INTERNATIONAL FINANCE CORPORATION

ENVIRONMENTAL AND SOCIAL PERFORMANCE

ANNUAL MONITORING REPORT (AMR)

MONTANA EXPLORADORA DE GUATEMALA, S. A.
MARLIN MINE

REPORTING PERIOD: 2005

AMR COMPLETION DATE: MARCH 31, 2006

TABLE OF CONTENTS

TABLE OF FIGURES

TABLE OF TABLES

1.0 INTRODUCTION AND BACKGROUND

The 2005 Annual Monitoring Report (AMR) is prepared pursuant to conditions of the Loan Agreement between Montana Exploradora de Guatemala, S. A. (Marlin) and the International Finance Corporation (IFC) (Investment Number 21766, June 30, 2004). Schedule 9 of the Loan Agreement specifies the terms and conditions of the AMR relating to Environmental (including social impacts and community development) and Health and Safety matters.

The AMR has been prepared to confirm compliance of the Marlin Mine with the applicable national and local requirements, IFC environmental guidelines and social policies, and the Environmental and Social Impact Study approved for the Marlin Mine. Specific components of the AMR are presented below:

- A description of all significant health & safety, environmental and social activities and events that occurred during the reporting period.

- Provision of additional information about activities (i.e., status of permits or other approvals, ongoing public consultation, etc.).

- Quantitative performance monitoring data summaries in comparison to appropriate World Bank Group (WBG) and International Finance Corporation (IFC) guidelines and national requirements.

- An explanation of any cases of non-compliance with WBG/IFC guidelines or applicable regulatory limits that have occurred, identifying the cause and the corresponding corrective measures planned or underway to prevent future occurrences.

1.1 Annual Monitoring Report Certification

AMR Certification

IFC Project Identification: Marlin Mine
IFC Project Sponsor: Glamis Gold Ltd.
IFC Investment Numbers: 21766
AMR reporting period: 01/01/2005 – 12/31/2005
Montana Exploradora de Guatemala, S. A. authorized representative: Milton Estuardo Saravia

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The 2005 AMR was prepared by Blankenship Consulting LLC, an independent consulting firm. The social portions were based on information provided by Montana Exploradora de Guatemala, S.A. and Fundación Sierra Madre. The environmental sections were prepared from information provided by Montana and from environmental monitoring reports prepared by Consultoría y Tecnología Ambiental, S.A., an independent environmental consulting firm.

The undersigned certify that the data contained in this AMR completely and accurately represent environmental and social issues for the Marlin Mine during this reporting period, as per the Loan Agreement for IFC's investment number 21766, and further certify that analytical data summaries incorporated into this report are based upon data collected and analyzed in a manner consistent with the World Bank Group's *Pollution Prevention and Abatement Handbook*, *Monitoring*.

Montana Exploradora de Guatemala, S. A., *Milton Estuardo Saravia*	*Signature/Date*
Blankenship Consulting LLC *George Blankenship*	*Signature/Date*
Consultoría y Tecnología Ambienta, S. A.l *Dr.- Ing. Adrián Juárez Pineda*	*Signature/Date*

2.0 PROJECT STATUS

Construction of Marlin Mine mining and administrative facilities was completed during 2005 and mining and processing of ore was initiated.

2.1 Construction

Earth Work

- Rock excavation, compaction and structural fill work were completed in March 2005 for all process plant components, and for the office, warehouse and maintenance buildings. This work was performed by the earth work contractor, Sococo.

- Development of the run-of mine (ROM) ore stock pile was completed in August; construction of haul roads to the crusher, shop and underground mine was completed in October. The majority of this work was performed "in house" by the surface mine fleet and personnel.

- Final grading and drainage work was completed in November. The fence around the process plant and raw water pond was also completed in November and also performed by Sococo.

Concrete

- Concrete work for the refinery was completed in March.

- The pad for reagent storage and the foundation for maintenance shop and mills were completed in May.

- Concrete work for the electrical sub-station, counter current decantation (CCD), leach areas, warehouse and mobile equipment shop work was completed in June.

- Concrete work for the crusher was completed in July.

All concrete work was performed by the contractor IASA.

Camp

- Construction of the worker residential camp, including kitchen, dining area, electrical installation and potable water and wastewater systems was completed in March. All work was performed by the contractor CVG, S. A.

Buildings

CVG, S.A also constructed the office and ancillary buildings which were completed as follows:

- Administration buildings were completed in May.

- Training, health clinic and employee locker buildings were completed in June.

- The truck shop, plant maintenance buildings, refinery, warehouse and reagent storage areas were completed in August.

- The support buildings for the underground mine were completed in September. 5

- Construction of the crusher, reclaim tunnel, feeders and conveyors, sag mill, ball mill, CCD and leach tanks was completed in August.

- Construction of the tailings detoxification system, Merrill Crowe gold recovery plant and electrical sub-station were also completed in August.

- The diesel fuel storage station was completed at the end of September. A foam fire suppression system was ordered late in the year to fulfill requirements of the final permits for use of the station.

- Installation of piping to the plant, and connection of potable water to the process plant, camp, offices, underground mine was completed in September. Installation of the return water line from the tailings impoundment was also completed in September.

- Installation of electrical systems for the crusher, conveyor belts and mills was completed in July; electrical systems for the CCD, leach area, reclaim water pumps and fuel station were installed in September.

Power Line

- Construction of the electric power transmission line was completed in July. The line was energized in November and limited power consumption authorized in December.

During 2005, power for the plant was provided by Aggreko, a vendor and operator of on-site electric power generators.

2.2 Commissioning

- The crusher was commissioned in August of 2005.

- The grinding circuit, Merrill Crowe plant and the refinery were all commissioned in October.

2.3 Mining

Marlin Mine mining activities were initiated in 2005 at both surface and underground mining locations.

Surface Mine

Open pit mining began in July 2005, when the initial access road was cut. The ore body was reached in early August, and ore was stockpiled until plant startup in late October.

A total of 375,509 tonnes or ore was mined, at an average grade of 5.83 g/t gold and 62.85 g/t silver. This ore contained roughly 70,000 oz. of gold and 760,000 oz. of silver. Waste stripping totaled 577,387 tonnes for the year. The majority of this material was placed in the upper area of

the waste dump, or used for construction of the lower waste dump access road. Approximately 50,000 tonnes of potentially acid generating waste was placed in the Area 5 waste dump for encapsulation.

There were 2,443 blastholes drilled in the pit for a total of 17,422 meters drilled. Explosives use totaled 74.9 tonnes. Use of explosives was limited due to the nature of the material being mined, mostly soft material with very little hard rock.

The following table summarizes the material movement from the pit in 2005.

Table 1. Marlin Mine Surface Mine Production

		Aug 2005	Sep 2005	Oct 2005	Nov 2005	Dec 2005	Total 2005
Ore	tonne	86,925	23,334	8,211	107,568	149,471	375,509
Grade Au	gr/t Au	10.18	4.35	7.26	3.88	4.84	5.83
Oz. Au	Au oz	28,462	3,263	1,916	13,423	23,268	70,333
Grade Ag	gr/t Ag	79.64	44.75	45.42	52.27	64.48	62.85
Oz. Ag	Ag oz	222,584	33,572	11,990	180,773	309,863	758,782
Waste	tonne	24,198	100,557	122,943	152,287	177,402	577,387
Total	tonne	111,123	123,891	131,154	259,855	326,873	952,896

Underground Mine

Development advance in the underground mine was 2,814 meters, 101.7% of the planned advance for the year. Advance occurred in the main, ventilation, 2000 and 1980 access ramps.

A total of 202,560 tonnes was mined from the underground mine; 9,865 of ore, at an average grade of 22 g/t Au and 420 g/t Ag, containing 6,977 ounces of gold and 133,210 ounces of silver and 192,695 tonnes of waste

Construction of the backfill batch plant was completed in December.

2.4 Production

Process

- A total of 125,727 tonnes of ore were processed during 2005:
    - 741.032 kgs (23,825oz) of gold
    - 4,894.46 kgs (157,361oz) of silver
    - Gold recovery was calculated to be 86.3% and silver was 56.2%. This is still during start-up and it is believed both gold and silver recovery will increase.

Operations were interrupted for a period of two weeks after Hurricane Stan due to a shortage of diesel fuel. The mine was not affected by the storm, but all major highways and roads in Guatemala were seriously damaged, thus hampering fuel deliveries to the mine. However, the

road and bridge constructed by the company become the only access for the highlands part of San Marcos, facilitating the shipment of emergency supplies to the areas affected.

2.5 Exploration

Exploration activity in the Marlin district in 2005 included extension and definition drilling in the La Hamaca area and extension drilling in the West Vero/Cancil target areas. La Hamaca is a satellite deposit three kilometers north of Marlin. West Vero/Cancil is a prospective exploration project located approximately one kilometer south of Marlin.

Drilling at La Hamaca was carried out between January to April and again in August to October, 2005. A total of 43 core holes totaling 10,885 meters were completed on both privately-owned and company-owned land. A total of 26 holes for 8,168 meters were completed in the West Vero target area between May to July, and November to December, 2005 on privately-owned land. A fixed fee of 1,000 quetzales was paid to land owners for each exploration hole drilled on their land.

Drilling in both areas was carried out by Kluane Drilling, an independent Canadian contractor that worked under the direction of Montana Exploradora geologists. A man-portable Hydrocore Gopher drill was utilized to minimize surface disturbance. At each location a total of 25-35 local residents were employed by Montana Exploradora to transport the drill, prepare drill platforms, and deliver drill materials and samples during the course of the projects. Local residents remained employed by Montana for several weeks following each drill campaign to mitigate disturbance through re-contouring drill sites, reseeding disturbed areas and planting trees.

2.6 Reforestation (Forest Incentives Program)

The Marlin Mine reforestation campaign is part of the Forestry Management Plan presented to and approved by the Instituto Nacional del Bosque (INAB). Reforestation was described in this Plan as compensation for the direct impact of tree cutting within the project footprint. Additionally, the Fundacion Sierra Madre, with support from Montana, conducts community environmental awareness, agroforestry and reforestation activities, which are described in a subsequent section of this AMR.

Reforestation during 2005 occurred both within the project area and in the surrounding municipalities of San Miguel Ixtahuacán y Sipacapa under the *Incentivos Forestales* program. Under this program, private landowners are paid incentives for planting and caring for trees. The incentives are paid for five years. In addition to cash incentives, participating landowners receive technical assistance from the company for ground preparation, fertilizers, insect control, etc. for the first five years, after that period the land owner is completely responsible for the care of the trees.

Last year (2005) was the second reforestation year and 63 hectares were approved by INAB for tree cutting on the Marlin Mine; however, 21 hectares were actually affected in 2005. It is anticipated that close to the proposed 63 hectares will be affected over time, however, this will be completed post 2005. For this reason, the full 63 hectares were reforested in 2005 as required. Additional hectares were also reforested in 2005; however, these will be credited during 2006 for that year's requirement.

Since the inception of the *Incentivos Forestales* program, Montana has paid over Q286,000 (US$36,600) to a total of 135 families for planting and caring for trees on their land.

2.7 Employment

During 2005, four types of workers were employed on the Marlin Mine: 1) employees of mine construction contractors; 2) salaried Montana employees who worked directly for the company on mine construction and/or operations activities; 3) Montana contract employees who were temporarily employed by the company to perform a variety of construction or maintenance tasks; and 4) Montana rotational employees who were temporarily employed by the company in two shifts, each shift working one week at a time. This system was implemented in response to requests from local officials for the company to provide employment for a greater number of local area residents. Montana employed an average of 180 rotational workers/month during 2005. Rotational employees have continued on the payroll after completion of construction; there were 265 rotational workers on the payroll in December, working on a variety of maintenance, environmental restoration and municipal road maintenance and improvement tasks.

As shown in Figure 1, total Marlin Mine employment (construction and operations) peaked during April at a total of 2,339 workers.

FIGURE 1. MARLIN MINE EMPLOYEES BY PLACE OF RESIDENCE WHEN HIRED: JANUARY – DECEMBER 2005

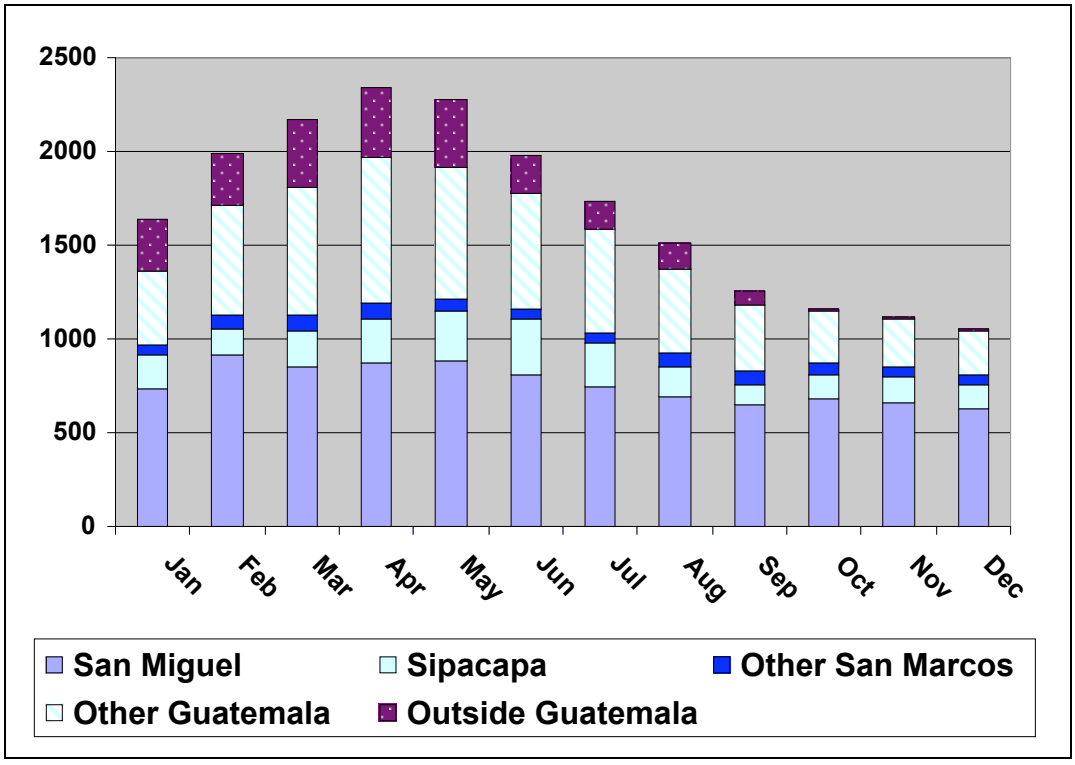


Figure 2 displays annual average employee place of residence data for 2005. An average of 89 percent of all workers employed at the Marlin Mine were Guatemalan residents; 45 percent were from the municipality of San Miguel Ixtahuacán (San Miguel), 11 percent were from the municipality of Sipacapa. Virtually all of the workers from San Miguel and Sipacapa were indigenous.

Figure 3 displays Marlin Mine workforce by type of employment. During 2005, an average of 54 percent of all Marlin Mine workers were employed by construction contractors, 11 percent were Marlin Mine rotational workers, 9 percent were other Marlin Mine contract workers and 26 percent were Montana direct employees.

FIGURE 2. MARLIN MINE EMPLOYEES BY PLACE OF RESIDENCE WHEN HIRED: 2005 AVERAGE

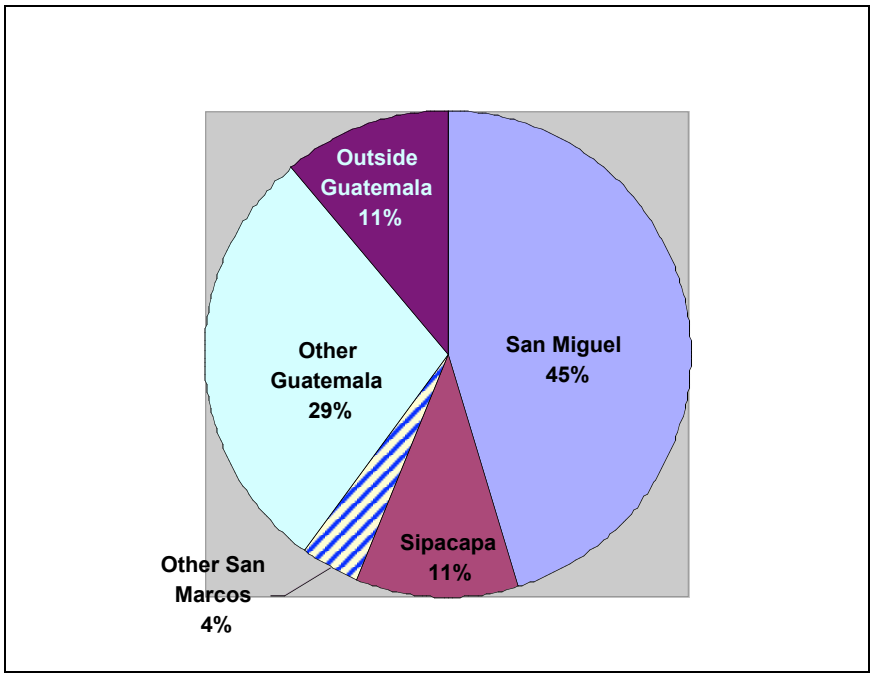


FIGURE 3. MARLIN MINE EMPLOYEES BY EMPLOYMENT TYPE: 2005 AVERAGE

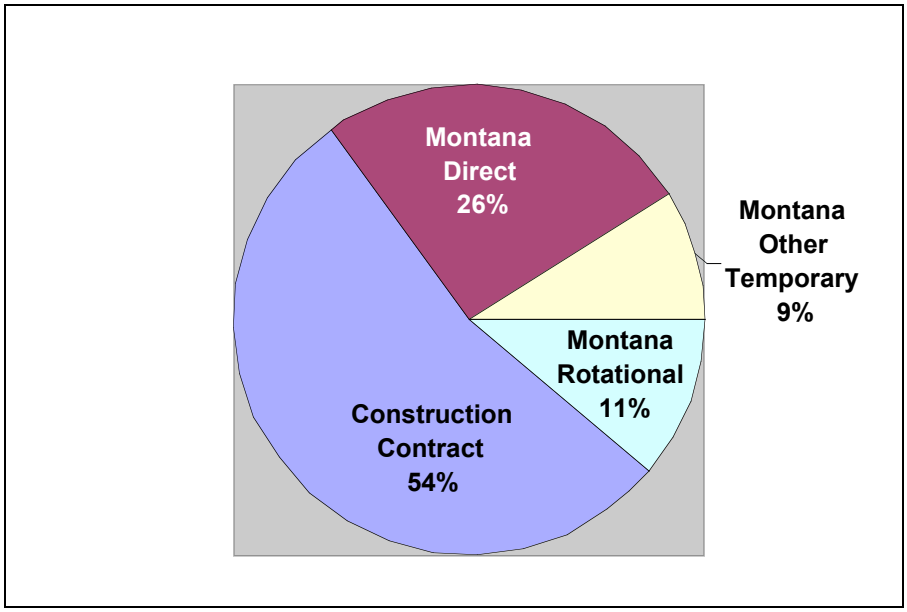


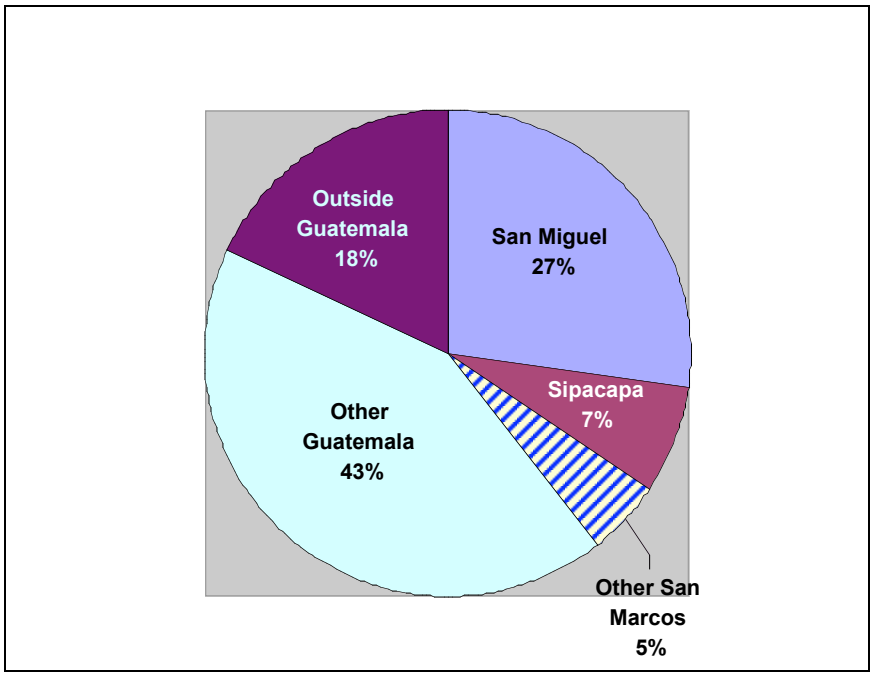
TABLE 2. MARLIN MINE OPERATIONS EMPLOYMENT BY PLACE OF RESIDENCE WHEN HIRED: DECEMBER 2005					
	Place of Residence When Hired				
	San Miguel	Sipacapa	Elsewhere in San Marcos Department	Elsewhere in Guatemala	Outside Guatemala
Montana Operations Employees	295	41	47	167	6
Percent	53%	7%	8%	30%	1%

Table 2 displays place of residence information for Marlin Mine operations employees as of the end of December 2005. Of the total, 99 percent were Guatemalans; 53 percent were from San Miguel and 7 percent were from Sipacapa.

2.8 Payroll

The 2005 payroll (all worker types) for the Marlin Mine totaled over US $11 million. Of that amount, 81 percent ($8.9 million) was paid to Guatemalan employees, 26 percent ($2.8 million) was paid to employees from San Miguel and 7 percent ($0.8 million) was paid to employees from Sipacapa (see Figure 4).

FIGURE 4. TOTAL 2005 MARLIN MINE PAYROLL BY EMPLOYEE'S PLACE OF RESIDENCE



2.9 Employee Benefits

Montana full-time direct employees receive the benefits listed below. Rotating employees[1] and their families receive health care treatment at the company health clinic, as do all residents of communities near the project, but they do not receive life, medical or dismemberment insurance. Temporary employees are paid on a daily basis and receive no benefits.

- Health insurance for Montana employees and their families.
- Health care: Marlin Mine employees and their families can receive treatment at the health clinic located at the mine site.
- Life insurance.
- Accidental death and dismemberment insurance.
- Overtime pay.
- 14th salary bonus: a bonus equal to one month's salary for employees that have worked a full year (prorated for those that have worked for less than one year).
- Christmas bonus: also a bonus equal to one month's salary for employees that have worked a full year (prorated for those that have worked for less than one year), calculated from December 1 through November 30.
- 15 days vacation/year.
- Social Security.
- IRTRA (Instituto de Recreación de Trabajadores de la Empresa Privada de Guatemala), an institution which provides recreation facilities for employees of private entities.
- Transportation is provided to and from the mine site daily from San Miguel, Sipacapa, San José Nueva Esperanza, San Antonio, Máquivil, and Huehuetenango.
- Safety equipment: all Marlin Mine workers are provided with the safety equipment required for their particular job.

2.10 Employee Training

The Marlin Mine provides a variety of training for all employees. Table 3 displays training received during 2005, excluding social and environmental training, which are reported under subsequent sections this AMR.

[1] Montana hired an average of 148 per month on a rotating basis during 2005. Rotation, in which an employee works for several weeks/month, allows Montana to employee more local residents of communities.

TABLE 3. MARLIN MINE EMPLOYEE TRAINING: 2005

Job Classification	Number Trained				Training Description	Certification
	Male	Female	Indigenous	Total		
Administrative Personnel		2		2	Management Assistance	Y
Office Manager		1		1	Management Skills	Y
Supervisors & Above	20		3	20	Industrial Safety through Preventative Observation	Y
HR Assistance		1		1	Recruiting and hiring skills	Y
Kitchen Personnel	30		30	30	International Cuisine	N
All personnel				167	Safety Department provides an induction in safety to new hires	Y
Supervisors & Above				28	Cyanide Handle by DuPont	N
Supervisors & Above	6			6	Radiation Safety Course	Y
Supervisors	12			12	Train the Trainers	Y
All personnel				3064	Safety annual training program	N
Plant technical personnel	23			23	Mando y Control de motores eléctricos a través de sensores y Plc	Y
Plant technical personnel	23			23	Mantenimiento industrial básico	Y
Plant technical personnel	4			4	7009 Impementos del Sistema Delta V	Y
Plant technical personnel	4			4	7024 Administración Delta V para XP Server 2003	Y
Plant technical personnel	4			4	7032 Sistemas diapositivos Fieldbus	Y
Truck Operators personnel	22	2	19	24	777D Truck Operation	Y
Truck Operators personnel				24	Water Truck Operation (In house training)	
Truck Operators personnel				24	Operación de IT 28 (In house training)	
Truck Operators personnel				4	Operación de Cargador 988	Y
Truck Operators personnel				4	Operación de motoniveladora	Y
Truck Operators personnel				24	Operación Cargador 4-2D11 (In house training)	
Truck Operators personnel	2			2	Operación Perforadora Drill	Y
Truck Operators personnel				24	Operación de Excavadora (In house training)	Y

TABLE 3. MARLIN MINE EMPLOYEE TRAINING: 2005						
	Number Trained					
Job Classification	Male	Female	Indigenous	Total	Training Description	Certification
Truck Operators personnel				6	Operación Cargador 992	Y
Truck Operators personnel				24	Operación Retro excavadora 790 (In house training)	
Truck Operators personnel				4	Operación de tractor D6R	Y
Truck Operators personnel				6	Operación de tractor O.Q.R	Y
Plant Operators				24	Trituración, Molienda y Circuito por gravedad (IHT)	
Plant Operators				16	Lixiviación, decantación contra corriente (IHT)	
Plant Operators				14	Refinería y MC (IHT)	
Underground personnel					Manejo de explosivos (IHT)	
Mechanics				9	Hidrauilica básica	Y
Mechanics				9	Electricidad básica	Y
Total		6		3631		

2.11 Purchasing

Marlin Mine purchasing is divided into three categories: construction services contracts, construction purchasing for materials, equipment and supplies and operations purchasing for materials equipment and supplies.

