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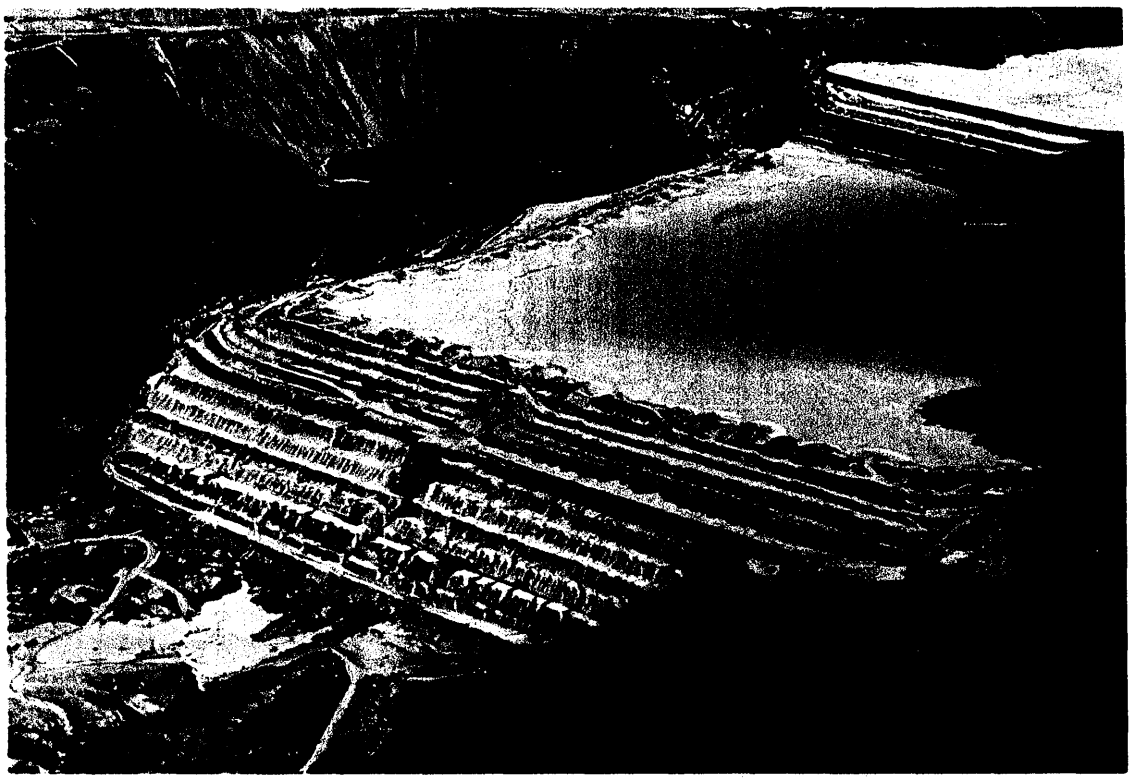
1995 Reclamation Status Report
January 9, 1996

Jesse Mitchell, PVMD Environmental Technician



From Moonscape to Wildlife Habitat in 2 Years

MAGMA

Pinto Valley Mining Division

1995 Reclamation Status Report
January 9, 1996

Jesse Mitchell, PVMD Environmental Technician

A. General

This report is provided to highlight reclamation activities which were performed by PVMD during 1995. Reclamation at PVMD includes the Environmental Mining Practices and Cattle Treatment (EMPACT) method and more traditional capping and seeding methods of primary establishment of vegetation on disturbed lands. This is followed by a maintenance program called Holistic Resource Management (HRM).

This report contains a narrative description of 1995 activities as well as: Photo documentation of PVMD reclamation to date, two articles published in the public media, and precipitation data for the calendar year 1995.

EMPACT / HRM work in 1995 averaged $900 / acre. Additionally PVMD's reclamation program received national attention with a National Public Radio spot which aired on December 1, 1995.

B. EMPACT - General Discussion

EMPACT reclamation on bare tailings, rather than a dirt cap has offered a number of advantages over capping in many situations.

1. Cost Savings:
   The calculated cost of capping No. 4 Tails was over twice the cost of EMPACT.

2. Established plants are rooted into tailings rather that the cap resulting in:
   a. Higher stability.
   b. Interstitial water in the tailings allows established plants to grow independent of rainfall.

3. EMPACT does not create a capping borrow area than requires subsequent reclamation.

No ill effects to the cattle have been detected to date. The cattle are healthy - mother cows are calving. They tend to become pets from the constant contact with people (Figure 8).

C. HRM Maintenance - General Discussion

Finely ground material on steep slopes will require a very dense vegetation such as grasses to remain stable. Maintenance of grass requires removing the top of the plant occasionally by either mowing, grazing, or fire. By removing the top of the plant occasionally with grazing, roots are sacrificed in order

to promote re-growth. The new re-growth then gathers sunlight to promote root re-growth, while the previously sacrificed roots decay, to be used for food, and leave aeration channels. The entire plant, above and below ground, is kept healthy in this manner (Figure 17 through 20).

Over grazing happens when the animal returns to the re-grown plant before the top and root re-growth cycle is complete, causing more root sacrifiction. Concurrent with the grazing, hoof action breaks the cap on the ground planting seeds dropped by the plant. *The number of animals has no bearing on over grazing. it is purely a function of the time the plants are exposed to grazing.*

Most reclamation has a limited life span and limited success because the need for maintenance of the plants has never been addressed. During the dormant season of a perennial plant, the plant matter left above the ground is dead. With the coming of Spring, an area around the circumference will regenerate, becoming dead material the following dormancy. After several years of this cycle the entire plant will have a crop canopy of dead material blocking sunlight and the plant will then be completely dead above and below ground (Figure 10). At the same time, there are no replacements despite the production of thousands of seeds because of the crop canopy and the undisturbed ground cap. The ground now has a root ball developed in it which is decaying, leaving voids causing extremely loose ground which undercuts and erodes readily. By grazing reclamation projects they will stay reclaimed and continually advance in succession given the opportunity to be.

Self-supporting and cash generating by the fifth year achieves the goal of making tailings an asset rather than a liability.

D. PVO No. 2-1/2 and No. 3 Dams

No. 2-1/2 and No. 3 Dam were EMPACTed in the Fall of 1993 and 1994. A combination of EMPACT and HRM continues to date.

Larry Widner, the Tonto National Forest District Ranger has called EMPACT on No. 2-1/2 and No. 3 Dams the success story of the year.

Late summer rains brought on establishment of perennial plants, which should grow beginning in the Spring of 1996 independently of rainfall. Seven different species are easily recognized and there are probably several more. I have been able to pick out alfalfa, giant bermuda, common bermuda, love grass, blue gramma, side oats gramma, and annual oats, as well as indigenous forbs and shrubs.

Tree saplings are also numerous (Figure 1). There are mesquite, cottonwood, willow, and salt cedar. All of the trees are volunteer plants with the exception of the mesquites, which were introduced by feeding mesquite beans to cattle.

H. Cottonwood

Cottonwood was capped in 1987. The capping cost was very reasonable in this case as the material was available at the heel. The cap is approximately ten (10) inches deep on the top and runs as thick as two feet on the slope.

A mixture of indigenous grasses and shrubs were hand broadcast after the cap was installed. Many of the shrubs, mainly catlaw and burro brush have established although they remain less than three (3) feet in height. Various desert annuals such as foxtail and weeds thrive there in cycles depending on the weather. There has been minuscule establishment of perennial grasses, the top appearing very lush during August and September of this year.

The area generally has available water and produces enough feed to become an attraction for range cattle, which over graze the young plants before they can establish. Slopes on the dam are sparsely vegetated with brush such as bacruss. They are generally remaining intact due to the small drainage area connected with them, the fact that the water mostly "sheets" off, and the cap being up to two feet thick.

There are, however, 13 areas of considerable erosion where the items mentioned above do not function. If this Dam were several benches high, with erosion as severe as it is on the top bench, it would be a catastrophe by the time it cumulated several benches.

In short, the slope area should be more densely vegetated with grass plants. The top area is beginning to resemble a typical dessert savanna (Figure 11) and of course, presents no erosion problems.

Any work on Cottonwood will require securing the perimeter from intrusion by range cattle. At present Cottonwood is Forest Service land with a special use permit. The Forest Service has given their blessing for fencing and reclamation work there. There is also a safety issue concerning cattle in the road to PVMD which would require fencing on both sides of the road.

J. Copper Cities

No. 2 Dam

Most of the slopes of No. 2 Dam were dirt covered in 1977. At different times, from 1977 to approximately 1984, some seeding and hand planting of trees was done. Love grass and approximately 5% of the tree seedlings have firmly established. The trees, mondele pines, are 10 - 15 feet high and healthy.

The area is open range and has been grazed since 1977, with no control other than the number of cattle to which it was exposed. The small terraces that have been etched into the dam by the cattle are clearly visible.

As with any uncontrolled grazing, many areas are over-grazed, while others are over-rested, however; the grazing here has had an overall positive effect. The top area of the dam was never reclaimed so any range cattle grazing has been on the slopes, simulating controlled EMPACT (Figure 10).

There is a bench to bench drainage system (Figure 15) which has helped keep the dam intact. The area overall is in fair to good condition, but as with Solitude, the trend is to the bare side, with the dirt slowly being eroded away (Figure 16). At present nothing has been done to the top of No. 2 Dam, all of No. 8, 9 and 10 tailings as well as the dump areas of Copper Cities

Precipitation Data for Calendar Year 1995

January	5.86
February	1.93
March	3.03
April	0.35
May	0.25
June	0.0
July	0.23
August	3.25
September	1.22
October	0.02
November	1.48
December	0.12
Total Precipitation	17.74

Figure 8

Calving percentage has been close to 100%. Much better than normal ranching operations.

Cattle become pets from constant contact with people. They are generally moved from paddock to paddock by calling them to where we want them.

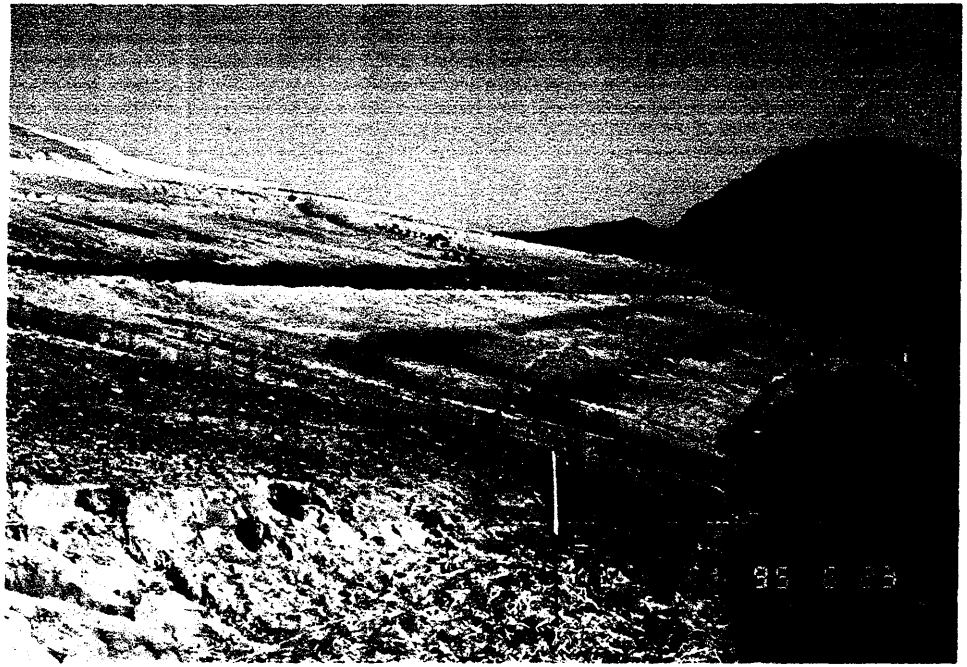


Figure 17. No. 2-1/2 Dam during heavy grazing (June 1995). Cattle are visible just above center in photo.

Figure 18. The area shown in Figure 17 after two months rest (September 1995).

Figure 19. A close photo of Figure 18 (September 1995).

Figure 20. Photo shows close-up of area immediately below header road on No. 2-1/2 Dam (September 1995).

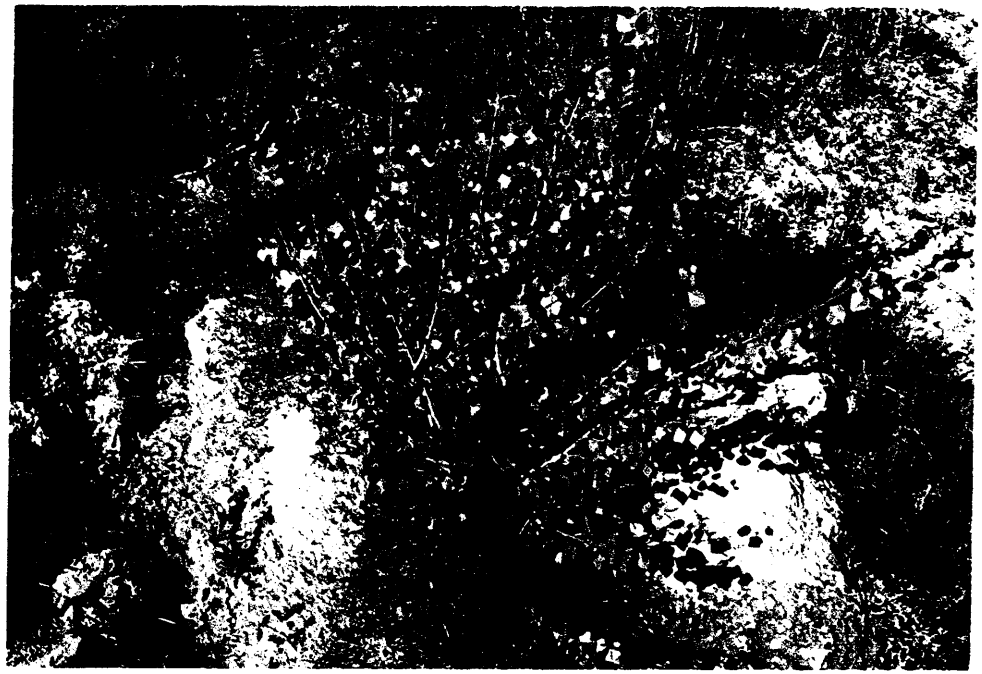
Figure 10. Plants on Copper Cities No. 2 Tailings. Note the grass in the forefront stagnated almost to the point of death, as opposed to healthy plants in the background which have been grazed.

Figure 11. Top of Cottonwood Tailings (October 13, 1995).

Figure 1

Willow Sapling on No. 2-1/2 Dam.

Cottonwood Sapling on No. 2-1/2 Dam.



Cottonwood Sapling on No. 3 Dam.

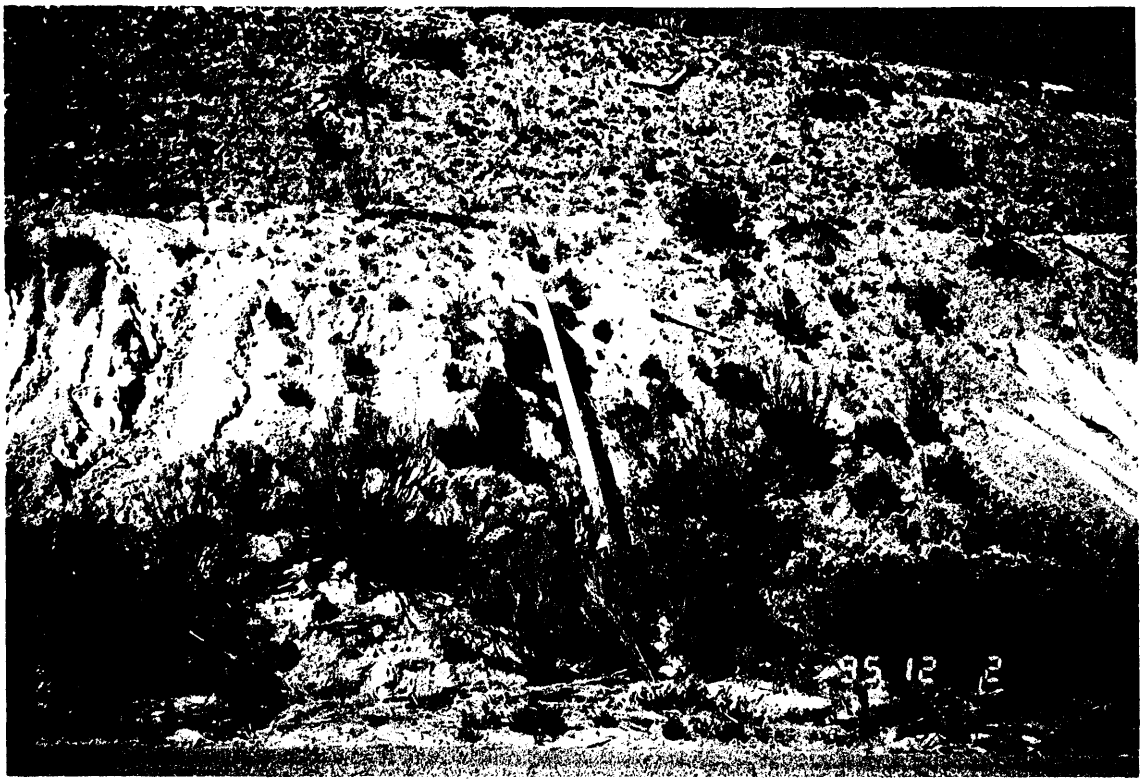


Figure 15. Bench to bench drainage pipe on Copper Cities No. 2 Tails.

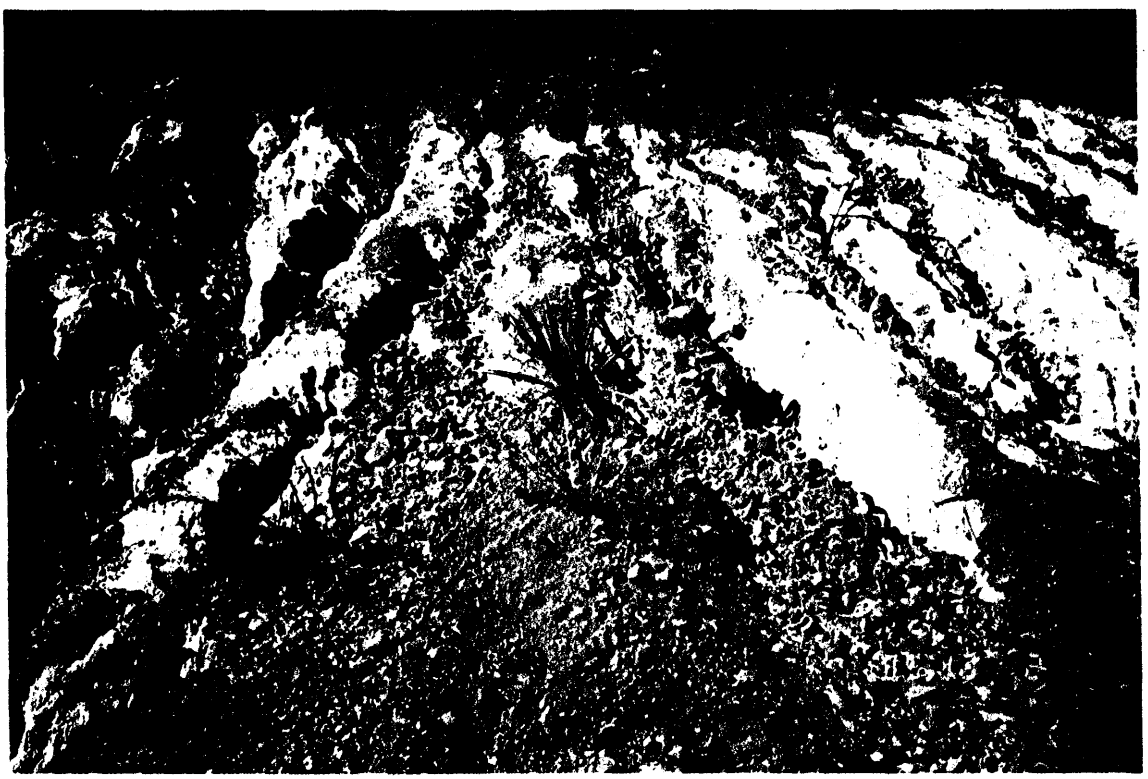
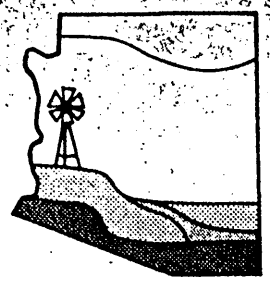


Figure 16. Slowly disappearing soil cap at Copper Cities No. 2 Tails.

Figure 14

From moonscape to wildlife habitat in two years.



Arizona Hydrological Society

September 17, 1995

Jessie Mitchell
Magma Copper Company
Pinto Valley Division
P.O. Box 100
Miami, AZ 85539

Dear Presenter,

On behalf of the entire Arizona Hydrological Society, we would like to extend our heartfelt thanks to you for your presentation at the Eighth Annual Symposium here in Tucson. The symposium was a success because so many people like you joined the effort. We recognize the work that goes into preparing a presentation and believe the diversity of presentations like yours helped make the symposium such a success. All of us on the AHS symposium planning committee, as well as everyone who attended the symposium, benefited from your participation. We thank you, and hope to see you again next year.

Sincerely,

The AHS Symposium Planning Committee

Mike Block
Dawn Garcia
Mike Geddis
Howard Grahn
Liz Greene
Jeanmarie Haney
Peter Livingston
Marla Moody
Barbara Tellman
Laurie Wirt
Betsy Woodhouse

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Pinto Valley Mine (f)

BHP Copper, Inc.

Pinto Valley Operations

BHP Copper, Inc.

Pinto Valley Operations

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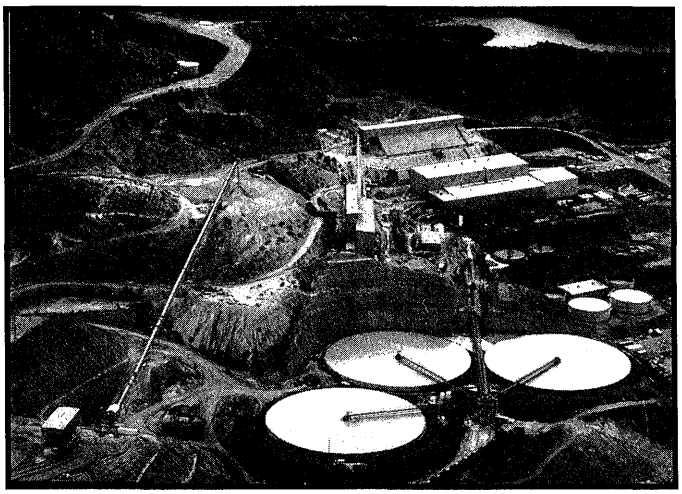
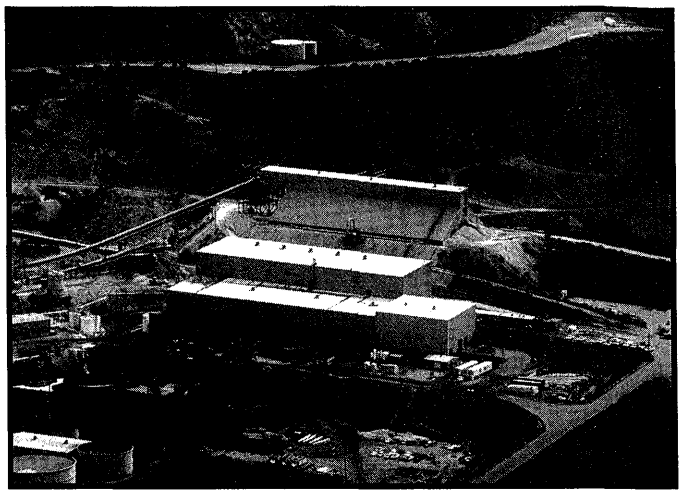
BHP Copper, Inc.
Pinto Valley Operations





PINTO VALLEY CONCENTRATOR

The Concentrator's original design throughput was 36,300 mt (40,000 st) per day. However, following several small (in comparison to the current construction) expansions in flotation capacity and two generations of computer control systems, from the as built HP 1000 to the current TDC 3000 DCS, the ball mills are now grinding 57,200 mt (63,000 st) per day. The flowsheet is typical with three stage crushing, single stage closed circuit grinding, flotation, regrinding of rougher concentrate and two stage cleaning of concentrates. The process begins with an ore containing about 4.0 kg/mt (8lb/st) of copper and ends with a concentrate about 280 kg/mt (560 lb/st) of copper, i.e. about 0.4% Cu in the concentrate. From startup in July, 1974 through July, 1995 the Concentrator has produced more than 2.7 billion (10^9) gross pounds of copper at a weighted average 88.7% sulfide copper recovery.

Pinto Valley Concentrator is currently (1995) undergoing a US $7.0 million ($10^6$) copper flotation circuit upgrade and expansion. The rougher circuit is being expanded to a volume of 1841 m^3 (65,000 cu ft) with the addition of 44 x 28.32 m^3 (300 cu ft) WEMCO's. Simultaneously, the cleaner circuit is being upgraded with the replacement of 28 x 8.5 m^3 (300 cu ft) mechanical cells with three 2.4 m x 12.8 m (8' x 42') column cells. These will join an in place 2.4 m x 12.8 m (8' x 42') column. The project is expected to provide a substantial increase in copper recovery as well as dramatically lower production costs.

The workforce consists of 109 operational and 73 maintenance personnel.

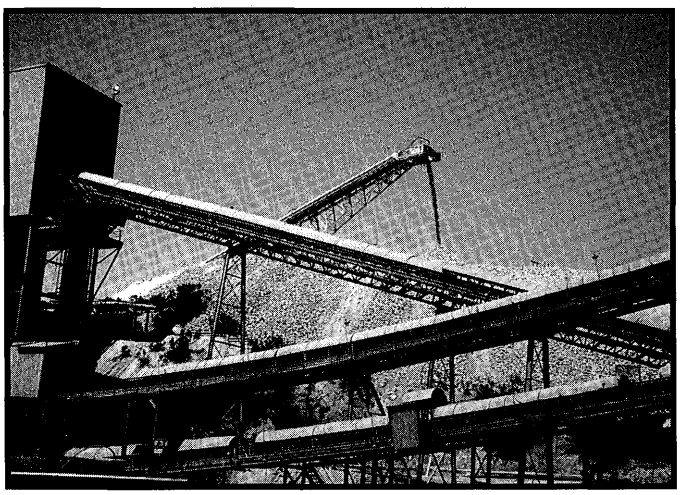
Primary Crushing Plant

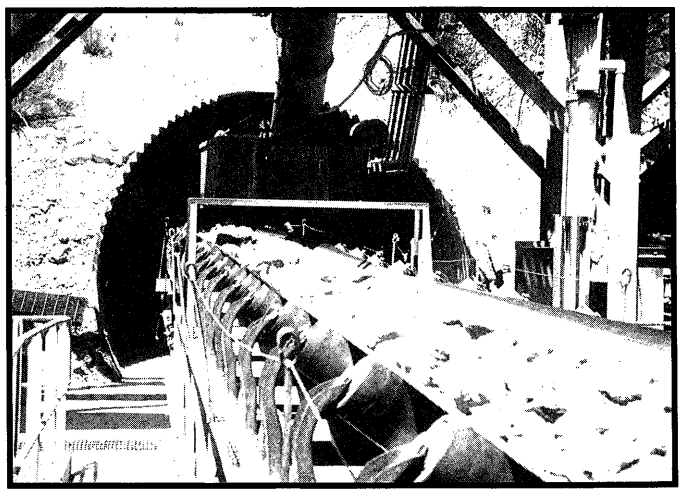
Mine ore is delivered to the Primary Crusher in 172 mt (190 - st) capacity DRESSER 985 trucks. The trucks discharge directly into a

Traylor 1.52 m x 2.26 m (60" x 89") gyratory crusher which is adjusted to produce ore less than 15 cm (6") in minimum dimension. The crushed ore is taken from a bin below the crusher by conveyor to the coarse ore storage pile which has a live capacity of 30,000 mt (30,000 st).

The crusher surge pocket is emptied by an apron feeder driven by a four speed motor which is controlled by the operator in the "fine ore" is carried by conveyor to the fine ore bins and deposited by a tripper conveyor. This "tripper car" operates automatically running back and forth to maintain a consistent level of ore from one end of the fine ore bin to the other. A tripper is also used when the product is transferred from secondary crushing to the tertiarys.

As the ore is crushed large amounts of very fine particles are created causing dust. Dust collectors are used throughout the plant to make the work atmosphere safer.

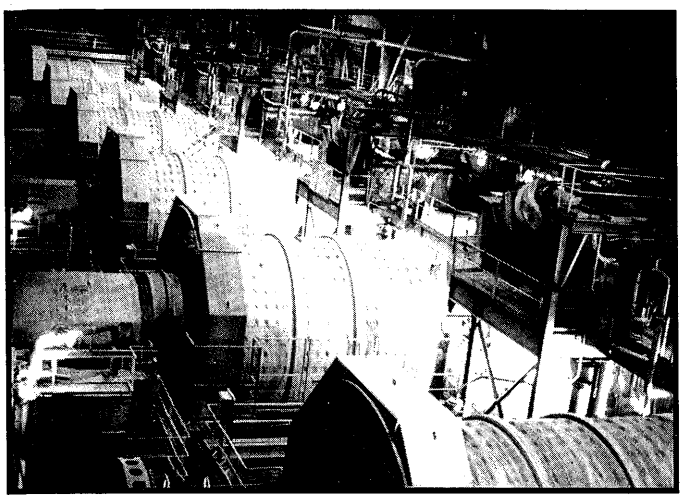




Fine Crushing Plant

The Fine Crushing Plant consists of 2 types of crushers: three Nordberg 2.13 m (7') standards; six Nordberg 2.13 m (7') shortheads coupled with belt conveyors and screens which combine to reduce the ore size from about 15 cm (6') to less than 1 cm (1/2"). The ore is drawn from the bottom of the coarse ore storage pile and systematically eened and crushed in two steps until it is

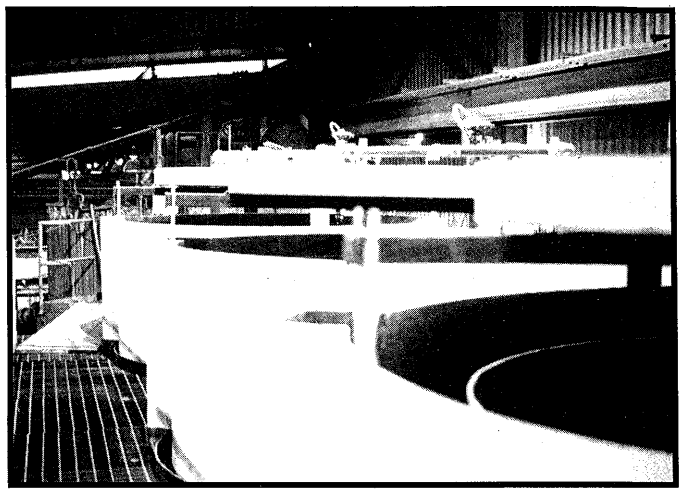
The Crushing Plant is controlled by a technician who is stationed in a control room. Crusher feed to the secondaries (standards) is regulated by crusher power. The power signal is currently used to manually adjust a variable speed reclaim feeder drive. An average high tertiary bin level will override this signal and automatically reduce crusher feed.



Grinding & Flotation

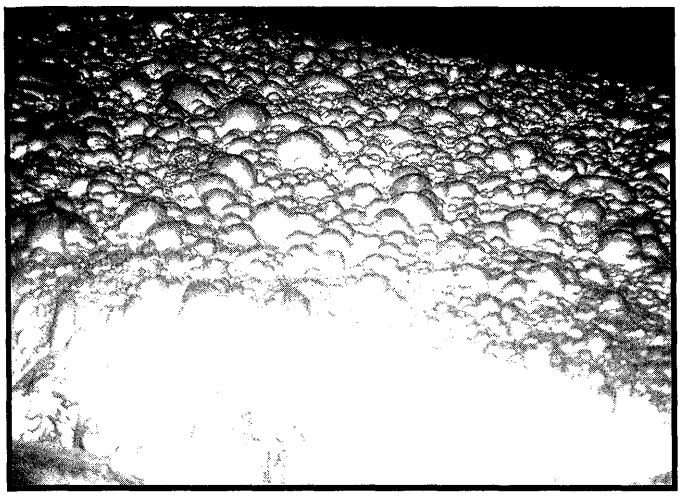
Fine ore is reclaimed by conveyors into 6 ball mills where controlled amounts of water are added order to grind it to a size which will liberate "free" the copper and molybdenum (moly) bearing minerals from waste "gangue". Large heavy duty slurry pumps and clusters of 3 x 83.8 cm (33") diameter cyclone classifiers are used to separate finely ground particles from coarser. The fine particles form a slurry for treatment in the flotation process while coarser particles are returned to the mills for further grinding. Three inch balls are used in the mills to grind the ore. Lime as pH control, xanthate and a dithiophosphate sulfide collectors and fuel oil as a moly promoter are added to the slurry in order to prepare it for flotation.

The flotation section is divided into two stages consisting of rougher and cleaner sections. In flotation, agitators are located in rows of long open-topped tanks. These agitators draw air into the slurry to make a froth. The froth picks up the copper and moly particles and floats them away from the unwanted gangue. The slurried gangue passes through the tanks and is referred to as tailings.



In the flotation process, a "rough" float is conducted, thus the name roughers. Then a cleaning float in column cells is made to produce a concentrate which is greater than 28% copper and 0.7% moly. Another grinding circuit called "regrinding" is required between the rougher and cleaner floats to free the copper and moly minerals for final upgrading.

A control room is manned by a technician who monitors the operation of all of the equipment in the grind, flotation, thickening and concentrate pumping areas. Additionally, using a Honeywell TDC 3000 DCS system, the control room technician manages advanced grinding controls and supervises reagent additions.



Copper Moly Thickeners

The concentrate from the preceding process is called copper-moly concentrate because it contains both valuable elements, flows into two large 27.4 m (90') diameter tanks called thickeners. The purpose of thickeners is to allow the solids to settle to the bottom of the tank and be drawn out as a thickened slurry while clear water is recovered from the top of the tank. This thickened slurry is pumped to the Moly Plant where a separate molybdenite concentrate is made.

Molybdenite (Moly) Flotation

Molybdenite is a sulfide mineral which is commonly associated with sulfide copper minerals. In the process of recovering these sulfide copper minerals, some of the molybdenite (moly) is also recovered. During the copper flotation process the concentration of copper is raised to about 28% copper while the moly is upgraded to about 0.7% molybdenite. At this grade it becomes economical to separate the moly from the copper. Another flotation process is used in which ammonium hydrosulfide and sodium hydrosulfide are added to the thickened copper - moly concentrate to "depress" copper and iron sulfides, thus allowing moly to float but not the sulfide copper. This process uses five more flotation steps and ends with a moly concentrate containing about 80% molybdenite.

The moly concentrate is loaded into 55 gallon drums and shipped to another plant for further upgrading before being sold for its molybdenum content. Presently (August, 1995) a barrel of moly is worth about US $1500.

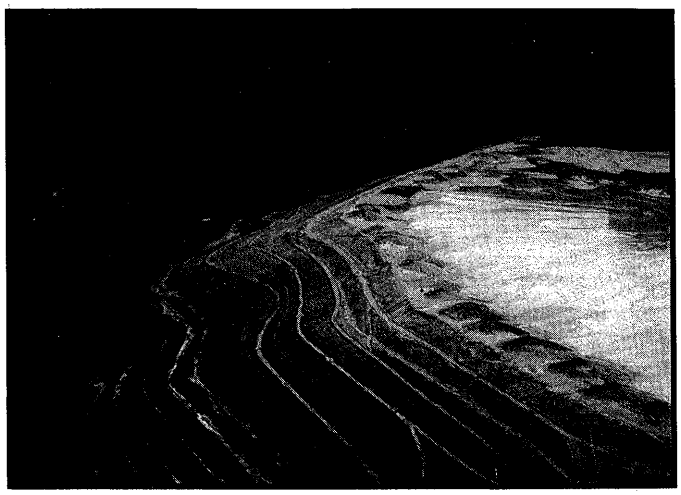
Tailings

Tailings from the copper flotation circuit flow by gravity to 3 very large 107 m (350') diameter thickeners. The underflow (thickened slurry) from these thickeners flows down a large pipeline to the tailings dam and the overflow or clear water is pumped back tot he grinding circuit. Water recovery is very important to the operation because it requires 81.378 m^3/min (21,500 USGPM) to run the plant. As in all desert regions, water conservation is of paramount importance. New makeup water at Pinto Valley averages 0.42 mt (100 gal/st).

At the tailings dam, cyclone classifiers again are used to separate coarse sand which falls in piles to make a dam from fine slimes which flows to the back of the damned area. A pond of water is also formed at the rear of the dam and is pumped back to tanks for use in the grinding circuit.

Since 1994 new and successful reclamation projects incorporating the use of cattle in the bioremediation of Pinto Valley tailings dams have demonstrated the efficacy of the concept.

Four crews consisting of 10 Operators, 1 Reagent Mixer, 2 utility Helpers and 25 Laborers perform the tasks of operating the crushing, grinding, flotation, concentrate pumping and tailings deposition sections of the process 365 days a year.



Copper Concentrate Disposal

The tailings from the moly flotation process becomes the final copper concentrate. it is thickened again in another thickener and then pumped 11 miles to the Filter Plant near the town of Miami.

In the Filter Plant two (2) 2.69 m (8'10") diameter x 8 disk Denver Disk Filters are used to dewater the 60% solids concentrate to an average 9.7% moisture. The concentrate is then hauled by truck to the San Manuel smelting and refining complex.

Three crews of an operator and a helper run the Filter Plant 24 hours a day 5 days per week.

PINTO VALLEY MINE

The Pinto Valley Mine and Concentrator lie about six miles west of the town of Miami, Arizona, at an elevation of approximately 1,219 m (4,000') above sea level. Development of the Pinto Valley open pit began in 1972, and the Mine and Concentrator went into production in 1974.

Pinto Valley Division is mining in one large open pit with ore occurring at or near the surface to a depth of about 427 m (1,400'). The current mine plan contains approximately 152 m mt (167 million short tons) of ore grade material averaging slightly in excess of .4% copper, which is about 3.6 kg (8 pounds) per ton of ore.

As is typical, the stripping rate varies from year to year in accordance with the overall mine plan. Stripping ratios are currently in the 1.18:1 range. Stripping requirements will decrease with time to about the 1:1 level by the end of the 1990's and subsequently, to below .5:1 near the end of the mine's life.

The mining operation is carried out in four phases: drilling, blasting, loading and hauling.

