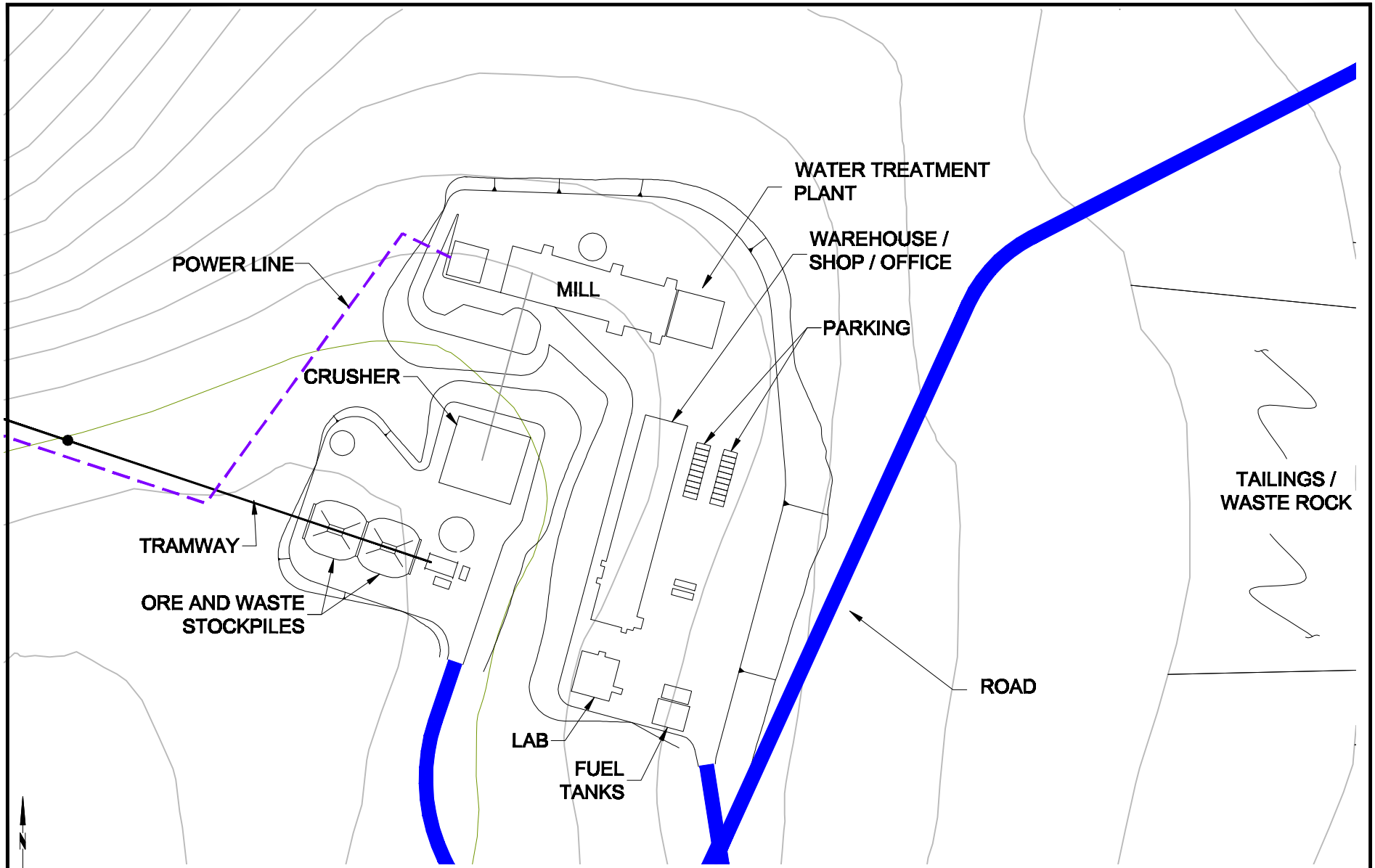
- Storage of 2.5 million cubic yards (MCY) of tailings and waste rock. The storage capacity of the facility is approximately 35 percent greater than the current production estimates;
- Separation of tailings and waste rock to the extent practicable;
- Composite liner system with drainage collection;
- Staged construction and reclamation;
- Collection of runoff from waste rock and tailings with conveyance to the process pond;
- Inclusion of water treatment wastes in covered trenches within the TWSF;
- Snow removal storage area with conveyance to the storage pond; and
- Diversion of runoff around operating areas of the facility.

The proposed configuration of the TWSF is shown on **Figure 2-6**. Tailings and waste rock would be separated except for a commingled zone at the interface of the two materials. The TWSF would have 4 horizontal to 1 vertical (4H:1V) side slopes constructed in three 50-foot raises with two 100-foot wide benches. A toe berm would be constructed at the base of the tailings facility to provide containment for seepage and runoff water from the tailings stack and to enhance geotechnical stability. The facility would occupy an area of about 55 acres and would measure approximately 1,600 feet by 1,700 feet. The stack would reach a maximum depth of about 90 feet. The TWSF would be constructed in the following sequence:

- The area would be cleared and grubbed to ensure the surface is free of vegetation, large rocks or boulders, and other debris.
- The topsoil and subsoil would be removed and hauled to the stockpile area.
- A drainage system would be constructed within the subgrade to intercept and remove groundwater from the TWSF foundation soils. The system would consist of a series of French drains constructed upstream and within the footprint of the TWSF and would discharge to engineered wetlands located east of the TWSF.
- The foundation area subgrade would be graded and compacted in-place to create a suitable foundation for the liner.
- The toe berm would be constructed using materials excavated from the water management ponds and other borrow materials as necessary.
- The clay member of the composite liner would be placed. Final design would determine whether a 1-foot clay liner or a geosynthetic clay liner would be used.

TABLE 2-2. Mine and Mill Equipment

Item	Number of Units
Mine Equipment	
Drill Jumbos	8
Long-hole Drill	1
Scoop Trams	10
20-ton Trucks	5
Rock-Bolter	1
Grader	1
Compressors	3
Service Trucks	5
Personnel Trucks	8
Slushers	6
Pug Mill	2
Water Tanks	2
Transformers	1 lot
Fans	1 lot
Pumps	1 lot
Shop Equipment	1 lot
Safety Equipment	1 lot
Misc. Equipment	1 lot
Mill Equipment	
Primary Crusher	1
Screening Section	1
Secondary Crusher	1
Ball Mills	2
Conditioner Circuit	1
Flotation Circuits	4
Concentrate Thickener	1
Concentrate Filter	1
Tailings Thickener	1
Tailings Filter	2

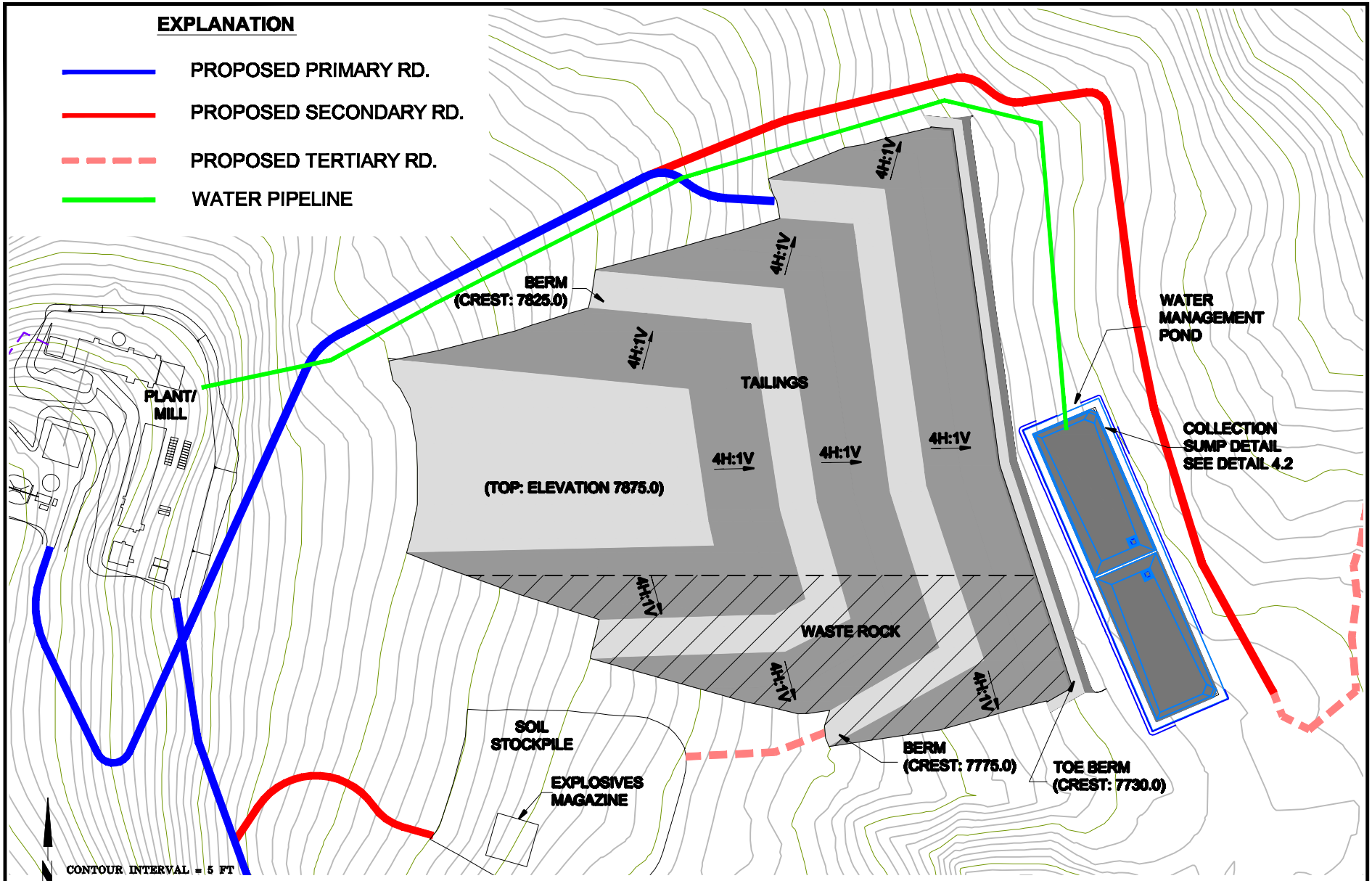


After Telesto ,2006

IDAHO COBALT PROPERTY
FORMATION CAPITAL CORPORATION, U.S.
LEMHI COUNTY, IDAHO

PLANT SITE
GENERAL ARRANGEMENT
October, 2007

FIGURE
2-5



After Telesto ,2006

IDAHO COBALT PROPERTY
FORMATION CAPITAL CORPORATION, U.S.
LEMHI COUNTY, IDAHO

TWSF
PLAN VIEW

January, 2006

FIGURE
2-6

- A synthetic liner (such as 60-mil PVC) would be placed over the subgrade in a scheduled construction sequence. Subsequent liner expansions would be installed as needed.
- A drainage collection system would be constructed over the synthetic liner to collect water infiltrating through the tailings and waste rock and to convey flow to the process pond. This system would be constructed within a protective sand layer, which would also act to protect the liner from damage during tailings and waste rock placement.
- Drainage channels would be constructed along the outside slopes of the TWSF, along the toe berm, and on the intermediate benches of the TWSF (as construction progresses) to collect surface drainage from the facility and convey it to the process pond. All drainage channels would be designed to handle runoff from a 25-year, 24-hour storm event. Perimeter drainage channels would be constructed to intercept storm water run-on to the TWSF, direct water around the TWSF, and convey water back to natural flow paths via BMPs and sheet flow.
- Snow would be removed from the active disposal areas prior to placing waste rock or tailings in the TWSF. The snow would be stockpiled in a designated area within the facility.
- Reclamation of the TWSF would occur incrementally after each phase of tailings and waste rock placement is completed. The TWSF would continue to be the repository for stabilized water treatment waste if post-closure water treatment is required and would be reclaimed once it is no longer needed for waste disposal. The facility would be regraded to a continuous slope of 4H:1V or less to reduce potential for erosion.
- A cover system consisting of a 60-mil high-density polyethylene (HDPE) geomembrane, a geonet drainage layer, and a soil layer would be constructed over the TWSF to limit infiltration into the tailings and waste rock.
- The cover soil (three feet) would be revegetated to help reduce infiltration and erosion.
- After reclamation, tailings drainage would continue to be conveyed to the process pond as long as closure water treatment is needed. After cessation of water treatment, tailings drainage would be conveyed to a one gpm infiltration field located east of the pond.
- A replacement wetlands would be constructed to offset impacts to wetlands removed by the TWSF construction.

Waste rock would be delivered to the TWSF by truck or tram from the Ram and by truck from the Sunshine. Waste rock would be placed in approximately 5-foot lifts on the prepared surface by end dumping from mine trucks and would be spread and leveled with a dozer.

Milling Operations

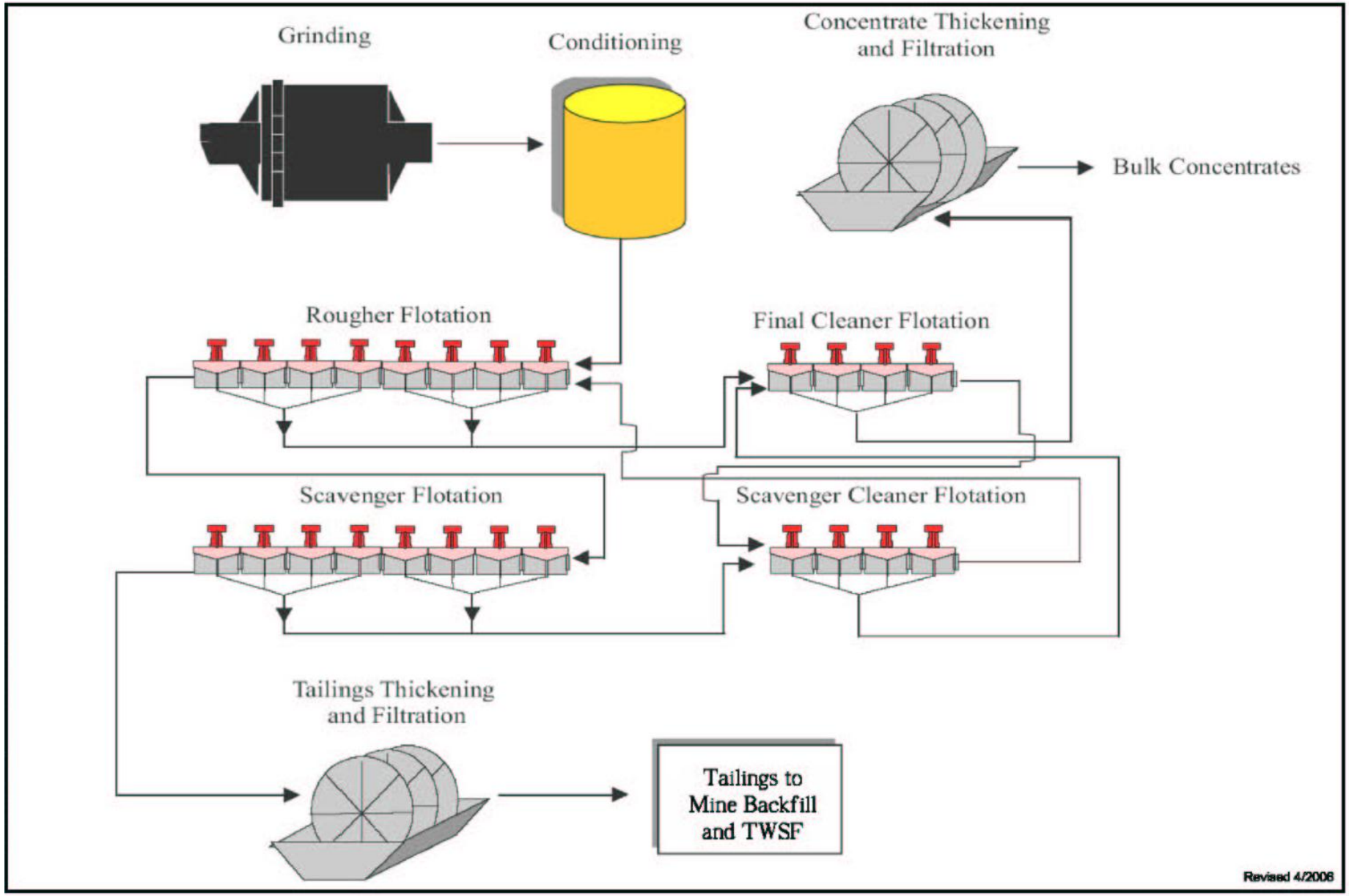
Mill Location and Description

The mill would be located at the Big Flat, an area of relatively flat topography east of the Ram deposit. The mill would include crushing and grinding equipment, flotation cells, concentrate thickeners, tailings thickeners, concentrate filters, tailings filters, and ancillary equipment. **Figure 2-7** depicts the general mill (concentrator plant) flowsheet.

The milling process would reduce the run-of-mine ore to minus 0.5-inch size in the primary and secondary crushing area. This material would then be reduced to minus 200 mesh size, in a liquid pulp, in the ball mills. The pulp from the ball mills would be conditioned and processed in the flotation circuits, where the ore minerals would be floated away from the waste (gangue). The concentrated ore minerals would be dewatered in a thickener and a drum filter prior to shipment. The waste material, or tailings, would also be dewatered prior to disposal at the TWSF or as backfill in the mine.

Ore Stockpile

A tramcar would hoist ore from the Ram to the mill where it would be dumped into a hopper. Ore from the Sunshine would be hauled by off-highway trucks and dumped into a hopper. A conveyor would lift the ore from the hopper onto the coarse ore stockpile. The stockpile area would have a



IDAHO COBALT PROPERTY FORMATION CAPITAL CORPORATION, U.S. LEMHI COUNTY, IDAHO	**CONCENTRATOR PLANT FLOWSHEET** Nov., 2008	FIGURE **2-7**

maximum capacity of approximately 22,000 tons. The ore stockpile area would be a concrete pad designed to collect all surface water runoff and decant, which would be piped to the process pond.

Milling Production Rate

A flotation mill would be used to process ore from the mine. At a production rate of 800 tons of ore per day, the mill would produce approximately 32 dry tons of concentrate per day and approximately 768 dry tons of tailings per day. The concentrate would be shipped to an offsite processing facility. Mill production may vary from 800 to 1,200 tpd, and the operating schedule may vary from 250 to 350 days per year.

Materials and Supplies

Mill reagents used to recover the minerals include copper sulfate, sodium xanthate, potassium xanthate, superfloc, and lime. An estimate of the annual quantity of the mill materials and supplies is shown in **Table 2-1**. The xanthates, frother, and superfloc are biodegradable polymers. The reagents, copper sulfate and lime, would largely be sorbed by the sulfides and with the exception of lime most of the reagents would report to the concentrate.

Concentrate Storage and Shipping

At full production, the mill would produce between 32 and 40 dry tons of concentrate per day. The concentrate would be dried to approximately 10 percent moisture content using a conventional thickener followed by a vacuum filter. The concentrate would be temporarily stored, prior to shipping to the offsite processing facility, in a shed adjoining the mill building.

Concentrate would be shipped in modified rolloff containers. Each container would hold approximately 16 to 20 tons of concentrate. The containers would be of steel construction with steel locking lids. Concentrate would be loaded into the containers, and the lids would be closed and locked. Excess concentrate would be removed from the exterior of the containers and the containers would be hoisted onto a truck and clamped into position prior to beginning the journey to the off-site processing facility.

Tailings Handling

The mill would produce between 768 and 1,152 dry tons of tailings per day at full production. Tailings would be dewatered in the mill through a thickener and vacuum filter. The dewatered tailings would either be trucked to the TWSF or delivered to the paste plant, also located at the mill, where they would be mixed with water and cement and pumped into the Ram Mine for use as paste backfill.

Tailings Characterization

Samples of the tailings solids and the solution stripped from the tailings, after being passed through a filter press, were collected as part of the metallurgical testing activities. The tailings generated by metallurgical testing were then characterized in the baseline geochemical program (Telesto, 2004) by a variety of static and kinetic tests to determine the potential for tailings to generate acidic and metal-bearing solutions. During milling, sulfide minerals are removed from the ore. As a result, tailings are relatively low in sulfide minerals (including pyrite) and are considered not to be potentially acid generating. Results of static acid generation testing (acid-base-analysis or ABA) indicate that the tailings materials are neutral in pH and retain a relatively low level of sulfide-sulfur (approximately 0.05 percent). However, kinetic tests have indicated there is a potential for long-term release of low levels of metals from the tailings.

Tailings paste would consist of 65 to 70 percent solids and 30 to 35 percent water. Paste solids would consist of from 96 to 98 percent tailings and 2 to 4 percent Portland cement. Because of the addition of cement, tailings paste would be alkaline with long-term pH of approximately 9.

Tailings Disposal

Tailings would be placed in the TWSF, or the Ram Mine as backfill. It is estimated that the amount of backfill material required for the mine would consume approximately 40 to 45 percent of the tailings stream.

Tailings slurry would be delivered to a dewatering station in the mill. A thickener and vacuum filter would separate the solids from the liquids. Details on the filter cake are provided in the *Conceptual Design of the Tailing/Waste Rock Facility and Water Management Ponds* (Telesto, 2006). The final filter cake would be approximately 80 percent solids after moisture conditioning. If not used as backfill, the filter cake would be trucked from the dewatering facility to the TWSF and end dumped. The tailings would then be leveled and shaped in 2-foot maximum lifts by a small tracked dozer. Compaction of the tailings to 90 percent standard Proctor density would be achieved by the truck and dozer traffic on the pile.

During winter operations, the working areas would be kept small. Snow would be removed from the working area and placed in the snow removal area. The tailings would be quickly spread and compacted once delivered from the dewatering facility. Once compacted, freezing of the tailings is not a concern. Operational procedures would specify requirements to prevent incorporating snow and frozen tailings into the pile prior to compaction.

The mine production schedule indicates that backfill would be required in the mine within the first 6 months of mining the Ram deposit. As the mining method is dependent on backfill as a working platform and for ground support, maintenance of the backfill schedule would be critical to mine production. The backfill paste would be produced in a paste plant located at the mill. The plant would consist of a spiral flow mixer, and a positive displacement pump with ancillary equipment and utilities. Tailings from the disc filter would be fed into the spiral flow mixer where water and Portland cement would be added in the correct proportions and thoroughly mixed. The mixer overflow would discharge into the feed hopper for the piston pump. The pump would force the paste through a pipe to the mine.

Water Treatment Residuals Storage

Residuals, or waste products from the water treatment plant would also be stored in the TWSF. Water treatment waste stabilized with bentonite and cement would be hauled to the TWSF by truck and placed in covered trenches within the facility. Disposal trenches would be located such that approximately 4 to 6 months of waste material can be contained within a single trench. Batches of stabilized waste would be hauled to the TWSF, placed within the trench and compacted. The waste would be covered with PVC liner to prevent downward percolation through the material. The PVC cover would be anchored within the adjacent tailings and the downstream end of the trench would remain open for the next batch of stabilized waste placement. The trench would be progressively filled and covered until full, with each cover section welded directly to the previous section. Trench locations would be surveyed and documented for future reference.

Tailings Disposal Quality Assurance/Quality Control

To meet material placement specifications for the TWSF, a quality assurance/quality control (QA/QC) plan would be utilized to determine steps for tailings and waste rock placement. Tailings material received from the plant/mill facility would be dewatered to $\pm$2 percent of the optimum moisture content prior to being placed in the TWSF. Once the tailings material has been dewatered to $\pm$2 percent of the optimum moisture content, the material would be end dumped and compacted in 2-foot lifts to 90 percent of the standard Proctor maximum density. During cold weather, dried tailings would be spread and compacted before they freeze. Any non-compacted material that does freeze would be stockpiled. Dried tailings material that cannot be placed because of snowfall events would also be stockpiled. The tailings stockpile would be located on the lined portion of the TWSF. Material that has been stockpiled through the winter that does not meet the stacking requirement of $\pm$2 percent of

optimum moisture content would be mixed with newly processed material to ensure that the mixed material meets the stacking requirement. Field verification of the moisture content and density would be conducted once per week and documented.

Water Resources

The ICP's primary demand for water is for ore processing. The milling process would require approximately 960 gallons per ton of ore processed, which equates to about 768,000 gallons per day (gpd) for the nominal ore production of 800 tons per day (tpd). Except for water lost to the concentrate and the tailings, the effluent from the milling operation would report to the process pond. This water would mix with mine water and other waters reporting to the process pond and would be recycled back to the mill.

The primary source of water for the operation would come from the developed Ram deposit. Mine flow would be a function of the length and depth of mine workings, and flow would increase with the development of the mine. At full development, the POO estimates the Ram would produce approximately 43 gpm and the Sunshine is estimated to produce an average of 8 gpm. Additional water for the operation would come from the collection of runoff from the TWSF and storm water. During startup, process water would be provided by pumping groundwater from wells as needed.