During 2005 Montana spent $48,639,000 on construction contracts. Of this amount, a total about 79 percent was spent in Guatemala including 1.5 percent in San Miguel (see Table 4).

TABLE 4. 2005 MARLIN MINE CONSTRUCTION CONTRACT PURCHASING BY LOCATION OF VENDOR

	Contractor Location				
	San Miguel	**Sipacapa**	**Elsewhere in San Marcos Department**	**Elsewhere in Guatemala**	**Outside Guatemala**
Montana Construction Contracts	$710,000	0	0	$37,534,000	$10,395,000
Percent	1.5%	0%	0%	77%	21%

Montana spent over $88 million for materials, equipment and supplies for construction of the Marlin Mine during 2005. Of that total, 59 percent was spent within Guatemala including 3 percent in San Miguel and 0.5 percent in Sipacapa (see Table 5).

TABLE 5. 2005 MARLIN MINE CONSTRUCTION MATERIALS, EQUIPMENT AND SUPPLIES PURCHASING BY LOCATION OF VENDOR

	Contractor Location				
	San Miguel	**Sipacapa**	**Elsewhere in San Marcos Department**	**Elsewhere in Guatemala**	**Outside Guatemala**
Montana Construction Purchases	$2,752,000	$447,749	$986,000	$47,373,000	$36,370,000
Percent	3%	0.5%	1%	54%	41%

During 2005 Montana spent $11,328,000 on materials, equipment and supplies for operations of the Marlin Mine. Of the total, $9,084,000 (80 percent) was spent within Guatemala including 15 percent in San Miguel and 5 percent in Sipacapa (see Table 6).

TABLE 6. MARLIN MINE OPERATIONS PURCHASING FOR MATERIALS, EQUIPMENT AND SUPPLIES: 2005					
	Contractor Location				
	San Miguel	Sipacapa	Elsewhere in San Marcos Department	Elsewhere in Guatemala	Outside Guatemala
Montana Construction Purchases	$1,755,000	$573,000	$831,031.62	$5,925,000	$2,243,000
Percent	15%	5%	7%	52%	20%

2.12 Land Acquisition

During 2005, Montana acquired an additional 835 cuerdas (approximately 90 acres) of land for the Marlin Mine. Although Montana had acquired the land necessary to construct the Marlin Mine, some landowners along the perimeter of the project decided to sell their land and Montana bought it to expand the buffer area. Montana purchased 47 separate parcels of land from a total of 40 owners, 10 of whom were women. Parcel sizes ranged from 1 cuerda to 50 cuerdas; the average parcel size was 18 cuerdas. Montana paid a total of Q3,340,000 ($438,320) for these parcels, or Q4000/cuerda ($4,863/acre). The average amount paid per parcel was $9,326. The *Marlin Mining Project Land Acquisition Procedures* (March 2004) paper (available on the Glamis Gold, Ltd. website) noted "Although there has been some land speculation in immediately adjacent communities, owing in part to Peridot purchases and in part to the purchase of land with remittances sent by family members living abroad, land is reportedly available for Q 350 to Q 1,500/cuerda in communities in the municipalities of San Miguel and Sipacapa."

TABLE 7. MARLIN MINE ADDITIONAL LAND ACQUISITIONS						
Number of Parcels Purchased	Number of Owners	Number of Women Owners	Total Area	Average Parcel Size in Cuerdas	Total Paid in Quetzales	Total Paid in Dollars
47	40	10	835 cuerdas 90 acres	18	Q3,340,000	$438,320

Homes and Improvements

Montana paid for improvements on 34 of the parcels purchased for the Marlin Mine during 2005. Improvements included crops, coffee, fruit trees, wells and water, houses and other structures. In some cases owners harvested crops after the sales occurred and in some cases owners dismantled improvements and took them when they moved.

TABLE 8. MARLIN MINE LAND ACQUISITION: PROPERTIES WITH IMPROVEMENTS			
Number of Parcels w/ Improvements	Number of Women Owners	Total Paid in Quetzales	Total Paid in Dollars
34	2	Q1,861,615	$244,307

There were 18 homes which served as primary residences for their owners on the land purchased for the Marlin Mine during 2005. Of the 14 landowners with primary residences, 11 (79 percent) built or moved to other homes within the same community where their original land was located; 3 (21 percent) moved to other communities.

TABLE 9. PRIMARY RESIDENCES PURCHASED BY MONTANA

Number of Primary Residences	Number that Stayed within the Same Community	Percent	Number that Moved to a Different Community	Percent
18	11	61%	7	39%

Of the 18 primary residences purchased by Montana, 12 (67 percent) were located in San José Ixcaniche, 4 (22 percent) were located in San José Nueva Esperanza, 2 (11 percent) were located in Salem and none were located in Agel.

TABLE 10. LOCATION OF PRIMARY RESIDENCES PURCHASED OR EXCHANGED BY MONTANA

Number of Primary Residences	Primary Residences Located In			
	Agel	San José Nueva Esperanza	San José Ixcaniche	Salem
18	0	4	12	2

3.0 TAX AND ROYALTY PAYMENTS

During 2005, Montana paid over $6,937,000 in taxes and royalties for the Marlin Mine. Table 11 provides information on the individual taxes.

TABLE 11. 2005 MARLIN MINE TAX AND ROYALTY PAYMENTS

Guatemalan Tax or Royalty	2005 Marlin Mine Tax/Royalty Payment		Tax/Royalty Type	Comments
	Quetzales	Dollars		
IVA (crédito fiscal)	Q48,772,350	$6,252,865	Value Added Tax (VAT) – 12% on all purchases	Montana is due a refund of the VAT attributable to export production
IUSI	515,866	66,137	Tax on land	Can accrue to the municipality where the land is located under certain conditions
Derechos Ancelarios	339,011	43,463	Import tax	Paid on certain non-exempt imported items
Regalias	1,014,737	130,094	Royalties on	50% returned to the

			production	municipality where the ore is mined
IGSS Patronal	3,469,554	444,815	Social security tax (employer's share)	Funds health care and hospitals
Total	**Q54,111,518**	**$6,937,374**		
Montana payment of employee share of IGSS	Q1,322,648	$169,570		Montana pays employee's share of IGSS taxes

Montana Exploradora will begin paying income taxes in 2008.

4.0 SIGNIFICANT EVENTS

The following significant events occurred during 2005:

- An incident occurred in late 2004 and early 2005 regarding the transport of an oversized load through the community of Los Encuentros, approximately 150 kilometers from the Marlin Mine, on the Pan American highway between the mine site and Puerto Quetzal. The ball mill shell left Puerto Quetzal on November 29 for a 7 day transit along the Pan American Highway and other routes to the project site. The transportation contractor had obtained all necessary permits to dismantle phone and electrical lines that needed to be disconnected to allow passage of this over-height load. The contractor had also obtained permission to dismantle two pedestrian overpasses that were too low to allow the shell to pass. Local residents near Los Encuentros objected to the temporary dismantling of a footbridge over the Pan American Highway, necessary for the ball mill bound for the site to pass, despite all required permits having been obtained in advance by the transportation contractor. At that time, Montana instructed the contractor to move the equipment away from the community and await resolution of the dispute.

  Following a month of consultations with local representatives, government officials, determined that the lawful flow of commerce in Guatemala must continue, and in early January instructed police to escort the truck through the community. Unfortunately, activists had succeeded in arousing the local population by spreading misinformation as to the intended location and use of the equipment. A confrontation between police and villagers resulted, with injuries and one fatality, although the circumstances surrounding the fatality remain unclear. Montana is saddened that this activity resulted in injury and loss of life.

- In April, Montana's parent company, Glamis Gold Ltd., posted the Marlin Mine 2004 IFC Annual Monitoring Report on its website. Glamis and Montana chose to voluntarily release the AMR in a further effort to provide information and transparency with respect to Montana's activities in Guatemala.

- On June 18 an unauthorized referendum on whether future mineral development should be permitted within Sipacapa was held within a number of villages in the municipality. None of Montana's reserves or resources are located within the boundaries of Sipacapa, although it does have exploration concessions and areas of exploration interest within the municipality.

Montana objected to the highly questionable methods used to set up the referendum as well as the validity of any potential result that purported to deal with resources that are controlled by the national government under Guatemalan law. Montana also raised concerns about numerous instances of intimidation and threats to local residents to coerce votes against mining activities.

Before the referendum was to be held, a Guatemalan national circuit court issued an order to cease all activity, known locally as an "amparo" until the legality of such an event could be determined. The *amparo* had the effect of rendering any referendum held in violation of the order as illegal until the Constitutional Court, which is now reviewing the matter, has issued its final ruling. Despite this order and instructions from the mayor of the municipality, the referendum took place on June 18. The referendum was carried out by members of special interest groups and included continued threats to cut off water supplies in communities closest to the Marlin Mine. Threats to burn houses and crops in these areas were brought to our attention.

Because the *amparo* had been issued invalidating the referendum, and in an effort to avoid any potential conflicts, Montana asked that its employees and supporters not take part in the referendum. Consequently, very few supporters of the Marlin Mine turned out to vote, although one community abstained from voting and another close to the project site, where mineral exploration is taking place, voted in favor of mining. In total, eleven communities voted against mining activities in the municipality of Sipacapa. Although a vote was carried out, turnouts were low and it was not certified or sanctioned by the *Tribunal Supremo Electoral* (Supreme Electoral Tribunal).

- In March 2005, the Compliance Advisor Ombudsman (CAO) received a complaint raising concerns that the Marlin Mine would: (a) reduce access by the community to local water supplies; and (b) result in contamination of local waterways. In addition, the complaint alleged that the project was developed without adequate consultation and in violation of the rights of indigenous people and that the mine exacerbated social tensions, violence and insecurity.

  The CAO investigated this complaint and issued its findings in a report released on September 7, 2005. The CAO concluded that environmental impacts were properly identified with appropriate management plans put in place and that the health and environmental risks identified in the complaint were insignificant. The Assessment recommended expanded consultation, particularly in areas outside of the immediate proximity to the project. Glamis has initiated broader consultation, and supported the formation of an independent environmental monitoring committee comprised of local stakeholders. Montana has initiated additional water studies to provide additional data on ground and surface water conditions in the area of influence of the Marlin Mine.

- On September 6, Guatemalan President Oscar Berger, San Miguel Ixtahuacán Mayor Oswaldo Avila Perez and Glamis Gold Ltd. President and CEO Kevin McArthur inaugurated a project to significantly upgrade and pave 20 kilometers of road providing access between San Miguel Ixtahuacán and the road that connects Concepción Tutuapa and Tejutla and eventually San Marcos. Montana will invest approximately US$5 million to upgrade this important road used by residents to move people and products throughout the region. The improvement and paving of this road will substantially reduce travel time from San Miguel to San Marcos, the departmental capital, provide

access to the road from a number of communities not currently served, reduce wear and tear on vehicles and most importantly, provide a much safer roadway for local residents.

- In March, Montana engaged Business for Social Responsibility (BSR) a non-profit business association based in San Francisco, California to examine the possibility of launching an independent community environmental monitoring association that would monitor the environmental impacts of the Marlin mine. Between March and August, extensive consultations were conducted with communities surrounding the mine site, environmental groups, Mayan organizations, Universities, multi-lateral agencies, Church groups, government officials, and international organizations to assess the response to such an initiative and how it might be structured.

  On September 17, an independent community-based environmental monitoring association, known as Asociación de Monitoreo Ambiental Comunitario (or AMAC, by its Spanish acronym) was formed and initiated its activities. AMAC includes representatives (all chosen by community assembly) of seven local communities from the direct area of impact of the mine. The Catholic Church has a representative in the association which is engaged in water quality monitoring.

- In October 2005, Hurricane Stan hit Guatemala, causing widespread destruction and damage to communities and causing extensive loss of life and injury. In the communities surrounding the Marlin Mine, there was no loss of life. However, most major roadways and bridges were washed out leaving residents without access to food, medical care and emergency aid. For many of the communities near the mine, the Marlin Mine access road and bridge across the Rio Cuilco River, which withstood the hurricane, was the only access to the Pan American Highway and the rest of the country. Similarly, for the Municipality of Sipacapa, the bridge constructed by Montana was the only access from the community to the Marlin Mine access road.

  In the aftermath of the hurricane, Montana was a first responder for the first two weeks following Hurricane Stan., The company joined with the Guatemalan Red Cross and other emergency aid organizations to transport emergency supplies by air and ground to stranded communities in San Miguel and Sipacapa and to the neighboring municipality of Tejutla, which had no access to the rest of the country. In addition to transporting and warehousing emergency supplies, the company provided workers and equipment to repair damaged roads and community potable water systems. Montana operated relief efforts from the Marlin Mine for two weeks, until efforts were organized by the municipalities of San Miguel and Sipacapa, and the company then supported these community efforts.

  Fundacion Sierra Madre also participated in the hurricane relief effort, joining the multi-sectoral committee that the San Miguel municipality set up to coordinate relief efforts. The FSM Health Coordinator and a nurse from the San Miguel Health Center administered care and delivered vital supplies to affected families in Tierra Blanca, San Miguel and in the stranded village of La Vega, Sipacapa.

- Marlin Mine operations officially began in September. During 2005 a total of 375,509 tonnes or ore was mined, at an average grade of 5.83 g/t gold and 62.85 g/t silver. A total of 125,727 tonnes of ore were processed during 2005, yielding 741.032 kgs (23,825oz) of gold and 4,894.46 kgs (157,361oz) of silver. Gold recovery was calculated to be 86.3 percent and silver was 56.2 percent.

5.0 LAISON WITH EXTERNAL PARTIES

5.1 Guatemalan Monitoring Requirements for the Marlin Mine

Ministry of Energy and Mines (MEM) Requirements

According to article 31 of the Mining Law, the exploitation license holder is required to prepare and submit an Environmental and Social Impact Statement (EIA&S) for proposed projects. Upon project approval, the license holder is required to comply with the recommendations contained in the EIA&S. Montana is required to comply with the terms of the approved EIA&S for the Marlin Mine and the recommendations specified by Ministerio de Ambiente y Recursos Naturales (MARN) in its resolution 779-2003/CRMM/EM (this includes the monitoring proposed in the EIA&S).

Ministry of Environment and Natural Resources (MARN) Requirements

Resolution 779-2003/CRMM/EM of MARN requires that Montana fulfill the following:

1. Comply with all the indications and recommendations described in the EIA&S (this includes the monitoring proposed in the EIA&S),
2. Comply with all the requirements of the law and other institutions in regard to this project,
3. Control noise when it exceeds 90 dB(A) in the work areas, and
4. Allow MARN's Dirección General de Gestión Ambiental y Recursos Naturales to conduct environmental inspections and/or monitoring at any time.

The Marlin Mine EIA&S proposed an environmental monitoring program which included the following parameters:

- Controlled discharges and liquid effluents from the process will be monitored every 3 months,
- Noise levels in the receptors closest to the Project will be monitored every 3 months,
- Ambient air quality (PM10) in eight (8) sampling stations will be monitored every 3 months,
- Water quality will be monitored every 3 months,
    - Surface water and sediment in rivers in five (5) sampling stations, underground water in three (3) sampling stations and springs,
    - Potable water,
- Aquatic biological resources in 3 sampling stations (Quivichil Creek, Cuilco and Tzalá Rivers) every 6 months,
- Terrestrial biological resources in three plots once a year,
- Forest coverage in the Proje3ct area every 2 years,
- Socioeconomics in the communities near the Project area every 3 months, and
- Opinion of the nearby communities every year. [In 2005 this was sent to the MARN in the third quarterly report.]

In 2005, most of the monitoring parameters are compared to World Bank Guidelines[2], except for potable water which is compared to the values determined by the Guatemalan Standards Commission (COGUANOR). The stronger standards are used. [In 2006, Guatemala established new standards which will be followed where they are stronger than the World Bank Guidelines.] The results of the monitoring program must be presented to the regulatory agencies every 3 months, beginning with the construction phase of the Project.

Other Requirements

No other Guatemalan institutions require monitoring for the Marlin Mine; however, the Ministry of Public Health and Social Assistance (MSPAS) is authorized to conduct water quality audits and the National Institute of Forests (INAB) may conduct field inspections to assess the implementation of the Forest Management Plan. The Marlin Mine also received visits from the San Marcos Human Rights representative during 2005 who reviewed safety and on-site worker health care.

5.2 Ongoing Public Consultation and Disclosure

Montana has an ongoing Public Consultation and Disclosure Program for the Marlin Mine. The objectives and elements of the program are described in the *Marlin Mining Project Public Consultation and Disclosure Plan*, which was submitted to IFC as a supporting document for the original loan application.

Community Relations Unit

One of the key elements of the PCDP is the Community Relations Unit of the Sustainable Development Department, made up of Mam and Sipakapense-speaking residents of the municipalities of San Miguel Ixtahuacán and Sipacapa and headed by a community relations specialist. The Community Relations Unit has been trained to provide information about the project and to conduct meetings and facilitate participation of indigenous peoples at the community, organization and individual level. The initial focus was on the directly affected communities, but the public consultation and disclosure work of the Community Relations Unit has been expanded over time to include many other communities in the municipalities of San Miguel and Sipacapa. The Community Relations Unit also meets with communities from both the Departments of Huehuetenango and Quetzaltenango that are along the access road to the Marlin Mine from the Pan American Highway.

During 2005, the Marlin Mine Community Relations Unit held 163 discussions with a total of 4,357 persons. Most discussions were with communities and organizations within San Miguel and Sipacapa, although a small number were with organizations outside the affected municipalities. As shown in Table 12, during 2005 the Community Relations Unit conducted 121 tours of the project for a total of 2,414 persons.

[2] World Bank Group, 1998. Pollution Prevention and Abatement Handbook.

TABLE 12. SUMMARY OF PUBLIC CONSULTATION ACTIVITIES OF THE COMMUNITY RELATIONS UNIT			
Consultation Type	**Number of Consultations**		
	2003/2004	**2005**	**TOTAL**
Community Visits	179	163	342
Number of Persons	11,609	4,357	15,966
Visits to the Project	190	121	311
Number of Persons	3,389	2,414	5,803

The community visits and visits to the projects are documented in Excel spreadsheets with the following information:

- Date of the visit,
- Name of the community, organization or individuals that attended,
- Number of attendees,
- Reason for the meeting and/or comments about major topics discussed in the meetings.

Visits to the San Martin Mine in Honduras

Montana conducted 2 tours to the San Martin mine in Honduras during 2005. These tours and the 14 conducted in 2004 were designed to give Guatemalan officials and local community members the opportunity to see a working mine and to discuss community effects with local officials in a community adjacent the mine site. Now that it is operational, community tours are conducted at the Marlin Mine and the visits to San Martin have been phased out.

Staff Contacts

In addition to these visits, a variety of Marlin Mine personnel held numerous formal, informal and ad hoc meetings with community, departmental and national officials, NGOs and individuals. These meetings occur frequently and address a variety of topics.

Public Communications

Montana has an ongoing public communications program that includes the following elements:

- *Periódico Horizontes:* An external newsletter with a circulation of 10,000, delivered by hand to households in communities near the project. The newsletter includes articles on a variety of topics, including aspects of the Marlin Mine, Fundación Sierra Madre programs and activities, community news, sports and an invitation to contact and consult with Marlin Mine staff.

- *Volante (Flyers)s:* Short papers on a specific topic, which are widely distributed in communities near the project. They are used to provide timely information on topics such as job opportunities, the mining process and cyanide use and safety. Some flyers are in the form of line drawings easily accessed by persons with limited literacy. A total of 2,000 flyers were distributed during 2005.

- *Boletín El Ingieniero:* An internal newsletter focusing aspects of the Marlin Mine, including progress, administrative issues, occupational health and safety, environmental programs and a request for opinions and recommendations. A total of 15,000 copies of El Ingeniero were distributed during 2005.

- *Folletos (Pamphlets)*: Illustrated pamphlets used to provide more detailed information about the Marlin Mine, such as the phases of mining, mining benefits, environmental protection and social responsibility. A total of 15,000 Folletos were distributed during 2005.

- *Radio spots:* Advertisements placed on a variety of radio stations covering topics such as technical, environmental, social, economic and legal aspects of the Marlin Mine and the FSM health campaigns. During 2005, 10 spots were purchased from 6 radio stations, including 2 in Huehuetenango and 6 from stations near in communities near the mine. Each spot was aired 8 times.

- *Sierra Madre Development News:* A monthly publication of Fundación Sierra Madre (FSM), printed in both Spanish and English, which highlights events and activities of the Foundation's health care, vocational training and sustainable development programs. The newsletter features local participants in the Foundation's programs.

Copies of newsletters, pamphlets and ads are available on request.

Another method for communicating with the public is through the Glamis Gold website. The website has a section in English and in Spanish. There is information on the Marlin Mine including Glamis Gold press releases. Glamis Gold took the step of making its 2004 IFC Annual Monitoring Report public though not required to do so. The AMR is available on the website in both Spanish and English. A number of other documents related to the Marlin Mine are also available.

Charitable Requests and Grievance Redress

Montana has established responsibility and resources for addressing charitable requests and grievances within the Sustainable Development Department. In 2005 and early 2006, a draft Grievance Management System has been put together. It is currently under review and slated for implementation in the second quarter of 2006.

During 2005 a new Organizational Development Unit was designed, created and began to function. The concept is based on refocusing and reducing charitable requests by having communities analyze their development priorities in relation to available resources including those from the Marlin Mine resulting in an increased positive impact on surrounding communities. This process will strengthen local community planning and project implementation capacity.

During the first quarter of 2006, efforts began to implement the Organizational Development Plan, which includes training communities in project analysis. The Plan has earmarked Q2.6 million (US$342,000) for 2006 for community projects.

Environmental Monitoring and Contingency Committees.

In order to fulfill its requirement to support the establishment of an independent Environmental Monitoring and Contingency committee for the communities surrounding the Marlin Mine, Montana requested that Business for Social Responsibility (BSR) – a non-profit business association based in San Francisco, California – examine the possibility of launching a

community environmental monitoring association to monitor the environmental impacts of the Marlin mine.

Between March and August, 2005, extensive consultations occurred with communities surrounding the mine site, environmental groups, Mayan organizations, Universities, multi-lateral agencies, Church groups, government officials, and international organizations to assess the response to such an initiative and how it might be structured.

The response was positive: people thought the idea of a community environmental monitoring association was a constructive step. There was agreement that it would be good to launch such an initiative with a particular focus on the following conditions**:**

- The initiative should focus on the communities directly impacted by the mine's operation.
- Other groups could participate to provide technical or other support to the Association but the control of the environmental monitoring should remain in the hands of the local communities.
- The initiative should be independent from the company.
- The work of the Association should not be paid directly by the company.
- The company would need to listen, and respond, to the Association's suggestions.

Montana agreed to follow these recommendations and eventually the community-based monitoring association, known as Asociación de Monitoreo Ambiental Comunitario (or AMAC, by its Spanish acronym) initiated its labour on September 17th 2005. Six local communities from the direct area of impact of the mine were initially invited to send a representative. These communities were: Salitre, San Jose Ixcaniche, Siete Platos, Agel and Nueva Esperanza, all from San Miguel municipality, and Salem from the municipality of Sipacapa. The community of Carrizal from Sipacapa was invited to join in February 2006. Each of the communities chose their representative in a community Assembly after a visit by a BSR representative to explain the purpose and the objectives of the Association. Representatives from the Catholic Church, the Evangelical Church and the two municipalities of San Miguel and Sipacapa were also invited to integrate into the Association but only the Catholic Church so far has sent a representative to the meetings.

Two technical representatives, one mining engineer from the Faculty of Engineering of the University of San Carlos and one environmental scientist, were also invited to participate in order to build the technical capacity of the Association through a number of training sessions on mining and the environment. The Association members have also been trained in conflict resolution, communication and negotiation by an external facilitator. An environmental scientist/hydro geologist was also hired to assist AMAC in taking water samples and interpreting the results. The participants also visited the mine and met with Montana environmental and community relations' personnel in order to better understand Montana's mining operation and its current monitoring efforts. AMAC is also presently taking steps to obtain its registered legal status.

AMAC took its first water samples in February 2006. Results were sent to an independent laboratory in Canada and in March all results for cyanide and toxic heavy metals came back negative, or below permissible limits of the World Bank. AMAC then met with Montana

personnel to compare their results with those of the laboratory that Montana used and the results were almost identical, all below permissible levels.

AMAC has outlined a plan communicating its activities to the participating communities and to external groups. The Association members will visit every participating town to communicate through assemblies what has been done and what their future plans are. They will also visit or communicate with: the Catholic and Evangelical churches, local municipalities, Mayan groups, the Ministry of Energy and Mines, Embassies and other groups in Guatemala City. Three more samplings are scheduled for this year.

Local communities are the main focus of this monitoring effort. Gaining their buy-in has taken a great deal of time, patience and an ability to listen to, and incorporate, their traditional ways of choosing representatives and making decisions. We believe that this initiative will have national implications, as it will serve as a model for constructive dialog between civil society and the extractive industry in Guatemala.