After the mine engineers have determined the short range plan of mining (area of mining), the drilling and blasting foreman designs the blast for the particular area, depending on the hardness of the ground and whether the material is ore or waste.

Surveyors then take the design from the maps and lay it out in the mine. Rotary drills come in and drill single pass holes which are approximately 68.6 cm (12 1/4") in diameter and an average 16.2 m (53') deep. There are some 80 holes in each blast which break approximately 209,000 mt (230,000 st) of material per blast. Blasting is done on a five-day week basis with an average of four blasts during the week.

After the holes are drilled, the blasting crew moves in, measures the depth of the holes, primes the holes to detonate the slurry, and loads each hole with approximately 680 kg (1500 lb) of slurry. The holes are then stemmed and tied in on a set pattern with appropriate delays added to the blasting pattern.

The mine is then cleared of personnel and equipment in the blast area. The blast is set off by a cap, radio controlled. Blasting materials are stored in separate magazines about one-fourth mile from the mine and taken out for each blast according to requirements. Blasting is usually done between shifts.

Following drilling and blasting the material is classified as ore or leachable waste. Leachable waste is transported to the dumps where the copper content is leached and the pregnant solution is further processed at the Pinto Valley SXEW facilities. Ore grade material currently classified as material above .29% copper is transported to the Primary Crusher facility for upgrading in the Concentrator facility.

The mining operation is equipped with the capacity to move about 45.4 - 49.9 m mt (50-55 million short tons) per year of ore and waste [122,500 - 136,000 mt/day, (135,000 - 150,000 tons/day)]. The haulage ability will be reduced with time due to increase in haulage lengths and lifts; however, current fleet size is adequate to meet projected mining requirements. The loading capacity will remain fairly constant and is also adequate to meet projected requirements. Loading is accomplished with the use of five electric shovels, one with an 13.76 m^3 (18 cu yd), one with a 19.11 m^3 (25- cu yd) bucket, two with 15.29 m^3 (20- cu yd) dipper is capable of scooping about 32,000 kg (70,000 pounds) of material, and it usually takes five bites to fill one of the 172 mt (190 st) trucks.

The haulage fleet consists of 20 DRESSER 172 mt (190 - st) diesel electric trucks. Each truck hauls approximately 15 loads per eight hour shift. The mine operates 24 hours a day seven days per week.

Certain support equipment is necessary to maintain daily production. This includes two rubber-tire graders which clean up around the shovels and keep the haulage roads clean. In addition three D-9 and two D-10 crawler dozers are used to keep the dumps and pit in good condition. The many miles of haul roads are maintained by two motor graders.

The workforce consists of 153 employees in the Mine Department.

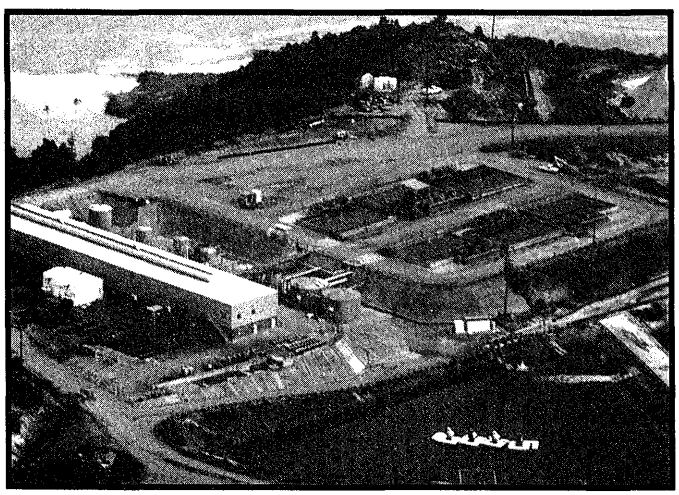
PINTO VALLEY LEACHING - S.X.E.W.

by

Tom McWaters

Holmes and Narver designed and constructed the Pinto Valley Leaching SXEW Plant. Construction started on May 15, 1980 and the first electrolytic copper cathodes were produced on July 6, 1981.

All the pregnant leach solution is collected at Gold Gulch Dam below the mine dumps. four 4,000 gpm pumps, with 600 hp motors, pump the solution through a one mile long 30 inch diameter pipeline to the SX-EW Plant. The pipeline is of high density polyethylene and stainless steel. The lift from Gold Gulch to the SX-EW Plant is approximately 350 feet.



The SX Plant was designed for 0.75 gpl at 6,000 gallons per minute of leach solution.

Solvent extraction consists of two identical sections (trains) of mixer-settlers utilizing the Lo-Profile concept with counter-current flows. Each train has two extraction stages and one strip stage. These trains are parallel and can be operated independently.

In the extraction stage the organic solution, containing approximately 96.5% diluent (kerosene) and 3.5% LIX 984 reagent, extracts the copper from the leach solution and advances it with the use of a pumping mixer to the stripper. There it is contacted with aqueous copper sulfate in the presence of sulfuric acid and the copper is stripped from the organic. The leach solution enters the first stage extractor and emerges as raffinate from the second stage extractor into the raffinate pond. From the stripper stage the rich electrolyte advances to the tankhouse by the use of pumps in the pit area.

The electrowinning plant produces a metallic copper from the electrolyte solution by passing an electric current from an insoluble cast lead-calcium-tin anode to a copper cathode. Each commercial cell contains 30 cathodes and 31 anodes. To reduce the acid mist each cell has approximately 5 layers of hollow plastic demisting balls.

There are two rectifiers, one for the commercial cells and one for the starter cells. The commercial cells rectifier capacity is 22,000 amps which allows us to produce over 60,000 pounds per day.

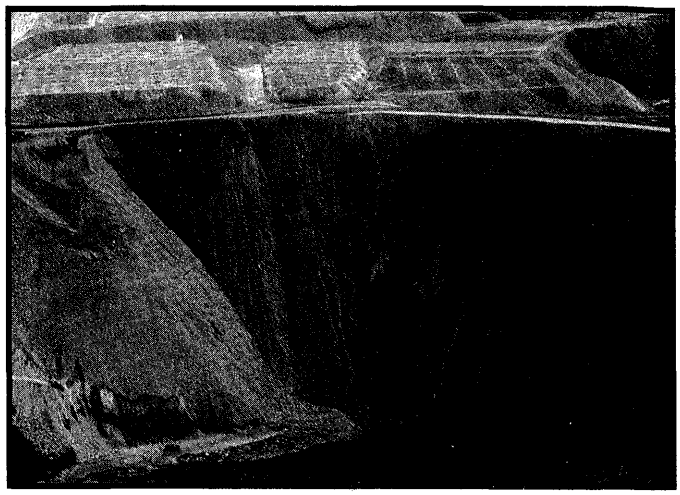
In order for the starter sheets to be of the highest quality, all concentrated electrolyte is first routed to the starter cells. After the solution passes through the starter cells, it is fed to the commercial cells. Recirculated solution is continually fed to the commercial cells to replenish the copper which is deposited on the cathode.

To maintain the Electrowinning cells at the desired temperature, the hot electrolyte leaving the tankhouse passes through a heat exchanger that preheats the incoming cold electrolyte from solvent extraction.

Sulfurcrete was used on all floor areas in the tankhouse to protect it from the corrosive electrolyte.

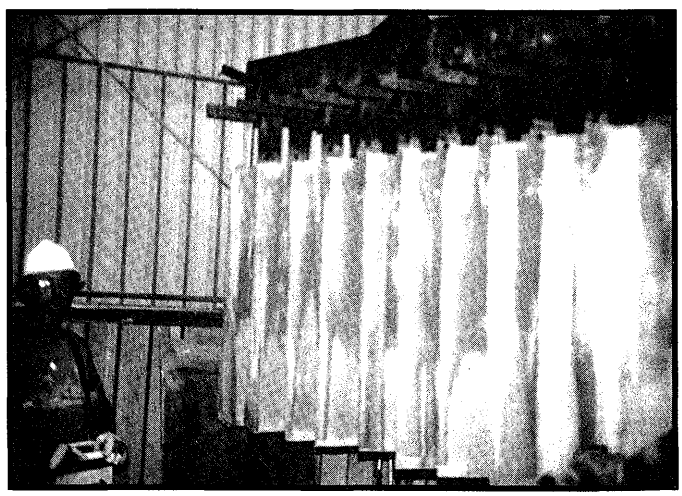
Three pump stations and 4.25 miles of pipeline are required to move the raffinate solution to the leach dumps. The first pump station at the SX-EW raffinate dam utilizes four, 2,200 gpm barge mounted vertical pumps with 300 hp motors. The first booster pump station has four 2,200 gpm horizontal pumps with 300 hp motors and the second booster pump station has two 1,825 gpm pumps with 50 hp motors, two 1,475 gpm pumps with 200 hp motors, and two 2,125 gpm pumps with 350 hp motors. The lift from the SX-EW Plant to the highest dump is approximately 550 feet.

Control of the pumping system is through the use of a programmable logic controller



(PLC) located in the SX-EW control room. One is able to control flows and pressures to and from the plant and visually observe on a CRT the status of pumps, valves, conductivity, pressures, motor currents, and flows at all the outlying pump stations.

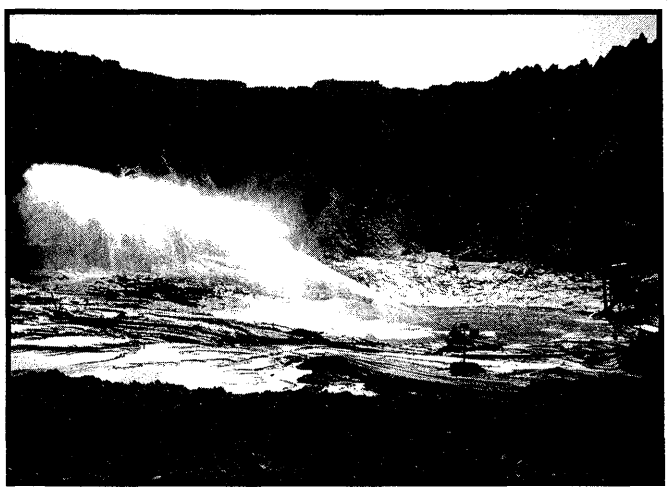
The leaching process works on a ferrous-ferric bacterial leaching of chalcocite and chalcopyrite copper bearing sulfide minerals; plus the sulfuric acid leaching of some oxcides of copper.



MIAMI UNIT OPERATION

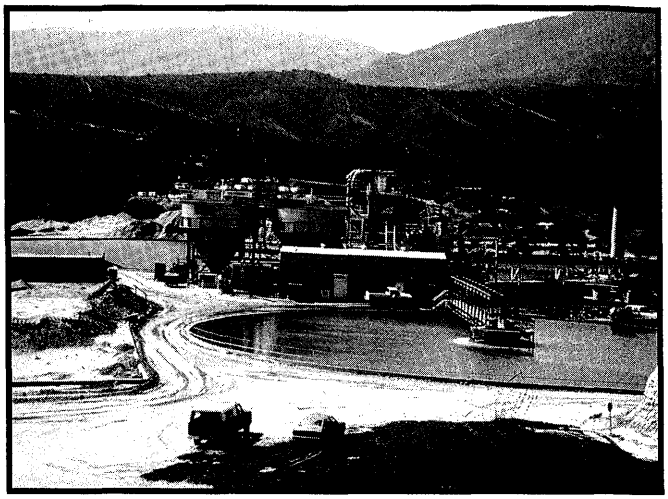
In Situ Leaching

Leaching of the block caved area of the Miami underground mine began in 1941 in some areas where mining has been abandoned. From 1911 to 1959 some 159 million tons of ore were taken from the underground mine. Much of this ore was mined by the block caving method. As a result, there was a subsidence and fragmentation of the overlying low grade ore which is now being leached. Weak sulfuric acid solutions applied at the surface and through injection holes percolate through the ore, dissolving the copper. Solution is collected underground and processed in the Miami Unit SWEX Plant to produce cathode copper.



Tailing Reprocessing Operation

Old Miami mine tailings are located at the east end of Miami. It will take eight years to restore the area to its natural terrain under the unique tailings reprocessing program thus eliminating a potential environmental hazard as well as producing copper and reclaiming valuable real estate.



Approximately 38 million tons of tailings are being mined with hydraulic monitors which cause tailings to flow from the mining face to a low point where eductors are located. The eductors are water jet pumps that move the slurry of tailings to a set of trash screens. From the screens, the slurry is pumped to the processing plant where it enters a large thickener. At the thickener, solution is drawn off the top while the slurry settles to the bottom.

Most of the copper contained in the tailings in dissolved into the solution by the weak acid in the thickener. The solution from the top of the thickener is clarified and sent to Miami Unit SXEW plant where the copper is removed from the solution by electrowinning onto copper cathodes. The slurry residue from the thickeners is pumped to a nearly depleted open pit mine for final disposal.

NOTES

CONCENTRATOR

MAJOR PROCESSING EQUIPMENT

February 13, 1996

PRIMARY CRUSHING SYSTEM

EQUIPMENT	MANUFACTURER	SIZE	NUMBER	MOTOR H.P.
Crusher	Fuller Traylor	60" X 89"	1	500
Apron Feeder	Stevens-Adamson	84' X 20'	1	50 V.S.
Conveyor No. 1	Continental	60" X 1450'	1	3 @ 600 ea.
Dust Suppression Pump	Gould	4" X 6"	1	100
Dust Collector 15DC01	Krebs	30,000	1	100

FINE CRUSHING PLANT

EQUIPMENT	MANUFACTURER	SIZE	NUMBER	MOTOR H.P.
Apron Feeder	Stevens-Adamson	42" X 15'	6	15 V.S.
Conveyors (2A-B-C)	Continental	42" X 365'	3	60
Secondary Screen	Tyler	7' X 16'	3	40
Secondary Crusher	Nordberg	7' Standard	3	300
No. 3 Conveyor	Continental	60" X 501'	1	600
No. 4 Conveyor	Continental	84" X 43'	1	15
No. 5 Conveyor	Continental	60" X 512'	1	600
Tertiary Tripper	Continental	60" X 512'	1	Eurodrive 3
Tertiary Feeders	Continental	84" X 20'	6	50 V.S.
Tertiary Screens	Tyler	8' X 20'	6	40
Tertiary Crushers	Nordberg	7' Shorthead	6	300
No. 7 Conveyor	Continental	60" X 690'	1	600
No. 8 Conveyor	Continental	60" X 370'	1	250
Fine Ore Tripper	Continental	60"	1	2 X 10

DUST COLLECTORS (F.C.P.)

EQUIPMENT	MANUFACTURER	SIZE	NUMBER	MOTOR H.P.
21 DC 01	Krebs	30,600 ACFM	1	75
22 DC 02	Krebs	38,400 ACFM	1	100
22 DC 01, 03, 04	Ducon	40,000 ACFM	3	150
Spray Water Pump	Gould	6" X 3"	2	200
Slurry Pumps	Ash	C-6-5	2	40
22 DC 05	Krebs	13,500 ACFM	1	40
22 DC 06	Ducon		1	50

PRIMARY GRINDING SYSTEM

EQUIPMENT	MANUFACTURER	SIZE	NUMBER	MOTOR H.P.
Dust Collector	Krebs	30,000 ACFM	1	75 + 30
Reclaim Feeders	Continental	48' X 36'	12	40 V.S.
Feed Conveyors	Continental	30" X 224'	6	15
Ball Mills	Allis Chalmers	18' X 21'	6	4000
Cyclone Feed Pumps	Warman	16" X 14"	6	400
Cyclone	Krebs	33"	18	--
Floor Sump Pumps	WArman	3½"	6	15

COPPER/MOLY FLOTATION SYSTEM - DEC.,1995

EQUIPMENT	MANUFACTURER	SIZE	NUMBER	MOTOR H.P.
Roughers	WEMCO	1000 cu. ft.	65	75
Cleaners	Column Cells	8' x 42'	4	-
Column Tail Scavenger	WEMCO	300 cu. ft.	15	30
Trash Screens	Derrick	2' x 8' ; 2 mm	2	20
Ro Conc Pump VFD	Ash	6" x 6"	4	75
Column Cell Feed	Ash	6" x 6"	4	50
Column Cell Tail	Warman	10" x 8"	2	30
Cu - Mo U'Flow VFD	Warman	4" x 3"	1	7.5
Compressor	Sullair		2	250
Near Stream Xray	Denver	Autometrics	4	3 stm / mp
Regrind Ball Mills	Fuller Traylor	11' X 15'	2	800
Cu/Mo Conc. Thickeners	Dorr-Oliver	90'	2	5
1st Set Cyclone Pumps	A.S.H.	C-6-5	4	75
2nd Set Cyclone Pumps	A.S.H.	BC-6-5	4	20
Regrind Ball Mill Pump	A.S.H.	B-6-5	4	15
1st Cleaner Conc. Pump	A.S.H.	BC-6-5	4	20
Cleaner Scavenger Pump	A.S.H.	BC-6-5	4	50
Floor Sump Pumps	Warman	3 1/2"	4	15

MOLY PLANT SYSTEM

EQUIPMENT	MANUFACTURER	SIZE	NUMBER	MOTOR H.P.
Feed Pumps	A.S.H.	A-6-5	3	20 V.S.
Conditioning Tank	Lightning	58"	1	20
Transfer Pumps	A.S.H.	B-6-5	2	10
Rougher Cells	Denver	No.24(50 cu.ft)	24	10
Cleaner Cells	Denver	No.18(Specials)	30	5
Chem - Pak Injector	Lubrizol / Gate City	CP 3	4	-
Ball Mills	Denver	5' X 8'	2	75
Rougher Conc. Thickener	Dorr-Oliver	40'	1	2
Final Product Thickener	Dorr-Oliver	26'	1	1.5
Disc Filter	Denver	4' X 3"	1	.75
Vacuum Pump	Nash	3" X 3"	1	15
Dryer	Denver-Holoflite	14' X 7"	1	1.5
Floor Sump	Galigher	3 1/2"	1	15
Cu Feed Pumps	A.S.H.	A-6-5	2	10
Ball Mill Discharge Pumps	A.S.H.	AA-6-5	4	1.5
Copper Conc. Thickeners	Dorr-Oliver	90'	2	5

CONCENTRATE DISPOSAL SYSTEM

EQUIPMENT	MANUFACTURER	SIZE	NUMBER	MOTOR H.P.
Agitator	Philadelphia Gear	105"	2	150
Booster Pump	A.S.H.	A-6-5	2	25
Main Line Pump	Ingersoll-Rand	Triplex	2	350 V.S.
Agitator	Philadelphia Gear	112"	1	200
Filter Feed Pumps	A.S.H.	A-6-5	2	10 V.S.
Filter	Denver	8'10" X 8 disc	2	3
Vacuum Pump	Nash	2600 CFM	2	200
Filtrate Thickener	Dorr-Oliver	26'	1	1.5
Floor Sump Pumps	Galigher	3 1/2"	2	10
Air Systems				
Snap Blow	Sullair	Screw	1	
Plant	Ingersoll-Rand	3 Cylinder	1	40

TAILINGS DISPOSAL SYSTEM

EQUIPMENT	MANUFACTURER	SIZE	NUMBER	MOTOR H.P.
Thickener	Dorr-Oliver	350'	3	3 @ 7.5
Slurry Pumps (4 Dam)	Warman	12" x 16"	3	400 V/S
Slurry Pumps (4 Dam)	Warman	12" x 16"	1	600

WATER SYSTEMS

EQUIPMENT	MANUFACTURER	SIZE	NUMBER	MOTOR H.P.
Plant Site				
Industrial Water Pumps	Gould	14" X 12"	4	2 @ 500
Service Water Pumps	Gould	8" X 6"	3	400
Reclaim Waters				
No. 1 & 2 Dams				
Barge	Hazleton	12"	1	250
Booster	Gould	14" X 12"	1	600
No. 3 Dam				
Barge	Hazleton	12"	1	250
No. 1 Booster	Gould	14" X 12"	1	600
No. 2 Booster	Gould	14" X 12"	1	600
No. 4 Dam				
Transfer Barge	Hazleton	12"	1	250
Barge	Hazleton	14" X 12"	1	250
No. 1 Booster	Gould	14" X 12"	1	600
No. 2 Booster	Gould	14" X 12"	1	600
Cottonwood Dam				
Barge	Hazleton	12"	1	250
Cottonwood Reservoir				
Barge	Hazleton	12"	1	250
Makeup Water				
Peakwell Booster Station	Gould	8" X 6"	3	700
Burch Booster Station	Gould	8" X 6"	3	600
Burch Station	Gould	8" X 6"	2	600

REAGENT SYSTEM

EQUIPMENT	MANUFACTURER	SIZE	NUMBER	MOTOR H.P.
Lime Bin Screw Conveyor	Pacific Screw Conv.	24" X 40'	1	25
Lime Bin Bucket Elevator	Link Belt	57' X 1" height	1	10
Lime Disch. Screw Conv.	Pacific Screw Conv.	12" X 30'	1	10
Lime Ball Mill	Denver	6' X 10'	1	150
Discharge Pumps	A.S.H.	A-6-5	2	15
Milk of Lime Agitator	Lightnin	68"	2	15
Milk of Lime Circ. PUmp	Ingersol-Rand	6" X 5"	2	75
High Press. Reagent Pump	Roper	AM03D1	6	2
Mine-Pak Reagent Feeder	Lubrizol / Gate City	E1	31	-

PINTO VALLEY MINE

MINE STATISTICS AND MAJOR EQUIPMENT

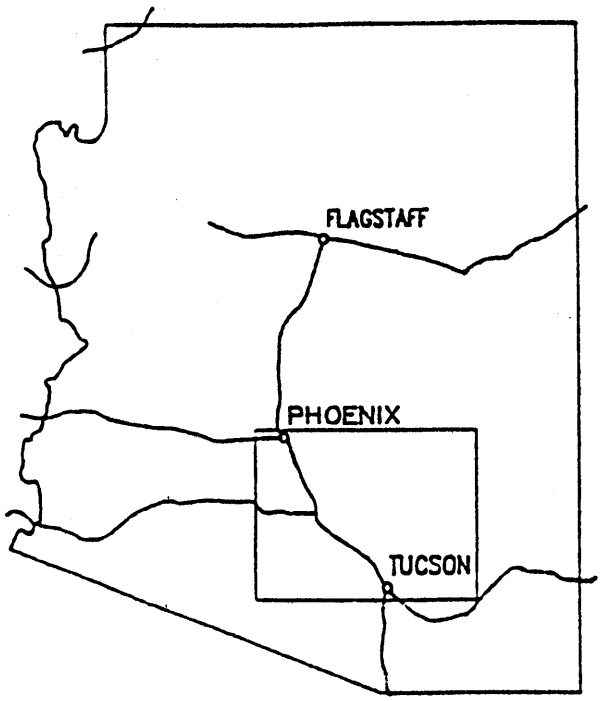
MINE STATISTICS

Average planned production rate (1996)		137,970 TPD
Stripping ratio, planned (1996)		1.18:1
Bench height		45'
Rotary drilling @ 12 1/4" dia., 8' sub-grade (1995)		1132 ft/shf
Average production drillhold spacing (1995)		34' x 36'
Blasting agent		SOUTHWEST ANFO, Prill and Slurry
In-place rock specific wt. (wet)		12.5 ft^3 / ton
Tons per shovel shift (1995)	18 CY	10,873
	20 CY	12,974
	25 CY	12,905
	27 CY	17,940
Tons per truck shift (1995)		2700
Haul distance, avg. one way (1995)		2.2 mi.
Ramps, planned nominal maximum		10%
Slopes, inter-ramp	1. Monzonite	48° maximum
	2. Schist	40° maximum
Current planned bottom bench		2,600
Pit dimensions, current		5,600' N-S x 8,000' E-W
Cutoff, sulfide copper		0.29%
Average annual rainfall	(since 1973)	23.86"
Pit water flows	1. Sustained	100-250 GPM
	2. Rain storm avg. maximums	500-800 GPM

Dump area under leach		100 acres
Elevations:	Mine Office	3,886
	Primary Crusher	4,026
	Top Operating Bench	3,680
	Bottom Operating Bench	3,140
Employees:	Mine and PV SXEW (138 + 15)	153
	Company - all other	466
	Company - total	619

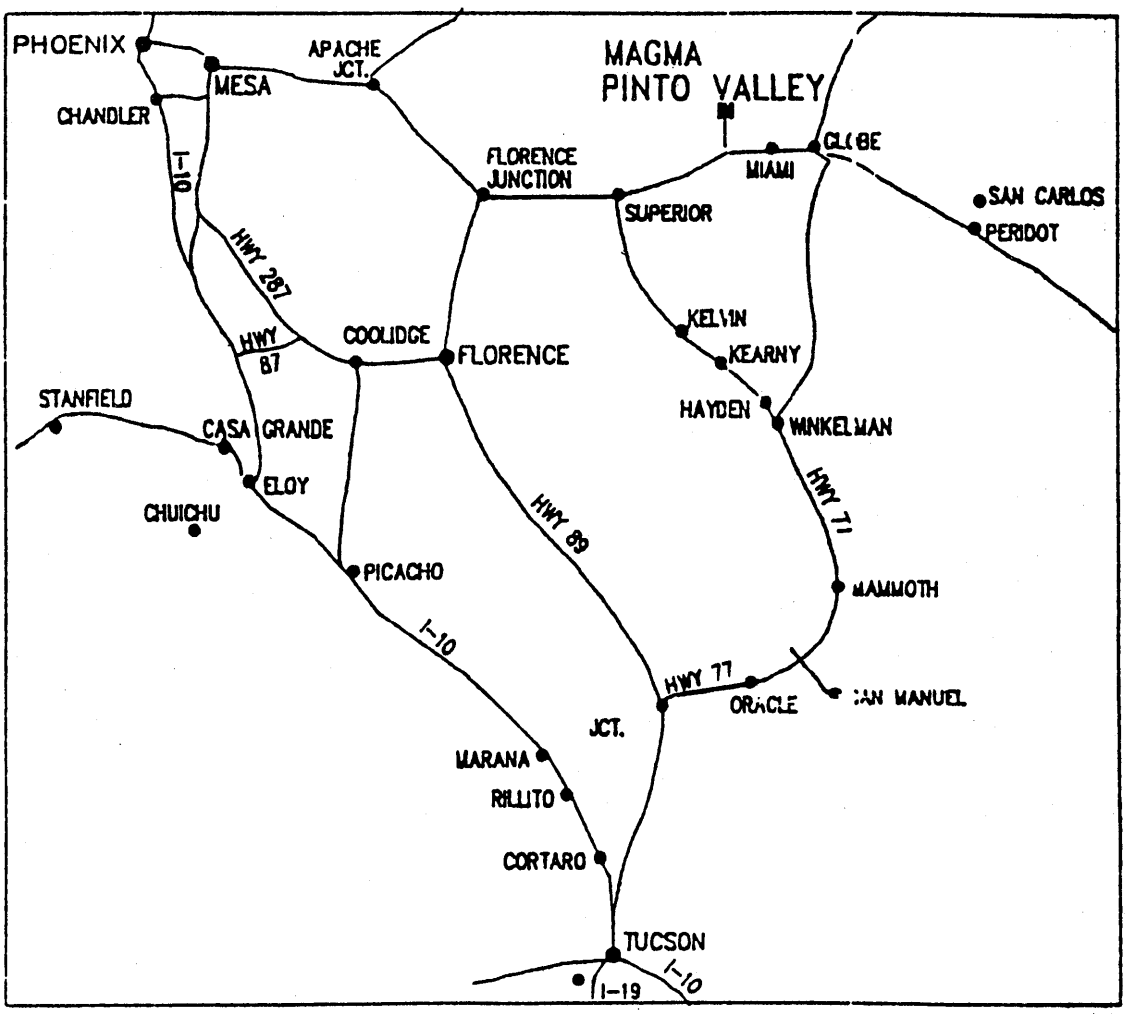
MINE EQUIPMENT

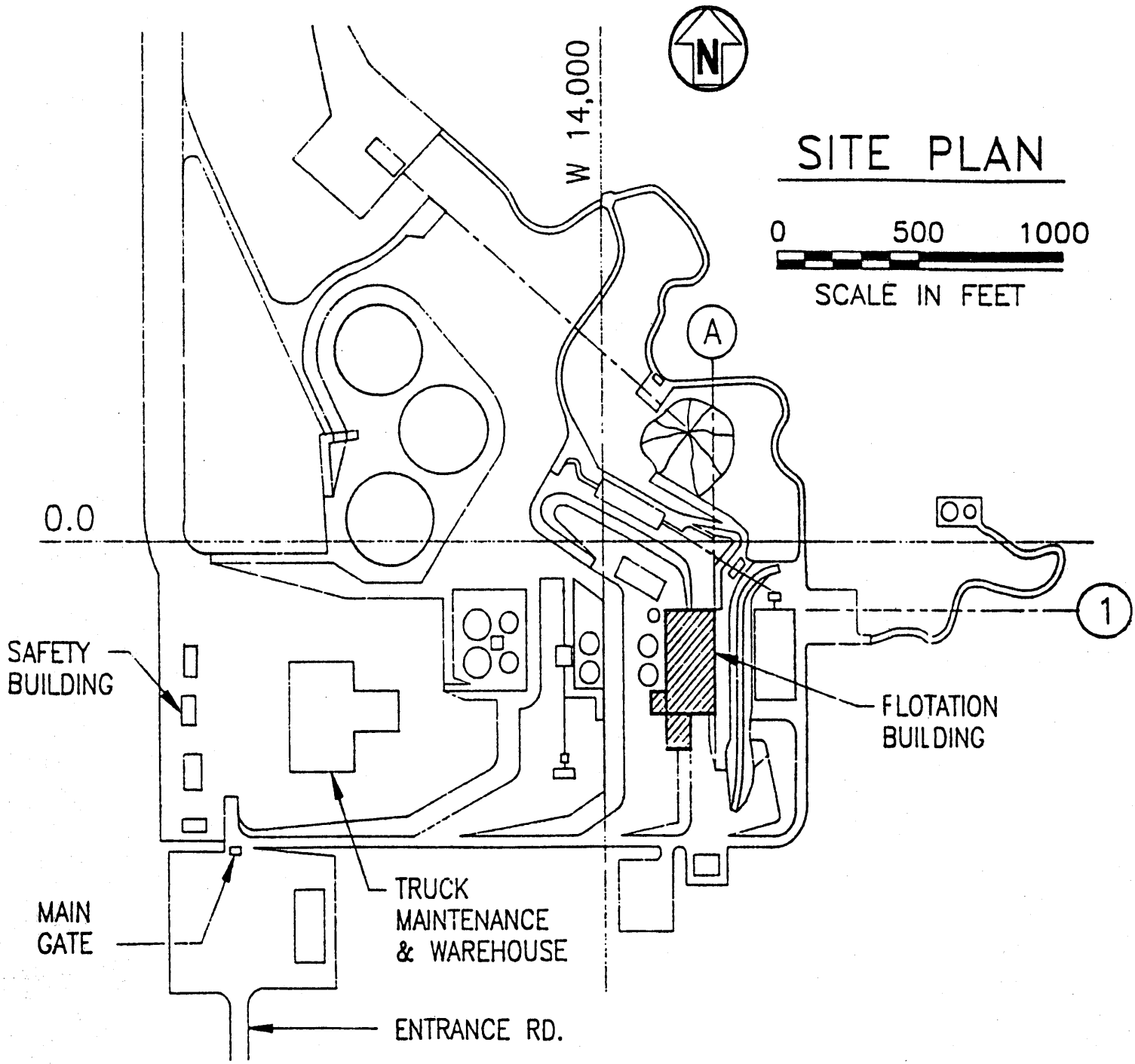
	DESCRIPTION	CAPACITY
Drills	1 - Drill Tech D90K	
	2 - Marion M-4	
	12 1/4" diameter bit	
	53' hole length	
	34' x 34' spacing ore	
	33' x 38' spacing waste and	
	leach	
Blast	Emulsion blend on dry holes	
	Straight Emulsion on wet holes	
	1300# to 1800# / hole	
	Radio detonation with primacord and shock tube	
	Blast one / day	
	4 day / week	
Shovels	1 - P + H 2100 BL, 18 yd^3	10,873 TPS
	2 - P + H 2300 20 yd^3	12,974 TPS
	1 - P + H 2300 25 yd^3	12,905 TPS
	1 - P + H 2300 XP, 27 yd^3	17,940 TPS
Front End Loaders	1 - Cat 994, 21 yd^3	8,883 TPS
Trucks	20 - Dresser 190 D, 2000 HP	190 Tons
Dozers	1 - Cat. D9G	
	2 - Cat. D9N	
	2 - Cat. D 10N	
Graders	2 - Cat Rubber Tired 824 C	
Blades	2 - Cat 16G	
Water Trucks	1 - Wabco	16,000 gal
	1 - Wabco	25,000 gal



BHP Copper, Inc.

Pinto Valley Operations

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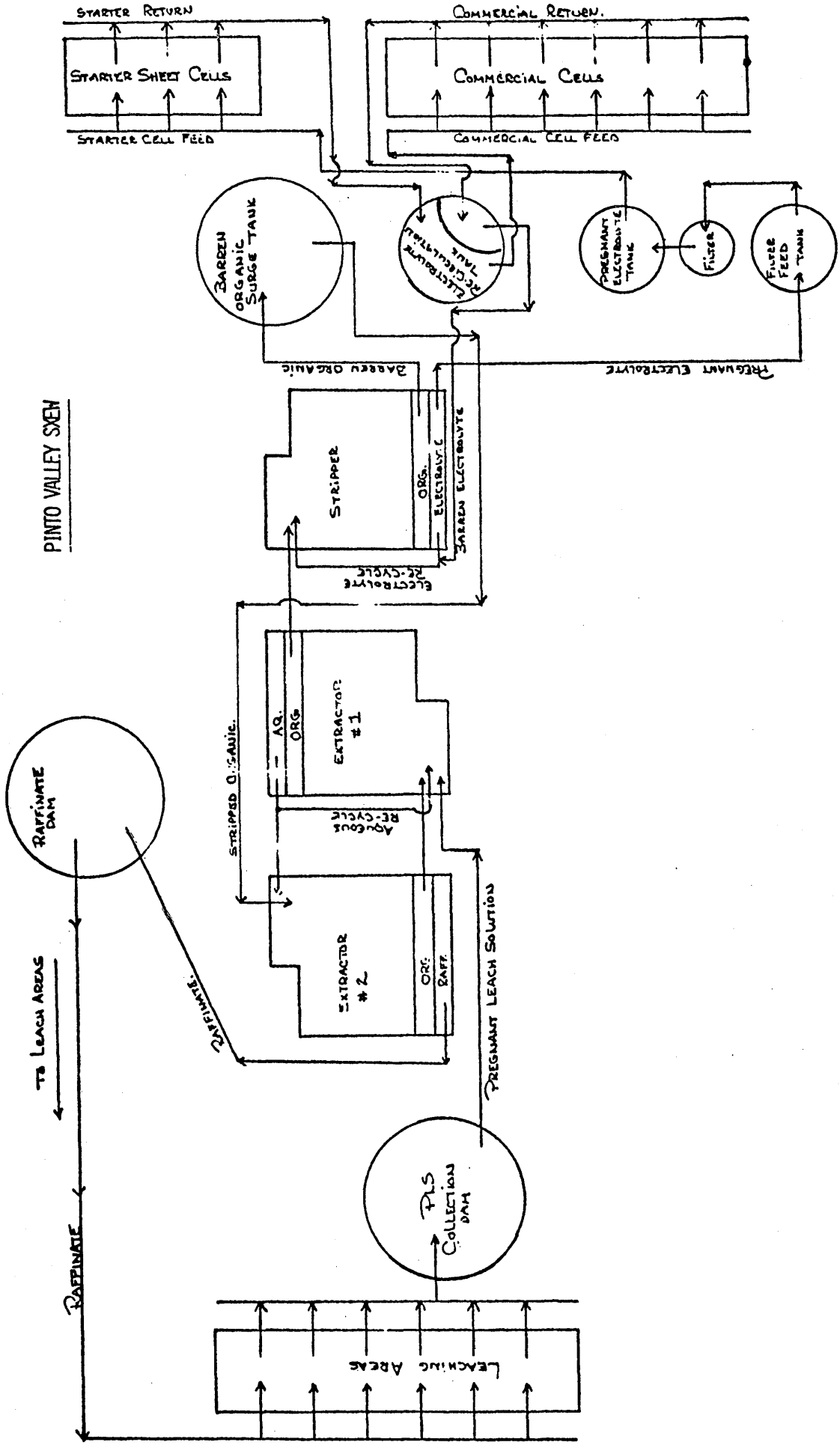
PINTO VALLEY SXEW
STARTER RETURN
STARTER SHEET CELLS
STARTER CELL FEED
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BARREN ORGANIC SURGE TANK
ELECTROWON TANK
PREGNANT ELECTROLYTE TANK
FILTER
FILTER FEED TANK
BARREN ORGANIC
PREGNANT ELECTROLYTE
STRIPPER
ORG.
ELECTROLYTE
BARREN ELECTROLYTE
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PLS COLLECTION DAM
LEACHING AREAS

HMC

DECISION NOTICE

FINDING OF NO SIGNIFICANT IMPACT

Copper Mine Expansion
BHP Copper Inc. - Pinto Valley Operations

USDA, Forest Service
Tonto National Forest
Globe Ranger District
Gila County, Arizona

DECISION AND RATIONALE

The BHP Copper Inc. submitted Plan of Operations (POO) #96-12-02-19 on June 19, 1996, for the purpose of expanding mining operations in three separate areas at their Pinto Valley Operations (portions of unsurveyed sections 20, 29, and 30 within T. 1 N., R. 14 E., G&SRBM). The first area includes expansion of an active open pit, construction of a segment of haulage road, and construction of a perimeter road totalling approximately 126.6 acres immediately adjacent to ongoing mining operations. The second area includes the expansion of the East Dump (waste rock disposal area) totalling approximately 5.1 acres. The third area also includes expansion of the same existing open pit and encompasses approximately 21.2 acres.

Based on the analysis documented in the Environmental Assessment and public participation, it is my decision to implement Alternative 3. However, implementation of the project can not proceed without approval of the Plan of Operations (POO). The decision to implement Alternative 3 will allow for the approval of POO #96-12-02-19, as supplemented, to reflect the reconfiguration of the East Dump as identified in the Environmental Assessment; but is not an approval of the POO.

Alternative 3 was selected in consideration of the following rationale:

It is consistent with the United States Mining Laws of 1872, as amended;

It is consistent with policies and procedures for implementing the National Environmental Policy Act (NEPA), as amended, and Council of Environmental Quality (CEQ) regulations.

It is consistent with all other applicable regulations including locatable minerals (Title 36 Code of Federal Regulations (CFR), Part 228, Subpart A).

It meets the needs of the proponent, allowing for continued development of the mineral resource.

It is consistent and complies with the standards and guidelines in the 1985 **Tonto National Forest Management Plan** (Forest Plan).

