United States Environmental Protection Agency
Region 10
Park Place Building, 13th Floor
1200 Sixth Avenue, WD-134
Seattle, Washington 98101
(206) 442-1214

Date: July 24, 1990

Permit No.: ID-000006-0

PROPOSED REISSUANCE OF A NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO DISCHARGE POLLUTANTS PURSUANT TO THE PROVISIONS OF THE CLEAN WATER ACT

SUNSHINE MINING COMPANY
P.O. Box 1080
Kellogg, Idaho 83837

has applied for reissuance of a National Pollutant Discharge Elimination System (NPDES) permit to discharge pollutants pursuant to the provisions of the Clean Water Act. This fact sheet includes (a) the tentative determination of the Environmental Protection Agency (EPA) to reissue the permit, (b) information on public comment, public hearing and appeal procedures, (c) the description of the current discharge, (d) a listing of tentative effluent limitations, schedules of compliance and other conditions, and (e) a sketch or detailed description of the discharge location. We call your special attention to the technical material presented in the latter part of this document.

Persons wishing to comment on the tentative determinations contained in the proposed permit reissuance may do so by the expiration date of the Public Notice. All written comments should be submitted to EPA as described in the Public Comments Section of the attached Public Notice.

After the expiration date of the Public Notice, the Director, Water Division, will make final determinations with respect to the permit reissuance. The tentative determinations contained in the draft permit will become final conditions if no substantive comments are received during the Public Notice period.

The permit will become effective 30 days after the final determinations are made, unless a request for an evidentiary hearing is submitted within 30 days after receipt of the final determinations.

The proposed NPDES permit and other related documents are on file and may be inspected at the above address any time between 8:30 a.m. and 4:00 p.m., Monday through Friday. Copies and other information may be requested by writing to EPA at the above address to the attention of the Water Permits Section, or by calling (206) 442-1214. This material is also available from the EPA Idaho Operations Office, 422 West Washington Street, Boise, Idaho 83702.

TECHNICAL INFORMATION

1. Applicant: Sunshine Mining Company
P.O. Box 1080
Kellogg, Idaho 83837

NPDES Permit No.: ID-000006-0

2. Project Activity and Location:

The Sunshine Mining Company operates a mine, mill, an antimony plant, and a new silver-copper refinery complex situated along Big Creek, a tributary of the South Fork Coeur d'Alene River. Sunshine processes ore from the mine in a froth flotation mill and the ore concentrate is refined at the antimony plant and silver-copper refinery. These operations are located approximately 3 miles east of Kellogg, Idaho. There are three discrete discharges associated with the operations emanating from the following sources.

A. Tailings Pond - Discharge 001 to South Fork Coeur d'Alene River upstream of the confluence of Big Creek with the South Fork Coeur d'Alene River.

B. Non-contact Compressor Cooling Water - Discharge 002 to Big Creek.

C. Price Tunnel Diversion Dam - Discharge 003 (intermittent) to Big Creek.

Wastestreams discharged via the Tailings Pond Discharge 001 include those from the following sources:

Source	Flow Quantity (gal/day)
1. Sunshine Mine Drainage	1,265,760
2. Sunshine Mill	852,480
3. Bunker Hill Crescent Mine Drainage	180,000
4. Antimony Plant Fouled Anolyte	5,460
5. Antimony Plant Washwater	28,800
6. Stream #125 Raffinate	259,200
7. Stream #95 Zinc Chloride Solution	2,160
8. Stream #110 Gypsum Filter Cake Washwater	13,536
9. Tri-Mer Tri-NO_x Scrubber	144
10. Stream #111 Milk of Lime	18,000
11. Domestic Wastes	43,200
12. Laboratory Wastes	2
Total Wastestream Flow	2,668,742

Discharge via Outfall 002 consists of non-contact cooling water. In a new compressor cooling system, compressor cooling water from the Sunshine Mine is piped to a surge tank at the new silver-copper refinery where the cooling water is reused as supply makeup water for the antimony plant and refinery. The Outfall 002 discharge consists of overflow from this surge tank which occurs when the full makeup volume of cooling reuse water from the mine compressor cooling system is not needed at the antimony plant and refinery.

The Outfall 003 discharge consists of mine drainage from an inactive mine and it is an intermittent discharge which usually does not occur during the dry summer-fall months.

3. Background

The existing National Pollutant Discharge Elimination System (NPDES) permit for Sunshine Mining Company was issued on November 4, 1976, and became effective on December 6, 1976. This permit was modified on October 10, 1978, and it expired on December 6, 1981. The permit has been automatically continued in force since that time under the provisions of 5 USC 558(c), the applicable parts of which are enumerated in 40 CFR §122.6.

Sunshine completed construction of the existing tailings pond in 1979, but the wastewater in the pond did not reach decant elevation and discharge through Outfall 001 to the South Fork Coeur d'Alene River did not begin until May 14, 1984. Wastewater has been discharged continuously from Outfall 001 since that time.

In late 1984, Sunshine placed into operation a new mine compressor cooling system which resulted in (1) the elimination of the previous cooling water discharge and (2) the location of the new non-contact compressor cooling water Outfall 002 discharge to Big Creek at a point near the new silver-copper refinery complex.

The existing permit does not provide for coverage of discharges from the new silver-copper refinery complex because the new discharges were not known at that time. The refinery complex was placed into operation on December 29, 1984.

Current waste treatment of discharges from the antimony plant and new silver-copper refinery complex consists of lime addition to a repulp tank where wastestreams 4, 5, 6, 7, 8, 9, and 10 (listed above) are mixed, and subsequent settling of this mixture along with wastes from wastestreams 1, 2, 3, 11, and 12 in the tailings pond. The combined waste flow is discharged through Outfall 001.

Domestic wastes throughout the mine, mill, and refinery complex are either routed directly to the tailings line or through septic tanks without drainfields into the tailings line prior to discharge and treatment in the tailings pond.