Fundación Sierra Madre Community Advisory Councils

FSM has established Community Advisory Councils (CAC) in the municipalities of San Miguel, Sipacapa and Máquivil, and has developed rules, procedures and structures for the CAC's. The CAC's will involve the communities in the formulation of the Foundation's plans and strategies.

6.0 SCHOOLS

Information about school enrollment was collected from schools in each community. Table 13 displays 2002, 2004 and 2005 enrollment for schools in villages near the project site.

TABLE 13. ENROLLMENT IN SCHOOLS NEAR THE MARLIN MINE: 2002, 2004 & 2005

Community/ School	2002 Ending Enroll-ment	2004 Ending Enroll-ment	Change in Number	Percent Change From 2002	2005 Ending Enroll-ment	Change in Number	Percent Change From 2004
San Miguel Ixt.							
Agel	208	205	(3)	-1%	215[3]	10[4]	5%
San José Ixcaniche	97	127	30	31%	142	15	12%
San Jose Nueva Esperanza	57	69	12	21%	87	18	26%
Salitre	208	261	53	25%	312	51	20%
Siete Platos	n/a	129	n/a	n/a	131	2	1.5%
Sipacapa							
Salem	58	66	8	14%	87	21	32%

[3] This does not include 15 children in kindergarten, which began this year, bringing the total to 230.
[4] This does not include 15 children in kindergarten, which began this year, bringing the change to 15.

As noted in last year's report school enrollment increased substantially during the 2002-2004 two year period in every community near the project site except for Agel,[5] which experienced a slight decrease, and possibly in Siete Platos,[6] which did not have 2002 enrollment data available. Over the past year, there was a continued dramatic increase in school enrollment. Fewer families are traveling to the coast for work and more children are completing the school year and not leaving due to labor migration.

7.0 HEALTH CARE

A Health Baseline Study (HBS) was carried out in 2005 to determine the health conditions and risk factors for the communities in the area of influence around the Marlin Mine in San Miguel Ixtahuacán and Sipacapa municipal districts. All data was collected before the mine started operation in order to guarantee that the results of the Study would reflect health conditions of the population, excluding any influences derived from mineral extraction activities.

The Study was requested by the Guatemalan Ministry of Health and was performed under strict protocols approved by the Ministry. The Ministry of Health provided technical assistance and supervision. Montana was requested to provide funding for a consulting firm [GETSA (Gestión y Tecnología en Salud)], which performed the study in coordination with local health authorities. National and international experts certified the results of the Health Baseline Study.

The HBS focused on the health conditions of the population as well as health services currently availability in the area. This will be useful for both Montana and the Ministry of Health to better plan Montana's support of the local health system in coordination with the Ministry of Health. The Study also sought to establish information for the identification and measurement of any possible future causality between the mineral extraction process and health related problems in nearby communities. Studying these two aspects allows authorities, Montana and local communities to have available, objective and reliable information regarding health issues in the area of influence of the Marlin Mine.

This base line health information also establishes a platform for the implementation of a Health Monitoring and Evaluation System (HM&ES) to be in place during the life of the Marlin Mine. It is anticipated that the information developed in the study and follow up monitoring will justify a higher level of health care and development of increased capacity and capability in San Miguel Ixtahuacán's public Health Center.

The HBS was carried out using a specifically designed household survey; it also measured key health indicators and performed clinical examinations and evaluations. These same activities were performed in a control group of a population outside the Marlin Mine area that has similar conditions to those in its area of influence. This methodology allows for more accurate and objective analysis of data.

The Study concludes that health services currently available in the areas of study are insufficient to satisfy the population's demand. General health conditions of the population that was studied are similar to those in the rest of Guatemala. The Study identifies critical health issues that will

[5] Agel school officials believe that some children transferred to a new school that opened nearby.
[6] Siete Platos officials remarked that like other communities, more families stayed in the community in recent years, so that enrollment may have increased in that community as well.

require attention in the short, mid and long term. The Ministry of Health, Montana Exploradora and the Sierra Madre Foundation are already addressing critical health issues in the area.

The Health Baseline Study has provided timely information before the Marlin Mine began operations that will allow for reliable monitoring by the Ministry of Health, Montana Exploradora de Guatemala and any other interested parties. The Ministry of Health has reviewed the Health Baseline Study and formally accepted the results as representing the health situation in the communities studied. The Health Baseline Study will be made public once the Ministry of Health has integrated its observations in the HBS document.

8.0 MARLIN MINE ROLE IN POVERTY REDUCTION

The IFC's mission is to "*promote sustainable private sector investment in developing countries, helping to reduce poverty and improve people's lives*." The Marlin Mine Social and Community Development Programs, described in the *Indigenous Peoples Development Plan* submitted as part of the IFC loan application, includes activities intended to ensure that residents of communities near the project site will share in the benefits of the project in a manner that substantially reduces poverty and improves their lives. This section of the AMR demonstrates Marlin Mine progress in achieving that goal.

In February of 2003, the World Bank released "*Poverty in Guatemala*" [7] a five-year comprehensive analysis of poverty in Guatemala conducted through the Guatemala Poverty Assessment Program (GUAPA). The study's three main objectives were to 1) conduct a multi-dimensional analysis of poverty in Guatemala using both quantitative and qualitative data; 2) examine the policies of government spending and policies on the poor; and 3) use the empirical findings of the report to identify options and priorities for poverty reduction in the future.[8]

The Priority Actions for poverty reduction contained in the study include the following:

1. *Promoting economic growth*: The study notes that "In this context, the main engine of growth is likely to come from the private sector" and that priority actions should include "promoting growth with special emphasis on sectors that are likely to generate substantial employment for the poor." Activities which could support growth in non–farm activities in rural areas include:

    a. increasing and improving the targeting of investments in education and technical training;

    b. increasing investments in transport and basic infrastructure, which are crucial for the diversification, growth and inclusion of the poor in the rural economy; and,

    c. policies that promote micro-, small- and medium-enterprises (MSMEs), a segment of the private sector that tends to generate a lot of employment.

2. *Investing in education*, *with priority actions to improve quality and access to pre-primary and primary education.*

[7] Poverty in Guatemala, Report No. 24221-GU. World Bank. February 20, 2003.
[8] Ibid, Executive Summary, p.i.

3. *Investing in health, with an emphasis on expanding access and usage using both supply- and demand-side interventions.*

4. *Integrating actions to reduce malnutrition into the basic health-care package.*

5. *Reducing isolation and improving communications by investing in rural transport and roads.*

6. *Improving governance and the effectiveness of the public sector.*

The study also identifies priority target groups for poverty reduction, including (a) poor and malnourished children; (b) poor women and girls; (c) poor indigenous households; (d) the rural poor; and (e) specific geographic areas including the Department of San Marcos.[9]

The following provides brief highlights of Marlin Mine 2005 social and community development activities and outcomes which correspond to each of the GUAPA priority actions for poverty reduction. Each aspect of the Marlin Mine Social/Community Development Program is presented in detail in subsequent sections of this AMR.

1. Promoting Economic Growth

The Marlin Mine has promoted economic growth in the following ways:

a. **Payroll**: The 2005 payroll for the construction phase of the Marlin Mine totaled over US $11 million. Of that amount, 81 percent ($8.9 million) was paid to Guatemalan employees, 26 percent ($2.8 million) was paid to employees from San Miguel and 7 percent ($0.8 million) was paid to employees from Sipacapa, virtually all of whom are indigenous and poor.

b. **Purchasing**: During 2005, the Marlin Mine spent over $6.2 million on goods in services in San Miguel ($5.2 million) and Sipacapa ($1.02 million).

c. **Land Acquisition**: During 2005, Montana paid ($683,000) for land and improvements (i.e. buildings or other value added) for the Marlin Mine. Virtually all of the landowners who received payments have been indigenous.

d. **Training**: Montana has provided vocational and technical training to a number of local indigenous residents to qualify them for technical jobs at the mine. In 2005, 567 employees received vocational training for operations jobs, not including the annual health and safety training, Fundación Sierra Madre (FSM, described in a subsequent section of this AMR) has aligned with a Guatemalan government vocational training agency, INTECAP, to provide vocational training for a variety of MSME enterprises which may contract with the mine, or supply goods and services to other local or regional markets.

[9] Ibid, Executive Summary, pp.x – xiii

2. *Investing in education*, *with priority actions to improve quality and access to pre-primary and primary education.*

   The Marlin Mine has contributed to education in the following ways:

   a. Montana has funded salaries, benefits and supplies for 37 teachers in San Miguel and Sipacapa.

3. *Investing in health*, *with an emphasis on expanding access and usage using both supply- and demand-side interventions*.

   Marlin Mine health care activities include the following:

   a. FSM and APROSAMI provided basic health services and training to more than 6,000 people in communities surrounding the Marlin Mine.

   b. Health fairs have been held in both San Miguel Ixtahuacán and Sipacapa.

4. *Integrating actions to reduce malnutrition into the basic health-care package*.

   FSM and APROSAMI have given a number of classes on prenatal care and prevention of childhood illnesses, which have included segments on nutrition.

5. *Reducing isolation and improving communications by investing in rural transport and roads*.

   a. During 2004, Montana built a bridge and developed a road that leads from the project area to Highway CA1, also known as the Pan American Highway. The bridge has been formally transferred to the municipality of San Miguel Ixtahuacán. In the aftermath of Hurricane Stan, this road and bridge provided the only access to many communities in the area surrounding the mine. Similarly a bridge constructed by Montana to provide access to Sipacapa withstood the hurricane and provided the only access for Sipacapa to Montana's access road and the rest of the country after the storm. Additionally the primary access road to Tejutla was damaged buy the storm and Montana reconstructed and reopened the road to provide access to and from that community.

   b. In response to a request from the Guatemalan Government and the Mayor of San Miguel, Montana will invest approximately US$5 million to significantly upgrade and pave 20 kilometers of road providing access between San Miguel Ixtahuacán and the road that connects Concepción Tutuapa and Tejutla and eventually San Marcos.. This important road is used by residents to move people and products throughout the region. The improvement and paving of this road will substantially reduce travel time from San Miguel to San Marcos, the departmental capitol, provide access to the road from a number of communities not currently served, reduce wear and tear on vehicles and most importantly, provide a much safer roadway for local residents.

c. Montana's Sustainable Development Department has also worked with communities near the mine on maintenance and improvement of a number of local roads in the municipality of San Miguel Ixtahuacán.

6. *Improving governance and the effectiveness of the public sector.*

   FSM/CDC conducted to local government capacity building initiatives in San Miguel during 2005:

   - In November, a local consultant worked with all the municipal employees to draft a Personnel Manual (*Manual de Descripción de Puestos y Funciones*). It is being reviewed by the Municipal Council (*Concejo Municipal*) and if approved, will be adopted and adhered to by the municipality.

   - On December 7-17, a CDC Volunteer Advisor worked with the San Miguel Mayor and the Office of Municipal Planning (OMP) to help them draft the 2006 municipal budget in a participatory and logical manner that followed the new guidelines instituted by the federal government. His assistance made it possible for the OMP to be incorporated, for the first time, not only into the budget process, but also added to the budget as a resource of the municipality.

7. *Priority target groups for poverty reduction, including indigenous households and women*.

   Montana's achievements in this area include:

   a. During 2005, an average of 56 percent of Montana's workforce workers was made up of indigenous residents of local communities.

   b. The more than 6,000 residents of the project area who received health care services from FSM/APROSAMI in 2005 were virtually all indigenous and a large percentage were women who received prenatal and maternal care and training.

   c. The 138 participants of FSM vocational training courses in 2005 were virtually all indigenous and 76 percent were women.

   d. FSM/FAFIDESS supported 20 communal banks with 332 members in 2005, all of whom are indigenous women.

9.0 COMMUNITY/SUSTAINABLE DEVELOPMENT

9.1 Community Development Projects, Small Grants and Emergency Assistance

Montana funds selected Community Development initiatives and small grants in communities near the Marlin Mine, through the Montana Sustainable Development Department. During 2005, Montana also provided emergency assistance to communities affected by hurricane Stan. These initiatives are summarized below; a complete list of projects is provided in Attachment A.

<u>2005 Community Development</u>

Montana participated in 28 separate community development projects during 2005; 21 in San Miguel Ixtahuacán, and 7 in Sipacapa (see Table 14), contributing a total of $237,761.03, of the total 82 percent went to projects in San Miguel and 18 percent went to projects in Sipacapa.

TABLE 14. 2005 MONTANA COMMUNITY DEVELOPMENT PROJECT PARTICIPATION

Municipality	Number of Projects	Montana Contributions/ Quetzales	Montana Contributions/ Dollars
San Miguel Ixtahuacán	21	Q1,524,436.05	$195,568.72
Sipacapa	7	329,100.00	42,192.31
Total	**28**	**Q1,854,536.05**	**$237,761.03**

Ongoing Community Development

Montana is also participating in four community development programs that were initiated in 2005 but will be completed in 2006. The total amount of these projects is $177,528; three are in San Miguel and one is in Sipacapa (see Table 15).

TABLE 15 ONGOING MONTANA COMMUNITY DEVELOPMENT PROJECT PARTICIPATION

Municipality	Number of Projects	Montana Contributions/ Quetzales	Montana Contributions/ Dollars
San Miguel Ixtahuacán	3	Q1,276,500.00	$163,658.00
Sipacapa	1	108,225.00	13,875.00
Total	**4**	**Q1,384,725.00**	**$177,528.85**

2005 Small Grants

Montana routinely provides small grants to communities, schools, charitable/service organizations and for community events and celebrations. Table 16 provides a summary of 2005 Marlin Mine Community Donations.

TABLE 16. 2005 MONTANA COMMUNITY DONATIONS

Municipality	Number of Projects	Montana Contributions/ Quetzales	Montana Contributions/ Dollars
San Miguel Ixtahuacán	15	Q66,515.00	$8,527.56
Sipacapa	2	3,635.00	466.03
Total	**17**	**Q70,150.00**	**$8,993.59**

Hurricane Stan Relief and Reconstruction

In October 2005, Hurricane Stan hit Guatemala, devastating the county and destroying or damaging communities and homes and causing extensive loss of life and injury. In the communities surrounding the Marlin Mine, most major roadways and bridges were washed out

leaving residents without access to food, medical care and emergency aid. For many of the communities near the mine, the Marlin Mine access road and bridge across the Rio Cuilco River, which withstood the hurricane, was the only access to the Pan American Highway and the rest of the country.

In response to the emergency Montana joined with local municipalities, the Guatemalan Red Cross and other emergency aid organizations to transport medicine and emergency medical personnel by air and ground to stranded communities in San Miguel and Sipacapa and to the neighboring municipality of Tejutla, which was particularly hard hit. As noted in a Guatemalan newspaper, in the beginning it was only Montana Exploradora that was getting aid to many communities.[10]

Montana continued its participation by transporting and warehousing emergency supplies and by dedicating workers and equipment to repair damaged roads and community potable water systems. In terms of emergency supplies, it consisted of food, blankets, foam mattresses, medicine and potable water. The value of the food aid directly provided by Montana (not just transported), the staff time, local travel expenses (pick-ups), aid transportation (trucks and airplanes) amounted to $40,042. Table 17 shows the municipalities, number of communities and number of persons that Montana Exploradora provided relief aid in the aftermath of Hurricane Stan. Many of the communities are far from the direct influence of the Marlin Mine, but, at first, there were not other entities that could reach these areas.

TABLE 17. MONTANA HURRICANE STAN RELIEF EFFORT

Municipality	Number of Communities	Number of Persons
San Miguel Ixtahuacán	10	800
Sipacapa	3	788
Tejutla	13	3,556
San José Ojetenam	8	1,055
Concepción Tutuapa	3	1,600
Tajumulco	7	1,612
Total	**44**	**9,411**

Table 18 below displays Montana's participation in specific reconstruction projects.

[10] "Nueva Esperanza, donde nadie ha llegado," *Prensa Libre*, Guatemala, October 18, 2005. "Por suerte, otros víveres sí han llegado, gracias al transporte proporcionado por la empresa minera Montana, única que pudo acceder a las zonas incomunicadas."

TABLE 18. MONTANA HURRICANE STAN RECONSTRUCTION PROJECTS			
Municipality	**Number of Projects**	**Montana Contributions/ Quetzales**	**Montana Contributions/ Dollars**
San Miguel Ixtahuacán	4	Q188,370	$24,150
Sipacapa	2	48,290	6,191
Tejutla	1	19,000	2,435
Total	**7**	**Q255,660**	**$32,776.93**

FSM also participated in the hurricane relief effort, joining the multi-sectoral committee that the San Miguel municipality set up to coordinate relief efforts. The FSM Health Coordinator and a nurse from the San Miguel Health Center administered care and delivered vital supplies to affected families in Tierra Blanca, San Miguel and in the stranded village of La Vega, Sipacapa.

2005 Education Funding

Montana also participates in education initiatives in communities near the Marlin Mine. In 2005, Montana funded the salaries and benefits of 37 teachers (21 men and 16 women) for community schools near the mine. This initiative was initiated in response to request from the mayors of San Miguel and Sipacapa, who are using municipal funds to pay for additional teachers.

TABLE 19. 2005 MONTANA TEACHER FUNDING			
Municipality	**Number of Teachers**	**Montana Contributions/ Quetzales**	**Montana Contributions/ Dollars**
San Miguel Ixtahuacán	25	q 173,700.75	$22,269.33
Sipacapa	12	361,876.55	46,394.43
Total	**37**	**Q535,577.30**	**$68,663.76**

9.2 Sustainable Development: Fundación Sierra Madre[11]

In July 2003, Glamis Gold – through its Guatemalan subsidiary, Montana Exploradora – hired Citizens Development Corps (CDC) to design and implement an integrated community development program (ICDP) for the communities adjoining the Marlin Mine. The primary goal of the ICDP program is to create the foundation for sustainable multi-sectoral development that will improve the quality of life of these communities in the immediate future and beyond the life of the mine.

The ICDP is managed by CDC and implemented through the Fundación Sierra Madre, a Guatemalan NGO set up specifically to help create local ownership for the program. Since FSM is managed by Guatemalans, it is part of the local community and plays an integral role in building local capacity and promoting program sustainability. FSM is based in San Miguel Ixtahuacán. During 2004 a Foundation office was established in Sipacapa though its formal inauguration was on February 17, 2005.

[11] Much of the information in this section is excerpted from CDC/FSM quarterly reports and other foundation documents.

CDC has forged partnerships with other organizations in order to execute specific objectives of the ICDP. The main ICDP partners include:

- APROSAMI (Asociación de Promotores de Salud de San Miguel Ixtahuacan), a San Miguel-based community health organization;
- INTECAP (Instituto Técnico de Capacitación y Productividad), a state-run entity that offers vocational trainings; and
- FAFIDESS (Fundación de Asesoría Financiera a Instituciones de Desarrollo y Servicio Social), a Guatemalan micro-finance institution (MFI) that coordinates the program's communal banks.

These partnerships, which were formalized in 2004 and have continued through 2005, were created as a way to bring an integrated strategy to program implementation while maximizing the results of each program component.[12]

The Integrated Community Development Program (ICDP) has four main objectives:

1. Improve access to and quality of health services for men, women and children.
2. Increase economic opportunities by strengthening family/micro economic production.
3. Promote environmental awareness.
4. Develop institutional capacity and visibility of Foundation Sierra Madre, its partners and strategic public institutions.

A results matrix for FSM goals and achievements is presented in Attachment B. During 2005, FSM conducted the following activities:

Health Care

During 2005, FSM and APROSAMI provided basic health services and training to more than 6,000 people in communities surrounding the Marlin Mine, through the community health centers it renovated at the end of 2003. Services and key events included the following:

Health Fairs: FSM and APROSAMI held health fairs in six different communities during 2005 and provided a total of 1001 consultations and services (see Table 20).

[12] CDC/FSM 2005 Work Plan

TABLE 20. 2005 FSM APROSAMI HEALTH FAIRS SERVICES AND PATIENTS SEEN						
Location	**Date**	**Consults (Adults)**	**Consults (Children)**	**Pap Smears**	**Ultrasound**	**Health Talks/ Information**
San Miguel	Apr 27-28	354	90	0	0	300
La Cal	June 15	57	56	0	0	150
La Estancia	Aug 16	114	81	34	0	410
Xeabaj	Oct 4	57	11	7	0	233
Subchal	Nov 10	73	55	23	16	73
San Miguel	Dec 7	119	51	30	30	223
Total		**249**	**117**	**60**	**46**	**529**

Health Services: During 2005, APROSAMI delivered 6,370 individual health services in 14 different communities (see Table 21). Table 21 displays a list of FSM/APROSAMI health activities in 2005 and the number of people served.

TABLE 21. 2005 APROSAMI SERVICES		
HEALTH ACTIVITY	**TOTAL**	**OBSERVATIONS**
General consultations	1,943	Most frequent diagnosis have been arthritis, gastritis and skin infections
Consultations children < 6 years	706	Most prevalent illnesses have been diarrhea, pneumonia and other ARIs
Consultations of newborns	244	Younger than 28 days
Pre-natal consultations	1,062	300 consults conducted by APROSAMI nurses and 762 by midwives
Birth deliveries	348	All conducted by midwives
Cases of HRP	46	Of the registered HRPs, 5 were treated in Huehuetenango and San Marcos hospitals, 7 in the Casa Materna and 9 locally – the rest were treated in other, non-specified hospitals
Household visits	247	All conducted by APROSAMI technical/ nurse staff
Health talks on general health topics (to mothers)	263	Topics included family planning and reproductive health
Health talks on general health topics (to general audience)	1,418	Topics included pre-natal care, vaccination, hygiene and rabies
Training of vigilantes de salud	72	Topics included HRP, newborn care and treatment of diarrhea
Training of midwives	21	Topics included HRP, family planning, pre-natal care, vaccination and detection/ treatment of pneumonia, among others
TOTAL	**6,370**	

Vocational Education

A total of 138 people participated in a vocational course during 2005, 76% of which were women (see Table 22).

TABLE 22. FSM 2005 VOCATIONAL TRAINING CLASSES			
COURSE	**LOCATION**	**PARTICIPANTS**	**DATES**
Traditional Weaving	Sipacapa Town	8 women; 1 man	Nov 10 –Feb 17, 2005
Sewing	Sipacapa Town	7 women; 8 men	Nov 13 –Feb 17, 2005
Sewing	Quequesiguán, Sipacapa	15 women	May 30 – Oct 18
MS Windows & Office	San Miguel Town	8 women; 7 men	June 27 – July 8
CEFE1	FSM Training Center in Máquivil, San Miguel	8 women; 12 men	June 27 – July 22
Traditional Weaving	El Jardín, Sipacapa	5 women; 4 men	June 1 – Aug 31
Sewing	Quequesiguán, Sipacapa	14 women	May 30 – Oct 21
MS Windows & Office	San Miguel Town	8 women; 7 men	June 27 – July 8
CEFE	FSM Training Center in Máquivil, San Miguel	8 women; 12 men	June 27 – July 22
Traditional Weaving	El Jardín, Sipacapa	4 women; 3 men	June 1 – Sep 14
Sewing/Tailoring	Plan de los López,Quequesiguán, Sipacapa	15 women	40 hours
Sewing/Tailoring	Plan de los López,Quequesiguán, Sipacapa	15 women (same as “pre-course”)	Sep 12 – Oct 21
Sewing/Tailoring	Quequesiguán, Sipacapa	14 women	May 30 – Oct 25
Sewing/Tailoring	Los López, Sipacapa	16 women	Sep 12 – Oct 19
Arts & Crafts	FSM Training Center, Sipacapa	22 women; 1 man	Nov 7 – 18
Arts & Crafts	San Miguel Regional School	20 women	Nov 21 – Dec 2
Food Preparation	Xeabaj, Sipacapa	23 women	Dec 5 – 16

Forest Nursery Training

With funding from Corporate Citizenship Facility (CCF), FSM developed and started the *Seeds for Development* forest nursery training project during 2004. The purpose of the project is to develop tree nurseries for reforestation projects, including the Marlin Mine and to help counter the deforestation of the area resulting from illegal logging and domestic firewood use.

In late 2005, FSM organized a conference to review final results of the "Seeds for Development" Project. The main results of the project, presented during the conference were:

- Four training modules – *Frutales, Huertos Familiares, Viveros Forestales* and *Educación Ambiental* – developed, tested, validated and published;
- More than 145 people trained with the modules during the validation phase;
- 97 people hired for reforestation of 40.3 hectares;
- 29,650 tree seedlings sold to Montana Exploradora and others;
- Two studies published – Forest Diagnostic and Market Assessment;
- Three study tours conducted with more than 15 participants (farmers from San Miguel and Sipacapa).

Soon after the final conference, the next phase of the project was implemented. Using the Tables 23 and 24 display 2005 FSM demonstration projects in San Miguel and Sipacapa.

TABLE 23. FSM 2005 AGRICULTURAL DEMONSTRATION PLOTS: SAN MIGUEL

Crop	Area (Cuerdas)	Landowner	Date of Planting	Number of Participants	Leadership
Tierra Colorada					
Broad beans	1	Venancio Díaz	Nov 18	4	Community Leaders
Sugar daddies	1	Vicente López	Nov 18		
Subchal					
Potatoes Atlantic	1	Carlos López	Nov 28-29	5	Farmers' Group from La Unión
Broad beans	0.5	Tránsito Díaz	Nov 28		
Chisnan					
French beans	1	Enrique Mejía	Nov 22	16	Community Leaders
Snow peas	1	Enrique Mejía	Nov 22		

TABLE 24. FSM 2005 AGRICULTURAL DEMONSTRATION PLOTS: SIPACAPA

Crop	Area (Cuerdas)	Landowner	Date of Planting	Number of Participants	Leadership
La Estancia					
Potatoes Atlantic	1	Aurelio López	Nov 19	10	Community Leaders
Broad beans	1	Aurelio López	Nov 16		
Sugar daddies	1	Aurelio López	Nov 18		
Pie de la Cuesta					
Potatoes Atlantic	1	Calixto Sánchez	Nov 19	14	Asociación de Agricultores de Pié de la Cuesta (ASIPA)
Broad beans	1	Arnulfo Sánchez	Nov 19		
Sugar daddies	0.5	Arnulfo Sánchez	Nov 19		
French Beans	0.5	Arnulfo Sánchez	Nov 19		

As the tables show, most of the plots measured one cuerda, which is equivalent to 1/8 acre. The first post-planting training was held on December 13, focusing on "Best Agricultural Practices." Attendees included over 90 people from both municipalities as well as seven of the demonstrative plot leaders.