All practicable means have been employed to avoid and/or minimize adverse environmental impacts on lands administered by the National Forest System. Detailed descriptions of the required mitigation measures can be found in Chapter 2 of the Environmental Assessment.

The minerals administrator assigned to the proposed BHP project will be responsible for seeing that the project is implemented in compliance with the specific designs and measures detailed in the Plan of Operations.

The following baseline documents, identified by BHP Copper Inc. and utilized in the Environmental Assessment, were considered in making the decision: Biological Evaluation of Approximately 153 Acres (Pit Expansion A, Pit Expansion B, & East Dump) in the Vicinity of the Pinto Valley Mine, Gila County, Arizona (SWCA 1996); An Archaeological Survey of 305 Acres of USFS and Private Lands for the Pinto Valley Plan of Operations, Gila County, Arizona (SWCA 1996); Summary of Geochemical information for the Schist Lithology at the Pinto Valley Mine (Schafer and Associates 1996); Stability Analysis for the Proposed East Dump Pinto Valley Mine, Gila County, Arizona (Westec 1996); Hydrologic Relationship Between the Open Pit and Pinto Creek. Technical Memorandum Submitted to Mr. Bill Gray/BHP Copper Inc., by Mr. Terry Turner (Hargis + Associates 1996); Evaluation of the Necessity for Conformity Analyses for a Planned Federal Action at the BHP Copper Facility, Pinto Valley, Arizona (Applied Environmental Consultants 1996); Evaluation of Visibility Impacts Due to a Planned Federal Action at the BHP Copper Facility, Pinto Valley, Arizona Applied Environmental Consultants 1996); Revised Emission Inventory and Visibility Impact Analysis for a Planned Federal Action at the BHP Copper Facility, Pinto Valley, Arizona (Applied Environmental Consultants 1997). References to the above documents can be seen in Chapter 6 of the Environmental Assessment.

PUBLIC INVOLVEMENT AND SCOPING

Public involvement began on July 26, 1996, when scoping letters were mailed to parties known to have an interest in activities within this area. In addition, articles soliciting comments were published in the Copper Country News and the Arizona Silver Belt on August 6 and 7, 1996, respectively. During the scoping activities, seven comment letters were received, and phone contacts were made. Public comments received were reviewed and analyzed in the environmental analysis. Key issues were identified by the Interdisciplinary Team and grouped into the applicable resource category including: Water Resources, Biological Resources, and Air Resources. The key issues, by resource category, provided the focus of the analysis and can be seen on pages 6-7 of Chapter 1 of the Environmental Assessment.

The specific people and agencies involved in this project are documented in Chapter 5 of the Environmental Assessment.

All comments received throughout the analysis were considered in this decision. An explanation of the comments, and how they were dealt with, are contained in Chapters 1, 3 and 4 of the Environmental Assessment.

Additionally, in compliance with 36 CFR 215.5 and in response to public and agency request for additional review, the Environmental Assessment was made available to interested agencies and individuals. A legal notice, soliciting comments on the Environmental Assessment, was published in the Arizona Silver Belt on October 30, 1996. Two agencies and one individual responded with comments. In the response to the National Park Service (Tonto National Monument) comments on air quality, a revised emissions inventory was submitted by BHP Copper Inc. and additional mitigation measures adopted. In response to the Arizona Game and Fish Department comments, the white-tail deer was added to the Environmental Assessment as species expected to regularly occur in the project area. An explanation of the comments received during this comment period can be seen in Table A in the Appendix of the Environmental Assessment. A listing of project wide mitigation measures can be seen on page 22 in Chapter 2 - Mitigation Measures Common to All Alternatives of the Environmental Assessment.

ALTERNATIVES CONSIDERED IN DETAIL

The alternatives considered in detail include a no action alternative and two other alternatives that respond to the needs for the action and the issues (see Chapter 2 of the Environmental Assessment). Four other alternatives were eliminated from detailed study.

DETAILED ALTERNATIVES

Alternative 1: (No Action): This alternative would disapprove the Plan of Operations for the Pinto Valley Mine Expansion submitted by BHP Copper Inc. BHP Copper Inc. would continue to mine copper ore within the boundaries of its property until available deposits that could be safely accessed, after considering slope stability and stripping rates, are depleted. However, the General Mining Laws of 1872, as amended, gives BHP the right to pursue environmentally sound mining operations on National Forest System Lands. The No Action Alternative is required by National Environmental Policy Act (NEPA) and serves as a baseline from which to evaluate the effects of the action alternatives on the environmental resources.

Alternative 2: Proposed Action: This alternative would allow the proposal to be implemented as submitted by the proponent.

Alternative 3: Reconfiguration of the East Dump: This alternative would allow the proposal to be implemented as submitted by the proponent, except that the East Dump (waste rock disposal area) would be reconfigured so that the entire dump would be located on BHP land. Reclamation would be the same under this

alternative as described under the proposed action, but will not include the East Dump area that was previously located on Forest System Lands.

ELIMINATED ALTERNATIVES

Use of Existing Dumps for Disposal of Waste Rock: Under this alternative three dumps, currently in use on the BHP property, were considered as potential locations for storage of the waste rock. This alternative was not considered in detail because it was determined that these dumps would reach capacity from existing sources and could not contain the material that would originate from the proposed expansion. In addition, the location of the existing dumps were too far from the expansion area to be economical or environmentally preferred.

Use of Miller Gulch for Waste Rock Dump Site: This alternative considered the possibility of using Miller Gulch, a canyon on BHP property, for storage of waste rock in the initial phases for this project. This alternative was not considered in detail because preliminary studies indicated the presence of springs, wetlands, riparian vegetation, and heritage resources. After excluding those portions that have heritage resources and riparian areas, sufficient land was not available to store waste rock.

Backfill of the Pinto Valley Mine Pit: This alternative considered the possibility of placing waste rock into formerly used portions of the Pinto Valley Mine Pit. This alternative was not considered in detail because the configuration of the pits would makes concurrent backfilling logistically and technically impractical without creating unsafe working conditions. In addition, backfilling would create economic hardship, preclude development of future unproven ore reserves which may become economically feasible with development of new technologies, and could not occur concurrently with mining as the pit is not compartmentalized so backfill would be dumped on top of ongoing mining operations.

Alternative Mining Methods to Eliminate Need for Pit Expansion: This alternative considered alternative methods for extracting ore with subsurface techniques or in-situ leaching methods. This alternative was not considered in detail because underground mining methods were considered technologically or economically infeasible. In addition, alternative ore treatment, such as in-situ leaching or tank processing, were considered either unfeasible from an environmental perspective or impractical/unfeasible from an ore grade/quantity standpoint.

In response to comments from interested and affected persons and agencies, and from concerns raised by the interdisciplinary team, mitigation measures were adopted to ensure that the environmental effects of the proposed action would not be significant. Adoption of mitigation measures would also form a basis that would parallel this decision not to prepare an Environmental Impact Statement. As seen on page 22, Chapter 2 of the Environmental Assessment, the first mitigation measure involves in-kind replacement of structural range improvements on livestock grazing allotments within the project area. This

would include re-alignment of fences and replacement of other improvements that are impacted by the proposed activities. This measure would alleviate concerns of livestock movement into active mining areas and maintain the efficiency of allotment management plans for the specific allotment(s). The second and third measures involve implementing increased mitigation to control emissions on unpaved roads to less than the 100 tons per year (tpy) de minimus threshold, thus, complying with the Federal standards for ambient levels of specific pollutants in compliance with the Clean Air Act. Both mitigation measures can be seen on page 22 of the Environmental Assessment. Further description regarding the affects and consequences of the alternatives on the air resource can be seen on pages 31-32 and 38-39 of the Environmental Assessment. The fourth measure also involves the air resource and provides an avenue for BHP Copper Inc. and the Forest Service to explore long-term monitoring of air quality in the area surrounding the Pinto Valley Mine. Methods to monitor air quality would provide baseline data for use by the mining company, Forest Service, and other regulatory agencies to further evaluate compliance to the Clean Air Act.

FINDING OF NO SIGNIFICANT IMPACT (FONSI)

It is my determination, based on the Environmental Assessment, that this is not a major Federal action that would significantly affect the quality of the human environment; therefore, an Environmental Impact Statement is not needed.

Both beneficial and adverse effects have been taken into consideration when making this determination of significance. Beneficial effects have not, however, been used to offset or compensate for potential adverse effects. This determination is based on the following rational:

With the specified mitigation and reclamation measures, the effects of the selected alternative are not expected to be significant. Impacts from the selected alternative would be mitigated during project implementation and upon completion of final reclamation according to the Forest Plan direction and state and federal regulations;

Public health and safety are minimally affected by the proposed action and would be very limited in geographical distribution;

There would be no significant irreversible resource commitments or irretrievable loss to heritage resources, park lands, prime rangelands, wetlands or floodplains, or wild and scenic rivers;

Based on responses received on the Environmental Assessment, the effects on the quality of the human environment as disclosed by the Environmental Assessment are not in dispute, nor are the effects considered highly controversial;

Due to the amount of active mining occurring in similar areas on the Forest in recent years, these activities are not considered highly uncertain; nor do they represent unique or unknown risks;

This decision does not necessarily set a precedent for future decisions. Any future decisions will need to consider all relevant scientific and site-specific information available at that time;

Based on the analysis for the Environmental Assessment, the cumulative impacts from implementation of the selected alternative would not be significant;

Based on archaeological survey, and ethnohistoric literature review, and contacts with concerned Native American tribes, there would be no known effects on heritage resources listed or eligible for listing in the National Register of Historic Places. The Forest Supervisor has made a determination that the proposed project and the selected alternative will have no effect upon heritage resources;

There are no effects on Threatened or Endangered species or its habitat; and

This action does not threaten to violate Federal, State or local law or requirements imposed for the protection of the environment.

The proposed project (selected alternative) will be administered and monitored by a Forest Service Minerals Administrator who is empowered to take what ever actions are necessary to keep environmental effects below significant thresholds.

FINDINGS REQUIRED BY OTHER LAWS

Under the 1872 Mining Law, as amended, National Forest System Lands are subject to locatable mineral exploration and development, unless otherwise withdrawn from mineral entry. The area of the proposed action is located on lands open to mineral entry.

It is the purpose of 36 CFR 228, Subpart A to set forth rules and procedures through which use of the surface of National Forest System lands in connection with operations authorized by the United States mining laws (30 U.S.C. 21-54), which confer a statutory right to enter upon the public lands to search for minerals, shall be conducted so as to minimize adverse environmental impacts on National Forest System surface resources. This proposed mine expansion project and selected alternative is consistent with the CFR 228 regulations.

The proposed mine expansion project is located within Management Area 2F of the 1985 Tonto National Forest Management Plan (Forest Plan). The Forest's Plan management direction is to support environmentally sound energy and minerals development. Specific standards and guidelines are found in the Regional Guide

and in the prescriptions under decisions units 35, 36, 37, 42, and objectives J 04, G 01, G 02, G 05 - G 09. This proposed mine expansion project and selected alternative is consistent with the management prescriptions for the area.

Consistent with 2670 Forest Service Manual direction and the Endangered Species Act, as amended, a Biological Evaluation was completed for the proposed project on September 12, 1996. The listing of species evaluated was developed with cooperation from the U.S. Fish and Wildlife Service, Arizona Game and Fish Department, and the Forest Service. No endangered species, threatened species, proposed or threatened species, nor critical habitat are known nor expected to occur on the proposed project site.

Consistent with the National Historic Preservation Act, as amended, a report documenting an archeological survey of the project area was accepted by the Forest Service on October 14, 1996. This report was forwarded to the State Historic Preservation Office. An ethnohistoric literature review of the project was also completed during October 1996 as an initial attempt to identify places of traditional importance to Native American tribes. This report was sent to the State Historic Preservation Office and concerned Native American tribes on October 28, 1996. Copies of the survey report were included in the mailing to the Tribes. The archeological survey identified no archeological properties. The ethnohistoric report and subsequent contacts with the Tribes identified no non-archeological resources. It was determined that the proposed project and the selected alternative would have no potential to effect heritage resources. Heritage resource clearance was approved by the Forest Supervisor on March 14, 1997 (Report Number: 96-12-163A).

The area analyzed in this environmental document does not contain jurisdictional waters (including wetlands) that would require Section 404 permitting in compliance with the Clean Water Act of, as amended. A letter dated October 28, 1996 from the Arizona Section, Regulatory Branch of the Department of the Army, Corps of Engineers states that the work to be accomplished under the Plan of Operations #96-12-02-19 does not require a permit from the Corps.

Consistent with the Clean Air Act, as amended, a conformity determination for the Federal action was not required.

IMPLEMENTATION DATE

If no appeal is received, implementation of this decision may occur on, but not before, five business days following the end of the appeal period. If an appeal is received, implementation may not occur for 15 days following the date of the appeal disposition. Implementation of the project can not proceed without approval of the Plan of Operations (POO). The decision to implement Alternative 3 will allow for the approval of POO #96-12-02-19, as supplemented, to reflect the reconfiguration of the East Dump as identified in the Environmental Assessment; but is not an approval of the POO.

APPEAL RIGHTS STATEMENT

This decision is subject to appeal pursuant to Forest Service regulations at 36 CFR 215.7. Any written appeal must be postmarked or received by May 5, 1997. The Notice of Appeal should be sent to: USDA-Forest Service, Southwestern Region, ATTN: Appeal Deciding Officer, 517 Gold Avenue, SW, Albuquerque, New Mexico 87102.

Appeals must meet the content requirements of 36 CFR 215.14.

INFORMATION CONTACT PERSON

For further information on this project, contact Dean C. Morgan, Project Leader at the Globe Ranger District, Route 1, Box 33, Globe, Arizona 85501-9707; (520) 402-6200.

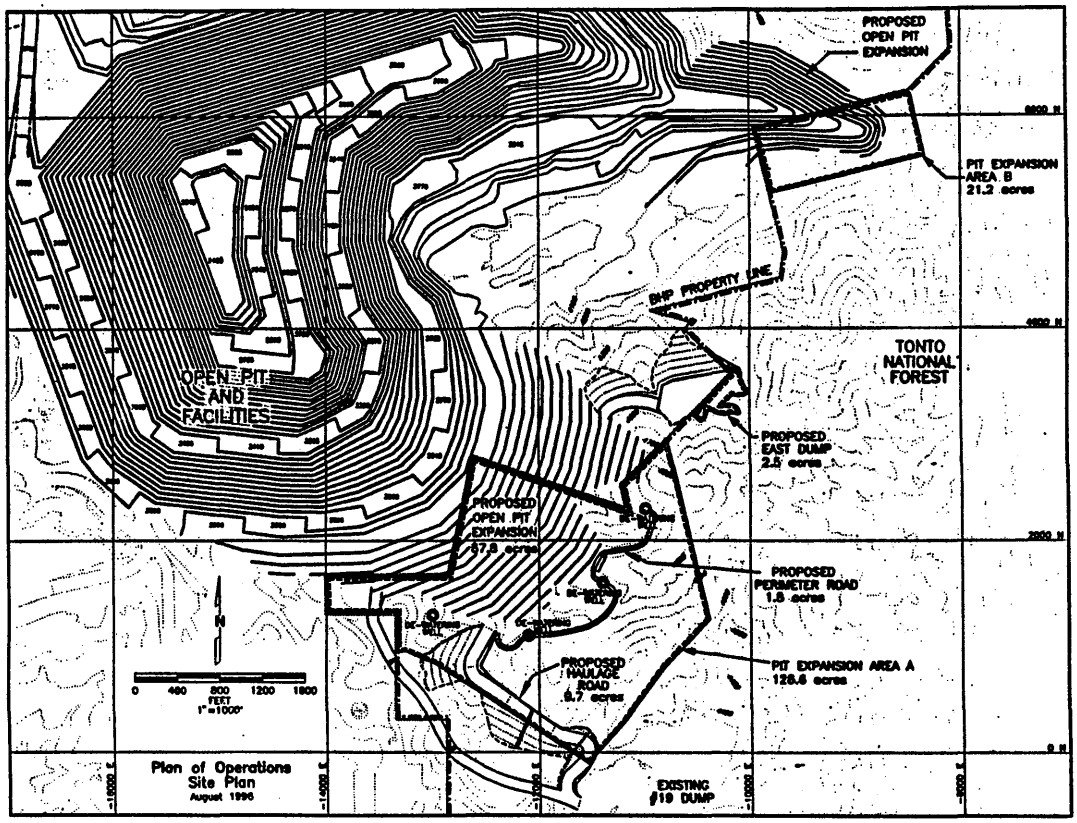
Dean C. Morgan

LARRY P. WIDNER
For District Ranger
Globe Ranger District

3/17/97
Date

ENVIRONMENTAL ASSESSMENT

BHP COPPER INC.
PINTO VALLEY OPERATIONS
PLAN OF OPERATIONS #96-12-02-19



USDA FOREST SERVICE
Tonto National Forest
Globe Ranger District
Gila County, Arizona

MARCH 1997

ENVIRONMENTAL ASSESSMENT

BHP PINTO INC.
PINTO VALLEY OPERATIONS
PLAN OF OPERATIONS #96-12-02-19

USDA FOREST SERVICE
Tonto National Forest
Globe Ranger District
Route 1, Box 33
Globe, Arizona 85501-9707
(520) 402-6200

March 18, 1997

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LIST OF ABBREVIATIONS

ACOE - Army Corps of Engineers
ADEQ - Arizona Department of Environmental Quality
AGFD - Arizona Game and Fish Department
AIP - Air Installation Permit
APP - Aquifer Protection Permit
CO - Carbon Monoxide
CWA - Clean Water Act
EA - Environmental Assessment
EPA - Environmental Protection Agency
GGMCC - Greater Gila/Miami Chamber of Commerce
ID Team - Interdisciplinary Team (also known as IDT)
MSL - Mean Sea Level
NAAQS - National Ambient Air Quality Standards
NEPA - National Environmental Policy Act
NO_X - Nitrogen compounds
O_3 - Ozone
Pb - lead
PM_{10} - Particulate Matter ≤ ten microns nominal aerodynamic diameter
POO - Plan of Operations
SCBD - Southwest Center for Biodiversity
SGCEDC - Southern Gila County Economic Development Corporation
SIP - State Implementation Plan
TPY - Tons per year
USDA - United States Department of Agriculture
USFWS - United States Fish and Wildlife Service

1. PURPOSE AND NEED FOR ACTION

This chapter establishes the purpose and need for the proposed action, identifies the decision to be made, summarizes the issues identified during scoping, and presents the evaluation criteria for assessing the impacts associated with each alternative.

This EA has been prepared under the requirements of the National Environmental Policy Act (40 CFR parts 1500-1508) to evaluate impacts associated with the proposed expansion of the Pinto Valley Mine onto Tonto National Forest lands.

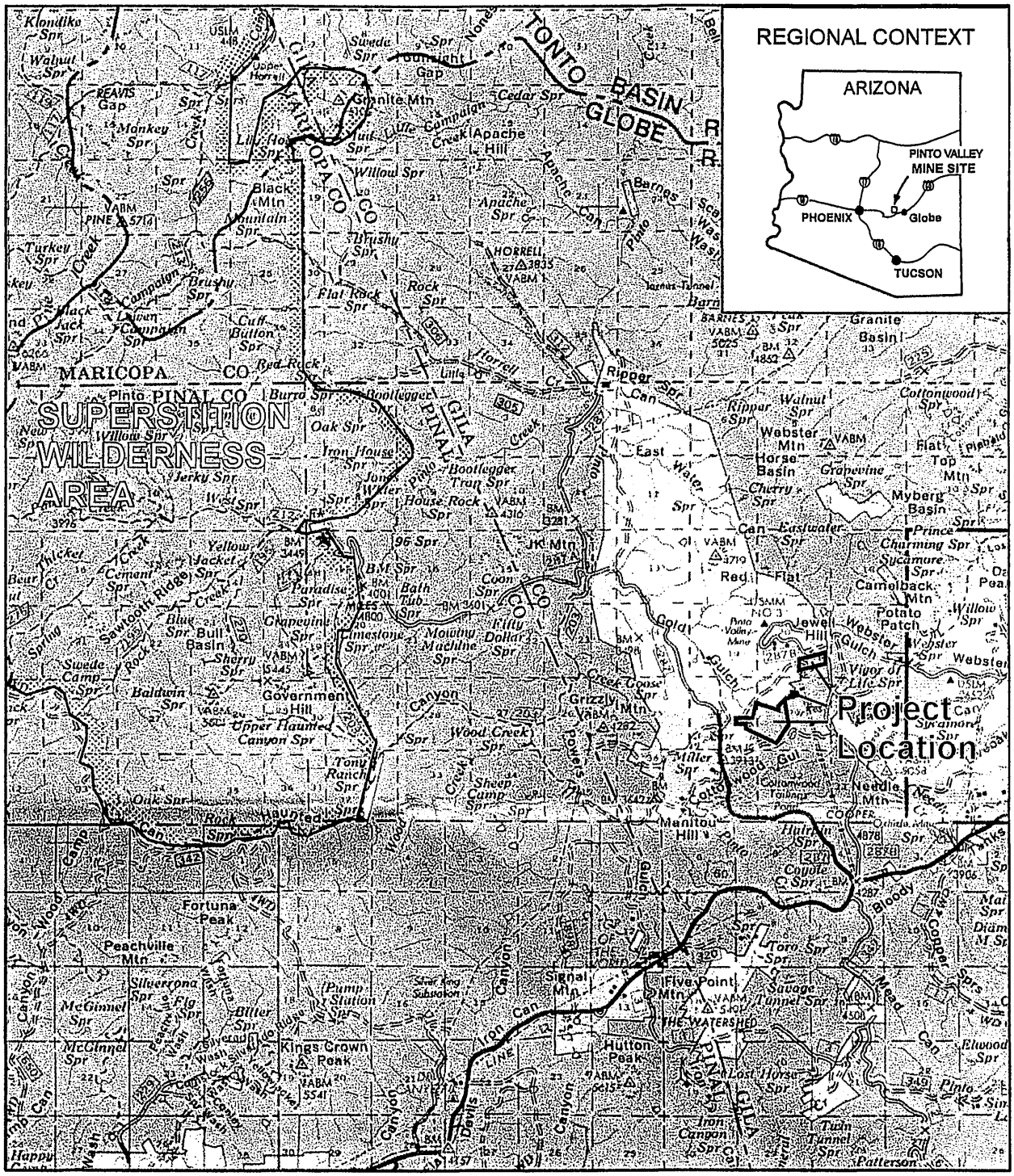
1.1 PROPOSED ACTION

Pinto Valley Mine is located approximately 8 miles west of Miami, Gila County, Arizona within the Globe-Miami mining district (Figure 1). Pinto Valley Mine is an existing facility that has been mining copper ore since 1972. BHP Copper proposes to expand its Pinto Valley Mine operations onto approximately 150.3 acres of lands on the Globe Ranger District of the Tonto National Forest (POO #96-12-02-10). Approval would authorize extension of the existing pit to the southeast onto approximately 126.6 acres and to the east onto approximately 21.2 acres. In addition, approximately 2.5 acres are proposed as the site of a portion of a waste rock dump (Figure 2). The proposed action is more thoroughly described in Section 2.1.2 of this document.

Tonto National Forest Management Plan's (Tonto Forest Plan) management direction is to support environmentally sound energy and minerals development. Specific standards and guidelines are found in the Regional Guide and in the prescriptions under decision units 35, 36, 37, 42, and activities J 04, G 01, G 02, G 05- G 09. The proposed action is consistent with existing resource management objectives identified in the *Tonto Forest Plan*.

1.2 PURPOSE AND NEED FOR ACTION

The purpose of the proposed action is to allow BHP Copper to continue to mine proven copper ore reserves present in the Pinto Valley Mine complex. Under the 1872 mining law, National Forest System Lands are subject to locatable mineral exploration and development, unless otherwise withdrawn from mineral entry. A decision on whether to approve the proposed action is required by the *Tonto Forest Plan*, which directs the Forest to process notices of intent and operating plans.



LEGEND

- BLM LAND
- PRIVATE LAND
- FOREST SERVICE LAND

N

SCALE

0 0.5 1 2 4

Miles

BASE MAP: TONTO NATIONAL FOREST RECREATION MAP (U.S. FOREST SERVICE, 1991)

SWCA Environmental Consultants Inc.
343 S. Scott Avenue
Tucson, Arizona 85701
Phone (520) 325-9194
FAX (520) 325-2033

JOB NUMBER	DATE
07-61754	8/29/94
FILE NAME	REV. DATE
PINTO1.CDR	

PINTO VALLEY MINE EXPANSION
PLAN OF OPERATIONS

FIGURE 1. PROJECT LOCATION

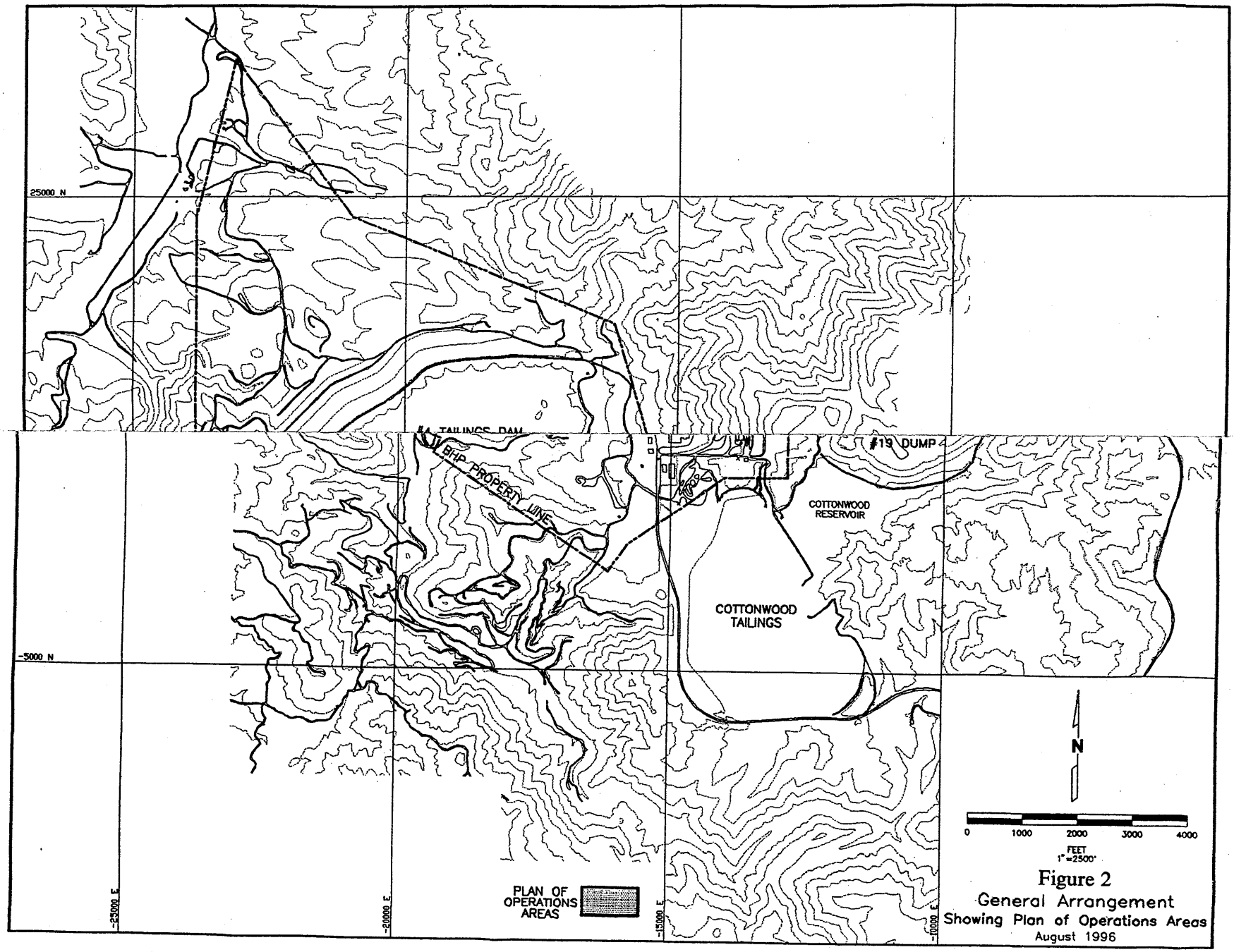


Figure 2
General Arrangement
Showing Plan of Operations Areas
August 1996

1.3 DECISION REQUIRED

The responsible official must either:

1) Determine if implementing the proposed action would have significant direct impacts, indirect impacts, or cumulative impacts on existing resources and thus require an Environmental Impact Statement;

or, if there is a finding of no significant impact,

2) Approve the proposed Pinto Valley Mine Expansion Plan of Operations or one of the alternatives, giving consideration to:

> BHP Copper's rights under the 1872 Mining Law as amended and other applicable Forest Service regulations.
>
> Allowance for surface uses consistent with the *Tonto National Forest Management Plan*, providing for resource protection which is necessary for the proposal to comply with federal and state statutes and regulations.

1.4 PUBLIC SCOPING SUMMARY

An interdisciplinary team (ID team) was formed by the Tonto National Forest to analyze the proposed action. The ID team included members with expertise in minerals, reclamation, biology, hydrology, geology, cultural resources, soils, lands and recreation, air quality, and geotechnical engineering. The ID team has reviewed the proposal and identified issues and concerns to be addressed in this EA.

The Tonto National Forest requested public input for this proposed project to determine the issues of concern. A mailing list of 74 addresses was compiled that included federal, state, and local agencies, as well as individuals and organizations that would have an interest in or be affected by the project. A public notice soliciting comments was published in the *Copper Country News* and the *Arizona Silver Belt* on August 6 and 7, 1996, respectively. The mailer included a description of the proposed project and a map showing the lands included in the mine expansion plan of operations. Copies of the scoping letter and the public notice are available from the Globe Ranger District in Globe, Arizona. The Forest Service received eight letters in response to the mailer. A Scoping Report, summarized in Table 1, identified the issues/ comments raised during scoping by the public and the ID team.

Table 1. Issues Identified During Project Scoping. IDT=Interdisciplinary Team, SCBD=Southwest Center for Biological Diversity, AGFD=Arizona Game and Fish Department, PVT=Private Individual, SGCEDC=Southern Gila County Economic Development Corporation, GGMCC=Greater Globe-Miami Chamber of Commerce, ACOE= Army Corps of Engineers, USFWS=United States Fish & Wildlife Service.

Resource	Issue/Comments	Source
Water Resources	• How will surface water quality be affected by the proposed expansion?	SCBD, IDT, AGFD
	• How will groundwater quality be affected by the proposed expansion?	SCBD, IDT, AGFD
	• How will surface water quantity in Pinto Creek be affected by the proposed expansion?	IDT
	• Will there be impacts to Jurisdictional Water of the US and require a Clean Water Act Section 404 permit?	ACOE
Biological Resources	• Will expanding the Pinto Valley Mine, creating new waste rock disposal area, and constructing a new haul road affect Threatened and Endangered Species?	IDT, SCBD, AGFD, USFWS
	• Will the proposed expansion affect special status species?	IDT
	• Will erosion from the construction of a new perimeter road and segments of a new haul road in the project area affect surface water and springs in the area and the fish and birds who inhabit these areas?	SCBD
	• What are the anticipated losses of wildlife habitat, as described by the AGFD, including threats posed to terrestrial, avian, and aquatic species?	AGFD
	• How will riparian area be affected by the proposed expansion?	USFWS
Heritage Resources	• Will surface disturbance associated with the proposed expansion impact heritage resources?	IDT
Air Resources	• Is the expansion proposed in the Plan of Operations in conformity with the Clean Air Act and National Ambient Air Quality Standards?	IDT
	• Will there be impacts to visibility in the Superstition Wilderness Areas as a result of increased emission at Pinto Valley Mine?	IDT
Land Use	• Will there be impacts to the management or improvements on grazing allotments as a result of the surface disturbance associated with mine expansion?	IDT
	• Does the proposed mine expansion comply with the Tonto National Forest Plan?	SCBD
	• Will the Forest Service take into account any past record of violations of BHP Copper Co. and the effectiveness of past reclamation operations...by the mining corporation?	SCBD
	• Will the proposed activities infringe on adjacent mining claims?	PVT
	• What are the scope, goals, and approaches for reclamation?	AGFD, IDT
	• Will the Forest Service include a cost/benefit analysis of the proposed project, clearly delineating who will pay for the proposed expansion activities and what parties will receive direct financial compensation from the proposed activities. Use of National Forest System Lands for mineral extraction activities is a controversial activity which must be adequately justified as a use for public lands on the Tonto National Forest which are owned and maintained by the American taxpayers.	SCBD
	• Will public access be restricted as a result of the proposed mine expansion and will public safety be endangered?	IDT
Visual Quality	• How will the expansion of the East Dump affect the visual quality of the project area?	SCBD
Socio-Economic Resources	• What are likely economic impacts of the proposed action or alternatives to the local economy?	SGCEDC, GGMCC

1.5 ENVIRONMENTAL ISSUES AND EVALUATION CRITERIA

The following key issues have been identified and will be tracked through the EA:

1.5.1 Water Resources

Comment/Issue: How will surface water quality be affected by the proposed expansion?

Evaluation Criteria: Numeric and narrative standards of existing Clean Water Act and Arizona Water Quality Standards that would govern the proposed action with supporting narrative.

Comment/Issue: How will groundwater quality be affected by the proposed expansion?

Evaluation Criteria: Numeric and narrative standards of existing Clean Water Act and Arizona Groundwater Quality Standards that would govern the proposed expansion with supporting narrative.

Comment/Issue: How will surface water quantity in Pinto Creek be affected by the proposed expansion?

Evaluation Criteria: Narrative description of the area hydrogeology the explains the relationship between Pinto Creek and the mine pit. Likelihood of reducing or diverting water to Pinto Creek.

1.5.2 Biological Resources

Comment/Issue: Will the proposed expansion affect special status species?

Evaluation Criteria: Potential to result or contribute to future listing of special status species.

Comment/Issue: What are the anticipated losses of wildlife habitat including threats posed to terrestrial, avian, and aquatic species?

Evaluation Criteria: Existing data from AGFD regarding game mammal densities and estimated population impacts resulting from direct habitat loss.

Comment/Issue: How will riparian areas be affected by the proposed expansion?

Evaluation Criteria: Description of habitat affected by the proposed expansion.

1.5.3 Air Resources

Comment/Issue: Is expansion proposed in the POO in conformity with the Clean Air Act and National Ambient Air Quality Standards?

Evaluation Criteria: Narrative descriptions and quantitative emissions inventory.

Comment/Issue: Will there be effects to visibility in the Superstition Wilderness Area as a result of increased emissions at Pinto Valley Mine?

Evaluation Criteria: Narrative description and EPA Level 1 and Level 2 Visibility Analysis.

1.6 ISSUES ELIMINATED FROM FURTHER CONSIDERATION

Other issues were raised during the scoping process which did not become key issues but were considered in the EA analysis. Each of the issues eliminated from further consideration by the ID team and the rationale for their elimination is provided below.

1.6.1 Water Resources

Comment/Issue: Will the proposed expansion impact waters of the United States and will require a Clean Water Act Section 404 permit?

Rationale for elimination: This issue was eliminated from further consideration because there are no jurisdictional waters of the U.S. within the proposed project area (Letter dated May 9, 1996 from BHP to ACOE). This determination was made and approved by the ACOE regulatory office in Phoenix.

1.6.2 Biological Resources

Comment/Issue: Will expanding the Pinto Valley Mine, creating new waste rock disposal area and constructing a new haul road, affect Threatened and Endangered species?

Rationale for elimination: A Biological Evaluation was completed for the proposed project that evaluated impacts to Threatened and Endangered species. The Biological Evaluation is on file at the Globe Ranger District. The list of species evaluated was developed with cooperation from the US Fish and Wildlife Service, Arizona Game and Fish Department, and Forest Service. No endangered species, threatened species, proposed endangered or threatened species, nor critical habitat are known

nor expected to occur on the project site (SWCA 1996a). Therefore, additional analysis or impact assessment is not needed and this issue will not be discussed further in this document.

Comment/Issue: Will erosion from the construction of a new perimeter road and segments of a new haul road in the project area affect surface water and springs in the area and the fish and birds who inhabit these areas?

Rationale for elimination: This issue will not be tracked under biological resources. Discussion on these resources will be discussed under surface water quality.

1.6.3 Heritage Resources

Comment/Issue: Will surface disturbance associated with the proposed expansion impact heritage resources?

Rationale for elimination: A Class III cultural resources survey was completed for the proposed expansion area. No sites eligible for inclusion on the National Register of Historic Places were located during survey efforts (SWCA 1996b). A more detailed discussion of the Ethnographic history of the project region follows.

In July 1996, the Tonto National Forest mailed a letter to the tribal administrative and cultural resource departments of nine tribes requesting comments and concerns regarding this EA. The nine tribes included the Hopi Tribe, Pueblo of Zuni, San Carlos Apache, White Mountain Apache, Tonto Apache, Yavapai-Apache Nation, Ft. McDowell Mohave-Apache Indian Community, Yavapai-Prescott Indian Tribe, and Salt River Pima-Maricopa Indian Community.

The project area lies within a larger region that is known to have been utilized by Native American people during prehistoric (prior to A.D. 1450) and historic times (A.D. 1450 to present). This region is bounded by the Pinal and Dripping Spring Mountains on the south, the valleys of Pinal Creek on the east, Salt River on the north, and Campaign Creek, the headwaters of Queen Creek, and the town of Superior on the west.

Extensive ethnohistoric studies have been conducted or are in progress immediately to the east and west of the project area (Newton 1995, 1996). Available archival records and literature were investigated to identify documentation of Native American occupation and use within a 1200-acre proposed waste rock disposal area north of Miami, Arizona (Newton 1996). A similar study was conducted for a 2600-acre proposed open-pit copper mine project area west of Miami (Newton 1995). A work plan is currently

being developed to conduct additional documentation of the ethnohistoric information on Native American occupation and use of this area through interviews with knowledgeable tribal members from the Yavapai, Western Apache, Hopi, and Zuni tribes.

The Hopi, Zuni, and O'Odham (Gila River Indian Community, Salt River Pima-Maricopa Indian Community, Ak-Chin Indian Community, and Tohono O'Odham Nation) people have said that prehistoric cultural remains recorded by archaeologists within the region exist as evidence that their ancestors occupied or migrated through the area. A recent archaeological survey of the project area did not identify any prehistoric cultural remains (SWCA 1996b); therefore, it is unlikely that the ancestors of the Hopi, Zuni, or O'Odham people utilized this area during prehistoric times.

According to available documentation (Castetter, Bell, and Grove 1938; Russell 1975), O'Odham people may have traveled into the region on plant-gathering expeditions in historic times; however, there is no known documented evidence that these people occupied or used the project site. It is possible that other Native Americans, such as the Hopis and Zunis, also utilized the region during historic times; however, there is little documented evidence that these people inhabited, utilized, or even traveled through this region (Newton 1995, 1996), let alone the project area. It is, therefore, unlikely that the project site contains any places of traditional importance to these tribes. To date, none of these tribes have identified any places of traditional importance within the project site.