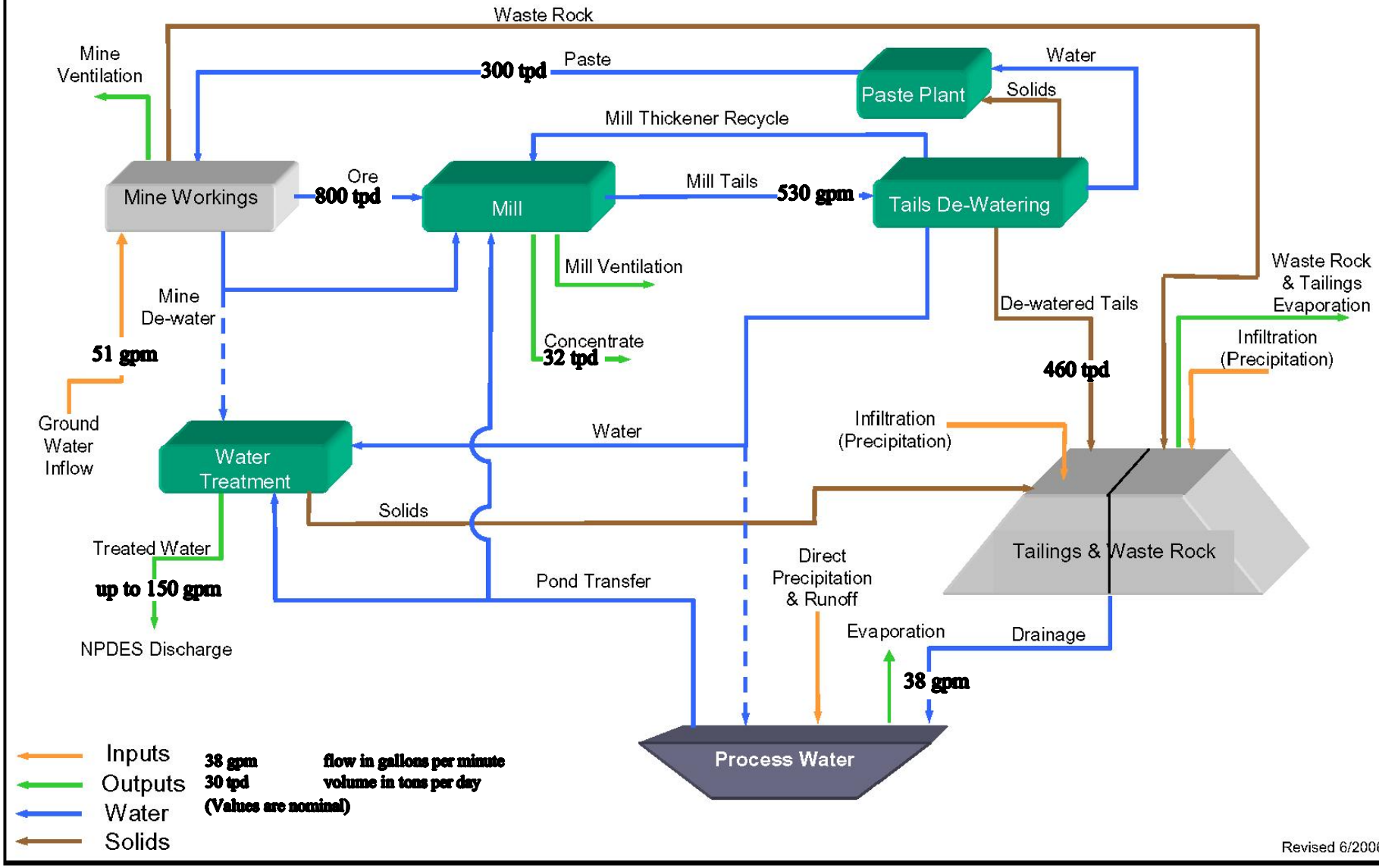
The water supply for the mill is expected to vary throughout the life of the mining operation. Although sufficient water for processing is predicted to be available from the Ram workings and storm water, there is the possibility that additional water would be required to support operations. Two water supply wells would be constructed in the Big Flat area to meet additional demand.

Water for human consumption would be supplied as bottled water or from onsite wells (if well water is of suitable quality). Human consumption water would be less than 100 gallons per day. Water for showers, toilets, and other human uses would either come from on-site wells or would be site water that has been processed through an on-site treatment plant to produce water of adequate quality and permitted for this use. Water from the storage pond would be used for fire protection. A septic tank and drain field would be permitted and installed north of the mill site.

Water Management

A water and chemical mass balance for the ICP has been developed using a dynamic system model (DSM) that considers the relationships between the Project components and the surrounding water environment, and predicts the impact on them throughout the life of the mine and during the post-closure period. The DSM is designed to determine water flows from the mine and surface facilities, water storage requirements, water chemistry of site waters, and to estimate the quantities of water that would be treated and discharged to maintain a balanced system. The DSM was developed by FCC to estimate impacts to water resources (Telesto, 2005). The agency EIS team independently evaluated, validated and modified the DSM to reflect their understanding of the hydrologic and geochemical characteristics of the site and the impacts the Project would have on water resources. This EIS team's modified DSM was used in the technical evaluation of hydrologic and geochemical impacts from FCC's proposal and the other alternatives (Hydrometrics, 2006). No model is perfectly accurate in representing the complexity of environmental conditions that occur in nature and at a mining site. Therefore, the technical analysis evaluated the sensitivity of the model to a variety of input parameters and looked at the possible range of environmental responses that may occur as a result of mining. Additional detail regarding the DSM can be found in *Environmental Response to Mining at the Idaho Cobalt Project* (Telesto, 2005), the *Water Resources Technical Report* (Hydrometrics, 2006), and Chapter 4 of the EIS.

The DSM includes specific water balance calculations for each year of the Project life. **Figure 2-8** shows a schematic of the ICP water balance for year five, a year in which the Ram workings are fully developed and the TWSF occupies its maximum area (footprint).



Revised 1/2008
After Telesto Solutions, Inc., 2006

IDAHO COBALT PROPERTY FORMATION CAPITAL CORPORATION, U.S. LEMHI COUNTY, IDAHO	**WATER BALANCE FLOW DIAGRAM**	**FIGURE** **2-8**

The ICP water management plan is based on operating a water treatment plant and releasing water in accordance with an NPDES permit in conjunction with temporary storage in a small water equalization pond adjacent to the water treatment plant and a larger water management pond to temporarily store process solutions. The water treatment plant would have the ability to treat up to 150 gpm of water for discharge through the NPDES outfall. Except during periods of very high inflow, the water treatment plant would treat incoming water on an as-received basis, with very little water stored in the water management pond. During periods of high inflow, water would accumulate in the water management ponds for treatment during lower inflow periods.

A conceptual illustration of the Project water balance is shown in **Figure 2-8**.

Process Water Characteristics - Mine water quality has been evaluated by the Dynamic Systems Model, which includes chemical mass loading effects associated with: (1) wall rock weathering, (2) waste rock weathering in the stope access slash, (3) drainage from the cemented paste backfill tailings, and (4) ambient ground water inflow. The projected mine water chemistry results from the relative chemical mass loading from these four potential sources and makes up the supply water to the ICP process circuit. Process water chemistry then results from: (1) inflows of mine water and captured precipitation, (2) drainage from the TWSF, (3) the mill process, and (4) evapo-concentration.

The primary contaminants of concern (COCs) for the ICP are nitrate, sulfate, arsenic, copper, cobalt, nickel, and zinc. Primary COCs are constituents expected to occur at higher concentrations in the water management pondwater compared to natural waters and which could also have significant environmental effects if discharged into surface water or groundwater.

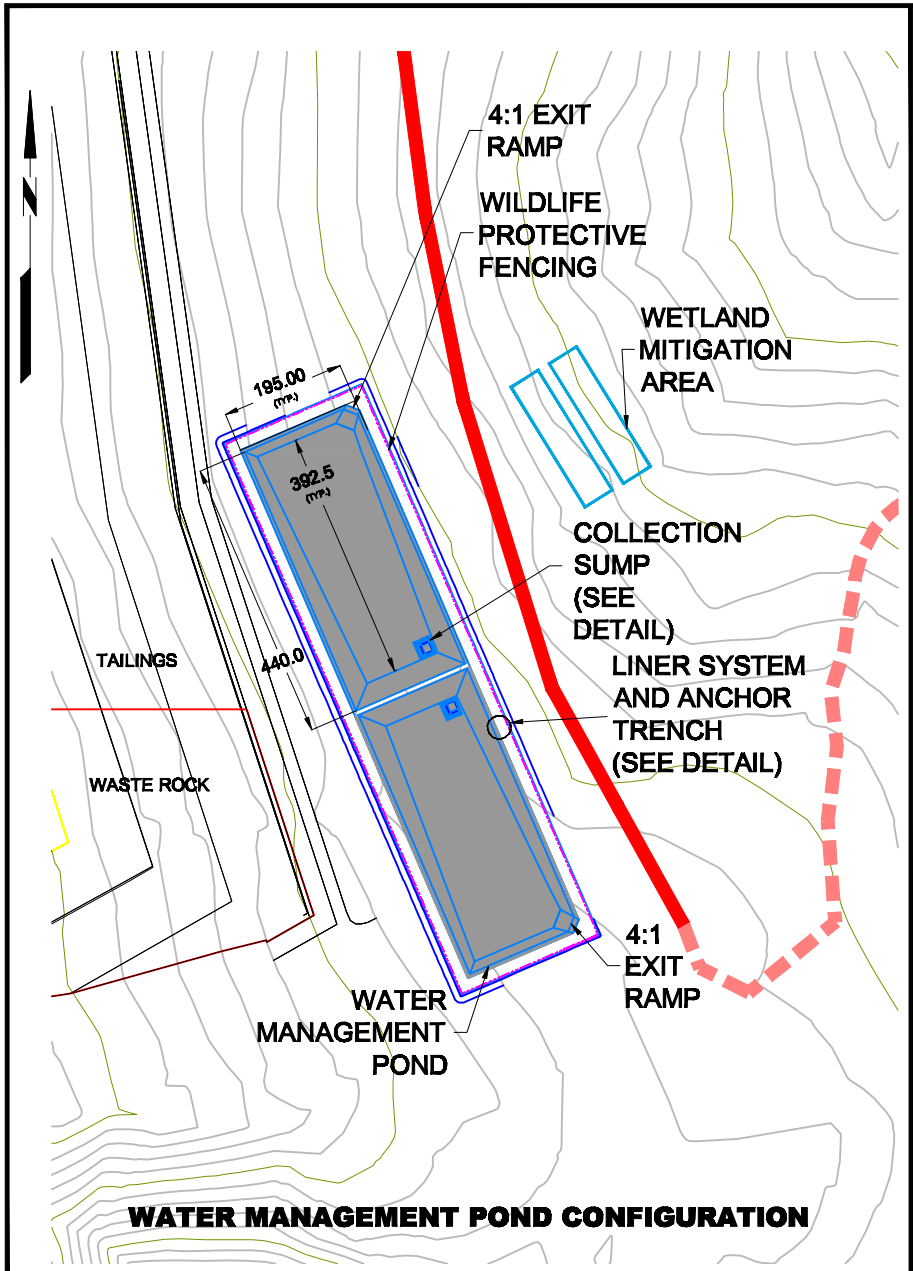
Water Management Pond - A key component to the Project and the water management program is the water management pond. It collects drainage from the TWSF and stores mining and milling process solutions if needed. The pond would be surrounded with an 8-foot high chain link fence for wildlife protection, double lined with HDPE liners, and would have a leak detection and recovery system between the primary liner and secondary liner (**Figure 2-9**). The pond would be sized to contain process waters and would also have the capacity to contain the runoff from a 500-year return period event plus 2 feet of freeboard. The design capacity for the pond is 10 million gallons. After adding the freeboard, the ultimate pond capacity is 12 million gallons.

Prior to commencing construction of the water management pond, Formation would provide a final engineering design to the USFS. The final design would include stability analysis based on actual material and site parameters, and specifications for materials, construction, and QA/QC. The QA/QC Plan would specify that construction monitoring would proceed under the supervision of a qualified professional engineer.

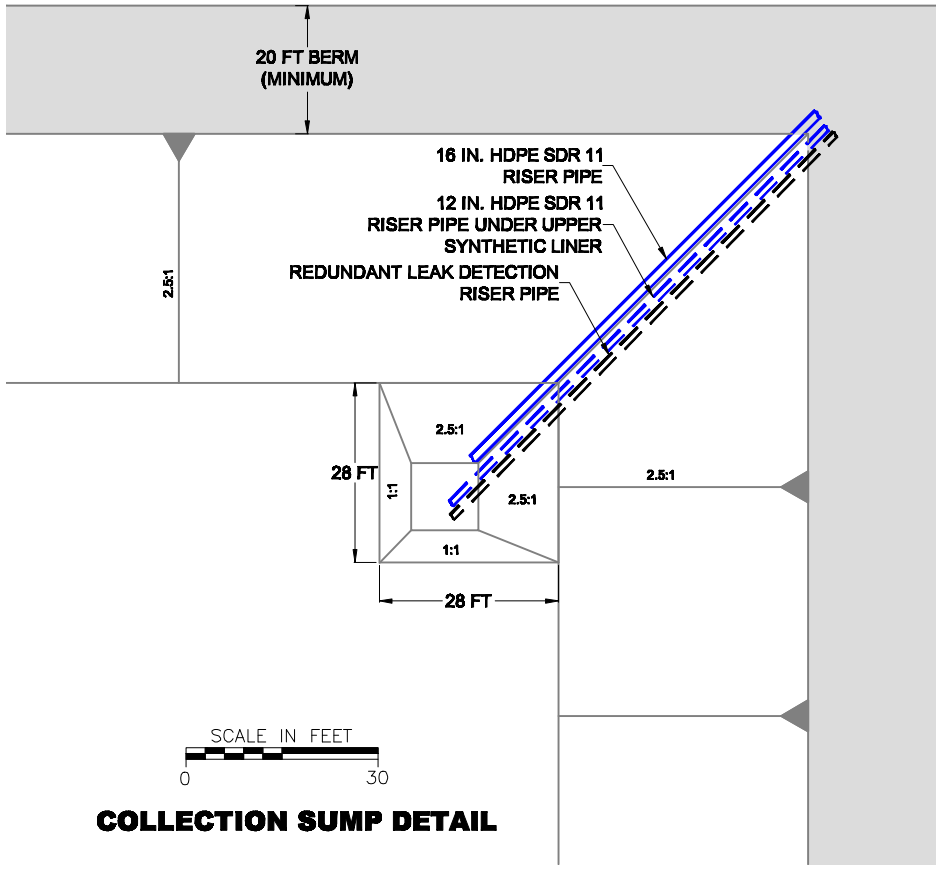
The water management pond would be operated to fully contain all waters from the operation prior to treatment and discharge, other than upgradient (clean) storm water and sanitary discharges.

In the event projections show that there would be insufficient water for winter operations, adequate water would be retained in the pond to prevent a water shortage. A minimum amount of water would be kept in the pond at all times to hold the liner in place. Water from the mine and effluent from the milling process would flow by gravity to the pond as needed during periods of mill shutdown, or other operational reasons when storage is required. Water accumulated in the pond would be recycled back to the mill by pumps controlled from the mill. The pipeline from the pond to the mill would be double contained and complete with leak detection at all low points and at pipe-to-pipe connections.

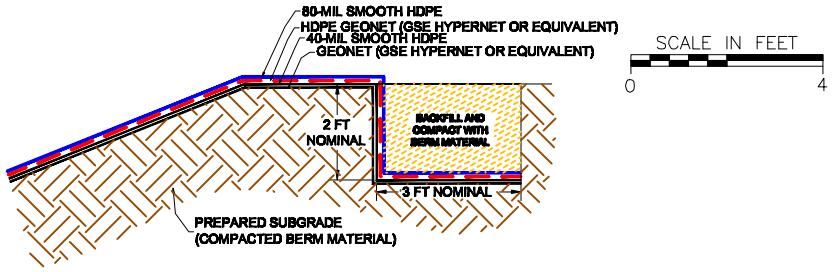
Equalization Pond - The equalization pond would receive water and solids from mine and mill process streams for temporary storage prior to treatment. This pond would serve to equalize inflows from the source waters to provide a more consistent flow quantity to the water treatment equipment. This pond is sized at 90,000 gallons (8 hours storage at 150 gpm plus 25 percent contingency).



WATER MANAGEMENT POND CONFIGURATION



COLLECTION SUMP DETAIL



LINER SYSTEM AND ANCHOR TRENCH DETAIL

SCALE IN FEET
0 300

IDAHO COBALT PROPERTY
FORMATION CAPITAL CORPORATION, U.S.
LEMHI COUNTY, IDAHO

WATER MANAGEMENT PONDS DETAILS

Nov., 2007

FIGURE
2-9

Water Treatment

Mine water at the ICP is predicted to contain elevated concentrations of nitrate, sulfate, and metals (arsenic, cobalt, copper, iron manganese and zinc). A water treatment plant would be installed in the mill to treat excess mine water. The plant would be designed to process up to 150 gpm. Formation proposed to use pre-treatment consisting of chemical addition, clarification, filtration, plus reverse osmosis (RO) technology to treat the water prior to discharge.

Water Treatment System Design - The Dynamic Systems Model was used to determine the treatment plant capacity and to estimate process water quality. The treatment process has been developed on the basis of a 150-gpm maximum capacity in conjunction with the 10 million gallon storage volume in the water management pond. The treatment system capacity and pond volume were balanced to produce an efficient system.

FCC has indicated that the design objectives of the treatment system are to produce the highest quality discharge stream reasonably achievable. A secondary objective is to operate the system as close as possible to a zero liquid-waste discharge condition.

The treatment process would employ solids/liquids separation using chemical addition, clarification and filtration, followed by reverse osmosis (RO) membrane for dissolved ion removal. The treatment system also proposes to minimize liquid-waste discharge through successive high-recovery membrane separation steps to recover the feed stream volume at rates as high as 99.5 percent. The high recovery would be enabled by a combination of advanced system configuration and specialized technology for brine concentration. In addition to the RO process units, the following support processes are recognized as necessary components in the context of the primary treatment objectives: (1) pre-treatment coagulation and clarification, (2) sand media filtration, and (3) denitrification of a recirculating stream. A flow diagram of the proposed water treatment system is shown in **Figure 2-10**.

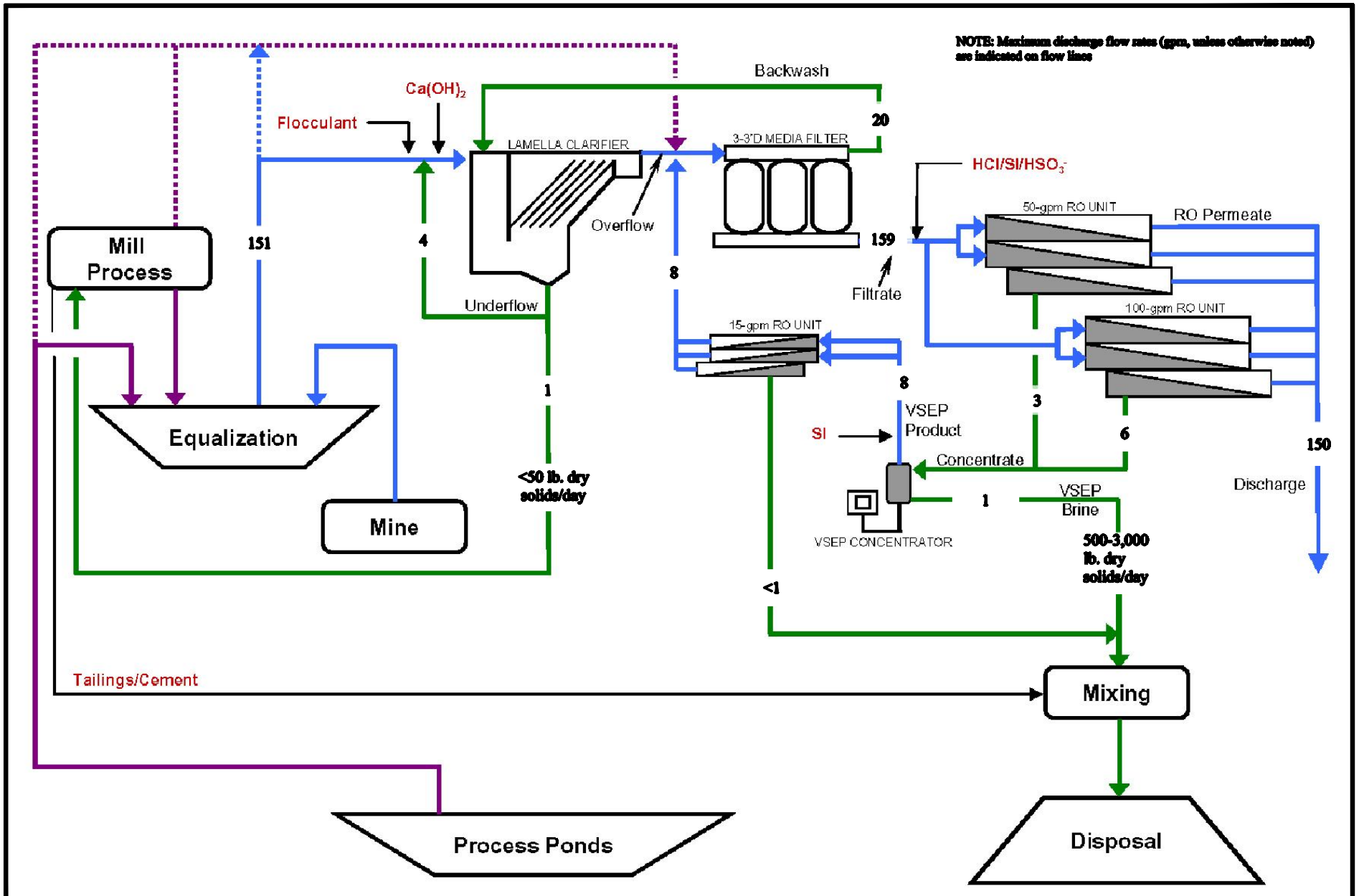
Final effluent from the treatment plant would be discharged through a pipeline to Big Deer Creek downstream from monitoring station WQ-24 (**Figure 2-1**).

Treatment Process Description - Feed streams to the water treatment plant would consist of mine water, mill process effluent, and/or process pond water. A 90,000 gallon equalization pond would be required at the treatment plant to equalize inflow to the treatment plant.

Pre-treatment Coagulation and Clarification - Pre-treatment removal of the metals is required to improve the performance of the RO system (both in terms of discharge water quality and system reliability/integrity). The pre-treatment would operate in conjunction with metals removal achieved by the mill process. Pre-treatment coagulation and clarification would be achieved by pH adjustment with hydrated lime and high-rate, clarification. Thickened solids in the clarifier underflow would be recycled to the pre-treatment stream while some fraction is bled from the system to the mill.

Media Filtration - Clarifier overflow from the pretreatment process would be further processed by sand media filtration to separate the residual solid suspension carried in the overflow from the pre-treatment clarification step. Media filtration typically produces high-quality filtrate that extends the life of down stream cartridge filters (integrated part of the RO unit), thus reducing RO system maintenance downtime. Medial filter backwash would be recovered by recycling to the pre-treatment coagulation reactor or equalization storage.

Reverse Osmosis Membrane Separation - The RO unit would be configured as two arrays, capable of producing a combined 150 gpm of permeate. The arrays would be designed to operate in parallel, one sized at 50 gpm and the other at 100 gpm to facilitate an incremental range of possible operating rates, 50, 100, and 150 gpm permeate. Typical system operation, for handling expected baseline water input to the system, is expected to require operation only of the 50-gpm train. During periods of increased input, the second, larger RO unit would be put into operation.



IDAHO COBALT PROPERTY FORMATION CAPITAL CORPORATION, U.S. LEMHI COUNTY, IDAHO	**WATER TREATMENT CONCEPTUAL PROCESS FLOW SHEET** Nov., 2007	**FIGURE** **2-10**

The feed stream to the RO units would be pH-neutralized (with hydrochloric acid) and conditioned with scale inhibitor, to protect the membrane elements against scaling minerals, and bisulfite (e.g. $NaHSO_3$) for oxidant and bacterial control. FCC projects recovery rates of 90 to 95 percent (amount of clean permeate produced per feed volume) with the aid of scale inhibitor based on predicted feed water quality. The high recovery would be attained by recirculating a large fraction of the concentrate stream to the influent side of the RO unit.

Membrane element selection for the RO system would be dependent on the achievable reduction of sulfate and nitrate concentrations. Desired reduction levels for these two constituents indicate that the membrane elements would need to meet a minimum rejection criterion of 99 percent.

Vibration Membrane Separation - Permeate (treated water) from the RO unit would be discharged in accordance with an NPDES permit while the concentrate (waste stream) would be treated further to reduce the waste stream volume. The approach for waste volume reduction would be to employ a specialized technology referred to as vibratory separation (VSEP). In the VSEP process, highly concentrated streams, including solids, are passed through an array of RO membranes, which operate under a high-frequency oscillation or vibration. The vibratory motion allows mineral scale and other solids to form at the membrane surface without attaching, minimizing the risk of fouling.

Like the primary RO system,, FCC proposes to operate the VSEP membrane separation at high recovery (nominally >90 percent) to provide a high reduction in concentrate waste volume. The VSEP would process a commingled stream of RO concentrate and RO membrane spent cleaning solutions. The function of the VSEP is to reduce concentrate volume.

Secondary RO Separation of VSEP Product - Computer simulations of the VSEP unit indicate that nitrate (and potentially potassium) concentrations would be elevated in the product (permeate) stream. Since this stream would be recycled back into primary process, nitrate concentrations would need to be reduced to prevent a buildup in concentration. Nitrate reduction in the product stream would be achieved in a secondary 15-gpm RO unit. Target nitrate reductions in this unit would be dictated by the plant feed nitrate concentration with the objective to maintain a steady state or decreasing nitrate load through the process. Effluent and backwash rinse solutions from the process would be recycled to the primary process stream at the feed point to the sand media filter unit. Concentrate from the secondary RO would be combined with the VSEP waste (concentrate) stream for final stabilization and disposal.

The VSEP and secondary RO unit would produce a combined waste (concentrate) stream that constitutes a very small fraction of the plant feed volume. This final waste stream would contain high levels of dissolved constituents and precipitated mineral compounds. FCC projects that concentrations in this final waste stream would achieve a 99.5 percent total system recovery condition.

FCC proposes to stabilize the final process waste stream by combining it with bentonite and cement at the mill facility. The concentrated waste or reject water would be stored at the water treatment plant in a tank until there is enough material for a 3,000-gallon batch stabilization. FCC estimates that the total chemical mass of waste generated by the process (without bentonite and cement) would be in the range of 500 to 3,000 pounds per day (dry weight basis) and that the volume of the final waste stream including bentonite and cement would range from 7 to 26 cubic yards per day. This range represents the variability in process flow (50 to 150 gpm) and feed stream constituent concentrations. The average water treatment reject stream is estimated to be less than 1 gpm.