FSM Micro-Enterprise Development

In 2005, 36 people received FSM technical assistance activities to help their businesses grow. Technical assistance areas included poultry production, computing/IT and bread-making.

Communal Banks

During 2005 FSM/FAFIDESS supported 20 communal banks and one solidarity group with 332 members in the ICDP region. The communal banks lent a total of Q1,188,500 ($152,371) and saved a total of Q132,603 ($17,000). All bank members are indigenous women. Details of all the banks operating in San Miguel and Sipacapa are shown in the following table.

TABLE 25. COMMUNAL BANKS INAUGURATED IN 2005

N°	COMMUNAL BANK	Number Members	Amount Lent	Amount Saved
1	Máquivil	30	Q122,000	Q21,137
2	El Centro de Máquivil	25	46,000	12,500
3	Nuevo Amanecer	16	45,500	4,262
4	Mujeres de Legual	14	47,500	11,250
5	Shanshegual	11	34,000	4,712
6	La Peña	14	40,500	6,090
7	Mujeres de Sibinal	15	54,000	8,895
8	La Patria	14	54,000	4,940
9	Pueblo Viejo	20	81,000	4,800
10	El Centro de la Lima	19	60,500	12,917
11	El Arenal	16	58,500	9,050
12	Socias de Chilive	22	87,000	12,000
13	Mujeres de Tres Cruces	16	45,000	2,905
14	Mirando al Futuro	16	39,500	1,900
15	Las Maravillas	10	36,000	3,164
16	El Ladrillero, El Triunfo	26	87,500	4,620
17	El Centro de Chílive	21	80,000	5,220
18	Buena Vista	10	32,000	1,401
19	Betania	11	43,000	700
20	Las Triunfadoras	6	55,000	150
	TOTAL	**332**	**Q1,188,500**	**Q132,603**
	Total in Dollars		**$152,371.79**	**$17,000.38**

As the table shows, FAFIDESS' loan portfolio is currently worth over $150,000. On average, each bank member is managing a loan worth around $477. In addition, the bank members have put just under $17,680 into a savings program designed to support a revolving fund that is being used to increase the capacity of the women's communal banks, which represents.

In late 2005, FAFIDESS implemented a technical training program to address the results identified in a Training Needs Assessment survey. The women surveyed thus represented 22% of FAFIDESS' members. Some of the principal findings are:

- Although 94% of the respondents can speak Spanish, 52% said they would prefer to receive trainings in Mam.
- Only 35% of the respondents said they can read and write in Spanish.
- 46% have between 4-6 children, followed by 26% who have between 1-3.
- 52%, earn a living by raising animals, followed by 12% who work primarily in agriculture (growing tomatoes and potatoes)
- The vast majority, 84%, used their loan to buy raw materials (mainly animals).
- When asked what major business "problem" they encountered and what kinds of trainings they thought would help, 23 and 27 women answered respectively, "sanitation/health of animals" (problem) and "animal vaccination" (training they'd like to have)

FAFIDESS conducted specialized technical assistance in treatment and care of pigs and poultry with 215 bank members. FAFIDESS staff conducted home visit to 115 members working with livestock to monitor acquisition of skills during training. It was confirmed that bank members were indeed able to better care for their livestock.

Environmental Awareness

One of the most important achievements of 2005– the new "closed-stoves" pilot project launched in coordination with Helps International –falls under this objective. While the Helps International "Onil Stove" brings many benefits, the impetus for starting this project was to improve air quality standards in the region. The "openfire" stoves create a lot of smoke and lead to high incidences of respiratory illnesses –not to mention severe burns –especially in children. The "closed stoves" Onil project was monitored in the latter part of the year to gauge for community acceptance of the new stoves.

Early in 2005 the a training module was validated with 11 community leaders of Sícabe village, all of whom agreed to take the course to their respective constituencies. Then, on March 31, the first activity of the module ("preserving our forests") was given to a group of 22 CONALFA literacy instructors, five of whom then committed to take this activity to their classrooms.

Another FSM achievement during 2005 was the final training of CONALFA literacy outreach workers. Seven workers completed the final training, which focused on environmentally-sound trash disposal. Designed to be hands-on and participatory the participants were taught to identify the different types of trash and discuss ways to minimize and dispose of it. The literacy workers – four women and three men – made a commitment to bring the PEBA module to their respective literacy groups. This means that over 100 people will be receiving this training in the coming months.

Communications

CDC and FSM publish *Sierra Madre Development News*, the ICDP monthly newsletter printed in both English and Spanish, which is distributed to a wide local, national and international audience. The newsletter has become an effective tool for the program, to highlight achievements and keep interested stakeholders informed of ongoing activities.

FSM continued to run radio Public Service Announcements. On December 7, FSM hosted the 3rd Annual *Feria de la Vida, del Color y del Sabor* which drew over 500 people to the San Miguel town square.

Community Advisory Councils

FSM has established Community Advisory Councils (CAC) in the municipalities of San Miguel, Sipacapa and Máquivil, and developed rules, procedures and structures for the CAC's. The CAC's will involve the communities in the formulation of the Foundation's plans and strategies.

Capacity Building in Local Municipalities

Sierra Madre played a role in helping the San Miguel municipality strengthen its own systems and procedures during 2005. It sponsored two consultancies coordinated and overseen by the municipality through a UNDP advisor that achieved the following:

- In November, a local consultant worked with all the municipal employees to draft a Personnel Manual (*Manual de Descripción de Puestos y Funciones*).

- In December, a CDC Volunteer Advisor traveled to San Miguel and worked with the mayor and the Office of Municipal Planning (OMP) to help them draft the 2006 municipal budget in a participatory and logical manner in accordance with the new guidelines instituted by the federal government.

Mine Closure, Marlin Properties and Installations

- Glamis and Montana Exploradora will to donate the Marlin Mine lands to the Sierra Madre Foundation as part of the mine closure.

- While the process plant and tanks will be removed, the electrical line to the property, the offices, workshops, cafeteria and housing on the Marlin Mine property will be given to the Sierra Madre Foundation.

- Consideration and planning with the peoples of Sipacapa and San Miguel Ixtahuacán as to how best use the installations will take place well in advance of the mine closure.

10.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT CAPABILITY

10.1 Environmental and Social Management Systems

Marlin Mine Environmental Management System

The Marlin Mine is currently implementing an Environmental Management System (EMS) intended to promote continuous improvement in the environmental management of the Marlin Mine. The EMS is concentrated into four phases including:

1. Policy & Planning,
2. Implementation,
3. Evaluation, and
4. Review & Improvement.

Phase I

Phase I of the Marlin EMS has been completed and includes a Policy Statement signed by the General Manager, as well as development of various environmental management plans (EMPs). EMPs for the following subjects have been completed:

1. Flora,
2. Fauna,
3. Surface Water (including sediment & erosion control),
4. Dust Control,
5. Materials and Waste Management, and
6. Environmental Monitoring.

Phase II

Phase II of the Marlin EMS has been initiated. The Policy Statement has been signed and clearly posted in the applicable areas of the mine. This statement was reviewed and approved by the management team. Additionally, drafts of the various EMPs were submitted to the affected area managers for their comments. After addressing the comments, the EMPs were finalized and distributed to the management team. The EMPs have become part of the contract documents for significant works that will be done at Marlin by third parties. They are expected to comply with the EMPs and this is stated in the standard contract language.

Further employee training on the EMPs and their implementation will be conducted in 2006.

Phase III

Phase III of the Marlin EMS will be implemented in 2006 and the design of this phase is currently underway.

Phase IV

Phase IV of the Marlin EMS will be implemented in 2006. This will include regular meeting of the Senior Environment Committee (made up of key Marlin Mine managers) to review environmental monitoring data and issues/concerns. Discussions will be conducted concerning areas and methods of improvement.

Upon completion of these phases, a third party auditor will be contracted to review the EMS. This is anticipated for late 2006 or early 2007. It is anticipated that the auditor will find various areas within the EMS that will require further development and improvement. The auditor will define these areas as well as suggested actions for improvement.

Montana Exploradora de Guatemala, S.A. will discuss these suggestions and their implementation for the year 2007.

<u>Marlin Mine Sustainable Development Management System</u>

Montana is currently implementing a Sustainable Development Management System (SDMS) intended to promote continuous improvement in the sustainable development efforts of the Marlin

Mine. The SDMS is concentrated into four phases including:

1. Policy & Planning
2. Implementation
3. Monitoring
4. Evaluation, Review & Improvement.

Phase I

Phase I of the Marlin SDMS is under draft. It will include a Policy Statement signed by the General Manager. The sustainable development management plans (SDMPs) are under preparation. SDMPs for the following subjects will be prepared:

1. Community Relations,
2. Organizational Development (Community Projects),
3. Liaison with the Sierra Madre Foundation,
4. Liaison with the International Finance Corporation.

Phase II

The Policy Statement will be signed and clearly posted in the applicable areas of the mine. This statement will be reviewed and approved by the management team. Additionally, drafts of the various SDMP will be submitted to the area managers and supervisors for their comments. After addressing the comments, the SDMPs will be finalized and distributed to the management team. The SDMPs have become part of the commitment of Montana Exploradora to the surrounding communities. Works undertaken by contractors for the Sustainable Development Department will be expected to comply with the SDMPs and this is stated in the standard contract language.

Phase III

Phase III of the Marlin EMS will be implemented in 2006.

Phase IV

Phase IV of the Marlin EMS will be implemented in the fourth quarter 2006 or first quarter 2007. This will include regular meetings of the senior management to review sustainable development performance and issues/concerns. Discussions will be conducted concerning areas and methods of improvement.

Both during and after the completion of the four phases, the Sustainable Development Department with consult with local community leaders, independent consultants and the IFC on the performance of the Sustainable Development Department. It is anticipated that within the SDMS that will undergo continuous development and improvement over the life of the Marlin Mine.

10.2 Marlin Mine Environmental and Sustainable Development Staffing

Environmental Department Staffing

The 2005 status of the professional staff within Marlin's Environmental Department is shown in Table 26.

TABLE 26. 2005 MARLIN MINE ENVIRONMENTAL DEPARTMENT STAFF		
Position	**Individual**	**Reports To**
Environmental Manager – Guatemala	Lisa Wade	Project Manager
Environmental Coordinator	Gustavo Gomez	Env Manager
Environmental Coordinator	Eversson Ordonez	Env Manager
Environmental Supervisor	Alejandra Chupina	Env Manager
Environmental Supervisor	Oliver Cano	Env Coordinator
Environmental Technician	Werner Valiente	Env Supervisor
Environmental Technician	Cesar Gonzalez	Env Manager
Environmental Assistant	Marvin Mejia	Env Coordinator

Sustainable Development Department Staffing

The 2005 status of the professional staff within Marlin's Sustainable Development shown in Table 27.

TABLE 27. 2005 MARLIN MINE SUSTAINABLE DEVELOPMENT DEPARTMENT STAFF		
Position	**Individual**	**Reports To**
Sustainable Development Department		
Sustainable Development Manager - Guatemala	James Schenck	Project Manager
Community Relations Unit Coordinator	Keneth Müller/ Wilson Castañeda	Sus. Dev. Manager.
Organizational Development Unit Coordinator	Alan Ovalle	Sus Dev Manager
Infrastructure Supervisors	Two Persons	Org Dev Coordinator
Community Relations Assistant Coordinator	Liane MacMannis	Com Relations Unit Coordinator
Media Technician	José G. Gómez	Com Relations Unit Coordinator
Administrative Assistant	Aurelia de Paz	Sus Dev Manager
Municipal Community Relations Supervisors – Sipacapa & San Miguel Ixtahuacán	Two Persons	Com Relations Unit Coordinator
Community Relations Promoters	Five Persons	Com Relations Unit Coordinator

10.3 Sustainable Development Department Training

Table 28 displays Marlin Mine 2005 Sustainable Development Department staff training.

TABLE 28. 2005 MARLIN MINE SUSTAINABLE DEVELOPMENT DEPARTMENT STAFF TRAINING		
Date	**Subject**	**Attendees**
February	How to make presentations, based on principal themes	Community Relations General Coordinator, Municipal Coordinators (2).

	(strategic)	
June	How to make presentations, based on principal themes (strategic)	Community Relations General Coordinator, Municipal Coordinators (2).
October	FODA Analysis	Community Relations Assistant, Municipal Coordinators (2), Community Relations Promoters (6).
November	How to make presentations, based on principal themes (strategic)	Community Relations Assistant, Municipal Coordinators (2), Community Relations Promoters (6).

11.0 ENVIRONMENTAL PROGRAM MONITORING

11.1 2005 Marlin Mine Environmental Overview

The following overview discusses environmental activities which occurred at Marlin during the 2005 reporting year

EMPs

Development and/or updating of the various Environmental Management Plans (EMPs) referenced in the EIA&S was completed. These EMPs are the procedures for the Environmental Management System (EMS) and include the following:

1. Surface Water (Drainage, Erosion & Sediment Control),
2. Dust Control,
3. Materials & Waste Management,
4. Flora Management,
5. Fauna Management, and
6. The Monitoring Plan.

Audit

A third party Environmental Audit and Review (Audit) was conducted by MFG, Inc. in 2005. The site inspection was conducted November 7, 8, and 9th of 2005; with a follow up visit to review the final two quarter conducted in March, 2006. The final report was issued in March, 2006. The audit report is attached in Attachment C. Follow up on the noted audit items is ongoing.

11.2 Current Environmental Permit Status

The current status of Marlin permits are shown in Table 29.

TABLE 29. CURRENT STATUS OF MARLIN MINE PERMITS

Description	Ministry	Approval Date
EIA&S (Res. No. 779-2003/CRMM/EM)	MARN	September, 2003
Exploitation License (Res. No. 3329)	MEM	November, 2003
Forestry License (No. DR-VI-016-M-2005)	INAB	May, 2005
Forestry License for Powerline (No. DR-VI-070-Cu-2005)	INAB	May, 2005
EIA for Hydrocarbon Storage Tanks (Res. No. 1215-2006/MAGC/LL)	MARN	May, 2005
Construction & Operation of the Electrical Substation (Res. No. 1191-2005/MAGC/GO)	MARN	May, 2005
Importation of Cyanide (Res. No. 1790-2005/MAGC/KC)	MARN	July, 2005
Operation of 11 Generators (Res. No. 2326-2005/MAGC/LP)	MARN	August, 2005
Transport, Use & Storage of Explosives (Oficio No. 6259)	Defense Ministry	September, 2005
Hydrocarbon Use License (No. 003032)	MEM	October, 2005
EIA for Powerline Project (Res. No. 1133-2005/MAGC/EM)	MARN	October, 2005
Powerline Commission Approval (Res. CNEE-120-2005)	National Energy Commission	October, 2005
Use of Radioactive Equipment License (Res. No. 663-2005)	MEM	November, 2005
Environmental License (No. 0002-06/DIGARN)	MARN	Jan, 2006

11.3 Report of Significant Environmental Events and Issues

Environmental incidents are reported internally, maintained on file by the Environmental Department and reported externally as required. Following is a table of the environmental incidents noted in 2005.

TABLE 30. MARLIN MINE 2005 SIGNIFICANT ENVIRONMENTAL EVENTS AND ISSUES

Incident	Date	Subject	Response
Spill	04/10/05	10 gals diesel	Soil clean up
Spill	07/07/05	5 gals used oil	Soil clean up
Spill	07/07/05	25 gals hydraulic oil	Soil clean up
Spill	07/27/05	5 gals diesel	Soil clean up
Spill	08/20/05	80 gals oil	Soil clean up
Spill	09/14/05	2 liters diesel	Soil clean up
Spill	09/15/05	100 liters diesel	Soil clean up
Spill	09/25/05	1130 kgs antiscalant & 50 kgs borax	Container retrieval, soil clean up of borax, amend transport procedures
Other	09/28/05	Forklift puncture of cyanide box while offloading	Change unloading procedures
Animal Mortality	10/09/05	Bird mortality	Repair pump near cyanide mix tank
Animal Mortality	10/10/05	Bird mortality	Repair pump near cyanide mix tank
Other	10/16/05	Seepage tank overflow (20 mins)	Repair seepage return pump
Spill	10/22/05	55 gals diesel/water mix	Soil clean up
Spill	12/16/05	400 kgs antiscalant	Soil clean up, further operator training

All the incidents of 2005 occurred within the mine except one, the antiscalant spill in September. This spill was the only incident reported externally during 2005 and copies of the report were sent to the Guatemalan MARN, the Guatemalan MEM, and to the IFC. To summarize, this spill occurred during product transportation to Marlin along the gravel road from km 241 to the site. The transport truck platform tipped such that the totes containing the antiscalant slid off the truck and into the adjacent drainage. The truck tipped when a culvert collapsed as the truck was rounding a curve in the road. One of the totes that slipped off the platform broke open and spilled the majority of its contents into the drainage. As it was raining, none of the spilled antiscalant was retrieved. This antiscalant spill presented no danger to the environment. The other totes were placed back onto the truck platform, along with the emptied tote; and later hauled to Marlin. The truck was also transporting dry borax, and a minor amount of this inert materials was also spilled.

Two preventive measures were subsequently implemented. The first preventive measure included the modification of the transportation requirements to include the use of closed containers to haul totes of chemicals and/or reagents shipped in significant quantities to Marlin. The closed containers are securely fixed to the truck platform and cannot slide off if the truck platform happens to angle to one side.

The second preventive measure was implemented in early 2006 and established a Marlin operated checkpoint along the gravel road to the mine from km 241. This checkpoint is established very near to the km 241 entrance on the gravel road and all trucks shipping quantities of chemicals or petroleum products are required to stop at this point. The truck, driver, and platform conditions are reviewed prior to approving final transport to Marlin along the gravel road. The checkpoint was established at this location as the winding, steep, gravel road to Marlin is considered one of the more difficult stretches of the transportation route.

11.4 Sampling and Measurement Reports

The following sections present specific environmental sampling and measurement reports as required under the IFC agreement. The Marlin environmental monitoring program includes quarterly monitoring of the following aspects: air quality, surface water quality, ground water quality, and aquatic life. This is as indicated in Chapter 10 of the EIA&S. Monitoring points for aquatic biology, surface water quality, and ground water quality are indicated in Figures 4.1, 4.2, and 4.3 respectively of the Marlin Monitoring Plan. The figures have been attached to this report in Attachment D. Marlin submits the monitoring results in regular quarterly reports to the MARN with a copy to the MEM.

SGS established an on site laboratory for metallurgical and mine samples. It was thought that the same lab could be used to analyze the environmental samples. However, when SGS began conducting the environmental analyses in September, anomalous readings for certain parameters were noted immediately. This may be due to the fact that the metallurgical samples and the environmental samples were prepared and analyzed in the same building. After sending samples to SGS for five months, September 05 through January 06, the decision was made to change to ACZ Laboratories in Steamboat Springs, CO. This is a reputable lab that specializes only in environmental analyses. The results recently received from ACZ confirmed that the previous SGS environmental data was anomalous, as had been thought. Details regarding this issue are discussed below in the sections on water quality monitoring. The analytical results for the month of October were discarded due to various anomalous parameters.

SGS continues to analyze the metallurgical and mine samples without these types of issues.

11.5 Air Emissions

The EIA&S evaluated the potential for air quality impacts resulting from operations. Based on conclusions from the air quality study, it was determined that air quality impacts would not be significant. The most apparent potential air quality impacts from mining operations result from fugitive dust emissions from the roads, occurring primarily during the dry season (Nov-Apr). Marlin conducts an aggressive dust suppression program (road watering and dust suppression additives) to mitigate potential fugitive dust emissions. The ambient monitoring program calls for the measurement of particulate levels around the site using PM_{10} (particulate with mean aerodynamic diameter of 10 microns or less) monitoring stations. Visual inspection is done to ensure that management practices are implemented to minimize fugitive dust emissions.

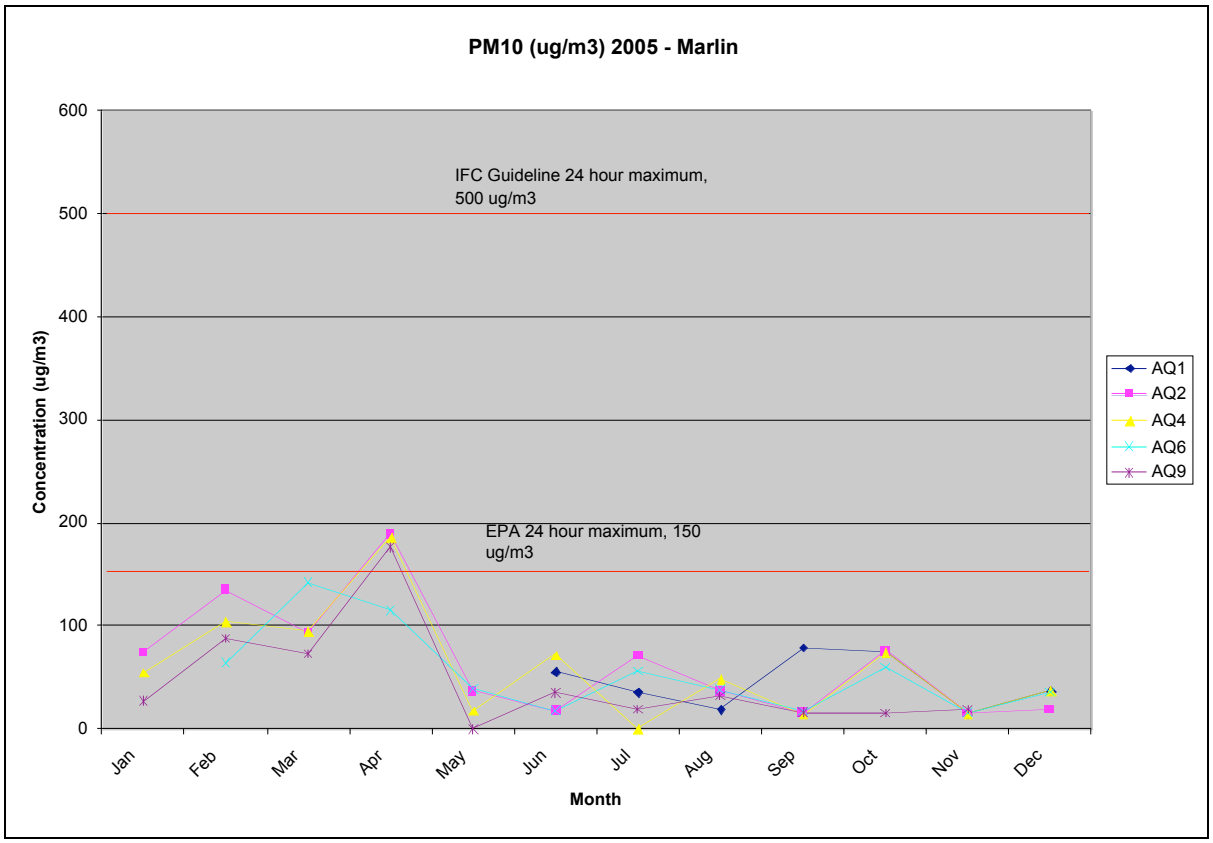
Marlin conducted ambient air quality monitoring at nine PM_{10} monitoring locations during 2005. Table 31 and Figure 5 summarize the PM_{10} ambient air quality monitoring data. All monitoring results were within the IFC guideline of 500 $\mu g/m^3$ for the 24 hour maximum and 100 $\mu g/m^3$ for the annual arithmetic mean.

TABLE 31. PM_{10} AMBIENT AIR QUALITY MONITORING DATA

PM10 (ug/m^3) - Marlin 2005															
Monitoring Stations			Month, 2005												Annual Arithmetic Mean
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Area and Wind Location		IFC Guideline	500 ug/m^3 (24 hour maximum) & 100 ug/m3 (annual arithmetic mean)												
		EPA Standard	150 ug/m^3 (24 hour maximum) & 50 ug/m^3 (annual arithmetic mean)												
Marlin	Downwind	AQ1 (Agel)						56	36	19	79	74	15	37	45
	Downwind	AQ2 (San José NE)	75	135	93	189	37	18	71	37	16	76	15	19	65
	Downwind	AQ4 (San José Ixcaniche)	55	104	95	186	18	72	148*	49	14	75	15	37	60
	Upwind	AQ6 (Ixcanichel)		64	142	115	39	18	56	38	17	60	16	36	55
	Upwind	AQ9 (Salem)	27	88	73	176	19*	35	19		32	16	15	19	45
Road to Marlin	Not Applicable	AQ12 (Chuena)			95	133	53		94	162	16				92
	Not Applicable	AQ5 (Los Horcones)	33	86	38							106	16		56
La Hamaca	Background	AQ10 (Salitre)	35	173	58	173	18	75	17	19	17	65	16	17	57
	Background	AQ11 (Salitre Northwest)				169	37	74	100	37	16	32	31	90	65

*: The monitoring period went for one extra hour, i.e. 25 hours.

FIGURE 5. PM_{10} AMBIENT AIR QUALITY MONITORING DATA



Three of the five stations within the Marlin area were above the EPA 24 hour maximum standard during April, 2005. April is a typically dry month and higher PM_{10} concentrations are not unusual during this month. One of the upwind stations, AQ9, was one of the three stations that reported the exceedance and it could therefore be concluded that the issue was related to background concentrations as a result of the dry weather.

