M/045/017

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BARRICK RESOURCES (USA) INC.
Barrick Mercur Gold Mine
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December 2, 1997

Tom Munson, Senior Reclamation Specialist
Utah Department of Natural Resources
Division of Oil, Gas and Mining
Box 145801,
1594 West North Temple, Suite 1210
Salt Lake City, 84114

Dear Mr. Munson:

Re: November 14, 1997 Letter Regarding the Post-Closure Surface Water Runoff Monitoring of the Golden Gate Basin Mercur Mine

Global Environmental Technologies, L.L.C., was retained by Mercur to prepare the following response to your letter dated November 14, 1997 addressing the monitoring of surface water runoff to the Golden Gate Basin (GGB). This information clarifies and supports previous information submitted to or discussed with either/both UDOGM and UDWQ.

Questions included in your letter of November 14 include the following:

1. ***Please provide a map, which shows the location of current monitoring points, and any future monitoring points. Please include the parameters which will be monitored and how this will be done.***

Figure 1, attached to this letter, is a portion of the map entitled "Post Reclamation Mine Drainage", map 5.5-1 which was prepared by JBR Environmental Consultants, Inc. for Barrick. This map was recently updated on October 31, 1997 to include surface water runoff channel modifications. This map illustrates that surface water runoff (stormwater) will be channeled towards the GGB from two locations. These locations include 1) the Golden Channel to Pit, North (entering the basin on the central and north side), and; 2) the East Channel to Pit (entering from the most eastern side of the basin). The North

drainage collects stormwater runoff from Reservation Canyon below the dam, from Meadow Canyon to the north, and from the Rover Subbasin to the northwest. The east channel will collect stormwater from the Mercur Pit Subbasin to the south of the GGB. Stormwater runoff from both locations will be monitored, as detailed in sections 4.1 and 4.2 of the October 4, 1997 report "Golden Gate Basin Post-Closure Surface Water Monitoring, Barrick Resources (USA) – Mercur Mine". Surface water sampling parameters that will be monitored in the GGB were also presented in the October 4 report in Table 4-1. This table has been provided as an attachment to this response. These parameters are routinely monitored by Barrick as a part of the QA/QC sampling performed for the Mercur Ground Water Quality Discharge Permits UGW450001 and UGW450002.

2. ***Please provide a detailed physical channel description of how and where the surface water will be routed into the pit to prevent future erosional problems upstream of the pit.***

A detailed description of the surface water conveyances in Mercur Canyon is presented in the document "Barrick Resources (USA), Inc. Mercur Mine Notice of Intention to Revise Mining Operations to the Division of Oil, Gas and Mining", prepared by JBR Consultants, dated January 1996. It is Barrick's intention that surface stormwater runoff will be channeled into the GGB from both entry points shown on the attached map through the use of engineered concrete conveyances. These conveyances will allow surface water runoff to be directed from the engineered surface water channels in Mercur Canyon into the GGB, and minimize the potential for upstream erosion of surface materials.

3. ***It was observed that one of the water quality samples had cyanide in it. Why was this?***

Levels of cyanide in the one sample from the "Drill and Blast Yard Ramp" were slightly elevated (0.19 mg/l free cyanide) because runoff has contacted disturbed areas and historic mining tailings (Golden Gate Tailings) that had not yet been removed for processing as of the sample date. Once reclamation has been completed, it is anticipated that runoff volume will be decreased, and runoff that is available to the GGB will improve in quality.

Surface water runoff was sampled on three occasions during February and March 1997. Runoff was sampled from 1) the drill and blast yard ramp, and 2) from the east and southwest ramps into the GGB. Runoff was collected during a period of snowmelt. Samples could only be collected from the disturbed and unreclaimed ramp areas. No runoff samples were available from revegetated areas due to rapid surface water infiltration where reclamation has already been completed.