4. Receiving Water Quality Standards

The Idaho receiving water quality standards are contained in Title 1, Chapter 2 of the Idaho Code entitled, "Water Quality Standards and Wastewater Treatment Requirements". In Section 1-2110, the South Fork Coeur d'Alene River in the vicinity of the Sunshine 001 discharge is classified for present protection of "secondary contact recreation" and "agricultural water supply" water uses. The South Fork is also protected for future "cold water biota" and "primary contact recreation" water uses.

In the same section of the Code, Big Creek in the vicinity of Sunshine's 002 and 003 discharges is classified for present protection of "secondary contact recreation" and "agricultural water supply", and future protection of "cold water biota" water uses.

Idaho Water Quality Standards require that waters designated for secondary contact recreation meet a fecal coliform standard of 800/100 ml at all times, and 200/100 ml based on a minimum of five samples taken over a 30 day period.

For waters used for agricultural water supply, Idaho Water Quality Standards do not contain specific numerical criteria. Therefore, EPA national water quality criteria were used as a guideline to determine whether the discharge would be compatible with this use. The pertinent criteria are those developed for livestock watering and irrigation water supply, which are contained in Water Quality Criteria - 1972, commonly known as The Blue Book.

5. Applicable Regulations

Regulatory or other controls applicable to the wastestreams contributing to the Outfall 001 discharge are listed below.

Wastestream	Regulation or Other Controls
1. Sunshine Mine Drainage	40 CFR §§440.102(a) and 103(a)
2. Sunshine Mill	40 CFR §§440.102(b) and 103(b)
3. Bunker Hill Mining Company Crescent Mine Drainage	40 CFR §§440.102(a) and 103(a)
4. Antimony Plant Fouled Anolyte	40 CFR §§421.142(b) and 143(b)
5. Antimony Plant Washwater	40 CFR §§421.142(c) and 143(c)
6. Stream #125 Raffinate	BPJ - BPT, BAT, and BCT
7. Stream #95 Zinc Chloride Solution	40 CFR §§421.252(b) and 253(b)
8. Stream #110 Gypsum Filter Cake Washwater	BPJ - BPT, BCT
9. Tri-Mer Tri-NO_x Scrubber	BPJ - BPT, BAT, and BCT
10. Domestic Wastes	40 CFR §133; Idaho Code-Title 1, Chapter 2, Section 1-2420, BPJ
11. Laboratory Wastes	BPJ
12. Milk of Lime	BPJ

For the industrial wastestreams, these regulations include Best Practicable Control Treatment Technology (BPT) requirements for the pollutant parameters total suspended solids (TSS), oil & grease, and pH, and Best Available Treatment Technology Economically Achievable (BAT) requirements for toxic and nonconventional pollutant parameters.

For the conventional pollutant parameters TSS, oil & grease, and pH applicable to the industrial wastestreams, EPA Region 10 is required to establish Best Conventional Pollutant Control Technology (BCT) limitations since no such national effluent guidelines have been promulgated. And for all industrial wastestreams contributing to the Outfall 001 discharge, the BCT requirements were determined to be equivalent to BPT.

In the cases of industrial wastestreams where no national effluent guidelines have been promulgated, effluent limits were established as needed based on Best Professional Judgement (BPJ) determinations relative to BPT, BAT, and/or BCT. This approach is authorized under 40 CFR §125.3(c)(2).

For the domestic waste flow, the applicable regulations pertaining to TSS are contained in 40 CFR §133 as amended and the Idaho Department of Health and Welfare, Division of Environment, treatment requirements for sewage wastewater discharge to surface waters of the state (Title 1, Chapter 2, Section 1-2420 of the Idaho Code). "Monthly average" and "daily maximum" TSS limitations of 30 mg/l and 60 mg/l, respectively, were used. Due to the relative small amount of biochemical oxygen demand (BOD_5) contributed by the Sunshine domestic waste flow in comparison to the large quantities of metal tainted inorganic flows in the other wastestreams, coupled with the retention time provided in the tailings pond, a BOD_5 limitation was not factored into the proposed permit.)

6. Basis of Discharge Limitations

A. Antimony Plant/Silver-Copper Refinery Discharge

Included in the proposed permit are discharge limitations applicable to the combined discharge of eight wastestreams from the Antimony Plant and Silver-Copper Refinery, with the limitations to be applied to the treated discharge prior to its introduction into the company's tailings line. EPA has elected to establish specific limitations on this internal wastestream because it is not possible to effectively measure at Outfall 001, compliance with technology based effluent limitations applicable to the refinery wastestreams due to dilutional effects and parameter interference occurring at the Outfall 001 discharge. Dilution caused by one half of the total wastestream flow through the tailings pond and Outfall 001 being dilute mine water, makes detection of regulated discharge parameters and levels difficult or impossible for parameters such as silver, gold, and oil & grease. In addition, there is considerable variation of pollutant levels occurring in the wastestreams.

The proposed limitations for this combined discharge are based on the above mentioned regulations or other controls. The applicable promulgated and BPJ effluent guidelines were applied to each of the eight wastesteams, and the individual loadings in terms of pounds per day allowed for each pollutant parameter were calculated.

Load limits were calculated by multiplying the effluent limitations for the applicable wastestreams by the respective production figures (limitation x production = lb/day). Then the building block approach was used to calculate the combined waste discharge load limitations by summing the load allowances for each pollutant in all the wastestreams to give the total lb/day discharge allowance for each pollutant. (The corresponding mg/l concentration for each parameter of the total discharge were also calculated by applying the total lb/day loadings and the combined discharge flow to the above equation.) Both the "monthly average" and "daily maximum" limitations were developed using this procedure.