The two stations collecting background data in the La Hamaca area also reported values exceeding the EPA standard during April.

Lastly, the PM_{10} concentration at AQ12 was slightly above the EPA standard in August, 2005. This station is located in Chuena near the main road to Marlin and is affected by both mine traffic and public traffic. Beginning in the dry season (late 2005) additional dust suppressors were added to the road watering activities to improve this issue.

It should be noted that point AQ6 is very near to the waste dump and will no longer be monitored as ambient air. Also, points AQ5 and AQ12 were used interchangeably to monitor traffic impacts. Future monitoring will include only point AQ12 to build a more consistent database.

An additional upwind monitoring point, which will be labeled AQ15, will be established in Carrizal in early 2006. This is near the southeast property boundary and will help to compare upwind and downwind PM_{10} differences.

11.6 Groundwater

Marlin conducted ground water quality monitoring at five locations and submitted the data to both MEM and MARN in the regular quarterly reports for 2005. Ground water quality monitoring is required on a quarterly schedule by the EIA&S, however, the wells were often sampled more frequently to further establish baseline and/or background groundwater quality. The monitoring wells included in the sampling program and their location descriptions are listed in Table 32.

TABLE 32. MARLIN MINE GROUNDWATER SAMPLING WELLS

Groundwater Quality Monitoring Point	Location Description
MW2	Southwest of the TSF (upgradient)
MW3B	North/Northeast of the TSF (downgradient)
MW4	North of the TSF (downgradient)
MW5/PSA-1	Production Well – South of Marlin Pit, near Rio Tzala
G11	North of the TSF dam (downgradient)

MW2: Monitor well MW2, southwest of the TSF, indicated anomalous results for antimony during the months that SGS was analyzing the samples. These results are considered anomalous and are likely a result of laboratory error as previously discussed in this section. The SGS laboratory on site was noted to have some problems with contamination when analyzing very low level metals concentrations as this is not the objective of a metallurgical lab. The same building was used for metallurgical, mining, and environmental type analysis. To avoid this issue in the future, environmental compliance samples were no longer submitted to the SGS laboratory after January, 2006. All samples are now being sent to ACZ Laboratories in Steamboat Springs, Colorado. This is a reputable lab with precise, low detection level analytical methodologies specifically designed for environmental compliance monitoring. The results for 2006 from ACZ confirm these antimony readings as anomalous and not a reason for concern. No other unusual results were noted in well MW2 during 2005. The monitoring data for well MW2 during 2005 is shown in Table 33.

Table 33. MW2 Monitoring Data

MW2 2005

Mes		Ene	Feb	Mar	Abr	May	Jun	Jul	Ago	Sep	Nov	Dic
Fecha		**1/19/2005**	**2/11/2005**	**4/7/2005**	**4/29/2005**	**5/20/2005**	**6/10/2005**	**7/30/2005**	**8/9/2005**	**9/26/2005**	**11/25/2006**	**12/19/2005**
Laboratorio		CTA	CTA	CTA	CTA	CTA	CTA	CTA	CTA	SGS	SGS	SGS
pH de campo	u.e.	7.32	7.23		7.25	7.34	7.38	7.36	6.92	6.46	7.38	6.94
pH de laboratorio	u.e.									7.98		7.4
Temperatura de campo	°C	25	22.5		24.9	24.3	25.4	24.0	24.1	25.60	22.8	23.1
Temperatura de laboratorio	°C										12.4	
Conductividad de campo	uS/cm	499	465		452	247	260	414	416	380.00	147	165.8
Conductividad de laboratorio	uS/cm									399.00		69
Oxígeno Disuelto de campo	mg/L		3.2									
Alcalinidad Total	mg/L			206	166	200	180	209	210	199		40
Amonio	mg/L			<0.02	<0.05	<0.02	<0.02	0.02	<0.02	<0.1	<0.05	<0.05
Cloruros	mg/L			1.07	0.74	0.87	0.95	1.66	1.48	1.4	<20	2.9
Fluoruros	mg/L			0.19	0.19	0.23	0.2	0.25	0.27	0.18		
Cianuro Total	mg/L			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.01	<0.01	0.01
Cianuro Libre	mg/L									<0.02		
Cianuro WAD	mg/L			<0.010	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.05	<0.05
TKN	mg/L			0.2	0.14	0.08	0.06	0.32	0.25	<0.5	<0.5	<0.5
Nitratos	mg/L											0.1
Nitritos	mg/L											<0.01
Sulfatos	mg/L			11.4	7.95	11.6	11.4	13.1	12.9	14	74	9.4
Sulfuro de hidrógeno	mg/L								<0.1		<0.02	2.14
Sólidos Suspendidos	mg/L			<12	<12	<12	22	17	<12	24	20	30
Sólidos Disueltos	mg/L			250	206	260	276	324	300	326	30	160
Sólidos Totales	mg/L			276	348	284	334	312	300			
Hidrocarburos totales	mg/L	<0.500	0.090	1.900	2	<0.5	<0.500	1.5	<0.500			
Grasas y Aceites Totales	mg/L											
DQO	mg/L			<5	7	<5	<5	6	8		43	44
Aluminio Disuelto	mg/L	0.068	0.029	0.052	0.006	0.006	0.016	0.063	0.033	0.05	0.08	0.033
Aluminio Total	mg/L	0.659	0.112	0.017	0.016	0.106	0.141	0.199	0.119			
Antimonio Disuelto	mg/L	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.287	0.015	0.864
Antimonio Total	mg/L	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006			
Arsénico Disuelto	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.005	<0.001	0.003
Arsénico Total	mg/L	<0.003	<0.003	0.005	<0.003	<0.003	<0.003	<0.003	<0.003			
Bario Disuelto	mg/L	0.084	0.082	0.088	0.072	0.071	0.079	0.079	0.081	0.082	0.048	0.053
Bario Total	mg/L	0.087	0.084	0.041	0.071	0.079	0.084	0.082	0.08			
Berilio Disuelto	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005
Berilio Total	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			
Boro Disuelto	mg/L	0.01	<0.010	0.011	<0.010	0.011	<0.010	<0.010	<0.01	<0.01	<0.01	0.009
Boro Total	mg/L	0.012	<0.05	0.043	0.011	0.01	0.016	<0.010	0.009			
Cadmio Disuelto	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0002	<0.0001	<0.0001
Cadmio Total	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002			
Calcio Disuelto	mg/L											
Calcio Total	mg/L	64.6	61.4	59.3	45.6	59	48.1	60.3	56.9	60.1	13.5	16.1
Cobalto Disuelto	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.004	<0.001	0.002			
Cobalto Total	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			
Cobre Disuelto	mg/L	<0.002	<0.002	<0.002	<0.002	0.003	<0.002	0.005	<0.002	0.0014	0.0009	<0.0008
Cobre Total	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.004			
Cromo Disuelto	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		<0.001	<0.001
Cromo VI	mg/L									<0.001		
Cromo Total	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.02		
Estaño Disuelto	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.005	<0.001	<0.001	<0.001	<0.001
Estaño Total	mg/L	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009			
Estroncio Disuelto	mg/L	0.378	0.369	0.382	0.324	0.335	0.368	0.348	0.362			
Estroncio Total	mg/L	0.358	0.391	1.77	0.336	0.372	0.383	0.372	0.357			
Fosforo Disuelto	mg/L											
Fosforo Total	mg/L			0.07	0.06	0.09	0.07	0.1		0.04		
Hierro Disuelto	mg/L	0.443	0.352	0.187	0.149	0.164	0.166	0.261	0.302	0.18	0.11	0.43
Hierro Total	mg/L	0.64	0.424	0.91	0.165	0.239	0.335	0.369	0.422			
Magnesio Disuelto	mg/L											
Magnesio Total	mg/L	9.68	9.28	8.96	6.29	8.92	7.77	9.31	8.72	9.25	3.45	3.85
Manganeso Disuelto	mg/L	0.32	0.334	0.239	0.194	0.051	0.187	0.182	0.333	0.248	0.096	0.21
Manganeso Total	mg/L	0.331	0.341	0.076	0.176	0.13	0.216	0.166	0.386			
Mercurio Disuelto	mg/L	<0.0025	<0.0001	0.00011	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005		<0.0001	<0.0001
Mercurio Total	mg/L	0.0004	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001			
Molibdeno Disuelto	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.001	0.0006	0.0003
Molibdeno Total	mg/L	<0.002	<0.002	0.005	<0.002	<0.002	<0.002	<0.002	<0.002			
Níquel Disuelto	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.02	0.001	0.001
Níquel Total	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003			
Plata Disuelta	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0001	<0.0001	<0.0001
Plata Total	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002			
Plomo Disuelto	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0006	0.0003	0.001
Plomo Total	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002			
Potasio Disuelto	mg/L											
Potasio Total	mg/L	4.36	4.41	4.17	2.71	3.98	3.36	4.34	4.42	4.17	3.17	3.43
Selenio Disuelto	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.005	<0.005	<0.005
Selenio Total	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004			
Silicio Disuelto	mg/L	32.3	31.9	31.5	25.3	32.8	28.1	33.4	32.7			
Silicio Total	mg/L	37.5	33	20.4	30.5	33.4	29.6	34.4	33.2			
Sodio Disuelto	mg/L											
Sodio Total	mg/L	14.7	14.6	14.7	9.6	14.1	12.2	15.2	14.7	14.9	7.58	8.7
Talio Disuelto	mg/L	<0.06	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005			
Talio Total	mg/L	<0.05	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.0005			
Titanio Disuelto	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001			
Titanio Total	mg/L	0.003	0.002	0.002	<0.001	0.003	0.002	0.003	0.003			
Vanadio Disuelto	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			
Vanadio Total	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			
Zinc Disuelto	mg/L	0.015	0.008	0.097	0.014	0.037	0.042	0.048	0.007	0.02	0.005	0.01
Zinc Total	mg/L	0.016	<0.015	0.348	0.021	0.058	0.032	0.052	0.026			

MW3B: MW3B, downgradient from the TSF, was installed in September 2005 as a replacement well for MW3. The well cap for MW3 had been tampered with and it is supposed that rocks and dirt were thrown into the well, precluding any future monitoring at MW3. The blockage was not able to be removed/cleaned out and thus a new well, MW3B was installed near to the original MW3. Sampling of the new well, MW3B commenced in November, 2005 and the sampling results are shown in Table 1.4-3. The antimony levels in this well were also confirmed to be anomalous by the recent ACZ data.

MW4: Well MW4 was dry on all sampling occasions. MW4 is downgradient from the TSF; however wells G11 and MW3B are also downgradient of the TSF. Therefore the fact that no sample was taken from MW4 was not considered problematic.

MW5: Well MW5 is synonymous with the production well (PSA-1) and is sampled on a monthly basis. As with well MW2, there were anomalous antimony results. It is supposed that this is also due to laboratory error for the same reasons discussed previously. The early results for 2006 regarding antimony from ACZ indicate antimony is either very low level, or non detectable as the historical data has indicated. Sulfate and iron levels in MW5 are typically higher than levels in the other wells, although the levels are not problematic.

No other unusual results were noted in well MW5 during 2005. The monitoring data for well MW5 during 2005 is shown in Table 34.

Table 34. MW5 Monitoring Data

MW5 (PSA-1) 2005

Mes		Ene	Feb	Mar	Abr	May	Jun	Jul	Ago	Sep	Nov	Dic
Fecha		**1/19/2005**	**2/11/2005**	**4/7/2005**	**4/27/2005**	**5/19/2005**	**6/10/2005**	**7/28/2005**	**8/9/2005**	**9/26/2005**	**11/22/2005**	**12/19/2005**
Laboratorio		CTA	CTA	CTA	CTA	CTA	CTA	CTA	CTA	field data	SGS	SGS
pH de campo	u.e.	7.12	7.86		7.45	7.61	7.62	7.32	7.33	7.35	7.1	7
pH de laboratorio	u.e.										7.1	7.6
Temperatura de campo	°C	25.5	26.9		27.3	23.9	24.1	28.3	26.5	26.90	26.3	26.4
Temperatura de laboratorio	°C										12.4	
Conductividad de campo	uS/cm	822	840		796	814	325	806	821	702	857	850
Conductividad de laboratorio	uS/cm										842	374
Oxígeno Disuelto de campo	mg/L	1.11	5.25		3.93							
Alcalinidad Total	mg/L			318	256	310	246	325	326		4	224
Amonio	mg/L		0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.02		<0.05	<0.05
Cloruros	mg/L			1.4	1.67	1.93	2.02	2	2.17		<20	3.9
Fluoruros	mg/L			0.29	0.14	0.24	0.16	0.24	0.26			
Cianuro Total	mg/L			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.01	0.01
Cianuro Libre	mg/L											
Cianuro WAD	mg/L			<0.010	<0.002	<0.002	<0.002	<0.002	<0.002		<0.05	<0.05
TKN	mg/L		<0.05	0.06	0.07	0.08	<0.05	<0.05	<0.05		<0.5	<0.5
Nitratos	mg/L										<0.01	<0.01
Nitritos	mg/L										<0.01	<0.01
Sulfatos	mg/L			123	121	124	127	126	133		170	170
Sulfuro de hidrógeno	mg/L								<0.1		<0.02	<0.02
Sólidos Suspendidos	mg/L			<12	<12	36	48	<12	<12		20	40
Sólidos Disueltos	mg/L			456	452	536	444	592	279		170	40
Sólidos Totales	mg/L			508	552	540	504	562	572			
Hidrocarburos totales	mg/L	<0.500	0.037	1.300	<1		<0.500	<1	<0.500			
Grasas y Aceites	mg/L											
DQO	mg/L			8	<5	<5	5	<5	<5		<8	24
Aluminio Disuelto	mg/L	0.028	0.011	<0.004	0.005	<0.004		0.007	<0.004		<0.01	<0.004
Aluminio Total	mg/L	0.02	0.058	0.085	0.047	<0.015	0.024	0.015	0.023			
Antimonio Disuelto	mg/L	<0.006	<0.006	<0.006	<0.006	<0.006		<0.006	<0.006		0.068	0.863
Antimonio Total	mg/L	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006			
Arsénico Disuelto	mg/L	0.009	0.008	0.008	0.006	0.008		0.005	0.005		0.003	0.003
Arsénico Total	mg/L	0.009	0.008	<0.003	0.004	0.005	0.006	0.004	0.004			
Bario Disuelto	mg/L	0.039	0.042	0.039	0.036	0.037		0.038	0.039		0.039	0.04
Bario Total	mg/L	0.037	0.041	0.089	0.038	0.037	0.036	0.039	0.038			
Berilio Disuelto	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001		<0.005	<0.005
Berilio Total	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			
Boro Disuelto	mg/L	0.034	0.035	0.047	0.044	0.046		0.037	0.033		0.06	0.056
Boro Total	mg/L	0.042	<0.05	0.008	0.045	0.041	0.063	0.036	0.038			
Cadmio Disuelto	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002		<0.0001	<0.0001
Cadmio Total	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002			
Calcio Disuelto	mg/L											
Calcio Total	mg/L	100	101	103	76.2	93	80.5	108	102		110	116
Cobalto Disuelto	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	0.001			
Cobalto Total	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			
Cobre Disuelto	mg/L	0.003	0.002	<0.002	<0.002	<0.002		<0.002	<0.002		<0.0008	<0.0008
Cobre Total	mg/L	<0.003	0.005	<0.003	<0.003	<0.003	0.005	<0.003	<0.003			
Cromo Disuelto	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003		<0.003	<0.003		0.001	0.001
Cromo Total	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003			
Estaño Disuelto	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001		<0.001	<0.001
Estaño Total	mg/L	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009			
Estroncio Disuelto	mg/L	1.58	1.73	1.81	1.6	1.6		1.69	1.5			
Estroncio Total	mg/L	1.55	1.81	0.387	1.73	1.76	1.77	1.78	1.72			
Fósforo Dsiuelto	mg/L											
Fósforo Total	mg/L			<0.05	<0.05	<0.05	<0.05	<0.05				
Hierro Disuelto	mg/L	1.74	1.97	0.266	0.843	0.352		0.613	0.646		0.33	0.36
Hierro Total	mg/L	1.81	2.34	0.25	0.951	0.812	1.12	0.696	0.698			
Magnesio Disuelto	mg/L											
Magnesio Total	mg/L	23.3	23.2	23.8	23.3	22	23.2	24.7	23.4		26.1	26.6
Manganeso Disuelto	mg/L	0.07	0.076	0.072	0.07	0.066		0.064	0.069		0.078	0.08
Manganeso Total	mg/L	0.076	0.086	0.253	0.072	0.067	0.064	0.073	0.073			
Mercurio Disuelto	mg/L	<0.0001	<0.0001	<0.00005	<0.00005	<0.00005		<0.00005	<0.00005		<0.0001	<0.0001
Mercurio Total	mg/L	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001			
Molibdeno Disuelto	mg/L	0.004	0.004	0.005	0.004	0.004		0.004	0.004		0.005	0.0053
Molibdeno Total	mg/L	0.004	0.005	<0.002	0.004	0.004	0.005	0.005	0.004			
Níquel Disuelto	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003		<0.003	<0.003		<0.001	<0.001
Níquel Total	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003			
Plata Disuelta	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002		<0.0001	0.0002
Plata Total	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002			
Plomo Disuelto	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002		<0.0002	0.0013
Plomo Total	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002			
Potasio Disuelto	mg/L											
Potasio Total	mg/L	1.75	1.88	1.79	1.82	3.91	1.79	1.93	1.98		2.1	2.11
Selenio Disuelto	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004		<0.004	<0.004		<0.005	<0.005
Selenio Total	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004			
Silicio Disuelto	mg/L	18.7	19.2	18.7	19.2	16.8		20	19.3			
Silicio Total	mg/L	20.4	20.6	35.6	20	19.9	19.1	20.7	20.6			
Sodio Disuelto	mg/L											
Sodio Total	mg/L	41	43.1	43.8	41.8	38.6	41.3	42.9	41.4			45
Talio Disuelto	mg/L	<0.06	<0.005	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005			
Talio Total	mg/L	<0.05	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.0005			
Titanio Disuelto	mg/L	0.002	0.002	0.002	0.002	0.002		0.002	0.002			
Titanio Total	mg/L	<0.001	0.004	0.002	0.002	0.002	0.002	0.001	0.002			
Vanadio Disuelto	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001			
Vanadio Total	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			
Zinc Disuelto	mg/L	0.042	0.045	0.284	0.264	0.216		0.179	0.182		0.055	0.044
Zinc Total	mg/L	0.039	0.057	<0.015	0.307	0.338	0.367	0.227	0.213			

G11: Well G11 was installed in 2005 and sampling began in November. This well is located very near to the toe of the tailings dam, adjacent to the seepage return tank. A dedicated pump was installed in the well to facilitate monthly sampling during the life of the mine.

The antimony levels in this well were similar to the anomalous levels noted in MW2, and MW5. As with the other wells, the antimony results in early 2006 with the new lab returned to the historical levels. No other unusual results were noted in G11 during 2005. The results are shown in Table 35.

Table 35. G11 Monitoring Data

G11 2005

Mes		Nov	Dic
Fecha		**11/24/2005**	**12/18/2005**
Laboratorio		SGS	SGS
pH de campo	u.e.	7.5	7.45
pH de laboratorio	u.e.	7.2	7.7
Temperatura de campo	°C	23	24
Temperatura de laboratorio	°C	12.4	
Conductividad de campo	uS/cm	477	481
Conductividad de laboratorio	uS/cm	479	211
Oxígeno Disuelto de campo	mg/L		
Alcalinidad Total	mg/L	2	174.4
Amonio	mg/L	<0.05	<0.05
Cloruros	mg/L	<20	<2
Fluoruros	mg/L		
Cianuro Total	mg/L	0.02	0.02
Cianuro WAD	mg/L	<0.06	<0.05
TKN	mg/L	<0.5	<0.5
Nitratos	mg/L	0.25	<0.01
Nitritos	mg/L	<0.01	<0.01
Sulfatos	mg/L	17	17
Sulfuro de hidrógeno	mg/L	<0.02	0.05
Sólidos Suspendidos	mg/L	10	80
Sólidos Disueltos	mg/L	90	320
Sólidos Totales	mg/L		
Hidrocarburos totales	mg/L		
Grasas y Aceites	mg/L		
DQO	mg/L	<8	<8
Aluminio Disuelto	mg/L	<0.01	0.018
Aluminio Total	mg/L		
Antimonio Disuelto	mg/L	0.427	0.207
Antimonio Total	mg/L		
Arsénico Disuelto	mg/L	0.001	0.002
Arsénico Total	mg/L		
Bario Disuelto	mg/L	0.108	0.109
Bario Total	mg/L		
Berilio Disuelto	mg/L	<0.005	<0.005
Berilio Total	mg/L		
Boro Disuelto	mg/L	0.02	0.018
Boro Total	mg/L		
Cadmio Disuelto	mg/L	<0.0001	<0.0001
Cadmio Total	mg/L		
Calcio Disuelto	mg/L		
Calcio Total	mg/L	52.2	50.3
Cobre Disuelto	mg/L	<0.0008	<0.0008
Cobre Total	mg/L		
Cromo Disuelto	mg/L	<0.001	0.004
Cromo Total	mg/L		
Estaño Disuelto	mg/L	<0.001	<0.001
Estaño Total	mg/L		
Estroncio Disuelto	mg/L		
Estroncio Total	mg/L		
Hierro Disuelto	mg/L	0.1	0.14
Hierro Total	mg/L		
Magnesio Disuelto	mg/L		
Magnesio Total	mg/L	10.6	10.5
Manganeso Disuelto	mg/L	0.072	0.069
Manganeso Total	mg/L		
Mercurio Disuelto	mg/L	<0.0001	<0.0001
Mercurio Total	mg/L		
Molibdeno Disuelto	mg/L	0.0007	0.0009
Molibdeno Total	mg/L		
Níquel Disuelto	mg/L	<0.001	0.003
Níquel Total	mg/L		
Plata Disuelta	mg/L	<0.0001	<0.0001
Plata Total	mg/L		
Plomo Disuelto	mg/L	<0.0002	<0.0002
Plomo Total	mg/L		
Potasio Disuelto	mg/L		
Potasio Total	mg/L	6.13	6
Selenio Disuelto	mg/L	<0.005	<0.005
Selenio Total	mg/L		
Sodio Disuelto	mg/L		
Sodio Total	mg/L		34.8
Talio Disuelto	mg/L		
Talio Total	mg/L		
Titanio Disuelto	mg/L		
Titanio Total	mg/L		
Vanadio Disuelto	mg/L		
Vanadio Total	mg/L		
Zinc Disuelto	mg/L	0.001	0.001
Zinc Total	mg/L		

In addition to the ground water quality monitoring, there are five wells along the east embankment of the TSF. These PW wells were installed as part of the geotechnical and hydrogeological assessment of the Marlin Mine's TSF, and were completed on the east abutment ridge of the impoundment. The wells were primarily installed to allow insitu measurement of the permeability of the materials comprising the abutment. The abutment consists of a low permeability pyroclastic/ash unit underlain by a volcanaclastic unit. The wells penetrated the contact between these units and were completed with well screen over approximately the lower 40m of the wells. Depths to water in the wells were generally at the contact level and ranged from approximately 60m in PW12 (the shallowest well) to 90m in PW5.

Design analysis of the potential seepage through the east abutment during operation of the TSF suggested that seepage rates would be low; however, the potential was identified for an increase in the phreatic surface in the abutment which could potentially result in seepage daylighting in the drainage to the east. In order to mitigate this potential impact, the installation of seepage recovery/dewatering pumps in the wells was proposed. In the event significant increases in water levels in the wells are measured, pumping could be performed and, if indicated as necessary, additional wells could be installed.

In September 2005, immediately prior to commissioning of the TSF, the decision was made to install pumps in three of the five PW wells as a contingency measure. This involved the placement of RediFlo 4 pumps, manufactured by Grundfos.

The monitoring procedures for the PW wells is included in the "Marlin Tailings Facility Monitoring Plan", MEC, November 2004, issued as part of the TSF design documentation. The intent of the author of the monitoring plan was to perform water level monitoring to determine whether the water level in the wells is increasing such that sampling and potential pumping of the wells would be necessary. It is recognized that the text of the monitoring plan is not clear as to when water quality sampling and analysis is required, however, it was anticipated by the author of the TSF Design Report that a significant increase in water level would trigger the water quality sampling.

Water level monitoring has been periodically taken since the TSF was commissioned in early October 2005. The initial data set reflects the water level in the wells following their completion. The April 2004 readings reflect conditions towards the end of the dry season. In comparison, the September 2005 data reflects rainy season conditions, pre-commencement of the TSF. In general the water levels are higher in the September 2005 reading in comparison to the April 2004 readings with the exception of PW12 which indicates a decrease. Between September 2005 and February 2006, the readings show little to no change in the water levels. The historical water level information in the PW wells is shown in Table 36 below.

TABLE 36. HISTORICAL WATER LEVEL IN PW WELLS					
Wells	**PW1**	**PW3**	**PW5**	**PW7**	**PW12**
Date	**Depth to Water (m)**				
April 1, 2004	86.27	82.26	92.60	77.01	57.30
September 1, 2005	83.66	82.30	91.81	76.86	60.00
January 1, 2006	83.42	N/A	N/A	N/A	60.09
February 6, 2006	83.28	82.30	92.08	76.53	DRY
February 23, 2006	83.27	82.32	92.08	76.48	DRY
Well Depth (m)	90.28	84.31	94.25	95.71	75/60.3
Pump Depth (m)	N/A	82.66	93.64	93.64	N/A
Pump Type		RediFlo4	RediFlo4	RediFlo4	
Screen Depth (m)	54.65-87.65	53.00-83.00	53.00-92.00	53.00-92.00	35.60-68.60

Notes:
Well PW12 was initially drilled to 75m but was damaged during road construction. Current Depth is 60.3m.
Readings in PW3, PW5 and PW7 were not possible in Jan 2006 due to pump restrictions.
Pumps in PW3, PW5 and PW7 were removed in late January 2006. Pumps will be reinstalled in February/March 2006.