Stabilized Waste Disposal - Stabilized waste would be hauled to the TWSF by truck and placed in covered trenches within the facility. Disposal trenches would be located such that approximately 4 to 6 months of waste material could be contained within a single trench. Batches of stabilized waste would be hauled to the TWSF, placed within the trench and compacted. The waste would be covered with PVC liner to prevent downward percolation through the material. The PVC cover would be anchored within the adjacent tailings and the downstream end of the trench would remain open for

the next batch of stabilized waste placement. The trench would be progressively filled and covered until full, with each cover section welded directly to the previous section. Trench locations would be surveyed and documented for future reference.

Treated Water Discharge Pipeline - Treated water from the water treatment plant would be routed through a pipeline to a surface discharge located on Big Deer Creek. The pipeline would be routed along Ram Gulch to Bucktail Creek and along Big Deer Creek following existing roads where possible. Where no roads exist, the pipeline would follow an alignment that minimizes pipeline length and physical disturbance to soils and vegetation. The pipeline would affect 0.14 acres of jurisdictional wetlands at the crossings of two Bucktail Creek tributaries and at Big Deer Creek.

Storm Water Management Plan

FCC has proposed a Stormwater Management Plan (SWMP) with the goals of: 1) preventing storm water run-on to proposed facilities, 2) minimizing erosion, and 3) reducing sediment transport to downstream receiving waters. FCC would be required to obtain a Storm Water Permit or Permits from EPA prior to beginning construction. Facilities to be covered under the Permit for the proposed Project are as follows:

- Topsoil and borrow material stockpiles;
- Haul and access roads;
- Parking lots;
- Office buildings; and
- Ancillary disturbance areas not associated with milling process.

A construction storm water permit would be required to address construction activities proposed for the site.

A computerized soil erosion model was used to estimate sediment generation under existing and proposed developed conditions, and to compare erosion from existing road surfaces versus those that would be upgraded or modified (Telesto, 2006a). The effectiveness of proposed sediment management, using constructed Best Management Practices (BMP) sediment control structures, has been evaluated for the developed condition to assess the resulting changes in sediment loading to area drainages.

Snow removal and storage is another component of the storm water management plan and includes a plan for snow removal for each major facility.

Design Criteria - FCC has proposed that the design storm for the proposed clean water channels, which would exist beyond the life-of-mine, would be either the 25-year, 24-hour storm or the 100-year, 24-hour storm depending on the association of channels with mine roads, process facilities or process materials. BMP facilities designed to cover mine roads and operations are proposed to handle the 2-year, 24-hour storm.

Separation of clean storm water runoff would be accomplished through the use of diversion channels to prevent upgradient water from coming into contact with proposed facilities or mined material stockpiles. The diversion channels would be V-shaped channels with 1 foot of freeboard and 1:1 side slopes. These upgradient diversion channels would route clean runoff around proposed facilities and disturbed areas and would distribute flows back to the watershed via sheet flow.

The sections of road adjacent to the TWSF would be outsloped to minimize concentration of flows. The storm water runoff generated from these sections of road would be dispersed by the use of slash (stacked timbers and brush). The remainder of roads would be insloped and runoff would report to storm water diversion channels. Channels would have erosion protection in the form of check dams and riprap at outfalls. Outfalls would be protected with brush barriers, biofiltration swales or rock structures, to dissipate runoff energy and prevent headcutting.

Storm water channels installed around proposed facilities would intercept runoff before it interacts with a facility. The intercepted runoff would report to BMP structures, which would also be used to entrap sediment carried by flow in the channels. Design elements of typical BMPs are included in Appendix D to the *Storm Water Management Plan for the Idaho Cobalt Project* (Telesto, 2006a).

Specific design elements of the SWMP are:

- Diversion of upslope clean runoff around the proposed TWSF, process ponds, and proposed borrow area.
- Maintenance of existing sheet and overland flow characteristics over undisturbed areas.
- Conveyance of collected runoff to frequently spaced, erosion-protected outfalls.
- Use of available forest slash (partially burned timber and brush), rock sediment basins, silt fencing, and biofiltration swales in BMPs.
- Revegetation of mining-disturbed areas, concurrently with operations as practical, to increase erosion protection and reduce sediment loading.

Spill Control

FCC's spill control plan that addresses management of hazardous materials during shipping and storage would be revised to address any changes in the Plan of Operations, reviewed and approved by the agencies prior to initiation of construction activities. The Plan would include notification of the ICP facilities prior to transport of fuels or chemicals, use of closed trucks, travel only during daylight hours, use of pilot vehicles, and continuous radio contact with pilot vehicle and facility during transport.

Water Rights

Formation has applied for water rights on the groundwater from the mines and groundwater from two wells, for mining and milling purposes. Water from the wells would be used initially for drilling and other start-up water needs until the mine pumping and precipitation capture from the TWSF is adequate to supply operating water needs. The wells would also supply water for human use.

Water Resource Monitoring

FCC's proposed water resource monitoring plan is described in *Operational Water Monitoring Plan for the Idaho Cobalt Project* (Telesto, 2007). The proposed plan would provide for continuation of monitoring of baseline groundwater and surface water monitoring sites plus additional sites to monitor proposed mine facilities. A total of 25 surface water stations would be monitored on Bucktail Creek, South Fork Big Deer Creek, Big Deer Creek, Panther Creek, Big Flat Creek, Ram Gulch and several unnamed tributary streams/springs. A total of 25 groundwater monitoring wells would be monitored, upgradient and downgradient of all mine facilities in Bucktail Creek and Big Flat Creek drainages.

Formation would also install a cable car crossing of Panther Creek to facilitate baseline and operational monitoring of lower Big Flat Creek. The cable crossing would be installed south of the confluence of Big Flat Creek and Panther Creek and would be accessible from Forest Service Road #055. Design and construction of the cable car crossing would be similar to that of the BMSG crossing located upstream on Panther Creek and would consist of two 13-foot high "A" frames anchored with concrete deadmen, with a 90 to 120 foot cable span. A platform would be built on each "A" frame to allow passenger access. Equipment (e.g. backhoe or excavator) would be required to cross the creek in order to install the 2 or 3 yards of concrete for the deadman. The crossing would be installed in early spring prior to high flow.

Ancillary Facilities

Support Facilities

Tool rooms would be located at each of the decline portals to the Ram and Sunshine. Emergency power generators would also be located at the portals. Explosives storage magazines would be portable structures furnished by the supplier.

Power and Fuel

Idaho Power Company would supply power to the ICP substation from an existing 69-kilovolt powerline (see **Figure 2-1**). ICP would have to obtain an agreement with Noranda to utilize the powerline over private land from the Blackbird substation or wherever ICP's line crosses private land. From the ICP substation, located within the mill area, power would be distributed throughout the site via powerlines at 4,160 volts.

Emergency power would be supplied with diesel generating equipment. This equipment would be sufficient only for essential mill equipment and mine pumps.

On-site diesel, gasoline, and propane storage facilities would provide a 2-day supply of diesel and a 30-day supply of the other various fuels (**Table 2-1)**. The storage tanks for diesel and gasoline would be placed within concrete containment measuring 25 feet by 40 feet.

Borrow Areas

During construction and reclamation there would be a need for road surfacing materials, drain rock, and riprap. FCC has identified two borrow areas. One borrow area is along Blackbird Creek on National Forest Land (**Figure 2-2**). The other borrow area is near the Ram Portal, also in an area previously used as a borrow source (**Figure 2-1**).

The materials in the borrow area near the Ram Mine would be used for surfacing materials for the underground mine roads and other construction and reclamation activities. Approximately 40,000 cubic yards of these materials would be required, and is available at this borrow area. The materials in the Blackbird Creek borrow area have been tested and found to be appropriate for use as road surfacing materials. It is estimated that 20,000 cubic yards of materials would be required for site roads, and is available at this borrow area.

Work Force and Work Schedule

The anticipated personnel requirements for the mine, mine maintenance, engineering and geology, and surface facilities support departments during the first year of production would be 69 persons, increasing to 109 persons at full production. The anticipated personnel requirements for the milling operation would be approximately 31 persons. Total project employment would be approximately 157.

The work force numbers may be temporarily higher during construction and start up. During closure and reclamation, the work force would be reduced significantly.

FCC plans to operate the mine 24 hours per day, 5 days per week, for approximately 250 days per year. Mill production would operate 24 hours per day, 7 days per week, for approximately 350 days per year.

Interim Shutdown

Interim, temporary shutdowns may occur at the ICP as a result of possible reduction in metal prices or other unavoidable reasons. The objectives of the interim shutdown plan are to maintain site

environmental control facilities and activities, maintain the integrity of the site mining and milling facilities, and provide the regulatory agencies with continuous data on environmental compliance through the shutdown period. During an extended shutdown, most personnel would be furloughed or laid off. Formation would retain critical personnel needed to operate and maintain site facilities.

During an interim shutdown of unknown or extended duration, pumping of the underground mine(s) would continue. Mine openings would be maintained to allow access to the various dewatering facilities and their support infrastructure. Mine ventilation would continue to operate as needed to provide suitable air quality for employees entering the mine. Explosives, detonators and chemicals used in the mill would be removed from the site.

Prior to an interim shutdown of unknown or extended duration, the coarse ore stockpile would be completely processed. Bins, tanks, flotation cells, and thickener tanks would be emptied and cleaned. Any tailings in the mill would be transported to the mine or to the TWSF. A gravel or coarse rock cover would be placed on exposed tailings in the TWSF to control wind erosion of fine-grained material.

The water treatment plant would continue to operate during an interim shutdown. The plant would accept water either from the process pond or the mine for treatment and would direct treated water to the storage pond. The operating schedule for the plant would be determined based on available storage capacity in the mine and in the water management ponds, and the treatment plant operating efficiency. Treatment plant sludge would be filtered and placed in the TWSF or sent off site for processing or disposal.

During an interim shutdown of unknown or extended duration, the water management pond would continue to be operated in accordance with standard procedures. The pond would accept water for storage and the pumping infrastructure would be maintained so that water could be sent to the water treatment plant as needed. The pond would be monitored in accordance with the operational monitoring schedule and water levels would be maintained as appropriate to insure that there are no unplanned releases.

Ground water and surface water monitoring would be maintained as required by the various permits. Roads and sediment control BMPs would be maintained as needed to allow access. Agency reporting activities would be maintained as required by the Plan of Operations and other permits.

Reclamation

The ICP's proposed reclamation plan involves approximately 130 acres of surface disturbance. This includes existing roads that would not be reclaimed and would become a part of the post-mining road system in the area. Additionally, some newly constructed project roads would be incorporated into the post-mining road system. During project construction, ICP proposes to reclaim about 23,000 feet of substandard and non-essential existing roads in the vicinity of the Project. Once mining has ceased or when no longer required for post-closure water management or other closure activities, all above ground facilities would be demolished, removed from the site, and their former location reclaimed.

FCC's proposed reclamation plan detailed in the ICP Plan of Operations provides the following goals:

- Conduct reclamation and revegetation concurrently with the mining program, as much as possible. Concurrent reclamation would be performed on areas no longer required for the mining operation.
- Keep all clearing and disturbance to the minimum consistent with project needs.
- Place waste rock, tailings, roads, structures, diversions, and water management ponds such that they minimize subsequent shaping and recontouring and do not pose a hazard to human health and the environment.

- Re-establish stable and diverse surface topography and hydraulic features that are compatible with the surrounding landscape.
- Establish soil conditions that promote regeneration of stable, diverse, and self-sustaining plant communities through removal, storage, and redistribution of suitable soil materials.
- Revegetation of all areas disturbed by the operation to stable and diverse vegetation communities that provide wildlife habitat and minimize erosion.
- Work with the USFS to identify opportunities to improve the post-mining land use of the site through reclamation of existing, unnecessary roads.
- Provide methods, procedures, and practices for seasonal activities, temporary shutdowns, and final reclamation.
- Maintain water quality such that there is no material negative water quality impact at the BMSG compliance points (WQ-24 and WQ-25).

Facility Reclamation

Once the ore reserve is exhausted and mining ceases, surface and underground facilities not needed for reclamation or closure activities would be removed.

Mines - Reclamation of the flat areas adjacent to the Ram and Sunshine portals would include removal of buildings, cables, piping, and concrete pads, regrading, ripping to alleviate compaction, applying available growth medium (and amendments if determined necessary), and revegetating.

Adit portals would be sealed to prevent human or animal access. This would include backfilling the entries of adits with clean waste rock and grading the area to fill the portal depression.

Grading would include bringing as much of the portal bench fill as possible onto the cut area and re-establishing a continuous hillside slope, to the extent practicable. Abrupt surface features would be smoothed to create uniform grades and to produce a naturally appearing surface.

Mill - The combined mill, administration building, warehouse, shop, and ancillary facilities such as piping and tanks would be demolished and disposed. Buildings and equipment would be dismantled and removed from the property. Equipment and facilities with salvage value would be sold. All remaining scrap and demolition debris would be disposed of off-site at an approved landfill.

Foundations and walls would be demolished to 1 foot below grade and covered with fill to eliminate any safety hazards for wildlife or humans. Sumps or other voids would be backfilled with sufficient soil so that depressions would not occur after settling. Slab foundations would be broken up for adequate drainage, placed in the deeper portions of the regraded fill, and buried under no less than 2 feet of cover.

Regrading of this area would include moving much of the fill into the original cut area to establish a natural looking topography. The edges of the area would be shaped to blend with the surrounding contours. The area would be ripped to relieve compaction prior to topsoil placement. Topsoil would be placed over the area to a minimum depth of 12 inches.

The water treatment plant would be attached to the mill building such that the mill building and equipment can be dismantled and removed without disturbing the treatment operation. Water treatment operations would continue as long as pump-back ground water wells are operated. At the cessation of pump-back well operation, the water treatment plant would be decommissioned by dismantling and removing all equipment, building, and support structures.

Decommissioning and reclamation activities described for the mill process area would be applied to the water treatment plant and surrounding area, including foundation demolition, backfilling, regrading, and reseeding. The equalization pond would be reclaimed in accordance with procedures described for the water management pond.

Tram - Reclamation of the overhead tram would include removal of the structures, pipelines, cables, and concrete pads that comprise the facility. Following removal of the equipment, the disturbed areas within the tramline corridor would be graded and revegetated.

TWSF - The TWSF would be constructed in three phases with construction beginning on the eastern side (the lowest end) of the facility and proceed upwards. As stacking on Phase I of the facility nears its ultimate capacity, Phase II would be constructed. Once material placement on Phase I is complete, that phase would be reclaimed. Likewise, as soon as material placement on Phase II is complete, it would be reclaimed. Incremental reclamation of the TWSF would reduce the precipitation catchment area, reducing the amount of excess water captured each year. Reclamation of the TWSF would include grading, cover installation, topsoil placement, and revegetation.

Grading of the TWSF would require minor surface shaping to smooth corners to give a more natural appearance to the pile. The 100-foot setback benches would remain in place and would be backsloped into the pile and sloped to drain laterally. Slopes of the reclaimed pile would be at 4H:1V or less. Setback benches and the pile top would be graded at 3 percent to drain. If post-closure water treatment were required, the pile top would not be immediately reclaimed, but would be utilized for disposal of stabilized water treatment waste. FCC estimates the TWSF pile top would have adequate area to accommodate a 10 foot layer of stabilized water treatment waste over the period of 17 years.

The TWSF cover installation would include placing a 60-mil HDPE cover, installing a geonet drainage layer over the HDPE cover, and placing 2 feet of compacted borrow on top of the drainage layer.

Topsoil placement would include a minimum of 12 inches of topsoil on top of the compacted borrow. Soil would be placed loose and scarified along the contour to provide micro traps for moisture and seeds.

Seeding would be by mechanical means where practical and safe, and by hand where necessary. Seeding would include grasses, forbs, and shrubs. Trees would not be planted to avoid tree root penetration into the cover.

During operation, drainage from the TWSF underliner would report to the water management ponds. Following active mining, for the duration of water pumpback and treatment at the Ram and Sunshine mines, TWSF drainage would continue to report to the water management ponds. After the ponds have been reclaimed, drainage from above the TWSF underliner would report to an infiltration field located east of the water management ponds. The DSM estimates long-term drainage at 0.4 gpm. The drainfield would be designed to accept up to one gpm.

Pipelines - Surface pipelines would be removed. To minimize re-disturbing revegetated areas, buried pipelines would be capped and abandoned in place.

Soil Salvage

During the construction of the Project, available soil would be stockpiled and stabilized in a discrete location adjacent to the area disturbed by mining-related activities. Soil removed during mill and TWSF construction would be stockpiled near the TWSF area (**Figure 2-1**). Total topsoil salvage is estimated to be 284,000 cubic yards. Approximately seven acres would be required for the topsoil stockpile area. Precipitation run-on would be diverted around the stockpile area by perimeter ditches. As topsoil materials are placed in this area, the topsoil would be seeded with a mixture of non-native species (smooth brome, mountain brome, orchard grass, and timothy) at an application rate of 4 pounds per acre each to temporarily stabilize the stockpile.

Soil types and depths vary across the site. In the Ram and the Sunshine areas, the salvageable soil depth is estimated to range from 0 to 8 inches. On the Big Flat, soil depths are estimated to provide between 12 and 14 inches of quality material suitable for reclamation purposes.

Reclamation Recontouring

The removal or disposal of all equipment and facilities would proceed as soon as practical after closure of the operation. Disturbed areas would be graded or shaped to blend with the surrounding area, to the extent practicable. Surfaces would be graded and scarified on the contour to increase available soil moisture, provide stability for the reclaimed areas, and to minimize erosion.

Replacement of Growth Medium

Following recontouring of the site, salvaged soil would be taken from the stockpiles and placed over the recontoured surfaces. Prior to placement on disturbed sites, the selected growth medium would be tested for comparison with pre-selected reference sites. Testing would include pH, electrical conductivity, lime, organic matter content, texture, saturation percent, nitrate-nitrogen, phosphorus, potassium, zinc, iron, manganese, and copper. Formation would review testing results and propose a soil amendment program (if needed) to the USFS. The decomposition of organic matter while growth medium is in stockpile has been documented. Nitrogen fertilizer and organic materials would be added as necessary to ensure adequate plant development.

Seedbed conditioning would consist of ripping or discing the recontoured surface with notched or straight edged discs set together in rows or "gangs" combined with harrows. This step would break up seedbed clods and turn under and cut brush, limbs, and weeds. Additionally, it would break up surface compaction and anchor any straw or hay mulch that has been applied.

Re-Vegetation

Following grading (or contouring), growth medium placement, and seedbed conditioning, the areas would be revegetated with species appropriate for the specific site and climate. Species used in revegetation would stabilize the area and allow the natural incursion of indigenous species. Lodgepole pine is expected to regenerate naturally over the Big Flat and other areas as a result of the 2000 Clear Creek fire. FCC would collect serotinous lodgepole pine cones from nearby sources and place those cones over the replaced soils for subsequent opening and seed germination.

Grass seed application would be performed with a seed drill, hydroseeding, or hand broadcasting depending upon the terrain. Broadcast seeding would be done in the fall prior to freeze up to produce the optimum germination. Areas seeded to grass would receive a light application of weed-free straw mulch at the time of seeding followed by the application of fertilizer in the spring prior to summer rains.

Water Management at Closure

At closure, FCC intends to allow the mines to flood. As groundwater floods the Ram and Sunshine mines, soluble metals and salts would be flushed from exposed rock surfaces and from the tailings and waste rock used as backfill. Metal concentrations in the initial groundwater flush during, and soon after mine refilling are predicted to be elevated as described in the Water Resources portion of Chapter 4. To mitigate the potential impacts, groundwater downgradient of the mines would be monitored and a series of pumpback wells would be installed downgradient of each mine to intercept contaminated groundwater, if necessary.

Locations of proposed groundwater capture wells are shown on **Figure 2-1**. Groundwater pumping rates for intercepting 100 percent of the Ram and Sunshine capture systems are estimated to be 75 and 14 gpm, respectively (Appendix C of FCC, 2006). However, as discussed below under Alternative IV, pumpback rates for the Ram required to maintain metals loading to Bucktail Creek at or near baseline conditions should be significantly less than this. Quality of the groundwater captured

by the wells is predicted to be similar to post-mining minewater quality as described in **Table 4-7** (Chapter 4). This intercepted groundwater would be pumped to the mill where it would be treated and discharged under the NPDES permit. FCC has committed to operating the pumpback system and water treatment system as long as needed to achieve long-term water quality goals.

Water Management Pond

Prior to reclamation of the water management pond, any remaining water would be treated and discharged. Any sediment or residual material in the pond would be analyzed for pH and metals. If the testing shows leachable metals exceeding the regulatory limits, the sludge would be either stabilized in place and retested, or removed from the site and disposed of in a permitted disposal facility consistent with federal and state regulations. Following testing, the liner would be folded into the pond, dikes would be pushed into the pond, and the area would be regraded to approximate the pre-construction topography. Following the regrading operation, the area would be covered with growth medium and revegetated. Seedbed preparation and seed application would be performed in one operation with a tractor pulling a chisel tooth harrow and seed drill.

The water management pond would be reclaimed after pumping in the Ram and Sunshine Mine groundwater capture well fields cease.

Post-Closure Monitoring

All reclaimed sites would be monitored twice a year for a period of 3 years to evaluate the success of the reclamation work. Any areas not meeting the vegetation success criteria would be analyzed to determine the problems and the areas would be revegetated with a modified plan.

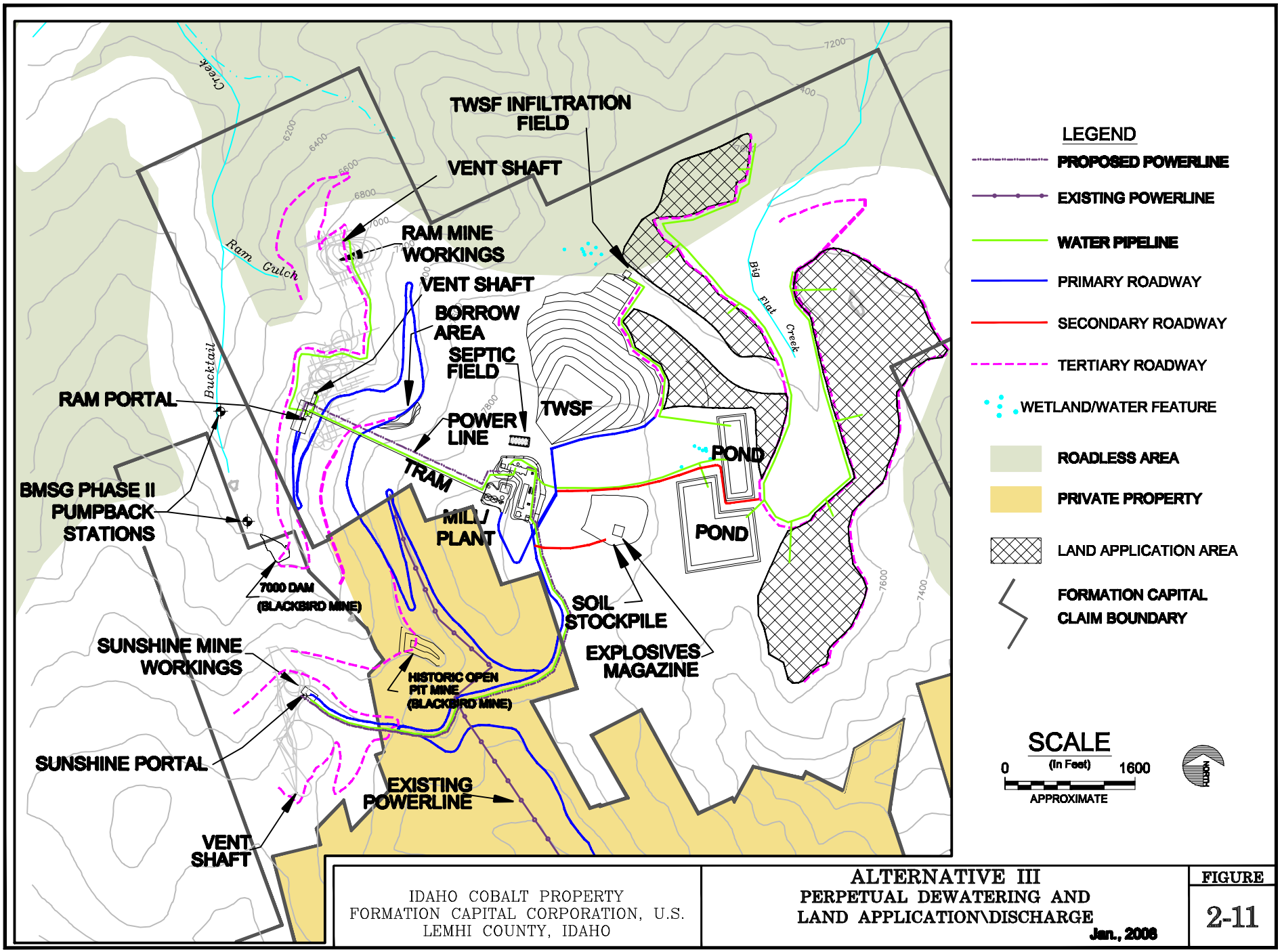
In addition, there would be quarterly monitoring of ground and surface water for 3 years following cessation of pumpback. Results of this monitoring would be used to evaluate the success of the measures taken to protect the water resources. Any changes in water quality would be evaluated to determine whether the changes are related to the reclaimed mining facilities.

Financial Assurance

As part of the approval of a Plan of Operations for the ICP, the Forest Service would require FCC to post a financial assurance that would provide adequate funding to allow the Forest Service to complete reclamation and post-closure operation and maintenance activities and necessary monitoring for as long as required to return the site to a stable and acceptable condition. The amount of financial assurance would be determined by the Forest Service and would be adequate to allow the Forest Service to complete all necessary reclamation of the ICP at any stage if FCC were to abandon the Project. The financial assurance would also cover potential costs to capture and treat water following closure if that were required to meet effluent or instream limits. The financial assurance may be in the form of a bond or other financial instrument and would be payable to the Forest Service in the event that FCC does not perform reclamation actions as required by the ICP Plan of Operations. The amount of the financial assurance would be calculated in accordance with USFS guidelines (USDA Forest Service, 2004).

Alternative III - Relocation of TWSF, Perpetual Mine Dewatering, and Land Application Water Discharge

Alternative III (**Figure 2-11**) incorporates design and operational modifications, mitigation measures and monitoring plan requirements developed by the Salmon-Challis National Forest (SCNF) and cooperating agencies to address identified environmental and operational impacts and to provide analysis of a broad range of reasonable alternatives. These measures would modify the Plan of Operations submitted by FCC. Proposed modifications have been developed in response to issues



IDAHO COBALT PROPERTY
FORMATION CAPITAL CORPORATION, U.S.
LEMHI COUNTY, IDAHO

ALTERNATIVE III
PERPETUAL DEWATERING AND LAND APPLICATION\DISCHARGE
Jan., 2008

FIGURE
2-11

and potential impacts identified during the scoping and Idaho Joint Review Process (JRP) used by the EIS team to develop Issues, Concerns, and Opportunities (ICOs) for the ICP and during the impact analysis.

Modifications to FCC's proposed Plan of Operation (Alternative II) that are incorporated into Alternative III in response to identified ICOs include:

- Alternative III includes relocation of the TWSF to an alternative site with a footprint of 53 acres while maintaining the capacity of 2.5 MCY that FCC proposes under Alternative II. The TWSF is moved to the northeast of the mill and is sized to accept the identified ore reserves and avoid direct and indirect impacts to wetlands. Water management for waters associated with the TWSF would be as described in the Plan of Operations for Alternative II but modified to reflect the change in facility configuration. This TWSF site would potentially allow expansion of the footprint to address additional ore reserves without impacting wetlands; any such expansion may require NEPA review and modification of the Plan of Operations.
- Modification of the TWSF closure cap to provide greater rooting depth and to protect the low permeability liner from damage from trees.
- Use of land application treatment (LAT) for water disposal which utilizes soil attenuation to supplement water treatment and dispose of water in the Big Flat drainage.
- Long-term (potentially perpetual) post-closure mine water capture from lower level of mine workings to maximize groundwater capture efficiency.
- Increase the size of the process water management pond and addition of a storage pond to account for the water balance of this alternative.
- Incorporation of an NPDES permit for discharge to Big Flat Creek via a groundwater connection from the LAT site.

Modifications to ICP Plan to Address Specific Resource Concerns

The Alternative III proposed modifications to FCC's Plan (Alternative II) described in more detail in this section are intended to address concerns about predicted or potential impacts from FCC's proposal. **Table 2-3** contains a comparison of disturbance acreages between each of the alternatives. A major component of Alternative III, the land application water treatment and storage system, was originally developed and proposed by Formation; FCC later withdrew land application in favor of their proposed reverse osmosis water treatment system and direct discharge to Big Deer Creek. FCC's evaluation of soil properties and water management (Cascade Earth Sciences, 2005) provides the basis for the LAT system included in Alternative III.

If Alternative III or components of Alternative III were to be selected by the Forest Service, revised designs and new implementation plans for some of the Project facilities would be required prior to construction of the Project. This is due to the fact that this alternative differs from the facility design and implementation plans contained in the POO (Alternative II). The required designs and plans would include design of the TWSF, design of the water mine dewatering used at closure, a tailings and waste rock commingling plan, a revised water management and treatment process, revised pond designs to provide adequate storage for 100 year precipitation event and to include overflow spillways and design of access road improvements on the Williams Creek/Deep Creek route.

Geotechnical Considerations

FCC proposes to use a mechanically stabilized earth (MSE) fill section to construct the Ram portal pad. To ensure that the existing slope downhill of the fill section remains stable and that the bearing pressure of the fill does not exceed the bearing capacity of the existing slope soil, a 5 foot setback between the toe of the fill and the toe of the cut should be provided. Additionally, the uphill cut slope of ½:1.0 (horizontal to vertical) that FCC proposes may exceed standards for all but short-term cuts in Type A soils or cuts in bedrock. Most of the hillside is likely to be bedrock, however any non-bedrock portions of the uphill cut will need to either be reinforced or reduced in slope to a range of ¾:1 to 1.5:1, depending on the soil conditions.

TABLE 2-3. Idaho Cobalt Project – New Site Disturbance				
PROJECT FEATURE	**ALT II (acres)**	**ALT III (acres)**	**ALT IV (acres)**	**ALT V (acres)**
RAM PORTAL	1.8	1.8	1.8	1.8
SUNSHINE PORTAL	0.4	0.4	0.4	0.4
TRAM CORRIDOR	1.7	1.7	1.7	1.7
MILL\PLANT	10.9	10.9	10.9	10.9
TWSF	55.4	52.5	36.0	36.0
CONSTRUCTED WETLANDS	0.6	0.0	0.6	0.6
INFILTRATION FIELD	0.25	0.25	0.25	0.25
PONDS	6.6	28.1	6.6	6.6
ROADS[1] AND UTILITIES[2]	39.2	34.9	40.8	36.9
BORROW AREAS[3]	6.0	9.0	9.0	9.0
LAND APPLICATION AREA	0.0	175.4	0.0	0.0
SOIL STOCKPILE	7.2	9.0	7.2	7.2
TOTAL	**130**	**324**	**115**	**111**

[1] Project Site Roads are all roads north of divide between Blackbird Creek and Big Deer Creek.
[2] Utilities include Power, Pipeline, Water Capture, NPDES Outfall, Septic, and Vent Shafts
[3] Borrow Areas Below Mill and on Blackbird Road.

Waste Storage Facility

Formation has identified 2.57 million tons of ore in the Ram and Sunshine deposits, and has designed the TWSF to hold 3.4 million tons or 2.5 million cubic yards (MCY) of tailings and waste rock. Alternative III has revised the TWSF footprint by moving it to an area to the north of the mill site. This site has suitable area and slope characteristics to store the proposed tailings and waste rock volume. The TWSF footprint acreage would be nearly identical to that proposed by Formation (53 vs. 55 acres), but the height of the dump slope would be greater.

The TWSF cap would be modified to provide a thicker cover capable of supporting native forest trees that would eventually revegetate the site. The cover thickness would be increased from 3 feet to 4 feet and consist of 3 feet of subsoil and 1 foot of topsoil.

Water Management and Treatment

Alternative III would capture water by pumping from the mines and treat and discharge the mine water via a land application system.

Groundwater Capture - The post-closure groundwater capture system would be modified to improve the post-closure groundwater capture efficiency and to reduce the amount of water that would need to be treated and disposed of during the post-closure period. Rather than using wells downgradient of the mine, groundwater would be captured using wells installed into the lower levels of the Ram and Sunshine workings to prevent flooding and flushing of the mine backfill and groundwater outflow from the workings. This would allow more efficient capture of groundwater with a minimum of dilution, thus reducing the amount of water requiring treatment and disposal. However, long-term dewatering of the mine would not allow mine flooding to rinse and remove soluble metals from the mine walls, waste rock and backfill. A water right for this dewatering system would be required from Idaho Department of Water Resources.

Water Treatment - A water pre-treatment system would be installed in the mill. The plant would be designed to recover trace metals from the mine and process water for the purpose of controlling the

trace metal levels in both the mill process water and the land application solutions. Treatment would include pH adjustment and sulfide precipitation followed by sludge thickening. Sulfide precipitation of metals would be achieved by addition of sodium sulfide to the incoming water, and pH adjustment would be by lime addition. The resulting sludge would be a lime/gypsum waste that would incorporate metal sulfide precipitates. The plant would be designed to process up to 300 gpm. The sludge would be sent off-site for further processing or disposal.

The water treatment plant would include a reactor tank for lime and sodium sulfide addition and a thickener to recover the metal sulfides and other constituents in a sludge. The sludge would be sent to the concentrate filter where it would be incorporated into the concentrate. This initial treatment would remove the majority of the metals in the mine water. Treated water would be sent to the storage pond where it would await land application for further treatment and disposal.

Land Application Treatment and Disposal - Land application water treatment and disposal (LAT) as proposed in Alternative III would occur for the approximately 12 years of operations and for a number of years following closure. The land application water disposal area under Alternative III would take advantage of soil attenuation to provide some of the water treatment. The LAT would utilize 175 acres in the Big Flat area northeast of the TWSF for water treatment and disposal (**Figure 2-11**).

The proposed land application system would use sprinkler irrigation to seasonally apply water under specified and controlled conditions.

The suitability of the Big Flat for land application of process water was evaluated using site-selection criteria and rating factors for forested sites as presented in the *Process Design Manual for Municipal Land Treatment Systems* (USEPA, 1981) and *Handbook for Land Application of Municipal and Industrial Wastewater* (IDEQ, 1996). Using the EPA criteria, the Big Flat area has a moderate to high overall suitability rating for a land application system.

Land application would provide an additional treatment step by removing residual metals and nitrogen from the treated water by soil adsorption and biological nitrogen uptake. Metals would be strongly adsorbed by soils in the land application area with the result that negligible leaching of applied metals to groundwater and surface water is expected to occur. Nitrogen applied to soils would be assimilated by plants and low amounts of nitrogen would be leached from the site to groundwater. Additional details regarding DSM and HYDRUS model hydraulic parameters, solute parameters, and boundary conditions are presented in the *Land Application Analysis Report for the Idaho Cobalt Project* (CES, 2005), the *Water Resources Technical Report*, and in Chapter 4 of this EIS.

Land Application System Design - The land application area would be divided into a number of zones to allow the site to be developed in stages, equalize operating pressures on slopes, reduce the maximum required irrigation flow rate, and provide operational flexibility.

Prior to establishment of the irrigation system, the Big Flat land application site would be cleared of trees (much of the area was burned in the 2000 Clear Creek fire) and revegetated with non-native grasses and forbs to stabilize the soil, provide maximum evapotranspiration, and maintain soil structure for infiltration of applied water. The land application area would periodically be mowed and the hay removed.

The results of a detailed water balance (CES, 2005) indicate that in the wettest year, a maximum of about 11.6 inches of water could be applied over the 4-month period of June through September while avoiding soil water drainage below a depth of 24 inches. Thus, the capacity for water management to avoid deep soil water drainage over the 175-acre land application area is approximately 55 million gallons. Irrigation would be scheduled between June 1 and September 30 depending on soil moisture conditions and would result in water application on the order of 0.2 to 0.3 inches per day. In early June and late September, the anticipated irrigation cycles would be 1-hour

intervals per day. During peak evapotranspiration demand in the warm summer months, the irrigation cycle would be lengthened from 1 to 2 hours per day.

EPA has indicated that a NPDES permit would be needed for the LAT discharge in the Big Flat drainage since the groundwater flow model indicates that irrigation discharge would quickly reach Big Flat Creek and soil attenuation would not totally remove nitrogen and would remove little, if any, of the sulfate. Sulfate discharged to groundwater is predicted to exceed the secondary drinking water standard and a variance of the Idaho groundwater standard within the vicinity of the Big Flat LAT would also be required.

Alternative III makes design changes to the water management system and adds a storage pond necessary because of the seasonal LAT. The process and storage ponds each would feature an emergency overflow spillway in this alternative. The spillway would not alter the nominal storage capacity of either pond. The spillway would safely route overtopping flows from a 100-year precipitation event across the pond embankment, minimizing erosion to the embankment should either pond overfill its design capacity. Should either pond overfill and discharge via the spillway, water would flow towards Big Flat Creek.

The storage capacity of the process and storage ponds would be based on the water balance for this alternative, which indicates that the projected storage pond would need to be sized for 48 million gallons (MG) plus 2 feet of freeboard, and the process pond would contain 23 MG plus 2 feet of freeboard. These ponds are sized to contain a 24-hour period volume requirement of a 100-year recurrence interval.

Water Monitoring

Alternative III would include changes to the water monitoring program to provide enhanced water monitoring to detect, document, and quantify effects of mining on groundwater and surface water quantity and quality. The modified monitoring strategy would support a performance-based approach to compliance assessment, where groundwater quality data from select operational monitoring wells to be located downgradient of the mines would be evaluated for compliance.

Water monitoring necessary for Alternative III would differ in some details from Alternative II to account for the changed location of the TWSF, the use of LAT, groundwater capture from the mine workings and NPDES permit monitoring related to the surface water impacts of the LAT groundwater discharge.

Road Upgrades

A number of additional road improvements described in the Monitoring and Mitigation Measures Included in Agency Alternatives section would be required under Alternative III.

A total of 13.2 miles of site roads including 5.7 miles of new construction would be required for Alternative III. Of this total, 1.0 mile lies within designated roadless area including 0.5 miles of new construction.

Other Mitigation

Other design and operational modifications, mitigation measures and monitoring requirements intended to reduce environmental impacts, improve agency oversight or reduce risk would be applied to Alternative III. These mitigation items are described in the Operational and Design Components, Mitigation Measures and Monitoring Included in Agency Alternatives (page 2-53) as they are common to all of the agency alternatives.

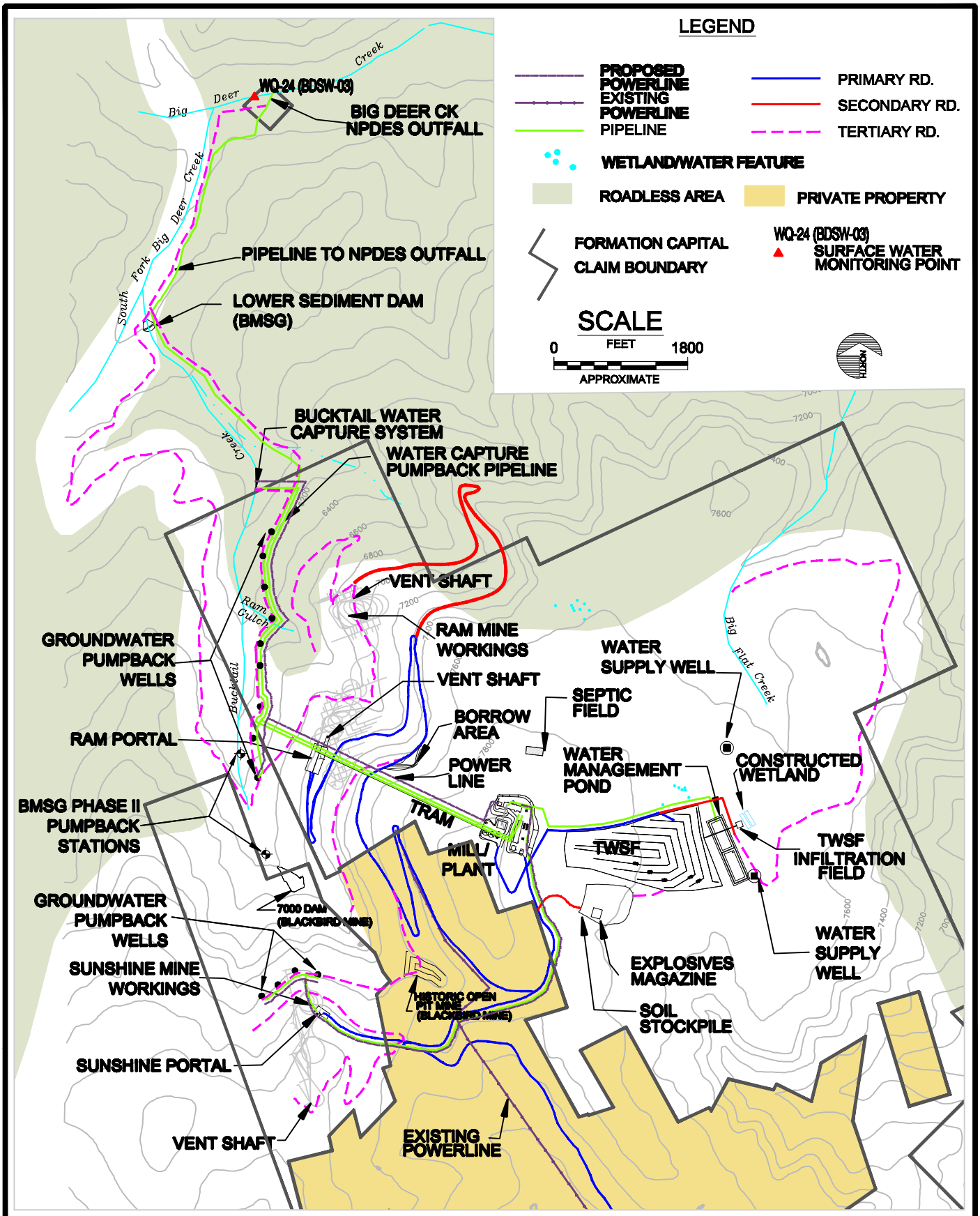
Alternative IV - Reduced Size of TWSF, Modified Water Treatment to Reduce Waste Stream, Surface Discharge To Big Deer Creek and Additional Groundwater Capture in Lower Bucktail Creek

Alternative IV incorporates design and operational modifications, mitigation measures and monitoring plan requirements proposed by the agencies in an attempt to reduce the risk of operational and environmental impacts, to provide analysis of a broad range of reasonable alternatives and to improve agency oversight of the mine operation. The Alternative IV changes have been developed in response to issues identified during the scoping, review and analysis process.

Alternative IV is distinguished from Alternatives II and III in that while the TWSF would be located to the southeast of the mill site as in Alternative II, it would be reduced in size to accommodate only the amount of ore currently identified by FCC. The water treatment system would be designed to meet requirements of direct discharge to surface water in Big Deer Creek, but would not include reverse osmosis as a primary treatment step in order to reduce the amount of water treatment waste that would require on-site disposal (**Figure 2-12**). Alternative IV would require that FCC obtain a NPDES discharge permit and an authorization for a mixing zone for sulfate. Discharge of treated water to Big Deer Creek would be via an in-stream effluent diffuser. At the completion of mining the decision to cease pumping from the mine would be made based on results of water quality monitoring, verification of groundwater flow patterns based on operational phase data collection, and predictions of impacts to groundwater and surface water. Post-closure groundwater capture wells would be installed and tested during the initial construction phase to confirm that the system would capture a sufficient amount of groundwater to protect downstream water quality. The Alternative IV capture system would include bedrock groundwater capture wells as described for Alternative II, and an additional alluvial groundwater/surface water capture system in lower Bucktail Creek drainage to assure capture of the metals load necessary to attain water quality goals. The ICP would have to demonstrate the effectiveness of the capture systems through field testing and modeling in order for the operational mining phase to proceed. The testing program would require installation and initiation of testing of bedrock and alluvial wells in the first year of construction so that adequate testing could be done to design the appropriate capture system prior to initiation of mining. Alternative IV would require amendment of slash (waste rock) backfill in the Ram and Sunshine underground mines to reduce metals mobility. These measures would require modification of the Plan of Operations submitted by Formation to include detailed plans for design and implementation of these design and operational components.

In addition to these major changes (TWSF size, post-closure water capture and pumpback system, modifications to the water treatment system, and underground waste amendment), a number of other changes and mitigation measures are incorporated into Alternative IV. These include addition of a spillway to the water management pond to reduce risk of structural failure in event of pond overflow; use of native vegetation for reclamation to minimize time required to regain natural vegetation community and minimize spread of non-native species; commingling tailings and waste rock in the TWSF; and additional access road improvements on the Williams Creek/Deep Creek route to improve traffic safety, reduce spill risk, and reduce sediment release to surface waters.

Should this alternative be selected by the agencies, revised designs and new implementation plans for some of the Project components would be required prior to construction of the Project. This is due to the fact that this alternative differs from the facility design and implementation plans contained in the FCC's POO (Alternative II). These include a revised TWSF design, a plan for installing and testing the water capture and pumpback system, a tailings and waste rock commingling plan, a revised water treatment process, a plan for waste rock amendment, revisions to the NPDES permit application reflecting the water treatment system, revised pond design to include an overflow spillway, revised discharge pipeline alignment and effluent diffuser design, and design of access road improvements on the Williams Creek/Deep Creek route. Additionally, prior to any surface disturbing



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ALTERNATIVE IV
LOWER BUCKTAIL GROUNDWATER CAPTURE - ADVANCED WATER TREATMENT AND DISCHARGE TO BIG DEER CK Jan. 2008

FIGURE
2-12

activity the ICP would be required to obtain access through BMSG property and obtain approval for use of any BMSG facilities that the ICP would need to utilize.

Modifications Included in Alternative IV

Waste Storage Facility

Formation has identified 2.57 million tons of ore in the Ram and Sunshine deposits, and has designed the TWSF to hold 3.4 million tons or 2.5 million cubic yards (MCY) of tailings and waste rock (Alternative II). A significant portion of the tailings would be disposed of underground as part of the mining backfill. Formation's TWSF design accounts for an approximate 35 percent increase in mining tonnage over that currently identified. Alternative IV has revised the TWSF footprint to more closely accommodate the identified ore reserves with a design capacity of 1.7 MCY and a footprint of 36 acres (**Figure 2-12**). Tailings and waste rock placement, and water management for waters associated with the TWSF are as described in the Plan of Operations for Alternative II but would be modified to reflect the change in facility configuration and to provide commingling of waste rock and tailings. The smaller TWSF footprint in Alternative IV avoids impacts to non-jurisdictional wetlands and provides a minimum of disturbance.

An increase in ore reserves or changes in operational parameters (tailings or waste density, amount of tailings used in backfill, variation in dilution estimate) could require changes to the TWSF design, the Plan of Operations and the required financial assurance. The Alternative IV TWSF design could be expanded if needed in the future. Expansion of the TWSF would impact the non-jurisdictional wetlands. The FCC proposal (Alternative II) includes a phased TWSF construction schedule that could also limit the TWSF footprint if additional ore were not found, but would not avoid the wetlands. Overall, if a larger TWSF is ultimately needed, expansion of the Alternative IV TWSF would likely be more difficult and potentially result in greater disturbance than Alternative II. Additionally, the Alternative IV TWSF footprint may constrain or complicate the ability to efficiently commingle tailings and waste rock as well as allow separate collection of drainage water from areas of the TWSF.

The TWSF cap would be modified to provide a cover capable of supporting native forest that would eventually revegetate the site. The cover thickness would be increased from 3 feet (Alternative II) to 4 feet and consist of 3 feet of subsoil and 1 foot of topsoil.

Geotechnical Considerations

Stabilized slope setbacks and cut slope reinforcement or slope reduction as described for Alternative III would be required for Alternative IV to maintain geotechnical stability of the Ram Portal pad.

Water Management and Treatment

The goals of water management and treatment during and after operations are to:

1. Maintain groundwater quality in existing (baseline) condition;
2. Prevent direct discharges to surface water in excess of surface water quality standards; and
3. Prevent any interference with BMSG's requirements to meet water and sediment quality standards.

A summary of the performance standards that would be applied to determine compliance with these goals, and the anticipated corrective actions if these standards are not met, is provided in Table C-1, Appendix C. FCC has applied for a mixing zone in Big Deer Creek for sulfate. In this alternative, the water quality standard for sulfate would be met at the end of a mixing zone in Big Deer Creek. Standards for metals and other parameters would continue to be met at the end-of-pipe.

Water management to meet these goals would consist of water capture and water treatment. During the operational phase mine water would be captured by pumping from the underground mines, and captured water would be treated for removal of metals and other parameters as needed to meet limits

in the NPDES permit. After closure, water would be captured (if water quality necessitates) by continued mine dewatering, pumping from groundwater capture wells, and/or diversion and pumping from surface water to the extent needed to meet performance standards and goals. Mine dewatering would continue until a post-closure capture system has been designed, constructed, tested, and proven effective. Post-closure water treatment would consist of the same water treatment methods used during operations and would be required to continue to comply with the NPDES permit.

Water Treatment - The water treatment process for Alternative IV would utilize the same basic process components as the pre-treatment system proposed by FCC in Alternative II, but would use ion exchange instead of reverse osmosis (RO) as a means to remove any residual metals in excess of the NPDES effluent limits. This would eliminate the need for disposal of a stabilized RO waste (a potentially large waste stream), but would result in higher levels of nitrate and sulfate in the discharge water. A biological nitrate removal process would precede ion exchange treatment for removal of nitrate that exceeds NPDES effluent limits. If needed to meet the ammonia effluent limit, ammonia would be removed by an ion exchange process utilizing a zeolite or synthetic resin medium. The treatment process would result in treated water (effluent) capable of meeting effluent limits imposed by an NPDES permit for discharge to Big Deer Creek. This includes sulfate at the edge of the mixing zone.

Water treatment process confirmation testing using the treatment process components described below and submittal of a final water treatment system design is required as part of this alternative. A description of the water treatability testing program would be submitted to the Forest Service for their review and approval prior to these tests being conducted. This testing would be completed and results submitted to the Forest Service prior to construction of the water treatment plant.

The treatment system for Alternative IV would utilize liquid/solid separation using chemical addition and either clarification and media filtration, or membrane filtration (for example, micro/ultra filtration membranes) for metals removal for the entire process stream; a portion or all of the clarified and filtered water would then undergo an ion exchange process for removal of residual metals, should that be required to meet NPDES limits. The liquid regeneration stream would be recycled to the pretreatment process to neutralize the sulfuric acid used to regenerate the ion exchange media, and stabilize metals as iron/manganese hydrates and/or metal hydroxides. An ion exchange process utilizing either natural zeolites or a synthetic resin would be utilized to remove ammonia in excess of NPDES effluent limits. The liquid regenerate from this ion exchange process would be sent to the water management pond. A biological nitrate removal process would precede ion exchange treatment for removal of nitrate that exceeds NPDES effluent limits.

Alternative IV requires that the treatment process be based on best available demonstrated technology, comply with New Source Performance Standards on the types and amounts of water that can be discharged, and be tested prior to implementation to confirm treatment efficiencies. An evaluation of several standard types of water treatment processes that could be used to treat site waters is contained in the *Water Resources Technical Report* (Hydrometrics, 2006).

The process (water management) pond capacity and footprint would be the same as described in the Alternative II POO. Use of the process pond would be the same as described in Alternative II. There would be no additional storage pond associated with this alternative.

During operations, the Alternative IV filtered solids would be de-watered into a cake, and disposed of in the TWSF as described in Alternative II. The chemical characteristics and volume of waste sludge produced as a result of liquids/solids separation would be about the same as for the pre-treatment step for the Alternative II treatment system. The sludge would contain low levels of metal hydroxides, metal sulfides, and/or metal salts depending on which type of coagulant is used. The liquid fraction of the waste stream would be recycled back to the treatment or mill process via the process pond. Exhausted ion exchange media would also be disposed of in the TWSF. It is estimated that approximately 20 tons of clarifier sludge and 3 tons of ion exchange media would require disposal each year.

Once mining ceases and the mill and TWSF are reclaimed, clarifier solids would be dewatered and hauled off site for disposal.

Treated water would be discharged through a pipeline to Big Deer Creek approximately two miles downstream from the water treatment plant. In Alternative IV the pipeline would be re-routed to avoid a cultural resource site near the confluence of South Fork Big Deer and Big Deer Creek (**Figure 2-12**) and discharge through a diffuser pipe into Big Deer Creek.

Post-Closure Mine Water Capture - Alternative IV incorporates additional water capture elements (mine dewatering, lower Bucktail alluvial groundwater and/or surface water capture) in addition to the Alternative II bedrock capture wells that would be used to mitigate potential impacts from the release of mine water to groundwater and surface water. This alternative also differs from Alternative II in the timing of the testing and development of the post-closure water capture elements. Alternative IV requires that bedrock and alluvial capture wells be installed and tested during the construction phase and that an effective capture system be demonstrated prior to the start of mining. In Alternative II, only bedrock capture wells are proposed to be used if monitoring results indicate that groundwater control is needed. A flow diagram illustrating the anticipated timing and decision-making process for the selection and installation of water capture components is shown in Figure C-1 (Appendix C). The capture system installation schedule is also summarized in **Table 2-4**.

TABLE 2-4. Mine Groundwater Capture Criteria

Ram Construction/ Development Phase	Install and initiate testing of Ram Mine bedrock groundwater capture wells
	Install and test Lower Bucktail alluvial groundwater capture system; demonstrate that effective capture system can be constructed
Ram Operational Phase	Demonstrate that construction of an effective capture system is feasible (prior to mining and processing of ore)
	Install preliminary capture facilities in Lower Bucktail drainage (prior to mining and processing of ore)
	Complete final Ram Mine capture system design (prior to mine shutdown)
Sunshine Construction/Development Phase	Install and initiate testing of Sunshine Mine bedrock groundwater capture wells
Sunshine Operational Phase	Demonstrate that construction of an effective capture system is feasible (prior to mining and processing of ore)
	Complete final Sunshine Mine capture system design (prior to end of mining)
Mine Closure Phase	Complete construction of approved Ram and Sunshine Mine capture systems prior to start of mine reflooding

The testing program would require installation and initiation of testing of bedrock and alluvial wells in the first year of construction so that adequate testing could be done to design the appropriate capture system prior to initiation of mining. Detailed field testing of the capture systems, including (but not necessarily limited to) subsurface characterization through test well drilling and multi-well aquifer testing (along with groundwater modeling, if warranted), would be used to determine the probable effectiveness of the capture systems in controlling the flow of contaminated mine/groundwater from the Ram and Sunshine Mines. The field testing results would be used by ICP owners to demonstrate to the Inter-Agency Task Force that the capture system design would be effective in controlling the

migration of metals and other chemicals from the ICP before mining would be allowed to proceed. The demonstration would rely on a combination of empirical testing and model predictions.

The lower Bucktail capture system would collect alluvial groundwater and/or surface water, with the optimum capture approach dependent on field testing to be performed during the mine development phase and on the total load requiring capture (as determined at mine closure). The Bucktail capture system would also intercept metal loads from natural sources and possibly from historical BMSG mine disturbances. Additional permitting related to disturbance in the streambed (404 and stream alteration permits) would likely be required for construction of the lower Bucktail capture system. Additionally, because there would be a larger area of groundwater affected by mine contaminants (between the source and the capture system) the State of Idaho, who regulates groundwater quality, would have to sanction this capture system concept.

At mine closure, cessation of mine dewatering would be contingent on monitoring results and projections indicating no unacceptable effects to water quality objectives or cleanup goals. If monitoring data and water quality models indicate that downgradient groundwater and surface water quality would be acceptable, the Ram and Sunshine Mines would be allowed to flood resulting in groundwater flow through the mine workings toward Bucktail Creek. All necessary water capture system components would be fully built and operational prior to allowing the mines to flood. The configuration of the final post-closure capture system would be selected and designed prior to mine closure and following approval by the Inter-Agency Task Force. The Interagency Task Force would consist of representatives of the Forest Service, EPA and DEQ and be established to oversee management of the ICP. The final capture system would consist of the bedrock groundwater capture wells, the lower Bucktail alluvial groundwater/surface water capture system, or both as needed to meet the following goals of post-closure water management:

1. Maintain groundwater quality in baseline (pre-mining) condition.
2. Prevent any interference with BMSG's requirements to meet water quality standards.

The post-closure water capture system would be operated for as long as needed to meet the water management goals. Once water quality objectives have been met and groundwater capture is no longer needed, the capture system(s) would be decommissioned and reclaimed.

If the bedrock capture system is not able to capture enough metal load to maintain groundwater quality at or below background levels, there could be a small metals load originating from the Sunshine or Ram mine areas to the upper Bucktail drainage. If this were to occur, there may need to be an agreement with BMSG on responsibility for treating this metal load. The potential for ICP metal loads to report to the BMSG capture facilities is discussed further in Chapter 4.

The metals load attributable to the Ram and Sunshine workings and requiring capture would be determined through groundwater and surface water monitoring. Groundwater monitoring would include sampling of monitoring wells to be located within and downgradient of the Ram and Sunshine workings to determine post-closure contaminant concentrations within and downgradient of each mine. The groundwater concentrations would then be used with the groundwater flow rate through the re-flooded mine workings to determine the groundwater load exiting each mine. The groundwater flow rate, or flux, could be assumed equal to the steady state mine inflow rate during full mine development. This assumption would provide a level of conservatism to the analysis since groundwater inflow to the dewatered mine workings would likely be greater than ambient groundwater flow through the mine sites. Surface water monitoring would also occur in Bucktail Creek upstream and downstream of the Ram workings to further quantify the metals load introduced from the Ram. Based on the monitoring results, the metals load requiring capture would be determined by the ICP and reviewed and approved by the Inter-Agency Task Force. The Task Force could require capture of an additional load above the calculated required load reduction (i.e., capture of greater than the calculated chemical load) to assure that the entire mine related load is captured.

The Lower Bucktail capture system would consist of a series of pumpback wells and/or capture trench within the Bucktail Creek alluvium and provisions for surface water capture at the same location. The backup capture system would be located in lower Bucktail drainage between monitoring sites WQ-19 and WQ-21, upstream of the unnamed tributary where WQ-11 is located, and upstream of a proposed BMSG stream diversion (BT-5 pipeline) system. The captured water from the bedrock or lower Bucktail capture systems would be pumped to the water treatment plant. The treated water would be piped back to the discharge location in Big Deer Creek near monitoring station WQ-24.

As described in Chapter 3, current (baseline) groundwater quality near the Ram and Sunshine ore bodies contains naturally occurring concentrations of certain metals, including copper and cobalt. As a result, groundwater flow through both the Ram and Sunshine areas currently results in metals loading to Bucktail Creek. Therefore, it would not be necessary for the capture systems to remove 100 percent of the groundwater metals loads exiting the ICP mines, but only that portion of the loads in excess of the current baseline loads to maintain background levels. Based on current groundwater quality and flux in the vicinity of the ICP mines, baseline metal loading rates to Bucktail Creek include: 0.022 lb/day copper and 0.033 lb/day cobalt at the Ram Mine area, and 0.0016 lb/day copper and 0.018 lb/day cobalt at the Sunshine Mine area. Based on the DSM mine water quality predictions and a post-reflooding groundwater flux of 50 gpm for the Ram and 8 gpm for the Sunshine Mine, predicted post-closure metals loading rates from the ICP mine outflows to Bucktail Creek would be 0.026 lb/day copper and 0.025 lb/day cobalt for the Ram Mine, and 0.033 lb/day copper and 0.093 lb/day cobalt for the Sunshine Mine. Therefore, based on current water quality predictions from the DSM, less than 50 percent of the post-closure Ram load would require capture to maintain post-mining copper loading rates at pre-mining levels, and approximately 95 percent of the Sunshine load would require capture to maintain post-closure copper and cobalt loading rates at pre-mining levels (post-mining cobalt concentrations and groundwater loads at the Ram are predicted to be less than pre-mining levels due to ore removal). The percentage of the metals loads requiring capture would be reevaluated at closure based on the measured steady state mine inflow rates, the measured mine inflow water quality, and the predicted post-flooding mine water quality as determined through the operational phase mine waste and backfill monitoring program. Current predictions of the post-closure groundwater loads requiring capture are discussed in more detail in the Water Resources Technical Memorandum (Hydrometrics, 2008).

If operational and closure monitoring data confirm these predictions, it is likely that the bedrock groundwater capture systems would be able to maintain post-mining metals loading to Bucktail Creek at pre-mining levels, at least for the Ram Mine where required capture volumes (<50 percent) are less than the potentially achievable capture efficiency which could be as high as 90 percent.

Treated Water Disposal - A surface water discharge to waters of the U.S. and NPDES permit is included in this alternative. Treated water from the water treatment plant would be routed through a pipeline to a surface discharge located on Big Deer Creek below monitoring site WQ-24 (**Figure 2-12**). The pipeline would be routed using existing roads where possible. Where no roads exist, the pipeline would follow an alignment that minimizes pipeline length and physical disturbance to soils, vegetation and cultural resources. The pipeline would be buried, and be made of materials suited for this application such as steel, poly-vinyl chloride (PVC), or high density polyethylene (HDPE). Where the pipeline crosses existing waterways, a culvert designed to pass the 100-year, 24-hour event would be placed in the stream channel, the pipe placed on top of the culvert, and fill placed over the pipe. The pipeline would affect jurisdictional wetlands at the crossings of two Bucktail Creek tributaries and where it crosses a low alluvial terrace at Big Deer Creek. Discharge to Big Deer Creek would be through a diffuser pipe placed in the Big Deer Creek channel bed.

Alternative IV Modifications in Common with Alternative III

Commingle Tailings and Waste in TWSF

As under Alternative III, Alternative IV would require the commingling of tailings and waste rock as they are placed in the TWSF. This would result in the hydrologic and geochemical characteristics of the TWSF behaving as though it consisted almost entirely of tailings and reduce risk of metals leaching from waste rock.

Underground Waste Rock Amendment

Waste rock left underground (slash) in the Ram and Sunshine Mines would be amended with lime, limestone or similar alkaline material to control the pH of the underground backfill. The amendment of the backfill would reduce the risk of metals leaching and potentially reduce metals levels in groundwater to equal or lower levels than pre-mining background.

TWSF Closure Cap

The TWSF cap would be modified to provide a cover capable of supporting native forest that would eventually revegetate the site. The cover thickness would be increased to 4 feet and consist of 3 feet of subsoil and 1 foot of topsoil.

Water Monitoring

Alternative IV would include changes to the water monitoring program as in Alternatives III and V (described in *Operational and Design Components, Mitigation Measures and Monitoring Included in Agency Alternatives)* to provide enhanced water monitoring to detect, document, and quantify effects of mining on groundwater and surface water quantity and quality. The modified monitoring strategy would support a performance-based approach to compliance assessment, where groundwater quality data from select operational monitoring wells to be located downgradient of the mines would be evaluated for compliance. The monitoring strategy would also provide the information needed to make decisions regarding the appropriate post-closure water management systems (e.g. whether to allow mines to flood; need for, location and extent of, water capture systems).

Water monitoring necessary for Alternative IV would differ in some details from Alternative III to account for the changed location of the TWSF, the elimination of LAT, water capture from groundwater and surface water rather than the mines and would include NPDES permit monitoring related to the discharge to Big Deer Creek.

Road Upgrades

A number of additional road improvements described in the Monitoring and Mitigation Measures Included in Agency Alternatives section would be required under Alternative IV. A total of 15.4 miles of site roads including 4.1 miles of new construction would be required for Alternative IV. Of this total, 2.5 miles lies within designated roadless area including 1.4 miles of new construction.

Other Mitigation

Other design and operational modifications, mitigation measures and monitoring requirements intended to reduce environmental impacts, improve agency oversight or reduce risk would be applied to Alternative IV. These mitigation items are described in the Operational and Design Components, Mitigation Measures and Monitoring Included in Agency Alternatives (page 2-53) as they are common to all of the agency alternatives.

Alternative V - Lower Bucktail Groundwater Capture, Water Treatment at Site of Blackbird Treatment Plant and Surface Discharge to Blackbird Creek

Alternative V (**Figure 2-13**) incorporates a change in the location of the water treatment and discharge facility; in most other aspects Alternative V is the same as Alternative IV. Alternative V is distinguished from Alternative II in that the tailings and waste rock storage facility is reduced in size as in Alternative IV, waste rock placed underground is amended and post-closure groundwater capture is supplemented by an alluvial groundwater/surface water capture system in lower Bucktail Creek. Alternative V is distinguished from Alternative III in that the TWSF is reduced in size to the minimum volume required for identified ore reserves and is located as in Alternative II to the southeast of the mill site, the storage pond is eliminated, and an alternative water treatment technology would be employed to meet discharge requirements to Blackbird Creek. Alternative V is distinguished from Alternative IV in that rather than constructing water treatment facilities at the Formation mill site, water would be pumped to the site of the Blackbird water treatment plant and treated there prior to discharge to Blackbird Creek. Alternative V would require that FCC enter into an agreement with the Blackbird Mine Site Group/Noranda for use and maintenance of the water treatment system. FCC would be required to obtain a NPDES discharge permit into Blackbird Creek. Although Noranda currently discharges under CERCLA authority, the addition of FCC mine water to their treatment system would require changes to their agreements with EPA. Changes to the Blackbird water treatment system (including additional facilities at the site) would be required to handle the additional flow and to meet modified effluent limits. Alternative V would modify the Plan of Operations submitted by Formation. Alternative V has been developed because it would minimize physical disturbance and impacts to the existing environment by utilizing existing infrastructure.

Should this alternative be selected by the agencies, revised designs and new implementation plans for some of the Project facilities would be required prior to construction of the Project. This is due to the fact that Alternative V differs from the facility design and implementation plans contained in the POO (Alternative II). These include the TWSF design, the water capture and pumpback system to be used at closure, a tailings and waste rock commingling plan, a tailings and slash amendment plan, a revised water treatment plant process selection, revised pond designs to include overflow spillways, and design of access road improvements on the Williams Creek/Deep Creek route. Additionally, the necessary agreements with BMSG and the approval of the CERCLA authorities would need to be obtained for any modifications of the BMSG treatment system. Requiring an agreement to utilize BMSG facilities is outside of the Forest Service's authority and thus Alternative V, although a reasonable alternative that potentially minimizes some environmental impacts, is not something that the Forest Service can require FCC to implement.

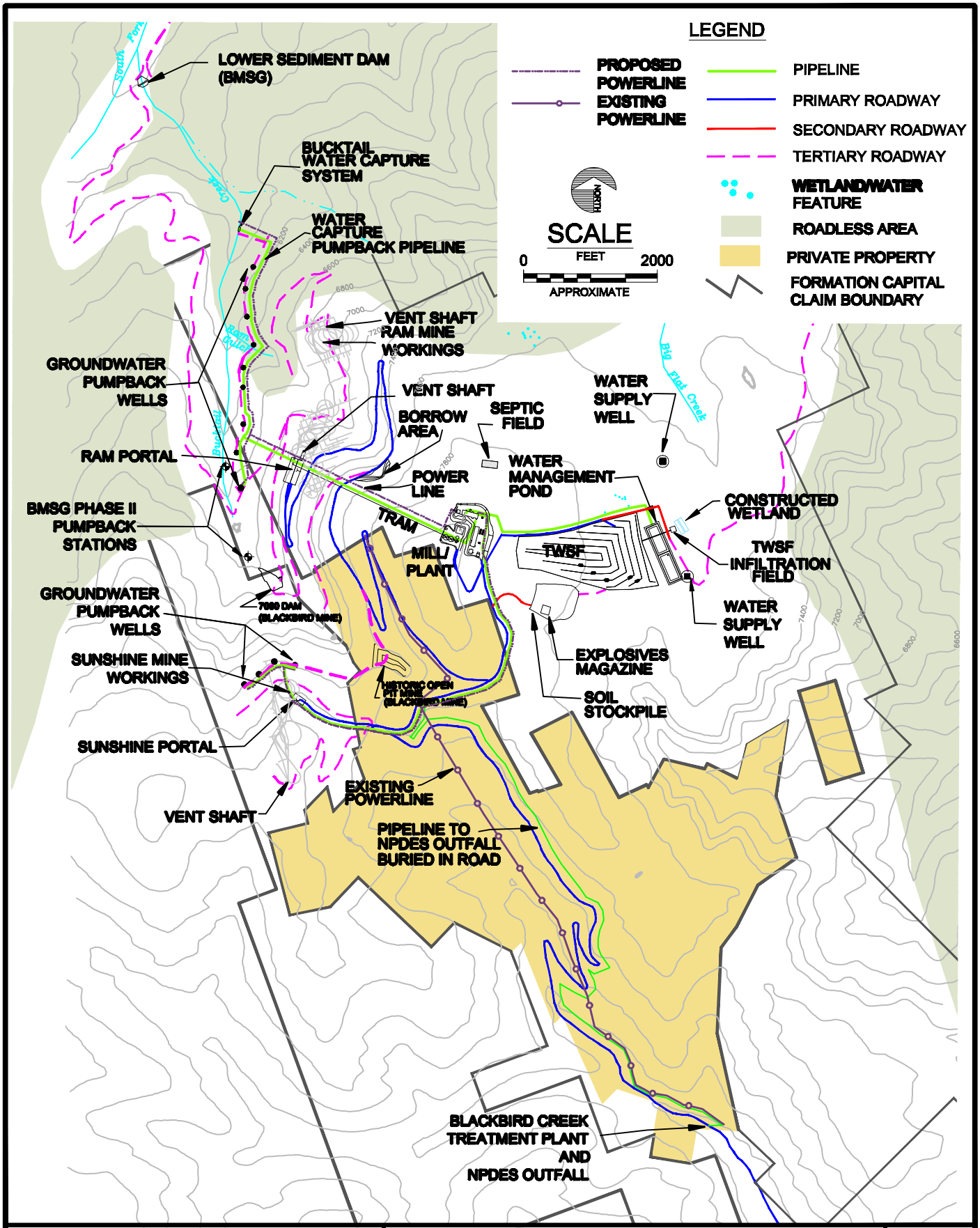
Modifications Included in Alternative V

Waste Storage Facility

Alternative V would utilize the 1.7 million cubic yard TWSF site located to the southeast of the mill site as described in Alternative IV. The TWSF closure cap would be modified to include a minimum of 4 feet of soil cover material to protect the liner from potential damage from trees growing on the reclaimed surface.

Geotechnical Considerations

Stabilized slope setbacks and cut slope reinforcement or slope reduction as described for Alternative III would be required for Alternative V to maintain geotechnical stability of the Ram Portal pad.



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ALTERNATIVE V
LOWER BUCKTAIL GROUNDWATER CAPTURE - ADVANCED WATER TREATMENT AND DISCHARGE TO BLACKBIRD CK

Jan, 2008

FIGURE
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Water Management and Treatment

The water treatment process for Alternative V would be moved to the current location of the BMSG treatment plant on Blackbird Creek to decrease the amount of disturbance and infrastructure required in the post-closure period. The water treatment process would include the precipitation process utilized by Noranda (or a similar process) and would include changes or additions to the existing water treatment facilities to meet required effluent limits in Blackbird Creek. A description of water treatment processes that could be implemented at the Blackbird treatment plant is found in the *Water Resources Technical Report* (Hydrometrics, 2006). Alternative V assumes that the treatment system would result in an effluent capable of meeting end-of-pipe effluent limits imposed by a NPDES permit that would be required for the water discharged from the ICP. These limits would likely be similar to those anticipated for discharge to Big Deer Creek in Alternatives II and IV. This Alternative would require an agreement with BMSG on utilizing their property and long-term operation of the water treatment system.

Treated water from the water treatment plant would be discharged to Blackbird Creek at the current discharge site adjacent to the treatment plant. Excess water from the mine and mill would be piped to the Blackbird treatment plant site in a pipeline installed in the existing access road or transferred underground via existing Blackbird Mine workings with water collected by BMSG in the upper Bucktail drainage. The pipeline would be buried, and be made of materials suited for this application such as steel, PVC, or HDPE.

Groundwater Capture System - The Alternative V post-closure groundwater capture system would be modified as in Alternative IV to capture alluvial groundwater and/or surface water in Bucktail Creek drainage to allow more complete capture of groundwater and contaminants of concern from the Ram and Sunshine Mines if the bedrock system is not adequate.

Road Upgrades

As under Alternative III and IV, additional road improvements would be required by the agencies to improve traffic safety, to reduce sediment production and reduce risks of spill of transported materials. A total of 14.5 miles of site roads including 2.6 miles of new construction would be required for Alternative V. Of this total, 1.0 mile lies within designated roadless area including 0.1 miles of new construction.

Water Monitoring

Alternative V would include changes to the water monitoring program as described in Alternative III and IV to provide enhanced water monitoring to detect, document, and quantify effects of mining on groundwater and surface water quantity and quality. The modified monitoring strategy would support a performance-based approach to compliance assessment, where groundwater quality data from select operational monitoring wells to be located downgradient of the mines would be evaluated for compliance.

Water monitoring necessary for Alternative V would differ in some details from Alternatives III and IV to account for the changed location/size of the TWSF, the elimination of LAT, water capture from groundwater and surface water rather than the mines and different NPDES permit monitoring location in Blackbird Creek.

Other Mitigation

Other design and operational modifications, mitigation measures and monitoring requirements intended to reduce environmental impacts, improve agency oversight or reduce risk would be applied to Alternative V. These mitigation items are described in the Operational and Design Components, Mitigation Measures and Monitoring Included in Agency Alternatives (page 2-53) as they are common to all of the agency alternatives.

Operational and Design Components, Mitigation Measures and Monitoring Included in Agency Alternatives

The agencies have identified a number of mitigation measures, monitoring requirements and operational practices that provide environmental benefits, reduce risk or improve the agencies ability to efficiently administer the proposed mining operation. Those measures that the agencies have determined to be appropriate and that can be applied to all alternatives are described in this section. These measures are referred to as "common" to all alternatives meaning that they would be applied to the Project no matter which alternative is selected.

Administration and Monitoring

Federal mining laws authorize mineral exploration and development on Federal Lands and state and federal environmental laws are intended to ensure that adverse impacts are minimized and long term productivity of the surface resources preserved to the extent practicable.

The Forest Service as the lead federal agency for the ICP EIS has a primary role in approving and administering the Project.

The Forest Service accepts certification and other approvals issued by state or other federal agencies as compliance with similar or parallel requirements of its mining regulations. Besides the Forest Service, other agencies that required permits for the Project are: US Environmental Protection Agency (EPA), Idaho Department of Environmental Quality (IDEQ), US Corps of Engineers (COE) and the Idaho Department of Water Resources (IDWR).

The plans and permits submitted to or to be submitted to these agencies by ICP include:

1. A National Pollution Discharge Elimination System (NPDES) Permit Application submitted to the Environmental Protection Agency, describes project discharges to surface waters that would be regulated under Section 402 of the Clean Water Act. This permit would be obtained prior to the discharge of any wastewater to waters of the United States. Prior to issuance of the NPDES permit, the State of Idaho would complete CWA Section 401 certification.
2. A request for a mixing zone for sulfate (associated with the discharge of treated water to Big Deer Creek) submitted to Idaho Department of Environmental Quality. If granted, the mixing zone would be authorized in the CWA Section 401 certification and the effluent limit for sulfate in the NPDES permit would reflect the existence of a mixing zone.
3. An Application for Permit to Construct and Operate to be submitted to the Bureau of Air Quality, Idaho Department of Environmental Quality, which would describe project impacts to air quality, as well as measures, which would be taken to reduce impacts.
4. Application for beneficial use of surface and/or groundwater submitted to the Idaho Department of Water Resources. These water rights are required prior to the diversion and use of surface or ground water.
5. Stream Channel Alteration Permit(s) submitted to the Idaho Department of Water Resources required for any activities that would occur below the mean high water mark of a perennial stream.
6. A revised Plan of Operations would be required to address issues in the Record of Decision once a preferred alternative is selected.
7. An application to the US Corps of Engineers for a nationwide 404 permit(s) related to the water discharge pipeline for dredge and fill in wetlands and/or waters of the U.S.

ICP would obtain approved plans and permits from the state and federal agencies described above. Because the Forest Service recognizes parallel requirements of other state and federal agencies, approval of the Plan of Operation is contingent upon approval of these plans and permits. ICP would

be required to change its current Plan of Operations to incorporate any requirements included in the Record of Decision. The following sequence of events illustrates the relationship:

1. Following issuance of the Record of Decision, ICP would submit a revised Plan of Operation and provide the necessary reclamation bond, which complies with the Preferred Alternative described in the Record of Decision and other state and federal permits in effect at that time. If acceptable, the Forest Service could approve this Plan contingent upon receiving the other required state and federal permits. At this point, those activities that do not require approval by other state and federal agencies could proceed. These activities may include road construction and timber harvest activities, which do not affect cultural resources, or Threatened and Endangered (T&E) plant or animal species.
2. Prior to beginning any surface disturbing activities, ICP would submit supplemental information as described in their Plan of Operation and required by the Record of Decision. In the first year of operation, ICP would provide additional details on the location, schedule, and surface resources that would be affected by the planned activities. A construction schedule would be submitted to the Forest Service indicating the order of activities and indicating which activities and mitigation measures are required prior to initiation of construction. The Forest Service would review these supplements to ensure that they are within the scope of the ICP EIS and approve any required Plan changes. If the effects of the proposal are within the scope of the EIS, approval to proceed would be granted following submittal of a bond to reclaim the surface resources affected.
3. EPA would issue the NPDES permit prior to discharge of any water to surface water. Any stipulations, conditions and monitoring required by the NPDES permit would be in place as required by the permit. FCC would obtain necessary stormwater permits prior to initiation of associated disturbance.
4. After the first year of operation, additional details on the next year's operation would be submitted as annual work plans. These annual work plans would include a summary of the previous years activities; describe the schedule of operations for the next year; and include a statement verifying that all proposed operations are as approved in the Plan of Operation. The Forest Service would annually review project status and proposed activities to assure that the Project is covered by a sufficient reclamation bond. If after review of these annual supplements, the Forest Service determines that proposed activities are outside the scope of the selected alternative and approved Plan of Operation, a modified Plan of Operation would be required and the appropriate analysis conducted as required by the NEPA Regulations and Forest Service Mining Regulations.
5. As other state and federal permits are approved, ICP would submit them to the Forest Service as supplements to their Plan of Operation if National Forest System Land would be affected by the approved operations. The Forest Service would review the conditions of the approved permit(s) to ensure that they are equivalent to the terms of the ROD and the current Plan of Operation, and would not result in any adverse environmental impacts that have not been considered in the NEPA analysis and documented in the FEIS. After this review, the Forest Service would either accept the permit as a supplement to the Plan of Operation or notify the company that the permits constitute a modification of their approved Plan, and additional NEPA analysis and documentation is required.

The above procedures would also be used to handle changes in state or federal permits. Modifications to the Plan of Operation may be required if environmental impacts occur which are outside the scope of the Record of Decision for the ICP. Such modifications may require additional environmental analysis and documentation.

Compliance with the approved Plan of Operation is conditioned upon compliance with the terms of the state and federal permits, which govern actions that could affect the surface resources on National Forest System lands. If, for example, the Air Quality were violated the Department of Environmental Quality would take the lead role in enforcement, but the Forest Service could also issue a notice of noncompliance under its mining regulations, identify what needs to be fixed and

provide a reasonable timeframe to bring the Project back in compliance with the terms of its Air Permit.

Although the Forest Service and other state and federal agencies would coordinate with each other to the extent possible, ICP has a legal and financial interest in seeing that the Project is implemented as described in its approved plans and permits. There has been a considerable investment in time and money during exploration evaluation and permitting of the Project. The success of the mining venture depends on implementing and coordinating all of the facilities, activities and personnel in an economically viable and environmentally sound way.

To accomplish the objective of documenting compliance with permit requirements, a system of self-monitoring, and Quality Assurance/Quality Control techniques is proposed. To achieve this objective, ICP would provide the Forest with a description of how environmental protection standards contained in approved Plans and Permits would be implemented. This plan would specify company and contractor personnel who are responsible for performance, inspection and approval of all work that affects the surface resources. The ICP would designate an environmental coordinator as the primary contact with the Forest Service on permit compliance, monitoring and mitigation.

An interagency task force would be formed to administer the ICP Plan of Operations. The Forest Service, IDEQ and US EPA (plus other agencies as appropriate) would be members of the task force. This group would oversee regulatory compliance and quality assurance issues related to the ICP.

Annual Reporting

The ICP would submit an annual report to the Forest Service that contains a description of all activities conducted during the previous year, summarizes the amount of acreage disturbed, status of reclamation, number of employees, spills or releases of chemicals or fuel, results of all monitoring plans in a format approved by the Forest including a complete data summary and illustrating any data trends, status of mining plan (tons of ore and waste mined and any changes to methods or equipment) and plans for the coming year. Significant changes would be required to be incorporated into the Plan of Operations and reflected in the financial assurance. Past, on-going or projected impacts to the environment may also require amendment of the Plan of Operations or financial assurance held for the Project.

Air Resources

The ICP proposes to control fugitive and process related dust generation by watering or chemical treatment of roads and disturbed areas, installing scrubbers and baghouses to capture dust from process components and otherwise comply with provisions of the State of Idaho's rules and regulations pertaining to protection of air quality.

The ICP would obtain Air Quality Permit from the State of Idaho prior to initiating construction activities. This Permit would be incorporated into ICP's Plan of Operation.

The ICP's Plan of Operation would be supplemented to include the reduction of impacts of dust along primary access roads by watering, surfacing, or treating the surface of the road with an approved chemical amendment. Treatment would be as directed by the Forest Service, based on the level of use, and would focus on the areas adjacent to established recreation sites and private dwellings.

Monitoring

The Forest would meet with the ICP annually to review the Plan of Operation. A summary of results of any air quality monitoring required by the Idaho Department of Environmental Quality would be supplied to the Forest Service in an annual monitoring report. Air quality mitigation measures would be modified or supplemented as necessary to address air quality concerns.

Geochemistry and Metals Leaching

Metals leaching and acid drainage is a potential concern for the TWSF and post-closure mine discharge. Operational, closure and post-closure monitoring is designed to identify mobilization of metals into the groundwater and surface water. The results of these monitoring programs would be forwarded to the Forest Service on a quarterly basis.

The ICP would provide the Forest, for review and approval, with a geochemical monitoring program for waste rock and tailings. This plan would identify action limits or thresholds of concern, and feasible methods of neutralizing or isolating materials that exceed identified action limits. The Plan would also include a quality control and quality assurance (QA/QC) component to assure that an adequate quantity and quality of data is being collected to identify any acid generation or metals leaching problems.

The requirements for monitoring and treatment of discharges from the TWSF and underground mines, and the short and long term monitoring of surface and ground water are described in the *Water Resources Technical Report* (Hydrometrics, 2006) and elsewhere in this Monitoring and Mitigation section.

The ICP would add an alkalinity amendment (limestone, lime or cement) to the slash waste rock left in the underground mines as a control to metals leaching to the groundwater. ICP would submit a plan for slash amendment and receive Forest Service approval prior to placement of slash in underground mine areas.

Commingle Tailings and Waste in TWSF

The agency alternatives would require the commingling of tailings and waste rock as they are placed in the TWSF. Tailings have a much smaller particle size than waste rock, and thus have a much lower permeability. Therefore, air and water movement through tailings is much less than through waste rock. Commingling the tailings and waste rock would effectively encapsulate the waste rock, which would help minimize air and water movement through the waste rock. The ARD potential of water moving through the waste rock would be substantially reduced as a result of this encapsulation. This would result in the hydrologic and geochemical characteristics of the TWSF behaving as though it consisted almost entirely of tailings.

Placement of tailings and waste rock on the TWSF would be coordinated such that both materials are properly placed and the tailings compacted according to TWSF final design requirements. Tailings placement in winter would follow the same requirements as described in Alternative II. Waste rock encapsulation would need to occur at least once per year in order to achieve the desired water quality effects. A detailed plan for placement and commingling tailings and waste rock would be prepared by FCC and submitted to the Forest Service for approval prior to TWSF construction.

ICP would provide a plan for handling and disposing of any pre-existing mine waste materials that would be disturbed by ICP activities. This plan would address issues related to the CERCLA cleanup within the designated superfund site.

Annually, the ICP would summarize the results of the previous year's geochemical monitoring program, update the geochemical model based on additional data and describe any changes to their Plan of Operation necessary to meet the geochemical standards which are established. The Forest Service prior to the next year's operation would review this summary.

Post-Mining Monitoring, Action Limits and Response

Post-mining monitoring of water quality in, and/or discharging from the mines and TWSF would be for a period of not less than 10 years. This monitoring would demonstrate that water quality meets established standards (including groundwater requirements) based on a statistical baseline

established in accordance with Idaho DEQ guidance, and is stable over time and a range of hydrologic events prior to bond release. Quality standards for these facilities would be established to protect all beneficial uses of the receiving streams. Initially these standards would be set at the limits in the approved NPDES Permit. If acceptable levels of water quality are not reached, then additional levels of treatment would be required. The results of all water quality monitoring would be submitted to the Forest within 10 days of receiving such information from the laboratory. Annual summaries of monitoring programs would be forwarded to involved state and federal agencies.

Geotechnical Stability of Facilities and Consequences of Failure

A minimum static factor of safety of 1.5 and a minimum pseudo-static factor of safety of 1.15 are required for the TWSF and Ram and Sunshine portal patio fills. A 500-year earthquake would be the minimum used for seismic design at both sites.

Process ponds would have overflow spillways designed to pass a 100-year event in order to preserve the integrity of the pond and liner in case of overflow.

The ICP would submit a plan for approval by the Forest Service for placement of tailings into the TWSF during winter months that would maintain the design density and moisture content of the dry stack tailings. At a minimum, the Plan would address the following: any accumulated snow greater than 1-inch in thickness, or ice greater than 1/2-inch in thickness would be removed from the active tailings placement surface prior to placement of additional lifts of tailings. ICP would utilize a daily inspection form during winter months to document the presence and removal of snow and ice on the TWSF. Snow and ice would be pushed to an inactive area of the tailings facility (see below). Daily field-testing would be conducted during the first winter season and the conditions during placement would be documented during that time. Tailings that cannot be placed due to obvious freezing would be sent to storage immediately. Otherwise, density and moisture testing upon placement would determine if the tailings are properly compacted, or if they need to be removed and stored until conditions improve. The documentation obtained during the first season would help to develop procedures for identifying unfavorable conditions prior to tailings placement. At all stages in the development of the TWSF an adequate surface area for storing frozen tailings and snow/ice would be maintained. Prior to each winter season, a specific tailings placement plan would be developed, including the reservation of space for storage. Any frozen tailings storage area would require a location where at least two lifts of tailings have been placed to specification (i.e., the frozen tailings storage area would not be directly on the liner protection layer, nor would it be on exposed liner). After the spring thaw, the tailings would be tested for moisture content and moisture conditioned as needed by spreading them in lifts to either dry, or to have moisture added prior to compaction. The stored tailings would be completely removed from the storage area and the surface of the storage area would be graded and recompacted prior to placement of any additional tailings.

The ICP would maintain a record of volume and location of stabilized water treatment waste within the TWSF. Any stabilized water treatment waste would be located a minimum of 150 feet from the ultimate exterior slope of the TWSF and a minimum of 5 feet from contact with the underlying liner. The depth of the stabilized waste at any point within the TWSF would never be greater than half the height of the TWSF pile. Cover liners placed over the stabilized waste to minimize potential for leachate from the water treatment waste would extend a minimum of 10 feet horizontally outside from the edge of the waste trench.

Mitigation Measures for Stability

If geotechnical problems arise during construction or operation, the responses would include but are not limited to: stopping the addition of more material in the affected area; removal of failed material and repair of liners if affected; reducing slope angle or buttressing slopes to increase stability; redesign and construction of the facility to avoid a future recurrence of the failure.

Sediment

Runoff from undisturbed areas would be diverted around all surface disturbances through ditches or berms. Diversions that would exist beyond life of mine would be designed to safely pass flows from the 100-year, 24-hour storm event.

Non-point source sediment control measures would consist of practices such as: disturbing the smallest area practical, concurrent reclamation when feasible, intercepting and treating runoff from disturbed areas in accordance with best management practices and the Storm Water Pollution Prevent Plan (SWPPP) to prevent sediment from leaving the site, and diversion of all runoff from undisturbed areas around areas of disturbance. No surface disturbing activities would commence until provisions for erosion and sediment control have been reviewed and are in place.

Berms and ditches would control runoff from road surfaces. The ditches would have settling basins, hay bales or silt fences to control sediment. Culverts sized to meet Forest Service Standards would be installed at all known springs and natural small drainages and where needed for road drainage. Sediment control devices such as stormwater dispersion terraces, silt fences, gabion sediment traps, grass filter waterways or straw bale barriers would be placed as needed to minimize road runoff on the undisturbed areas between and downhill of the roads. Road cuts and fills would be seeded with a quick growing cover consisting of native or short lived non persistent species adapted to site conditions as soon as practicable after construction, to minimize the sediment transport from these disturbed areas. Road revegetation would use hydroseeding, fertilization, dry mulch and tackifier on areas adjacent to streams, or on steeper or more erodible cuts or fills as appropriate.

Undisturbed vegetative buffers would be maintained along all surface waters as described in the Forest Plan, Soil and Water Guidelines (USFS, 1988). Field review to confirm these filter strips would be required prior to clearing.

The normal operating season for construction of earthen structures would be from June 1 to October 30 each year. Operations outside this period will be approved on a case-by-case basis after considering the potential for resource damage. Operations outside of this period would include provisions for ensuring that operations and facilities would not cause adverse surface resources impacts due to the effects of snow and freezing temperatures.

Snow plowing on Forest Roads would be regulated under an approved Forest Road Use Agreement.

Sediment Control Monitoring

All diversions and sediment control or treatment measures would be inspected by ICP employees or contractors, who would certify that the facility was constructed as planned, prior to use. Inspection and maintenance of sediment control measures would include:

1. Seasonally prior to and after snowmelt, after severe storm events, and prior to the winter season.
2. Sediment control devices would be cleaned to maintain at least 50 percent of their storage capacity prior to spring runoff.

The results of these inspections would be documented and available for review and submitted to the Forest Service annually.

The ICP would supplement its Plan of Operation as deemed necessary by the Forest Service, with site specific plans for erosion and sediment control facilities and practices in areas that are proposed for disturbance. The Forest would review these plans prior to construction to ensure that they meet the intent of the approved Plan of Operation and the Forest Service Preferred Alternative. Design and location of sediment control structures would be approved by the Forest prior to installation.

Annually, the ICP and the Forest would review and approve the effectiveness of ongoing erosion and sediment control measures prior to next year's operation.

Soils

The ICP would recover soil material from all areas of project disturbance in sufficient quantities to place a minimum of a 1 foot layer on features identified for reclamation in the Reclamation Plan. Additional topsoil may be required based on site specific analysis of the substrate material being covered.

The following would be required under all action alternatives: earth fill construction would be confined to the normal operating season unless specifically approved by the Forest; unless otherwise authorized, stabilize and reclaim all exposed soil materials in the same season as the disturbance; all slopes with exposed mineral soil materials would be kept to a minimum; surface disturbance would be recontoured to the extent practicable except where authorized to achieve other resource objectives; and disturbed and reclaimed slopes would be shaped to prevent the concentration of water except at points specifically designed to handle such flows without erosion. The ICP would comply with USFS Region 4 Reclamation Guidelines (USDA FS, 2004) except where otherwise authorized by the Forest.

Monitoring

The Forest and the ICP would review the Plan of Operations including the Reclamation Plan and financial assurance on an annual basis. The Plan would be modified or supplemented as necessary to address soil issues.

Ongoing review of soil erosion and productivity would be conducted by FCC and reviewed by the Forest Administrator. This monitoring would follow all surface disturbing activities, as well as spring runoff, large storm events and the fall reclamation effort. The results of this monitoring would be documented by FCC and used to update the plans for erosion, surface water control, and reclamation.

Water Resources

ICP has proposed a water monitoring plan to address operational and closure assessment of water resources. In order to allow a thorough and more timely evaluation of potential impacts of the proposed mining activities on groundwater and surface water quantity and quality the ICP would modify their water resources monitoring program to provide enhanced water monitoring to detect, document, and quantify effects of mining. The modified monitoring plan would support a performance-based approach to compliance assessment, where groundwater quality data from select operational monitoring wells to be located downgradient of the mines would be evaluated for compliance. If performance criteria exceed pre-established targets (e.g. if the calculated groundwater load were to result in exceedance of a surface water compliance target), a response action would be required by the mine to reduce the groundwater load to acceptable levels.

The purpose and rationale for these changes in the water monitoring program include:

1. To provide alternative-specific monitoring of facilities not included in, or modified from, facilities in Alternative II;
2. To collect information to support source identification and/or source allocation to differentiate effects of ICP from those of BMSG;
3. To collect information needed for final design of the reclamation and closure plan; and
4. To more closely reflect agency preferences in monitoring protocols, especially to make ICP monitoring consistent and comparable to BMSG monitoring and to support compliance monitoring.

The water monitoring plan proposed by ICP was developed for monitoring of facilities located and sized according to Formation's proposed mining plan. If another alternative were selected, ICP would be required to submit a water resources monitoring plan tailored to the specifics of that alternative. Another component of the modifications to the water monitoring plan is to support source identification and/or source allocation to differentiate effects of ICP from those of BMSG, under all alternatives the monitoring plan would include:

- Additional groundwater monitoring wells located to the north of the Ram underground workings to monitor for possible northward groundwater flow towards Big Deer Creek through bedrock structures such as the No-Name Fault;
- Additional monitoring wells south of the Ram workings to evaluate potential hydrologic connections to the Blackbird Mine-area groundwater;
- Additional monitoring wells peripheral to the Sunshine Mine to augment current information on groundwater flowpaths in the Sunshine area bedrock and possible hydrologic connections to the Blackbird Mine-area groundwater;
- Monitoring of storm water outfalls to determine effects of storm water and sediment quality on streams and to judge effectiveness and adequacy of storm water controls;
- Installation, testing and monitoring of monitoring wells/recovery wells downgradient of the Ram workings in the first years of mining to determine the effectiveness of FCC's proposed recovery system and to monitor groundwater release from the mine;
- Monitoring of mine inflow patterns and rates and mine water quality (drainage from tailings backfill, groundwater inflows, mine water sumps);
- Monitoring wells downgradient of TWSF to monitor impacts to shallow aquifer; and
- Coordination of ICP and BMSG monitoring activities to ensure consistency and comparability of data.

To collect information needed for final design of the reclamation and closure plan, the modified monitoring plan would also include:

- Monitoring of mine inflow distribution, quantity and quality. This information would be used in assessing mine recharge rates after shutdown and in design and operation of the post-closure mine dewatering system;
- Monitoring of springs and seeps adjacent to mine facilities for early detection of potential groundwater impacts; and
- Operational monitoring of mine water quality (drainage from tailings backfill and mine water sumps). This data would be used in assessing and predicting the effectiveness of tailings amendment in reducing the leaching of metals to groundwater and would characterize underground mine water sources.

To more closely reflect agency preferences in monitoring protocols, the revised monitoring plan would include:

- Minor modification to monitoring locations, frequency and parameters.
- Coordination through the Forest Service of ICP and BMSG monitoring activities in the timing, frequency, sampling methods, analytical methods and quality assurance/quality control requirements of monitoring to ensure consistency and comparability of data.
- Consistency with agency guidance and recognizing BMSG cleanup requirements in the collection and evaluation of monitoring data to determine compliance with surface water and groundwater water quality standards, performance standards and limits. For surface water, this would include compliance testing compatible with the Blackbird Unilateral Order on Consent (UAO) statement of work (SOW) requirements for Big Deer Creek/Panther Creek watershed (compliance based on 96-hour testing). For groundwater, this would include compliance testing based on IDEQ guidance (e.g. test for difference in mean concentrations with standards/limits).
- Consistency with DEQ guidance on development of a statistically significant baseline data set for surface and groundwater.

- Adaptive management to enhance monitoring as needed to support compliance monitoring.
- Reporting of all monitoring data to the Forest Service, IDEQ and EPA.

Additional detail regarding the justification for and requirements of a revised water monitoring plan can be found in the *Water Resources Technical Report* (Hydrometrics, 2006) and Chapter 4 of the EIS.

Emergency Management, Spill Control and Fire

Spill Control

The ICP would update its plans for spill prevention and control of hazardous materials in supplements to its Plan of Operation, prior to any change in transportation route or method or prior to transporting any chemical or fuel not previously listed in the plans. These plans would describe the toxic or hazardous materials at the site, and how they are transported, stored, used and disposed of. They would describe the emergency procedures, equipment and personnel that would be used to respond to an accidental spill, both on site and during transport on National forest System Lands. It would describe spill response training of all company employees, subcontractors and their employees.

ICP would have a documented Plan describing monitoring procedures to ensure: that all storage and contained facilities meet the prescribed standards; all emergency first aid and spill response materials are available and stored in the proper place; that all radio communications equipment is in working order; and that all shipping companies are complying with the terms of their road use permit for shipments on Forest Roads and on the mine site.

Two separate plans are required to address transportation and storage of chemicals and fuels under different regulatory authorities.

1. A Spill Prevention Control and Countermeasures Plan (SPCC) is required by federal law for storage of petroleum products at the Project. It addresses design standards for storage facilities, and response strategies in the event of a spill.
2. A Spill Response Plan is required by the Forest Service for transport of hazardous materials on Forest Roads and management and storage at the Project site. It would be incorporated into the Forest Service Road Use Permit, which is a required part of the ICP's Plan of Operation. Under the terms of this permit, all suppliers of such material would be required to submit spill response plans which describe the procedures, equipment and personnel which would be used in case of a spill during transport. All suppliers of hazardous materials or petroleum products would be required to comply with the ICP's approved Transportation and Spill Response Plans insofar as it affects any part of their operation.

Requirements for transport of hazardous or petroleum materials on Forest roads would include: use of single unit haul (4,500 gallon maximum, no tractor-trailer) vehicles not tandem trailers for transport of fuel; locations of spill response materials; provisions for radio contact with the mine site and the Lemhi County Sheriff; hazardous materials and petroleum products would be hauled in daylight hours on Forest roads unless otherwise approved; commercial haul may be limited on national holidays; experienced drivers would accompany new drivers for a minimum of one trip over the permitted road; maximum speed for over width vehicles would be 20 miles per hour; advance plans for diversion of streams which could be affected by spills of hazardous materials; notification procedures in the event of a spill; and the use of pilot vehicles for hazardous material haulage.

Pilot vehicles would be a legal width two-axle vehicle identified with approved signing. They would be equipped with VHF radios for emergency use only and CB radios for vehicle to vehicle communication. The VHF radios would be capable of communicating with the Lemhi County Sheriffs Office and Salmon National Forest Fire Dispatcher. First aid and containment equipment would be carried in all pilot vehicles piloting hazardous materials and petroleum products along with a copy of

the most recent spill response plan. All pilot vehicles drivers would complete spill response, and safety training, at least once annually prior to piloting hazardous materials and petroleum products.

The ICP would request that all suppliers of toxic or hazardous materials provide evidence of spill response training, plans, and spill cleanup materials that would be used in transporting materials to the mine. They would request certification that all trucks used to transport materials to the mine site meet or exceed Department of Transportation standards for use material being transported. The ICP would provide this information to the Forest Service prior to shipping hazardous materials or fuels. The ICP would notify the Forest Service prior to changing types of transport vehicles, materials or material containers for hazardous materials.

Annually the Company would inspect and review: all storage and containment facilities to ensure they are maintained to standard and adequate to contain spills; all emergency first aid and spill response materials to see that they are current and stored in the proper place; radio communications equipment to see that it is in working order; transport companies to ensure that they are complying with the terms of their road use permit for shipments on Forest roads, and on the mine site. The ICP would document the results of this annual review, certifying to the Forest Service and other appropriate agencies that all Plan requirements are being met.

Fire Protection

The ICP proposes to comply with all rules and regulations pertaining to fire protection and health and safety of project employees.

The Forest requires operators on Forest land to comply with procedures for protecting against starting and suppression of accidental wildfires. State of Idaho Forest Codes also apply.

The ICP would supplement its Plan of Operations as necessary to include requirements for burning of slash and other debris, maintenance of fire tools as required by State and Federal requirements, approved mufflers and spark arresters for all internal combustion equipment, fire extinguishers, pumps or other fire fighting equipment.

The ICP would designate an individual to be responsible for all aspects of the Plan of Operation related to fire. This individual would inspect and certify that the fire cache contains the required type and number of tools and equipment.

The Forest Administrator would conduct an annual inspection of the ICP fire cache, and a spot check of muffler and spark arresters. The Administrator would review and approve the fire plan on an annual basis. The Plan of Operations would be modified or supplemented as necessary to address fire and emergency issues identified by ICP or the Forest.

Emergency Management

Mine Safety and Health Administration (MSHA) governs provisions for ensuring worker safety. The ICP training program would comply with Mine Safety and Health Administration standards to include annual first aid and hazardous materials training for all employees.

The ICP would have the necessary trained personnel and equipment to respond to fires and/or medical emergencies at the mine site.

The ICP would meet with the Lemhi County Ambulance Service to discuss coordinated response to vehicle or other emergencies on Forest roads and within the mine area. The Company would provide emergency medical technicians and its own land based emergency transport service from the mine to Salmon. The ICP would also make a standing agreement for “Life Flight” services to allow rapid transport in the case of extreme emergencies and designate a helicopter landing facility at the mine property.

Heritage and Cultural Resources

The management of heritage and cultural resources on federal lands or federally funded, licensed, or permitted projects is governed by Section 106 of the National Historic Preservation Act and associated regulations. The procedures prescribed in this legislation and regulations are applicable to ICP development activities. If heritage or cultural resources are discovered during any earth disturbing activities, the activities would immediate cease and the Forest archeologist be notified.

ICP would utilize the alternative water discharge pipeline route identified in Alternative IV to avoid potential impacts to cultural resources in the lower Bucktail drainage.

Monitoring

The Forest, in consultation with other state and federal agencies, would meet the ICP annually to review the Plan of Operation. The Plan would be modified or supplemented as necessary to address cultural resource measures.

The ICP would have a qualified individual inspect and/or monitor surface disturbing activities in the vicinity of any identified cultural resource.

Land Use

Benchmarks, section and corner monuments would be protected or referenced prior to being disturbed. Prior to disturbing any benchmark, section or corner monument, ICP would submit a plan that describes plans to protect or reference them.

Noise

The ICP proposes to comply with all health and safety requirements pertaining to noise generation. MSHA governs worker health and safety, which includes requiring noise protection for workers in high noise areas.

Reclamation

Reclamation activities would be required to comply with Forest Service guidelines on seasonal disturbance and vegetation removal to control erosion and use of native vegetation. The agency goal for water quality is to maintain water quality such that there is no material negative surface water quality impact at the BMSG compliance points or elsewhere in the surface waters and such that there is no material negative groundwater quality impact. No material impact is defined as no interference of attainment of BMSG cleanup goals, compliance with groundwater and surface water quality standards including the Idaho Groundwater Quality Rule, and compliance with applicable water permits including NPDES permits.

The water quality goal has been established by the Forest Service and EPA and is based on the Forest Service's interpretation of the requirements at 36 CFR 228.8(b) for protection of water quality and minimization of adverse environmental consequences. The regulation at 36 CFR 228.4(c)(3) requires the ICP Plan of Operations to describe the measures to be taken to meet the requirements for environmental protection found at §228.8. The stated goal is to ensure that the ICP is in compliance with applicable federal and State requirements and poses no interference to the ability of BMSG to achieve its cleanup goals under the Consent Decree and Unilateral Order for the Blackbird Mine.

Mitigation and Management

Mitigation and monitoring measures designed to meet reclamation objectives under all alternatives would be required as conditions to Forest Service approval of the Plan of Operations and are as follows:

The ICP would submit cross sections and topographic maps, which display post-mining topography for all reclaimed areas. Slopes on these areas would be three to one or less unless it can be demonstrated to the satisfaction of the Forest Service that a steeper slope can be reclaimed to the same standard and stocking criteria. Edges of topographic disturbances would be blended with adjacent undisturbed land and would have no sharp topographic breaks.

ICP would submit a revised design for Forest Service approval of the TWSF cap that includes a soil cover layer that is at least 4 feet thick over the impermeable liner in order to allow the growth and long term sustainability of native forest tree species without damage to the liner system.

Ore processing and other ancillary facilities would be removed, including foundations, and the areas returned to as near the original contour as practicable, topsoil replaced and the area revegetated.

Soil storage sites would be restored to pre-mine topography upon removal of stockpiles.

All roads, including haul roads that are not needed for long-term access needs would be recontoured to the extent practicable and revegetated. Reclamation of roads would occur as soon as the lack of need for future use is identified. Forty thousand feet of existing roads identified in the Transportation Technical Report (Hydrometrics and Smith, 2006) would be reclaimed during the initial startup and construction period (within the first 2 years following project initiation). Roads that are retained for long term use would have the traveled way reduced to that needed for the anticipated traffic, and any excess road surface recontoured and revegetated.

Sediment control facilities would be recontoured and reclaimed once they are not needed and areas above them have been reclaimed to standards.

Interim reclamation measures would be presented to the Forest Service for review and approval prior to a temporary mine closure.

Prior to interim or final reclamation, the ICP would certify that chemical and physical characteristics of the material in the TWSF are as described in the baseline characterization. If material properties change, a modified Plan of Operation would be submitted including plans for neutralization, isolation, and reclamation of the materials.

Soils and suitable overburden material (as defined in the soil report) would be salvaged from disturbed areas sufficient to cover all disturbed areas with 1 foot of topsoil. Soil would be handled only when it exhibits good tilth and is moderately dry. Soil stockpiles would be placed in locations that are stable, isolated from surface and subsurface water, gently sloping and well drained. Stockpiles would be convex in shape and have no more than three to one slopes. They would be revegetated immediately to prevent erosion. Sediment control structures would be used to ensure that no soil material is lost.

Prior to topsoil salvage, trees would be cleared to facilitate removal. Some of the tree material would be piled and stored for later use in reclamation.

Appropriate reference sites would be identified in the ICP Project vicinity to determine native species occurrence and cover. This information would be used to develop a long-term site reclamation plan. A minimum of two reference sites would be identified to represent: 1) warm, dry sites and 2) wet, cool sites. Based on the reference site data, appropriate native seed mixes and/or plant lists would be reviewed and approved by the Forest Service prior to any site revegetation.

Short-term site reclamation, such as seeding topsoil stockpiles, would utilize native species or short lived non-native species, such as annual grasses or cereal grains. No persistent non-native species would be used in reclamation.

Seeding would normally be done in the fall after September 30th and before the ground freezes. Seeding rates should be in the range of 60 to 80 pure live seeds (PLS) per square foot. The lower seeding rate should be used on the drier sites and the higher seeding rates on the wetter sites.

If the approved reclamation plan includes tree and shrub plantings the planting would be done in the fall or spring using bare-root stock or container-held seedlings. Tree and shrub stock would be from sources appropriate for the elevation and climate.

For the ICP, the following reclamation criteria are also required to minimize impacts to the environment:

1. Recontoured topography would, to the extent possible, be gently sloping, at a maximum grade of no more than three to one or similar to the natural grade unless specifically authorized by the Forest Service. Convex slopes would predominate to avoid concentration of water except in areas specifically designated to handle the flows. Drainage patterns would be designed to handle the anticipated surface runoff and designed to accommodate such runoff without erosion or stability problems.
2. Vegetative species would be selected based on the following priorities: native species capable of being self-sustaining on the selected site; erosion control and stability; no noxious weeds. Sediment and erosion control measures would be used to prevent erosion to the extent possible on reclaimed surfaces, and to retain sediment onsite if erosion does occur. All sediment control measures would be maintained by the ICP until the reclamation effort has met established standards and bonds have been released.
3. Vegetation reestablishment criteria for bond release is that reclaimed areas would achieve 90 percent of reference site groundcover conditions.
4. All toxic or hazardous substances would be isolated from the surface environment.

Revegetation with native species would minimize the amount of time to return to near natural conditions and to minimize the spread of non-native species.

The ICP would consult with the Forest Service prior to final closure of underground mines to determine if complete backfilling of adit entrances or bat-gates are the most appropriate closure method.

Noxious Weed Control - A weed control plan would be included in the Idaho Cobalt Project Reclamation Plan that would be submitted to the Forest Service for review and approval. This plan would include specifics on reducing noxious weed introduction and weed control in the Project area. Noxious weed control activities at the site would be ongoing to prevent the establishment of noxious weed populations.

Monitoring

Annually the Forest Service would meet with ICP to review the Plan of Operation. ICP would submit a summary of reclamation activities including monitoring. This report would include the use of maps and photos to allow the accurate accounting of disturbed and reclaimed acreage. The annual report would include plans that project the following seasons disturbance and reclamation work. This plan would include details on vegetation removal and treatment, topsoil salvage, storage and revegetation, and seasonal reclamation requirements. The Forest Administrator would conduct an annual inspection of site reclamation.

Reclamation Monitoring - Monitoring would be conducted to determine success of revegetation and assess if maintenance activities are needed. Vegetation growth would be monitored in June and August following the first growing season. Species composition and canopy cover of seeded/planted and "volunteer species" would be recorded. If seeded/planted species have not become established following the first growing season, supplemental seedings and plantings may be undertaken. If noxious weeds invade revegetated areas, they would be removed by mechanical or other approved methods specified in the weed control plan. Additional monitoring would be conducted during August for a minimum of 3 years (until successful revegetation is confirmed by Forest Service) following initial planting to ensure that desired vegetation has become established. A report would be prepared assessing the status of the revegetation program and submitted to the Forest Service and other appropriate agencies.

The Plan of Operations would be modified or supplemented as necessary to address reclamation issues.

Financial Assurance

The Forest Service would require a bond or other financial assurance sufficient to cover the actual cost of reclamation, post-closure water treatment and post-mining monitoring.

Recreation

The ICP proposes to include an environmental awareness segment as part of new employee training. Hunting, fishing and other recreation issues are expected to be explained to employees as part of the training. The ICP would establish a company policy that employees are not allowed to have firearms within the Project area or during the commute to the job site.

Employees would comply with federal and state hunting and fishing regulations as well as other Forest policies applicable to recreation on Forest lands.

Socioeconomic Issues

The issues within this category (Land Use, Housing, Public Services, and Schools) are generally governed by State and Local laws and regulations and are not under the jurisdiction of the Forest Service. The Forest Service would work closely with State and local jurisdictions and the ICP to develop solutions to social and economic issues that arise in association with mine construction and operation.

Transportation

The ICP would obtain a Forest road use permit that specifies the conditions under which they can use the Forest roads. State and Federal regulations pertaining to the transport of materials (hazardous and other) would be applicable to the ICP and its suppliers.

The ICP's Plan of Operation and/or Road Use Permit would include the following:

1. Access road design would meet Forest Service specifications (USDOT, 2003) for road width, grade, alignment, surfacing, drainage, quality control and signing. Exceptions to these standards may be used only with Forest approval. Forest Plan requirements for road construction and natural resource protection would be followed. The ICP would submit designs for road construction and improvements to the Forest Service for review and approval prior to initiating construction.
2. Develop busing for all mine employees. The ICP would monitor the use of the provided busing to establish the rate of use, and would furnish an annual summary of use to the Forest. If an 80 percent usage rate for all mine employees including management is not achieved on an annual basis, revisions to the Plan may be required by the Forest Service.

3. The ICP would require contractors to comply with requirements for van pooling or busing of employees including the 80 percent participation goal. In addition, the ICP would ensure that small deliveries or partial loads of materials are delivered to a staging area in Salmon, for consolidation prior to proceeding to the mine site to the extent practicable. Occasional site visitors such as sales people would be authorized access to the site as necessary.
4. The ICP would develop a written policy for compliance with all Forest traffic rules and require that all contractors comply with State and Forest rules for oversize and overweight loads.
5. The Forest Service would approve all location or design changes for access and haul roads.
6. The ICP would be responsible for maintaining all signs, fencing and other features of the mine safety and security program.
7. The ICP would implement or provide payment to the Forest Service for deferred road maintenance (such as surface, culvert or bridge replacement), and recurrent (grading, cleaning culverts) maintenance based on road use, as specified in the Road Use Agreement.
8. The ICP Plan of Operations would describe plans to control public access to mine areas such as fencing and posting to prohibit unauthorized entry to hazardous areas. The Plan would provide for administrative traffic, as well as access for Forest permittees, contractors or operators.
9. For all access roads, the ICP would guarantee administrative, permittee, and contractor use of the mine access road during the active life of the mine including construction, reclamation and long-term monitoring.
10. The ICP would obtain a right of way for existing roads through the Cobalt townsite and Blackbird Mine property and provide those to the Forest Service.
11. The ICP transportation and/or spill control plan would include training requirements for all drivers including a requirement that all new drivers transporting fuel, chemicals or concentrate make their first trip to the site accompanied by a company representative.
12. All fuel, chemical supply and concentrate trucks, all tractor trailer units and any single unit vehicles more than 45 feet in length would be accompanied by a pilot car.
13. No secondary trailers (pups) would be allowed for ICP or their suppliers.
14. Fuel tankers would contain no more than 4500 gallons per load.

During the construction period, the ICP would coordinate all use of approved and alternative Access Routes with the Forest Service under an approved Road Use Permit.

Mitigation

Road Improvements - Formation proposes improvements to the Williams Creek/Deep Creek access road consisting of 10.9 miles of surface treatment. In addition to these improvements, the ICP would implement road improvements in a phased approach, as approved by the Forest Service, to mitigate additional road wear due to mine related traffic. The phased improvements, along with the 10.9 miles of improvements proposed by ICP, would eventually lead to reshaping the subgrade and resurfacing the entire 40 mile project Access Route. Other mitigation would include raising sections of road lying within the floodplain to reduce sediment delivery to streams. Sections to be raised include approximately 1.2 miles of Morgan Creek-Panther Creek Road, No. 60055 between Deep Creek Road and Blackbird Road and 1.7 miles (MP 35.7 to 37.4) of Blackbird Road (No. 60115). Reconstruction from MP 35.7 to 37.4 would also include improving channel width on Blackbird Creek. A new section of road on Williams Creek Road No. 60021 between mile point (M.P.) 7.1 and 8.1 would be constructed to bypass switchbacks that are a safety problem and create a steady grade climbing to the upper bench. During the construction, the section of bypassed road would be reclaimed. Five turnouts on Blackbird Creek Road, No. 60115 between M.P. 38.7 and 39.0 would be constructed to allow safe passing of vehicles. ICP would apply dust abatement to the entire project Access Route to address safety issues and protect investment in resurfacing. The section of road from the intersection of the Ram portal road and the Sunshine portal road to the mill facility would be widened to at least 40 feet under Alternatives III through V and have a safety barrier separating haul truck traffic and other traffic (i.e., vendors, mine personnel vans, regulators, visitors).

Borrow Areas - In addition to the two borrow areas proposed by FCC, additional road improvement work on the Williams Creek Road would utilize borrow from the existing Leesburg East pit located on Forest land in Section 27, T21N, R20E. Use of the Leesburg East Pit would require an estimated three acres additional disturbance at this site, which would be reclaimed following its use.

Road Reclamation - FCC plans on reclaiming approximately 23,760 feet of site roads during the construction phase. The agencies have identified an additional 15,840 feet of site roads to be reclaimed during the construction phase. All new roads constructed under all Alternatives would be reclaimed at closure, except those roads identified by the agencies as roads to be used for administrative purposes.

Monitoring

The Forest would meet with the ICP annually to review the Plan of Operation, including the transportation plan. The Plan would be modified or supplemented as necessary to address transportation and safety issues.

1. The ICP would develop a testing and inspection scheduled as outlined in Forest Service guidelines (USDOT, 2003), acceptable to the Forest for all construction and reconstruction of mine access and haul roads, and would be responsible for providing "as-built" certification of all items by a licensed professional engineer. The Forest Administrator would review the Project construction during construction to ensure compliance with approved Plans. Certification, results of tests and inspections, would be forwarded to the Forest for review and approval.
2. The ICP and the Forest would review all access and haul roads, during and after spring runoff, and prior to winter operations. The purpose of this inspection would be to certify that all design features are functioning as designed, and/or to identify any needed improvements or changes.

Visual Resources

The ICP proposes to use non-reflective earth-tone paints, as approved by the Forest Service, for all buildings and other major project features. The ICP would be required to utilize shields or baffles on exterior lights to reduce impacts of night lighting on recreationists using the nearby Frank Church River of No Return Wilderness and other National Forest lands.

Vegetation and Timber Resources

The ICP proposes to clear timber on areas scheduled for disturbance by mining operations in accordance with Forest management requirements for timber harvesting.

The Forest Plan contains management requirements for timber cut in connection with locatable mineral operations, as well as disposal of slash. In addition, it contains standards and guidelines for timber harvest in general. The ICP would submit its plans for clearing and disposal of vegetation prior to beginning operations, and each year thereafter for the following years clearing requirements. The areas to be cleared would also be delineated on the ground to facilitate Forest review. The Forest would review these plans and specify the measures that would be needed to ensure proper utilization of the timber, disposal of slash and protection of the surface resources.

The ICP may elect to purchase the timber from the Forest as an alternative to clearing and decking the timber for disposal by the Forest. Volume estimation and payment would be estimated on an average per acre basis. If the ICP does not elect to pay for the timber, they would harvest it according to Forest utilization standard and deck it for disposal by the Forest. If the ICP mis-manufactures timber under this alternative, they would be responsible for payment equal to the volume affected. All merchantable timber would be utilized. All slash and unmerchantable timber would be piled for burning in location that would not cause damage to surrounding vegetation. The

ICP would burn slash piles as directed by the Forest Service. The Forest would designate piles to be left for wildlife habitat or reclamation use. Debris left from burning would be spread or buried depending on the volume of material. Standard resource protection measures as specified in the Forest Plan and timber sale contract provisions would be applied on a site-specific basis.

Weed Control

The ICP would prepare a weed control plan for Forest Service review and approval. The ICP would use weed-free mulch and seed mixtures, promptly reclaim disturbed areas and control noxious weed annually. Herbicide selection and use would be in accordance with the approved State, county and Forest Service Weed Control Plans.

Wetlands/Riparian

The only dredge or fill in jurisdictional wetlands associated with the ICP would be for the water discharge pipeline crossing Ram Gulch, an unnamed tributary of Bucktail Creek and where that pipeline crosses the riparian zone of Big Deer Creek and discharges into Big Deer Creek under Alternatives II and IV. It is anticipated that these activities would be covered by Nationwide 404 permits. In addition, the ICP has agreed to provide mitigation for direct impacts to isolated nonjurisdictional wetlands and indirect impacts to jurisdictional wetlands as part of their Plan of Operations. The ICP proposes to construct 0.5 acres of wetlands in the headwaters of Big Flat Creek to offset impacts to 0.22 acres of isolated wetlands that would be destroyed by construction of the TWSF and indirect impacts that are predicted to result in the dewatering of 0.22 acres of jurisdictional wetlands downgradient of the Ram Mine for the duration of the mining and closure activities.

Monitoring

Clearing, harvest and slash disposal would be monitored by the ICP to ensure compliance with the Plan of Operation. Special attention would be paid to product utilization, slash disposal, and resource protection measures.

The ICP and the Forest would inspect for noxious weeds on the property in conjunction with their erosion control and surface water monitoring. The ICP would be responsible for conducting any necessary spraying of noxious weeds on the property. Herbicide purchase, use, storage, and disposal would be addressed in the ICP's hazardous materials and/or spill response plans. Herbicide applicators would be properly trained and licensed.

ICP would monitor both the jurisdictional and isolated wetlands in the vicinity of the mining operations and the constructed wetlands to determine mine related impacts to natural wetlands and effectiveness of the constructed wetland features. Monitoring would include seasonal soil water conditions and species composition. Results would be documented and reported to the Forest Service annually.

The Forest would meet with the ICP annually to review the Plan of Operation. The Plan would be modified or supplemented as necessary to address, timber, wetland/riparian and weed control issues. The ICP would be responsible for monitoring and reporting on wetland construction and function. If the constructed wetlands fail to operate as designed, the ICP would develop alternative wetlands mitigation to supply equivalent wetland values in the Project area.

Wildlife

The final reclamation plan would restore wildlife habitats to existing vegetation type (generally lodgepole pine forest) and/or mitigate long term loss of wildlife habitat. In addition, the ICP would educate their employees on: state and federal laws relating to hunting; avoidance of inadvertent or purposeful harassment of wildlife; recognition and protection of state and federal threatened and endangered species and Forest sensitive species in the Project area; and reporting of any T & E or

sensitive plant or animal species to the Forest Service or Idaho Department of Fish and Game (IDFG).

The ICP's Plan of Operations includes the following:

1. Reclamation of project disturbance would include measures designed to produce high value wildlife habitat. These measures would include creation of maximum amount of edge effect in reclaiming large areas; reseeding with mixtures of native plants of value to wildlife; and creation of diverse habitats for game and non-game animals.
2. New power pole construction should follow the guidelines in *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996* (APLIC, 1996) to prevent accidental electrocution of raptors.
3. Company busing of employees.
4. Possession or discharge of firearms by company employees or subcontractors within the Project area would be against Company policy.
5. ICP would report vehicle/wildlife collisions on Forest roads to the IDFG.

Other Mitigation

Other design and operational modifications, mitigation measures and monitoring requirements intended to reduce environmental impacts, improve agency oversight or reduce risk would be applied to all of the agency Alternatives (III, IV and V) and are listed as follows:

1. Modify and/or update the Plan of Operations consistent with selected alternative.
2. To ensure protection of the Blackbird Mine CERCLA remedy, Formation Capital Corporation (the operator) would obtain approval from the EPA and FS CERCLA Remedial Project Managers prior to any construction or excavation or other activity that could change or disturb any structure, pipeline, impoundment, cover, waste rock pile, any engineered infrastructure or other component of the CERCLA remedy.
3. To ensure long-term administrative access for agency personnel for the Idaho Cobalt Project, Formation would obtain access agreements through patented lands owned by Noranda (Cobalt Townsite and Blackbird Mine Site), that would allow the Forest Service future access. Additionally, ICP will provide an agreement indicating permission to utilize powerlines across private property to the Idaho Cobalt Project, which also permits the Forest Service to utilize the power line facilities in the event long-term water treatment or other reclamation administered by the agencies is required.
4. The operator will need to avoid adverse impacts to or interference with existing infrastructure (for example: 6,850 adit and treatment facility), developed by BMSG as part of the CERCLA remediation action.
5. ICP would provide an annual report summarizing mining, reclamation and monitoring activities and projecting proposed activities for the coming year. ICP would conduct an annual review with the Forest Service to determine if activities are in accordance with the approved Plan and if any changes to the Plan or financial assurance are needed.
6. ICP would provide notice to the Forest Service and make appropriate modifications to the Plan of Operations if there are significant changes to project permits (such as NPDES, 404 or Air Quality).
7. Waste rock (slash) left underground in the Ram and Sunshine Mines would be amended to provide alkalinity to reduce potential for metals leaching.
   a) ICP would provide a Waste Rock Amendment Plan as described in the FEIS and Water Resources Technical Report.
   b) ICP would provide funding for the SCNF to obtain a third party contractor to assist SCNF in review of the Waste Rock Amendment Plan.
8. Waste rock and tailings materials would be tested throughout the life of the mine to evaluate potential for acid generation and metals leaching.
   a) ICP would provide a Geochemical Monitoring Plan as described in the FEIS and Water Resources Technical Report.

9. ICP would provide funding for the SCNF to obtain a third party contractor to assist SCNF and Interagency Task Force in review of the Geochemical Monitoring Plan.
10. ICP would provide engineering final design for the ponds that include:
    a) Spillways to reduce risk of failure if overtopping occurs.
    b) Protection of pond liners from potential ice damage.
11. ICP would provide design changes to address geotechnical issues including a 5 foot setback between the toe of the fill and the toe of the cut on the mechanically stabilized earth pad fill and to reinforce or reduce cut slopes to a range of ¾:1 to 1.5:1, where they would otherwise exceed construction standards depending on the soil conditions.
12. ICP would provide a Stormwater Pollution Prevention Plan that includes:
    a) Permanent water control structures that would exist beyond the life of mine and any culverts on streams would be designed to handle flow from the 100-year storm event.
    b) Road sediment control BMPs will be designed for the 25 year, 24-hour precipitation event.
    c) Best management practices would be utilized for project sediment control.
    d) Soil disturbing construction activities would be conducted during a set construction season to minimize impacts to soils and sediment production.
    e) Sediment control monitoring.
13. Modifications to the water resources monitoring plan to provide adequate data to evaluate potential impacts to surface and groundwater.
14. ICP would provide a Post-mining Groundwater Capture Plan that includes:
    a) Decision criteria and action (trigger) limits for post-mining water capture. Criteria would include conditions that would lead to decisions regarding cessation of mine dewatering.
    b) A plan for installation and evaluation of bedrock groundwater, alluvial groundwater and surface water capture systems for the Ram and Sunshine Mines.
    c) The groundwater capture system would be fully installed prior to construction of the mine adits.
15. Enhanced emergency management capabilities would be instituted for medical (including designating a helipad site), spill control and fire situations.
16. Benchmarks, section and corner monuments would be protected or referenced prior to being disturbed. Prior to disturbing any benchmark, section or corner monument, ICP would submit a plan that describes plans to protect or reference them.
17. Native species and more detailed reclamation procedures would be used for reclamation to ensure achievement of self-sustaining vegetation following reclamation.
18. Vegetation reference areas would be established adjacent to the project to quantify reclamation goals for vegetative cover.
19. ICP would require as company policy that employees have no firearms on site or during travel to the site.
20. Additional access road improvements would be made to reduce sediment release and traffic accident risk.
21. Monitoring and inspection of roads and bridges to assure public safety and adherence to Forest Service engineering standards.
22. Construction workers would be required to utilize van sharing or busing to minimize traffic during the construction period..
23. Any surface vegetation clearing or timber removal would be conducted following USFS guidelines and practices and following Forest Service approval.
24. The ICP would institute a weed control plan that conforms to Forest Service and County guidelines.
25. ICP would be required to submit a plan to monitor existing wetlands and constructed wetlands to determine impacts to wetlands functions and would modify the constructed wetlands as necessary to assure that they are providing suitable wetland habitat to compensate for project impacts to natural wetlands.
26. The ICP would submit a final engineering design for the TWSF that includes:
    a) A closure cap that includes a minimum of 4 feet of soil cover material to protect the liner from potential damage from trees growing on the reclaimed surface;

b) A plan for placement of tailings into the TWSF during winter designed to maintain the design density and moisture content of the dry stack tailings;
c) Co-disposal of tailings and waste rock in the TWSF to reduce the oxidation rate of the higher permeability waste rock component and reduce long-term risk to the environment of metals release;
d) Final design for construction of the approved TWSF facility;
e) A commitment that if leakage is detected from the liner agencies would be notified within 10 working days and the operator would submit a response plan with schedule for implementation within 15 days; and
f) Post-mining monitoring of water quality in, and/or discharging from the TWSF for a period of not less than 10 years.

27. The ICP would develop a waste rock disposal plan for any material disturbance on the Sunshine portal pad or any other location where pre-existing wastes may be disturbed for Forest Service approval, in consultation with FS and EPA Remedial Project Managers, in accordance with all relevant federal, state, and local laws and for consistency with the Blackbird Mine CERCLA ROD.
28. The ICP would submit a final engineering design for the water treatment system and provide SCNF with funding for a third party contractor to assist SCNF in review of the Plan. At a minimum, the water treatment plan would:
    a) Provide treatment capable of meeting effluent limits in the NPDES permit; and
    b) Minimize the need for disposal of water treatment waste residues.
29. ICP would submit a final engineering design for the water discharge pipeline and discharge facility that includes:
    a) A route for the water discharge pipeline that avoids potential impacts to cultural resources;
    b) Field investigation report of the discharge location; and
    c) Design of effluent diffuser.
    d) Once the pipeline route is determined, it would be staked on the ground and the Shoshone-Bannock Tribes notified so that they may review the route.
30. ICP would designate a reclamation coordinator to be responsible for the following:
    a) Being the primary contact with the SCNF on permit compliance, monitoring and mitigation.
    b) Describing how environmental protection standards contained in plans and permits would be implemented.
    c) Preparing reclamation plans for all proposed surface disturbance. These plans would be submitted to the Forest Service and would include interim and final reclamation for the facilities along with an estimate of the costs to complete the work.
    d) The coordinator would certify that all reclamation work was completed as planned for each facility. The Forest Service Administrator would accompany the company coordinator in reviewing all proposed activities.
    e) Prior to the eighth year of operation the company would summarize the results of all testing for closure purposes and submit its plans for final reclamation to the Forest Service and Inter-Agency Task Force for review and approval.
31. ICP would reduce impacts of dust along primary access roads by watering, surfacing, or treating the surface of the road with an approved chemical amendment as directed by the SCNF.
32. The ICP would comply with USFS Region 4 Reclamation Guidelines except where authorized by the Forest including the following:
    a) The ICP would recover soil material from all areas of project disturbance in sufficient quantities to place a minimum of a 1 foot layer on features identified for reclamation in the Reclamation Plan;
    b) Earth fill construction would be confined to the normal operating season unless specifically authorized by the Forest Service;
    c) All exposed soil materials would be stabilized and reclaimed in the same season as the disturbance, unless otherwise authorized by the SCNF;
    d) All slopes would be kept to a minimum;

e) Surface disturbances would be recontoured;
f) Reclaimed slopes would be shaped to prevent the concentration of water except at points specifically designed to handle flows without erosion; and
g) If heritage or cultural resources are discovered during any earth disturbing activities, the activities would immediately cease and the Forest archeologist would be notified.

33. The ICP would obtain a Forest road use permit that specifies the conditions under which they can use the Forest roads. The ICP's Plan of Operation and/or Road Use Permit would include the following:
    a) Access road design would meet Forest Service specifications (USDOT Federal Highway Administration, 2003) for road width, grade, alignment, surfacing, drainage, quality control and signing. Exceptions to these standards may be used only with Forest approval. Forest Plan requirements for road construction and natural resource protection would be followed. The ICP would submit designs for road construction and improvements to the Forest Service for review and approval prior to initiating construction.
    b) Develop a plan for busing of all mine employees. The ICP would monitor the use of the provided busing to establish the rate of use, and would furnish an annual summary of use to the Forest. If an 80 percent usage rate for all mine employees including management is not achieved on an annual basis, revisions to the Plan may be required by the Forest Service.
    c) The ICP would require contractors to comply with requirements for van pooling or busing of employees including the 80 percent participation goal. In addition, the ICP would ensure that small deliveries or partial loads of materials are delivered to a staging area in Salmon, for consolidation prior to proceeding to the mine site to the extent practicable. Occasional site visitors such as sales people would be authorized access to the site as necessary.
    d) The ICP would develop a written policy for compliance with all Forest traffic rules and require that all contractors comply with State and Forest rules for oversize and overweight loads.
    e) The Forest Service would approve all location or design changes for access and haul roads on National Forest System lands.
    f) The ICP would be responsible for maintaining all signs, fencing and other features of the mine safety and security program.
    g) The ICP would implement or provide payment to the Forest Service for deferred road maintenance (such as surface, culvert or bridge replacement), and recurrent (grading, cleaning culverts) maintenance based on road use, as specified in the Road Use Agreement.
    h) Road Improvements – road improvements of the entire 40 mile project Access Route as detailed in the FEIS.
    i) Borrow Areas – Work on the Williams Creek Road would utilize borrow from the existing Leesburg East pit. The pit would be reclaimed following its use.
34. The ICP Plan of Operations would describe plans to control public access to mine areas such as fencing and posting to prohibit unauthorized entry to hazardous areas.
    a) For all access roads, the ICP would guarantee administrative, permittee, and contractor use of the mine access road during the active life of the mine including construction, reclamation and long-term monitoring.
35. The ICP would obtain a right of way for existing roads through the Cobalt townsite and Blackbird Mine property and provide those to the Forest Service.
36. The ICP transportation and/or spill control plan would include training requirements for all drivers including a requirement that all new drivers transporting fuel, chemicals or concentrate make their first trip to the site accompanied by a company representative.
    a) All fuel, chemical-supply and concentrate trucks, all tractor trailer units and any single unit vehicles more than 45 feet in length would be accompanied by a pilot car.
    b) No secondary trailers (pups) would be allowed for ICP or their suppliers.
    c) Fuel tankers would contain no more than 4,500 gallons per load.

d) During the construction period, the ICP would coordinate all use of approved and alternative Access Routes with the Forest Service under an approved Road Use Permit.

37. Road reclamation – Approximately 40,000 feet of site roads would be reclaimed during the construction phase. All new roads except those roads identified by the agencies as needed for administrative purposes would be reclaimed at mine closure.

In addition to these protective measures, the USFWS has identified specific requirements in their Biological Opinion to protect bull trout during reconstruction of a section of the Williams Creek road (see Appendix E). NMFS has also prepared a Biological Opinion that details requirements to protect endangered Chinook salmon and steelhead and their habitats (Appendix F).

Alternatives Considered But Dismissed From Detailed Consideration

A number of alternatives raised during scoping and analysis process have been considered but determined by the agencies to be technologically or economically infeasible, to provide no environmental benefit or are otherwise unreasonable or unacceptable. The alternatives considered but dismissed from further consideration are summarized in this section. Evaluation of these alternatives included comparison with objectives of the Forest Plan (USFS, 1988), analysis conducted by the applicant as part of their project development planning and analysis conducted as part of the EIS process.

Alternatives considered but dismissed from further consideration fall into the following general categories:

- Facility Design, Location and Sizing;
- Mining Methods;
- Process Water and Tailings Transport;
- Sediment Control;
- Utility/Powerline Corridors; and
- Reclamation and Closure.

Facility Design, Location and Sizing

A number of facility location alternatives have been considered during the evaluation of FCC's POO. These include alternative sites for the mill, TWSF and water treatment facilities.

Mill

FCC's mill site location is in the Big Flat drainage. The agencies looked at other locations within the Big Flat, but did not identify any that provided quantifiable environmental benefits. Placement of the mill underground was also considered. However, the risks of the additional traffic down the steep hillside to the Ram portal and the logistic difficulties of an underground mill servicing both the Ram and Sunshine Mines make an underground mill infeasible.

TWSF

Alternatives to FCC's placement of the TWSF have included several sites on the Big Flat both to the north and south of the proposed location. The primary objective in alternatives to the proposed site is to avoid potential direct or indirect impacts to isolated wetlands downgradient of the TWSF. Sites directly north of the mill and immediately south of the proposed TWSF were evaluated, but dismissed because of potential impacts to small areas of jurisdictional and non-jurisdictional wetlands. A site northeast of the mill has been retained for detailed evaluation in Alternative IV.

Scoping raised a concern about identification of additional ore reserves and expansion of the mine. FCC has sized the TWSF to contain substantially more (35 percent) material than currently identified ore reserves. This buffer is intended to account for potential variation in tailings and waste rock density, percentage of tailings that would be able to be placed underground, amount of dilution of the ore during mining and total amount of ore mined from that predicted. The agencies do not think there is sufficient information available to evaluate and analyze the range of potential impacts from a significantly increased mine size. Therefore consideration of a larger tailings and waste disposal area just to account for potential future expansion was not evaluated. However, the disturbed area footprint as proposed by FCC (55 acres in Alternative II versus 36 acres in Alternative IV) may be justified based on existing ore reserves and accounting for the uncertainty in a number of the physical properties of the waste materials and by the known mineral resource. There may be variations in the density of the materials as deposited, the amount of tailings produced as a result of dilution of the ore with waste or in the amount of material that can reasonably be placed underground. The larger TWSF pad size would also provide the advantage of increased storage area for tailings material during the winter if freezing conditions requires temporary storage rather than immediate placement and compaction. Additionally, changes in the price of metal values could change the value of some of the material within the current mine plan from waste to ore (or visa versa). ICP would be required to submit information demonstrating that any additional ore and waste material are similar to those analyzed in this EIS prior to approval of TWSF expansion. Alternative III contains an alternative TWFS location. Alternative IV TWSF has a reduced waste storage volume to match the current mine plan and assumptions on tailings and waste characteristics. The TWSF reduction in Alternative IV also uses FCC's proposed TWSF site but avoids placing the facility directly upgradient of some small isolated wetlands. Alternative III avoids the wetlands by moving the TWSF location, but retains the same storage volume proposed by FCC. Other sites evaluated did not have adequate area or had other environmental impacts that made them infeasible.

Water Treatment Facilities

As post-closure water treatment would likely be required for potentially many years, it might be beneficial to have the water treatment facility located where less pumping head was required or closer to the discharge point. Locating the water treatment facilities at the Ram portal, along lower Bucktail or Big Deer Creek or utilizing the Blackbird Mine Site Group water treatment plant on Blackbird Creek were considered. The logistic and access difficulties associated with maintaining an active water treatment facility in the Bucktail or Big Deer drainages was considered too great. Road maintenance, power reliability and steep terrain all add risk particularly to winter operations. Utilization of the existing Blackbird water treatment facility was retained for detailed analysis in Alternative V.

Water Treatment Discharge Location - Locating a surface water treatment discharge at Big Deer Creek (WQ-24), South Fork Big Deer (WQ-22), Big Flat (WQ-7), Little Deer (WQ-5), Panther Creek (WQ-25), and Blackbird Creek at the Blackbird Water Treatment Plant outfall were considered in considerable detail including analysis of several of the sites in preliminary DSM runs. A non-discharge option was also considered. The South Fork Big Deer location was dropped from consideration due to its proximity to the Big Deer Creek location, and the sediment quality limitations on South Fork Big Deer Creek, which would result in less dilution. Discharge of treated water to South Fork, which still contains metal contaminated sediments, would also likely result in dissolution and re-entrainment of metal load in the lower South Fork. While this is expected to occur over time as the BMSG cleanup progresses, discharging clean water that reaches Big Deer and Panther Creeks after picking up an additional metals load does not seem to be in the best interest of the fishery. The logistics and access difficulties associated with constructing and maintaining a pipeline down Little Deer Creek was considered too great, and this alternative was dismissed by the agencies. The no-discharge option was dismissed due to the positive water balance at the site. Discharge to Panther Creek would require a very long pipeline along the existing road system with associated cost and maintenance issues or new access in designated roadless area in the Big Deer Creek drainage. Additionally, the removal of the treated water volume from the South Fork and Big Deer Creek Drainages results in potential increase in metals concentrations. Discharge to Big Flat Creek would

involve transfer of water out of the Bucktail/Big Deer Creek subbasin and affects metals concentrations in South Fork and Big Deer Creek. Formation requested in a September 5, 2006 letter to the Forest Service and EPA that a Big Flat Creek discharge location be considered in the EIS. Although a Big Flat Creek discharge would have less surface disturbance because of the shorter pipeline distance there are some uncertainties associated with how the increased flow would affect the channel in the ephemeral portion of the drainage downstream from WQ-7. FCC provided some additional information on potential road alignment to a Big Flat Discharge site and subsequently withdrew their request that this alternative be considered in detail in the EIS. In this reach flow is largely in colluvium and alluvium. Alternative III contemplates an NPDES discharge permit to Big Flat Creek from groundwater discharge to the LAT system. Impact analysis of Alternative III indicates discharge of treated mine water to the Big Flat drainage would likely have significant impacts to Big Flat Creek as there would be no dilution during portions of the year. Existing data indicate that a Big Flat Creek surface discharge site would be feasible, however, based on the lack of significant benefits over the proposed Big Deer Creek discharge location, the interbasin transfer issue and the need for over 1/2 mile of new road in the designated roadless area a surface water discharge alternative to Big Flat was not carried forward.

The discharge location in Blackbird Creek at the Blackbird Water Treatment Plant outfall was retained in Alternative V. Discharge to Big Deer Creek (WQ-24) was considered to be the most environmentally beneficial and was retained in Alternative IV.

FCC submitted an option to discharge water through an infiltration gallery in the Big Flat drainage, hoping to avoid a NPDES discharge permit. The EIS team considered discharge via infiltration galleries in the South Fork Big Deer, Big Deer, Little Deer, and Big Flat drainages. An infiltration gallery would consist of a French drain type of pipe and gravel configuration, whereby effluent from the water treatment plant would discharge though a perforated pipe into a gravel bed, and the water would infiltrate into the shallow soils. The agencies believe that this type of discharge would eventually come to the surface and connect to a surface water stream, and thereby behave as if it were a direct discharge to surface water. Additionally, soils and sediment along streams in the Bucktail Creek/South Fork Big Deer Creek/Big Deer Creek drainages contain elevated metals concentrations (Golder, 2001 and 2005a). Infiltration of treated water through these soils could result in leaching of metals from the soil/sediment and increased transport of metals to the streams. The excavation of contaminated soils along these streams would also raise the potential for re-release of hazardous substances. As this alternative would still require an NPDES permit and there was no perceived benefit from this type of discharge, the discharge through an infiltration system option was eliminated from further study.

Work Camp

A work camp near the mine site was considered to reduce traffic and because a private trailer park facility is already in existence at the confluence of Blackbird and Panther Creeks. An area of several acres along Panther Creek would be available for expansion of a trailer park facility for construction workers or potentially for mine workers. The area has shallow groundwater and does not currently have adequate water or sewer facilities to house seasonal or year around construction workers. There is little soil at this site to provide attenuation of wastewater. The area of potential expansion for additional trailer usage at this site is near Panther Creek and much if not all of this area does not have adequate setback to meet Idaho Health Department requirements. Expansion of the trailer facilities at the Panther Creek Inn site to house 30 to 50 workers would likely require a sophisticated water treatment system and a NPDES discharge permit. Lemhi County regulations limit permanent habitation in mobile trailers to a period of less than one year. Based on the regulatory issues with this site and lack of other suitable and available camp locations, use of a worker camp in the general Project area was dropped from further consideration.

Mining Methods

Shaft Access

FCC's mine plan calls for accessing the ore by a decline driven from the hillside in the Bucktail Creek drainage. This minimizes the time needed, cost and waste rock produced in developing the mine. Access via a shaft in the vicinity of the mill site could reduce the footprint of the mine and reduce impacts and risks to the environment associated with the transport of men, materials, ore, waste and water over the steep terrain in the headwaters of Bucktail Creek. Additionally, if future exploration identified additional ore reserves below, or to the south of, the currently identified ore a shaft would probably be the most reasonable way to develop a deeper mine.

A shaft would have a relatively small disturbance footprint including a headframe and hoist house (about one half acre). Utilities including water, power and tailings pipelines could be routed down the shaft rather than down the hillside.

If a shaft were used for initial access replacing the decline it would significantly change the capital costs and economics of the mine. Shaft construction cost would be on the order of two or more times the cost of installing the decline and there would still have to be an opening in the vicinity of the planned decline to provide for ventilation and a secondary escape way. Additionally, the length of time required to construct the shaft and begin production from the mine would be longer, perhaps delaying production for a year or two. This would have a significant impact on the economics of the mine by increasing costs and delaying the period when revenue would start to be generated. If a shaft were added later in the life of the mine in addition to the decline access there would be minor incremental impacts consisting of the additional surface disturbance and an additional estimated 115,000 tons of waste material generated as a result of constructing the shaft and access to the shaft from the existing workings. Shaft access was dismissed from further consideration based on the time required to bring the mine into production, logistics and cost.

Process Water and Tailings Transport

Paste vs. Slurry

FCC proposes to pump tailings from the mill to the Ram Mine as a paste. Transport as a slurry and dewatering at the Ram and TWSF were also considered. The paste tailings at the Ram would be used for mine backfill. The dewatered tailings at the TWSF would be placed in that facility. The agencies looked at relocating the dewatering facilities to the mill site and transporting the dewatered tailings to the Ram by truck or with the tram, and to the TWSF by truck or conveyor. Truck haulage on the steep hillside down to the Ram, particularly in winter, would have higher accident and spillage risk as well as higher energy costs. Tram haulage would still have some spillage risk, but would have significant technological difficulties with winter operations when dewatered tailings would tend to freeze in the tram bucket. The tram would need an additional unloading station at the Ram, further congesting the portal pad and probably requiring enlargement of the pad. This option was dismissed as not providing a significant environmental benefit the paste tailings system.

Sediment Control

Sediment control practices including BMPs proposed by FCC and Jersey Barriers and outsloped roads were evaluated by the agencies. The agency evaluation concluded that maintenance issues associated with the Jersey Barriers would likely limit the effectiveness of stormwater dispersal, causing additional road erosion and stormwater management problems. Use of in-sloped roads and BMPs to control sediment is used in all alternatives to control road runoff.

Utility Corridors

Powerline

An alternative powerline that avoided private land in the vicinity of the Blackbird Mine was considered at the request of FCC. Although a feasible route was identified, the powerline alternative would require additional disturbance, consisting of as much as 7,000 feet of new road for construction. This alternative route was dismissed from further consideration because the company dropped it from their proposal and because of the additional disturbance over the route presented in FCC's POO. A variety of alternative powerline routes exist, some that could avoid or minimize conflict with BMSG' s power supply.

Project Access Routes

Alternatives to FCC's proposed Project Access Route were considered and dismissed. These alternatives were dismissed based on one or more issues relating to road maintenance standards, public safety, incursion into roadless areas, and conflicts with Wild and Scenic river issues.

Moccasin-Napias Route - This route would take Williams Creek Road (FS#60021) to Phelan Road (FS#60098) to Moccasin - Napias Road (FS#60076) to Morgan Creek - Panther Creek Road (FS#60055) to Blackbird Road (FS#60115) to the Project site and was dismissed from further consideration because it would require extensive upgrades, is too steep for loaded truck traffic, and is not currently maintained in winter.

Salmon River Route - This route would take Salmon River Road (FS#60030) to Morgan Creek - Panther Creek Road (FS#60055) to Blackbird Road (FS#60115) to project site and was dismissed from further consideration because the greater length of road immediately adjacent to the Salmon River and Panther Creek would present greater risk from spills. Additionally, this route would require extensive upgrades for safety issues due to the large amount of recreational traffic that would be sharing the Salmon River Road with project traffic.

Big Deer and Little Deer Routes - These routes would use Williams Creek Road (FS#60021) to Deep Creek Road (FS#60101) to Morgan Creek - Panther Creek Road (FS#60055) and then require new road along either Little Deer Creek or Big Deer Creek to the Project site. Developing either route would require one or two new bridges over Panther Creek adversely affecting the creek's eligibility as a Wild and Scenic river. Additionally, these routes would require new road construction in areas currently managed under a roadless classification.

Morgan Panther Route - Access on the Morgan Creek road, which intersects Highway 93 about five miles north of Challis was evaluated more extensively than the other dismissed routes. The Williams Creek, Deep Creek Panther Creek route was selected in preference to the Morgan Panther route because of less road in proximity to streams, significantly longer distance (44 miles) for employees and materials emanating from Salmon, and the fact that the Morgan Creek road in not currently kept open in the winter.

Reclamation and Closure

Based on analyses performed by FCC, contaminants of concern (primarily metals) would be released to groundwater from both the Ram and Sunshine Mine workings following the cessation of mining and reflooding of the underground workings. According to FCC's analyses, containment of the metals load from each mine would be required for some period of time after mine closure to ensure protection of downgradient water resources. The EIS Team considered several alternatives for control of metals migration through groundwater from the Idaho Cobalt Project underground mine workings.

Upgradient Alluvial Capture System

As an alternative to the lower Bucktail water capture system proposed in Alternatives IV and V, installation of a capture system in Upper Bucktail drainage was evaluated to address possible metals loading from the Ram and Sunshine workings to Bucktail Creek via groundwater. Under this alternative, one capture system would be constructed in Upper Bucktail drainage to capture a metals load from the Bucktail Creek surface water/alluvial groundwater system equivalent to the load attributable to the reflooded Ram and Sunshine Mine workings. An advantage of this approach is that it may be possible to capture the required load in a smaller volume of water due to the presumed higher metals concentrations in the upper portion of the drainage. Possible disadvantages include the need for adoption of a waste trading approach to water quality control since FCC would be capturing and treating metals derived from sources other than that attributable to ICP facilities (the upgradient capture scenario would capture "background" metal loads instead of the load attributable to the Ram workings), and the need for closer coordination with BMSG due to the proximity of the capture system to BMSG's existing Phase I capture facilities and Phase II capture facilities added in 2006.

Feasibility of this alternative would require that sufficient load be available in Upper Bucktail drainage to be captured in lieu of the metals load anticipated from the downgradient Ram Mine workings. Based on current information and groundwater flux estimates, the "peak" groundwater metals loads originating from the Ram workings are estimated to be on the order of 2 pounds/day (0.9 kg/day) copper and cobalt, and 0.2 pounds/day (0.09 kg/day) arsenic. Based on available information from Upper Bucktail Creek (site WQ-18) and middle Bucktail Creek (site WQ-19), current surface water loads exceed these values during high flows but not during low flows at both sites. Therefore, the waste trading approach to capture and treatment in Upper Bucktail drainage may not be feasible based on current metal loads in Upper Bucktail Creek and the estimated metals loads in groundwater exiting the backfilled Ram Mine workings. The discrepancy between the Upper Bucktail Creek loads and estimated Ram Mine loads would be even greater taking into account the additional copper loads currently being collected from the upper Bucktail drainage through BMSG's Phase II collection system For these reasons, this alternative was dismissed from further consideration.

Bedrock Capture System Using Tunnels

As an alternative to the bedrock groundwater pumpback well field proposed by FCC, the EIS team evaluated the potential use of combined horizontal tunnels and intersecting vertical drain wells downgradient of the Ram and Sunshine workings to capture bedrock groundwater exiting the mine workings. The captured water would be treated as necessary prior to discharge. Advantages of this alternative include capture of the Ram and Sunshine groundwater (and metal loads) upgradient of Bucktail Creek and BMSG-related COCs, and increased capture efficiency as compared to pumpback wells alone. Disadvantages include the potential difficulties associated with groundwater capture in a fractured bedrock media, although this concern should be lessened as compared to FCC's proposal for use of pumpback wells alone.

Under this alternative, one or more horizontal tunnels would be bored in the bedrock downgradient of the Ram and Sunshine workings. The tunnel(s) would be oriented perpendicular to the direction of groundwater flow to collect outflow from the workings. If necessary, a number of vertical boreholes would be drilled from the ground surface down to the lower tunnel. The vertical boreholes would drain groundwater from the bedrock into the bottom tunnel. From there, the water would be pumped from one or more pumping wells for treatment as necessary. Once the capture system water attains suitable quality, pumpback could be terminated, the groundwater system allowed to recover and the approximate premining groundwater flow field restored.

Although some of the same concerns regarding groundwater capture from a fracture flow media raised for the pumpback well field option apply to this option as well, the tunnel/vertical borehole system could provide a much higher level of capture efficiency as compared to bedrock pumpback wells. The greater drainage area provided, and the combination of horizontal and vertical drains

resulting in a bedrock drainage grid downgradient of each mine, could potentially provide adequate groundwater capture to assure protection of downgradient water resources. However, due to the uncertainties associated with bedrock groundwater capture, increased disturbance area and probably high cost, this alternative was dismissed from further consideration.

Capture Location at the Base of Ram Gulch

The base of Ram Gulch was evaluated as an alternative supplemental groundwater capture location. The potential advantage of this capture location could be the capture of Ram Mine water closer to the mine before mine water is further diluted by unaffected groundwater. Thus, reducing the amount of mine water and groundwater captured. The disadvantage of this location is that If the system were located at the base on Ram Gulch, there is a potential for contaminants originating from the North Ram Mine workings to bypass the capture system. Additionally, the proposed Alternative IV lower Bucktail Creek location is in a relatively narrow, steep portion of the drainage, upstream of where the drainage widens and the stream becomes a losing stream. This site was selected in part because it is within the narrowest part of the drainage where bedrock outcrops exist, meaning there should be little alluvial underflow and the required capture volumes can be largely obtained from surface flows, thus facilitating capture. It is purposely located upstream of where the drainage widens and the stream loses flow to the subsurface, and downstream of where potential contaminants from the Ram Mine are expected to enter Bucktail Creek through groundwater. Based on current knowledge, the disadvantages of the Ram Gulch location may outweigh the potential benefit of this location. However, field testing to be performed during the mine development and operating phases would determine the percent of the mine outflow groundwater requiring capture, and the need for and optimum location of a Bucktail drainage surface water/alluvial groundwater capture system. Based largely on the percentage on mine outflow requiring capture (estimated to be substantially less than 100 percent for the Ram Mine), including a surface water capture system in Ram Gulch may warrant further consideration.

Water Treatment Process

FCC's proposal calls for using a water treatment process involving coagulation, clarification, filtration and reverse osmosis. The water balance for Alternative II shows water being pumped from the process pond to the water treatment plant. Treated water would be routed to the discharge location in Big Deer Creek. Several types of treatment process were evaluated by the agencies and described in the *Water Resources Technical Report* (Hydrometrics, 2006). These alternative types of treatment processes include oil and grease separation, sedimentation, chemical precipitation, clarification and thickening, filtration, ion exchange, reverse osmosis, land application and biological denitrification. Although these processes are discussed individually, some of these processes could be used in series in a single treatment plant to achieve the necessary effluent water chemistry. For the purposes of configuring and evaluating water treatment aspects of Alternatives III, IV and V, general water treatment processes were described. However, other processes not selected for detailed analysis could potentially provide adequate treatment. These commercially available processes were not carried forward for further analysis other than evaluating the implementability of these processes and acknowledging that one or more of the processes discussed in the *Water Resources Technical Report* (Hydrometrics, 2006) would be appropriate to use for this application, and that effluent produced from one or more of these treatment processes could meet applicable effluent limits.

Mine Backfill

FCC proposes to backfill mine stopes in the Ram Mine with tailings (sand fill) as part of the mining process. Complete backfill of the Ram and Sunshine Mine openings was considered as a way to

minimize tailings disposal on surface and to potentially reduce metals leaching to groundwater. Complete mine backfill was dismissed from further consideration for the following reasons:

- Requiring backfill of access tunnels could only be done at the end of mining when it is certain that no additional ore reserves of future mine activity would occur. At this time the mine may be flooded and dewatering would be required.
- Access tunnel backfill would not eliminate the higher permeability flowpaths through the mine and no groundwater benefit could be assured.
- TWSF footprint would not be materially affected by tailings removal as the TWSF would have already been constructed to hold the tailings volume that would be removed for access tunnel backfill.
- Costs of complete backfill appear to outweigh potential benefits.