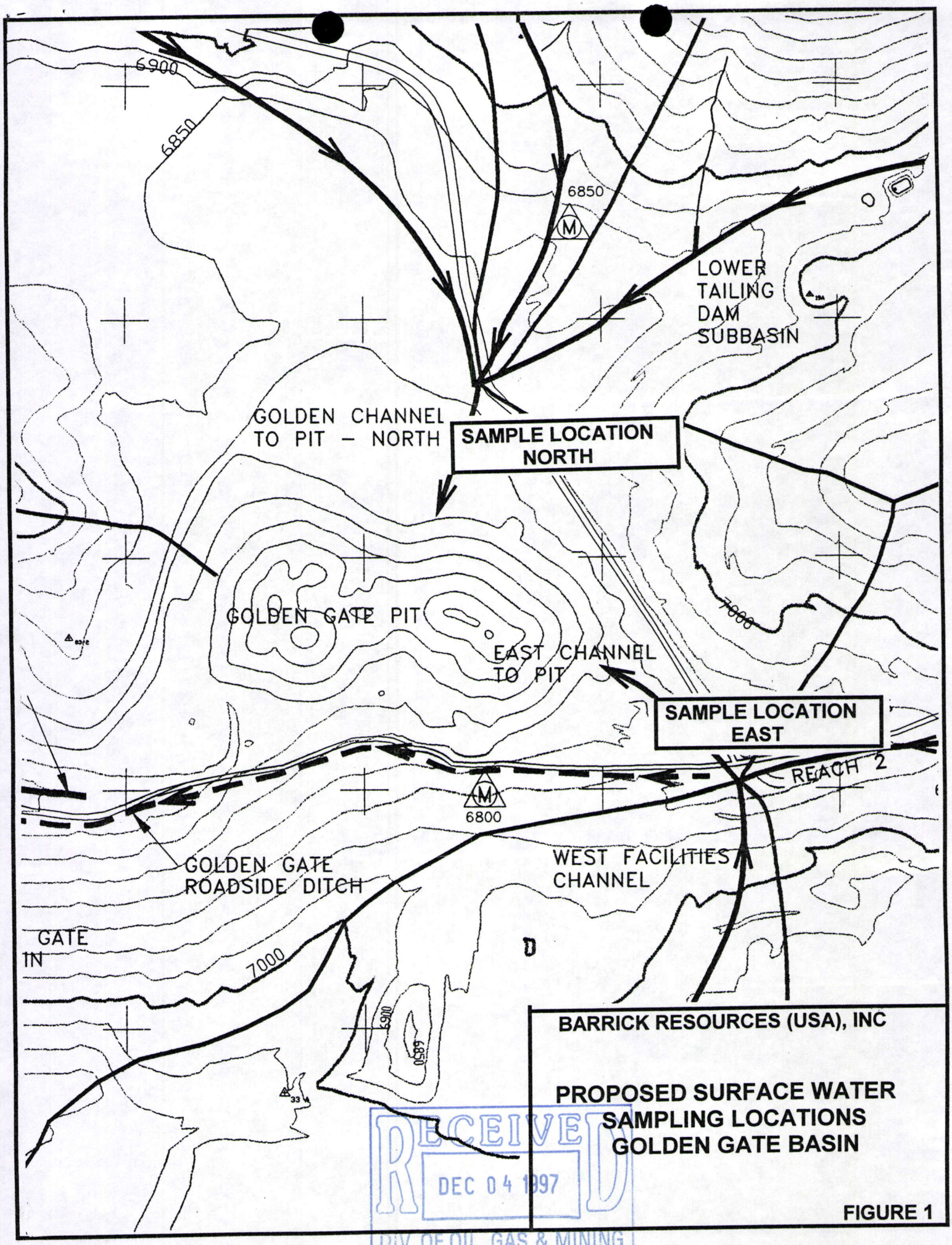
We believe that these responses will provide you with the information necessary to evaluate the proposal for the monitoring of incidental surface water runoff that will be routed into the Golden Gate Basin. If you require any additional information regarding these responses, or information regarding previously submitted documents, please contact me or Mr. Dave Beatty at 268-4447, extension 335.

Sincerely;

Glenn M. Eurick
Director, Environmental Relations US

C: M. Wright (UDOGM)
Dave Beatty (BMM)
John S. Brown (GET)
B. Buck (JBR)

Attachments: Table 4-1
Figure



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PROPOSED SURFACE WATER
SAMPLING LOCATIONS
GOLDEN GATE BASIN

FIGURE 1

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TABLE 4-1

GOLDEN GATE BASIN WATER SAMPLE ANALYTES

Parameter	Units	Limit	Detection Methodology[b]	Reference See 1,2,3,4 (and 5 below)	Maximum Holding Time
Sodium	mg/l	1.0	ICP	6-200.7	6 months
Phosphate as PO_4-P	mg/l	0.01	Colorimetric	2-4500E	28 days
Potassium	mg/l	1.0	AAS/ICP	1-258.1;6-200.7	6 months
Calcium	mg/l	1.0	AAS/ICP	1-215.1;6-200.7	6 months
Magnesium	mg/l	1.0	AAS/ICP	1-242.1;6-200.7	6 months
Chloride	mg/l	0.5	Titrimetric	1-325.3	6 months
Fluoride	mg/l	0.1	Colorimetric	1-340.2	28 days
Sulfate	mg/l	5	Turbidimetric/Gravimetric	1-375.4	28 days
Carbonate as CO3 at pH 4.5	mg/l	1	Titrimetric/Calculated	1-310.1;2-2320B 2-404	24 hours
Carbonate Alkalinity as $CaCO_3$ at pH 8.3	mg/l	5	Titrimetric	4-D1067-92B; 1-310.1; 2-2320B	14 days
Bicarbonate Alkalinity as HCO_3 at pH 4.5	mg/l	5	Titrimetric	4-D1067-92B; 1-310.1; 2-2320B	14 days
Hardness as $CaCO_3$	mg/l	5	EDTA	1-130.2	48 hours
Hardness (non-carb) as $CaCO_3$	mg/l	5	EDTA	1-130.2	48 hours
Hardness (T) as $CaCO_3$	mg/l	5	Calculation	2-2340B	48 hours
Hydroxide as OH	mg/l	0	Calculation	2-2320B	48 hours
Nitrate as N	mg/l	0.1	Colorimetric	2-353.1	24 hours
Nitrite	mg/l	0.005	Colorimetric	1-354.1	48 hours
Total Cations	meq/l	0.1	Calculation	2-104C-	
Total Anions	meq/l	0.1	Calculation	2-104C-	
Difference	%	0.1	Calculation	2-104C-	

TABLE 4-1 (Continued Page 2)

Parameter	Units	Limit	Detection Methodology[b]	Reference See 1,2,3,4 (and 5 below)	Maximum Holding Time
Trace Metals (D and T)[a]					
Aluminum	mg/l	0.1	AAS/ICP	1-202.1; 6-200.7	6 months
Ammonia as NH^3-N	mg/l	0.2	Electrode	1-350.3;2-4500F	28 days
Arsenic	mg/l	0.01	ICP	6-200.7	6 months
Barium	mg/l	0.01	ICP	6-200.7	6 months
Boron	mg/l	0.05	Colorimetric/ICP	2-404-A; 6-200.7	6 months
Cadmium	mg/l	0.002	ICP	6-200.7	6 months
Chromium	mg/l	0.01	ICP	6-200.7	6 months
Chromium, hexavalent	mg/l	0.01	Colorimetric	1-218.4;7-307B	24 hours
Copper	mg/l	0.01	ICP	1-200.7	6 months
Cyanide (Free)	mg/l	0.002	Colorimetric	4-D-2036	14 days
Cyanide (Amenable)	mg/l	0.002	Colorimetric	4-D-2036	14 days
Cyanide (Total)	mg/l	0.002	Colorimetric	4-D-2036	14 days
Cyanide (Weak Acid Dissociable)	mg/l	0.002	Colorimetric	4-D2036	14 days
Gold	mg/l	0.01	AAS/ICP	1-231.1; 6-200.7	6 months
Iron	mg/l	0.01	AAS/ICP	1-236.1;6-200.7	6 months
Lead	mg/l	0.005	ICP/GFAA/ICP	6-200.9; 6-200.7	6 months
Manganese	mg/l	0.01	AAS/ICP	1-243.1; 6-200.7	6 months
Mercury	mg/l	0.0002	Cold Vapor/AAS	6-245.1; 3-7470	6 months
Magnesium	mg/l	0.1	AAS/ICP	1-242.1; 6-200.7	6 months
Nickel	mg/l	0.01	ICP	6-200.7	6 months
Selenium	mg/l	0.002	ICP	6-200.7; 6-200.8; 6-200.9	28 days
Silica as SiO_2	mg/l	0.1	ICP	6-200.7	6 months
Silver	mg/l	0.01	AAS/ICP	1-272.1; 6-200.7	6 months
Thallium	mg/l	0.002	ICP/MS	6-200.8	6 months
Zinc	mg/l	0.01	AAS/ICP	1-289.1; 6-200.7	6 months

TABLE 4-1 (Continued Page 3)

Parameter	Units	Limit	Detection Methodology[b]	Reference See 1,2,3,4 (and 5 below)	Maximum Holding Time
Other Parameters					
pH(Field)	units	0.01	Electrometric	1-150.1; 1-150.2	Immediate
Specific Conductance at 25°C (Field)	umhos/cm	1	Conductance	1-120.1;2-205; 4-D-1125-91A	28 days
Total Dissolved Solids	mg/l	10	Gravimetric, 180°C	1-160.1;2-209B	7 days
Total Suspended Solids	mg/l	2	Gravimetric, 105°C	1-160.2	7 days
Turbidity	ntu units	0.1	Turbidimeter	1-180.1	24 hours
Temperature (Field)	degrees	0.5	Thermometric	2-3111B	Immediate

References

(1) "Methods for Chemical Analysis of Water and Wastes," EPA-6000/4-79-020, EMSL, Cincinnati, March 1983
(2) "Standard Methods for the Examination of Water and Wastewater," 16th Edition, APHA, 1985.
(3) "Test Methods for Evaluating Solid Waste," EPA Publication SW-846, 3rd Edition.
(4) "Annual Book of ASTM Standards, 1994, Vols. 11.01 and 11.02, American Society for Testing and Materials.
(5) "Standard Methods for the Examination of Water and Wastewater," 18th Edition, American Public Health Association, 1992.
(6) "Methods for the Determination of Metals in Environmental Samples-Supplement I", EPA-600/R-94-111, May 1994.
(7) "Standard Methods for the Examination of Water and Wastewater," 17th Edition, APHA, 1987.

Notes

Detection limits are limits which are the best achievable with the listed analytical method. Interferences in specific samples may result in a higher detection limit. Detection limits of 0.002 for the cyanides can be achieved by adjusting the sample volume and cell size of the spectrophotometer. A detection limit of 0.01 for nickel can be achieved by concentrating the samples. These methodologies have been approved by EPA.

a All metals from water samples will be analyzed for dissolved (D) metals (0.45u filtered) except Mercury which will be for total (T) metals (unfiltered, preparation method 3010 and 3020).
b Either of the EPA accepted methods shown may be used for analysis
ICP indicates Inductively-coupled plasma methods
MS indicates Mass Spectrometry
AAS indicates Atomic Adsorption Spectroscopy
EDTA is Ethylenediamine Tetraacetate used in titrations