The approach used for determining BPJ limitations is similar to that used in the development of promulgated effluent guidelines for the Nonferrous Metals Manufacturing Point Source Category industry. The applicable wastestream discharge rates were normalized on a production basis by relating the amount of wastewater generated to the mass of product which is produced. Respective production normalized parameters (PNPs) were selected and the production normalized flows (PNFs) were determined by dividing the volume of the wastestream by the mass of product produced taking into account the purity of the product. Model waste treatment technologies were selected for each BPJ wastestream based on the type of waste, the level of pollutants present in the wastestream, and whether or not multiple metallic pollutants and arsenic are present in the wastestream. Either sedimentation, chemical precipitation with lime and sedimentation followed by filtration (LS & F), or sulfide precipitation and filtration plus LS & F (sulfide precipitation used as a preliminary or post polishing treatment step) was selected for the model treatment technologies depending on the chemical makeup of the wastestreams involved. The respective PNFs were then multiplied times the treatability concentrations for the respective metals and arsenic that are contained in Table VII-21 of the General Development Document for Effluent Limitations Guidelines and Standards for the Nonferrous Metals Point Source Category, Phase II. The respective BPJ parameters were then multiplied times the production figures provided by Sunshine for the respective productions which are expected to occur over the 5 year term of the NPDES permit.

The calculations for the BPJ-PNFs are contained in the EPA Region 10 confidential file for Sunshine Mining Company. (Some of the information used to determine the PNFs is information that Sunshine has requested be kept confidential.)

Further information concerning the basis for the five sets of effluent limitations established for the affected BPJ wastestreams is provided below.

1. Stream #125 Raffinate

The raffinate wastestream generated in the silver-copper refinery is a wastestream not regulated by national effluent guidelines. The type of operation that Sunshine uses to refine copper from the integrated refinery was not considered in development of the Primary Electrolytic Copper Refining Subcategory or any other category of the Nonferrous Metals Manufacturing Point Source Category - Phase I effluent guidelines or any category of the Phase II effluent guidelines. EPA discussed with the Company, the possibility of recycling this wastestream and was informed that it is not possible to recycle it for several reasons. Therefore, it was necessary to develop BPJ limitations for the Raffinate Stream #125 .

These BPJ limitations were established based on current information provided by the Company relative to volume of the wastestream, plant operation, production, and purity of cathode grade copper product. The metal and arsenic treatability concentrations shown in Table VII-21 of the General Development Document for the Nonferrous Metals Point Source Category, Phase II were also used. The BPJ wastewater discharge allowance based on 0% recycle was determined to be 30,497 gal/ton. Because the wastestream is high in multiple metallic pollutants and arsenic, the selected model treatment technology consists of lime precipitation and sedimentation with the addition

of filtration and sulfide precipitation preliminary treatment. This is consistent with the model technology selection that has been made by EPA in effluent guidelines for other industrial categories of the Nonferrous Metals Manufacturing Industry where the wastestreams are high in multiple metallic pollutants and arsenic.

The BPJ limitations applicable to the Raffinate Stream #125 are as follows.

BPJ-BPT Limitations for TSS and pH

Pollutant or pollutant property	Maximum for any 1 day	Maximum for monthly average
	pounds per million pounds of copper metal produced by electrowinning	
TSS	5216.939	2481.227
pH	Within the range of 7.5 to 10.0 at all times	

BPJ - BAT Limitations

Pollutant or pollutant property	Maximum for any 1 day	Maximum for monthly average
	pounds per million pounds of copper metal produced by electrowinning	
Antimony	245.578	109.429
Arsenic	176.867	78.890
Cadmium	25.449	10.179
Copper	162.870	77.618
Iron	152.691	77.618
Lead	35.628	16.542
Manganese	38.173	29.266
Nickel	69.983	47.080
Zinc	129.787	53.442

The pH limitation of 7.5 to 10.0 stems from the fact that most toxic metals precipitate and have minimum solubilities at an alkaline pH. Therefore, to ensure that metals are precipitated and unavailable, the pH must be controlled within this range.

2. Stream #110 Gypsum Filter Cake Washwater

Based on the results of a sample of this wastestream (July 24, 1985, analysis by Silver Valley Laboratories), all of the metal parameter concentrations measured were below treatability levels.

Stream #110 is indicated by Sunshine to be high in total suspended solids (TSS); and the indicated level is well above treatability levels for TSS. Because of this, and since the wastestream is not regulated by national effluent guidelines, it was necessary to develop BPJ-BPT limitations for TSS. In addition, BPJ-BPT limitations for pH were developed.

Because this wastestream appears to be high in TSS but below treatability levels for metals, sedimentation was selected as the model treatment technology. The pH range is set at 7.5 to 10.0.

The BPJ - BPT limitations applicable to the Gypsum Filter Cake Washwater Stream #110 are as follows.

BPJ-BPT Limitations for TSS and pH

Pollutant or pollutant property	Maximum for any 1 day	Maximum for monthly average
	pounds per million pounds of copper metal produced by electrowinning	
TSS	272.440	129.575
pH	Within the range of 7.5 to 10.0 at all times	

The proposed BPJ - BPT wastewater discharge allowance for this wastestream was determined to be 1593 gal/ton.

3. Tri-Mer Tri-NO_x Scrubber

This wastestream is generated from a chemical scrubber which is used to treat vented gases from two sources within the silver-copper refinery complex. Since the scrubber wastestream is not covered by promulgated national effluent guidelines, it requires the development of BPJ limitations.

Sunshine sampled and submitted the results of three sets of chemical analyses on the wastestream. The results indicated that under the present mode of operation without recycle of the wastestream, the metal concentration levels are below treatability levels. But since it is anticipated that with 90% recycle of the wastestream there will be a buildup of metal concentrations above treatability levels occurring in the 10% discharge portion, BPJ - BAT limitations for metals were developed based on treatability levels achievable through lime precipitation and sedimentation with filtration. And BPJ - BPT limitations for TSS are based on a model treatment technology consisting of lime precipitation and sedimentation.

The proposed BPJ - BPT/BAT wastewater discharge allowance for the wastestream based on 90% recycle, was determined to be 0.01595 l/troy oz.. The normalized flow was multiplied by a factor of 0.10 to take into account 90% recycle.