Currently the PW wells have not been sampled for water quality. As shown in Table 1.4-6, with the exception of PW1 and PW7, the water level has been at or below the level of the pumps. In January 2006, the pumps were removed to allow an accurate assessment of the water levels. PW12 was determined to be dry and PW3 and PW5 had approximately 2m of water depth. During the monitoring period the water level in the TSF impoundment has risen to be approximately 40m above the measured water level in the wells suggesting that no direct hydraulic communication exists between the impoundment and the wells. In the event no significant change in the water levels of the wells is detected (a change greater than 5 m), the wells will be sampled on a quarterly basis starting in the second quarter of 2006. This will be conducted in the wells that have sufficient water to extract a representative sample. Should the water levels increase significantly (by 5 m or more), sampling will be performed on a monthly basis. Water level monitoring in the PW wells will continue on a monthly frequency during the life of the Mine. Water levels are expected to change throughout the year during the rainy and dry seasons, but these changes are not expected to be more than five meters.

11.7 Operational Monitoring

The Marlin facility was in the construction phase during the first three quarters of 2005; therefore, monitoring at the TSF began during the fourth quarter of 2005. Tailings deposition into the TSF began late in October, 2005.

Operational monitoring points are discussed in Section 5.4.3 of the Marlin Mine Environmental Monitoring Plan. These points were derived from the EIA&S, the TSF design report, and any additional environmental data that can aid in operational decision making processes. As operations commenced in late 2005, the only two applicable points were water collected from the underground, and water from the supernatant pond in the TSF. The monitoring points included in the 2005 sampling program and their location descriptions are listed in Table 37. The additional points mentioned in Section 5.4.3 of the Marlin Mine Environmental Monitoring Plan will be monitored beginning in 2006, and as they become applicable thereafter (when flow or discharge is noted).

TABLE 37. 2005 OPERATIONAL SAMPLING MONITORING POINTS	
Operational Monitoring Point	**Location Description**
D1	Water Collected from the Underground
D4	Supernatant within TSF

D1: Monitoring point D1 is water collected in the underground, which ultimately reports to the TSF. However, to clearly understand water quality for all sources entering the TSF, a separate monitoring point was recommended for this water. This point is monitored monthly when there is flow. The underground mine typically encounters small areas which temporarily produce drainage into the mine for short periods of time. When this occurs, a monthly sample is taken. These drainages are low flow and typically dry up within a few weeks.

It should be noted that certain metals during the September sampling event, the first data sent to the SGS on site laboratory, indicated some anomalous results. These include aluminum, arsenic, calcium, copper, chromium, iron, manganese, molybdenum, nickel, silver, lead, potassium, selenium, and zinc. There were no samples taken in November or December as there was no drainage. However, the first samples sent to ACZ were taken in February, 2006 and the abovementioned metals returned to their pre SGS levels.

The data is shown below in Table 38.

TABLE 38. MONITORING POINT D1 RESULTS

D1 - Descarga de la Mina Subterranea 2005

Mes		Ene	Feb	Mar	Abr	May	Jun	Jul	Ago	Sep	Oct	Nov
Fecha		**1/19/2005**		**4/7/2005**	**4/28/2005**			**7/27/2005**	**8/10/2005**	**9/27/2005**		
Laboratorio		CTA	CTA	CTA	CTA			CTA	CTA	SGS		
pH de campo	u.e.	7.82			8.01			8.05	7.6	8.16		
pH de laboratorio	u.e.									7.89		
Temperatura de campo	°C	23.1			30.7			23.3	23.9	23.0		
Temperatura de laboratorio	°C											
Conductividad de campo	uS/cm	840			746			931	836	990		
Conductividad de laboratorio	uS/cm									938		
Oxígeno Disuelto de campo	mg/L	5.7			5.16			3.94				
Alcalinidad Total	mg/L			148	125			306	214	5900		
Amonio	mg/L			0.99	9.64			0.41	6.3	22.4		
Cloruros	mg/L			6.13	5.62			3.17	2.58	<20		
Fluoruros	mg/L			0.29	0.21			0.37	0.34	0.39		
Cianuro Total	mg/L			0.013	<0.002			0.036	<0.002	<0.02		
Cianuro WAD	mg/L			<0.010	<0.002			<0.002	<0.002	<0.1		
TKN	mg/L			4.87	10.3			14.8	7.48	19.8		
Nitratos	mg/L											
Nitritos	mg/L											
Sulfatos	mg/L			156	145			159	158	210		
Sulfuro de hidrógeno	mg/L								<0.1			
Sólidos Suspendidos	mg/L			1450	<12			654	546	622		
Sólidos Disueltos	mg/L			456	592			18000	4750	11600		
Sólidos Totales	mg/L			2850	7270			18300	6200			
Hidrocarburos totales	mg/L	<500			<1			2.6				
Grasas y Aceites	mg/L											
DQO	mg/L			5	61			8	13			
Aluminio Disuelto	mg/L	0.007		0.011	0.038			6.31	1.76	1870		
Aluminio Total	mg/L	167		217	0.051			254	174			
Antimonio Disuelto	mg/L	<0.006		<0.006	<0.006			<0.006		0.0006		
Antimonio Total	mg/L	<0.006		<0.006	<0.006			<0.006	<0.006			
Arsénico Disuelto	mg/L	<0.003		<0.003	<0.003			0.004	<0.003	0.159		
Arsénico Total	mg/L	0.098		0.086	<0.003			0.132	0.049			
Bario Disuelto	mg/L	0.033		0.034	0.045			0.089	0.1	0.58		
Bario Total	mg/L	2.33		4.01	0.043			3.52	2.33			
Berilio Disuelto	mg/L	<0.001		<0.001	<0.001			0.005	<0.001	0.069		
Berilio Total	mg/L	0.016		0.023	<0.001			0.021	0.013			
Boro Disuelto	mg/L	0.105		0.09	0.075			0.044	0.032	0.95		
Boro Total	mg/L	0.134		0.078	0.074			0.051	0.036			
Cadmio Disuelto	mg/L	<0.002		<0.002	<0.002			<0.002	<0.002	0.0081		
Cadmio Total	mg/L	<0.002		<0.002	<0.002			0.002	<0.002			
Calcio Disuelto	mg/L											
Calcio Total	mg/L	98.3		77	59.9			97.3	89.6	5130		
Cobalto Disuelto	mg/L	<0.001		<0.001	<0.001			0.006	0.006			
Cobalto Total	mg/L	0.082		0.137	<0.001			0.151	0.111			
Cobre Disuelto	mg/L	<0.002		<0.002	<0.002			0.016	<0.002	0.625		
Cobre Total	mg/L	0.089		0.16	<0.003			0.188	0.112			
Cromo Disuelto	mg/L	<0.003		<0.003	<0.003			0.005	<0.003	0.38		
Cromo Total	mg/L	0.152		0.194	<0.003			0.294	0.177			
Estaño Disuelto	mg/L	<0.001		<0.001	<0.001			<0.001	<0.001	<0.001		
Estaño Total	mg/L	<0.009		<0.009	<0.009			<0.009	<0.009			
Estroncio Disuelto	mg/L	0.489		0.661	0.558			1.61	0.836			
Estroncio Total	mg/L	2.44		3.99	0.566			3.97	2.86			
Fosforo Disuelto	mg/L											
Fosforo Total	mg/L			<0.05	0.87			2.96		0.07		
Hierro Disuelto	mg/L	0.242		0.153	0.169			9.13	3.57	1130		
Hierro Total	mg/L	250		373	0.188			459	291			
Magnesio Disuelto	mg/L									560		
Magnesio Total	mg/L	19.7		22.1	17.8			25.6	20.4			
Manganeso Disuelto	mg/L	0.069		0.011	0.019			3.31	0.42			
Manganeso Total	mg/L	12.2		16.4	0.019			21.7	12.6	83.8		
Mercurio Disuelto	mg/L	0.0001		<0.00005	<0.00005			<0.00005	<0.00005			
Mercurio Total	mg/L	0.0007		0.0002	<0.0001			<0.0001	<0.0001			
Molibdeno Disuelto	mg/L	0.008		0.017	0.014			0.007	0.009	0.0261		
Molibdeno Total	mg/L	0.071		0.089	0.014			0.148	0.058			
Níquel Disuelto	mg/L	<0.003		<0.003	<0.003			0.013	0.004	0.41		
Níquel Total	mg/L	0.159		0.189	<0.003			0.292	0.167			
Plata Disuelta	mg/L	<0.002		<0.002	<0.002			<0.002	<0.002	0.121		
Plata Total	mg/L	0.011		0.019	<0.002			0.263	0.017			
Plomo Disuelto	mg/L	<0.002		<0.002	<0.002			0.058	0.006	0.521		
Plomo Total	mg/L	0.175		0.228	<0.002			0.269	0.127			
Potasio Disuelto	mg/L											
Potasio Total	mg/L	10.6		16.1	16			18.6	12.8	184		
Selenio Disuelto	mg/L	<0.004		<0.004	<0.004			<0.004	<0.004	0.014		
Selenio Total	mg/L	<0.004		<0.004	<0.004			<0.004	<0.004			
Silicio Disuelto	mg/L	14.8		14.1	10.6			11.7	13.7			
Silicio Total	mg/L	79.9		139	11.2			101	98			
Sodio Disuelto	mg/L											
Sodio Total	mg/L	30.7		47.3	45.4			42.3	41.7	79.1		
Talio Disuelto	mg/L	<0.06		<0.0005	<0.0005			<0.0005	<0.0005			
Talio Total	mg/L	<0.05		0.0018	<0.0005			<0.005	<0.0005			
Titanio Disuelto	mg/L	0.002		0.002	0.002			0.006	0.007			
Titanio Total	mg/L	0.073		0.133	0.002			0.155	0.202			
Vanadio Disuelto	mg/L	<0.001		<0.001	0.001			0.023	0.007			
Vanadio Total	mg/L	0.405		0.508	<0.001			0.765	0.505			
Zinc Disuelto	mg/L	<0.004		<0.004	0.05			0.202	0.031	4.51		
Zinc Total	mg/L	0.888		1.27	0.065			2.07	1.73			

D4: Monitoring point D4 is collected from the supernatant pond within the TSF, near to the dam discharge structure. This point is monitored monthly. Pre-operational studies at Marlin indicated

that the water stored in the TSF would meet the IFC effluent standards; monthly monitoring of this point is to confirm this assumption prior to the need for discharge from the TSF to the environment. No discharge of process water from the TSF occurred in 2005. The first discharge from the TSF to the environment will occur in late in the 2006 rainy season, or during the 2007 rainy season, depending on the precipitation and storm intensity in 2006.

Sampling at point D4 began in May; however, the only water collected at this point was stormwater runoff until late October when tailings discharge to the TSF began. Data collected in November and December is therefore representative of the water quality in the TSF during operations.

An assessment of compliance with IFC discharge standards cannot be made from just two sampling events taken at start up, continued sampling in early 2006 will be combined with the two 2005 events to confirm if compliance with the effluent standards can be achieved. During the two sampling events in 2005, it is noted that the following IFC discharge standards were exceeded on one or both of the events: pH, TSS, Cu, and Hg. The first set of samples submitted to ACZ in February, 2006 (will be included in the 2006 AMR) indicated that TSS and Hg were within the IFC effluent limits and only Cu and pH were not. Very close review of the upcoming 2006 results will be important. pH would be very easy to adjust to meet the IFC discharge standard. Additionally, copper based reagent addition in the plant would also be a basic adjustment in the mill to reduce copper levels in the TSF.

As with the other samples, the antimony results received in early 2006 from ACZ indicated much lower actual concentrations of antimony.

The 2005 data for D4 is shown in Table 39.

TABLE 39. MONITORING POINT D4 RESULTS

D4 - Laguna de la Represa de Colas 2005

Mes		May	Jun	Jul	Ago	Sep	Oct	Nov	Dic
Fecha		5/20/2005	6/8/2005	7/27/2005	8/9/2005	9/27/2005	10/25/2005	11/24/2005	12/20/2005
Laboratorio		CTA	CTA	CTA	CTA	SGS		SGS	SGS
pH de campo	u.e.	7.38	7.88	8.4	7.53	7.22		9.53	9.92
pH de laboratorio	u.e.					7.85		9	9.9
Temperatura de campo	°C	23.4	28	24.2	22.5	29.4		26.4	22.9
Temperatura de laboratorio	°C							12.4	
Conductividad de campo	uS/cm	170	164	203	206	165		714	1363
Conductividad de laboratorio	uS/cm					162		714	594
Oxígeno Disuelto de campo	mg/L	3.59	5.2	3.17		6.68		1.15	0
Alcalinidad Total	mg/L	58	61	85	87	74		<2	100.4
Amonio	mg/L	0.05	0.02	0.03	0.03	<0.1		2.64	--
Cloruros	mg/L	5.4	2.05	1.33	1.3	1.1		<20	2.6
Fluoruros	mg/L	0.16	0.21	0.24	0.26	0.19			
Cianuro Total	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002		<0.01	<0.01
Cianuro WAD	mg/L	<0.002	<0.002	<0.002	<0.002	<0.01		<0.05	<0.05
TKN	mg/L	1.49	0.9	0.7	0.97	<0.5		1.5	19.8
Nitratos	mg/L							0.22	<0.01
Nitritos	mg/L							0.26	0.5
Sulfatos	mg/L	16.3	17.1	11.4	11.7	12		280	600
Sulfuro de hidrógeno	mg/L				<0.1			<0.02	<0.02
Sólidos Disueltos	mg/L	572	437	118	370	466		190	90
Sólidos Suspendidos	mg/L	624	186	794	210	642		20	960
Sólidos Totales	mg/L	1366	644	962	600				
Hidrocarburos totales	mg/L	<0.5	<0.500	<1	<0.500				
Grasas y Aceites	mg/L								
DQO	mg/L	19	11	14	10			11	<8
Aluminio Disuelto	mg/L	4.03	0.345	2.65	0.769	31.4		0.02	0.024
Aluminio Total	mg/L	69.7	31.3	34.6	18.9				
Antimonio Disuelto	mg/L	<0.006	<0.006	<0.006	<0.006	<0.0004		0.023	0.846
Antimonio Total	mg/L	<0.006	<0.006	<0.006	<0.006				
Arsénico Disuelto	mg/L	<0.003	<0.003	<0.003	<0.003	<0.005		0.007	0.014
Arsénico Total	mg/L	0.008	0.004	0.004	<0.003				
Bario Disuelto	mg/L	0.191	0.16	0.444	0.161	0.713		0.096	0.241
Bario Total	mg/L	0.929	0.468	0.534	0.369				
Berilio Disuelto	mg/L	<0.001	<0.001	<0.001	<0.001	<0.005		<0.005	<0.005
Berilio Total	mg/L	0.004	0.002	0.001	<0.001				
Boro Disuelto	mg/L	<0.010	<0.010	<0.010	<0.010	0.03		0.04	0.244
Boro Total	mg/L	0.009	0.012	<0.010	0.007				
Cadmio Disuelto	mg/L	<0.002	<0.002	<0.002	<0.002	<0.0001		<0.0001	<0.0001
Cadmio Total	mg/L	<0.002	<0.002	<0.002	<0.002				
Calcio Disuelto	mg/L								
Calcio Total	mg/L	13.4	14.6	22.1	23.7	19.4		64.2	98.7
Cobalto Disuelto	mg/L	<0.001	0.002	0.003	0.001				
Cobalto Total	mg/L	0.01	0.005	0.006	0.003				
Cobre Disuelto	mg/L	<0.002	<0.002	0.005	<0.002	0.0108		0.0311	1.65
Cobre Total	mg/L	0.026	0.012	0.011	0.008				
Cromo Disuelto	mg/L	<0.003	<0.003	<0.003	<0.003	<0.02		<0.001	<0.001
Cromo Total	mg/L	0.004	0.003	0.004	0.003				
Estaño Disuelto	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001
Estaño Total	mg/L	<0.009	<0.009	<0.009	<0.009				
Estroncio Disuelto	mg/L	0.154	0.154	0.219	0.196				
Estroncio Total	mg/L	0.239	0.22	0.233	0.197				
Fosforo Disuelto	mg/L								
Fosforo Total	mg/L	0.23	0.11	0.07	0.09	0.26			
Hierro Disuelto	mg/L	1.67	0.234	1.86	0.508	19.5		<0.02	0.02
Hierro Total	mg/L	37.2	18.4	20.8	11.3				
Magnesio Disuelto	mg/L								
Magnesio Total	mg/L	5.71	6.12	6.62	6.89	8.85		1.98	1.69
Manganeso Disuelto	mg/L	0.061	0.061	0.381	0.083	1		<0.002	<0.002
Manganeso Total	mg/L	0.585	0.376	0.442	0.428				
Mercurio Disuelto	mg/L	<0.00005	<0.00005	<0.00005	<0.00005			0.0046	0.0016
Mercurio Total	mg/L	0.0001	<0.0001	<0.0001	<0.0001				
Molibdeno Disuelto	mg/L	<0.002	<0.002	<0.002	<0.002	0.0024		0.0192	0.042
Molibdeno Total	mg/L	0.003	0.002	0.003	0.002				
Níquel Disuelto	mg/L	<0.003	<0.003	<0.003	<0.003	<0.02		<0.001	0.003
Níquel Total	mg/L	0.028	0.013	0.012	0.01				
Plata Disuelta	mg/L	<0.002	<0.002	<0.002	<0.002	0.0005		0.0112	0.0215
Plata Total	mg/L	<0.002	<0.002	<0.002	<0.002				
Plomo Disuelto	mg/L	<0.002	<0.002	0.006	<0.002	0.0117		<0.0002	0.0003
Plomo Total	mg/L	0.026	0.011	0.014	0.127				
Potasio Disuelto	mg/L								
Potasio Total	mg/L	8.4	6.87	5.29	6.42	7.25		11.6	19.6
Selenio Disuelto	mg/L	<0.004	<0.004	<0.004	<0.004	<0.005		<0.005	<0.005
Selenio Total	mg/L	<0.004	<0.004	<0.004	<0.004				
Silicio Disuelto	mg/L	14.8	27.6	11.6	21.9				
Silicio Total	mg/L	90.7	49.5	60.9	42.2				
Sodio Disuelto	mg/L								
Sodio Total	mg/L	7.15	6.66	6.63	6.34	5.92		--	193
Talio Disuelto	mg/L	<0.0005	<0.0005	<0.0005	<0.0005				
Talio Total	mg/L	0.0007	<0.0005	<0.005	<0.0005				
Titanio Disuelto	mg/L	0.105	0.006	0.021	0.017				
Titanio Total	mg/L	1.51	0.707	0.692	0.483				
Vanadio Disuelto	mg/L	0.004	<0.001	0.01	0.002				
Vanadio Total	mg/L	0.07	0.036	0.041	0.024				
Zinc Disuelto	mg/L	0.028	0.008	0.021	0.018	0.04		0.002	0.004
Zinc Total	mg/L	0.122	0.047	0.059	0.127				

11.8 Surface Water Monitoring

Marlin conducts representative surface water monitoring from upstream and downstream surface watercourses. Surface water sampling is conducted regularly and reported to both the MARN and the MEM quarterly. Surface water sampling locations are listed in Table 40.

TABLE 40. SURFACE WATER SAMPLING LOCATIONS

Surface Water Monitoring Point	Location Description
SW1	Upstream Monitoring – Rio Tzala
SW1-2	Between SW1 and SW2
SW2	Downstream Monitoring – Rio Tzala
SW3	Riachuelo Quivichil – downstream of the TSF
SW4	Upstream – Rio Cuilco
SW5	Downstream – Rio Cuilco
SW8	Downstream of TSF, upstream of SW3

Additional surface water points are monitored in La Hamaca, but are not currently included in the Marlin AMR. Also, two additional monitoring points were added in 2006 in the Rio Cuilco, one above the confluence with the Rio Tzala and one below the confluence with the Rio Tzala. These will be reported in the 2006 AMR.

The monitoring was conducted by a third party consultant, CTA, until September, 2005 when the monitoring was taken over by Montana personnel. Point SW1-2 was not monitored during the first two quarters, nor was point SW2 monitored during the second quarter by the consultant; however these points were monitored by Montana personnel at least quarterly during the last two quarters. Points SW1, SW3, SW4, SW5, and SW8 were all monitored at least quarterly as required in the EIA&S. The points were often monitored more than quarterly during 2005 to further establish baseline and/or background conditions. All points have perennial flow with the exception of SW8, which is within the upper, ephemeral reaches of the drainage below the TSF.

There were no major concerns with the surface water quality data for 2005, excepting the anomalous results for antimony during the last quarter from the site SGS lab. The ACZ data received in February, 2006 was reviewed and the surface water quality results returned to pre SGS levels. The surface water quality data for 2005 is shown in Tables 41-1 through 41-7.

TABLE 41-1. 2005 SURFACE WATER QUALITY DATA

SW1 - Rio Tzala Arriba de la Mina, 2005

Mes		Ene	Feb	Mar	Abr	May	Jun	Jul	Ago	Sep	Nov	Dic
Fecha		**1/19/2005**	**2/10/2005**	**4/7/2005**	**4/27/2005**	**5/18/2005**	**6/8/2005**	**7/29/2005**	**8/11/2005**	**9/28/2005**	**10/23/2005**	**12/19/2005**
Laboratorio		CTA	CTA	CTA	CTA	CTA	CTA	CTA	CTA	SGS	SGS	SGS
pH de campo	u.e.	8.03	8.15		8.17	7.55	8.15	7.91	7.32	7.45	7.68	7.62
pH de laboratorio	u.e.									7.29	6.6	7.7
Temperatura de campo	°C	15.7	14.5		16.2	16.5	25.2	16.7	17.6	19.40	14.6	12.7
Temperatura de laboratorio	°C										12.4	
Conductividad de campo	uS/cm	174	196		231	134	217	129	144	98.20	106	170.3
Conductividad de laboratorio	uS/cm									99.00	153	76
Oxígeno Disuelto de campo	mg/L	7.04	7.95		7.15	8.3	6.6	4.57		7.43	6.51	4.77
Alcalinidad Total	mg/L			40	40		50	17	24	13	<2	24
Amonio	mg/L			<0.02	<0.05	0.08	<0.02	<0.02	<0.02	<0.1	<0.05	<0.05
Cloruros	mg/L			1.48	1.46		2.24	1.48	1.23	2.0	<20	1.3
Fluoruros	mg/L			0.14	0.11		0.24	0.12	0.14	0.08		
Cianuro Total	mg/L	<0.002		<0.002	0.004	<0.002	<0.002	<0.002	<0.002	<0.002	0.01	0.1
Cianuro WAD	mg/L	<0.002		<0.010	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.05	<0.05
TKN	mg/L			<0.05	0.12	0.91	0.19	0.13	0.16	<0.5	<0.5	<0.5
Nitratos	mg/L										0.1	0.09
Nitritos	mg/L										<0.01	<0.01
Sulfatos	mg/L			60.8	62.6		48.4	35.4	37	25	48	48
Sulfuro de hidrógeno	mg/L								<0.1		<0.02	<0.02
Sólidos Suspendidos	mg/L			<12	<12		43	58	<12	762	<10	40
Sólidos Disueltos	mg/L			116	76		162	122	122	257	40	40
Sólidos Totales	mg/L			170	238		208	210	124			
Hidrocarburos totales	mg/L	<0.500	<0.037	2.200	<1	<0.5	<0.500		<0.500			
Grasas y Aceites	mg/L											
DQO	mg/L			<5	<5	9	<5	<5	<5		<8	<8
Aluminio Disuelto	mg/L	0.118	0.246	0.168	0.166		0.102	1.72	0.16	22.8	0.15	0.114
Aluminio Total	mg/L	0.712	0.406	0.201	0.167		4.25	5.35	1.33			
Antimonio Disuelto	mg/L	<0.006	<0.006	<0.006	<0.006		<0.006	<0.006	<0.006	<0.0004	0.023	0.836
Antimonio Total	mg/L	<0.006	<0.006	<0.006	<0.006		<0.006	<0.006	<0.006			
Arsénico Disuelto	mg/L	<0.003	<0.003	<0.003	<0.003		<0.003	<0.003	<0.003	<0.005	<0.001	<0.001
Arsénico Total	mg/L	<0.003	<0.003	<0.003	<0.003		<0.003	<0.003	<0.003			
Bario Disuelto	mg/L	0.05	0.042	0.054	0.045		0.087	0.067	0.043	0.292	0.038	0.04
Bario Total	mg/L	0.046	0.041	0.057	0.044		0.131	0.08	0.047			
Berilio Disuelto	mg/L	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.005	<0.005	<0.005
Berilio Total	mg/L	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001			
Boro Disuelto	mg/L	0.012	<0.010	<0.010	<0.010		0.015	<0.010	<0.010	0.02	<0.01	<0.005
Boro Total	mg/L	0.012	<0.05	<0.005	0.185		0.019	<0.010	0.012			
Cadmio Disuelto	mg/L	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.0001	<0.0001	<0.0001
Cadmio Total	mg/L	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002			
Calcio Disuelto	mg/L											
Calcio Total	mg/L	20.6	22.1	27	24.7		22.8	13.5	14.4	13	15.1	17.6
Cobalto Disuelto	mg/L	<0.001	0.001	0.002	0.001		0.001	0.002	0.004			
Cobalto Total	mg/L	<0.001	0.001	0.002	0.001		0.001	0.003	0.002			
Cobre Disuelto	mg/L	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	0.008	<0.0008	0.0008
Cobre Total	mg/L	<0.003	<0.003	<0.003	<0.003		0.003	<0.003	<0.003			
Cromo Disuelto	mg/L	<0.003	<0.003	<0.003	<0.003		<0.003	<0.003	<0.003	<0.02	<0.001	<0.001
Cromo Total	mg/L	<0.003	<0.003	<0.003	<0.003		<0.003	<0.003	<0.003			
Estaño Disuelto	mg/L	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Estaño Total	mg/L	<0.009	<0.009	<0.009	<0.009		<0.009	<0.009	<0.009			
Estroncio Disuelto	mg/L	0.159	0.153	0.199	0.184		0.198	0.112	0.117			
Estroncio Total	mg/L	0.159	0.156	0.201	0.187		0.238	0.124	0.109			
Fosforo Disuelto	mg/L											
Fosforo Total	mg/L			<0.05	<0.05	0.49	<0.05	<0.05		0.21		
Hierro Disuelto	mg/L	0.187	0.228	0.139	0.137		0.137	1.06	0.16	13.6	0.07	0.08
Hierro Total	mg/L	0.386	0.267	0.138	0.157		2.5	3.02	0.999			
Magnesio Disuelto	mg/L											
Magnesio Total	mg/L	4.25	4.48	5.59	5.06		4.87	2.89	2.94	3.63	3.29	3.8
Manganeso Disuelto	mg/L	0.039	0.119	0.195	0.163		0.173	0.201	0.166	0.293	0.18	0.175
Manganeso Total	mg/L	0.032	0.129	0.212	0.149		0.281	0.243	0.187			
Mercurio Disuelto	mg/L	0.0008	<0.0001	<0.00005	<0.00005		<0.00005	<0.00005	<0.00005		<0.0001	<0.0001
Mercurio Total	mg/L	0.0013	<0.0002	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001			
Molibdeno Disuelto	mg/L	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	0.0003	0.0003	<0.0003
Molibdeno Total	mg/L	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002				
Níquel Disuelto	mg/L	<0.003	<0.003	<0.003	<0.003		<0.003	<0.003	<0.003	<0.02	0.001	0.002
Níquel Total	mg/L	<0.003	<0.003	<0.003	<0.003		0.003	0.006	<0.003			
Plata Disuelta	mg/L	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.0001	<0.0001	0.0003
Plata Total	mg/L	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002			
Plomo Disuelto	mg/L	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	0.0051	0.0003	0.0006
Plomo Total	mg/L	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002			
Potasio Disuelto	mg/L											
Potasio Total	mg/L	2.95	3.24	4.21	3.81		4.21	2.51	2.59	3.67	2.61	2.88
Selenio Disuelto	mg/L	<0.004	<0.004	<0.004	<0.004		<0.004	<0.004	<0.004	<0.005	<0.005	<0.005
Selenio Total	mg/L	<0.004	<0.004	<0.004	<0.004		<0.004	<0.004	<0.004			
Silicio Disuelto	mg/L	16.2	14.5	16	14.4		16.3	16.6	15.6			
Silicio Total	mg/L	16.8	14.5	16.1	14.8		21.1	24.4				
Sodio Disuelto	mg/L											
Sodio Total	mg/L	8.02	8.68	10	9.4		8.27	4.84	5.22	5.28	5.95	7.06
Talio Disuelto	mg/L	<0.06	<0.005	<0.0005	<0.0005		<0.0005	<0.0005	<0.0005			
Talio Total	mg/L	<0.05	<0.05	<0.0005	<0.0005		<0.0005	<0.005	<0.0005			
Titanio Disuelto	mg/L	0.001	0.002	0.001	<0.001		0.002	0.032	<0.001			
Titanio Total	mg/L	0.015	0.004	0.001	0.001		0.128	0.147	0.033			
Vanadio Disuelto	mg/L	0.001	<0.001	<0.001	0.001		<0.001	0.003	<0.001			
Vanadio Total	mg/L	0.001	0.001	<0.001	0.001		0.006	0.007	0.002			
Zinc Disuelto	mg/L	<0.004	0.008	0.005	0.018		<0.004	0.007	0.004	0.03	0.006	0.01
Zinc Total	mg/L	<0.015	0.021	<0.015	0.038		0.02	0.032	0.019			

TABLE 41-2. 2005 SURFACE WATER QUALITY DATA

SW1-2 - Rio Tzala Entre SW1 y SW2, 2005

Mes		Jul	Ago	Sep	Oct	Nov	Dic
Fecha		**7/28/2005**	**8/11/2005**			**11/22/2005**	**12/19/2005**
Laboratorio		CTA	CTA			SGS	SGS
pH de campo	u.e.	7.98	7.71			8.05	7.96
pH de laboratorio	u.e.					7.1	8.1
Temperatura de campo	°C	17.7	19.3			15.1	13.7
Temperatura de laboratorio	°C					12.4	
Conductividad de campo	uS/cm	140	166			166.4	187.2
Conductividad de laboratorio	uS/cm					169	84
Oxígeno Disuelto de campo	mg/L	4.55				6.85	7.21
Alcalinidad Total	mg/L	16	27			<2	51
Amonio	mg/L	<0.02	<0.02			<0.05	<0.05
Cloruros	mg/L	1.56	1.22			<20	1.3
Fluoruros	mg/L	0.12	0.15				
Cianuro Total	mg/L	<0.002	<0.002			<0.01	0.03
Cianuro WAD	mg/L	<0.002	<0.002			<0.05	<0.05
Cianatos	mg/L					4.68	<0.05
Nitratos	mg/L					0.05	0.11
Nitritos	mg/L					<0.01	<0.01
Sulfatos	mg/L	36.9	44.2			51	57
Sulfuro de hidrógeno	mg/L		<0.1			<0.02	<0.02
Sólidos Suspendidos	mg/L	37	13			20	20
Sólidos Disueltos	mg/L	134	162			50	140
Sólidos Totales	mg/L	256	162				
Hidrocarburos totales	mg/L	<1	<0.500				
Grasas y Aceites	mg/L						
DQO	mg/L	6	<5			<8	<8
Aluminio Disuelto	mg/L	2.15	0.148			0.75	0.121
Aluminio Total	mg/L	8.45	1.39				
Antimonio Disuelto	mg/L	<0.006	<0.006			0.233	0.872
Antimonio Total	mg/L	<0.006	<0.006				
Arsénico Disuelto	mg/L	<0.003	<0.003			<0.001	<0.001
Arsénico Total	mg/L	<0.003	<0.003				
Bario Disuelto	mg/L	0.084	0.047			0.47	0.039
Bario Total	mg/L	0.107	0.054				
Berilio Disuelto	mg/L	<0.001	<0.001			<0.005	<0.005
Berilio Total	mg/L	<0.001	<0.001				
Boro Disuelto	mg/L	<0.010	<0.010			<0.01	<0.005
Boro Total	mg/L	<0.010	0.01				
Cadmio Disuelto	mg/L	<0.002	<0.002			<0.0001	<0.0001
Cadmio Total	mg/L	<0.002	<0.002				
Calcio Disuelto	mg/L						
Calcio Total	mg/L	14.3	17.4			17.5	20.7
Cobalto Disuelto	mg/L	0.002	0.005				
Cobalto Total	mg/L	0.003	0.002				
Cobre Disuelto	mg/L	<0.002	<0.002			0.0009	0.001
Cobre Total	mg/L	<0.003	<0.003				
Cromo Disuelto	mg/L	<0.003	<0.003			<0.001	<0.001
Cromo Total	mg/L	<0.003	<0.003				
Estaño Disuelto	mg/L	<0.001	<0.001			<0.001	<0.001
Estaño Total	mg/L	<0.009	<0.009				
Estroncio Disuelto	mg/L	0.126	0.138				
Estroncio Total	mg/L	0.134	0.143				
Fósforo Disuelto	mg/L						
Fósforo Total	mg/L	0.06					
Hierro Disuelto	mg/L	1.19	0.157			0.6	0.1
Hierro Total	mg/L	4.76	1.03				
Magnesio Disuelto	mg/L						
Magnesio Total	mg/L	3.15	3.55			3.91	4.42
Manganeso Disuelto	mg/L	0.225	0.172			0.186	0.169
Manganeso Total	mg/L	0.275	0.21				
Mercurio Disuelto	mg/L	<0.00005	<0.00005			<0.0001	<0.0001
Mercurio Total	mg/L	<0.0001	<0.0001				
Molibdeno Disuelto	mg/L	<0.002	<0.002			<0.0003	0.0004
Molibdeno Total	mg/L	<0.002					
Níquel Disuelto	mg/L	<0.003	<0.003			0.001	0.002
Níquel Total	mg/L	0.004	<0.003				
Plata Disuelta	mg/L	<0.002	<0.002			<0.0001	0.0003
Plata Total	mg/L	<0.002	<0.002				
Plomo Disuelto	mg/L	<0.002	<0.002			0.0002	0.0003
Plomo Total	mg/L	<0.002	<0.002				
Potasio Disuelto	mg/L						
Potasio Total	mg/L	2.65	2.72			2.78	2.94
Selenio Disuelto	mg/L	<0.004	<0.004			<0.005	<0.005
Selenio Total	mg/L	<0.004	<0.004				
Silicio Disuelto	mg/L	21.8	15.5				
Silicio Total	mg/L	25.4					
Sodio Disuelto	mg/L						
Sodio Total	mg/L	4.98	5.72			6.5	7.49
Talio Disuelto	mg/L	<0.0005	<0.0005				
Talio Total	mg/L	<0.005	<0.0005				
Titanio Disuelto	mg/L	0.034	<0.001				
Titanio Total	mg/L	0.258	0.041				
Vanadio Disuelto	mg/L	0.004	<0.001				
Vanadio Total	mg/L	0.012	0.002				
Zinc Disuelto	mg/L	0.006	0.005			0.014	0.006
Zinc Total	mg/L	0.025	0.028				

TABLE 41-3. 2005 SURFACE WATER QUALITY DATA

SW2 - Rio Tzala Abajo de la Mina, 2005

Mes		Ene	Feb	Mar	Abr	May	Jun	Jul	Ago	Sep	Nov	Dic
Fecha		1/19/2005	2/11/2005	4/7/2005	4/27/2005	5/18/2005	6/8/2005	7/28/2005	8/11/2005	9/28/2005	11/23/2005	12/20/2005
Laboratorio		CTA	CTA	CTA	CTA	CTA	CTA	CTA	CTA	SGS	SGS	SGS
pH de campo	u.e.	8.08	8.27					7.19	7.66	7.84	7.97	7.94
pH de laboratorio	u.e.									7.29	7	7.9
Temperatura de campo	°C	14.3	19.6					17.5	16.3	20.00	10.8	13.1
Temperatura de laboratorio	°C										12.4	
Conductividad de campo	uS/cm	185	218					141	169	96.10	166.2	184.3
Conductividad de laboratorio	uS/cm									93.00	169	83
Oxígeno Disuelto de campo	mg/L	7.12	6.9					4.72		7.39	14.84	7.56
Alcalinidad Total	mg/L			62				24	30	15	<2	33.2
Amonio	mg/L			<0.02				<0.02	<0.02	<0.1	<0.05	<0.05
Cloruros	mg/L			6.08				1.46	1.24	1.9	<20	1.3
Fluoruros	mg/L			0.17				0.12	0.15	0.08		
Cianuro Total	mg/L	<0.002	<0.002	<0.002				<0.002	<0.002	<0.002	0.01	<0.01
Cianuro WAD	mg/L	<0.002	<0.002	<0.010				<0.002	<0.002	<0.01	<0.05	<0.05
TKN	mg/L			0.2				0.17	0.17	1.70	<0.5	0.5
Nitratos	mg/L										0.06	0.08
Nitritos	mg/L										<0.01	<0.01
Sulfatos	mg/L			58.9				39.1	47.3	21	46	52
Sulfuro de hidrógeno	mg/L								<0.1		<0.02	<0.02
Sólidos Suspendidos	mg/L			<12				48	17	700	20	30
Sólidos Disueltos	mg/L			124				10	154	234	50	100
Sólidos Totales	mg/L			178				<20	172			
Hidrocarburos totales	mg/L	<0.500	<0.037	2.600				<1				
Grasas y Aceites Totales	mg/L											
DQO	mg/L			<5				<5	<5		9	<8
Aluminio Disuelto	mg/L	0.119	0.121	0.013				1	0.146	25.3	0.14	0.094
Aluminio Total	mg/L	1.97	0.305	0.509				4.8	1.54			
Antimonio Disuelto	mg/L	<0.006	<0.006	<0.006				<0.006	<0.006	<0.0004	0.431	0.29
Antimonio Total	mg/L	<0.006	<0.006	<0.006				<0.006	<0.006			
Arsénico Disuelto	mg/L	<0.003	<0.003	<0.003				<0.003	<0.003	<0.005	<0.001	<0.001
Arsénico Total	mg/L	<0.003	<0.003	<0.003				<0.003	<0.003			
Bario Disuelto	mg/L	0.049	0.058	0.087				0.071	0.053	0.320	0.043	0.042
Bario Total	mg/L	0.101	0.064	0.102				0.081	0.063			
Berilio Disuelto	mg/L	<0.001	<0.001	<0.001				<0.001	<0.001	<0.005	<0.005	<0.005
Berilio Total	mg/L	<0.001	<0.001	<0.001				<0.001	<0.001			
Boro Disuelto	mg/L	0.014	0.015	0.024				<0.010	<0.010	0.020	<0.01	<0.005
Boro Total	mg/L	0.012	<0.05	0.022				<0.010	0.006			
Cadmio Disuelto	mg/L	<0.002	<0.002	<0.002				<0.002	<0.002	<0.0001	<0.0001	<0.0001
Cadmio Total	mg/L	<0.002	<0.002	<0.002				<0.002	<0.002			
Calcio Disuelto	mg/L											
Calcio Total	mg/L	64	24.6	31				15.6	17.8	14.6	18	20.8
Cobalto Disuelto	mg/L	<0.001	<0.001	<0.001				0.002	0.003			
Cobalto Total	mg/L	<0.001	<0.001	<0.001				0.002	0.001			
Cobre Disuelto	mg/L	<0.002	<0.002	<0.002				<0.002	<0.002	0.009	<0.0008	<0.0008
Cobre Total	mg/L	<0.003	<0.003	<0.003				<0.003	<0.003			
Cromo Disuelto	mg/L	<0.003	<0.003	<0.003				<0.003	<0.003	<0.02	<0.001	0.003
Cromo VI	mg/L	<0.003	<0.003	<0.003								
Cromo Total	mg/L	<0.001	<0.001	<0.001				<0.003	<0.003			
Estaño Disuelto	mg/L	<0.009	<0.009	<0.009				<0.001	<0.001	<0.001	<0.001	<0.001
Estaño Total	mg/L	0.159	0.183	0.241				<0.009	<0.009			
Estroncio Disuelto	mg/L	0.371	0.196	0.268				0.129	0.147			
Estroncio Total	mg/L							0.134	0.156			
Fosforo Disuelto	mg/L			<0.05								
Fosforo Total	mg/L	0.178	0.169	0.082				0.07		0.28		
Hierro Disuelto	mg/L	1.11	0.256	0.461				0.708	0.166	15.4	0.09	0.1
Hierro Total	mg/L							2.75	1.11			
Magnesio Disuelto	mg/L	9.58	5.06	7.11								
Magnesio Total	mg/L	0.029	0.04	0.115				3.48	3.74	4.26	4.04	4.57
Manganeso Disuelto	mg/L	0.36	0.046	0.132				0.186	0.163	0.347	0.161	0.093
Manganeso Total	mg/L	0.0003	<0.0001	<0.00005				0.217	0.2			
Mercurio Disuelto	mg/L	0.0004	<0.0002	<0.0001				<0.00005	<0.00005		<0.0001	<0.0001
Mercurio Total	mg/L	<0.002	<0.002	<0.002				<0.0001	<0.0001			
Molibdeno Disuelto	mg/L	<0.002	<0.002	<0.002				<0.002		<0.0003	<0.0003	0.0004
Molibdeno Total	mg/L	<0.003	<0.003	<0.003				<0.002				
Níquel Disuelto	mg/L	<0.003	<0.003	<0.003				<0.003	<0.003	<0.02	0.001	0.004
Níquel Total	mg/L	<0.002	<0.002	<0.002				<0.003	0.003			
Plata Disuelta	mg/L	<0.002	<0.002	<0.002				<0.002	<0.002	<0.0001	<0.0001	0.0033
Plata Total	mg/L	<0.002	<0.002	<0.002				<0.002	<0.002			
Plomo Disuelto	mg/L	<0.002	<0.002	<0.002				<0.002	<0.002	0.0058	<0.0002	0.0012
Plomo Total	mg/L							<0.002	<0.002			
Potasio Disuelto	mg/L	4.29	3.8	4.79								
Potasio Total	mg/L	<0.004	<0.004	<0.004				2.63	2.7	4.03	2.78	2.97
Selenio Disuelto	mg/L	<0.004	<0.004	<0.004				<0.004	<0.004	<0.005	<0.005	<0.005
Selenio Total	mg/L	15.3	15.4	16				<0.004	<0.004			
Silicio Disuelto	mg/L	35.2	15.8	17.1				16.7	16.2			
Silicio Total	mg/L							20.3				
Sodio Disuelto	mg/L	14.5	9.79	11.8								
Sodio Total	mg/L			124				5.19	5.75	5.76	6.77	7.63
Talio Disuelto	mg/L	<0.06	<0.005	<0.0005				<0.0005	<0.0005			
Talio Total	mg/L	<0.05	<0.05	<0.0005				<0.005	<0.0005			
Titanio Disuelto	mg/L	0.001	0.002	<0.001				0.008	<0.001			
Titanio Total	mg/L	0.014	0.007	0.012				0.138	0.045			
Vanadio Disuelto	mg/L	<0.001	0.001	<0.001				0.002	<0.001			
Vanadio Total	mg/L	0.002	0.002	<0.001				0.006	0.003			
Zinc Disuelto	mg/L	<0.004	0.005	0.005				<0.004	0.007	0.03	0.005	0.01
Zinc Total	mg/L	<0.015	<0.015	<0.015				0.026	0.027			

TABLE 41-4. 2005 SURFACE WATER QUALITY DATA

SW3 - Riachuelo Quivichil, 2005

Mes		Ene	Feb	Mar	Abr	May	Jun	Jul	Ago	Sep	Nov	Dic
Fecha		**1/19/2005**	**2/10/2005**	**4/7/2005**	**4/29/2005**	**5/19/2005**	**6/9/2005**	**7/28/2005**	**8/10/2005**	**9/22/2005**	**11/21/2005**	**12/18/2005**
Laboratorio		CTA	CTA	CTA	CTA	CTA	CTA	CTA	CTA	SGS	SGS	SGS
pH de campo	u.e.	8.27	8.66			7.63	7.81	8.46	8.18	7.57	8.55	8.73
pH de laboratorio	u.e.									7.66	8	9.1
Temperatura de campo	°C	12.9	25			21.3	24.3	19.1	21.1	21.00	19.7	20.9
Temperatura de laboratorio											12.4	
Conductividad de campo	uS/cm	445	544			156	172	189	267	99.90	326	367
Conductividad de laboratorio	uS/cm									98.00	334	160
Oxígeno Disuelto de campo	mg/L	6.7	9.2			2.05	3.09	4.62		6.55		4.92
Alcalinidad Total	mg/L			154		50	90	74	104	37	<2	85.4
Amonio	mg/L			0.04		0.06	<0.02	<0.02	<0.02	<0.1	<0.05	<0.05
Cloruros	mg/L			13.5		4.62	3.79	2.82	2.92	1.9	<20	3.4
Fluoruros	mg/L			0.31		0.16	0.23	0.18	0.24	0.12		
Cianuro Total	mg/L	0.003	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	0.03
Cianuro WAD	mg/L	<0.002	<0.002	<0.010		<0.002	<0.002	<0.002	<0.002	<0.01	<0.05	<0.05
TKN	mg/L			0.27		0.76	0.3	0.17	0.2	<0.5	<0.5	<0.5
Nitratos	mg/L										0.09	0.07
Nitritos	mg/L										0.05	<0.01
Sulfatos	mg/L			42.7		11.4	26.7	17	29.6	7.5	41	53
Sulfuro de hidrógeno	mg/L								<0.1		<0.02	<0.02
Sólidos Suspendidos	mg/L			70		137	64	18	<12	122	10	10
Sólidos Disueltos	mg/L			218		616	280	230	212	351	90	160
Sólidos Totales	mg/L			360		784	354	292	212			
Hidrocarburos totales	mg/L	<0.500	0.220			1.1	<0.500	<1	<0.500			
Grasas y Aceites	mg/L											
DQO	mg/L			12		23	9	8	7		10	12
Aluminio Disuelto	mg/L	0.025	0.148	0.005		0.97	0.074	0.942	<0.004	11.3	2.32	0.01
Aluminio Total	mg/L	0.408	0.362	7.05		45.7	10.5	7.56	1.34			
Antimonio Disuelto	mg/L	<0.006	<0.006	<0.006		<0.006	<0.006	<0.006	<0.006	0.135	0.503	0.823
Antimonio Total	mg/L	<0.006	<0.006	<0.006		<0.006	<0.006	<0.006	<0.006			
Arsénico Disuelto	mg/L	<0.003	0.005	<0.003		<0.003	<0.003	<0.003	<0.003	<0.005	<0.001	0.001
Arsénico Total	mg/L	<0.003	0.006	0.004		0.005	<0.003	<0.003	<0.003			
Bario Disuelto	mg/L	0.218	0.238	0.248		0.234	0.132	0.155	0.127	0.185	0.179	0.17
Bario Total	mg/L	0.229	0.238	0.315		0.501	0.261	0.178	0.149			
Berilio Disuelto	mg/L	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005
Berilio Total	mg/L	<0.001	<0.001	<0.001		0.001	<0.001	<0.001	<0.001			
Boro Disuelto	mg/L	0.073	0.206	0.091		0.011	<0.010	<0.010	<0.010	0.03	<0.01	0.012
Boro Total	mg/L	0.084	0.204	0.084		0.012	0.014	<0.010	0.01			
Cadmio Disuelto	mg/L	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	0.0005	<0.0001	<0.0001
Cadmio Total	mg/L	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002			
Calcio Disuelto	mg/L											
Calcio Total	mg/L	48.9	50	45.6		12.4	26.2	22.1	30.4	11.7	39.3	44.4
Cobalto Disuelto	mg/L	<0.001	<0.001	<0.001		<0.001	0.002	<0.001	<0.001			
Cobalto Total	mg/L	<0.001	<0.001	0.002		0.007	0.002	<0.001	<0.001			
Cobre Disuelto	mg/L	<0.002	<0.002	<0.002		0.018	<0.002	<0.002	<0.002	0.0057	0.0012	0.001
Cobre Total	mg/L	<0.003	<0.003	0.003		0.018	0.005	<0.003	0.003			
Cromo Disuelto	mg/L	<0.003	<0.003	<0.003		<0.003	<0.003	<0.003	<0.003		<0.001	<0.001
Cromo VI	mg/L									0.001		
Cromo Total	mg/L	<0.003	<0.003	<0.003		<0.003	<0.003	<0.003	<0.003	<0.02		
Estaño Disuelto	mg/L	<0.001	<0.001	<0.001		0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Estaño Total	mg/L	<0.009	<0.009	<0.009		<0.009	<0.009	<0.009	<0.009			
Estroncio Disuelto	mg/L	0.491	0.528	0.461		0.158	0.191	0.229	0.338			
Estroncio Total	mg/L	0.5	0.522	0.487		0.218	0.331	0.248	0.343			
Fosforo Disuelto	mg/L											
Fosforo Total	mg/L			<0.05		0.54	0.14	<0.05		0.09		
Hierro Disuelto	mg/L	0.138	0.236	0.103		0.482	0.068	0.478	0.075	7.06	0.68	<0.02
Hierro Total	mg/L	0.265	0.29	3.7		24.6	6.34	3.3	0.585			
Magnesio Disuelto	mg/L											
Magnesio Total	mg/L	12.3	13.3	12.3		3.65	7.03	5.82	7.62	3.54	10	10.6
Manganeso Disuelto	mg/L	0.051	0.119	0.164		0.021	0.02	0.026	0.007	0.0848	0.022	0.008
Manganeso Total	mg/L	0.055	0.109	0.247		0.304	0.116	0.039	0.015			
Mercurio Disuelto	mg/L	0.0004	<0.0001	<0.00005		<0.00005	<0.00005	<0.00005	<0.00005		<0.0001	<0.0001
Mercurio Total	mg/L	0.0006	<0.0002	<0.0001		0.0001	<0.0001	<0.0001	<0.0001			
Molibdeno Disuelto	mg/L	0.003	0.004	0.004		<0.002	<0.002	<0.002	0.002	<0.0003	0.0023	0.0041
Molibdeno Total	mg/L	0.004	0.004	0.005		<0.002	<0.002	<0.002				
Níquel Disuelto	mg/L	<0.003	<0.003	<0.003		0.004	<0.003	<0.003	<0.003	<0.02	<0.001	<0.001
Níquel Total	mg/L	<0.003	<0.003	0.004		0.016	0.004	<0.003	<0.003			
Plata Disuelta	mg/L	0.004	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.0001	<0.0001	<0.0001
Plata Total	mg/L	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002			
Plomo Disuelto	mg/L	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	0.0049	0.0004	<0.0002
Plomo Total	mg/L	<0.002	<0.002	0.002		0.014	0.003	0.002	<0.002			
Potasio Disuelto	mg/L											
Potasio Total	mg/L	4.87	6.45	6.54		3.29	4.39	3.56	4.09	3.14	4.89	4.94
Selenio Disuelto	mg/L	<0.004	<0.004	<0.004		<0.004	<0.004	<0.004	<0.004	<0.005	<0.005	<0.005
Selenio Total	mg/L	<0.004	<0.004	<0.004		<0.004	<0.004	<0.004	<0.004			
Silicio Disuelto	mg/L	14.7	14.4	21.4		12.8	14.2	21.1	20.5			
Silicio Total	mg/L	15.4	14.6	23.5		71.8	28.6	28.4				
Sodio Disuelto	mg/L											
Sodio Total	mg/L	24.3	42	23.4		6.41	9.66	8.16	10.8	8.93	13.4	15.8
Talio Disuelto	mg/L	<0.06	<0.005	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005			
Talio Total	mg/L	<0.05	<0.05	0.0013		<0.0005	<0.0005	<0.005	<0.0005			
Titanio Disuelto	mg/L	0.001	0.006	<0.001		0.027	0.001	0.017	<0.001			
Titanio Total	mg/L	0.01	0.012	0.251		1.09	0.245	0.189	0.033			
Vanadio Disuelto	mg/L	0.002	0.002	0.002		0.004	0.001	0.004	0.002			
Vanadio Total	mg/L	0.002	0.002	0.008		0.05	0.015	0.009	0.004			
Zinc Disuelto	mg/L	<0.004	0.008	<0.004		0.194	0.125	0.063	0.004	0.03	0.005	0.001
Zinc Total	mg/L	<0.015	<0.015	<0.015		0.07	0.026	0.035	0.819			

TABLE41-5. 2005 SURFACE WATER QUALITY DATA

SW4 - Rio Cuilco Arriba de la descarga de Riachuelo Quivichil, 2005

Mes		Ene	Feb	Mar	Abr	May	Jun	Jul	Ago	Sep	Nov	Dic
Fecha		1/19/2005	2/10/2005	4/7/2005	4/29/2005	5/19/2005	6/9/2005	7/28/2005	8/10/2005	9/24/2005	11/21/2005	12/18/2005
Laboratorio		CTA	CTA	CTA	CTA	CTA	CTA	CTA	CTA	SGS	SGS	SGS
pH de campo	u.e.				8.21	7.58	7.71	7.58	7.63	7.45	8.1	8.15
pH de laboratorio	u.e.									7.56	7.3	8.6
Temperatura de campo	°C				23.7	21.7	24.6	20.7	19	19.50	18.5	20.1
Temperatura de laboratorio	°C										12.4	
Conductividad de campo	uS/cm				260	127	129	113	124	73.60	129.8	140
Conductividad de laboratorio	uS/cm									81.00	132	63
Oxígeno Disuelto de campo	mg/L				5.78	4.32	3.6	4.33		6.58		22.48
Alcalinidad Total	mg/L			64	70	34	25	34	40	27	<2	62
Amonio	mg/L			<0.02	<0.05	0.07	<0.02	<0.02	<0.02	<0.1	<0.05	<0.05
Cloruros	mg/L			4.84	2.68	4.31	3.25	2.47	2.26	1.6	<20	2.4
Fluoruros	mg/L			0.17	0.17	0.11	0.14	0.13	0.15	0.07		
Cianuro Total	mg/L			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	0.09
Cianuro WAD	mg/L			<0.010	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.05	<0.05
TKN	mg/L			0.46	0.26	1.34	1.52	0.39	0.25	<0.5	<0.5	<0.5
Nitratos	mg/L										0.33	0.24
Nitritos	mg/L										0.01	<0.01
Sulfatos	mg/L			12.6	12	16.3	12.4	12.3	13.4	8.3	13	14
Sulfuro de hidrógeno	mg/L								<0.1		<0.02	<0.02
Sólidos Suspendidos	mg/L			39	<12	360	574	73	26	1170	<10	30
Sólidos Disueltos	mg/L			116	116	152	166	128	128	304	50	120
Sólidos Totales	mg/L			206	208	552	720	166	154			
Hidrocarburos totales	mg/L			1.500	3.6	2.5	<0.500	<1				
Grasas y Aceites	mg/L											
DQO	mg/L			<5	<5	14	14	6	6		<8	<8
Aluminio Disuelto	mg/L			0.038	0.04	0.015	0.235	1.08	0.088	15.4	0.11	0.059
Aluminio Total	mg/L			1.36	0.067	37.7	75.1	10.5	2.82			
Antimonio Disuelto	mg/L			<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.170	0.398	0.852
Antimonio Total	mg/L			<0.006	<0.006	<0.006	<0.006	<0.006	<0.006			
Arsénico Disuelto	mg/L			<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.005	<0.001	0.001
Arsénico Total	mg/L			0.003	<0.003	0.004	0.007	<0.003	<0.003			
Bario Disuelto	mg/L			0.057	0.026	0.055	0.066	0.103	0.047	0.254	0.032	0.034
Bario Total	mg/L			0.075	0.025	0.442	0.688	0.13	0.067			
Berilio Disuelto	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005
Berilio Total	mg/L			<0.001	<0.001	<0.001	0.002	<0.001	<0.001			
Boro Disuelto	mg/L			0.033	0.019	0.015	0.015	<0.010	<0.010	0.05	<0.01	0.014
Boro Total	mg/L			0.029	0.022	0.021	0.029	<0.010	0.015			
Cadmio Disuelto	mg/L			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0003	<0.0001	<0.0001
Cadmio Total	mg/L			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002			
Calcio Disuelto	mg/L											
Calcio Total	mg/L			15.7	14.2	10.7	5.16	10.6	10.8	9.26	12.6	13.7
Cobalto Disuelto	mg/L			<0.001	<0.001	<0.001	0.003	0.001	<0.001			
Cobalto Total	mg/L			<0.001	<0.001	0.007	0.019	0.002	<0.001			
Cobre Disuelto	mg/L			<0.002	<0.002	<0.002	<0.002	0.003	<0.002	0.0077	0.0009	0.001
Cobre Total	mg/L			<0.003	<0.003	0.02	0.046	0.004	0.003			
Cromo Disuelto	mg/L			<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		<0.001	<0.001
Cromo VI	mg/L									0.002		
Cromo Total	mg/L			<0.003	<0.003	<0.003	0.014	<0.003	<0.003	<0.02		
Estaño Disuelto	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Estaño Total	mg/L			<0.009	<0.009	<0.009	<0.009	<0.009	<0.009			
Estroncio Disuelto	mg/L			0.124	0.071	0.104	0.07	0.094	0.098			
Estroncio Total	mg/L			0.133	0.073	0.163	0.175	0.106	0.096			
Fosforo Disuelto	mg/L											
Fosforo Total	mg/L			<0.05	0.08	0.67	0.21	0.08		0.2		
Hierro Disuelto	mg/L			0.109	0.076	0.027	0.152	0.723	0.113	9.62	0.09	0.07
Hierro Total	mg/L			0.897	0.107	20.1	39.9	5.72	1.7			
Magnesio Disuelto	mg/L											
Magnesio Total	mg/L			4.48	4.16	3.01	1.51	3.01	2.99	2.79	3.46	3.62
Manganeso Disuelto	mg/L			0.054	0.027	<0.002	0.023	0.101	0.027	0.206	0.034	0.02
Manganeso Total	mg/L			0.075	0.051	0.539	1.23	0.161	0.069			
Mercurio Disuelto	mg/L			<0.00005	0.00008	<0.00005	<0.00005	<0.00005	<0.00005		<0.0001	<0.0001
Mercurio Total	mg/L			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001			
Molibdeno Disuelto	mg/L			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0003	0.0005	0.0008
Molibdeno Total	mg/L			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002			
Níquel Disuelto	mg/L			<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.02	<0.001	<0.001
Níquel Total	mg/L			<0.003	<0.003	0.015	0.034	0.003	0.004			
Plata Disuelta	mg/L			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0001	<0.0001	0.0003
Plata Total	mg/L			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002			
Plomo Disuelto	mg/L			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0074	<0.0002	0.0006
Plomo Total	mg/L			<0.002	<0.002	0.011	0.02	0.003	<0.002			
Potasio Disuelto	mg/L											
Potasio Total	mg/L			4.74	4.23	4.26	3.39	2.77	2.91	3.51	2.94	3.16
Selenio Disuelto	mg/L			<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.005	<0.005	<0.005
Selenio Total	mg/L			<0.004	<0.004	<0.004	<0.004	<0.004	<0.004			
Silicio Disuelto	mg/L			22.8	10.6	16.3	13.1	19.8	20.6			
Silicio Total	mg/L			23.8	12.8	62.7	79.7	30	21.3			
Sodio Disuelto	mg/L											
Sodio Total	mg/L			12.5	11.4	7.37	5.2	6.24	7.02	8.38	7.37	8.36
Talio Disuelto	mg/L			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005			
Talio Total	mg/L			<0.0005	<0.0005	<0.0005	0.0007	<0.005	<0.0005			
Titanio Disuelto	mg/L			<0.001	<0.001	<0.001	0.006	0.014	0.002			
Titanio Total	mg/L			0.065	0.002	1.4	2.59	0.384	0.11			
Vanadio Disuelto	mg/L			0.004	0.003	0.001	0.002	0.005	0.001			
Vanadio Total	mg/L			0.003	0.003	0.043	0.123	0.015	0.005			
Zinc Disuelto	mg/L			0.005	0.036	<0.004	0.015	0.023	<0.004	0.03	0.002	0.004
Zinc Total	mg/L			<0.015	0.038	0.089	0.121	0.028	0.234			

TABLE 41-6. 2005 SURFACE WATER QUALITY DATA

SW5 - Río Cuilco Abajo de la descarga de Riachuelo Quivichil, 2005

Mes		Ene	Feb	Mar	Abr	May	Jun	Jul	Ago	Sep	Nov	Dic
Fecha		1/19/2005	2/10/2005	4/7/2005	4/28/2005	5/19/2005	6/9/2005	7/28/2005	8/10/2005	9/24/2005	11/21/2005	12/18/2005
Laboratorio		CTA	CTA	CTA	CTA	CTA	CTA	CTA	CTA	SGS	SGS	SGS
pH de campo	u.e.	8.12	9.44		8.12	8.09	7.69	7.74	7.89	6.87	8.17	8.15
pH de laboratorio	u.e.									7.64	7.4	8.7
Temperatura de campo	°C	13.1	29.9		24.6	22	25.5	20.5	20.4	19.80	19.9	20.3
Temperatura de laboratorio	°C										12.4	
Conductividad de campo	uS/cm	149	139		155	142	111	130	143	75.40	133.9	143.8
Conductividad de laboratorio	uS/cm									85.00	137	64
Oxígeno Disuelto de campo	mg/L	7.85	8.52		6.96	4.15	3.7	4.62		6.43		9.64
Alcalinidad Total	mg/L			66	60	36	35	43	50	32	<2	52.9
Amonio	mg/L			<0.02	0.07	0.07	<0.02	<0.02	<0.02	<0.1	<0.05	<0.05
Cloruros	mg/L			2.99	6.41	4.56	3.36	2.53	2.36	1.5	<20	2.4
Fluoruros	mg/L			0.18	0.18	0.13	0.15	0.15	0.14	0.08		
Cianuro Total	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.01
Cianuro WAD	mg/L	0.002	<0.002	<0.010	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.05	<0.05
TKN	mg/L			0.26	0.36	1.35	1.42	0.46	0.2	<0.5	<0.5	<0.5
Nitratos	mg/L										0.25	0.21
Nitritos	mg/L										0.01	<0.01
Sulfatos	mg/L			13	15.2	16.3	13.3	13.4	15.3	6.5	13	12
Sulfuro de hidrógeno	mg/L								<0.1		<0.02	<0.02
Sólidos Suspendidos	mg/L			<12	<12	380	548	82	23	605	30	<10
Sólidos Disueltos	mg/L			104	124	240	118	140	142	171	30	20
Sólidos Totales	mg/L			166	352	646	616	214	172			
Hidrocarburos totales	mg/L	<0.500	<0.037		<1	1.5	<0.500	<1	<0.500			
Grasas y Aceites	mg/L											
DQO	mg/L			<5	8	14	22	7	<5		8	<8
Aluminio Disuelto	mg/L	0.061	0.051	0.052	0.028	0.005	0.026	1.62	0.101	30.3	0.4	0.056
Aluminio Total	mg/L	0.384	0.264	1.35	0.064	40.3	70.1	9.92	2.84			
Antimonio Disuelto	mg/L	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.0637	0.409	0.865
Antimonio Total	mg/L	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006			
Arsénico Disuelto	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.005	<0.001	0.001
Arsénico Total	mg/L	<0.003	<0.003	0.003	<0.003	0.005	0.007	<0.003	<0.003			
Bario Disuelto	mg/L	0.048	0.039	0.061	0.043	0.065	0.061	0.11	0.06	0.434	0.037	0.035
Bario Total	mg/L	0.044	0.038	0.08	0.042	0.481	0.635	0.135	0.08			
Berilio Disuelto	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005
Berilio Total	mg/L	<0.001	<0.001	<0.001	<0.001	0.001	0.003	<0.001	<0.001			
Boro Disuelto	mg/L	0.024	0.027	0.034	0.03	0.013	0.013	<0.010	<0.010	0.03	<0.01	0.012
Boro Total	mg/L	0.024	<0.05	0.027	0.031	0.02	0.025	<0.010	0.012			
Cadmio Disuelto	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0007	<0.0001	<0.0001
Cadmio Total	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002			
Calcio Disuelto	mg/L											
Calcio Total	mg/L	14.4	15.1	15.9	13.2	11.5	6.83	13.1	13.7	11.7	13.1	14.2
Cobalto Disuelto	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.001	<0.001			
Cobalto Total	mg/L	<0.001	<0.001	<0.001	<0.001	0.008	0.018	0.002	<0.001			
Cobre Disuelto	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	0.0117	0.0012	0.0009
Cobre Total	mg/L	<0.003	<0.003	<0.003	<0.003	0.021	0.041	0.004	0.005			
Cromo Disuelto	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.02	<0.001	<0.001
Cromo Total	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	0.014	<0.003	<0.003			
Estaño Disuelto	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Estaño Total	mg/L	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009			
Estroncio Disuelto	mg/L	0.111	0.123	0.131	0.105	0.114	0.088	0.112	0.129			
Estroncio Total	mg/L	0.109	0.119	0.134	0.111	0.175	0.178	0.131	0.131	0.24		
Fosforo Disuelto	mg/L											
Fosforo Total	mg/L			0.05	0.25	0.52	0.25	0.09		0.24		
Hierro Disuelto	mg/L	0.221	0.155	0.115	0.069	0.029	0.013	0.941	0.132	20.4	0.27	0.08
Hierro Total	mg/L	0.286	0.269	0.967	0.102	21.5	38.1	5.08	1.67			
Magnesio Disuelto	mg/L											
Magnesio Total	mg/L	4	4.07	4.6	3.87	3.25	1.86	3.67	3.69	4.66	3.57	3.73
Manganeso Disuelto	mg/L	0.047	0.023	0.071	0.017	<0.002	0.016	0.092	0.028	0.545	0.041	0.014
Manganeso Total	mg/L	0.046	0.024	0.095	0.021	0.543	1.16	0.123	0.069			
Mercurio Disuelto	mg/L	0.0002	<0.0001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005		<0.0001	<0.0001
Mercurio Total	mg/L	0.0006	<0.0002	<0.0001	0.0005	<0.0001	<0.0001	<0.0001	<0.0001			
Molibdeno Disuelto	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0003	0.0005	0.0007
Molibdeno Total	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002			
Níquel Disuelto	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.02	<0.001	<0.001
Níquel Total	mg/L	<0.003	<0.003	<0.003	<0.003	0.015	0.03	0.003	0.004			
Plata Disuelta	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0001	<0.0001	<0.0001
Plata Total	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002			
Plomo Disuelto	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0109	0.0002	0.0002
Plomo Total	mg/L	<0.002	<0.002	<0.002	<0.002	0.013	0.019	0.003	<0.002			
Potasio Disuelto	mg/L											
Potasio Total	mg/L	3.27	3.51	4.58	4.09	4.19	4.2	3.13	3.07	4.68	3.08	3.27
Selenio Disuelto	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.005	<0.005	<0.005
Selenio Total	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004			
Silicio Disuelto	mg/L	21.6	21.3	23.1	19.8	15.5	12.8	19.9	20.5			
Silicio Total	mg/L	27.3	20.2	24.6	19.8	65.1	84.1	27.3	21.5			
Sodio Disuelto	mg/L											
Sodio Total	mg/L	9.64	11.2	11.7	10.6	7.37	6.18	6.69	7.28	5.31	7.54	8.51
Talio Disuelto	mg/L	<0.06	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005			
Talio Total	mg/L	<0.05	<0.05	<0.0005	<0.0005	<0.0005	0.0006	<0.005	<0.0005			
Titanio Disuelto	mg/L	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	0.032	0.002			
Titanio Total	mg/L	0.01	0.008	0.062	0.001	1.41	2.43	0.352	0.118			
Vanadio Disuelto	mg/L	0.002	0.003	0.004	0.005	<0.001	0.001	0.005	0.001			
Vanadio Total	mg/L	0.002	0.003	0.003	0.005	0.046	0.12	0.014	0.005			
Zinc Disuelto	mg/L	0.007	<0.004	0.049	<0.004	0.005	0.021	0.006	0.004	0.05	0.003	0.002
Zinc Total	mg/L	<0.015	<0.015	0.016	0.061	0.072	0.151	0.024	0.854			

TABLE 41-7. 2005 SURFACE WATER QUALITY DATA

SW8 - Abajo del TSF, Riachuelo Quivichil, 2005

Mes		Ene	Feb	Mar	Abr	May	Jun	Jul	Ago	Sep	Nov	Dic
Fecha		**1/19/2005**				**5/19/2005**	**6/8/2005**	**7/27/2005**	**8/9/2005**	**11/24/2005**	**11/24/2005**	**12/20/2005**
Laboratorio		CTA				CTA	CTA	CTA	CTA	SGS	SGS	SGS
pH de campo	u.e.	8.66				7.75	7.96	8.12	7.73	6.15	7.85	7.85
pH de laboratorio	u.e.									--	7.3	8.3
Temperatura de campo	°C	14.9				22.3	30.7	27.5	26.2	19.10	25	22.8
Temperatura de laboratorio	°C										12.4	
Conductividad de campo	uS/cm	491				104	161	163	174	71.60	145	142.8
Conductividad de laboratorio	uS/cm									--	146	61
Oxígeno Disuelto de campo	mg/L	7.9				3.08	1	3.99		5.22	1.15	
Alcalinidad Total	mg/L	160				30	60	67	76	--	<2	80
Amonio	mg/L	0.06				0.11	0.08	<0.02	<0.02	0.4	<0.05	<0.05
Cloruros	mg/L									--	<20	2.4
Fluoruros	mg/L	0.18				0.14	0.24	0.22	0.18	--		
Cianuro Total	mg/L	<0.002				<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	0.05
Cianuro WAD	mg/L	<0.002				<0.002	<0.002	<0.002	<0.002	<0.01	<0.05	<0.05
TKN	mg/L	0.06				0.99	0.4	0.45	0.46	0.70	<0.5	<0.5
Nitratos	mg/L										<0.01	0.21
Nitritos	mg/L										<0.01	<0.01
Sulfatos	mg/L	93.7				4.68	12.1	8.65	8.78	--	5.7	5.2
Sulfuro de hidrógeno	mg/L										<0.02	<0.02
Sólidos Suspendidos	mg/L	157				346	484	73	52	--	<10	470
Sólidos Disueltos	mg/L	334				698	370	624	296	--	50	140
Sólidos Totales	mg/L					1110	812	652	374			
Hidrocarburos totales	mg/L	<0.500				2.6	0.58	2	<0.500			
Grasas y Aceites	mg/L											
DQO	mg/L					15	7	11	14		9	<8
Aluminio Disuelto	mg/L	0.123				<0.004	0.067	1.23	0.069	29.1	0.9	0.054
Aluminio Total	mg/L	9.93				64.3	40.3	28.7	13.7			
Antimonio Disuelto	mg/L	<0.006				<0.006	<0.006	<0.006	<0.006	0.0631	0.391	0.877
Antimonio Total	mg/L	<0.006				<0.006	<0.006	<0.006	<0.006			
Arsénico Disuelto	mg/L	0.003				<0.003	<0.003	<0.003	<0.003	<0.005	<0.001	0.001
Arsénico Total	mg/L	0.004				0.006	0.005	<0.003	<0.003			
Bario Disuelto	mg/L	0.195				0.094	0.154	0.371	0.152	0.637	0.161	0.134
Bario Total	mg/L	0.26				0.814	0.558	0.453	0.293			
Berilio Disuelto	mg/L	<0.001				<0.001	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005
Berilio Total	mg/L	<0.001				0.003	0.002	0.001	<0.001			
Boro Disuelto	mg/L	0.025				<0.010	<0.010	<0.010	<0.010	0.05	<0.01	<0.005
Boro Total	mg/L	0.028				0.009	0.014	<0.010	0.007			
Cadmio Disuelto	mg/L	<0.002				<0.002	<0.002	<0.002	<0.002	0.0006	<0.0001	<0.0001
Cadmio Total	mg/L	<0.002				<0.002	<0.002	<0.002	<0.002			
Calcio Disuelto	mg/L											
Calcio Total	mg/L	47				6.74	11.1	15.3	16.4	8.55	12.6	11.6
Cobalto Disuelto	mg/L	<0.001				<0.001	0.001	0.001	0.002			
Cobalto Total	mg/L	0.001				0.011	0.006	0.004	0.002			
Cobre Disuelto	mg/L	0.002				<0.002	<0.002	0.004	<0.002	0.0136	0.0014	0.0016
Cobre Total	mg/L	0.004				0.027	0.018	0.009	0.006			
Cromo Disuelto	mg/L	<0.003				<0.003	<0.003	<0.003	<0.003		<0.001	<0.001
Cromo VI	mg/L									0.003		
Cromo Total	mg/L	0.003				<0.003	0.005	<0.003	<0.003	<0.02		
Estaño Disuelto	mg/L	<0.001				<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Estaño Total	mg/L	<0.009				<0.009	<0.009	<0.009	<0.009			
Estroncio Disuelto	mg/L	0.716				0.078	0.141	0.165	0.162			
Estroncio Total	mg/L	0.709				0.159	0.203	0.183	0.163			
Fosforo Disuelto	mg/L											
Fosforo Total	mg/L									0.06		
Hierro Disuelto	mg/L	0.714				0.017	0.05	0.825	0.075	19.5	0.37	0.04
Hierro Total	mg/L	5.12				34.5	23.7	15	6.76			
Magnesio Disuelto	mg/L											
Magnesio Total	mg/L	16.6				2.33	3.81	5.15	5.95	4.39	4.52	4.04
Manganeso Disuelto	mg/L	0.177				0.005	0.055	0.179	0.086	0.227	0.06	0.037
Manganeso Total	mg/L	0.248				0.585	0.301	0.273	0.208			
Mercurio Disuelto	mg/L	<0.0001				<0.00005	<0.00005	<0.00005	<0.00005		<0.0001	<0.0001
Mercurio Total	mg/L	0.0007				<0.0001	<0.0001	<0.0001	<0.0001			
Molibdeno Disuelto	mg/L	0.004				<0.002	<0.002	<0.002	<0.002	<0.0003	0.0008	0.0013
Molibdeno Total	mg/L	0.005				<0.002	<0.002	<0.002	<0.002			
Níquel Disuelto	mg/L	<0.003				<0.003	<0.003	<0.003	<0.003	<0.02	<0.001	<0.001
Níquel Total	mg/L	0.005				0.024	0.018	0.009	0.008			
Plata Disuelta	mg/L	<0.002				<0.002	<0.002	<0.002	<0.002	0.0001	<0.0001	0.0019
Plata Total	mg/L	<0.002				<0.002	<0.002	<0.002	<0.002			
Plomo Disuelto	mg/L	0.002				<0.002	<0.002	0.005	<0.002	0.0175	0.0002	0.0028
Plomo Total	mg/L	0.003				0.024	0.016	0.011	0.004			
Potasio Disuelto	mg/L											
Potasio Total	mg/L	5.35				3.83	5.13	5.93	7.63	7.21	5.74	5.25
Selenio Disuelto	mg/L	<0.004				<0.004	<0.004	<0.004	<0.004	<0.005	<0.005	<0.005
Selenio Total	mg/L	<0.004				<0.004	<0.004	<0.004	<0.004			
Silicio Disuelto	mg/L	23.1				16.4	17.6	18.3	34.5			
Silicio Total	mg/L	29.8				97	68	56.6	40.4			
Sodio Disuelto	mg/L											
Sodio Total	mg/L	34				4.65	7.17	6.83	7.97	6.93	7.97	8.33
Talio Disuelto	mg/L	<0.06				<0.0005	<0.0005	<0.0005	<0.0005			
Talio Total	mg/L	<0.05				0.0008	<0.0005	<0.005	<0.0005			
Titanio Disuelto	mg/L	0.003				<0.001	0.001	0.008	0.001			
Titanio Total	mg/L	0.112				1.63	0.888	0.601	0.351			
Vanadio Disuelto	mg/L	0.009				<0.001	0.002	0.007	0.001			
Vanadio Total	mg/L	0.016				0.069	0.047	0.03	0.014			
Zinc Disuelto	mg/L	0.063				0.011	<0.004	0.239	<0.004	0.08	0.002	0.014
Zinc Total	mg/L	0.07				0.176	0.133	0.072	0.047			

11.9 Liquid Effluent Discharges

The Marlin Mine was not discharging mining effluents during 2005. The first mining effluent discharge is expected from the TSF late in the 2006 rainy season, or during the rainy season of 2007. During discharge events, water quality and flow monitoring will be conducted regularly and reported quarterly to both the MARN and the MEM, and annually to the IFC.

11.10 Aquatic Monitoring

In addition to water quality monitoring, