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Item #78

PROPOSED PLAN OF OPERATION
BIG SPRINGS PROJECT
FREEPORT McMoRan GOLD COMPANY

Submitted by:
Freeport McMoRan Gold Company
Mountain City Star Route
Elko, Nevada 89801
W.N. Ellett
Project Manager

Submitted to:
USDA Forest Service
Humboldt National Forest
Mountain City Ranger District
Mr. George Martinez
District Forest Ranger

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1.0 INTRODUCTION

This Plan of Operation is hereby submitted to the Forest Service and the Elko District office of the U.S. Bureau of Land Management, United States Department of the Interior (USBLM) in compliance with federal regulations regarding "Surface Management of Public Lands Under U.S. Mining Laws," 36 CFR Part 228. The Plan of Operation describes a proposed mining operation in Elko County, Nevada, by Freeport McMoRan Gold Company (Freeport), Mountain City Star Route, Elko, Nevada 89801, as agent for the Freeport McMoRan Gold Company - Bull Run Gold Mines Ltd., Big Springs Joint Venture (Figure 1).

The Big Springs Project is supported by generally accepted engineering design concepts, the details of which may be changed or modified as the project commences and runs towards completion. This Plan of Operation is a fair and accurate description of the project using current technology and current knowledge of the project's potential.

The proposed Big Springs Project involves the operation of a mine and heap leaching and milling facilities for gold recovery. Total reserves are estimated at 2.5 million tons of ore, 1.5 million tons of which will be milled, and 1.0 million tons of which will be heap leached. Initial mining will produce an estimated 270,000 tons of ore in the first year increasing to a maximum of 400,000 tons of millable and heap leachable ore per year. At this rate, gold production is estimated at 60,000 ounces per year. Feasiblity, preliminary engineering, and other mining studies have been conducted by Freeport. These studies are summarized and integrated into this Plan of Operation.

2.0 OVERVIEW OF PROPOSED PROJECT

2.1 Description of the Discovery

The Big Springs prospect was discovered by Freeport Exploration Company in 1982. Gold mineralization at Big Springs is primarily hosted by sandy limestones, siltstones, and conglomerates of the Permian Overlap sequence. The stratigraphy in the mine area is complex due to the rapidly changing nature of the Permian Overlap sedimentary rocks and to structural complexities. The major structural features at the Big Springs deposit include imbricate thrust plates of the Schoonover Thrust, northeast-trending high-angle faults related to the Midas Trench, and east-west-trending high-angle faults. Alteration in the mineralized areas is commonly coincident with major structures and consists of silicification, decalcification, argillization, and the introduction of hydrothermal barite and sulfides.

2.2 Description of the Claim Block

The Big Springs Project is located on U.S. Forest System (USFS) lands in the Humboldt National Forest, U.S. Bureau of Land Management (BLM) lands and on private fee lands, approximately 56 miles north-northwest of Elko, Elko County, Nevada. The project area is located along the upper reaches of the North Fork of the Humboldt River in T. 42 and 43 N., R. 53 E. and in T 42 N, R. 54 E. All fee lands are under lease to Freeport. The remaining property is held as unpatented lode and millsite claims (Figures 1 and 2).

2.3 Project Area

The project boundary is comprised of approximately 8,788 acres as shown in Figure 3. The proposed operations will directly impact approximately 585 acres within the project boundary. This Plan of Operation covers the activities conducted within the 585 acre active mining area.

2.4 Ongoing Exploration in Area of Concern

Freeport has conducted ongoing exploration in the Big Springs area since 1980. These exploration activities have consisted primarily of approximately 750 reverse circulation rotary drill holes. Past and current exploration activities have been conducted under U.S. Forest Service approved Exploration Operating Plans.

Exploration to determine extensions of the known orebodies is continuing. Condemnation drilling to finalize waste dump, mill, heap leach, and tailings impoundment locations, where appropriate, will be conducted in conjunction with detailed geotechnical site investigations in 1986. Current knowledge of the characteristics of the known orebodies indicates a high level of confidence in the non-mineralized character of the sites chosen for project facilities.

2.5 Project Design and Layout

The proposed mine site is located approximately 56 miles north-northwest of Elko within the North Fork of the Humboldt River drainage. The proposed mining operation will be developed between the elevations of 8,470 and 7,400 ft. All of the mined ore will be milled or heap leached at the proposed processing facilities in the valley approximately six miles east of the mining area (Figure 1).

Construction will begin in the fall of 1986 with a six-mile gravel haul road from the mining area to the processing facilities. Mining activities are scheduled to begin in the summer of 1987.

All mining will be by open-pit methods, using front-end loaders and trucks for loading and hauling. The ore will be mined at a rate of 1,000 tons per day with a stripping ratio of approximately 10:1. An average of 2.8 million tons of combined ore and waste will be produced annually.

The proposed mill and leach pads will together process up to 400,000 tons of Big Springs ore per year, and produce an estimated total of 60,000 ounces of gold annually. Mining at the various Big Springs pits will begin at a minimum rate and build up to a maximum of 400,000 tons of ore per year. The total estimated ore reserve at the project is 2.5 million tons, including leachable ore reserves.

Mining and milling activities will require approximately 400 acre-ft of water annually, which will be supplied by production water wells located at the mill site area. Construction of the tailings disposal site and leach pads will begin in spring of 1987 and is expected to be completed in late fall of 1987.

2.6 Life Expectancy of Project

The Big Springs Project will have an expected life of up to seven years based on the current estimate of ore reserves. As presently envisioned, the mine will work two 10-hour shifts per day, seven days per week on a seasonal basis. Mining operations may be halted during the severe winter months and equipment will be stored. The milling and crushing facilities will operate throughout the year. The mill work schedule will consist of three 8-hour shifts per day, seven days per week. The heap leach facility may operate on a seasonal basis similar to the mining operation.

3.0 DESCRIPTION OF PROJECT

3.1 Mining Operation

The Big Springs ore body is comprised of the North Sammy Creek, South Sammy Creek and Mac Ridge deposits. Each of these deposits will be developed as small, separate open pits (Figure 4a). An estimated 81 acres will be affected by mining of the pits. The project layout and operation described below is based upon considerations of practicality, economics and environmentally acceptable facilities.

3.1.1 Pits

The shape and configuration of the pits is primarily defined by the mineralization and economics of mining the ore. Further, pit slopes and benches are influenced by the geologic and geotechnical characteristics of the pit area. Initial engineering indicates that pits will have maximum pit slopes of 1.0 horizontal to 1.0 vertical comprised of 15- to 20-ft high benches. Detailed mine plans are currently being developed.

Pit bench heights and widths will be designed based on data available prior to pit development. The geologic and geotechnical characteristics of the materials exposed during pit construction will be monitored regularly. Modification of the planned pit slopes may be necessary in order to accommodate actual conditions.

If topsoil exists at the pit locations, it will be stripped and stockpiled for future reclamation purposes. Ore will be mined by typical open-pit methods involving drilling, blasting, and loading. Almost all overburden and ore will require drilling and blasting. Ore will be loaded by front-end loaders or hydraulic shovels and hauled to the Big Spings processing facility.

The open-pit mining schedule involves two 10-hour shifts per day, operating seven days per week. This schedule provides effective use of the capital-intensive haulage and excavating equipment and allows for less travel time for employees between Elko and the project site. Mining operations may be suspended during the severe winter months.

North Sammy Creek Pit

The North Sammy Creek Pit consists of four, connected small pits (Figure 4a). Cumulatively, the North Sammy Creek Pit area is approximately 2,500-ft long by 600-ft wide, trending northeast. The North Sammy Creek Pit will average 500-ft deep, and have a maximum pit slope height of approximately 700 ft. The North Sammy Creek Pit has the potential to produce approximately 2.0 million tons of ore and 15.1 million tons of waste. The North Sammy Creek Pit will cover an area of approximately 39.5 acres.

South Sammy Creek Pit

The South Sammy Creek Pit consists of three connected small pits (Figure 4a). The combined length of these pits is approximately 2,000 ft in a north-northwest direction. The This pit area will cover approximately 35 acres. About 0.2 million tons of ore and 1.3 million tons of waste rock may be produced from the South Sammy Creek Pit.

Mac Ridge Pit

The Mac Ridge Pit (Figure 4a) is the smallest of the Big Springs pits and will be approximately 500 ft in diameter, and have a maximum pit slope height of 360 ft.

The Mac Ridge Pit has the potential to produce approximately .3 million tons of ore and .4 million tons of waste.

3.1.2 Waste Dumps

The waste dumps will be located close to the pits as shown on Figure 4a. Based upon the presently indicated stripping ratio of 10:1, an average of 3.4 million tons of waste rock must be moved and disposed of annually. The total dump capacity is expected to be 15-20 million tons; individual dump capacities are noted below.

The waste dumps will be developed by end dumping with the active dump face lying at the waste rocks' angle of repose. The waste rock is primarily composed of competent sedimentary rocks including limestones, dolomites, shales, and jasperoid. Some lower strength material will also exist. Assumptions used in conceptual dump design were: a) waste rock has a 38 degree angle of repose, and b) the swell factor (from in-situ to dumped) is 30 percent.

Waste dump operation will be similar to that performed at Freeport's Jerritt Canyon Project. Refinement of the dump development plan will be performed after more definitive information is available regarding waste rock and dump foundation conditions.

It is anticipated that natural drainage of the dumps will take place as a result of material segregation during dumping. Springs of significant surface flow will be controlled by engineered drains where required.

Sammy Creek Dumps

Waste rock from the North and South Sammy Creek Pits will be hauled to the Sammy Creek Dump in the Sammy Creek and Beadles Creek drainages. The Sammy Creek Dump will be developed in four levels with flat terraces at approximately 8,200 ft, 8,000 ft and 7,800 ft and 7,600 ft. The dump will ultimately cover a surface area of approximately 105 acres and will contain approximately 15 million tons of waste rock. At the dump's downstream limit, the height of the 7,600-ft terrace above the creek level will be 160 ft.

The lower levels of the dumps will be used for waste rock mined from the lower portions of the North Sammy Creek Pit. The 8,000-ft level of the dump will hold waste material from the upper portions of the North Sammy Creek Pit and from the lower portions of the South Sammy Creek Pit. The upper level will be used for the rest of the material from the South Sammy Creek Pit.

An engineered catchment basin or series of sediment traps will be constructed below the toe of the lowest terrace of the Sammy Creek Waste Rock Dump. This catchment will be specifically designed to prevent siltation in Sammy Creek.

Mac Ridge Dump

The Mac Ridge Pit waste rock will be placed in dumps located southwest and southeast of the Mac Ridge Pit. The dumps will contain approximately .4 million tons of waste rock and will be developed as sidehill structures. The dump will cover approximately 7 acres, and have a maximum dump slope height of 150 ft.

3.1.3 Low-Grade Ore Stockpile

During mining, a limited quantity of gold-bearing material of sufficiently low grade to be uneconomic to haul and process at the Big Springs mill and heap leach facilities will be produced. This low-grade material has been included in the existing waste rock volumes and would be selectively placed in areas on the waste rock dumps. Should project economics improve sufficiently, this low-grade material would be reloaded and hauled to the processing facilities.

3.1.4 Portable Crushing Facility

If determined necessary, a portable diesel-powered primary crusher will be located at the mine site. This crusher will be sized to accommodate the mining operation. The crushed ore would be hauled to the mill for further crushing and grinding. If portable crushing is not appropriate, run-of-mine ore will be transported to the mill for crushing.

3.1.5 Major Mining Equipment

The types of equipment selected for the Big Springs Project include:

Quantity	Description	Nominal Size
2	loading units	13 cubic yard
7	haul trucks	50-ton
2	blasthole drills	5 1/2 - 6 3/4"
1	motor grader	16 G class
2	bulldozers	D-9 class
1	water truck	15,000 gallons
2	diesel generator	1,000 kw
1	portable crusher	2,000 tpd

This equipment list may be revised during the life of the mine to suit mining conditions.

3.1.6 Facilities

Mine Site

Mine site facilities for the project will consist of a truck-ready line, a two-bay maintenance shop, an explosives magazine, mine office trailer, and a fuel and lube-oil storage facility. Electrical power will be generated on site with portable diesel generators and distributed where needed. Communications will be by radio. Most of the structures for the project will be of a portable nature such as pre-constructed trailers. These facilities are shown in Figure 4. The mine facilities will be fenced with stock fencing.

Fuel for the diesel-powered equipment and power generator will be stored in tanks. These tanks will be installed on prepared foundations and surrounded by berms to contain the tanks' contents in the event of spillage or tank rupture.

Mill Site

Mill site facilities will consist of the mill, an operations office, a laboratory, tailings disposal impoundment, heap leach pads and ponds, electrical substation, and chemical and reagent storage. Primary crushing may be done by a portable crusher located at the mine site in order to facilitate hauling. Primary crushing, along with secondary and tertiary crushing, may also take place at the mill. The mill may be connected to commercial power and will have backup generators available if needed.

3.1.7 Drilling and Blasting Procedures

A system of drilling and blasting and use of a front-end loader to excavate the ore and waste is planned. Drilling of blastholes will be done using either rotary or percussion blasthole drills. The blasthole configuration will be laid out so as to maximize fracturing. ANFO (Ammonium Nitrate-Fuel Oil) blasting agents and cap sensitive primers will be used for production blasting to fragment the overburden and ore. Charge sizes will be less than 500 pounds per cap delay. Production blasting will be at a maximum of four times per week. No blasting will be done during hours of darkness. Explosives will be brought in and stored on site in approved storage facilities.

Scaled distance formulas (DuPont Blaster's Handbook, 16th edition) will be used to establish safe seismic disturbances and air blast limits. Although no problems are anticipated due to the blasting, monitoring equipment would be used and mitigation procedures would be employed should unexpected problems occur. The closest occupied residence is more than five miles from the mine.

3.1.8 Haul Roads

After blasting, both the waste rock and ore will be loaded into 50-ton haul trucks with either a 13 cu yd front-end loader or a hydraulic shovel. Waste rock will be hauled to the waste dump areas. Ore will be transported to the Big Springs processing facilities.

Several haul roads will be constructed to provide access from the pits to the waste dump sites. Heavy traffic areas, such as short hauls to the major waste dumps, will be two lane.

Two-lane haul roads will be constructed as shown in the typical road construction detail (Figure 5). Two-lane haul roads will be 52-ft wide to allow for a 40-ft wide running surface plus 12 ft for safety berms and internal ditches. Dust on the haul roads will be minimized by sprinkling with water or use of U.S. Forest Service approved chemical binders.

Haul roads with similar construction will also be built within the pits. In-pit haul roads will be wide enough for haul vehicles to pass abreast.

3.2 Processing Facilities

The processing facilities are located in the valley, approximately six miles east of the Big Springs mining operation (Figure 4b).

The gold recovery operation will consist of the following facilities:

1) A crushing and grinding section;
2) An ore roaster;
3) A countercurrent decantation or a carbon-in-pulp mill;
4) A heap leach area consisting of several lined, expandable pads, and barren and pregnant solution ponds;
5) A 2.5 million ton capacity tailings impoundment; and
6) A metal recovery plant utilizing either carbon adsorption or a Merrill Crowe zinc precipitation recovery process.

A schematic flow sheet for the gold recovery process is shown in Figure 6. As described on this diagram, coarse ore is hauled from the mine area and placed in stockpiles at the mill site. The ore is then crushed and passed through the ball mill. Following crushing and grinding, the ore is roasted and treated by cyanidation. Higher-grade ores are milled; the lower-grade ores are heap leached.

The crushing, grinding, roasting, and cyanidation facilities will operate year-round. The heap leach operation will probably operate on a seasonal basis, with operations suspended during the severe winter months. The gold recovery operations are described in detail in the following sections.

3.2.1 Milling Facility

The Big Springs milling facility complex will be located on approximately 1,000 acres of millsite claims on BLM lands in Sections 2 and 3, T.42 N, R. 54 E. (Figure 4b). In addition to the mill building, the milling facilities will include a primary and secondary crusher, a roaster, laboratory, and several other buildings to provide support services.

Because the Big Springs ore body consists of two mineralogically distinct types of ore, oxide ore and sulfide ore, the mill process will be designed to treat both ore types. The oxide ore can be processed using conventional cyanidation techniques. The sulfidic ore must be roasted and oxidized before processing in a cyanidation circuit.

Crushing and Grinding Facilities

The mill circuit is shown in Figure 6. The first step in the milling process is crushing. Coarse ores are taken from the coarse ore stockpile and are fed into a crushing facility. The ore is loaded by front-end loaders into a surge bin and feeder, and then is fed into a jaw crusher. The resulting crushed ore ranges from 1/2 to 6 inches in diameter. This crushed ore is then routed via conveyor belts to the stockpiles adjacent to the mill building (Figure 6).

After crushing, the ore is reduced to particles about 0.012 inches in diameter in the grinding circuit (Figure 6). The grinding circuit will consist of a semi-autogenous ball mill for grinding the ore.

Roasting

Following grinding, the ore will be oxidized in the roasting facility. The roasting process will remove the majority of the sulfides from the ore and will enable the ore to be conventionally processed. State-of-the-art air quality controls are planned for the roasting unit.

Ore Processing

After crushing, grinding and roasting, the ore is ready for cyanidation in the mill. The Big Springs mill will utilize a carbon-in-pulp, or a counter-current decantation milling method. The ore is piped as a slurry to the cyanide circuit where it is agitated in a series of tanks containing a solution of about 0.1 percent sodium cyanide and 0.2 percent lime. After the gold is removed from the ore by reacting with the sodium cyanide, the gold is recovered from solution.

In this process, activated charcoal is added to adsorb the gold in solution. A series of six to eight tanks are used to agitate the slurry. Activated charcoal is added to the last tank and is advanced from tank to tank by screening the coarser charcoal. In this manner, the charcoal is moved countercurrently to the flow of slurry which results in the highest loaded carbon being in contact with the highest grade solution and fresh unloaded carbon being contacted with lean solutions. The loaded carbon that is removed from the circuit is then treated in the stripping circuit.

The Carbon Stripping Circuit

The purpose of the carbon stripping circuit is to remove the gold from the carbon and precipitate it using zinc dust. From the oxide and carbonaceous circuits, the gold-loaded carbon will be fed into steel tanks. Desorption (stripping) of the gold will be accomplished by passing a hot solution of sodium hydroxide and sodium cyanide through the carbon-gold slurry. This process will break the gold from the carbon and put the gold into solution. This gold-bearing solution will then pass through a zinc precipitation unit. The residual carbon (charcoal) from the process will be regenerated into activated carbon by heating it in a kiln. The finished reactivated carbon will then be recycled to the oxide and carbonaceous ore circuits.

Gold Refining

The gold precipitate obtained from the zinc precipitation unit may be transported to the Jerritt Canyon Mill for final gold refining.

3.2.2 Heap Leaching Facilities

The proposed heap leaching operation will be located on the flats southwest of the tailings impoundment and east of the millsite (Figure 4b). Several expanding pads for leach material will be utilized. The leach pads and process ponds will ultimately cover approximately 72 acres. Initially, sufficient impermeable pad will be constructed to contain up to one year of leach ore production. Leach pads would be constructed of high-density polyethylene liner membrane over a compacted base. Foundations for the pads will be prepared on areas with slopes generally under 10 percent. Geotextiles under

the membrane may be used depending on the subbase materials to protect the membrane from puncture. Perforated pipes will be placed over the liner and 20- to 24-ft lifts of crushed ore would be placed by front-end loader.

The design and operations of the heap leach facilities will ensure stability of the heaps, the integrity of the liner, and allow operation with zero discharge of process solutions to the environment. The liner and pad system will be designed to meet with the requirements of the Nevada Division of Environmental Protection (NDEP).

Agglomeration of the crushed ore by the addition of cement and lime may be necessary. Should the agglomeration step be required, the solution used in the agglomeration step would be dilute sodium cyanide to allow activation of the leach process prior to placement of the ore in the heap.

The leach solutions will be prepared at the barren solution pond and will be pumped to the heap for mixing with makeup water. After placement of the ore on the prepared pad, a dilute sodium cyanide solution containing approximately 0.4 grams per liter NaCN will be sprayed on the surface at a rate of 0.005 gallons per minute per square foot of surface. Lime will be used to maintain the leach solution's alkalinity at a pH of 10 to 11. Pads and ponds will be sized and constructed to ensure containment of the leach solutions.

The required leaching time is expected to be 90 days, with possible extensions of an additional period of one month to one year. Following the completion of leaching, the heaps will be drained for several days and

then washed with fresh water until solutions show that cyanide residuals are 0.2 ppm cyanide and the pH is in the normal range. The material would then be reclaimed in place on the pad.

Solutions draining from the heap will be collected in pipes and lined ditches and drained by graviaty to a membrane-lined, pregnant solution pond. This pond will be designed to collect the calculated volume of the 100-yr, 24-hr storm event in addition to the calculated snowmelt following the winter period. The solution pond will be constructed over compacted earth with leak detection systems installed as required by NDEP.

Pregnant solutions will be pumped through carbon columns or a zinc precipitation unit for gold recovery. The "loaded" carbon from the columns or the zinc precipitate will be processed at the mill site. The solution processing facility is expected to be housed in an enclosed building.

Following processing, the barren solution will be returned to the barren solution pond where its chemical balance will be adjusted before being pumped back to the heaps. The barren pond will be constructed in the same manner as the pregnant pond.

The uppermost pad will be constructed first. The solution ponds and processing facilities will be constructed at the lowest spot in the area and will be isolated from existing drainage channels. A sufficient pad area will be annually constructed to accommodate the projected production and the initial production for the subsequent year. A mobile crushing plant may be located at the pad to minimize transport and handling of the prepared ore.

At the onset of winter, the facility may be winterized and closed. Winterization will involve the removal and storage of equipment. Prior to the seasonal closedown, the pond solutions will be neutralized and makeup water will be removed to draw down the ponds to the minimum practical level. The surface runoff and snowmelt from the heap leach facilities will be channeled via the ditches and pipelines into the process solution ponds and will be available for future use as makeup water.

Once the heap is no longer being leached, the ore will be washed and neutralized and drainage from the pad area isolated from the active heaps. Snowmelt and runoff from the neutralized heaps will be collected and diverted around the active heaps and process facilities and routed into the barren solution pond for use as makeup water.

The neutralized, spent ore heaps will be reclaimed following the reclamation procedures discussed in Section 6.4. These abandonment and reclamation procedures will satisfy the requirements of the NDEP.

3.3 Tailings Impoundment Facilities

The milling of the gold ore will produce a slurry of suspended, finely-ground rock mixed with mill waste water. This slurry, known as the tailings, will be disposed of in a tailings impoundment. As shown in Figure 6, the slurry will be piped from the mill building to a dam and reservoir where the liquid phase will evaporate and the solid portion will remain. Process water, to the extent practical, will be recirculated back to the mill for reuse in the milling process.

Tailings Impoundment Construction

The proposed tailings dam and reservoir is located east of the mill building (Figure 4b). Design plans for the embankment and reservoir are currently being developed. The detailed tailings impoundment design will be based upon geotechnical site investigations scheduled for summer of 1986. The dam will conform to Nevada State Engineering specifications and will have a permit to construct issued by that state office.

The embankment will be a zoned structure consisting of a central, impermeable clay core, an upstream random granular shell, a downstream gravel drain sandwiched between two, granular filter zones and extending to the toe, and a downstream selected granular soil or rock-fill shell. The clay core will extend downwards through the more permeable surface materials and into the impermeable clay foundation materials which underlie the axis of the dam, and upwards the full height of the dam.

This zoned embankment construction is designed to minimize seepage of tailings fluids from outside the impoundment, and to ensure stability in the event of an earthquake. The dam design calls for adequate freeboard plus camber to accommodate any embankment settlement. The tailings pond will be placed on top of of impervious clays which will minimize any vertical seepage of tailings fluids into the groundwater system. The height of the embankment will be approximately 22 ft. The tailings impoundment will cover approximately 100 acres.

Tailings Disposal System Operation

The mill tailings produced from processing the ore will be transported via a pipeline from the mill building to the tailings impoundment. The tailings pipeline will be supported on piers or laid along the ground. The tailings will either be pumped or will travel by gravity flow to the tailings pond. The tailings pipeline

will contain either flowmeters and pressure indicators or a gravity non-pressure system that would immediately indicate transmission line operational malfunctions.

After reaching the tailings pond site, the pipeline will be routed along the top of the dam. Discharge spigots will be placed at intervals to allow the tailings to enter the pond at several locations to provide for a level accumulation of tailings. Disposal of water will be accomplished by evaporation. Net evaporation rates for the area average 30 inches per year. Should additional evaporative capacity be required, a floating barge pump may be provided to pump water into a series of sprinklers which will spray water over the tailings pond.

3.4 Chemical Handling

Reagents required for the milling and heap leach operations are listed in Table 1. Cyanide will be received by truck in 3,000 lb metal bins or 2,000 lb bags. The corrosive materials be dumped into a tank where a 20 percent water solution will be made and pumped to end use points. Caustic, if used, will be obtained as a liquid and stored as a 20 percent solution. The lime will be made into a slurry as milk-of-lime for pH control in the barren pond.

TABLE 1

PARTIAL LIST OF CHEMICAL REAGENTS USED IN ORE PROCESSING

Sodium Cyanide
Activated Charcoal
Burnt Lime
Various Fluxes

4.0 ANCILLARY FACILITIES

4.1 Power

Electric power at the millsite may be provided by conventional power supplied by the Sierra Pacific Power Company. Estimated power requirements for the mill are anticipated to be 2 MW. Backup emergency power, from diesel generators, will be available at the mill. Primary power may be provided by diesel generators, if it is economic to do so.

Power at the mine, primarily for the haul truck ready line and maintenance facility, will be provided by on-site diesel generators. If primary crushing takes place at the mine, portable diesel powered crushing systems will be utilized.

4.2 Water Source and Supply

Water for the mill and heap leaching will be provided by production wells located in the vicinity of the mill. Anticipated water needs are approximately 250 gpm or 400 acre-ft per year. At least two wells, and possibly more, will be drilled to provide adequate water and backup. If necessary, fresh water storage tanks will be provided for storage capacity. If practical, process water will be recirculated from the tailings impoundment to the mill which will reduce fresh water makeup requirements. Water for project dust control will be provided from the primary source and/or sumps in the mine pits. The wells are expected to produce potable water for personnel consumption at the mill. Drinking water at the mine site will be provided from commercial sources and transported to the mine site.

4.3 Access and Primary Haul Roads

The primary access to the Big Springs Project will be via Nevada State Highway 51 (Highway 225) and along a county gravel

road to the proposed processing facilities (Figure 1). Access from the processing facilities to the mine area will be via a six mile long, two-lane haul road that will be built on the south side of the North Fork Humboldt River Canyon as shown in Figure 4a. The two-lane haul road will be 52-ft wide to allow for a 40-ft wide running surface, and 12 ft for safety berms and internal ditches. A typical cross section of the road is shown in Figure 5. Maximum road grades will be maintained at 6 percent with the exclusion of short sections which may reach 10 percent. The road will be sloped into the hillside and drainage will be by culverts under the roadway at selected locations. An approximate total of 53,500 ft (123 acres) of new roads, including the dump haul roads, the primary haul road, and the in-pit haul roads will be constructed and maintained throughout the life of the mine.

4.4 Drainage Control

All facilities will be protected from innundation from direct runoff and moderate storm events by berms and diversion ditching. Use of natural drainage courses will be maximized to reroute runoff. Springs and surface flow in areas impacted by the dumps, pits, and haul road will be controlled and channeled around the facilities.

Little or no accumulation of surface water in the pits is anticipated as a consequence of the geologic formation characteristics. Mine water would be pumped into the sumps and used for dust control if mine water does accumulate.

4.5 Fuel Storage

Fuel for the diesel-powered equipment and power generator will be stored in sealed tanks. Tanks will be installed on prepared foundations and surrounded by berms to contain the tanks' contents in the event of spillage or tank rupture.

4.6 Sanitary and Solid Waste Disposal

All sanitary wastes will be disposed of in an on-site, state-approved leach field. All trash will be handled in accordance with applicable federal, state and county laws. Refuse will be hauled to an approved landfill facility.

5.0 EMISSION-POLLUTION CONTROL

5.1 Control of Fugitive Dust From Roads and Disturbed Surfaces

Roads and disturbed surfaces within the mining and processing areas will be watered and treated if necessary with a dust suppression chemical to control fugitive dust. The specific control used will be determined in consultation with the Nevada State Air Quality Officer and the USFS.

5.2 Particulate Emissions

Fugitive dust emissions from the facility will be estimated. The emissions estimates will be in two categories: uncontrolled and controlled. Uncontrolled emissions estimates will be based on data for emissions from the sources when control devices are not used. The controlled estimates will be based on conservative efficiency ratings derived from EPA calculations.

5.3 Sediment Control

Sediment control in the Humboldt drainage will be handled by sediment traps located downstream from the waste dumps. Temporary sediment traps will be installed as necessary to limit sediment movement within the area.

5.4 Spill Prevention Plan

Freeport has developed a spill prevention plan to alleviate the impact of fuel spillages in the project area. The plan is based upon the relevant parts of the Jerritt Canyon Project's plan. Containments to prevent migration of spills and physical methods of neutralization and control will be used in the event of a spill.

6.0 ENVIRONMENTAL CONSIDERATIONS AND ANALYSIS

6.1 Preconstruction Considerations

Prior to the commencement of construction at the mine site, Freeport is required to comply with numerous state and federal environmental laws and regulations. The proposed areas of concern and ancillary project areas will be surveyed for archaeological resources and threatened and endangered species. Other natural resources such as wildlife, soils, air quality, fisheries, and the recreational potential of the area will be evaluated.

It is Freeport's intention to reclaim disturbance where conditions and current reclamation technology permit and as required by the USFS, the USBLM and Nevada state agencies. A third party consulting firm will prepare an Environmental Assessment (EA) which will include detailed reclamation recommendations. Freeport will work with this consulting firm to develop a reclamation plan consistent with the long-term management objectives of the BLM/USFS.

This Plan of Operations is being submitted as part of the National Environmental Policy Act (NEPA) review process, which is required of every major project on federal lands. In the review process, all environmental issues and impacts are addressed and evaluated. Where necessary, mitigation measures are proposed to minimize the project's potential impact on the human environment. The product of this review process will be an environmental document and Operating Plan for a project that will be managed and operated in a manner that has a minimal impact on the environment outside of the project site.

General reclamation plans are discussed below as they pertain to construction operations, interim reclamation, and final reclamation of the open pits, waste dumps, haul roads, millsite, leach pads, solution ponds and tailings impoundment.

Freeport has extensive experience gained from the Jerritt Canyon Project for which an approved reclamation plan exists. Adoption of specific aspects of that plan and its general objectives pertinent to the Big Springs Project will be made by Freeport.

6.2 Slash Clearing and Topsoil Stripping

As currently planned, the pits and overburden dumps are located and have been designed to avoid forested areas. When encountered, however, slash will be isolated, piled and left in place for establishment of microenvironments for rodents and small mammals. Slash clearing will be done to allow for a 25-ft zone outside of the pits and waste dump perimeters. Aspen stands will be left in place (some minor disturbance may be necessary) as wildlife habitat.

Once the slash has been removed, topsoil stripping will begin. Topsoil, if present, will be stripped to a depth of 8 to 12 inches from the pit, tailings pond, and heap leach areas. Topsoil stripping will take place in areas deemed suitable by the soil survey and will be done using dozers, scrapers, trucks and loaders. The topsoil will be taken to designated areas for storage as shown on Figure 4. Where practical, stockpiles will not exceed 20 ft in height with 10 ft being preferred to decrease wind erosion hazard and compaction. Stockpile sideslopes will not exceed 2:1 gradient to reduce water erosion potential and permit the establishment of protective vegetation cover.

6.3 Interim Reclamation

Ongoing reclamation is intended as the Big Springs Project proceeds. Where possible, and as soon as possible, recontouring, retopsoiling, and revegetation will be conducted.

Exploration drill sites and roads, unless subject to mining or additional exploration work, will be reclaimed. Cut slopes in rock will be at approximately 70 degrees with a maximum height of 40 ft, and will not be revegetated. Other cut and fill slopes will be retopsoiled and then revegetated. Seeding will be conducted during either late fall or early spring to take full advantage of spring precipitation.

6.4 Final Reclamation

Open Pit Reclamation

The open pits will be constructed with safety benches, as necessary, to assure slope stability. This will avoid public hazard at abandonment and will meet safety requirements.

At the end of mining, the inpit diversion of surface runoff from the upstream catchment area will be breached. The natural drainage upstream of the pit will be re-established so that runoff enters the pit at the low point of the pit rim.

Although no topsoil will be applied in these areas, mine pit walls with gradients of 2:1 or greater and the mine pit bottoms will be broadcast seeded. Natural encroachment of surrounding native species will occur on the sites. Aspen and assorted shrubs may be expected to colonize these isolated areas over time.

Waste Dump Reclamation

The waste dump crests will be partially regraded upon completion of mining at Big Springs. Dump contours will be reduced where practical, thus facilitating access by cattle to most portions of the area. Additionally, slope contours will be graded to blend into the surrounding topography, and proper drainages will be maintained on either side of the area.

All flat benches of the dump will be ripped and/or scarified to produce a rough surface for the anchoring of reapplied topsoil. Stockpiled topsoil will then be applied to the scarified surface.

Topsoil will be applied to the surface (excluding faces) of all waste rock areas. Reapplied soil will be left in a loose, cloddy condition (no use of disc or plow is required) to aid in moisture retention and decrease wind erosion losses.

These sites will be seeded using the seed mixtures and techniques discussed in the approved Jerritt Canyon reclamation plan. The waste rock disposal faces will be seeded one time only even though these areas will not have a soil growth media applied.

Road Reclamation

Unless otherwise authorized by the USFS or the USBLM for land resource management or recreational areas, all road corridors to the mining areas will be closed out and reclaimed. Similarily, unless so authorized, other identified arterial or mine access roads will also be closed and reclaimed following mine closure.

The reclamation methods will utilize the seed mixtures and application procedures specified in the approved Jerritt Canyon reclamation plan. After the road is abandoned, grading will reestablish natural drainageways. All culverts will be removed and the crossing contoured back to a condition similar to the pre-existing drainage areas. The road will be "outsloped" to permit natural drainage. This can often be done by "pulling" the berm and respreading it across the road. Where available, topsoil will also be respread. Borrow ditches will be filled in to permit outsloping and allow water drainage off the corridor area. Intersecting dips or water bars will be installed at locations marked by the Forest Officer.

Where practical, the compacted roadbed will be ripped to a depth of the wearing surface and then retopsoiled. This requirement may be waived if in the opinion of Freeport and the Forest Officer, the roadbed is compacted too densely to permit a reasonable ripping success. A disc, plow, or similar piece of equipment will be used to break up the clods and help prepare the soil in the roadbed for seeding.

Fencing will be left around areas which the USFS or the BLM consider beneficial to exclude from grazing allotments to allow revegetation to take hold or prevent access of livestock. The remaining fencing will be removed to re-establish access as close as possible to that prior to mining activities.

Millsite Reclamation

Upon completion of milling at the Big Springs Project, mill facilities will be removed and the area reclaimed. All buildings will be dismantled and removed; all building foundations will be broken up and transported to the tailings impoundment for burial. Topsoil will be reapplied and the mill area revegetated.

Heap Leach Pads and Ponds Reclamation

Reclamation of the heap leach area will have the goal of creating contoured, revegetated mounds of crushed rock which blend unobtrusively into the surrounding gentle slopes of the leach site. Heap solution will be evaporated, so that once the site is abandoned, the only run-off will be from incident precipitation.

Neutralization

Washing of older heaps will probably progress on an intermittent basis until cyanide and gold levels are sufficienty low in the off-flow solution and the alkalinity is at an acceptable level (pH 8.5 or below). Intermittent

operation of the washing cycle allows air to enter the heap and aid in the breakdown of cyanide species.

Due to the high evaporation rate expected at Big Springs during the summer months, it is likely that more displacement washes will be conducted in order to supply makeup water to the system. Fresh water may also be added directly if evaporation rates are extremely high.

Berms between heap sections will prevent mixing of cyanide solution with wash water and will allow removal of the heap from the collection system with minimal effort. However, to reduce equipment mobilization costs, actual reclamation of an individual heap will probably not take place until at least one or two adjacent heaps are also thoroughly washed and ready for reclamation.

Recontouring the Neutralized Heaps

After complete washing of an individual heap or heaps is accomplished, the heap edges can be recontoured with a bulldozer. During recontouring, the heap material will be spread out to cover all earthworks and liner material that are not needed for operation of the remaining heaps.

During most years, natural evaporation/transpiration is expected to exceed precipitation so there should be no drainage from the heaps.

Revegetating the Mounds

After recontouring, the mounds will be covered with the topsoil that had been stockpiled during pad and pond construction. The mounds will then be revegetated with an approved seed mixture.

Tailings Impoundment Reclamation

Reclamation will be achieved by contouring the surface, creating a suitable surface cover, creating drainage channels, and establishing vegetation. The surface of the impoundment will be contoured by managed discharge of tailings during the latter years of operation to form contours so that flow is directed to a channel at the interface of the tailings surface and the valley. This channel will be directed around the tailings embankment back into the original drainage. The front face of the embankment will be retained as a natural slope and will be revegetated.

7.0 WORK FORCE

7.1 Construction Work Force

It is expected that the construction work force will average 50 with a peak of 100 during periods of development. This work force will be hired on a contractual basis from local contractors, if possible, and will not have a significant long-term effect on the existing housing in the area. Pre-stripping and earthwork preparation may be done by Freeport or by a contractor.

7.2 Operating Work Force

The Big Springs Project may employ a total of 50 people. Mining may be performed by contract miners. Approximately 25 to 30 employees will work at the mill; about 5 to 8 people will be required for administrative work. A detailed breakdown of the manpower scheduling will be included in the Big Springs EA to appropriately document these facts.