Extensive recycle of wet scrubber wastewater has been observed throughout the Nonferrous Metals - Phase II industry (see 49 FR 26376). Some plants have reported 100% recycle of this type of wastestream. Existing practice in the Nonferrous Metals - Phase I industry, where 90% recycle is extensively demonstrated (see 48 FR 7052), supports EPA's selection of 90% recycle.

The BPJ limitations applicable to discharges from the Tri-Mer Tri-NO_x scrubber are as follows.

BPJ-BPT Limitations for TSS and pH

Pollutant or pollutant property	Maximum for any 1 day	Maximum for monthly average
	mg/troy ounce of silver sponge produced	
TSS	0.65379	0.31095
pH	Within the range of 7.5 to 10.0 at all times	

BPJ - BAT Limitations

Pollutant or pollutant property	Maximum for any 1 day	Maximum for monthly average
	mg/troy ounce of silver sponge produced	
Cadmium	0.00319	0.00128
Copper	0.02041	0.00973
Iron	0.01914	0.00973
Lead	0.00446	0.00207
Nickel	0.00877	0.00590
Silver	0.00462	0.00191
Zinc	0.01627	0.00670

The rationale for including a pH range limitation of 7.5 to 10.0 for this wastestream, is the same as is explained above in the discussion on Stream #125 Raffinate.

4. Laboratory Wastes

An estimated 2 gal/day of laboratory waste chemicals and samples are discharged through the waste treatment system. For all practical purposes, this wastestream is very minute compared to the other flows. Therefore, EPA has incorporated the estimated flow quantity into the permit base flow, but did not include waste loadings because of the absence of any data on the characteristics of the wastestream.

5. Stream #111 Milk of Lime

This stream is the lime addition presently in use by Sunshine for chemical precipitation of metals from a combination of wastestreams. The milk of lime is composed largely of water. Therefore, the flow quantity was included in the base flow for permit.

The combined pH range limitation for the Antimony Plant/Silver-Copper Refinery discharge is proposed at 7.5 to 10.0.

Where wastestream chemical data showed that pollutant parameters not covered by effluent guidelines or the BPJ-BAT limitations mentioned above are present in the respective wastestreams at concentrations higher than treatability values, technology-based waste load allowances were given for the applicable parameters based on treatability values.

For the applicable parameters in the nonferrous metals wastestreams, i.e., Antimony Plant Fouled Anolyte, Antimony Plant Washwater, Stream #125 Raffinate, Stream #95 Zinc Chloride Solution, and Tri-Mer Tri-NO_x Scrubber, the "monthly average" and "daily maximum" treatability concentration values contained in Table VII-21 of the General Development Document for Nonferrous Metals-Phase II, were used.

Where wastestream chemical data showed that pollutant parameters not covered by effluent guidelines or the BPJ-BAT limitations are present in the respective wastestreams at concentrations lower than treatability values, "monthly average" and "daily maximum" waste load allowances for the respective parameters were given based on the existing data.

All of the load allowances for wastestream pollutant parameters not covered by effluent guidelines or the BPJ-BAT limitations, were included in the total discharge load limit calculations mentioned above.

The calculations for these allowances are also contained in the EPA Region 10 confidential file for Sunshine Mining Company.

On the basis of the procedure outlined above, the following BPT/BAT concentration limitations were determined for Sunshine's Antimony Plant/Silver-Copper Refinery Discharge.

Allowable Dishcarge Concentrations (in mg/l)

	Parameter	Maximum for any 1 day	Maximum for monthly average
1.	Antimony	1.785	0.795
2.	Arsenic	1.286	0.574
3.	Cadmium	0.163	0.065
4.	Copper	1.072	0.529
5.	Gold	0.0011	-
6.	Iron	1.085	0.552
7.	Lead	0.255	0.118
8.	Manganese	0.244	0.188
9.	Mercury	0.0220	0.0093
10.	Nickel	0.449	0.302
11.	Silver	0.247	0.107
12.	Zinc	0.848	0.356
13.	TSS	39.8	18.9
14.	Oil & Grease	0.22	0.13
15.	pH	Within the range of 7.5 to 10.0 at all times	

B. Outfall 001 Discharge

Using the same procedure as outlined above for the Antimony Plant/Silver-Copper Refinery discharge, the applicable regulations and other controls mentioned above were applied to each of the wastestreams contributing to the Outfall 001 discharge, and individual loadings in terms of pounds per day allowed for each pollutant parameter were calculated. Then the building block approach was used to calculate the combined waste discharge effluent load limitations.

The load limits were calculated by multiplying the promulgated and BPJ determined effluent limitations for the applicable wastestreams by the respective production figures (limitation x production = lb/day) or, where effluent guidelines are given in concentrations, by multiplying the flows for the wastestreams times the respective limitation concentrations and applying a conversion factor of 8.337 lb/gal [flow (mgd) x 8.337 lb/gal x concentration (mg/l) = pollutant loading (lb/day)]. The load allowances for each pollutant were then summed for all the wastestreams to give the total lb/day discharge allowance for each pollutant. (The corresponding mg/l concentration limitation for each parameter of the total discharge were also calculated by applying the total lb/day loadings and the total wastestream flow to the above equation.) Both the "monthly average" and "daily maximum" limitations were developed using this procedure.

For the antimony, arsenic, iron, and manganese parameters not covered in the Ore Mining and Dressing regulations for the mine drainage and mill wastestreams, "monthly average" and "daily maximum" treatability concentration values determined from data and information contained in the Ore Mining and Dressing Point Source Category Development Documents, were used.

Where wastestream chemical data showed that pollutant parameters not covered by effluent guidelines or the BPJ-BAT limitations are present in the respective wastestreams at concentrations lower than treatability values, "monthly average" and "daily maximum" waste load allowances for the respective parameters were given based on existing data.

All of the load allowances for wastestream pollutant parameters not covered by effluent guidelines or the BPJ-BAT limitations, were included in the total Outfall 001 discharge load limit calculations. And the calculations for these allowances are contained in the EPA Region 10 confidential file for Sunshine Mining Company.

The combined pH range limitation for the Outfall 001 discharge is proposed at 6.0 to 9.5.

On the basis of the above procedure, the following BPT/BAT concentration limitations were determined for Sunshine's Outfall 001 discharge.

Allowable Discharge Concentrations (in mg/l)

	Parameter	Maximum for any 1 day	Maximum for monthly average
1.	Antimony	0.669	0.313
2.	Arsenic	0.586	0.277
3.	Cadmium	0.106	0.051
4.	Copper	0.390	0.194
5.	Iron	1.982	1.107
6.	Lead	0.548	0.273
7.	Manganese	0.879	0.499
8.	Mercury	0.0044	0.0020
9.	Zinc	1.236	0.610
10.	TSS	31.7	20.0
11.	pH	Within the range of 6.0 to 9.5 at all times	

C. Outfall 002 Discharge

As mentioned above, Discharge 002 is non-contact compressor cooling water. The Outfall 002 discharge has been monitored by Sunshine since the new compressor cooling system was placed into operation. The monitoring data for discharge quantity, temperature, pH, and oil & grease which was submitted to EPA during 1985, is tabulated in Table 1 of the Appendix. The averages and extremes of the data for these monitoring parameters are summarized below.

Outfall 002 Discharge Characteristics

Discharge Quantity - gpm		Temperature - °F.		pH		Oil & Grease - mg/l	
Avg.	Range	Ave.	Range	Ave.	Range	Ave.	Range
99.1	5-200	50.8	33.8-73	6.8	6.0-7.5	2.7	0.12-8.0

At EPA's request, data has also been collected for TSS, total hardness (as $CaCO_3$), antimony, arsenic, cadmium, copper, iron, lead, mercury, silver, zinc, and cyanide on both the company's intake water supply and the Outfall 002 discharge.

Since the discharge from Outfall 002 is non-contact cooling water, no contamination of this water should result from Sunshine's activities. Therefore, the permit does not allow contamination of this water. Sunshine is required to sample and analyze on a weekly basis for specific conductance in both the Company's intake water supply and the Outfall 002 discharge. EPA will review this data to determine if there is an increase in the concentration of dissolved ionic substances occurring in the discharge compared to intake water. Substantive increases in the ionic substance concentrations would be indicative that contamination of the discharge is occurring.

The following Outfall 002 flow and BPJ-BPT discharge limitations are included in the proposed permit.

1. Daily maximum flow - 0.3600 mgd
2. Daily maximum oil & grease - 10 mg/l
3. Monthly average oil & grease - 6 mg/l
4. pH - Within the range of 6.0 to 9.0
5. No metals or arsenic contamination of this water shall result from Sunshine's activities.

D. Outfall 003 Discharge

Discharge 003 consists of mine drainage from an inactive mine. The discharge is intermittent in nature, and it is not regulated under 40 CFR §440, Subpart J (Ore Mining and Dressing Point Source Category). Therefore, EPA is required to make a BPJ determination on this wastestream.

On June 10, 1983, Sunshine submitted an NPDES permit application for this wastestream. The individual metal and arsenic concentration levels reported in the application are below treatability concentration levels. Therefore, EPA is not proposing metals and arsenic discharge limitations for the Outfall 003 discharge but a requirement for monitoring of arsenic and selected metal parameters in the discharge is proposed. EPA has determined from a metals and arsenic standpoint, that if the discharge concentrations remain in the range shown in Sunshine's June 10, 1983, permit application, the discharge should not adversely affect Big Creek water quality and uses. The required metals and arsenic monitoring will provide for a check on this.

The following Outfall 003 flow and BPJ-BPT discharge limitations are included in the proposed permit.

1. Daily maximum flow - 0.2160 mgd
2. Monthly average flow - 0.0423 mgd
3. pH - Within the range of 6.0 to 9.0

7. Water Quality Assessment

The water quality standards applicable to this reach of the South Fork Coeur d'Alene River and Big Creek are for fecal coliform bacteria and hazardous substances. The numerical standard for fecal coliform bacteria (200/100 ml in a minimum of five samples taken in a 30 day period, 800/100 ml at any time) should be easily met because of the minor volume of domestic wastewater contained in the Sunshine discharge (0.043 mgd in a total of 2.7 mgd) and its detention in the tailings pond.

The water quality standard for hazardous substances requires that these substances be below the level at which public health and beneficial uses are impacted. EPA's water quality criteria for agricultural water supply were used in this assessment. Using a $_{30}Q_{10}$ flow in the South Fork of 40.484 cfs, and the lowest monthly average flow of Big Creek measured during the water years 1971, 1972, 1973, and 1974 of 10.56 cfs for a total stream flow of 51.044 cfs (33.0 mgd), EPA conducted a receiving water quality assessment of the Outfall 001 discharge. Complete mixing of the discharge in this total of S.F. Coeur d'Alene River and Big Creek stream flows was assumed and the most stringent of livestock watering and irrigation water quality (Blue Book) criteria applicable to irrigation water used for up to 20 years on fine textured soils of pH 6.0 to 8.5, were used. The water quality assessment and calculations using these criteria showed that the BAT waste load allowances for Sunshine's Outfall 001 discharge should not cause violations of water quality standards for antimony, arsenic, cadmium, copper, iron, lead, manganese, mercury, silver, and zinc.

Sunshine's technology-based BAT lead allowance will result in instream levels that approach criteria values. Receiving water monitoring will help verify compliance with water quality standards.

For zinc and mercury, upstream levels are presently less than water quality criteria. And the proposed BAT effluent concentration limitations relative to Sunshine's Outfall 001 discharge for both zinc and mercury, are well below the respective water quality standards (Blue Book) criteria values for these parameters.

Because one of the bases for these calculations is existing upstream concentrations, and these data are so limited, it is critical that the receiving water monitoring program be designed to address the issue of compliance with water quality standards. Should standards be violated as a result of Sunshine's discharge, this permit may be reopened to include appropriate water quality-based limits.

For the discharges to Big Creek (Outfalls 002 and 003), monitoring is required to insure that no contamination of these waters results from Sunshine's activities. If this condition is met, water quality standards should also be met.

8. Compliance Schedule Requirements

A. Antimony Plant/Silver-Copper Refinery and Outfall 001 Discharges

Based on waste discharge monitoring report (DMR) data submitted by Sunshine on the Outfall 001 discharge during 1985, 1988, and 1989 (see Tables 2, 3, and 4 of the Appendix), the Company is not consistently meeting all of the BPT/BAT/BCT allowable discharge concentration limits of the proposed permit outlined in Section 6 above for antimony, arsenic, copper, zinc, and pH.

The following BPT and BAT compliance dates applicable to the wastestreams being discharged via Outfall 001 are required under the Water Quality Act of 1987 and NPDES regulations at 40 CFR §125.3(a)(2).

	Wastestream	BPT	BAT
1.	Sunshine Mine Drainage	Date of permit issuance	December 3, 1985
2.	Sunshine Mill	Date of permit issuance	December 3, 1985
3.	Bunker Hill Crescent Mine Drainage	Date of permit issuance	December 3, 1985
4.	Antimony Plant Fouled Anolyte	September 20, 1988	September 20, 1988
5.	Antimony Plant Washwater	September 20, 1988	September 20, 1988
6.	Stream #95 Zinc Chloride	September 20, 1988	September 20, 1988
7.	Stream #125 Raffinate	March 31, 1989	March 31, 1989
8.	Stream #110 Gypsum Filter Cake Washwater	March 31, 1989	-
9.	Tri-Mer Tri-NO_x Scrubber	March 31, 1989	March 31, 1989

It may not be possible for Sunshine to meet the effluent limitations with existing treatment facilities. If additional facilities are required, EPA would establish a schedule for the construction of such facilities in an administrative order. The order would require that such construction be completed in the shortest reasonable period.

B. Tailings Pond Seepage

Included in the proposed permit is a compliance schedule for the planning, design, and installation of a seepage control system aimed at controlling seepage of wastewater from the Sunshine tailings pond. This requirement is necessary because it is apparent that a significant amount of tailings pond seepage is reaching Big Creek in the vicinity of the pond. Data collected by EPA shows that conductivity and antimony, arsenic, copper, and manganese concentration levels in Big Creek increased significantly between sampling points upstream and at the mouth of the creek.

While it is acknowledged that some seepage will occur from any tailings pond, the data show that seepage from the Sunshine pond is well in excess of that expected from a properly designed impoundment.

In planning and design of the seepage control system, the applicant would be required to conduct a study and evaluation to define all parameters, and to collect data necessary to design the system. The seepage control study would be required to be completed within a period of five months and the seepage control system would be required to be placed into operation within a period of 14 months.

9. Monitoring Requirements

Self monitoring of discharge parameters is necessary for the permittee to demonstrate compliance with effluent limitations and to assure that water quality standards are being met. The monitoring requirements are based on the Agency's determination of the sample types and minimum sampling frequencies needed to adequately characterize the discharges.

Because the Sunshine operations result in the discharge of several known toxic pollutants to Big Creek and the S.F. Coeur d'Alene River, frequent sampling of the discharges is necessary to ensure that the effluent limitations are being complied with. The monitoring requirements for the Antimony Plant/Silver-Copper Refinery and Outfall 001 discharges are more extensive because they are an accumulation of wastes from the major sources.

A. Antimony Plant/Silver-Copper Refinery Discharge

The proposed monitoring requirements for this discharge are summarized below.

Parameter	Measurement Frequency	Sample Type
Flow	Daily	-
Antimony	5/week	24-hour composite
Arsenic	5/week	24-hour composite
Cadmium	5/week	24-hour composite
Copper	5/week	24-hour composite
Gold	5/week	24-hour composite
Iron	5/week	24-hour composite
Lead	5/week	24-hour composite
Manganese	5/week	24-hour composite
Mercury	5/week	24-hour composite
Nickel	5/week	24-hour composite
Silver	5/week	24-hour composite
Zinc	5/week	24-hour composite
TSS	Daily	24-hour composite
Oil & Grease	Weekly	24-hour composite
pH	Daily	24-hour composite

The "5/week" sampling for metals and arsenic requirement should be adequate to account for variability of antimony plant/silver-copper refinery wastes and the chemical precipitation-settling-filtration treatment processes. This and the other monitoring requirments will provide both Sunshine and EPA with better feedback on the effectiveness of treatment-control measures.

B. Outfall 001 Discharge

The proposed monitoring requirements for this discharge are summarized below.

Parameter	Measurement Frequency	Sample Type
Flow	Daily	-
Antimony	3/week	Grab
Arsenic	3/week	Grab
Cadmium	3/week	Grab
Copper	3/week	Grab
Iron	3/week	Grab
Lead	3/week	Grab
Manganese	3/week	Grab
Mercury	3/week	Grab
Zinc	3/week	Grab
TSS	Daily	Grab
Total Hardness (as $CaCO_3$)	Weekly	Grab
pH	Daily	Grab

The "3/week" sampling for metals and arsenic requirement is needed to adequately demonstrate compliance with the permit limitations. This requirement and the other monitoring requirements will provide both Sunshine and EPA with better feedback on overall treatment effectiveness.

C. Outfall 002 Discharge

The proposed monitoring requirements for this discharge are summarized below.

Parameter	Measurement[1/] Frequency	Sample Type
Flow	Weekly	-
Temperature	Weekly	Grab
Oil & Grease	Weekly	Grab
pH	Weekly	Grab
Specific Conductance	Weekly	Grab

1/ Specific conductance to be monitored in both the discharge and Sunshine's water supply intake.

This monitoring is needed to demonstrate compliance with the four permit limitations. The monitoring of specific conductance in the water supply intake and discharge is also needed to demonstrate that contamination of the discharge is not occurring and the discharge continues to be strictly non-contact compressor cooling water with no extraneous inflows of other wastes via the antimony plant/silver-copper refinery head tank or other sources.

D. Outfall 003 Discharge

The proposed monitoring requirements for this discharge are summarized below.

Parameter	Measurement Frequency	Sample Type
Flow	Quarterly	-
Antimony	Quarterly	Grab
Arsenic	Quarterly	Grab
Cadmium	Quarterly	Grab
Copper	Quarterly	Grab
Lead	Quarterly	Grab
Mercury	Quarterly	Grab
Zinc	Quarterly	Grab
Total Suspended Solids	Quarterly	Grab
pH	Quarterly	Grab

This monitoring is needed to demonstrate compliance with the three permit limitations and to allow assessment of the total impact, if any, of the discharge.

E. Receiving Water Monitoring

To ensure that water quality standards are being met, an instream receiving water quality monitoring program is being required. The monitoring program, which will be conducted during the low flow season, will be aimed at determining the levels of toxic pollutants attributable to the Sunshine complex. This analysis will aid in determining compliance with water quality standards. The monitoring program should also document the effectiveness of the seepage control measures that will be instituted as part of the permit conditions.

Should the receiving water monitoring indicate that water quality standards are being violated as a result of Sunshine's activities, the permit will be reopened to include the appropriate controls to meet water quality standards.

APPENDIX

Table 1

Outfall 002 Discharge Monitoring Data

Date (1985)	Discharge (gpm)	Temperature °F	pH (pH units)	Oil & Grease (mg/l)
January 23	75	42.0	6.7	3.20
January 30	75	33.8	7.0	2.35
February 6	75	34.0	6.7	3.86
February 13	75	35.0	6.6	2.00
February 20	75	36.0	7.5	1.70
February 27	100	43.0	7.2	1.70
March 6	100	46.0	7.3	2.40
March 13	150	46.0	7.2	4.00
March 20	150	43.0	7.2	2.30
March 27	75	49.0	6.9	1.0
April 3	75	50.0	6.9	2.1
April 10	75	54.0	6.6	4.1
April 17	75	52.0	6.8	1.0
April 24	15	53.0	7.2	1.0
May 8	100	54.0	6.1	2.8
May 15	150	53.0	6.6	1.3
June 19	75	56.3	6.6	6.6
July 8	30	73.0	7.4	7.4
July 22	75	65.0	6.6	8.0
July 29	100	57.0	6.0	2.0
August 5	75	69.0	7.1	5.3
August 12	80	60.0	6.2	4.9
August 19	200	58.0	6.6	1.0
August 26	150	61.0	6.2	1.2
September 3	100	61.0	6.6	1.6
September 9	200	60.0	7.4	0.72
September 16	200	61.0	6.9	2.4
September 24	60	59.0	6.4	4.0
October 1	75	54.0	7.4	0.12
October 7	100	57.0	6.8	5.0
October 14	5	60.0	7.0	4.8
October 28	200	51.0	6.8	0.74
November 12	100	41.0	6.3	0.54
November 18	100	43.0	6.3	3.2
December 2	100	43.0	6.3	2.7
December 13	75	38.0	6.8	1.0
December 18	75	45.0	6.9	1.0
December 23	150	42.0	7.2	1.0

TABLE 2

Outfall 001 Discharge Monitoring Data (1985)[1]/

	Flow (mgd)		Antimony		Arsenic		Cadmium		Copper		Lead		Mercury		Zinc		Total Suspended Solids		pH (pH units)	
Month	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.	Min.	Max.
January	1.060	1.630	0.60	0.71	0.45	0.56	0.0014	0.0019	0.038	0.110	0.015	0.018	0.00021	0.00050	0.010	0.010	12.9	22.7	8.1	9.0
February	1.380	1.750	0.51	0.67	0.42	0.84	0.0018	0.0022	0.058	0.106	0.016	0.019	0.00025	0.00029	0.060	0.130	10.1	21.1	7.1	9.16
March	1.210	1.630	0.62	0.78	0.21	0.28	0.0016	0.0018	0.169	0.380	0.019	0.021	0.00034	0.00042	0.020	0.040	6.8	14.1	7.4	9.0
April	1.390	1.980	1.05	1.20	0.36	0.49	0.0021	0.0028	0.019	0.050	0.021	0.026	0.00029	0.00038	0.010	0.030	10.5	21.4	7.1	8.9
May	1.090	1.980	0.94	1.10	0.38	0.50	0.0019	0.0022	0.023	0.050	0.016	0.019	0.00019	0.00029	0.018	0.019	6.9	10.9	6.2	6.9
June	1.260	2.230	0.40	0.58	0.043	0.073	0.0094	0.0142	0.815	1.540	0.049	0.070	0.00110	0.00207	0.990	2.200	3.4	5.4	6.2	6.7
July	1.344	1.862	0.26	0.44	0.032	0.052	0.0112	0.0152	0.960	1.400	0.067	0.079	0.00142	0.00194	0.680	1.300	3.7	6.4	6.2	6.9
August	1.440	1.860	0.196	0.36	0.036	0.045	0.0158	0.0217	1.340	2.600	0.063	0.087	0.00273	0.00420	1.300	1.900	4.5	8.4	6.1	7.0
September	1.459	2.107	0.30	0.46	0.039	0.045	0.01422	0.0166	1.020	1.600	0.078	0.092	0.00212	0.00331	1.250	1.600	5.0	7.3	6.3	7.0
October	1.510	2.520	0.52	0.81	0.045	0.062	0.0053	0.0096	0.220	0.460	0.061	0.087	0.00040	0.00046	0.270	0.370	6.3	11.1	6.3	8.0
November	1.803	2.229	3.54	7.00	0.0088	0.015	0.0073	0.0148	0.637	1.700	0.041	0.075	0.00078	0.00221	0.590	1 900	8.0	14.1	6.6	9.3
December	1.817	2.107	0.59	1.14	0.033	0.066	0.0054	0.0120	0.224	0.510	0.038	0.061	0.00040	0.00099	0.223	0.562	9.8	27.6	7.1	9.8

1/ Discharge parameters are expressed in units of mg/l unless otherwise indicated.

Table 3

Outfall 001 Discharge Monitoring Data (1988)[1/]

	Flow (mgd)		Antimony		Arsenic		Cadmium		Copper		Lead		Mercury		Zinc		Total Suspended Solids		pH (pH units)	
Month	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.	Min.	Max.
January	0.3341	0.8597	0.274	0.357	0.010	0.022	0.0071	0.0190	0.055	0.070	0.011	0.029	0.00021	0.00030	0.071	0.131	1.4	5.0	7.0	7.8
February	1.1534	1.4933	0.107	0.168	0.017	0.020	0.004	0.004	0.027	0.038	0.020	0.020	0.00016	0.00022	0.073	0.087	10.3	22.9	6.7	7.3
March	1.0958	1.2802	0.100	0.208	0.023	0.032	0.004	0.005	0.013	0.015	0.022	0.026	0.00015	0.00015	0.084	0.100	20.0	32.3	6.7	7.1
April	1.3104	1.8619	0.440	0.701	0.200	0.400	0.004	0.004	0.047	0.092	0.028	0.043	0.00017	0.00023	0.056	0.094	21.3	33.2	6.7	7.8
May	1.0728	1.6286	0.267	0.491	0.037	0.081	0.004	0.004	0.122	0.207	0.025	0.036	0.00015	0.00015	0.817	1.600	5.3	8.9	6.6	7.6
June	1.587	1.862	0.341	0.602	0.036	0.049	0.004	0.004	0.269	0.591	0.020	0.020	0.00019	0.00025	0.592	0.993	4.6	7.7	6.9	7.6
July	1.780	1.984	0.528	0.791	0.085	0.144	0.004	0.004	0.182	0.320	0.020	0.020	0.00015	0.00021	0.287	0.592	4.6	10.9	6.8	7.5
August	1.9570	2.2291	0.207	0.469	0.033	0.090	0.004	0.004	0.319	0.503	0.023	0.025	0.00028	0.00043	0.207	0.469	4.1	8.1	7.1	7.7
September	1.790	2.107	0.261	0.565	0.020	0.026	0.004	0.004	0.228	0.267	0.020	0.025	0.00041	0.00096	0.262	0.288	4.7	7.7	6.9	7.7
October	1.9267	2.1067	0.067	0.479	0.067	0.173	0.004	0.004	0.331	0.835	0.012	0.023	0.00038	0.00078	0.337	1.220	7.1	17.0	7.1	9.8
November	1.9526	2.3587	0.630	0.816	0.121	0.213	0.004	0.004	0.135	0.250	0.020	0.020	0.00015	0.000225	0.482	1.130	11.4	26.3	6.8	9.6
December	1.692	1.862	0.154	0.511	0.145	0.212	0.004	0.004	0.249	0.410	0.023	0.034	0.00028	0.00056	0.154	0.511	8.8	19.6	6.6	9.3

1/ Discharge parameters are expressed in units of mg/l unless otherwise indicated.

Table 4

Outfall 001 Discharge Monitoring Data (1989)[1/]

	Flow (mgd)		Antimony		Arsenic		Cadmium		Copper		Lead		Mercury		Zinc		Total Suspended Solids		pH (pH units)	
Month	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.	Min.	Max.
January	2.0434	2.2291	0.398	0.603	0.147	0.326	0.005	0.006	0.198	0.368	0.020	0.020	0.00025	0.00038	0.244	0.730	7.7	16.7	6.9	8.9
February	2.200	2.359	0.398	0.459	0.140	0.321	0.004	0.004	0.239	0.316	0.025	0.036	0.00024	0.00032	0.211	0.625	10.8	37.5	7.2	[illegible]
March	2.2421	2.7907	0.638	1.500	0.445	0.801	0.005	0.007	0.114	0.350	0.020	0.020	0.00025	0.00034	0.062	0.120	10.6	23.4	6.8	8.9
April	2.212	2.359	0.546	0.845	0.153	0.198	0.004	0.004	0.143	0.193	0.020	0.020	0.00022	0.00030	0.138	0.194	6.6	14.9	7.0	8.5
May	2.091	2.657	0.567	1.080	0.273	0.567	0.004	0.004	0.088	0.260	0.020	0.020	0.00020	0.00038	0.096	0.181	11.0	27.9	6.8	8.6
June	2.1989	2.6568	0.997	2.69	0.168	0.227	0.0048	0.007	0.445	0.952	0.0205	0.022	0.00080	0.00111	0.105	0.141	4.1	7.4	6.8	8.0
July	2.1830	2.3587	0.995	2.33	0.010	0.206	0.004	0.004	0.225	0.450	0.02	0.02	0.00044	0.00098	0.275	0.853	4.0	7.0	6.9	8.1
August	2.1082	2.3587	2.30	3.33	0.344	0.833	0.004	0.006	0.034	0.071	0.02	0.02	0.00022	0.00033	0.051	0.131	5.3	11.0	7.1	9.0
September	1.8763	2.9275	1.793	3.29	1.58	2.49	0.0045	0.005	0.146	0.432	0.025	0.030	0.00063	0.00155	0.224	0.817	7.2	26.9	7.0	9.0
October	2.0146	2.5200	0.443	0.659	0.093	0.212	0.004	0.004	0.266	0.47	0.03	0.03	0.00162	0.0027	0.201	0.427	5.9	14.7	7.3	[illegible]
November	2.0304	2.7907	0.555	0.637	0.855	1.441	0.005	0.007	0.794	2.49	0.03	0.03	0.00106	0.00187	0.131	0.251	9.9	19.2	7.0	9.2
December	1.9843	2.5200	0.114	0.264	0.114	0.178	0.004	0.004	0.198	0.280	0.030	0.030	0.00054	0.00070	0.030	0.058	2.7	19.6	7.4	9.6

1/ Discharge parameters are expressed in units of mg/l unless otherwise indicated.