Two Native American groups, the Yavapais and the Western Apaches, are believed to have occupied and/or utilized this region during the last four hundred years. McClintock (1921) suggested that the Tonto Basin area, which includes the project area, was an intermediary area utilized by both the Yavapais and Western Apaches. Based on the available information concerning this region, the project area may have been utilized by both of these groups for subsistence hunting and gathering (Newton 1995, 1996); however, there is no known documented evidence that either Yavapai or Western Apache occupied or used this particular project site. To date, no Yavapai or Western Apache Tribes have identified any places of traditional importance within the project site.

A Phase I Ethnohistory has been completed as part of the National Historic Preservation Act Section 106 compliance process for this project. Based on analysis completed to date, additional compliance efforts are not expected to be needed and further evaluation of this topic is not planned for the EA.

1.6.4 Land Use

Comment/Issue: Will there be impacts to the management or improvement on existing grazing allotments as a result of the surface disturbance associated with the mine expansion?

Rationale for elimination: The proposed expansion lies within the Bohme/Sleeping Beauty/Bellvue grazing allotment. The allotment encompasses 7,000 acres. The mine expansion would reduce this allotment by 2.14%. The Globe Ranger District Range staff has determined that because of the relatively small acreage of impact associated with the proposed actions and alternatives considered, the stocking rate permitted on the grazing allotment would not be reduced. Mitigation would be provided for damage to any cattle-related improvements within the project area. Mitigation is expected to consist of in-kind replacement of improvements. Therefore, no impact will result to grazing allotments.

Comment/Issue: Does the proposed mine expansion comply with the Tonto National Forest Plan?

Rationale for elimination: As stated on page 1 of this EA, the proposed mine expansion is consistant with the Tonto National Forest Plan.

Comment/Issue: Will the Forest Service take into account any past record of violations of BHP and the effectiveness of past reclamation operations completed (or not) by the mining corporation before approving the proposed project?

Rationale for elimination: The Forest Service has determined that the expansion would neither increase nor decrease the probability of regulatory violations at the Pinto Valley Mine site.

Within the last five years, Pinto Valley operations has had six enforcement actions related to the environment. All actions were resolved and the Pinto Valley operations is currently in compliance with all regulatory actions. Planned or active reclamation activities at Pinto Valley Mine Operations include: a large scale tailings reprocessing project at Miami Unit, tailings reclamation using cows and other methods; seeding of Cottonwood tailings, slope reduction; best management practices for erosion control; and others. These methods have been effective.

No further evaluation of these topics is planned for this EA.

Comment/Issue: Will the proposed expansion infringe on adjacent mining claims?
Rationale for elimination: The proposed expansion occurs about 0.5 miles northeast of mining claims controlled by parties other than BHP. No impacts to these claims are anticipated as a result of this project. This issue will not be addressed further in this document.

Comment/Issue: What are the scope, goals, and approaches for reclamation?

Rationale for elimination: Reclamation is a Forest Service regulation and a component of the alternatives described in Chapter 2. Therefore, it is not a resource issue used to compare and contrast alternatives. As part of the Forest Service administrative responsibilities for mining on public lands, the Forest Service requires that reclamation requirements be addressed in the POO and that adequate bonding is provided by the proponent to ensure that post-closure reclamation is completed as proposed.

Comment/Issue: Will the Forest Service include a cost/benefit analysis of the proposed project, clearly delineating who will pay for the proposed expansion activities and what parties will receive direct financial compensation from the proposed activities? Use of National Forest System Lands for mineral extraction activities is a controversial activity which must be adequately justified as a use for public lands on the Tonto National Forest which are owned and maintained by the American taxpayers.

Rationale for elimination: Two interpretations of this comment are possible: a) a cost/benefit should be completed for this project to determine if the risks of capital expenditure made by BHP are warranted by the potential returns and the second half of the comment is expressed as an opinion and not a scoping issue, or b) the commentor feels that a private enterprise profiting from activities on public lands is inappropriate because of the controversy the commentor feels surrounds the use of public lands for mining, and therefore, anticipated expenditures and expected profits should be disclosed in this document. The following discussion responds to each of these interpretations separately.

a) The capital and operating cost associated with developing the mine expansion will be the sole burden of BHP Copper They have completed a cost analysis of the proposed expansion in relation to the anticipated returns on the investment and have determined that the economic risks are warranted. Independent confirmation of this by the Forest, through a cost/benefit analysis, is not required. The Pinto Valley Mine has been operating since 1972 and will continue regardless of the decision made on this EA for at least seven more years.

b) Mining on public lands is authorized under the General Mining Law of 1872, as amended, the Mining and Mineral Policy Act of 1970, and the Federal Land Policy and Management Act of 1976. Justification of the use of public lands through a cost/ benefit analysis expected through such use of public lands is not a requirement of these regulations.

Based on the information above, use of a cost/benefit analysis is not necessary and will not be prepared.

Comment/Issue: Will public access be restricted as a result of the proposed mine expansion and will public safety be endangered?

Rationale for elimination: The public does not currently access the proposed mine expansion area for recreational use. Any access roads in the area have security gates to ensure that people not associated with mining activities did not enter into areas of active mine activity.

1.6.5 Visual Quality

Comment/Issue: How will the expansion of the East Dump affect the visual quality of the project area?

Rationale for elimination: Visual Quality Objectives for the project area have been classified by a Forest Landscape Architect as Maximum Modification; meaning that management activities may result in a noticeable modification to the characteristic landscape. When viewed as background, the visual characteristic must blend with the existing landscape. When viewed from the middle and foreground, they may not appear to completely borrow from existing landscape. The proposed expansion is a small scale continuation of the existing surface disturbance associated with the Pinto Valley operation. Background views of the project area would not be significantly changed and the proposed action is consistent with existing foreground and middleground views. This issue will not be discussed further in this EA.

1.6.6 Socioeconomic Resources

Comment/Issue: What are the impacts of the proposed action or alternatives to the local economy?

Rationale for elimination: Economic consequences, such as employment and taxes generated, of the alternatives differ. Information on employment and taxes that distinguish the alternatives has been provided in Chapter 2, Alternatives.

2. ALTERNATIVES

This chapter describes the alternatives considered in detail, the alternatives eliminated from further consideration, and summarizes a comparison of alternatives. Council on Environmental Quality regulations require the analysis of a range of alternatives, including no action (40 CFR 1502.14[d]). The number of alternatives that constitutes a reasonable range depends on the nature of the proposed action, as well as the issues and environmental impacts associated with it. Based on the issues identified during public scoping and the environmental impacts associated with the proposed action, it was determined that the alternatives considered in detail in this EA constitute a reasonable range of alternatives for purposes of NEPA compliance.

2.1 ALTERNATIVES CONSIDERED IN DETAIL

2.1.1 Alternative 1: No Action

Under this alternative, the Forest Service would disapprove the POO for the Pinto Valley Mine Expansion submitted by BHP Copper However, the General Mining Law of 1872 gives BHP Copper the right to pursue environmentally sound mining operations on public lands. The No Action Alternative is required by NEPA and serves as a baseline from which to evaluate the effects of the action alternatives on the environmental resources.

Under the No Action Alternative, BHP Copper would continue to mine copper ore within the boundaries of its property until available deposits that could be safely accessed after considering slope stability and stripping rates are depleted. Four de-watering wells would either be placed on private land or permitted by the Forest Service under a separate action. These wells are anticipated to pump approximately 25-35 gallons per minute for each well. A total of 1.26 billion tons of ore could be removed from the mine, leaving about 700 million tons of proven reserves unrecoverable. The pit floor would be deepened from 3,050 feet to a final bottom elevation of 2,600 feet above mean sea level (msl). The expected life of mine operations would be six years.

Under the No Action Alternative, the current mine employee base of approximately 633 workers would be expected to decline to roughly 566 in 2002 and drop abruptly to about 60 in 2003. This level would decline to 45 by mine closure in 2007. Tax revenue generated by the mine under the No Action Alternative for the life of the mine would be approximately $45.1 million.

2.1.2 Alternative 2: Proposed Action

The Proposed Action consists of an extension of the existing Pinto Valley Mine pit to the southeast onto an area referred to as Area A, and to the east onto an area (Area B). The proposed expansion areas would allow for deepening of the pit from its current bottom elevation of 3,050 feet to a final elevation of approximately 2,375 feet above mean sea level (msl). In addition, approximately 2.5 acres of forest land are proposed as the site for a part of a waste rock dump known as the East Dump. Figures 3 and 4 depict the project area and provide plan and cross-section view of the proposed action.

Approximately 67.8 acres of Area A (Figures 3a, 3b, and 4) would become part of the Pinto Valley Mine pit. An approximately 30-foot wide road covering roughly 1.8 acres would be constructed along the perimeter of the pit. A haul road would be constructed on the south side of the new pit; this road would average approximately 100 feet-wide and have a length within Area A of roughly 1,850 feet. All fill construction, required to build this road, would result in a total disturbance of about 9.7 acres. A series of four de-watering wells would be drilled along the perimeter of the proposed pit to increase the stability of the host rock. These wells are anticipated to pump approximately 25-35 gallons per minute from each well. This water would be fed into the mill water feed pond.

Roughly half of Area B (Figure 3a) would be incorporated into the Pinto Valley Mine pit. No new roads or de-watering wells are required for expansion into Area B.

East Dump would be filled with waste rock originating from Area A (Figure 3a). The rock would be dumped onto the 2.5 acres of National Forest System Lands and approximately 10 acres of BHP lands. The material would be stored at the angle of repose and maintained with a level top surface.

According to the Pinto Valley Mine POO, completion of the proposed expansion would require ten years. Expansion would commence upon receiving all necessary project approvals, which is hoped to occur in 1997. Figure 3b depicts the production areas on Forest Service land and portions of the BHP owned land that are dependent on the POO.

As shown in Table 2, production rates for the past seven years averaged 52,731.9 Ktons/year (min=50,454 Ktons/year and max=55,616 Ktons/year). Average production rate for the proposed action is 45,205.5 Ktons/year (min=26,599 Ktons/year and max=59,821 Ktons/year). Under the proposed action peak production occurs during the first year.

Reclamation of mined areas would be accomplished during mine closure as described in the Pinto Valley Mine POO. The proposed haul road would be partially recontoured to fit more closely with adjacent topography and its top surface would be scarified and re-seeded with a Forest Service approved seed mix.

Table 2. Historic production levels and action alternatives production schedule. These values include ore (leach and mill), waste rock, and overburden.

Year	Production in Ktons		
	Total Mine Production Private and USFS Lands	POO Production Rates	
		USFS Lands	USFS and Private Lands Dependent on POO Implementation for Production
1989	53,689	0	0
1990	53,229	0	0
1991	55,616	0	0
1992	52,334	0	0
1993	52,905	0	0
1994	50,896	0	0
1995	50,454	0	0
1996	Not Available	0	0
Year 1	59,821	8,236	8,236
Year 2	56,348	5,797	15,909
Year 3	55,947	2,132	6,532
Year 4	56,422	0	4,065
Year 5	55,177	0	0
Year 6	47,313	0	0
Year 7	33,670	0	0
Year 8	31,488	0	0
Year 9	30,050	4,061	4,061
Year 10	26,599	820	820

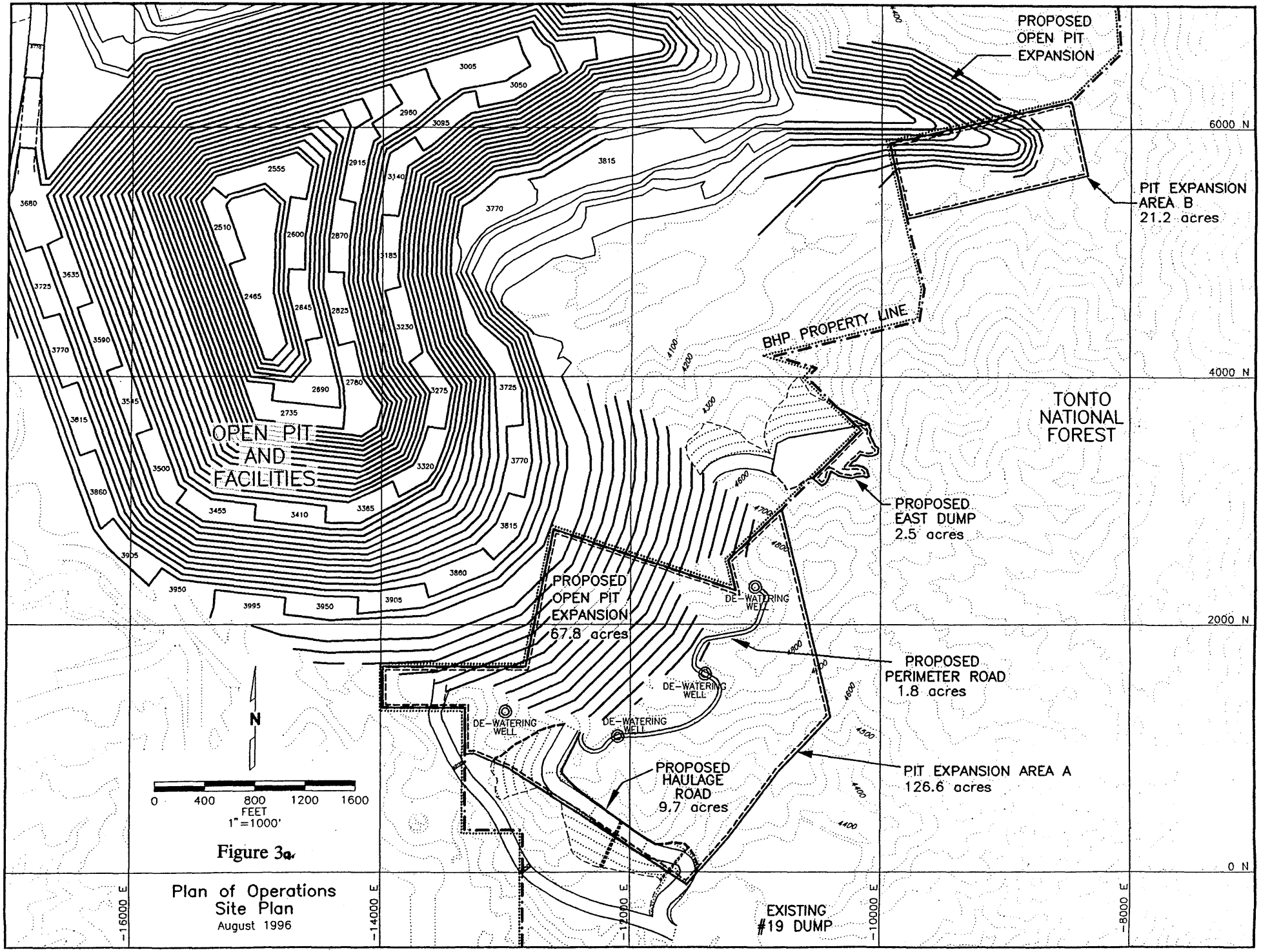
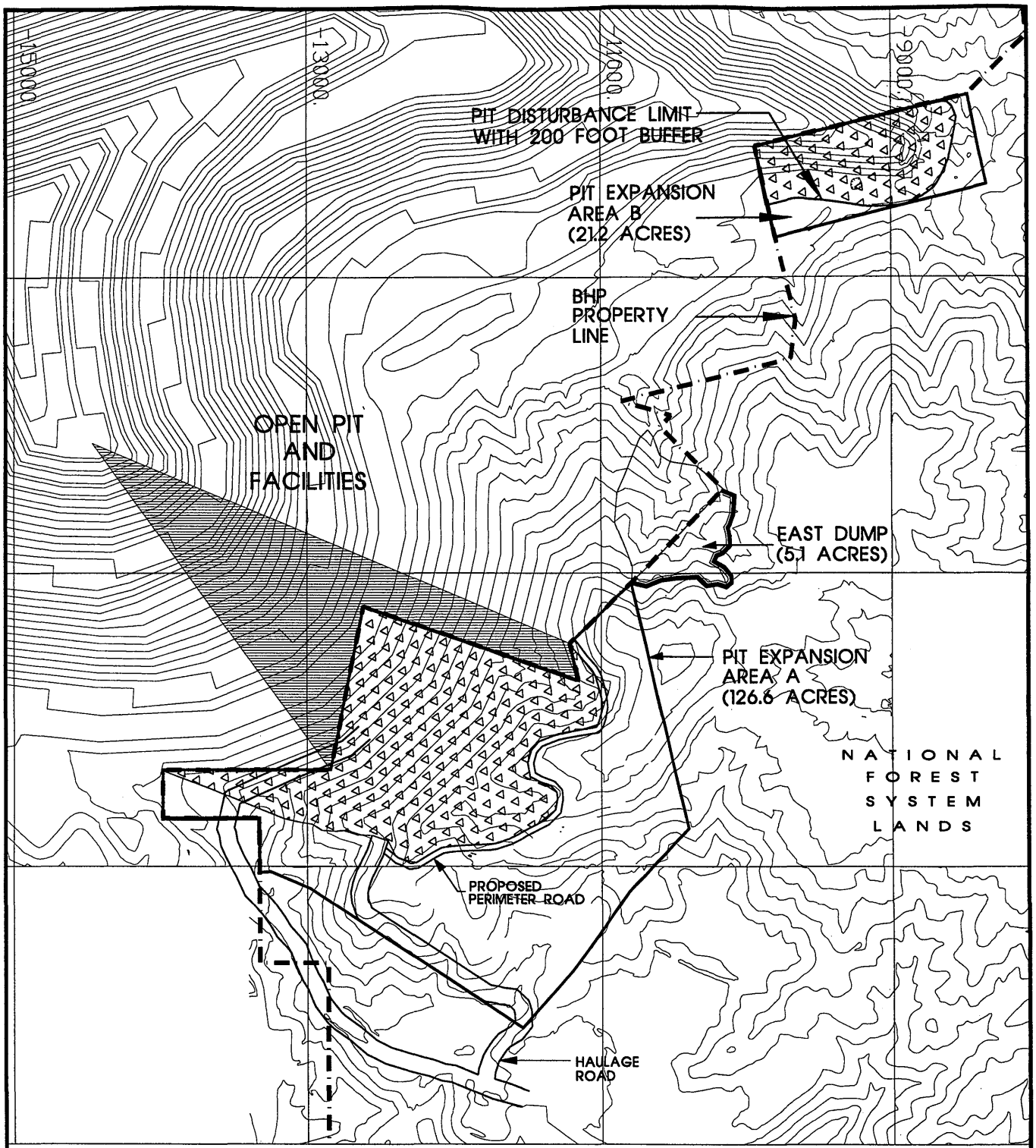


Figure 3a

Plan of Operations
Site Plan
August 1996



PINTO VALLEY OPERATIONS

FIGURE 3B. PRODUCTION AREAS ON FOREST LAND AND PORTIONS OF BHP OWNED LAND DEPENDENT ON THE PLAN OF OPERATION.

SWCA Environmental Consultants Inc.

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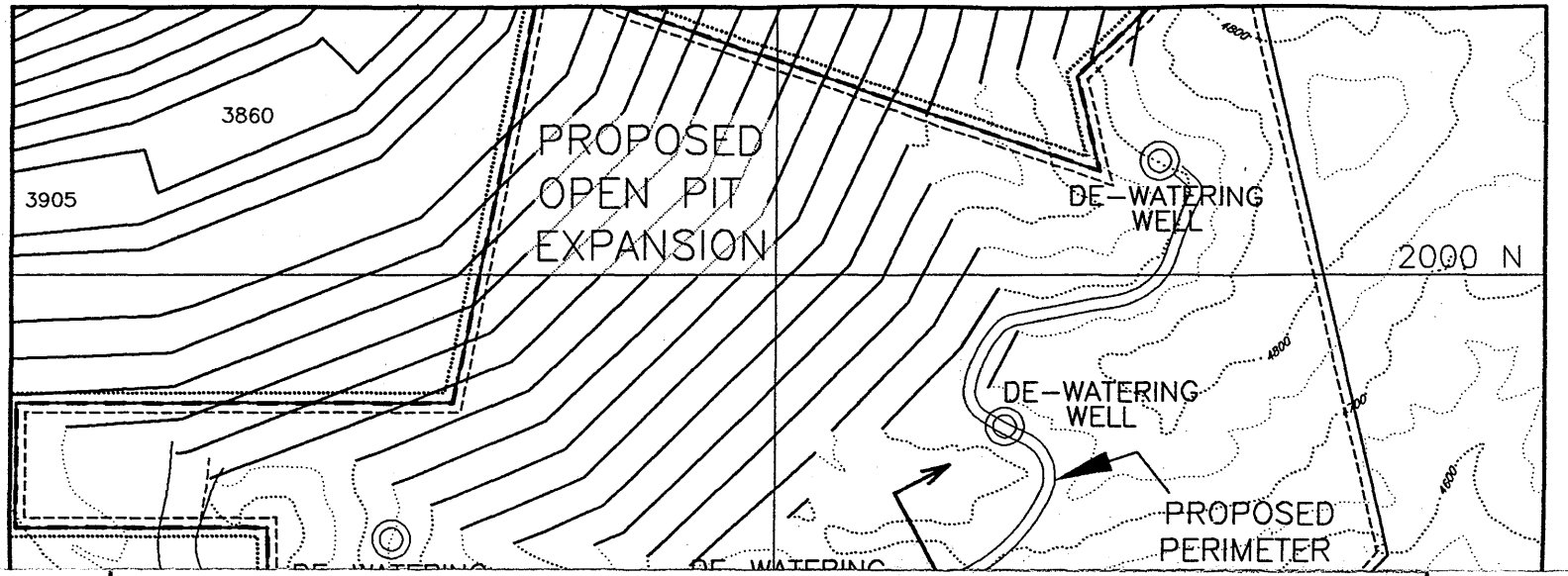
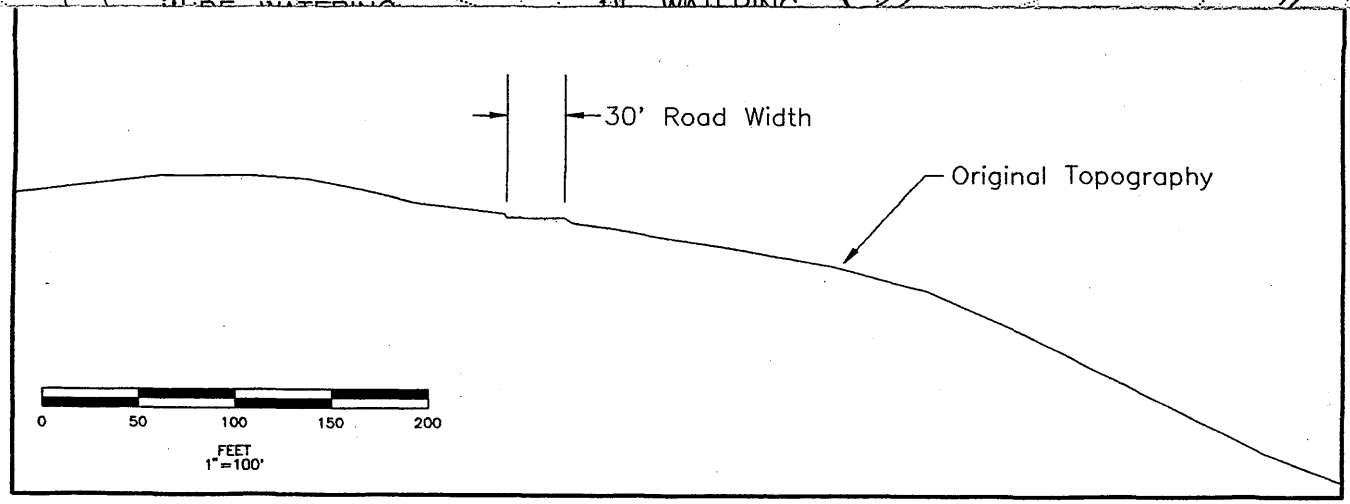




Cross Section B – Perimeter Road

Figure 4

PIT EXPANSION AREA A
PLAN AND SECTIONS
August 1996

Culverts would be removed from the road to permit natural drainage. The waste rock dump would be recontoured as necessary so that all slopes are less than 2.5:1. Under this alternative 13.2 acres of Forest Service System Lands would be reclaimed. Sides and top of the dump would be revegetated using hydromulch techniques.

Under the Proposed Action, the current mine employee base of 633 workers could be expected to increase to 642 for 3 years and then decline to 586 by 2001. The Proposed Alternative would provide for roughly 525 to 540 more jobs in the Miami area during the years 2003 through 2007 than the No Action Alternative. This number of workers could remain employed through the life of the mine (2007). Tax revenue generated by the life of the mine with the proposed expansion would be approximately $61.1 million, $16 million more than that generated under the No Action Alternative.

2.1.3 Alternative 3: Reconfiguration of the East Dump

The lands identified for expansion in Areas A and B are necessary to provide the required slope stability for the pit walls and to achieve the project's purpose and need. Topography in the vicinity of Area A likewise determines the route for the proposed haulroad. In this alternative, the pit expansion and haulroad configuration will remain the same. The proposed East Dump area would be reconfigured so that the entire dump would be located on BHP land (Figure 5). Reclamation would be the same under this alternative as described under the proposed action, but will not include the East Dump area (2.5 acres) that was previously located on Forest Service System Lands. Total area to be reclaimed would be 10.7 acres.

2.2 ALTERNATIVES ELIMINATED FROM DETAILED STUDY

Listed below are alternatives to the proposed action that were discussed by the ID team but eliminated from further consideration.

2.2.1 Use of Existing Dumps for Disposal of Waste Rock

Three dumps currently in use on the BHP property, the #19 Dump, West Dump, and North Dump, were considered as potential locations for storage of the waste rock to be removed during the operations on Area A. However, it was determined that these dumps would reach capacity from existing sources and could not contain the material that would originate from the proposed expansion or that these dumps were located too far from the Pinto Valley Mine expansion area to be economical or environmentally preferred.

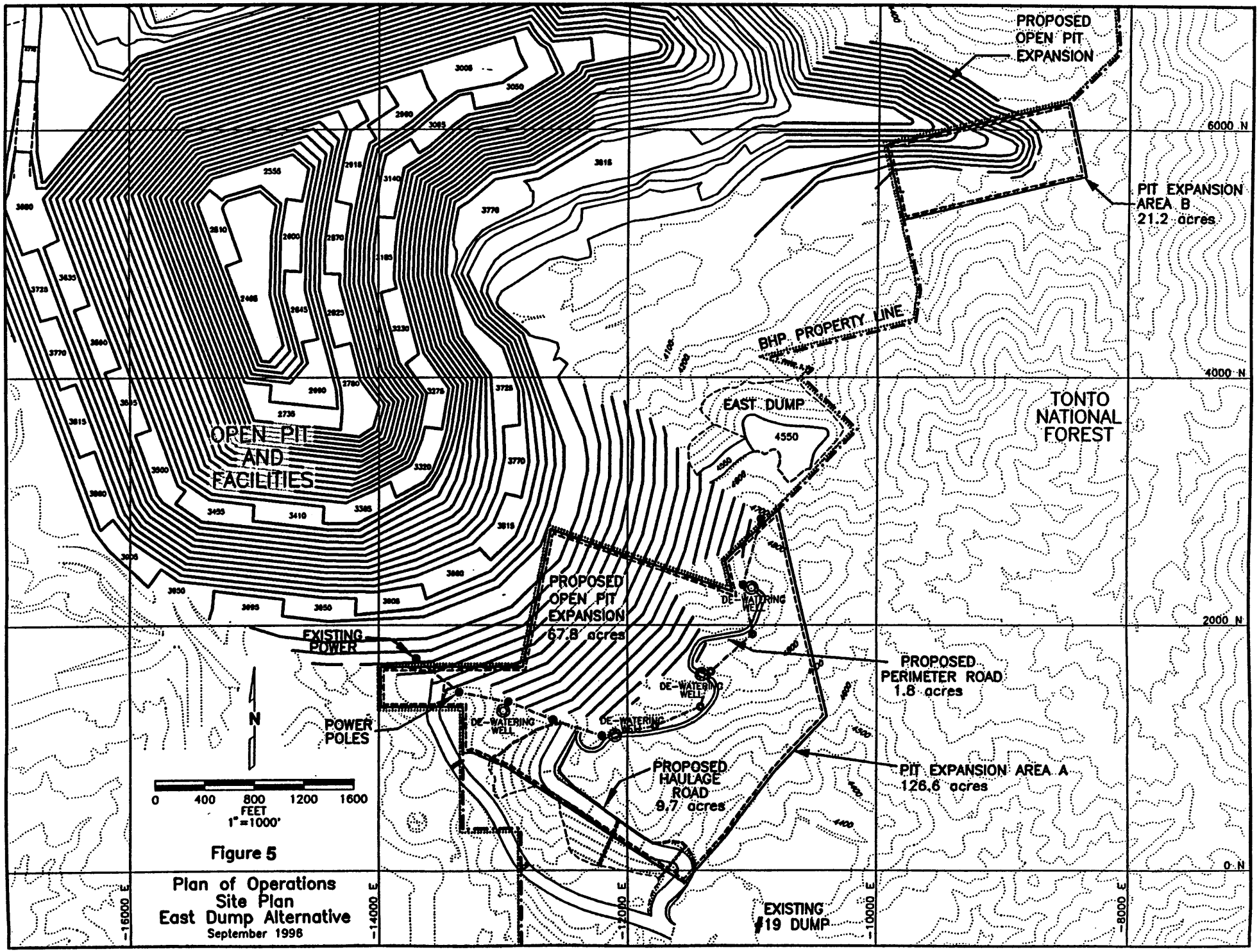


Figure 5

Plan of Operations
Site Plan
East Dump Alternative
September 1998

2.2.2 Use of Miller Gulch for Waste Rock Dump Site

The possibility of using Miller Gulch, a canyon located on BHP Copper property, for storage of waste rock was considered in the initial phases of this project. However, during feasibility studies of the area, Miller Gulch was found to contain springs, wetlands, relatively well-developed riparian vegetation, and cultural resource sites. Insufficient land is available to store waste rock after excluding those portions that have heritage resources and riparian area. Due to the environmental impacts that would result from placement of waste rock in this area, Miller Gulch was eliminated as a potential location for the dump.

2.2.3 Backfill of the Pinto Valley Mine Pit

The possibility of placing waste rock into formerly used portions of the Pinto Valley Mine pit was raised by members of the project ID team. The configuration of the pit makes concurrent backfill logistically and technically impractical without creating unsafe working conditions. Backfill upon completion of mining activities would 1) create an economic hardship, 2) preclude development of future unproven ore reserves which may become economically feasible with development of new technologies, and 3) could not occur concurrently with mining as the pit is not compartmentalized so backfill would be dumped on top of ongoing mining operations.

2.2.4 Alternative Mining Methods to Eliminate Need for Pit Expansion

Due to the characteristics of the ore body at Pinto Valley, alternative methods for extracting the ore with subsurface techniques or in-situ leaching, are either technologically or economically infeasible and will not be considered further.

In situ Leaching: Leaching the ore in place by injecting and recovering acid solutions is not feasible because of the near-surface location of the ore and the complex geology of the site. Several faults and fracture zones, as well as groundwater resources in the ore zone, would result in lack of control of the solutions to be injected. Solutions would most likely be lost, with no reasonable means of recovery. The risk of losing solutions and the degradation of adjacent surface and groundwater resources makes this alternative unfeasible from an environmental perspective.

Tank Processing: Tank processing of ore is usually considered for high-grade ore deposits or for ore requiring special treatment techniques for recovering the minerals. The grade of ore and quantity of ore to be processed make this technique impractical and unfeasible.

2.3 MITIGATION MEASURES COMMON TO ALL ALTERNATIVES

1. Mitigation would be provided for damage to any cattle-related improvements on the grazing allotment within the project area. Mitigation is expected to consist of in-kind replacement of improvements.

2. Year 2 (15,909 kiloton) of the Plan of Operations (POO), BHP will apply 0.01 inches of water on a daily basis to unpaved haul roads identified in the EA for the POO production area on USFS and connected BHP land only, when equivalent natural precipitation does not occur.

3. Year 1,3,4,9, and 10 (8236, 6532, 4065, 4061, and 820 kiloton, respectively) of the POO, BHP will perform measures that will result in an 89.5% control efficiency for unpaved haul roads identified in the EA for the POO production area on USFS and connected BHP land only. This will be achieved by applying 0.24 gallons of petroleum resins per square yard of unpaved road (see Compilation of Air Pollution Emission Factors, 5th Edition, Volume 1, Figure 13.2.2.2-2), or other dust suppressants or water applied at a frequency necessary to achieve the equivalent control efficiency. BHP will maintain records of the treatment dates, areas treated, and type and quantity of the dust suppressant and water utilized.

4. BHP will meet with Forest Service officials to explore long-term monitoring of air quality in the area surrounding Pinto Valley Mine.

2.4 COMPARISON OF ALTERNATIVES

This section provides a comparison of the environmental impacts expected to occur as a result of completion of each of the alternatives considered in this study (Table 3). Assessment of impacts is limited to those issues identified during the public scoping process.

Table 3. Comparative Summary of Anticipated Environmental Effects of the No Action Alternative, Proposed Action Alternative, and the Reconfiguration of East Dump.

ISSUE	IMPACT		
	No Action Alternative	**Proposed Action Alternative**	**Reconfiguration of East Dump**
WATER RESOURCES			
Surface Water Quality	Potential water quality impacts regulated by the CWA Section 402. Potential cumulative effects are minimized by the substantive protections of the CWA.	Potential water quality impacts regulated by the CWA Section. Potential cumulative effects are minimized by substantive protections of the CWA.	Same as the proposed action.
Groundwater Quality	Potential groundwater impacts are regulated by the Arizona APP regulatory program. The APP program requires groundwater quality to meet aquifer quality limits which may or may not exceed aquifer water quality standards depending on the alert levels set for individual water quality constituents in the APP.	Potential groundwater impacts are regulated by the Arizona APP program. This requires that groundwater quality at designated points of compliance meet drinking water quality standards.	Same as the proposed action.
Surface Water Quantity	Lowering of mine pit floor to elevation of 2,600 feet above msl. Due to hydrogeologic conditions, it is unlikely that groundwater flow would be diverted from Pinto Creek to the pit or from the pit to Pinto Creek.	Lowering mine pit floor elevation to 2,375 feet above msl. Due to hydrogeologic conditions, it is unlikely that groundwater flow would be diverted from Pinto Creek to the pit or from the pit to Pinto Creek.	Same as the proposed action.
BIOLOGICAL RESOURCES			
Wildlife Habitat	None expected	Loss of 150.3 acres of chaparral. About 13.2 acres would be reclaimed upon mine closure.	Loss of 147.8 acres of chaparral. About 9.7 acres would be reclaimed upon mine closure.
Riparian Habitat	None expected	Loss of 6 to 8 cottonwood trees.	Same as for proposed action.

Table 3. Comparative Summary of Anticipated Environmental Effects of the No Action Alternative, Proposed Action Alternative, and the Reconfiguration of East Dump.

ISSUE	IMPACT		
	No Action Alternative	**Proposed Action Alternative**	**Reconfiguration of East Dump**
Special Status Species	None expected	8 species may occur occasionally in the project area but are not expected to be found regularly, and 3 species may occur or are likely to occur regularly in the project area.	Same as for proposed action.
AIR RESOURCES			
Emissions	Current level of emissions would continue for approximately 6 years.	Slight increase in emission may occur the next four years of operation and then current levels of emissions would continue for the remaining 6 years.	Same as for proposed action.
Visibility	Contributions by BHP to airborne particulates in region could be expected to decline in 6 years.	Contributions by BHP to airborne particulates in region could be expected to decline in 10 years.	Same as for proposed action.

3. AFFECTED ENVIRONMENT

3.1 GENERAL DESCRIPTION OF THE AFFECTED ENVIRONMENT

The proposed project area lies approximately eight miles west of Miami, Gila County, Arizona in the foothills between the Pinal and Superstition Mountains. Topography consists of relatively steep-sided hills and canyons; elevation of the area ranges from roughly 4,200 to 4,900 feet.

The regional climate is semi-arid with a bimodal precipitation pattern of summer thunderstorms and more gentle winter rains. Annual precipitation averages approximately 23 inches but may vary widely from year to year. Based on a wind monitoring station present in Pinto Valley since 1992, prevailing winds are from the south-southeast; however, topography of the valley likely influences lower wind direction and winds above the valley may not be as homogeneous (USDA 1996).

Upland vegetation in the project area is largely characteristic of the Interior Chaparral biotic community, but also contains floral elements of Sonoran Desertscrub and Great Basin Conifer Woodland (Brown 1994), which in the general project region typically occur at lower and higher elevations, respectively. Scrub live oak is dominant in most areas, with patches of manzanita. Other common species present include sugar-bush, mountain mahogany, and buckthorn. Pinyon pine and Coahuila juniper are present on north-facing slopes. Drier south-facing slopes support catclaw, fairy duster, snakeweed, turpentine bush, sotol, beargrass, banana yucca, agave, and various cacti.

Wildlife is expected to be typical of Interior Chaparral habitats. Common mammals in the project area are expected to include eastern cottontail, rock squirrel, white-throated woodrat, brush mouse, javelina, white-tailed deer, and mule deer. Birds expected to be common in the project area include mourning dove, western scrub jay, spotted towhee[1], canyon towhee[2], rufous-crowned sparrow, and black-chinned sparrow. Reptiles expected to be common in the project include gopher snake, Arizona alligator lizard, side-blotched lizard, greater earless lizard, and various species of whiptail.[3]

Geology in the project region is relatively complex due to past orogenic processes. The project area is underlain by Precambrian Pinal Schist. Geochemical analyses conducted on this rock within the project area indicates that it is non-acid forming (Schafer and Associates 1996). Other rock types in the region

[1] Formerly known as the rufous-sided towhee

[2] Formerly known as the brown towhee

[3] Common names used for mammals, birds, and reptiles are from Hoffmeister (1986), 6th ed. of the A.O.U. check-list and amendments, and Stebbins (1985), respectively.

include Early Proterozoic metasedimentary, Mississippian to Cambrian sedimentary, Late Cretaceous to Early Tertiary granitoid, Middle Miocene to Oligocene volcanic, and Quaternary alluvium. Soils in the project area generally occur as a shallow veneer, although slightly thicker alluvial/colluvial deposits are present in some drainage bottoms.

3.2 AFFECTED ENVIRONMENT FOR KEY ISSUES

3.2.1 Water Resources

3.2.1.1 Surface Water. The Pinto Valley Mine lies within the Pinto Creek watershed. The head waters of Pinto Creek lie in the Pinal Mountains southwest of Globe. The creek flows in a generally northerly direction and terminates at Roosevelt Lake. Pinto Creek is primarily intermittent in the vicinity of the Pinto Valley Mine, but perennial pools exist along the reach of Pinto Creek between Miller Gulch and Haunted Canyon and a reach of perennial flow exists just downstream of the confluence with Haunted Canyon. This reach supports riparian vegetation and both native and non-native fish. A second reach of perennial flow begins just upstream of the Pinto Valley Weir and extends for approximately nine miles to the "Box" just below Henderson Ranch. This reach supports riparian vegetation and native fish.

Pinto Creek surface water quality is generally characterized as a calcium/sulfate type with the following average values: pH of 8.4, Total Dissolved Solids of 294 mg/L, Total Suspended Solids of less than 4.0 mg/L, sulfate of 86.8 mg/L, and hardness of 157 mg/L as $CaCO_3$ (USDA Forest Service 1995). Table 4 lists the results of these samples at the Aquifer Protection Permit (APP) monitoring locations.

Water quality of surface water discharged from Pinto Valley Mine is regulated by a (NPDES) permit issued by the EPA in 1993. Water quality is monitored at 4 NPDES point source discharge points that are located downgradient from mining activities. Only discharge point PV005 discharges on a continual basis. Monitoring has shown that the discharge points authorized by the permit have complied with permit conditions. Violations of permit conditions from a previous NPDES permit were recorded. The Pinto Valley Mine has significantly upgraded capabilities since entering into a consent decree with the Department of Justice, EPA, and ADEQ in 1994.

Analyses of water quality samples collected for the APP consistently meet applicable Arizona Surface Water Quality Standards for all constituents (Hargis + Associates 1996b).

Table 4. Water Chemical Analysis at APP Monitoring Locations. All data are reported in mg/L. Sample locations are depicted in Figure 2.

	Sample Location									
	Well Sample								Surface Sample	
Constituent	APP1A	APP2	APP3A	APP3B	APP4	APP5A	APP5B	APP6	PV005	MG1-6b
Sample Date	6/27/94	6/23/94	6/28/94	7/5/94	6/21/94	6/28/94	7/5/94	6/23/94	8/20/96	2/9/96
Cyanide	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	N.D.[1]	N.D.
Fluoride	0.19	0.08	0.52	0.28	0.30	0.28	0.57	2.61	N.A.[2]	N.A.
Nitrite as a Nitrogen	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.66	<0.05	N.A.	N.A.
Nitrate as a Nitrogen	0.43	3.08	<0.06	<0.06	<0.06	0.19	1.3	<0.06	N.A.	N.A.
Sulfate	1,000	940	800	73	1,200	830	230	43	1200	690
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	N.A.	N.A.
Arsenic	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.008	N.D.	0.0075
Barium	0.061	0.05	0.019	0.045	0.057	0.078	0.031	0.019	N.A.	N.A.
Beryllium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	N.A.	N.D.
Cadmium	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	N.D.	N.D.
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	N.A.	N.D.
Copper	<0.01	<0.01	<0.01	0.012	<0.01	0.018	0.013	<0.01	N.D.	N.D.
Lead	<0.002	0.003	0.003	<0.002	<0.002	0.006	0.006	<0.002	N.D.	N.D.
Mercury	<.0002	<.0002	<.0002	<.0002	0.0006	<.0002	<.0002	<.0002	N.A.	N.D.
Nickel	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	N.D.	N.D.
Selenium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	N.D.	N.D.
Thallium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	N.A.	N.A.

[1] N.D. = Not present above detection limit.
[2] N.A. = No data available

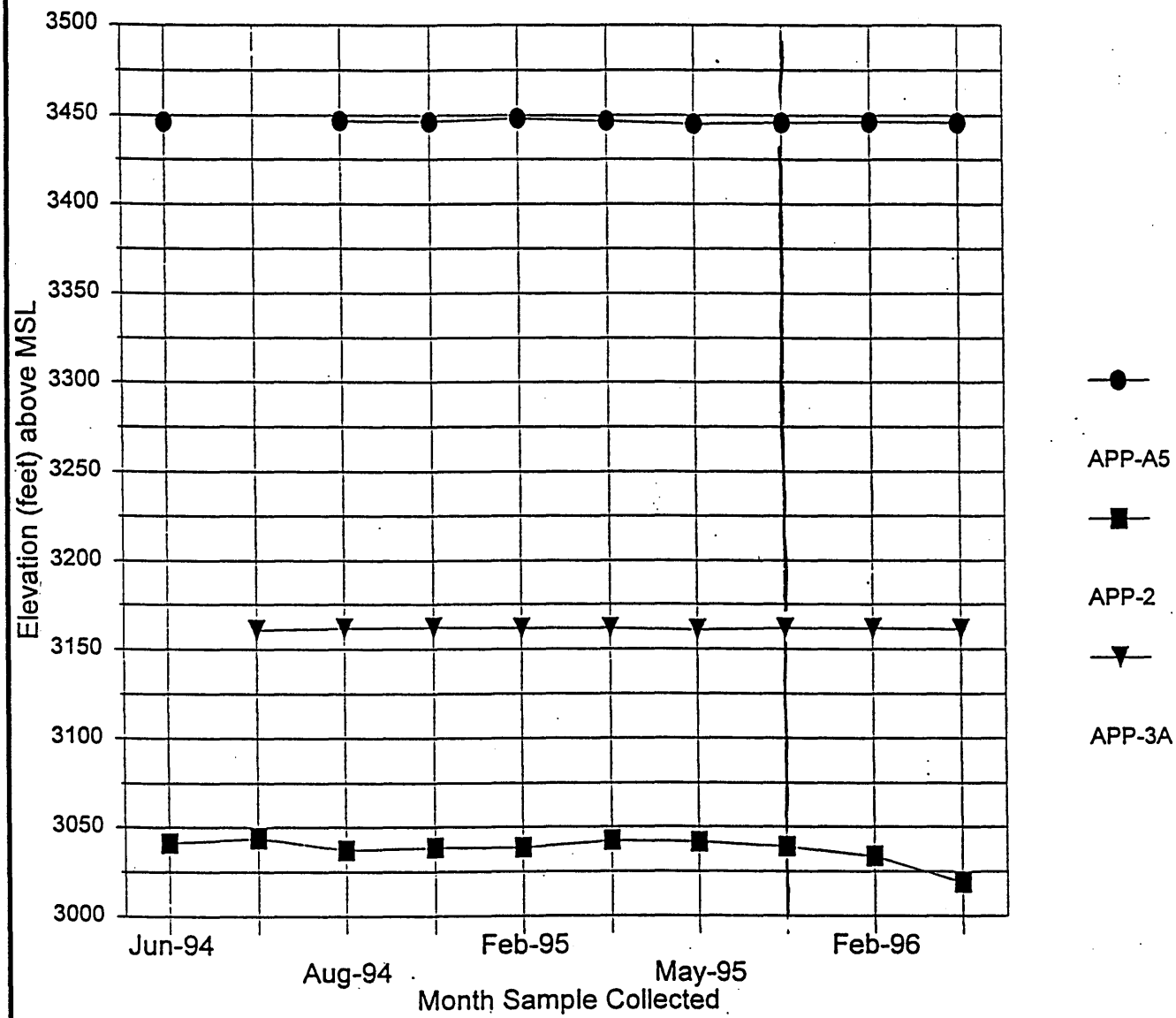
3.2.1.2 Groundwater. According to a 1995 hydrogeologic report of the Pinto Valley Mine area prepared by Hargis + Associates, groundwater is present in two hydrogeologic units within the project vicinity: 1) a shallow system composed primarily by pore space within surficial alluvium; and 2) a deep discontinuous system within bedrock fractures. Alluvium is present in the major and minor stream channels and drainages in the project region; bedrock is present throughout the region and underlies the alluvium. The alluvial aquifer is recharged by precipitation, surface water runoff and infiltration and, in some areas by discharge from the bedrock aquifer; discharge from this aquifer occurs through evapotranspiration, baseflow discharge into Pinto Creek, underflow out of the project area, and, in some areas, through discharge to bedrock (Hargis + Associates 1995). The bedrock aquifer is also recharged by precipitation and stormwater runoff and, in some areas, by discharge from the alluvial aquifer. Discharge from the bedrock aquifer occurs through discharge to the overlying alluvium, pumpage from wells, springs, and underflow out of the area (Hargis + Associates 1995).

Dewatering wells are located along the walls of the mine for stabilization purposes. These wells only intercept water which would eventually end up in the mine pit and therefore are not expected to change or modify existing groundwater regimes.

The Hargis + Associates report (1996a) states that groundwater within both units typically follows topography to the Pinto Creek valley and then moves northward paralleling the flow of Pinto Creek. Permeability of the alluvium is expected to be relatively high. Permeability of the bedrock is very low; although, at depth the gross permeability is expected to be orders of magnitude less. Depth of alluvium averages roughly 10 feet but reaches depths of up to 50 feet near Pinto Creek. In the Pinto Valley Mine area, depth to groundwater in the bedrock aquifer generally decreases to the west towards Pinto Creek. Groundwater elevations between the Pinto Valley Mine pit and Pinto Creek range from 3,470 to 4,000 feet msl (Hargis + Associates 1996a); the elevation of Pinto Creek west of the mine ranges from roughly 3,450 to 3,250 feet msl (Figure 6).

As part of the continual groundwater monitoring on the property, water levels and elevations are measured at 73 well sites. Quarterly water samples have been taken at many of these well sites and indicate that water levels have remained relatively unchanged over the monitoring period (Hargis + Associates 1996b).

Ground Water Elevation



PINTO VALLEY OPERATIONS

FIGURE 6. GROUND WATER ELEVATION AT PINTO VALLEY OPERATIONS.

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3.2.2 Biological Resources

3.2.2.1 Special Status Species. The Forest Service, US Fish and Wildlife Service, and Arizona Game and Fish Department listed 33 species that are not federally listed as threatened or endangered but may have special management status, and have the potential to occur in the region containing this project. These special status species were evaluated in the Biological Evaluation completed for the proposed expansion (SWCA 1996b). This report documents that the project area does not contain suitable habitat or is outside the known range of 18 of the special status species, including the Mexican long-tongued bat, Chiricahua western harvest mouse, buff-breasted flycatcher, lowland leopard frog, Chiricahua leopard frog, chuckwalla, desert tortoise, Mexican garter snake, narrow-headed garter snake, Maricopa tiger beetle, desert sucker, longfin dace, Hohokam agave, Tonto Basin agave, Apache wild buckwheat, Fish Creek rock daisy, Arizona bugbane, and Blumer's dock. Of the 15 remaining special status species, four (northern goshawk, common black hawk, western yellow-billed cuckoo, and Arizona toad) are unlikely to occur in the project area, eight (spotted bat, California leaf-nosed bat, greater western mastiff bat, occult little brown bat, cave myotis, red bat, southern yellow bat, and Yavapai Arizona pocket mouse) may occur in the project area but are not expected to be found regularly, and three (loggerhead shrike, San Carlos wild buckwheat, and Mogollon fleabane) may occur or are likely to occur regularly in the project area.

Although loggerhead shrike, San Carlos wild buckwheat, and Mogollon fleabane were not located during field surveys, habitat in the project area is typical of those known to be occupied by these species.

3.2.2.2 Riparian Habitat. Drainages within the project area are ephemeral. Vegetation within canyon bottoms and arroyos is generally composed of the same species as those found in upland habitats, although individuals are typically more robust and vegetation is denser. Vegetation in these drainages are typically dominated by scrub live oak, catclaw, and mesquite; other less common species present include lemonadeberry and sugarbush. Two small patches of cottonwood, consisting of three to four trees each, are present on Area B.

3.2.2.3 Wildlife Habitat. The project area primarily supports upland Interior Chaparral habitat which is characterized by dense to semi-open vegetation dominated by evergreen scrub, thin soils, and exposures of bedrock. Drainages within areas A, B, and East Dump are ephemeral and no springs or seeps are known to occur. The Arizona Game and Fish Department (AGFD) divides wildlife habitat

into four categories based on wildlife value and abundance, with Category I having the highest value. AGFD considers the project area to contain Class III habitat, which is defined as having high to medium wildlife value and being relatively abundant statewide.

AGFD has estimated that densities of javelina, mule deer, and white-tailed deer in the vicinity of this facility range from 0.5 to 1.5, 1 to 5, and 1 to 7 animals/mi.^{2}, respectively (SWCA 1994).

3.2.3 Air Resources

The Environmental Protection Agency (EPA) has set ambient concentration standards for six air pollutants: respirable particulate matter (PM_{10}), sulfur dioxide (SO_2), nitrogen compounds (NO_x), carbon monoxide (CO), ozone (O_3), and lead (Pb). The EPA requires individual states to meet the federal standards for ambient levels of these six pollutants. Currently, the project area lies within non-attainment areas for PM_{10} and SO_2 and attainment areas for NO_x, CO, O_3, and Pb (Applied Environmental Consultants 1996a). Section 110 of the Clean Air Act requires the State of Arizona to prepare and submit to the EPA a State Implementation Plan (SIP) to reduce emissions to achieve and maintain attainment of both PM_{10} and SO_2 National Ambient Air Quality Standards (NAAQS). The Arizona Department of Environmental Quality (ADEQ) has developed a PM_{10} SIP for the Hayden/Miami planning area for which the EPA has proposed partial approval. ADEQ is in the process of developing the SO_2 SIP (Applied Environmental 1996a).

Several mining activities currently contribute to emissions at the Pinto Valley Mine, including drilling, blasting, loading and unloading haul trucks, bulldozer work, tailpipe emissions, and fugitive dust from driving on unpaved roads (Ibid.). Emission inventories are maintained at the Pinto Valley operation and submitted to ADEQ on an annual basis.

At the request of the Forest Service, BHP completed an emissions inventory which demonstrated that direct and indirect increases of PM_{10} and SO_2 emissions from the Federal action were below the de minimus threshold that would require a conformity determination for the project (Applied Environmental 1997). This included emissions from activities on the Federal land as well as activities on BHP property that could not be conducted without access to the Federal land. Maximum emissions from the planned Federal action were calculated and evaluated based on the calendar year when mining production would be at its greatest. Table 2 lists the production schedule for Pinto Valley Mine and shows that maximum production for the Federal action would be in Year 2 (15,909 tpy). Based on this maximum production year (Year 2), Table 5 presents the emissions from the Federal land and BHP property dependent on access to the Federal land using the general unpaved road emissions factors and implementing mitigation measures to control road related emissions. An alternative method for calculating emissions from haul roads, known as the Western Surface Coal Mine Emission Factors, was also used to determine emissions. Information on this method of analysis can be found in the emissions inventory report by Applied Environmental (1997).

Table 5. Maximum Emissions Using General Unpaved Road Emission Factors and Implementing Mitigation Measures to Control Road Related Emissions During Year 2 Production.

Description	Pollutant	General Unpaved Road Emission Factors (tpd)	(tpy)	Mitigated Control of Road Related Emissions (tpd)	(tpy)
Mining Activities	PM_{10}	0.099	18.95	0.099	18.85
	NO_x	------	------	------	------
	SO_2	------	3.01	------	3.01
Traffic on Roads	PM_{10}	0.381	101.41	0.000	0.000
	NO_x	------	------	------	------
	SO_2	------	------	------	------
Tailpipe Emissions	PM_{10}	0.0147	6.24	0.0147	6.24
	NO_x	0.224	------	0.224	------
	SO_2	------	12.21	------	12.21
Total Emissions	PM_{10}	0.4947	126.60	0.1137	25.19
	NO_x	0.224	------	0.224	------
	SO_2	------	15.22	------	15.22

Table 5 indicates that emissions totaled 126.60 for PM_{10}. These emissions were based upon an 89.5% control efficiency for fugitive PM_{10} emissions from unpaved roads and exceeded the 100 tpy de minimus threshold for requiring a conformity determination for the Federal action. BHP proposed additional mitigation measures to increase control efficiency during year 2, which would reduce the total PM_{10} emissions to 25.19 tpy, and is below the 100 tpy de minimus threshold. These measures are listed in Chapter 2, page 22. All other years of production assume 89.5% control efficiency in haul road dust control and have emissions below the 100 tpy de minimus level. Total SO_2 emissions for all project years were below the 100 tpy de minimus threshold.

3.2.4 Visibility Analysis

A visibility analysis was conducted on the Federal land that follows the methodology set forth in the EPA *Workbook for Plume Visual Impact Screening and Analysis*, EPA-450/4-88-015, revised October 1992. Two visibility screening levels were applied to assess visibility impacts in the Superstition Wilderness Area (SWA) due to the POO at the BHP facility. The screening was conducted using the EPA approved VISCREEN computer model. Level 1 screening is designed to provide a conservative estimate of worst-day plume visual impacts using assumed worst-case meteorological conditions. Level 2 screening, which is applied when screening criteria at Level 1 area exceeded, has the same objectives as Level 1 but allows for more realistic meteorological and plume composition input, representative of the given source and on-site meteorology. The model used emissions information for PM_{10}, SO_2, and NO_x, which were estimated to be 0.1137, undetectible, and 0.224 tons per day, respectively (Applied Environmental 1997). The analysis concluded that visibility impacts in the SWA due to emissions from implementing the POO would be below perceptible levels, using U.S. Forest Service Region 3 perceptibility thresholds of 0.02 for plume constrast and 13% reduction in standard visual range.

4. ENVIRONMENTAL CONSEQUENCES

This chapter describes the environmental consequences of implementing either the Proposed Action, No Action, or Reconfiguration of East Dump Alternatives. This chapter is organized by the issues identified in Chapter 1, with a description of direct, indirect, and cumulative effects to the federal lands for each alternative.

4.1 SURFACE WATER QUALITY

Under any of the alternatives, surface water runoff from the project area would flow, as it currently does, into either Cottonwood Reservoir or the mine pit, which in turn is pumped into Cottonwood Reservoir. The project area, mine pit, and Cottonwood Reservoir form a closed system with regard to surface water runoff; therefore, no change in existing conditions of surface water quality outside of this system would be expected as a result of implementing any of the alternatives. Within this closed system, surface water quality would continue to be regulated by ADEQ and the EPA under Section 402 (NPDES) of the Clean Water Act. Four NPDES permitted discharge points are located downgradient of tailings dams #2 and #3, and the cottonwood tailings to regularly monitor surface water quality to ensure that Arizona water quality standards are not exceeded. Three of these points are non-discharging for the design storm event and one is a discharging point. Water quality data for the discharging point and a downgradient monitoring station (PV005 and MG1-6b) are provided in Table 3. The locations of these points are depicted in Figure 2.

Waste rock proposed to be placed in East Dump consists of Pinal Schist. Geochemical tests conducted by Schafer and Associates (1996) indicate that this rock has a very low acidification potential (neutralization potential more than 3 times greater than acidification potential). It is, therefore, considered unlikely that water percolating through the proposed dump would become acidified.

Any existing and foreseeable actions in the region that have the potential to impact surface water quality are regulated by federal and state regulations, such as the Clean Water Act. Considering the direct and indirect impacts of the proposed expansion and requirements of existing environmental regulations, the proposed expansion is not expected to contribute to, nor result in, cumulative impacts to surface water quality.

4.2 GROUNDWATER QUALITY

The proposed action is included in the APP developed for this facility by the ADEQ. Specific conditions of the facility's APP (including closure and monitoring requirements) are on file at the offices of ADEQ in Phoenix, Arizona. The APP has also specified establishment of alert level points that will serve as an early warning system to detect changes in groundwater quality before they exceed

specified standards. Alert levels will be set for all APP monitoring points and for the early warning monitoring points at APP-7, the Raffinate Pond monitor well, and Spring Gold Gulch. Based on the conditions and requirements of the APP permit, the proposed expansion would not contribute to degradation of existing groundwater quality beyond what is allowed by the APP, which stipulates that at applicable points of compliance, groundwater quality must meet Arizona Aquifer Water Quality Standards.

There are 15 points of compliance (POCs) at Pinto Valley Operations (Table 6 and Figure 2). Nine of these POCs are monitor wells, and four are National Pollutant Discharge Elimination System (NPDES) points, three of which do not flow on a regular basis. The remaining two POCs are springs.

Monitor wells APP-1A, APP-1B, and APP-2 are located downgradient of No. 4 Tailings Dam; monitor wells APP-4, APP-3A, and APP-3B are located downgradient of No. 3 Tailings Dam; and monitor wells APP-5A, APP-5B, and APP-6 are located downgradient of No. 1 Tailings Dam. Spring North Draw 1 is located downgradient of the future site of the Northside Waste Rock Dump. Homestead Springs (sample location MG1-6b) is located west of the No. 2 Tailing Dam. NPDES discharge point PV002 is located downstream of No. 1 Tailing Dam; discharge point PV003 is located downstream of No. 3 Tailings Dam; and discharge points PV004 and PV005 are located downstream of Cottonwood Tailings Dam. NPDES discharge point PV005 is the only continuously flowing discharge point.

Modeling studies have been used to project constituent concentrations in the future at the regional groundwater discharge point located upgradient of the Magma weir on Pinto Creek. These modeling studies indicated that no federal or state water quality standards will be exceeded at the groundwater discharge point during operation or after closure of the mine. For example, sulfate concentrations will not exceed the federal secondary Maximum Contaminate Level at the groundwater discharge point after mine closure (pers. comm. Hargis + Associates September 1996).

Under any of the alternatives, the direct and indirect impacts to groundwater quality would not differ from the existing situation. The permit requires that alert levels be established. Should groundwater begin to deteriorate, alert levels would identify trends and correction measures would be initiated prior to degradation of groundwater beyond levels permitted by ADEQ.

Any existing and foreseeable actions within the region that have the potential to impact groundwater quality are regulated by federal and state regulations such as the APP. Considering the direct and indirect impacts of the proposed expansion and existing environmental regulations, the proposed expansion is not likely to contribute to nor result in cumulative impacts to groundwater quality.

Table 6. Points of Compliance and Alert Level Monitoring Points.

Sampling Point Number	Identifier	ADWR Registration Number	Latitude	Longitude
0019[1]	APP-1A	55-543407	33° 27' 25"	110° 58' 43"
0020[1]	APP-1B	55-543408	33° 27' 25"	110° 58' 43"
0021[1]	APP-2	55-543406	33° 27' 16"	110° 59' 46"
0022[1]	APP-3A	55-543404	33° 25' 34"	110° 59' 59"
0023[1]	APP-3B	55-543405	33° 25' 34"	110° 59' 59"
0024[1]	APP-4	55-543403	33° 25' 21"	111° 00' 03"
0025[1]	APP-5A	55-543402	33° 23' 42"	110° 59' 07"
0026[1]	APP-5B	55-553712M	33° 23' 42"	110° 59' 07"
0027[1]	APP-6	55-543401	33° 23' 36"	110° 58' 57"
0028[1]	PV002[3]	N/A	33° 23' 36"	110° 59' 06"
0029[1]	PV003[3]	N/A	33° 25' 25"	111° 00' 04"
0030[1]	PV004[3]	N/A	33° 23' 04"	110° 58' 14"
0031[1]	PV005[3]	N/A	33° 22' 36"	110° 57' 16"
0032[2]	APP-7	TBD	TBD	TBD
0033[1]	Spring North Draw 1	N/A	33° 25' 38"	111° 00' 00"
0034[2]	Raffinate Pond Monitor Well	N/A	TBD	TBD
0035[2]	Spring Gold Gulch 1	N/A	33° 25' 31"	110° 59' 43"
0036[1]	Homestead Springs	N/A	33° 24' 54"	110° 00' 05"

Source: Aquifer Protection Permit prepared by Hargis and Associates.

[1] These 15 sites are the hazardous and nonhazardous Points of Compliance pursuant to A.R.S. §49-244.2 and A.R.S. §49-244.3, respectively.

[2] These three sites are alert-level points to be used as early warning sites.

[3] Designated NPDES Monitoring Points.

TBD = To be determined
N/A = Not applicable

4.3 SURFACE WATER QUANTITY IN PINTO CREEK

Surface water generated on Areas A, B, and East Dump does not currently contribute to surface flow in Pinto Creek. Under any of the alternatives, surface water flowing off the project area would drain into either the mine pit or Cottonwood Reservoir and would not contribute to surface flow in Pinto Creek.

During scoping, concern was raised that expansion would allow the lowering of the mine pit floor below the elevation of Pinto Creek, thereby diverting flow from Pinto Creek to the pit or intercepting groundwater that may otherwise discharge to Pinto Creek. The current elevation of the pit floor is approximately 3,050 feet above msl, which is already below the elevation of Pinto Creek to the west of the mine (elevation of Pinto Creek west of the mine ranges from 3,450 to 3,212.5 feet above msl). Under the No Action alternative, the final pit floor would be 2,600 feet above msl. This elevation would be approximately 613 feet below the level of Pinto Creek at a point due west of the pit and about 800 feet below the creek at the point nearest the pit. Under the proposed action and Alternative 3, the pit would to expand to a final bottom elevation of 2,375 feet above msl. This elevation would be approximately 838 feet below the level of Pinto Creek at a point due west of the pit and about 1,025 feet below the creek at the point nearest the pit.

Under any of the three alternatives, substantial gradients between the mine pit and Pinto Creek would have to develop before surface water or shallow groundwater flow would be diverted from Pinto Creek to the pit (Hargis + Associates 1996).

Groundwater elevations along the ridge between the mine pit and Pinto Creek range from approximately 3,350 to 3,565 feet above msl at Gold Gulch North PV003 and Homestead Seep H2, respectively, which is above the elevation of both Pinto Creek and the floor of the pit. Bedrock present between the mine pit and Pinto Creek has very low permeability. Springs and seeps located in areas between the creek and the pit at elevations substantially greater than either Pinto Creek or the floor of the pit indicate that there is a divide in groundwater flow on the western edge of the pit. At this divide, groundwater flows to the west on the west side of the divide and to the east on the east side of the divide. This divide is likely maintained by the low permeability of the bedrock and the presence of fault planes potentially filled with clayey gouge (Hargis +Associates 1996a, 1996b). This divide would have to dissipate before an easterly gradient from Pinto Creek to the mine pit could develop. Hargis + Associates (1996a) consider this unlikely.

Because the pit is currently (approx. 160 feet) below the elevation of Pinto Creek due west of the mine and the nature of existing ground water regime between the pit and Pinto Creek, implementation of the Action Alternatives is not expected to have direct or indirect effects on surface flow in Pinto Creek.

The No Action Alternative would lower the existing pit elevation to level approximately 613 feet below the elevation of Pinto Creek due west of the mine and is also not expected to have adverse impacts to surface flow in Pinto Creek.

Other reasonably foreseeable actions which may impact surface water flows in Pinto Creek include the Carlota Copper Mine. The Carlota/Cactus pit would be placed in the creek bottom west of the Cottonwood Tailings facility and the creek diverted to the eastern edge of the pit. Upon closure, the Carlota/Cactus pit would be approximately 650 feet below the existing elevation of Pinto Creek. Because it is unlikely for an easterly groundwater gradient from Pinto Creek to the BHP pit to develop (Hargis + Associates (1996a), implementation of the No Action or Action Alternative is not expected to result in adverse cumulative impacts to Pinto Creek.

4.4 SPECIAL STATUS SPECIES

Under Alternative 1, no impacts to special status species are expected to occur.

Under Alternatives 2 and 3, eight species may occur in the project area but are not expected to be found regularly, and three species may occur or are likely to occur regularly in the project area. Due to the small scale of this project, potential impacts to special status species are not expected to contribute to future listing of any of these species (SWCA 1996b).

4.5 RIPARIAN HABITAT

Under Alternative 1, the No Action Alternative, there would be no impacts to the limited number of riparian tree species (six cottonwoods) that occur in Area B.

Impacts to riparian habitat would be the same for Alternatives 2 and 3. The six to eight cottonwood trees in Area B of the proposed pit expansion would be removed under either alternative.

The proposed project and alternatives are not expected to have direct impact that would result in cumulative impacts to riparian habitats (see prior discussion in Section 4.3 regarding impact to surface water quality).

4.6 WILDLIFE HABITAT

The analysis of impacts of the alternatives to wildlife habitat and associated wildlife species is based on wildlife numbers expected to occur on the federal lands involved in the proposed expansion. These estimates are extrapolated from density estimates provided by the Arizona Game and Fish Department for habitats of similar quality in the region containing the project area (AGFD 1994).

Under Alternative 1, the No Action Alternative, no federal lands would be involved in the expansion of the mine; therefore, no manageable habitat would be lost.

Under Alternative 2, the Proposed Action, 150.3 acres of wildlife habitat would be used for the mining expansion. Loss of 150.3 acres of wildlife habitat would equate to a loss of carrying capacity for 0.18 to 0.35 javelina, 0.23 to 1.17 mule deer, and 0.23 to 1.64 white-tailed deer.

Under Alternative 3, the Reconfiguration of East Dump Alternative, 147.8 acres of wildlife habitat would be used for mining expansion. Loss of 147.8 acres of wildlife habitat would equate to a loss of 0.12 to 0.35 javelina, 0.23 to 1.15 mule deer, and 0.23 to 1.62 white-tailed deer.

Because of the proximity of existing mine related impacts, the absence of water resources in the POO project area, and the nature of the habitats that would be impacted, indirect effects to wildlife and wildlife habitat are expected to be minimal to non-existent.

The combined loss of wildlife habitat from past and proposed mining activities in the region equals approximately 16,000 acres[4]. This proposed action and alternatives would contribute a maximum of about 1% to this estimated disturbance area. The majority of this disturbance already exists and wildlife populations in the project area are not expected to change appreciably as a result of implementing any of the alternatives.

4.7 EMISSIONS CONFORMITY WITH CLEAN AIR ACT AND NATIONAL AMBIENT AIR QUALITY STANDARDS

Emissions sources affected by the proposed expansion are limited to mining activities, including drilling, blasting, loading and unloading of mined material, bulldozer activity, haul truck activity, and front-end loader and water truck traffic. Maximum emissions expected from the mining activities on Forest lands were calculated using general unpaved road emission factors (Applied Environmental Consultants 1997).

Project emissions of carbon monoxide (CO), nitrogen compounds (NO_X), and sulfur dioxide (SO_2), and particulate matter (PM_{10}) are not expected to produce exceedence of the NAAQS. EPA require that conformity determination be performed for nonattainment pollutants, PM_{10} and SO_2 for the project area. Applied Environmental Consultants calculated the maximum projected controlled emissions for PM_{10} and SO_2 (1997) that would be attributable to Federal action and private action that could not occur without access from the Forest Service land. By implementing increased mitigation to control

[4] This estimate is based on information provided in drafts of the Cyprus Miami Mine Expansion EIS and the draft Carlota EIS. Acreage estimates are rounded to the nearest 1000 acres.

emissions on unpaved roads, maximum expected emissions of PM_{10} total 25.19 tons per year (tpy) and emissions of SO_2 total 15.22 tpy. The revised emissions for both PM_{10} and SO_2 are less than the 100 tpy de minimus threshold; therefore, a conformity determination is not necessary. BHP will cite specific control actions and compliance measures at least as stringent as those assumed in the EA by incorporating voluntary conditions in the ADEQ Pinto Valley Unit Air Installation Permit (AIP). Inclusion of these measures will meet federal enforceability requirements thereby ensuring conformity with the applicable Arizona State Implementation Plan (SIP). The Globe Ranger District, Tonto National Forest, will be supplied the draft AIP for comment when it is prepared and a copy of the final SIP. Additional measures related to air quality are listed in Section 2.3 (page 22) of this EA.

While emissions originating on Forest lands would be as described above, these emissions represent a shift in location for emissions currently originating from operation of the mine. Average annual emissions originating from the mine expansion project would be slightly higher during the first year of the expansion, and very similar to the average emissions for the past several years. Under the proposed action, peak production occurs during the first year (Table 2). Therefore, under Alternative 1, existing average levels of emissions on a mine-wide basis would continue for 6 more years. Under the remaining alternatives, this level of emissions would continue for 10 more years. Because emission levels would remain similar to existing conditions under Alternatives 2 and 3, these alternatives are not expected to result in cumulative impacts to air quality in the region. Emissions for PM_{10} and SO_2 would be below de minimus levels.

4.8 VISIBILITY IMPACTS TO SUPERSTITION WILDERNESS AREA

Based on the visibility impact analysis for the Federal action on Forest Service land and the POO dependent BHP land, emissions from activities would remain below perceptible levels for visibility impacts in the Superstition Wilderness Area. No direct, indirect, or cumulative impacts are expected to occur from the proposed expansion.

4.9 ENVIRONMENTAL JUSTICE

As indicated in Figure 1, the project area is not located within areas of residential development and no minority or low income populations live in the vicinity of the project site. No significant and adverse environmental effect on minority or low-income communities is anticipated.

4.10 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The irreversible commitments of resources applies primarily to nonrenewable resources, such as minerals or to factors such as soil productivity that are renewable only over a long period of time. Irretrievable commitments of resources applies to the loss of production or use of natural resources. Non-reclaimable portions of haul roads, pits and dumps constitute an irretrievable loss of vegetative cover and soil productivity. Extraction of mineral resources has both irretrievable and irreversible effects. Because of the shallow and sometimes non-existent topsoil, the top layer of soil which contains the seed bank would not be separated from the other materials. Therefore, the seed bank would be an irretrievable loss of resources.

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APPENDIX

SUMMARY OF PUBLIC COMMENTS RECEIVED ON ENVIRONMENTAL ASSESSMENT (OCTOBER 1996)

Table A. Summary of Comments Received on BHP Copper Inc. POO #96-12-02-19 Environmental Assessment

Resource	Comment	Source
General Comments	•...action alternatives presented...Alternative three ...is the Department's preferred alternative	1-1
	•**Reclamation**: Department makes specific recommendations regarding reclamation including...posting of adequate bond; ...specification of goals, objectives, and strategies for reclamation;...fill contour and revegetate all disturbed areas (including pits, dump sites, roads and building sites); ..use of native species and supplemental watering which may be necessary;...remove all mining equipment....cover all disturbed areas with stockpiled topsoil prior to reveg...	1-10
Water Resources	•...concern with potential impacts groundwater supplies as well as to fisheries in nearby Roosevelt Lake....	1-4
	•...concerned with cumulative impacts the proposed expansion and increased water use will have on flow in Pinto Creek....a Coordinated water budget study of Pinto Creek is warranted...Potential and actual water withdrawals of Carlota Mine and existing and expanded operations of PVM	1-5
Biological Resources	•....initial losses during expansion of the mine will be significant....resulting in further fragmentation of wildlife habitat in the project area.	1-2
	•...the Department does not anticipate that the quality of habitat following reclamation will equal the existing habitat quality. ...recommend that difference in habitat values as well as the loss of habitat value over the life of the project be compensated for...	1-3
	•Pg 23, 3.1 -- include white tailed deer and waterfowl in list of species	1-6
	•...extrapolation does not accurately reflect the javelina density in project area...The mine expansion will impact a large percentage of the resident javelina herd's home range...minimum number of animals disrupted is 8 javelina, 10-15 mule deer and 8-10 white tailed deer	1-7
	•...Since project implementation would include initial displacement of wildlife....mitigation projects designed to compensate for losses of upland and riparian wildlife habitats should be begun previous to or at the initiation of ...efforts should be directed at off-setting the impact of wildlife dispersing into adjacent areas....examples were previously submitted to the Globe Ranger District August 26, 1996 (letter to Mr. Larry Widner regarding PVM Expansion)	1-9
Heritage Resources	None to Date	

Table A. (continued)

Resource	Comment	Source
Air Resources	•...Tonto National Monument request for data on emissions associated with the additional Ktons produced with Slice 78	3-1
	•...the BHP Pinto Valley Operation Facility is included in the Hayden/Miami PM10 non-attainment area State Implementation Plan, and whether or not the Plan has been approved by the EPA.	3-2
	•...Regarding Tonto National Monument's view that excluding BHP facility emissions from the years 2001 to 2005 from the emissions inventory is invalid.	3-3
	•...Regarding Tonto National Monument's contention that emissions would be underestimated using a control efficiency of 89.5%.	3-4
	•...a summary of comments 3-1 to 3-4	3-5
Land Use	•..EA states that presently there is no public access into the mine. ...does not address public access in areas adjacent to the mine or expansion area...Department requests public land access in areas adjacent to the mine or expansion area remain or be improved for recreational users.	1-8
	•...Making ref. To figure 3-31?..Gap Claims are part of the Major Metals or Star Route claims in Conflict with the Carlota Copper project proposed plans	2-1
Visual Quality	None to Date	
Socio-Economic Resources	None to Date	

Sources:
1-1 through 1-10 Arizona Game & Fish Dept.

2-1 Hardy Turquoise Co.

3-1 through 3-5 National Park Service, Tonto National Monument

STATE OF ARIZONA

AQUIFER PROTECTION PERMIT NO. P-100329

PART I. AUTHORIZATION TO DISCHARGE POLLUTANTS IN A MANNER SUCH THAT CURRENT AND REASONABLY FORESEEABLE FUTURE USES OF THE AQUIFER ARE PROTECTED

In compliance with the provisions of Arizona Revised Statutes (A.R.S.) Title 49, Chapter 2, Articles 1, 2 and 3; Arizona Administrative Code (A.A.C.) Title 18, Chapter 9, Article 1; A.A.C. Title 18, Chapter 11, Article 4; and conditions set forth in this permit:

Facility Name: BHP Copper Inc. - Pinto Valley Operations

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Operator:
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P. O. Box 100
Miami, AZ 85539

is authorized to operate pregnant leach solution (PLS) and raffinate processing facilities, seepage/stormwater retention facilities, surface runon/runoff facilities, tailings impoundments and ponds, leach dumps, waste rock dumps, the concentrator area and ancillary facilities listed in PART IV, TABLE I.A at the Pinto Valley Operations of BHP Copper Inc. The Pinto Valley Operation is located approximately 8 miles west of Miami, Arizona, in Gila County, over groundwater of the Salt River groundwater basin in Township 01 N, Ranges 13E and 14E, Gila and Salt River Base Line and Meridian:

Latitude	33° 24′ 33.0"	North
Longitude	110° 57′ 48.0"	West

This permit shall become effective on the date of the WQD Director's signature and shall be valid for the life of the facility (operational, closure, and post-closure periods) provided that the facility is constructed, operated, and maintained pursuant to all the conditions of this permit according to the design and operational information documented or referenced in PARTS I, II, III, IV, V and VI of the Permit, and such that Aquifer Water Quality Standards are not violated at the applicable points of compliance.

Kimberly W. MacEachern
Director
Water Quality Division
Arizona Department of Environmental Quality
Signed this 30th day of September, 1996

PART II. SPECIFIC CONDITIONS

A. Facility Description

The Pinto Valley Operation is an open pit copper and molybdenum mine, dump leaching and solvent extraction/electrowinning (SX/EW) operation. The facility is authorized to operate ore crushing and concentrating operations, dump leaching and SX/EW operations, tailings impoundments, waste dumps, process solution ponds, stormwater runoff ponds, process pipelines and ancillary maintenance operation facilities according to the design and operational plans approved by the Arizona Department of Environmental Quality (ADEQ) Aquifer Protection Program Section.

The facility mines low-grade copper and molybdenum ore. Both millable and leach-grade ore are mined. Millable ore is crushed and concentrated in on-site facilities. Copper concentrate is shipped to off-site facilities for smelting and refining. These off-site facilities are not part of this permit. Molybdenum concentrates are containerized and shipped off-site. Low-grade ore is deposited in the dump leaching area referred to as Gold Gulch. Raffinate solutions consisting of weak sulfuric acid are sprayed over the low-grade ore. The resulting pregnant leach solution (PLS) is collected in a double-lined facility with leak detection and pumped to the SX/EW plant where it is processed using an organic solvent and electrowinning process. Resulting cathode copper is shipped off-site for further refining.

B. Application of Facility BADCT

The Pinto Valley Operation relies on engineered controls and operational procedures to demonstrate BADCT. Ore is crushed and concentrated under careful control to minimize contact with natural stormwater runoff. Copper concentrate is contained and pumped off-site for dewatering and transport to the smelter. Upset conditions are contained by clay or slime-lined facilities that are maintained and inspected on a weekly basis. Runoff from the concentrator area is contained, reclaimed, and recycled back into the process water control system.

Waste rock from the open-pit mining operation is deposited in appropriate areas where stormwater runon and runoff are diverted or contained, respectively. Natural site-specific conditions minimize the opportunity for acid-rock drainage production or accumulation. Stormwater runoff is reclaimed and recycled to the process water control system.

Waste rock will also be deposited in a major dump on the west side of the property to aid in closure of two large tailings impoundments. Potentially acid-generating waste rock will be enclosed in non-acid-generating waste rock overlying fine-grained tailings. Stormwater runoff will be segregated from seepage water. Both waters will be reclaimed and recycled into the process water control system.

Additional new waste rock dumps will be built north, south and east of the open pit. The north dump will be constructed in an area where site specific conditions minimize acid rock drainage formation and accumulation. Stormwater runoff is contained, reclaimed, and recycled into the process water control system.

The east and south waste rock dumps consist of non acid-generating schist. Runoff from these dumps either reports to the open pit or the process water storage reservoir where it is contained, reclaimed, and recycled back into the process water control system.

Tailings are deposited in two engineered tailings impoundments. Cycloning and spigoting are used to separate the coarse portion of tailings from slimes. The coarse portion is used for dam

construction. The slimes are used for lining the tailings decant ponds. Decant pond size is minimized by constant reclaim and recycling of decant water to the process water control system. Beach widths are optimized to enhance dam stability. The tailings dams are constructed using the upstream construction method which builds off of starter dams. Dam stability is monitored using piezometers and inclinometers. Dam faces on both active tailings impoundments are undergoing reclamation. Stormwater runoff from reclaimed and non-reclaimed areas is segregated.

PLS from the leach dumps is collected in a double-lined collection pond incorporating a 60-mil primary and 40-mil secondary liner and a leak detection system. PLS is pumped at a rate of approximately 7,000 gallons per minute (gpm). The impoundment employs an under-drain cutoff trench keyed to bedrock to capture any PLS migrating under the impoundment.

All impacted stormwater runoff is captured in stormwater retention facilities designed to contain a 100-year, 24-hour storm or greater. Pumping equipment and backup power sources are maintained where necessary to control stormwater runoff and recycle it to the process water control system.

Four National Pollutant Discharge Elimination System (NPDES) point source discharge points are located on the property. Only one of these NPDES points discharges on a continual basis. This discharge currently meets NPDES permit requirements.

Wastewater from the sanitary system is contained and recycled.

C. Permitted Activities and Discharge Controls

1. Pregnant Leach Solution (PLS) and Raffinate Processing Facilities and associated stormwater runoff containment facilities

FACILITY	LATITUDE	LONGITUDE	DRAINAGE SUB-BASIN
Raffinate Pond	33° 23′ 33"	110° 59′ 17"	Whitman Draw
Low-Grade Ore Leaching Piles	33° 25′ 30"	110° 58′ 10"	Gold Gulch
Gold Gulch Dam No. 1	33° 25′ 00"	110° 58′ 46"	Gold Gulch
Gold Gulch Dam No. 1A	33° 25′ 07"	110° 59′ 10"	Gold Gulch
Gold Gulch Dam No. 2 and Reservoir	33° 25′ 30"	110° 59′ 27"	Gold Gulch

a. Dump leaching shall be restricted to the leaching piles and associated solution collection and transport ditches, PLS ponds, and raffinate pond, as specified in the approved plans and designs submitted with the Aquifer Protection Permit (APP) Application referenced in PART V.

b. A dilute sulfuric acid dump leach process shall be used as described in the approved plans submitted with the APP Application referenced in PART V.

c. Leached ore generated by dump leach processing shall not be removed from the dump leach areas. Removal or transfer of leached ore, except for purposes of pilot scale testing or closure, shall be considered a major modification to the facility.

The permittee is restricted in discharge to an action leakage rate listed in PART IV TABLE II.B. for the leak detection sump of Gold Gulch 1A PLS Pond.

e. The permittee is authorized to discharge the following solutions into Gold Gulch 1A:

(1) Pregnant Leach Solution (PLS) derived from dump leaching operations at the Pinto Valley Mine.

(2) Stormwater runoff derived from the leach dumps at the Pinto Valley Mine.

(3) Solutions pumped from Gold Gulch 2, including stormwater runoff.

(4) Solutions derived from upset conditions or stormwater from the tailings, leaching, and other mine process facilities.

(5) Solutions pumped from the Gold Gulch 1 cutoff drain and collection sump.

(6) PLS from Gold Gulch 1.

f. Gold Gulch 1 shall be operated as a desilting basin.

g. Discharge limits and operational requirements for the Raffinate Pond are reserved until completion of the Compliance Schedule activities outlined in PART II Section I.2

2. Seepage/Stormwater Retention Facilities and Outfalls
All seepage/stormwater retention facilities shall be so designed, constructed and operated to contain the direct precipitation from the 100-year, 24-hour storm event plus the normal operating volumes. All seepage/stormwater retention facilities shall maintain sufficient freeboard to prevent overtopping as stated in PART IV Table VI, Facility Operation and Inspection. The Outfalls 002, 003, 004, and 005 are allowed to discharge to waters of the United States in compliance with the NPDES Permit.

FACILITY	LATITUDE	LONGITUDE	DRAINAGE SUB-BASIN
No. 1 Seepage Toe Drain and Caisson	33° 23′ 44"	110° 59′ 00"	Miller Gulch
No. 1 Upper Basin	33° 23′ 43"	110° 59′ 04"	Miller Gulch
No. 1 Lower Basin	33° 23′ 43"	110° 59′ 08"	Miller Gulch
NPDES Outfall 002	33° 23′ 25"	110° 59′ 05"	Miller Gulch
Upper Catchment Upper Pond	33° 23′ 41"	110° 58′ 40"	Miller Gulch
Upper Catchment Lower Pond	33° 23′ 45"	110° 58′ 38"	Miller Gulch
Upper Catchment Toe Drain	33° 23′ 37"	110° 58′ 43"	Miller Gulch
Lower Tule Pond	33° 23′ 21"	110° 58′ 17"	Miller Gulch
Lower Tule Caisson	33° 23′ 22"	110° 58′ 18"	Miller Gulch
North Pond	33° 23′ 52"	110° 58′ 11"	Miller Gulch
Peeples Pond	33° 23′ 50"	110° 58′ 15"	Miller Gulch
Turner Pond	TBD	TBD	Miller Gulch
Southside Ditch	33° 23′ 37"	110° 57′ 57"	Miller Gulch

East Catchment and East Catchment Caisson	33° 25′ 21"	110° 59′ 37"	Whitman Draw
Slack/Conklin Pond	33° 25′ 14"	110° 59′ 45"	Whitman Draw
No. 3 Seepage Caisson	33° 25′ 22"	110° 59′ 52"	Whitman Draw
West Catchment	33° 25′ 11"	110° 59′ 53"	Whitman Draw
Canyon Dam	33° 25′ 24"	111° 00′ 00"	Whitman Draw
NPDES Outfall 003 (PV003)	33° 25′ 24"	111° 00′ 00"	Whitman Draw
Able Pond	33° 25′ 33"	110° 59′ 42"	Gold Gulch
Gold Gulch Final Catchment	33° 25′ 28"	110° 59′ 34"	Gold Gulch
Baker Pond	33° 25′ 45"	110° 59′ 53"	Gold Gulch
Rosa's Pond System	33° 27′ 19"	110° 59′ 23"	Eastwater Canyon
Cottonwood Canyon Reservoir	33° 23′ 23"	110° 57′ 37"	Cottonwood Canyon
Cottonwood Seepage Caisson System	33° 23′ 04"	110° 58′ 14"	Cottonwood Canyon
NPDES Outfall 004 (PV004)	33° 23′ 02"	110° 58′ 12"	Cottonwood Canyon
NPDES Outfall 005 (PV005)	33° 22′ 44"	110° 57′ 23"	Cottonwood Canyon

TBD = To be determined

a. The permittee shall construct and operate the seepage/stormwater collection facilities consistent with the design and operational practices described in the approved plans submitted with the APP Application and Amendments referenced in PART V.

b. The permit is required to meet the effluent standards of National Pollutant Discharge Elimination Systems Permit No. AZ0020401 (Amended) for discharges at Outfall Nos. 002, 003, 004, and 005.

c. Able and Baker Ponds and Gold Gulch Final Catchment may receive discharges of tailings from the tailings slurry line under an upset condition.

3. Tailings Impoundments

FACILITY	LATITUDE	LONGITUDE	DRAINAGE SUB-BASIN
No. 1 Tailings Impoundment	33° 23′ 55"	110° 58′ 50"	Miller Gulch
No. 2 Tailings Impoundment	33° 24′ 30"	110° 59′ 05"	Whitman Draw
No. 3 Tailings Impoundment	33° 25′ 00"	110° 59′ 34"	Whitman Draw
No. 4 Tailings Impoundment	33° 27′ 04"	110° 59′ 00"	Eastwater Canyon

a. No. 3 and 4 Tailings Impoundments

(1) The permittee is restricted to an annual average maximum deposition of 87,600 tons per day (tpd), by dry weight of tailings from Pinto Valley's copper extraction flotation process. Total deposition of tailings over the life of the facility shall not cause the ultimate dam height to exceed an elevation of 3,860 feet above sea level at the No. 3 Tailings Impoundment and an elevation of 4,005 feet above sea level at the No. 4 Tailings Impoundment.

(2) All tailings deposited at the permitted site shall be derived from the flotation process at the Pinto Valley Concentrator as referenced in Component B of the APP Application (PART V). This process shall include water (H_2O) and the reagents listed in PART IV, Table III.B.

4. Waste Rock Dumps

FACILITY	LATITUDE	LONGITUDE	DRAINAGE SUB-BASIN
Westside Dump	33° 23' 33"	110° 58' 44"	Miller Gulch
Northside Dump 9.1	33° 25' 35"	110° 58' 47"	Gold Gulch
Northside Dump 9.11	33° 25' 23"	110° 58' 49"	Gold Gulch
Northside Dump 9.12	33° 2 5' 13"	110° 58' 44"	Gold Gulch
Northside Dump 9.3	33° 24' 25"	110° 58' 43"	Gold Gulch
North Dump	33° 25' 50"	110° 59' 00"	Gold Gulch
Southside Dump 13	33° 24' 03"	110° 58' 18"	Cottonwood Canyon
Southside Dump 14	33° 24' 00"	110° 58' 23"	Cottonwood Canyon
19 Dump	33° 23' 36"	110° 57' 24"	Cottonwood Canyon
19.1 Dump	33° 23' 49"	110° 57' 51"	Cottonwood Canyon
19 Extension Dump	33° 23' 20"	110° 57' 25"	Cottonwood Canyon
East Dump	33° 24' 20"	110° 57' 18"	Gold Gulch

a. Runoff from waste rock dumps shall be contained by downstream seepage/stormwater retention facilities as described in the approved plans submitted with the APP Application referenced in PART V.

b. The waste rock dumps and associated run-off impoundments shall be operated and inspected according to PART IV, Table VI.

5. Concentrator Area

FACILITY	LATITUDE	LONGITUDE	DRAINAGE SUB-BASIN
Concentrator	33° 23' 37"	110° 57' 57"	Miller Gulch

a. Runoff from the Concentrator Area will be contained by downstream seepage/stormwater retention facilities as described in the approved plans submitted with the APP Application referenced in PART V.

b. The run-off impoundments associated with the Concentrator Area shall be operated and inspected according to PART IV, Table VI.

D. Monitoring Requirements

All monitoring required in this permit shall continue for the duration of the permit, regardless of the discharge or operational status of the facility, unless otherwise designated in this permit or an approved contingency plan. This monitoring program may be modified, including possible reduction of monitoring frequencies and parameters with Department approval, after 24 months from the effective date of this permit. Requests for such changes must be written and include justification for the changes.

1. Discharge Monitoring

   a. Pregnant Leach Solution and Raffinate Processing Facilities

      (1) The pregnant leach solution in the Gold Gulch 1-A Pond shall be sampled initially for four consecutive quarters according to PART IV, TABLE II.A. After the initial quarterly sampling of Gold Gulch 1-A, the pregnant leach solution and raffinate shall be sampled on a triennial basis as specified in PART IV, TABLE II.A.

      (2) The Leak Detection Sump of the Gold Gulch 1A PLS Pond shall be monitored and the results reported according to the terms and frequencies in PART IV, TABLE II.B.

   b. Seepage/Stormwater Retention Facilities

      (1) The process water stored in Cottonwood Canyon reservoir shall be monitored and reported according to the terms and frequencies specified in PART IV, TABLE II.A

   c. Tailings Impoundments and Ponds

      (1) The tailings generated by Pinto Valley's Concentrator shall be monitored and reported according to the terms and frequencies specified in PART IV, TABLE II.A.

      (2) The average daily deposition volume into the Nos. 3 and 4 Tailings Impoundments shall be monitored and reported according to the terms and frequencies in PART IV, TABLE III.A.

   d. Waste Rock Dumps

      (1) The waste rock shall be monitored and reported according to the terms and frequencies in PART IV, TABLE IV.

2. Groundwater Monitoring

   a. Point(s) of Compliance

      Point(s) of Compliance are located as indicated in PART IV, TABLE V.A.

   b. Ambient Groundwater Quality Monitoring

Within two years of issuance of this permit, the permittee shall provide a minimum of 8 quarterly analyses of groundwater samples to establish downgradient ambient water quality data for evaluating any long-term changes in quality in accordance with PART IV, TABLE V.B.

The results of quarterly ambient water quality samples shall be submitted to the ADEQ Aquifer Protection Permit Program with the quarterly Self-Monitoring Report as required in PART II.J.5. The report shall include all data and calculations necessary to establish valid Alert Levels (ALs) and Aquifer Quality Limits (AQLs) for each well on a well by well basis.

(1) Alert Levels (ALs)

Unless another method is approved by the Director, ALs shall be established as the upper prediction interval for each parameter sampled during the ambient monitoring period. ALs shall be established as both the upper and lower prediction intervals for pH. Prediction intervals are defined by and shall be calculated by the methods given in both the following documents and their subsequent revisions:

Environmental Protection Agency, 1989. Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities -- Interim Final Guidance. Office of Solid Waste, Waste Management Division, EPA/530-SW-89- 026 (or NTIS # PB89-151047).

Environmental Protection Agency, 1992. Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities -- Addendum to Interim Final Guidance, Office of Solid Waste, Permits and State Programs Division.

The above references shall also be used in the case of either censored data or non-normally distributed data.

(2) Aquifer Quality Limits (AQLs)

AQLs shall be established for parameters with aquifer water quality standards (AWQS) as follows:

(a) If the calculated AL is less than the AWQS, then the AQL shall be set equal to the AWQS;

(b) If the calculated AL is greater than the AWQS, then the AQL shall be set equal to the AL.

c. Compliance Monitoring

After completion of the initial ambient groundwater monitoring requirements, the permittee shall continue to conduct quarterly monitoring at each location listed in PART IV, Table V.A. for the indicator parameters listed PART IV, Table V.C. Biennially, the permittee shall monitor the locations listed in PART IV, Table V.A. for the parameters listed in Part IV, Table V.B. Monitoring results shall be reviewed to determine if AQLs and ALs have been exceeded. If compliance monitoring indicates that an AL or AQL has been exceeded, the Permittee is required to follow the requirements of the contingency plan provided in PART II. Section E.2.

3. Operational Monitoring

a. Operational Requirements

(1) The Gold Gulch 1A PLS Pond leak detection sumps shall be monitored for fluid presence on a weekly basis and pumped as needed as specified in PART IV, TABLE II.B. Records of the volume pumped shall be maintained by the permittee at the facility for a period of five (5) years from the date of inspection. If compliance monitoring indicates that the stated action leakage rate has been exceeded, the permittee is required to follow the requirements of the contingency plan provided in PART II Section E.1.a.

b. Facility Maintenance Inspection

(1) The facility and pollution control structures shall be inspected for the items listed in PART IV, TABLE VI. A log of these inspections shall be kept at the facility for five years from the date of each inspection, available for review by ADEQ personnel.

(2) If substantial damage of the pollution control structures is identified during inspection, proper repair procedures shall be performed. All repair or modification procedures and material(s) used shall be documented on the Self-Monitoring Report and Documentation Form and submitted quarterly to the ADEQ, Aquifer Protection Permit Compliance. If no damage to the pollution control structures is identified during the quarter, the permittee shall indicate that the required inspections occurred during the quarter.

4. Sampling Protocols

Sampling procedures, preservation techniques, and holding times shall be consistent with the most recent Department Quality Assurance Project Plan.

a. Discharge Monitoring

(1) Pregnant Leach Process Solution and Raffinate Processing Facilities

Process solution monitoring shall be performed as required by PART IV, Table II.A. of this permit and in accordance with the most recent Quality Assurance Project Plan of the Department.

b. Groundwater Monitoring

(1) Static water levels shall be measured and recorded prior to sampling. Wells shall be purged of at least three borehole volumes (as calculated using the static water level) or until indicator parameters (pH, temperature, and electrical conductivity) are stable, whichever represents the greater volume. If evacuation results in the well going dry, the well should be allowed to recover to 80% of the original borehole volume, or allowed to recover for 24 hours, whichever is shorter, prior to sampling. An explanation for reduced pumping volumes, a record of the volume pumped, and modified sampling procedures shall be reported on the Self-Monitoring Report and Documentation Form.

(2) Samples shall be collected at the wellhead of monitor wells and at the caisson of Outfall locations.

c. Operational Monitoring

(1) Freeboard Monitoring

All freeboard measurements shall consist of the vertical distance between the fluid surface and the lowest point on the berm of the pond.

5. Installation and Maintenance of Monitoring Equipment

a. Monitoring Equipment

The permittee shall provide monitoring or sampling access, ports or devices at the facility for all monitoring required by this permit.

b. Groundwater Monitoring Equipment

All groundwater monitor wells required by this permit shall be installed and maintained according to plans approved by the ADEQ Aquifer Protection Permit Program so that proper groundwater samples can be collected. Should additional groundwater wells be determined necessary, the construction details shall be submitted to the ADEQ Aquifer Protection Permit Program for approval.

6. Monitoring Records

a. Discharge Monitoring Records

(1) The following information associated with each sample, inspection or measurement and the name of each individual who performed the sampling or measurement should be included in the monitoring records;

(a) Date, time and exact place of sampling, inspection, or measurement and the name of each individual who performed the sampling or measurement.

(b) Procedures used to collect the sample or make the measurement.

(c) Date on which sample analysis was completed.

(d) Name of each individual and laboratory who performed the analysis.

(e) Analytical techniques or methods used to perform the sampling and analysis.

(f) Chain of custody records.

(g) Any field notes relating to the information described in subparagraphs a through f above.

b. Groundwater Monitoring Records

All information required in PART II.D.6.a.(1) shall be recorded for each groundwater sample collected as required by this permit.

c. Operational Monitoring Records

(1) Facility Inspection Records

The following information shall be recorded for facility inspections:

Name of inspector, date and approximate time of inspection, condition of facility components listed in PART IV, TABLE VI, any damage or malfunction, and the repair(s) performed.

E. Contingency Plan Requirements

The permittee shall maintain at least one copy of the approved contingency plan(s) at the location where day-to-day decisions regarding the operation of the facilities are made. The permittee shall revise promptly all copies of the contingency plan(s) to reflect approved changes. The permittee shall advise anyone responsible for the operation of the facility of the location of copies of all contingency and emergency plans. In addition to any information required by the contingency plan referenced in PART V.A, at a minimum, the following contingency requirements shall be implemented.

1. Discharge Monitoring Contingencies

a. Action Leakage Rate/Alert Level Exceedance

(1) The permittee shall initiate the following actions within five days of becoming aware of the exceedance of the action leakage rate at the Gold Gulch 1A Leak Detection Sumps:

(a) Pump out all fluid collected in the primary leakage collection system into either Gold Gulch 1-A PLS Collection Pond or Gold Gulch 1.

(b) Quantify and record the amount of fluid pumped from the leakage collection system.

(c) Initiate repair of all identified points of leakage into the leakage collection system.

(2) Within 30 days of a confirmed exceedance of the action leakage rate, the permittee shall submit a written report to the Department which includes the documentation specified in PART II.J.3.b of this permit. In addition to actions already taken, the report shall detail additional response actions to be taken for increased leakage rates.

Additional response actions based on leakage rates in excess of 2,000 gallons per acre per day, based on the reported wetted acreage, shall at a minimum include:

(a) Head reduction on the liner including emptying of the impoundment if necessary,

(b) Visual inspections to identify areas of leakage,

(c) Repair of all identified areas of leakage.

b. Maximum Deposition Limit Violation

The permittee shall notify the Department in accordance with PART II.J.4, should Maximum Deposition Limits (MDL) as specified in TABLE III.A. be violated.

c. Accidental Discharge

(1) The permittee shall correct any failure that results in an accidental discharge and take the following actions:

(a) Within 30 days of an accidental discharge that might cause the exceedance of an AQL or might cause imminent and substantial endangerment to public health or the environment, the permittee shall submit to the ADEQ, Aquifer Protection Permit Compliance a written report that includes the documentation required in PART II.J.3.b.

(b) Upon review of the above required report, the Department may require additional monitoring and/or actions.

(2) Spills

In the event of any accidental spill or unauthorized discharge of suspected hazardous or toxic materials, process solutions, or reagents on the facility site that would cause imminent and substantial endangerment to human health and the environment, the related area shall be promptly isolated and the material identified. Information on persons that may have been exposed to the material will be recorded. The permittee shall remove and dispose of the material according to applicable federal, state, and local regulations.

(3) Emergency Response

(a) The permittee shall provide for emergency response on a 24-hour basis in the event that a condition arises which results in imminent and substantial endangerment to public health or the environment. The plan shall be kept at the facility and provide for the following:

(i) designation of an emergency response coordinator who shall notify the ADEQ, Aquifer Protection Permit Compliance, and activate the necessary contingency plan in the event of an emergency;

(ii) a general description of the procedures, personnel and equipment to be used to assure appropriate mitigation of unauthorized discharges; and

(iii) a list of names, addresses and telephone numbers of persons to be contacted in the event of an emergency.

(b) The emergency response coordinator shall notify the ADEQ, Aquifer Protection Permit Compliance, within 24 hours that emergency response measures are taken or those portions of the contingency plan that address an imminent and substantial endangerment are activated.

(c) The emergency response coordinator shall notify the ADEQ Emergency Response Unit immediately in the event there is a release of hazardous substances in excess of a reportable quantity in accordance with 40 CFR 302 et seq. All releases of hazardous substances shall be reported in accordance with 40 CFR 302 et seq.

d. Slope Failures

If a slope failure involving the leach dumps, liners, surface impoundments or retention structures (dams) occurs which affects the ability of the facility to operate safely, the permittee shall promptly close the active area in the vicinity of the failure, and conduct a field investigation of the failure to analyze its origin and extent, its impact on the facility operations, temporary and permanent repairs and changes in operational plans considered necessary. Within 30 days of a slope failure, the permittee shall submit a written report which includes the documentation specified in PART II.J.3.b of this permit. The permittee shall initiate the actions necessary to mitigate the impacts of the failure, consistent with Department approval.

2. Groundwater Monitoring Contingencies

Alert Level (AL) or Aquifer Quality Limit (AQL) Exceedance

a. The permittee shall notify the Department at the address specified in PART II.J.1 within five days of becoming aware of the exceedance of an AL or AQL.

b. Verification sampling shall be conducted within fifteen days of becoming aware that AL or AQL has been exceeded.

c. Within five days of receiving the results of verification sampling from the laboratory, the permittee shall notify the Department of the results, at the address indicated in PART II.J.1, regardless of whether the results are positive or negative.

(1) If the results of verification sampling indicate that an AL or AQL has not been exceeded, the permittee shall assume that no exceedance has occurred; no further action is required until the next scheduled monitoring round.

(2) If the results of verification sampling indicate that an AL has been exceeded, the permittee shall, within 30 days of receiving the laboratory results verifying that an AL has been exceeded, commence sampling on a quarterly basis as per PART IV Table V.B. With Department approval, other appropriate frequencies and/or analyte lists may be substituted for the list in PART IV Table V.B. Compliance sampling shall continue until the results from two consecutive quarters show no further exceedances of the AL. In addition, the permittee shall submit to the ADEQ, either (a) or (b) of the following:

(a) a written report describing the cause, impacts or mitigation of the discharge responsible for the AL exceedance,

(b) a demonstration that the AL exceedance resulted from error(s) in sampling, analysis, or statistical evaluation.

(3) If the results verify that an AQL has been exceeded, the permittee shall, within 30 days of receiving the laboratory results verifying that an AQL has been exceeded,

commence sampling on a monthly basis as per PART IV Table V.B. With Department approval, other appropriate frequencies and/or analyte lists may be substituted for the list in PART IV Table V.B. Sampling as per PART IV Table V.B. shall continue until the results from two consecutive months show no exceedance of the AQL. In addition, the permittee shall submit either (a) or (b) of the following:

(a) a written report which includes the documentation specified in PART II.J.3.b. The permittee shall initiate the actions necessary to mitigate the impacts of the violation, consistent with Department approval.

(b) a demonstration that the AQL exceedance resulted from error(s) in sampling, analysis, or statistical evaluation.

(4) Upon review of the report documenting an AL or AQL exceedance, the Department may require additional monitoring and/or action beyond those specified in this permit.

F. Temporary Cessation

The permittee shall notify the ADEQ, Aquifer Protection Permit Compliance, in writing 30 days prior to temporary cessation of operations occurs at the facility. Notification of the temporary cessation does not relieve the permittee of any permit requirements unless otherwise specified in this permit.

Accompanying the notification shall be a description of any measures to be taken to maintain discharge control systems such that discharge is minimized to the maximum extent practicable during temporary cessation.

G. Closure

1. Closure Notification

The permittee shall notify the ADEQ, Aquifer Protection Permit Program of the intent to cease, without intent to resume, an activity for which the facility was designed or operated prior to ceasing. The permittee shall notify the Aquifer Protection Permit Program at least 180 days prior to closure of an operating facility. Within 90 days following notification, the permittee shall submit for approval, to ADEQ Aquifer Protection Permit Program, a closure plan according to the requirements of A.A.C. R18-9-116.C. which eliminates, to the maximum extent practicable, any reasonable probability of further discharge from the facility and of exceeding Aquifer Water Quality Standards at the applicable point of compliance. This plan shall be in addition to or an amendment of the approved closure method referenced in the facility file.

2. Closure Completion

Upon completion of closure activities, the permittee shall give written notice to ADEQ Aquifer Protection Permit Program indicating that the approved closure plan has been fully implemented.

H. Post-Closure

1. Post-Closure Requirements

a. Post-closure requirements shall be established based on a review of facility closure activities and will be reviewed and approved by the ADEQ Aquifer Protection Permit Program.

b. At a minimum, post-closure requirements shall include maintenance and monitoring activities for a period of 10 years or other suitable period of time as determined by ADEQ, as referenced in PART IV, TABLE VI and PART V.A. These shall essentially consist of: periodic verification that all the containment and monitoring structures and facilities retain their integrity and their operability; appropriate repairs as necessary; and monitoring of groundwater. These activities will continue for a period of time to be determined at the time of closure, and approved by the ADEQ Aquifer Protection Permit Program, and neither shall their frequency be modified nor the monitoring cease without approval by the ADEQ.

2. Post-Closure Plan

The post-closure plan shall ensure that any reasonable probability of further discharge from the facility, and of exceeding Aquifer Water Quality Standards at the applicable points of compliance, are eliminated, to the greatest extent practicable. The post-closure monitoring program shall be based on observed and projected water quality trends at the points of compliance. The post-closure plan will comply with the requirements of R18-9-116.F.

3. Post-Closure Completion

The permittee shall notify ADEQ Aquifer Protection Permit Program in writing when the post-closure activities have been completed.

I. Compliance Schedule Requirements

1. Ambient Groundwater Monitoring

a. The permittee shall submit to the ADEQ Aquifer Protection Permit Program within 30 days of receipt of the final quarter of the initial eight-quarter ambient monitoring data, the tabulated ambient groundwater monitoring data as required in PART IV, TABLE V.B.

b. The permittee shall submit to the ADEQ Aquifer Protection Permit Program within 60 days of receipt of the final quarter of ambient monitoring data, a report which includes the statistical calculations of the ALs and AQLs to be established for the point of compliance locations. The report shall include copies of the laboratory analytical reports and the QA/QC procedures using in collection and analysis of the samples.

c. Monitor Well APP-7

(1) Monitor well APP-7 shall be installed and located according to plans approved by the Arizona Department of Water Resources (ADWR) and the ADEQ Aquifer Protection Permit Program.

(2) The permittee shall install groundwater monitor well APP-7 at least 24 months prior to the initiation of the Northside Waste Rock Dump. APP-7 shall be monitored in accordance with PART IV, TABLE V.B., and the ambient monitoring data and statistical AL and AQL calculation shall be submitted to the

ADEQ Aquifer Protection Permit Program for review, approval and incorporation into the permit and in accordance with PART II.D.2.b. Upon the completion of ambient monitoring the permittee shall conduct monitoring of APP-7 in accordance with PART IV, TABLE V.C.

2. Raffinate Pond

a. Within 30 days from the original effective date of this permit, the permittee shall submit to the Aquifer Protection Permit Program, a workplan and schedule for evaluation of the existing raffinate pond. Upon completion of this evaluation, the permittee shall submit both the evaluation data and a proposal to either upgrade the existing raffinate pond or construct a new raffinate pond. The proposal must provide a demonstration that BADCT is satisfied by either upgrading the existing raffinate pond or constructing a new raffinate pond. Prior to approval of the raffinate pond proposal, the Department shall establish that the following requirements demonstrating BADCT are satisfied:

(1) liner materials for the raffinate pond shall be chemically compatible with the raffinate solution;

(2) the hydraulic conductivity of the raffinate pond liner system shall be demonstrated to be no greater than 10^{-6} cm/sec;

(3) the raffinate pond liner material shall maintain structural integrity adequate to resist erosion during storm events and standard operation;

(4) the raffinate liner can be easily inspected for damage or wear;

(5) an evaluation of the necessity for a leak detection sump or other leak detection mechanism;

(6) a QA/QC plan for the upgrade or new construction;

(7) engineering design drawings for the upgrade or new construction.

b. Within 30 days of Department approval of the raffinate pond proposal, the permittee shall submit a schedule for the upgrade or construction work to be performed. The permittee shall be required to complete construction according to the submitted schedule.

c. The Department will not approve a proposal to upgrade the existing raffinate pond if an adequate demonstration of BADCT cannot be made. In this event, the permittee shall submit a schedule to the Department for construction of a new raffinate pond. This schedule shall be submitted within 30 days of the Department's decision. The permittee shall be required to complete construction of the new raffinate pond according to the submitted schedule.

d. Upon Department approval of the upgrade to the existing raffinate pond or construction of a new raffinate pond, PART II Section C.1.g of the permit shall be modified to include discharge monitoring limitations for the raffinate pond.

e. Within 60 days of the original effective date of this permit, the permittee shall submit a report, to the Aquifer Protection Permit Program for approval, documenting the

hydrologic conditions and the potential for remediation of groundwater contamination beneath the Raffinate Pond. This report shall also recommend an alert-level monitoring well for the Raffinate Pond area and an estimate of the past release's effect on groundwater at the point of compliance.

f. Within 90 days of the original effective date of this permit, the permittee shall install a new monitor well or designate an existing monitor well as an alert-level monitoring well for the Raffinate Pond at a location approved by the Department.

3. Post Audit
The permittee shall verify that the pollutant fate and transport are behaving as predicted. Within 180 days after the tenth anniversary of the original effective date of this permit, the permittee shall conduct a postaudit of the computer modeling efforts which predicted the fate and transport of pollutants discharged by the Pinto Valley Operations. The permittee shall submit a report to the Aquifer Protection Permit Program describing the postaudit as well as any changes in the conceptual model, any model redesign, and any changes in predicted post-closure conditions.

4. Attenuation Capacity
The permittee shall verify the capacity of the geologic materials at the Pinto Valley site to attenuate pollutants. Within 180 days of the original effective date of this permit, the permittee shall submit a report, to the Aquifer Protection Permit Program for approval, documenting the methods, results, and conclusions of either geochemical modeling or laboratory tests. These tests must include estimates of attenuation limits or pollutant loading amounts that might cause pollutant breakthrough in concentrations greater that AQLs.

5. Emergency Response Plan
The permittee shall, within 60 days of the effective date of the permit, submit a copy of a facility emergency response plan to the ADEQ Aquifer Protection Permit Program. The plan shall include the information as referenced in PART II.E.1.c.(3).

6. Seepage/Stormwater Runoff Impoundments
The permittee shall submit 90 days prior to construction, two copies of the final designs for Turner Pond and No. 1 Seepage as described in the approved plans submitted in the APP Application referenced in PART V.

7. Westside Facilities
Upon completion of construction of the Westside facilities, the permittee shall inform the Department as to the closure of any associated stormwater impoundments or seepage control facilities.

8. Seepage/Stormwater Impoundments
The permitte shall submit the information necessary to support BADCT for the following facilities: Lower Tule Pond, North Pond, Peeples Pond, Slack/Conklin Pond (Slack Dam and Conklin Pond), Canyon Dam, Able Pond, Gold Gulch Final Catchment, Baker Pond, Rosa's Pond System and Cottonwood Reservoir. Within 30 days of the original effective date of the permit, the permittee shall submit the following information to the department for each of the referenced facilities:

a. All permeability test data and test procedures;

b. The location of the permeability tests indicated on a facility outline;

c. Costs and discharge reduction for alternative discharge control technologies.

d. The QA/QC procedures used for liner construction and the engineering drawings for the upgrade of the Peeples pond liner system.

e. As-built drawings for the 1994/1995 modification to the Slack/Conklin Pond.

J. Reporting Requirements

1. Reporting Location

Signed copies of all reports required herein, except for those required in Part II.D.2.b and Part II.I., shall be submitted to the Department at:

Arizona Department of Environmental Quality
Aquifer Protection Permit Compliance
3033 North Central Avenue
Phoenix, Arizona 85012
Phone Number: (602) 207-4675

Signed copies of the reports required in Part II.D.2.b and Part II.I sahll be submitted to the Department at:

Arizona Department of Environmental Quality
Aquifer Protection Permit Program
3033 North Central Avenue
Phoenix, Arizona 85012

2. Modification Reporting

a. All requests for permit modifications shall be done in accordance with PART VI.H.3., unless otherwise specified in this permit.

b. Requests for a major modification to a facility (as defined in PART V.C.24.) shall be submitted at least 180 calendar days before the discharge occurs.

3. Permit Violation or Alert Level Exceedance Reporting

a. The permittee shall notify the ADEQ Aquifer Protection Permit Program within five days of becoming aware of a violation of any permit condition or an AL having been exceeded.

b. The permittee shall submit a written report within 30 days after becoming aware of the violation of a permit condition or of an AL having been exceeded. The report shall document all of the following:

(1) A description of the violation and its cause;

(2) the period of violation, including exact date(s) and time(s), if known, and the anticipated time period during which the violation is expected to continue;

(3) any action taken or planned to mitigate the effects or the violation, or to eliminate or prevent recurrence of the violation;

(4) any monitoring activity or other information which indicates that any pollutants would be reasonably expected to cause a violation of an AWQS; and

(5) any malfunction or failure of pollution control devices or other equipment or process.

4. Maximum Deposition Limit Violation

a. The permittee shall notify the Department within five days of becoming aware of a MDL violation.

b. Within 30 days after becoming aware of a MDL violation, the permittee shall submit a written report to the Department for review. The report shall document all of the following:

(1) A description of the violation and its cause;

(2) the period of violation, including exact date(s) and time(s), if known, and the anticipated time period in which the violation is expected to continue; and

(3) a contingency plan describing any action taken or planned to mitigate the effects of the violation, or to eliminate or prevent recurrence of the violation.

Upon review of the report, if necessary, the Department may require additional monitoring or studies yet to be determined, beyond those herein specified.

5. Self-Monitoring Reports

a. The permittee shall complete the Self-Monitoring Report and Documentation Form provided by the Department to reflect facility inspection requirements designated in PART IV, TABLE VI and submit to the ADEQ, Aquifer Protection Permit Compliance, quarterly along with other reports required by this permit. Facility inspection reports shall be submitted no less frequently than quarterly, regardless of operational status.

b. PART IV, TABLES II.A., II.B., III.A., III.B., IV, V.A., V.B., and V.C. identify the location and frequency for reporting results from discharge and groundwater monitoring requirements. Results shall be submitted in the Self-Monitoring Report Form. Monitoring methods shall be recorded and any deviations from the methods and frequencies prescribed in this permit shall be reported.

c. The permittee shall complete the Self-Monitoring Report Forms, to be supplied by the Department, to the extent that the information reported may be entered on the form. The results of all monitoring required by this permit shall be submitted in such a format as to allow direct comparison with the limitations and requirements of the permit.

d. The Self-Monitoring Report shall include: Copies of laboratory analysis forms, documentation on sampling date and time, name of sampler, static water level prior to sampling, sampling method, purging volume, indicator parameters, analytical method, method detection limit, date of analysis, preservation and transportation procedures, and analytical facility. Data shall be compiled on standardized forms which allow comparison with past reports.

e. Quarterly Sampling Reports:

Samples taken during quarter beginning	Quarterly Report due by
January	Apr. 28
April	Jul. 28
July	Oct. 28
October	Jan. 28

6. Operational Reporting

a. The permittee shall report operational conditions listed in PART IV, TABLE VI in the Self-Monitoring Report form quarterly. If none of the conditions occur, the report shall say "no event" for a particular reporting period. If the facility is not in operation, the permittee shall indicate that fact in the Self-Monitoring Report.

b. The permittee shall submit data required in PART IV, TABLES II through VI regardless of the operating status of the facility unless otherwise approved by the Department or allowed in this permit.

PART III. OTHER CONDITIONS

A. Analytical Methodology

The water samples shall be analyzed using EPA approved methods or Arizona State approved methods listed in PART IV, TABLES II.A, IV, V.B and V.C. Alternative EPA or Standard Methods may be substituted for the methods specified in PART IV so long as equivalent or better detection limits are achieved. The analysis shall be performed by a laboratory licensed by the Arizona Department of Health Services, Office of Laboratory Licensure and Certification. For results to be considered valid, all analyses shall be performed by a licensed and certified laboratory and all analytical work shall meet quality control standards specified in the approved methods. A list of certified laboratories can be obtained at the address listed below:

Arizona Department of Health Services
Office of Laboratory Licensure and Certification
3443 North Central Avenue
Phoenix, Arizona 85012
Phone Number: (602) 255-3454

B. Environmental Laboratory Contact

Upon submittal of the samples to a state-certified laboratory for analysis, a copy of the appropriate portions of the signed permit shall be forwarded to the laboratory for reference.

PART IV

TABLE I.A

LIST OF INDIVIDUALLY PERMITTED FACILITIES
PINTO VALLEY OPERATIONS
MIAMI, ARIZONA

FACILITY CATEGORY	FACILITY NAME	TYPE OF DISCHARGE	LAT. (D, M, S) N	LON. (D, M, S) W	SUB-BASIN	FAC. STATUS	PERMIT TYPE	BASIS[1]
No. 1 Tailings Impoundment	No. 1 Tailings Impoundment	Seepage, stormwater and runoff from face of dam	33° 23' 55"	110° 58' 50"	Miller Gulch	Existing	Individual	A.R.S. 49-241.B.6
No. 1 Seepage Facility	No. 1 Seepage Toe Drain and Caisson	Commingled tailings Seepage/Stormwater runoff	33° 23' 44"	110° 59' 00"	Miller Gulch	Existing	Individual	A.R.S. 49-241.B.1
"	No. 1 Upper Basin	Commingled seepage and stormwater runoff	33° 23' 43"	110° 59' 04"	Miller Gulch	Existing	Individual	A.R.S. 49-241.B.1
"	No. 1 Lower Basin	Seepage/Stormwater runoff	33° 23' 43"	110° 59' 08"	Miller Gulch	Existing	Individual	A.R.S. 49-241.B.1
"	NPDES Outfall 002	Seepage/Stormwater runoff	33° 23' 25"	110° 59' 05"	Miller Gulch	Existing	Individual	A.R.S 49-241.B.10
Upper Catchment Collection and Pumping System	Upper Catchment Upper Pond	Commingled Seepage/Stormwater runoff	33° 23' 41"	110° 58' 40"	Miller Gulch	Existing	Individual	A.R.S. 49-241.B.1
"	Upper Catchment Lower Pond	Seepage/Stormwater runoff	33° 23' 45"	110° 58' 38"	Miller Gulch	Existing	Individual	A.R.S. 49-241.B.1
"	Upper Catchment Toe Drain	Seepage and overflow	33° 23' 37"	110° 58' 43"	Miller Gulch	Existing	Individual	A.R.S. 49-241.B.1
"	Lower Tule Pond	Commingled stormwater runoff, seepage and filtered wastewater	33° 23' 21"	110° 58' 17"	Miller Gulch	Existing	Individual	A.R.S. 49-241.B.1
"	Lower Tule Caisson	Commingled water	33° 23' 22"	110° 58' 18"	Miller Gulch	Existing	Individual	A.R.S. 49-241.B.1

1 Statute in effect at signing of permit

Concentrator Area	Concentrator	Stormwater runoff	33° 23' 37"	110° 57' 57"	Miller Gulch	Existing	Individual	A.R.S. 49-241.A
"	North Pond	Stormwater runoff, commingled final tailings slurry	33° 23' 52"	110° 58' 11"	Miller Gulch	Existing	Individual	A.R.S. 49-241.B.1
"	Peeples Pond	Commingled process water, wash water and stormwater runoff	33° 23' 50"	110° 58' 15"	Miller Gulch	Existing	Individual	A.R.S. 49-241.B.1
Westside Dump	--	Stormwater runoff	33° 23' 33"	110° 58' 44"	Whitman Draw & Miller Gulch	New	Individual	A.R.S. 49-241.B.2
"	Turner Pond	Stormwater runoff	--	--	Miller Gulch	New	Individual	A.R.S. 49-241.A
No.2 Tailings Impoundment	No. 2 Tailings Impoundment	Seepage and accumulated precipitation	33° 24' 30"	110° 59' 05"	Whitman Draw	Existing	Individual	A.R.S. 49-241.B.6
No.3 Tailings Impoundment	No. 3 Tailings Impoundment	Seepage and decant water	33° 25' 00"	110° 59' 34"	Whitman Draw	Existing	Individual	A.R.S 49-241.B.6
"	East Catchment and East Catchment Caisson	Commingled seepage, stormwater runoff and gland seal water	33° 25' 14"	110° 59' 37"	Whitman Draw	Existing	Individual	A.R.S. 49-241.B.1
"	Slack/Conklin Pond	Commingled seepage and stormwater runoff	33° 25' 14"	110° 59' 45"	Whitman Draw	Existing	Individual	A.R.S. 49-241.B.1
"	West Catchment	Stormwater runoff	33° 25' 11"	110° 59' 53"	Whitman Draw	Existing	Individual	A.R.S 49-241.B.1
"	No. 3 Seepage Caisson	Seepage	33° 25' 22"	110° 59' 52"	Whitman Draw	Existing	Individual	A.R.S. 49-241.A
"	Canyon Dam	Commingled stormwater runoff and seepage	33° 25' 24"	111° 00' 00"	Whitman Draw	Existing	Individual	A.R.S. 49-241.B.1
"	NPDES Outfall 003	Commingled Seepage/Stormwater runoff	33° 25' 24"	111° 00' 00"	Whitman Draw	Existing	Individual	A.R.S. 49-241.B.10
SX-EW Facility	Raffinate Pond	Regenerated raffinate	33° 23' 33"	110° 59' 17"	Whitman Draw	Existing	Individual	A.R.S. 49-241.B.1
Gold Gulch Drainage Facilities	Low-grade Ore Leaching Piles	PLS	33° 25' 30"	110° 58' 10"	Gold Gulch	Existing	Individual	A.R.S. 49-241.B.7
"	Gold Gulch Dam No. 1 and PLS Pond	PLS and stormwater runoff	33° 25' 00"	110° 58' 46"	Gold Gulch	Existing	Individual	A.R.S. 49-241.B.1

"	Gold Gulch Dam No. 1A and PLS Pond	PLS	33° 25' 07"	110° 59' 10"	Gold Gulch	Existing	Individual	A.R.S. 49-241.B.1
"	Gold Gulch Dam No. 2 and Reservoir	Stormwater	33° 25' 30"	110° 59' 27"	Gold Gulch	Existing	Individual	A.R.S. 49-241.B.1
"	Able Pond	Tailings decant water and stormwater runoff	33° 25' 33"	110° 59' 42"	Gold Gulch	Existing	Individual	A.R.S. 49-241.B.1
"	Gold Gulch Final Catchment	Stormwater runoff and decanted tailings water	33° 25' 28"	110° 59' 34"	Gold Gulch	Existing	Individual	A.R.S. 49-241.B.1
"	Baker Pond	Tailings decant water and stormwater runoff	33° 25' 45"	110° 59' 53"	Gold Gulch	Existing	Individual	A.R.S. 49-241.B.1
Northside Waste Rock Dumps	9.1	Stormwater runoff	33° 25' 35"	110° 58' 47"	Gold Gulch	Existing	Individual	A.R.S. 49-241.B.2
"	9.11	Stormwater runoff	33° 25' 23"	110° 58' 49"	Gold Gulch	Existing	Individual	A.R.S. 49-241.B.2
"	9.12	Stormwater runoff	33° 25' 13"	110° 58' 44"	Gold Gulch	Existing	Individual	A.R.S. 49-241.B.2
"	9.3	Stormwater runoff	33°24' 25"	110° 58' 43"	Gold Gulch	Existing	Individual	A.R.S. 49-241.B.2
North Dump	--	Stormwater runoff	33° 25' 50"	110° 59' 00"	Gold Gulch	New	Individual	A.R.S. 49-241.A
No. 4 Tailings Impoundment	No. 4 Tailings Impoundment	Decant water, Seepage/Stormwater runoff	33° 27' 04"	110° 59' 00"	Eastwater Canyon	Existing	Individual	A.R.S. 49-241.B.6
"	Rosa's Pond System	Evaporation	33° 27' 19"	110° 59' 23"	Eastwater Canyon	Existing	Individual	A.R.S. 49-241.B.1
Cottonwood Tailings Impoundment System	Cottonwood Canyon Reservoir	Commingled runoff, seepage, make-up and reclaimed water	33° 23' 23"	110° 57' 37"	Cottonwood Canyon	Existing	Individual	A.R.S. 49-241.B.1
"	Cottonwood Seepage Caisson System	Seepage; and stormwater runoff	33° 23' 04"	110° 58' 14"	Cottonwood Canyon	Existing	Individual	A.R.S. 49-241.B.1
"	NPDES Outfall 004	Seepage and stormwater runoff	33° 23' 02"	110° 58' 12"	Cottonwood Canyon	Existing	Individual	A.R.S. 49-241.B.10
"	NPDES Outfall 005	Seepage	33° 22' 44"	110° 57' 23"	Cottonwood Canyon	Existing	Individual	A.R.S. 49-241.B.10
Southside Dumps	13	Stormwater runoff	33° 24' 03"	110° 58' 18"	Cottonwood Canyon	Existing	Individual	A.R.S. 49-241.B.2

"	14	Stormwater runoff	33° 24' 00"	110° 58' 23"	Cottonwood Canyon	Existing	Individual	A.R.S. 49-241.B.2
"	19	Stormwater runoff	33° 23' 36"	110° 57' 24"	Cottonwood Canyon	Existing	Individual	A.R.S. 49-241.B.2
"	19.1	Stormwater runoff	33° 23' 49"	110° 57' 51"	Cottonwood Canyon	Existing	Individual	A.R.S. 49-241.B.2
19 Extension Dump	--	Stormwater runoff	33° 23' 30"	110° 57' 25"	Cottonwood Canyon	New	Individual	A.R.S. 49-241.B.2
East Dump	--	Stormwater runoff	33° 24' 20"	110° 57' 18"	Gold Gulch	New	Individual	A.R.S. 49-250,B.22

Footnotes:

D, M, S = Degrees, minutes, seconds
N = North
W = West
A.R.S. = Arizona Revised Statutes
NPDES = National Pollutant Discharge Elimination System
(--) = Not applicable

PART IV, continued

DISCHARGE MONITORING

TABLE II.A.
LEACHING PROCESS SOLUTION MONITORING

Sampling Point Number	Identification	Location (Latitude/Longitude)
001	Gold Gulch 1-A PLS Collection Pond	33° 25' 03" N 110° 58' 56" W
004	Cottonwood Canyon Reservoir	33° 23' 23" N 110° 57' 37" W
005	Tailings Distribution Point	33° 23' 50" N 110° 58' 08" W
006	Raffinate Pond	33° 24' 32" N 110° 59' 11" W

Suite A - General Inorganic and Physical Parameters:

Parameter	Analytical Method [1]	Monitoring Frequency	Reporting Frequency
pH (field)	Meter	Quarterly for initial 4 quarters at sample point 001. Triennially thereafter at sample points 001, 004, 005 and 006.	Quarterly for initial 4 quarters at sample point 001. Triennially thereafter at sample points 001, 004, 005 and 006
Specific Conductance (field)	Meter	"	"
Temperature (field)	Meter	"	"
pH (lab)	EPA 150.1	"	"
Specific Conductance (lab)	EPA 120.1	"	"
Temperature (lab)	EPA 170.1	"	"
Calcium	EPA 215	"	"
Magnesium	EPA 242.1	"	"
Potassium	EPA 258.1	"	"
Sodium	EPA 273.1	"	"
Chloride	EPA 325	"	"
Fluoride	EPA 340	"	"
Nitrate-Nitrite as N[2]	EPA 353	"	"
Sulfate	EPA 375	"	"
Acidity	EPA 305	"	"
Hardness[3]	Calculation	"	"
Total Dissolved Solids	EPA 160.1	"	"

Suite B - Total Metals[4]

Parameter	Analytical Method [1]	Monitoring Frequency	Reporting Frequency
Antimony	EPA 204	"	"
Arsenic	EPA 206	"	"
Barium	EPA 208	"	"
Beryllium	EPA 210	"	"
Cadmium	EPA 213	"	"

Chromium	EPA 218	"	"
Cobalt	EPA 219	"	"
Copper	EPA 220	"	"
Iron	EPA 236	"	"
Lead	EPA 239	"	"
Manganese	EPA 243	"	"
Mercury	EPA 245	"	"
Nickel	EPA 249	"	"
Selenium	EPA 270	"	"
Thallium	EPA 279	"	"
Zinc	EPA 289	"	"

Suite C - Radiochemicals 4:

Parameter	Analytical Method [1]	Monitoring Frequency	Reporting Frequency
Radium, Total (226+228)[5]	Calculation	"	"
Radium-226	EPA 903.1	"	"
Radium-228	EPA 904	"	"
Gross Alpha	EPA 900.1	"	"
Adjusted Gross Alpha 6	Calculation	"	"
Uranium, Total	EPA 908	"	"
Radon-222	EPA 900	"	"

Suite D - Organics

Parameter	Analytical Method [1]	Monitoring Frequency	Reporting Frequency
Total Petroleum Hydrocarbons	BLS-181	Biannually for first year only at sample point 001.	Biannually for first year only at sample point 001.
Benzene	EPA 602	"	"
Toluene	EPA 602	"	"
Ethylbenzene	EPA 602	"	"
Xylenes, Total	EPA 602	"	"
Acenapthene	EPA 610	"	"
Acenapthylene	EPA 610	"	"
Anthracene	EPA 610	"	"
Benzo(a)anthracene	EPA 610	"	"
Benzo(b)fluoranthene	EPA 610	"	"
Benzo(k)fluoranthene	EPA 610	"	"
Benzo(a)pyrene	EPA 610	"	"
Benzo(ghi)perylene	EPA 610	"	"
Chrysene	EPA 610	"	"
Dibenzo(a,h)anthracene	EPA 610	"	"
Fluoranthene	EPA 610	"	"
Fluorene	EPA 610	"	"
Indeno(1,2,3-cd)pyrene	EPA 610	"	"
Naphthalene	EPA 610	"	"
Phenanthrene	EPA 610	"	"
methylnapthalene	EPA 8021	"	"
n-butylbenzene	EPA 8021	"	"

sec-butylbenzene	EPA 8021	"	"
isopropylbenzene	EPA 8021	"	"
p-isopropylbenzene	EPA 8021	"	"
1,2,4 - trimethylbenzene	EPA 8021	"	"
1,3,5 - trimethylbenzene	EPA 8021	"	"
n-propylbenzene	EPA 8021	"	"
Pyrene	EPA 610	"	"

Explanation to footnotes:

1 All analytical methods are EPA methods unless otherwise specified. Any EPA approved method may be used to analyze for the parameters listed as long as the method provides the capability of achieving the lowest method detection limit or most precisely and accurately quantitates the concentration of the parameter listed.

2 Nitrate-nitrite as N may also be determined as the sum of nitrate (EPA 352) plus nitrite (EPA 354) expressed as N.

3 Hardness may be expressed as the sum of the calcium plus magnesium concentrations expressed as $CaCO_3$.

4 All metals and radiochemical analyses shall be for total metals/radiochemicals.

5 Total radium is expressed as the sum of radium-226 plus radium-228.

6 Adjusted gross alpha is determined as the measured gross alpha, including radium-226 but excluding uranium (total) and radon-222.

N/A - means not applicable.

PART IV, continued

TABLE II.B.
LEACHING PROCESS-LEAK DETECTION MONITORING

Sampling Point Number	Identification	Location
002	Gold Gulch 1-A Leak Detection Sump	33° 25' 04" N 110° 59' 03" W
003	Gold Gulch 1-A Leak Detection Sump	33° 25' 04" N 110° 59' 03" W

Parameter	Discharge Limit	Alert Level	Analytical Method[1]	Monitoring Frequency	Reporting Frequency
Suite A:					
Fluid Presence	N/A	N/A	N/A	Weekly	Quarterly
Volume Pumped	N/A	N/A	Meter/Calc	As pumped	"
Rate Pumped	N/A	N/A	Meter/Calc	As pumped	"
Pond Elevation	N/A	N/A	feet above msl	Weekly	
Action Leakage Rate (ALR) [2]	1,250 gpd/ acre[3] maximum ALR allowed:[3] 8,130 gal/day[4] 5.65 gpm[4]	1,250 gpd/acre[4] maximum ALR allowed:[3] 8,130 gal/day[4] 5.65 gpm[4]	Calculation	Weekly	"
pH	N/A	N/A	Meter	As pumped	"
Specific Conductance	N/A	N/A	Meter	"	"

Explanation to footnotes:

1 All analytical methods are EPA methods unless otherwise specified.

2 The action leakage rate (ALR) is expressed in gallons per day per acre (gpd/acre), where acreage is given as the wetted area of the pond. Wetted acreage corresponds to pond elevation.

3 gpd/acre is based on calculation of total gpd in leak detection sump divided by total wetted acreage.

4 Based on a maximum dry weather pond acreage of 6.5 acres and pond level elevation of 3495.5 msl.

5 If leakage totals from both sumps 002 and 003 are less than these amounts, no action is necessary. gpd/acre is based

N/A - means not applicable.

PART IV, continued

TABLE III.A.
TAILINGS DEPOSITION MONITORING

Maximum Deposition Limit	Reporting Frequency[1]
87,600 tons per day[2]	Annually

1 Maximum Deposition Limit violations shall initiate PART II.E.1.b.

2 Daily average based on annual tonnage.

PART IV, continued

TABLE III.B.
TAILINGS, CONCENTRATOR, AND SOLVENT EXTRACTION-ELECTROWINNING PLANT, REAGENT INVENTORY

ADDITIVES[1]	
Used in Tailings	Used in Flotation
Hychem flocculent	AEROFloat
Millsperse	Lime
Barochem S-35	Kerley ki-240
Barochem S-319	Xanthate (Kerley)
Barochem S-543	Xanthate (dry)
Caustic Soda NaOH	Oreprep X-139
Lime	Cytec 7668
Used in the Moly Plant	Flotzel F-150
Ammonium sulfate	Used in the Filter Plant
Sodium Cyanide	Calgon M5710
Nitrogen	Calgon MS800
NaHs - Kerley	Kerley K1700
Diesel Oil	Used in SX-EW Plant
Na-HsTNT	H_2SO_4
Ammonium Sulfide (NH4)2S	Lix
	Cobalt
	Kerosene

Explanation of footnotes:

1 Other reagents may be substituted.

PART IV, continued

TABLE IV.
WASTE ROCK MONITORING

Sampling Point Number	Identification	Location (Latitude-N Longitude-W)
007	Westside Dump	33° 23' 33" 110° 58' 44"
008	Northside Dump 9.1	33° 25' 35" 110° 58' 47"
009	Northside Dump 9.11	33° 25' 23" 110° 58' 49"
0010	Northside Dump 9.12	33° 25' 13" 110° 58' 44"
0011	North Dump 9.3	33° 24' 25" 110° 58' 43"
0012	North Dump	33° 25' 50" 110° 59' 00"
0013	Southside Dump 13	33° 24' 03" 110° 58' 18"
0014	Southside Dump 14	33° 24' 00" 110° 58' 23"
0015	19 Dump	33° 23' 36" 110° 57' 24"
0016	19.1 Dump	33° 23' 49" 110° 57' 51"
0017	19 Extension Dump	33° 23' 20" 110° 57' 25"
0018	East Dump	33° 24' 20" 110° 57' 18"

Parameter	Discharge Limit	Alert Level	Analytical Method	Monitoring Frequency	Reporting Frequency
Acid Base Accounting	N/A	N/A	Modified Sobek Method	Every 10 million tons placed per active dump	Annually
Synthetic Precipitation Leaching Procedure	N/A	N/A	EPA 1312	"	"

Explanation to Footnotes:

N/A = Not applicable.

PART IV, continued

TABLE V.A.
MONITOR WELLS FOR GROUNDWATER MONITORING

Sampling Point Number	Identifier	ADWR Registration Number	Latitude	Longitude
0019[1]	APP-1A	55-543407	33° 27' 25"	110° 58' 43"
0020[1]	APP-1B	55-543408	33° 27' 25"	110° 58' 43"
0021[1]	APP-2	55-543406	33° 27' 16"	110° 59' 46"
0022[1]	APP-3A	55-543404	33° 25' 34"	110° 59' 59"
0023[1]	APP-3B	55-543405	33° 25' 34"	110° 59' 59"
0024[1]	APP-4	55-543403	33° 25' 21"	111° 00' 03"
0025[1]	APP-5A	55-543402	33° 23' 42"	110° 59' 07"
0026[1]	APP-5B	55-553712M	33° 23' 42"	110° 59' 07"
0027[1]	APP-6	55-543401	33° 23' 36"	110° 58' 57"
0028[1]	PV002 [3]	N/A	33° 23' 36"	110° 59' 06"
0029[1]	PV003 [3]	N/A	33° 25' 25"	111° 00' 04"
0030[1]	PV004 [3]	N/A	33° 23' 04"	110° 58' 14"
0031[1]	PV005 [3]	N/A	33° 22' 36"	110° 57' 16"
0032[2]	APP-7	TBD	TBD	TBD
0033[1]	Spring North Draw 1	N/A	33° 25' 38"	111° 00' 00"
0034[2]	Raffinate Pond Monitor Well	N/A	33° 24' 33"	110° 59' 17"
0035[2]	Spring Gold Gulch 1	N/A	33° 25' 31"	110° 59' 43"
0036[1]	Homestead Springs	N/A	33° 24' 54"	111° 00' 05"

Explanation to Footnotes:

1 These 15 sites are the hazardous and nonhazardous Points of Compliance pursuant to A.R.S. §49-244.2 and A.R.S. §49-244.3, respectively.

2 These three sites are alert-level points to be used as early warning sites.

3 Designated NPDES Monitoring Points

TBD = To be determined
N/A = not applicable

PART IV, continued

TABLE V.B.
AMBIENT AND CONTINGENCY GROUNDWATER MONITORING

Suite A - Eastwater (Monitor Wells APP-1A, APP-1B, APP-2)				
Common Ions: Suite A - Eastwater				
Parameter	**AQL[1] (mg/l)**	**Alert Level[1]**	**Sampling Frequency**	**Reporting Frequency**
pH (field)	Reserved	Reserved	Quarterly for the first 8 quarters, then biennially or as required by Contingency Plan (PART II.E.2.c.)	Quarterly for the first 8 quarters, then biennially or as required by Contingency Plan (PART II.E.2.c.)
Specific Conductance (field)	"	"	"	"
Temperature (field)	"	"	"	"
Bicarbonate	"	"	"	"
Calcium	"	"	"	"
Carbonate	"	"	"	"
Chloride	"	"	"	"
Cyanide (total)	"	"	"	"
Fluoride	"	"	"	"
Magnesium	"	"	"	"
Nitrate as nitrogen	"	"	"	"
Nitrite as nitrogen	"	"	"	"
Nitrate + Nitrite	"	"	"	"
Potassium	"	"	"	"
Sodium	"	"	"	"
Sulfate	"	"	"	"
Total dissolved solids	"	"	"	"
Cation/Anion Balance (calculated according to SM 1030F (1992))	none	5%	"	"

Total Trace Elements: Suite A - Eastwater

Parameter	**AQL[1] (mg/l)**	**Alert Level[1]**	**Sampling Frequency**	**Reporting Frequency**
Antimony	Reserved	Reserved	"	"
Arsenic	"	"	"	"
Barium	"	"	"	"
Beryllium	"	"	"	"
Cadmium	"	"	"	"
Chromium (total)	"	"	"	"
Copper	"	"	"	"
Iron	"	"	"	"
Lead	"	"	"	"

Manganese	"	"	"	"
Mercury	"	"	"	"
Nickel	"	"	"	"
Selenium	"	"	"	"
Thallium	"	"	"	"
Zinc	"	"	"	"

Radiochemicals: Suite A - Eastwater

Parameter	AQL[1] (mg/l)	Alert Level[1]	Sampling Frequency	Reporting Frequency
Gross Alpha	Reserved	Reserved	"	"
Gross Beta	"	"	"	"
Radium 226 + Radium 228	"	"	"	"
Radon 222	"	"	"	"
Uranium	"	"	"	"

Organics: Suite A - Eastwater

Parameter	AQL[1] (mg/l)	Alert Level[1]	Sampling Frequency	Reporting Frequency
Carbon Disulfide	Reserved	Reserved	"	"
Toluene	"	"	"	"

Suite B - Gold Gulch (Monitor Wells APP-3A, APP-3B; Alert-level Monitoring Point Spring Gold Gulch 1)

Common Ions: Suite B - Gold Gulch

Parameter	AQL[1] (mg/l)	Alert Level[1]	Sampling Frequency	Reporting Frequency
pH (field)	Reserved	Reserved	Quarterly for the first 8 quarters, then biennially or as required by Contingency Plan (PART II.E.2.c.)	Quarterly for the first 8 quarters, then biennially or as required by Contingency Plan (PART II.E.2.c.)
Specific Conductance (field)	"	"	"	"
Temperature (field)	"	"	"	"
Bicarbonate	"	"	"	"
Calcium	"	"	"	"
Carbonate	"	"	"	"
Chloride	"	"	"	"
Fluoride	"	"	"	"
Magnesium	"	"	"	"
Nitrate as nitrogen	"	"	"	"
Nitrite as nitrogen	"	"	"	"
Nitrate + Nitrite	"	"	"	"
Potassium	"	"	"	"
Sodium	"	"	"	"

Sulfate	"	"	"	"
Total dissolved solids	"	"	"	"
Cation/Anion Balance (calculated according to SM 1030F (1992))	none	±5%	"	"

Total Trace Elements: Suite B - Gold Gulch

Parameter	AQL[1] (mg/l)	Alert Level[1]	Sampling Frequency	Reporting Frequency
Aluminum	Reserved	Reserved	"	"
Antimony	"	"	"	"
Arsenic	"	"	"	"
Barium	"	"	"	"
Beryllium	"	"	"	"
Cadmium	"	"	"	"
Chromium (total)	"	"	"	"
Cobalt	"	"	"	"
Copper	"	"	"	"
Iron	"	"	"	"
Lead	"	"	"	"
Mercury	"	"	"	"
Manganese	"	"	"	"
Nickel	"	"	"	"
Selenium	"	"	"	"
Thallium	"	"	"	"
Zinc	"	"	"	"

Radiochemicals: Suite B - Gold Gulch

Parameter	AQL[1] (mg/l)	Alert Level[1]	Sampling Frequency	Reporting Frequency
Gross Alpha	Reserved	Reserved	"	"
Gross Beta	"	"	"	"
Radium 226 + Radium 228	"	"	"	"
Radon 222	"	"	"	"
Uranium, total	"	"	"	"

Organics: Suite B - Gold Gulch

Parameter	AQL[1] (mg/l)	Alert Level[1]	Sampling Frequency	Reporting Frequency
Total petroleum hydrocarbons	Reserved	Reserved	Quarterly for the first 8 quarters, then biennially or as required by Contingency Plan (PART II.E.2.c.)	Quarterly for the first 8 quarters, then biennially or as required by Contingency Plan (PART II.E.2.c.)
Toluene	"	"	"	"
Acenaphthylene	"	"	"	"
Anthracene	"	"	"	"
Benzene	"	"	"	"

Benzo (a) anthracene	"	"	"	"
Benzo (a) pyrene	"	"	"	"
Benzo (b) fluoranthene	"	"	"	"
Benzo (ghi) perylene	"	"	"	"
Benzo (k) fluoranthene	"	"	"	"
Bromobenzene	"	"	"	"
n-Butylbenzene	"	"	"	"
sec-Butylbenzene	"	"	"	"
tert-Butylbenzene	"	"	"	"
Chlorobenzene	"	"	"	"
2-Chlorotoluene	"	"	"	"
4-Chlorotoluene	"	"	"	"
Chrysene	"	"	"	"
Dibenzo(a,h)anthracene	"	"	"	"
1,2-Dichlorobenzene	"	"	"	"
1,3-Dichlorobenzene	"	"	"	"
1,4-Dichlorobenzene	"	"	"	"
Ethylbenzene	"	"	"	"
Fluoranthene	"	"	"	"
Fluorene	"	"	"	"
Hexachlorobenzene	"	"	"	"
Indeno(1,2,3-cd)pyrene	"	"	"	"
Isopropylbenzene	"	"	"	"
p-Isopropyltoluene	"	"	"	"
Naphthalene	"	"	"	"
Pentachlorophenol	"	"	"	"
Phenanthrene	"	"	"	"
Pyrene	"	"	"	"
Toluene	"	"	"	"
1,2,3-Trichlorobenzene	"	"	"	"
1,2,4-Trichlorobenzene	"	"	"	"
1,2,4-Trimethylbenzene	"	"	"	"
1,3,5-Trimethylbenzene	"	"	"	"
Total Xylene	"	"	"	"
n-Propylbenzene	"	"	"	"

Suite C - Whitman Draw (Monitor Well APP-4; Outfall 003); Homestead Springs

Common Ions: Suite C - Whitman Draw

Parameter	AQL[1] (mg/l)	Alert Level[1]	Sampling Frequency	Reporting Frequency
pH (field)	Reserved	Reserved	Quarterly for the first 8 quarters, then biennially or as required by Contingency Plan (PART II.E.2.c.)	Quarterly for the first 8 quarters, then biennially or as required by Contingency Plan (PART II.E.2.c.)

Specific Conductance (field)	"	"	"	"
Temperature	"	"	"	"
Bicarbonate	"	"	"	"
Calcium	"	"	"	"
Carbonate	"	"	"	"
Chloride	"	"	"	"
Cyanide (total)	"	"	"	"
Fluoride	"	"	"	"
Magnesium	"	"	"	"
Nitrate as nitrogen	"	"	"	"
Nitrite as nitrogen	"	"	"	"
Nitrate + Nitrite	"	"	"	"
Potassium	"	"	"	"
Sodium	"	"	"	"
Sulfate	"	"	"	"
Total dissolved solids	"	"	"	"
Cation/Anion Balance (calculated according to SM 1030F (1992))	None	± 5%	"	"

Total Trace Elements: Suite C - Whitman Draw

Parameter	**AQL[1] (mg/l)**	**Alert Level[1]**	**Sampling Frequency**	**Reporting Frequency**
Aluminum	Reserved	Reserved	"	"
Antimony	"	"	"	"
Arsenic	"	"	"	"
Barium	"	"	"	"
Beryllium	"	"	"	"
Cadmium	"	"	"	"
Chromium (total)	"	"	"	"
Cobalt	"	"	"	"
Copper	"	"	"	"
Iron	"	"	"	"
Lead	"	"	"	"
Manganese	"	"	"	"
Nickel	"	"	"	"
Selenium	"	"	"	"
Thallium	"	"	"	"
Zinc	"	"	"	"
Mercury	"	"	"	"

Radiochemicals: Suite C - Whitman Draw

Parameter	**AQL[1] (mg/l)**	**Alert Level[1]**	**Sampling Frequency**	**Reporting Frequency**
Gross Alpha	Reserved	Reserved	"	"
Gross Beta	"	"	"	"
Radium 226 + Radium 228	"	"	"	"

Radon 222	"	"	"	"
Uranium, total	"	"	"	"

Organics: Suite C -Whitman Draw

Parameter	AQL[1] (mg/l)	Alert Level[1]	Sampling Frequency	Reporting Frequency
Total petroleum hydrocarbons	Reserved	Reserved	Quarterly for the first 8 quarters, then biennially or as required by Contingency Plan (PART II.E.2.c.)	Quarterly for the first 8 quarters, then biennially or as required by Contingency Plan (PART II.E.2.c.)
Carbon Disulfide	"	"	"	"
Acenaphthene	"	"	"	"
Acenaphthylene	"	"	"	"
Anthracene	"	"	"	"
Benzene	"	"	"	"
Benzo (a) anthracene	"	"	"	"
Benzo (a) pyrene	"	"	"	"
Benzo (b) fluoranthene	"	"	"	"
Benzo (ghi) perylene	"	"	"	"
Benzo (k) fluoranthene	"	"	"	"
Bromobenzene	"	"	"	"
n-Butylbenzene	"	"	"	"
sec-Butylbenzene	"	"	"	"
tert-Butylbenzene	"	"	"	"
Chlorobenzene	"	"	"	"
2-Chlorotoluene	"	"	"	"
4-Chlorotoluene	"	"	"	"
Chrysene	"	"	"	"
Dibenzo (a,h) anthracene	"	"	"	"
1,2-Dichchlorobenzene	"	"	"	"
1,3-Dichchlorobenzene	"	"	"	"
1,4-Dichchlorobenzene	"	"	"	"
Ethylbenzene	"	"	"	"
Fluoranthene	"	"	"	"
Fluorene	"	"	"	"
Indeno (1,2,3-cd) pyrene	"	"	"	"
Isopropylbenzene	"	"	"	"
p-Isopropyltoluene	"	"	"	"
Naphthalene	"	"	"	"
Pentachlorophenol	"	"	"	"
Phenanthrene	"	"	"	"
n-Propylbenzene	"	"	"	"
Pyrene	"	"	"	"
Toluene	"	"	"	"
1,2,3-Trichlorobenzene	"	"	"	"
1,2,4-Trichlorobenzene	"	"	"	"

1,2,4-Trimethylbenzene	"	"	"	"
1,3,5-Trimethylbenzene	"	"	"	"
Total Xylenes	"	"	"	"
Hexachlorobenzene	"	"	"	"

Suite D - Whitman Draw (Raffinate Pond Alert Level Monitor Well)

Common Ions: Suite D - Raffinate Pond

Parameter	AQL[1] (mg/l)	Alert Level[1]	Sampling Frequency	Reporting Frequency
pH (field)	Reserved	Reserved	Quarterly for the first 8 quarters, then biennially or as required by Contingency Plan (PART II.E.2.c.)	Quarterly for the first 8 quarters, then biennially or as required by Contingency Plan (PART II.E.2.c.)
Specific Conductance (field)	"	"	"	"
Temperature (field)	"	"	"	"
Bicarbonate	"	"	"	"
Calcium (D)	"	"	"	"
Carbonate	"	"	"	"
Chloride (D)	"	"	"	"
Fluoride (D)	"	"	"	"
Magnesium (D)	"	"	"	"
Nitrate as nitrogen	"	"	"	"
Nitrite as nitrogen	"	"	"	"
Potassium (D)	"	"	"	"
Sodium (D)	"	"	"	"
Sulfate (D)	"	"	"	"
Total dissolved solids	"	"	"	"
Cation/Anion Balance (calculated according to SM 1030F (1992))	None	±5%	"	"

Field Filtered Trace Elements: Suite D - Raffinate Pond

Parameter	AQL[1] (mg/l)	Alert Level[1]	Sampling Frequency	Reporting Frequency
Aluminum (D)	None	Reserved	"	"
Antimony (D)	"	"	"	"
Arsenic (D)	"	"	"	"
Barium (D)	"	"	"	"
Beryllium (D)	"	"	"	"
Cadmium (D)	"	"	"	"
Chromium, total (D)	"	"	"	"
Cobalt (D)	"	"	"	"
Copper (D)	"	"	"	"

Iron (D)	"	"	"	"
Lead (D)	"	"	"	"
Mercury (D)	"	"	"	"
Manganese (D)	"	"	"	"
Nickel (D)	"	"	"	"
Selenium (D)	"	"	"	"
Thallium (D)	"	"	"	"
Zinc (D)	"	"	"	"

note: (D) = field filtered

Radiochemicals: Suite D - Raffinate Pond

Parameter	AQL[1] (mg/l)	Alert Level[1]	Sampling Frequency	Reporting Frequency
Gross Alpha (D)	None	Reserved	"	"
Gross Beta (D)	"	"	"	"
Radium 226 + Radium 228 (D)	"	"	"	"
Radon 222 (D)	"	"	"	"
Uranium, total (D)	"	"	"	"

note: (D) = field filtered

Organics: Suite D - Raffinate Pond

Parameter	AQL[1] (mg/l)	Alert Level[1]	Sampling Frequency	Reporting Frequency
Total petroleum hydrocarbons	None	Reserved	Quarterly for the first 8 quarters, then biennially or as required by Contingency Plan (PART II.E.2.c.)	Quarterly for the first 8 quarters, then biennially or as required by Contingency Plan (PART II.E.2.c.)
Acenaphthene	"	"	"	"
Acenaphthylene	"	"	"	"
Anthracene	"	"	"	"
Benzene	"	"	"	"
Benzo (a) anthracene	"	"	"	"
Benzo (a) pyrene	"	"	"	"
Benzo (b) fluoranthene	"	"	"	"
Benzo (ghi) perylene	"	"	"	"
Benzo (k) fluoranthene	"	"	"	"
Bromobenzene	"	"	"	"
n-Butylbenzene	"	"	"	"
sec-Butylbenzene	"	"	"	"
tert-Butylbenzene	"	"	"	"
Chlorobenzene	"	"	"	"
2-Chlorotoluene	"	"	"	"
4-Chlorotoluene	"	"	"	"
Chrysene	"	"	"	"
Dibenzo(a,h)anthracene	"	"	"	"
1,2-Dichlorobenzene	"	"	"	"
1,3-Dichlorobenzene	"	"	"	"

1,4-Dichlorobenzene	"	"	"	"
Ethylbenzene	"	"	"	"
Fluoranthene	"	"	"	"
Fluorene	"	"	"	"
Indeno(1,2,3-cd)pyrene	"	"	"	"
Isopropylbenzene	"	"	"	"
p-Isopropyltoluene	"	"	"	"
Naphthalene	"	"	"	"
Pentachlorophenol	"	"	"	"
Phenanthrene	"	"	"	"
n-Propylbenzene	"	"	"	"
Pyrene	"	"	"	"
Toluene	"	"	"	"
1,2,3-Trichlorobenzene	"	"	"	"
1,2,4-Trichlorobenzene	"	"	"	"
1,3,5-Trimethylbenzene	"	"	"	"
Total Xylenes	"	"	"	"
Hexachlorobenzene	"	"	"	"

Suite E - Miller Gulch (Monitor Wells APP-5A, APP-5B, APP-6; Outfall 002)

Common Ion: Suite E - Miller Gulch

Parameter	**AQL[1] (mg/l)**	**Alert Level[1]**	**Sampling Frequency**	**Reporting Frequency**
pH (field)	Reserved	Reserved	Quarterly for the first 8 quarters, then biennially or as required by Contingency Plan (PART II.E.2.c.)	Quarterly for the first 8 quarters, then biennially or as required by Contingency Plan (PART II.E.2.c.)
Specific Conductance (field)	"	"	"	"
Temperature (field)	"	"	"	"
Bicarbonate	"	"	"	"
Calcium	"	"	"	"
Carbonate	"	"	"	"
Chloride	"	"	"	"
Fluoride	"	"	"	"
Magnesium	"	"	"	"
Nitrate as nitrogen	"	"	"	"
Nitrite as nitrogen	"	"	"	"
Potassium	"	"	"	"
Sodium	"	"	"	"
Sulfate	"	"	"	"
Total dissolved solids	"	"	"	"
Cation/Anion Balance (calculated according to SM 1030F (1992))	None	± 5%	"	"

Presence of Bank Storage (Yes or No)	None	Yes	"	"

Total Trace Elements: Suite E - Miller Gulch

Parameter	AQL[1] (mg/l)	Alert Level[1]	Sampling Frequency	Reporting Frequency
Aluminum	Reserved	Reserved	"	"
Antimony	"	"	"	"
Arsenic	"	"	"	"
Barium	"	"	"	"
Beryllium	"	"	"	"
Cadmium	"	"	"	"
Chromium (total)	"	"	"	"
Cobalt	"	"	"	"
Copper	"	"	"	"
Iron	"	"	"	"
Lead	"	"	"	"
Manganese	"	"	"	"
Mercury	"	"	"	"
Nickel	"	"	"	"
Selenium	"	"	"	"
Thallium	"	"	"	"
Zinc	"	"	"	"

Radiochemicals: Suite E - Miller Gulch

Parameter	AQL[1] (mg/l)	Alert Level[1]	Sampling Frequency	Reporting Frequency
Gross Alpha	Reserved	Reserved	"	"
Gross Beta	"	"	"	"
Radium 226 + Radium 228	"	"	"	"
Radon 222	"	"	"	"
Uranium	"	"	"	"

Organics: Suite E - Miller Gulch

Carbon Disulfide	Reserved	Reserved	"	"
Toluene	"	"	"	"

Suite F - Cottonwood (NPDES Permit Outfalls PV004, PV005)

Common Ions: Suite F - Cottonwood

Parameter	AQL[1] (mg/l)	Alert Level[1]	Sampling Frequency	Reporting Frequency
pH (field)	Reserved	Reserved	Quarterly for the first 8 quarters, then biennially or as required by Contingency Plan (PART II.E.2.c.)	Quarterly for the first 8 quarters, then biennially or as required by Contingency Plan (PART II.E.2.c.)

Specific Conductance (field)	"	"	"	"
Temperature (field)	"	"	"	"
Bicarbonate	"	"	"	"
Calcium	"	"	"	"
Carbonate	"	"	"	"
Chloride	"	"	"	"
Cyanide (total)	"	"	"	"
Fluoride	"	"	"	"
Hardness	"	"	"	"
Magnesium	"	"	"	"
Nitrate as nitrogen	"	"	"	"
Nitrite as nitrogen	"	"	"	"
Nitrate + Nitrite	"	"	"	"
Potassium	"	"	"	"
Silver	"	"	"	"
Sodium	"	"	"	"
Sulfate	"	"	"	"
Total suspended solids	"	"	"	"
Total dissolved solids	"	"	"	"
Cation/Anion Balance (calculated according to SM 1030F (1992))	None	± 5%	"	"

Total Trace Elements: Suite F - Cottonwood

Parameter	AQL[1] (mg/l)	Alert Level[1]	Sampling Frequency	Reporting Frequency
Antimony	Reserved	Reserved	"	"
Arsenic	"	"	"	"
Barium	"	"	"	"
Beryllium	"	"	"	"
Cadmium	"	"	"	"
Chromium (total)	"	"	"	"
Copper	"	"	"	"
Iron	"	"	"	"
Lead	"	"	"	"
Manganese	"	"	"	"
Mercury	"	"	"	"
Nickel	"	"	"	"
Selenium	"	"	"	"
Thallium	"	"	"	"
Zinc	"	"	"	"

Radiochemicals: Suite F - Cottonwood

Parameter	AQL[1] (mg/l)	Alert Level[1]	Sampling Frequency	Reporting Frequency
Gross Alpha	Reserved	Reserved	"	"
Gross Beta	"	"	"	"
Radium 226 + Radium 228	"	"	"	"

Radon 222	"	"	"	"
Uranium	"	"	"	"

Organics: Suite F - Cottonwood

Carbon Disulfide	Reserved	Reserved	"	"

Suite G - North Draw

Common Ions: Suite G - North Draw (Alert Level Monitor Well APP-7, Spring North Draw 1)

Parameter	AQL[1] (mg/l)	Alert Level[1]	Sampling Frequency	Reporting Frequency
pH (field)	Reserved	Reserved	Quarterly for the first 8 quarters, then biennially or as required by Contingency Plan (PART II.E.2.c.)	Quarterly for the first 8 quarters, then biennially or as required by Contingency Plan (PART II.E.2.c.)
Specific Conductance (field)	"	"	"	"
Temperature (field)	"	"	"	"
Bicarbonate	"	"	"	"
Calcium	"	"	"	"
Carbonate	"	"	"	"
Chloride	"	"	"	"
Cyanide (total)	"	"	"	"
Fluoride	"	"	"	"
Magnesium	"	"	"	"
Nitrate as nitrogen	"	"	"	"
Nitrite as nitrogen	"	"	"	"
Nitrate + Nitrite	"	"	"	"
Potassium	"	"	"	"
Sodium	"	"	"	"
Sulfate	"	"	"	"
Total dissolved solids	"	"	"	"
Cation/Anion Balance (calculated according to SM 1030F (1992))	None	5%	"	"

Total Trace Elements: Suite G - North Draw

Parameter	AQL[1] (mg/l)	Alert Level[1]	Sampling Frequency	Reporting Frequency
Antimony	Reserved	Reserved	"	"
Arsenic	"	"	"	"
Barium	"	"	"	"
Beryllium	"	"	"	"
Cadmium	"	"	"	"
Chromium (total)	"	"	"	"
Copper	"	"	"	"
Iron	"	"	"	"
Lead	"	"	"	"

Manganese	"	"	"	"
Mercury	"	"	"	"
Nickel	"	"	"	"
Selenium	"	"	"	"
Thallium	"	"	"	"
Zinc	"	"	"	"

Radiochemicals: Suite G - North Draw

Parameter	**AQL[1] (mg/l)**	**Alert Level[1]**	**Sampling Frequency**	**Reporting Frequency**
Gross Alpha	Reserved	Reserved	"	"
Gross Beta	"	"	"	"
Radium 226 + Radium 228	"	"	"	"
Radon 222	"	"	"	"
Uranium	"	"	"	"

Explanation to Footnotes:

1 - Reserved means that AQLs and ALs shall be established as set forth in PART II.D.2.b.

PART IV, continued

TABLE V.C.
COMPLIANCE GROUNDWATER MONITORING

Suite H - Eastwater (Monitor Wells APP-1A, APP-1B, APP-2)

Parameter	AQL[1] (mg/l)	Alert Level[1]	Sampling Frequency	Reporting Frequency
pH (field)	Reserved	Reserved	Quarterly	Quarterly
Specific conductance (field)	Reserved	Reserved	Quarterly	Quarterly
Temperature (field)	Reserved	Reserved	Quarterly	Quarterly
Fluoride	Reserved	Reserved	Quarterly	Quarterly
Nitrate + Nitrite (as N)	Reserved	Reserved	Quarterly	Quarterly
Sulfate	Reserved	Reserved	Quarterly	Quarterly
Total dissolved solids	Reserved	Reserved	Quarterly	Quarterly
Copper	Reserved	Reserved	Quarterly	Quarterly
Iron	Reserved	Reserved	Quarterly	Quarterly
Barium	Reserved	Reserved	Quarterly	Quarterly
Manganese	Reserved	Reserved	Quarterly	Quarterly
Selenium	Reserved	Reserved	Quarterly	Quarterly
Zinc	Reserved	Reserved	Quarterly	Quarterly
Radon 222	Reserved	Reserved	Quarterly	Quarterly
Gross Alpha	Reserved	Reserved	Quarterly	Quarterly
Gross Beta	Reserved	Reserved	Quarterly	Quarterly

Suite I - Gold Gulch (Monitor Wells APP-3A, APP-3B; Alert-level Monitoring Point Spring Gold Gulch 1)

Parameter	AQL[1] (mg/l)	Alert Level[1]	Sampling Frequency	Reporting Frequency
pH (field)	Reserved	Reserved	Quarterly	Quarterly
Specific conductance (field)	Reserved	Reserved	Quarterly	Quarterly
Temperature (field)	Reserved	Reserved	Quarterly	Quarterly
Fluoride	Reserved	Reserved	Quarterly	Quarterly
Nitrate + Nitrite (as N)	Reserved	Reserved	Quarterly	Quarterly
Sulfate	Reserved	Reserved	Quarterly	Quarterly
Total dissolved solids	Reserved	Reserved	Quarterly	Quarterly
Antimony	Reserved	Reserved	Quarterly	Quarterly
Beryllium	Reserved	Reserved	Quarterly	Quarterly
Barium	Reserved	Reserved	Quarterly	Quarterly
Cadmium	Reserved	Reserved	Quarterly	Quarterly
Chromium (total)	Reserved	Reserved	Quarterly	Quarterly
Cobalt	Reserved	Reserved	Quarterly	Quarterly
Copper	Reserved	Reserved	Quarterly	Quarterly
Iron	Reserved	Reserved	Quarterly	Quarterly

Lead	Reserved	Reserved	Quarterly	Quarterly
Manganese	Reserved	Reserved	Quarterly	Quarterly
Mercury	Reserved	Reserved	Quarterly	Quarterly
Nickel	Reserved	Reserved	Quarterly	Quarterly
Selenium	Reserved	Reserved	Quarterly	Quarterly
Zinc	Reserved	Reserved	Quarterly	Quarterly
Radon 222	Reserved	Reserved	Quarterly	Quarterly
Gross Alpha	Reserved	Reserved	Quarterly	Quarterly
Gross Beta	Reserved	Reserved	Quarterly	Quarterly
Total Petroleum Hydrocarbons	Reserved	Reserved	Annually	Annually

Suite J - Whitman Draw (Monitor Well APP-4; Outfall 003; Homestead Springs; and Alert Level Raffinate Pond Monitor Well)

Parameter	AQL[1] (mg/l)	Alert Level[1]	Sampling Frequency	Reporting Frequency
pH (field)	Reserved	Reserved	Quarterly	Quarterly
Specific conductance (field)	Reserved	Reserved	Quarterly	Quarterly
Temperature (field)	Reserved	Reserved	Quarterly	Quarterly
Fluoride	Reserved	Reserved	Quarterly	Quarterly
Nitrate + Nitrite (as N)	Reserved	Reserved	Quarterly	Quarterly
Sulfate	Reserved	Reserved	Quarterly	Quarterly
Total dissolved solids	Reserved	Reserved	Quarterly	Quarterly
Cobalt	Reserved	Reserved	Quarterly	Quarterly
Copper	Reserved	Reserved	Quarterly	Quarterly
Iron	Reserved	Reserved	Quarterly	Quarterly
Manganese	Reserved	Reserved	Quarterly	Quarterly
Selenium	Reserved	Reserved	Quarterly	Quarterly
Zinc	Reserved	Reserved	Quarterly	Quarterly
Radon 222	Reserved	Reserved	Quarterly	Quarterly
Gross Alpha	Reserved	Reserved	Quarterly	Quarterly
Gross Beta	Reserved	Reserved	Quarterly	Quarterly
Total Petroleum Hydrocarbons	Reserved	Reserved	Quarterly	Quarterly

Suite K - Miller Gulch (Monitor Wells APP-5A, APP-5B, APP-6; and Outfall 002)

Parameter	AQL[1] (mg/l)	Alert Level[1]	Sampling Frequency	Reporting Frequency
pH (field)	Reserved	Reserved	Quarterly	Quarterly
Specific conductance (field)	Reserved	Reserved	Quarterly	Quarterly
Temperature (field)	Reserved	Reserved	Quarterly	Quarterly
Fluoride	Reserved	Reserved	Quarterly	Quarterly
Nitrate + Nitrite (as N)	Reserved	Reserved	Quarterly	Quarterly
Sulfate	Reserved	Reserved	Quarterly	Quarterly
Total dissolved solids	Reserved	Reserved	Quarterly	Quarterly
Copper	Reserved	Reserved	Quarterly	Quarterly

Iron	Reserved	Reserved	Quarterly	Quarterly
Manganese	Reserved	Reserved	Quarterly	Quarterly
Selenium	Reserved	Reserved	Quarterly	Quarterly
Zinc	Reserved	Reserved	Quarterly	Quarterly
Radon 222	Reserved	Reserved	Quarterly	Quarterly
Gross Alpha	Reserved	Reserved	Quarterly	Quarterly
Gross Beta	Reserved	Reserved	Quarterly	Quarterly

Suite L - Cottonwood (NPDES Permit Outfalls PV004, PV005)

Parameter	**AQL[1] (mg/l)**	**Alert Level[1]**	**Sampling Frequency**	**Reporting Frequency**
pH (field)	Reserved	Reserved	Quarterly	Quarterly
Specific conductance (field)	Reserved	Reserved	Quarterly	Quarterly
Temperature (field)	Reserved	Reserved	Quarterly	Quarterly
Fluoride	Reserved	Reserved	Quarterly	Quarterly
Nitrate + Nitrite (as N)	Reserved	Reserved	Quarterly	Quarterly
Sulfate	Reserved	Reserved	Quarterly	Quarterly
Total dissolved solids	Reserved	Reserved	Quarterly	Quarterly
Arsenic	Reserved	Reserved	Quarterly	Quarterly
Cadmium	Reserved	Reserved	Quarterly	Quarterly
Chromium (total)	Reserved	Reserved	Quarterly	Quarterly
Copper	Reserved	Reserved	Quarterly	Quarterly
Iron	Reserved	Reserved	Quarterly	Quarterly
Lead	Reserved	Reserved	Quarterly	Quarterly
Manganese	Reserved	Reserved	Quarterly	Quarterly
Mercury	Reserved	Reserved	Quarterly	Quarterly
Nickel	Reserved	Reserved	Quarterly	Quarterly
Selenium	Reserved	Reserved	Quarterly	Quarterly
Silver	Reserved	Reserved	Quarterly	Quarterly
Zinc	Reserved	Reserved	Quarterly	Quarterly
Gross Alpha	Reserved	Reserved	Quarterly	Quarterly
Gross Beta	Reserved	Reserved	Quarterly	Quarterly

Suite M - North Draw (Spring North Draw 1, Alert Level Monitoring Well APP-7)

Parameter	**AQL[1] (mg/l)**	**Alert Level[1]**	**Sampling Frequency**	**Reporting Frequency**
Reserved	Reserved	Reserved	Quarterly	Quarterly

Explanation to footnotes:

1 - Please refer to PART II.D.2.b. for AQL and Alert Level determinants

N/A - Not applicable

PART IV, continued

TABLE VI.
FACILITY OPERATION AND INSPECTION

Facility Category	Facility Name	Operational Requirement	Inspection Frequency
PLS Collection System	Gold Gulch Dam No. 1 and PLS Pond	Discharge pump in good working order; no evidence of seepage; maintain 2' of freeboard; spillway maintained free of debris, sediments, vegetation or other obstructions; no substantial erosion, subsidence, cracking or other damage to berm or dam;	Daily
PLS Collection System	Gold Gulch Dam No. 1A and PLS Pond	No visible cracks, holes or leaks in liner; discharge pump in good working order; no evidence of seepage; maintain 2' of freeboard; spillway maintained free of debris, sediments. vegetation, or other obstructions; no substantial erosion, subsidence, cracking or other damage to berm or dam; collection sump pumps working properly; backup power generator in good working order; no impairment of access to leak detection and gravity drain system; leak detection and gravity drain system in good working order.	Daily
SX-EW Facility	Raffinate Pond	Reserved - refer to compliance schedule in PART II.I.2	

Stormwater and Process Water Retention Ponds	No. 1 Upper Basin No. 1 Lower Basin Upper Catchment/Upper Pond Upper Catchment/Lower Pond Turner Pond East Catchment West Catchment Gold Gulch Dam No. 2 and Reservoir	No substantial erosion, subsidence, cracking, piping, sloughing, or sliding or dams and berms; No visible seepage from dams an berms; pumps in good working order; backup power supply operational; No exceedances of BMP required surge capacity; freeboard maintained at 2 feet;	Weekly
Stormwater and Process Water Retention Ponds	Facilities as stated above	liquid storage capacity maintained at 80% of design volume	Annually and after rainfall of over 3 inches in 24 hours
Stormwater and Process Water Retention Ponds	Upper Tule Pond	operate solely as sedimentation pond	N/A
Stormwater and Process Water Retention Ponds	Upper Catchment Sand Tank Upper Catchment Holding Tank Tule Holding Tank	operate so as not to overflow	Monthly
Stormwater and Process Water Retention Ponds	Lower Tule Pond North Pond Peeples Pond Slack/Conklin Pond Canyon Dam Able Pond Gold Gulch Final Catchment Baker Pond Rosa's Pond System Cottonwood Reservoir	Reserved; Refer to Compliance Schedule in PART II.I.8	N/A
Caisson and Seepage Collection Systems	No. 1 Seepage Toe Drain and Caisson Lower Tule Caisson Cottonwood Seepage Caisson System East Catchment Caisson	Free of debris, sediments, vegetation, or other obstructions; no impairment of access; system working properly; pumps in good working order; backup power supply operational;	weekly

Tailings Impoundments	Tailing Impoundments No. 1, 2, 3, and 4 Cottonwood Tailings Impoundment	no visible evidence of crest failure, no visible slips at toe, no visible cracks or erosion features.	Weekly
Tailings Impoundments	Facilities as stated above	check open standpipe piezometers and pneumatic piezometers for proper operation and no obstructions,	monthly as measured
Tailings Impoundments	Facilities as stated above	check inclinometers when installed for proper operation and no obstructions;	Quarterly as measured
Waste Rock Dumps	Westside Waste Rock Dumps Northside Waste Rock Dumps Southside Waste Rock Dump 19 Extension Dump East Dump	No visible slips at toe No visible evidence of crest failures	Quarterly
Wash Racks	South Truck Wash Facility North Barn Truck Wash Facility	All discharges piped to permitted facility wash water contained solely on pad sludge removed on annual basis	Monthly
stormwater diversion ditches	sitewide	No substantial erosion; free of debris, sediments, vegetation, or other obstructions; no structural damage.	Monthly
Monitoring Wells	sitewide	Wellhead cap or box locks and secure;	Quarterly; as sampled
Barge Pumps	sitewide	check hour meters	weekly
Barge Pumps	sitewide	lube pump, check drives, and test run	Every; 1,000 to 1,200 hours of operating time
Sump Pumps	sitewide	check hour meters; visually inspect	weekly
Sump Pumps	sitewide	lube pump, check drives, and test run by filling sump	Every 800 to 1,000 hours of operating time

PART IV, continued

TABLE VII.
OPERATIONAL REPORTING SUMMARY

Operational Condition	Specific Reference for Necessary Action
Alert Level Exceedance	PART II.E.1.a
Groundwater Alert Level Exceedance	PART II.E.2.c.(2)
Aquifer Quality Level Violation	PART II.E.2.c.(3)
Accidental Discharge	PART II.E.1.c
Emergency Response	PART II.E.1.c.(3)
Temporary Cessation	PART II.F.
Closure	PART II.G.
Post-Closure	PART II.H.
Major Modification to Facility	PART II.J.2
Modification to Permit	PART VI.H.3
Change in Owner or Operator	PART VI.H.4
Bankruptcy or Environmental Enforcement Against the Permittee	PART VI.C

PART V. REFERENCES: PERTINENT INFORMATION

A. References

The terms and conditions set forth in this permit have been developed based upon the information contained in the following:

1. Field Inspection Form(s) dated _____
2. Permit Application dated September 15, 1995
3. Aquifer Impact Review dated November 7, 1995; December 5, 1995; June 4, 1996
4. Plan Review File Number 100329
5. Plan Approval by Mining APP Unit dated _____
6. Amendments to above No. 2 dated January 13, 1995; April 3, 1996; March 28, 1996
7. Public Notice dated June 30, 1996
8. Public Hearing comments, correspondence and any additional supplemental information contained in the permit file _____
9. Other _____

B. Facility Information

1. Facility Contact Person Mr. William Gray
2. Address Box 100, Miami, Arizona 85539
3. Emergency Telephone Number: (520) 473-6254

The Department shall be notified within 30 days of the change in facility contact person.

4. Landowner of Facility Site BHP Copper Inc.
   7400 North Oracle Road
   Suite 200
   Tucson, AZ 85704

C. Definitions

1. "**Alert Level (AL)**" means a numeric value, expressing either a concentration of a pollutant or a physical or chemical property of a pollutant, which is established in an individual Aquifer Protection Permit and which serves as an early warning indicating a potential violation of either an Aquifer Water Quality Standard at the applicable point of compliance, or any permit condition.

2. "**Applicant**" means the owner or operator of the facility.

3. "**Aquifer Protection Permit (APP)**" means an individual, or general permit issued pursuant to A.R.S. Section 49-203 and 49-241 through 251, and A.A.C. R18-9-101 et sec.

4. "**Aquifer Quality Limit (AQL)**" means the maximum amount of a given constituent which the permit conditions allow in the aquifer at the point of compliance. AQLs shall only be established for constituents with AWQSs.

5. "**Aquifer Water Quality Standard**" means a standard established pursuant to A.R.S. Section 49-221 and 49-223.

6. "**Areal composite sample**" means a set of samples collected from an area and combined into a single sample. The number and spacing shall be representative of the quality of the accumulated material.

7. "**BADCT**" means the Best Available Demonstrated Control Technology, processes, operating methods, or other alternatives to achieve the greatest degree of discharge reduction determined for a facility by the Director pursuant to A.R.S. Section 49-243.B and D.

8. "**Chain of Custody Form**" is used to maintain and document sample possession for enforcement purposes (User's Guide to the EPA Contract Laboratory Program).

9. "**Department**" means the Department of Environmental Quality.

10. "**Director**" means the Director of Environmental Quality or the Director's designee.

11. "**Discharge**" means, for purposes of the aquifer protection permit program prescribed by A.R.S. Title 49, Chapter 2, Article 3, the addition of a pollutant from a facility either directly to an aquifer or the land surface or the vadose zone in such a manner that there is a reasonable probability that the pollutant will reach an aquifer.

12. "**Discharge Impact Area**" means the potential areal extent of pollutant migration, as projected on the land surface, as the result of a discharge from a facility.

13. "**Discharge Limitation (DL)**" means any restriction, prohibition, limitation or criteria established by the Director, through a rule, permit or order, on quantities, rates, concentrations, combinations, toxicity, and characteristics of pollutants.

14. "**Drywell**" has the meaning ascribed to it in A.R.S. Section 49-331.3.

15. "**Environment**" means navigable waters, any other surface water, groundwater, drinking water supply, land surface, subsurface strata or ambient air, within or bordering on this state.

16. "**Exceedance**" means the detection of a pollutant at levels or concentrations exceeding limits established in this permit.

17. "**Existing facility**" means a facility on which construction began before the effective date of this chapter and which is neither a new facility nor a closed facility. For purposes of this definition construction on a facility has begun if the facility owner or operator has either:

    a. Begun, or cause to begin, as part of a continuous on-site construction program any placement, assembly or installation of a building, structure or equipment; or

    b. Entered a binding contractual obligation to purchase a building, structure or equipment which is intended to be used in its operation within a reasonable time. Options to purchase or contracts which can be terminated or modified without substantial loss, and contracts for feasibility engineering and design studies ,do not constitute a contractual obligation for purposes of this definition.

18. "**Facility**" means any land, building, installation, structure, equipment, device, conveyance, area, source activity or practice from which there is, or with reasonable probability may be, a discharge.

19. "**Groundwater Quality Protection Permit**" means a permit issued by the Arizona Department of Health Services or the Department pursuant to A.A.C. R9-20-208 prior to September 26, 1989.

20. "**Hazardous substance**" means:

    a. Any substance designated pursuant to Section 311(b)(2)(a) and 307(a) of the Clean Water Act;

    b. any element, compound, mixture solution or substance designated pursuant to Section 102 of CERCLA;

    c. any hazardous waste having the characteristics identified under or listed pursuant to A.R.S. 49-922;

    d. any hazardous air pollutant listed under 112 of the Federal Clean Air Act (42 United States Code Section 7412);

    e. any imminently hazardous chemical substance or mixture with respect to which the administrator has taken action pursuant to Section 7 of the Federal Toxic Substances Control Act (15 United States Code Section 2606); and

    f. any substance which the Director, by rule, either designates as a hazardous substance following the designation of the substance by the Administrator under the authority described in subdivisions (a) through (e) of this paragraph or designates as a hazardous substance on the basis of a determination that such a substance represents an imminent and substantial endangerment to public health.

21. "**Inert material**" means that which is insoluble in water and will not decompose or leach substances to water, such as broken concrete, brick, rock, gravel, sand, uncontaminated soils.

22. "**Injection well**" means a well which receives a discharge through pressure injection or gravity flow.

23. "**mg/l**" means milligrams per liter.

24. "**Major Modification(s) to a Facility**" means:
A physical change in an existing facility or change in its method of operation that results in a significant increase or adverse alteration in the characteristics or volume of the pollutants discharged, or the addition of a process or major piece of production equipment, building or structure that is physically separated from the existing operation and that causes a discharge, provided that:

    a. a modification to a groundwater protection permit facility as defined in Section 49-241-01, subsection C, that would qualify for an area-wide permit pursuant to section 49-243, subsection P, consisting of an acitvity or structure listed in Section 49-241, subsection B, shall not constitute a major modifcation solely because of that listing.

    b. For a groundwater protection permit facility as defined in section 49-241.01, subsection C, a physical expansion that is accomplished by lateral accretion or upward expansion within the pollutant management area of the existing facility or group of facilites shall not consititue a major modification if the accretion or expansion is accomplished through sound engineering practice in a manner compatible with existing facility design, taking into account safety, stability and risk of environmental release. For a facility described in Section 49-241.01, subsection C, paragraph 2, if the area of the contemplated expansion is not identified in the notice of disposal, the owner or operator of the facility shall submit the information required by Section 49-243, subsection A, paragraphs 1, 2, 3 and 7 to the director.

25. "**NPDES Permit**" means a permit issued by the United States Environmental Protection Agency for discharge to the waters of the United States as required by the Clean Water Act, as amended.

26. "**New Facility**" means a previously closed facility that resumes operation or a facility on which construction was begun after the effective date of this chapter on a site at which no other facility is located or to totally replace the process or production equipment that causes the discharge from an existing facility. A major modification to an existing facility is deemed a new facility to the extent that the criteria in A.R.S. 49-243, subsection B, paragraph 1 can be practicably applied to such modification. The following constitute major modification:

    a. A physical change in an existing facility or change in its method of operation that results in a significant alteration in the characteristics or volume of the pollutants discharged.

    b. The addition of a process or major piece of production equipment, building or structure that is physically separated from the existing operation and that causes a discharge.

    For purposes of this definition construction on a facility has begun if the facility owner or operator has either:

    (1) Begun, or caused to begin as part of a continuous on-site construction program, any placement, assembly or installation of a building, structure or equipment.

(2) Entered a binding contractual obligation to purchase a building, structure or equipment which is intended to be used in its operation within a reasonable time. Options to purchase or contracts which can be terminated or modified without substantial loss, and contracts for feasibility engineering and design studies, do not constitute a contractual obligation for purposes of this definition.

27. "**Operator**" means any person who makes management decisions regarding facility operations governed by this permit.

28. "**Owner**" means any person holding legal or equitable title in any real property subject to this permit.

29. "**Point of Compliance**" means the designated point or points, as determined by the Director pursuant to A.R.S. Title 49, Section 244, at which compliance with Aquifer Water Quality Standards shall be determined.

30. "**Pollutant**" means fluids, contaminants, toxic wastes, toxic pollutants, dredged spoil, solid waste, substances and chemicals, pesticides, herbicides, fertilizers and other agricultural chemicals, incinerator residue, sewage, garbage, sewage sludge, munitions, petroleum products, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and mining, industrial, municipal and agricultural wastes or any other liquid, solid, gaseous or hazardous substances.

31. "**Pre-Mine Activity**" means conventional truck and shovel mining that is performed prior to actual leaching of the ore. This can include placing ore in leach dumps before the start of leaching, stripping overburden, laying solution lines and other operations that are directly associated with bringing the mine into immediate production.

32. "**Recharge project**" has the meaning ascribed to it A.R.S. Section 45-651.5.

33. "**Regulation**" means A.A.C. Title 18, Chapter 9, Article 1, requirements for facilities affecting aquifer water quality.

34. "**Sewage**" means wastes from toilets, baths, sinks, lavatories, laundries, and other plumbing fixtures in residences, institutions, public and business building, mobile homes, water craft, and other places or human habitation, employment, or recreation.

35. "**Sewage disposal system**" means a system for a sewage collection, treatment and discharge by surface or underground methods.

36. "**Surface impoundment**" means a pit, pond or lagoon, having a surface dimension that is equal to or greater than its depth, which is used for the storage, holding, settling, treatment or discharge of liquid pollutants containing free liquids.

37. "**Temporary cessation**" means any cessation or operation of a facility for a period of greater than 60 days but which is not intended to be permanent.

38. "**Toxic pollutant**" means a substance that will cause significant adverse reactions if ingested in drinking water. Significant adverse reactions are reactions that may indicate a tendency of a substance or mixture to cause long-lasting or irreversible damage to human health.

39. "**ug/l**" means micrograms per liter.

40. "**Underground storage and recovery project**" has the meaning ascribed to it in A.R.S. Section 45-802.6.

41. "**Vadose zone**" means the zone between the ground surface and any aquifer.

42. "**Well**" means a bored, drilled or driven shaft, pit or hole whose depth is greater than its largest surface dimension.

PART VI. GENERAL CONDITIONS: RESPONSIBILITIES

A. Preservation of Rights

This permit shall not be construed to abridge or alter causes or action or remedies under the common law or statutory law, criminal or civil, nor shall any provision of this permit, or any act done by virtue of this permit, be construed so as to stop any person, this state or any political subdivision of this site, or owners or land having groundwater or surface water rights or otherwise, from exercising their rights or, under the common law or statutory law, from suppressing nuisances or preventing injury due to discharges.

B. Monitoring Requirements

The permittee shall conduct any monitoring activity necessary to assure compliance with any permit condition, with Aquifer Water Quality Standards, and with A.R.S. 49-241 through 49-251:

1. The permittee shall install, use and maintain all monitoring equipment in acceptable condition or provide alternate methods approved by the Department; and

2. the permittee is required to conduct monitoring of a type and frequency sufficient to yield data which are representative or the monitored activity and approved by the Department.

C. Reporting of Bankruptcy or Environmental Enforcement

The permittee shall notify the ADEQ, Aquifer Protection Permit within five (5) days after the occurrence of either:

1. The filing of bankruptcy by the permittee; or

2. the entry or any order or judgment against the permittee for the enforcement of any environmental protection statute and in which monetary damages or civil penalties are imposed.

D. Site Examination

1. On presentation of credentials, the Department may, as is reasonably necessary, inspect the facility or an activity used for the generation, storage, treatment, collection or disposal of any waste or pollutant, and where records are kept for the purpose of ensuring compliance with A.R.S. Title 49, Chapter 2, A.A.C. R18-9-101 through 130 and this permit, or to verify information submitted in a permit application, or documented in a permit including any permit conditions.

2. The Department may:

   a. Obtain samples;

   b. analyze or cause to be analyzed any samples either on site or at another location;

   c. take photographs;

   d. inspect equipment, activities, facilities and monitoring equipment or methods of monitoring; or

e. inspect and copy any records required to be maintained.

3. Any pertinent information required by the permit shall be available for on-site inspection during normal business hours. The owner or operator of the property shall be afforded the opportunity to accompany an ADEQ inspector. Split samples, receipts, and copies of photographs will be provided to the facility owner or operator if the owner or operator requests them at the time the samples(s) is (are) obtained or the photograph(s) is (are) taken as the case may be. A copy of the results of any analyses made of samples, monitoring, or testing shall be furnished promptly to the owner or operator.

4. Inspections shall be conducted pursuant to the appropriate provisions of the Arizona Revised Statutes.

E. Proper Operation

1. The permittee shall at all times operate the facility so as to ensure the greatest degree of discharge reduction achievable through application of the best available demonstrated control technology, processes, operation methods or other alternatives, including, where practicable, no discharge of pollutants as determined in the application process.

2. The permittee shall operate the facility to ensure that pollutants discharged will in no event cause or contribute to a violation of aquifer water quality standards at the applicable point of compliance for the facility, or that no pollutants discharged will further degrade, at the applicable point of compliance, the quality of any aquifer that already violates the aquifer quality standard for that pollutant.

F. Technical and Financial Capability

1. The permittee shall maintain the technical and financial capability necessary to fully carry out the terms of this permit.

2. Any bond, insurance policy or trust fund provided as a demonstration of financial capability in the permit application (R18-9-108.8.c.iii.) shall be in effect prior to any activity authorized by this permit and remain in effect for the duration of the permit.

G. Other Rules and Laws

The issuance of this permit does not waive any federal, state, county or local government rules, regulations or permits applicable to this facility.

H. Permit Actions

1. This permit may be modified, transferred, renewed or revoked under the rules of the Department. The filing of a request by the permittee for a permit action does not stay any existing permit condition.

2. The Director shall issue a public notice of all proposed permit actions pursuant to R18-9-124.

3. Permit Modification

   a. Request for modification of a permit shall be made in writing by the permittee, the Department, or any affected person, and shall identify the specific item(s) to be considered for modification and the facts and reasons which justify the request.

   b. The permittee may be required to submit additional information pursuant to A.A.C. R18-9-108, including an updated permit application.

   c. The Director may modify an individual Aquifer Protection Permit if the Director determines any one or more of the following:

      (1) That material and substantial alterations or additions to a permitted facility justify a change in permit conditions;

      (2) that the discharge from the facility violates or could reasonably be expected to violate any Aquifer Water Quality Standard;

      (3) that rule or statutory changes have occurred, such as to require a change in the permit; and/or

      (4) that there has been a change of an applicable point of compliance.

   d. With written concurrence of the permittee, the Department may make minor modifications to a permit for any of the following reasons without giving public notice or conducting a public hearing:

      (1) To correct typographical errors;

      (2) increase the frequency of monitoring or reporting;

      (3) change an interim compliance date in a compliance schedule if the permittee can show just cause and that the new date does not interfere with the attainment of a final compliance date requirement;

      (4) change construction requirements, if the alteration complies with the requirements of these rules and provides equal or better performance; or

      (5) replace monitoring equipment, including wells, if such replacement results in equal or greater monitoring effectiveness.

4. Permit Transfer

   a. The Director may transfer an individual Aquifer Protection Permit if the Director determines that the proposed transferee will comply with Arizona Revised Statute (ARS) 49-241 through 49-251 and A.A.C. Chapter 9, Article 1, regardless of whether the permittee has sold or otherwise disposed of the facility, until the Director transfers the permit.

   b. The proposed transfer or and the transferee shall notify the Department within ten days after any change in the owner or operator of the facility. The notice shall include the name and signature of the transferor owner or operator, the name and signature of the transferee owner or operator; and the name and location of the facility.

c. Information required in R18-9-108.A.1, 2, 3 and 6; B.7, 8, and 9; and D. shall be submitted about the Transferee prior to transfer of the permit.

5. Permit Revocation and Suspension

The Director may suspend or revoke this permit for any of the following reasons:

a. Noncompliance by the permittee with any applicable provision of Title 49, Chapter 2, Article 3 or the Arizona Revised Statutes, A.A.C. Title 18, Chapter 9, Article 1 or permit conditions;

b. the permittee's misrepresentation or omission of any fact, information or data related to the permit application or permit;

c. the Director determines that the permitted activity is causing or may cause a violation of any Aquifer Water Quality Standard; or

d. a permitted discharge has the potential to cause or will cause imminent and substantial endangerment to public health or the environment.

I. Confidentiality of Information

1. Any information submitted to or obtained by the department pursuant to A.R.S. 49-243 may be available to the public unless it is designated confidential. Information or a particular part of the information shall be considered confidential on either:

a. A showing, satisfactory to the Director, by any person that the information, or a particular part of the information, if made public, would divulge the trade secrets of the person; or

b. a determination by the attorney general that disclosure of the information or a particular part of the information would be detrimental to an ongoing criminal investigation or to an ongoing or contemplated civil enforcement action under A.R.S. Title 49, Chapter 2 in Superior Court.

2. Criteria for Determining Confidentiality

a. A confidentiality claim has been made at the time the information was submitted or obtained;

b. the facility owner or operator has shown that reasonable measures have been taken to protect the confidentiality of the information and intends to continue to take such measures;

c. the information is not, and has not been, reasonably obtainable without the facility owner or operator's consent by persons other than governmental bodies by use of legitimate means, other than discovery based on a showing of special need in a judicial or quasi-judicial proceeding;

d. no statute or rule specifically requires disclosure of the information; and

e. the facility owner or operator has shown that disclosure of the information is likely to cause harm to its competitive position.

3. Financial information required in the permit or permit application will be held confidential. Notwithstanding, the Director may disclose any records, reports or information obtained from any person in regard to this permit, including records, reports or information obtained by the Director or Department employees, to:

   a. Other state employees concerned with administering A.R.S. Title 49, Chapter 2, or if the records, reports or information are relevant to any administrative or judicial proceeding under that chapter; and/or

   b. employees of the United States Environmental Protection Agency, if such information is necessary or required to administer and implement or comply with the Clean Water Act, and Safe Drinking Water Act, CERCLA or provisions and regulations relating to those acts.

4. Claims of confidentiality for the following information shall be denied:

   a. The name and address of any permit applicant or permittee;

   b. the chemical constituents, concentrations and amounts of any pollutant discharge; or

   c. the existence or level of a concentration of a pollutant in drinking water or in the environment.

J. Violations; Enforcement

Any person who owns or operates a facility contrary to the provisions of A.R.S Title 49, Chapter 2, who violates the conditions specified in the A.A.C. Title 18, Chapter 9, Article 1, or this permit, is subject to the enforcement actions prescribed in A.R.S. Title 49, Chapter 2, Article 4 or the Arizona Revised Statutes.

PART VII. AQUIFER WATER QUALITY STANDARDS

A. General Standards Applicable to all Aquifers

1. A discharge shall not cause the concentration of a pollutant in an aquifer to exceed at an applicable point of compliance any one of the maximum concentrations prescribed in A.A.C. R18-11-046, unless a higher Aquifer Quality Limit has been established for this permit.

2. A discharge shall not cause a pollutant to be present in an aquifer classified for drinking water protected use in a concentration which endangers human health.

3. A discharge shall not cause a violation of a surface water quality standard established for a navigable water of the State.

4. A discharge shall not cause a pollutant to be present in an aquifer which impairs existing or reasonably foreseeable uses of water in an aquifer.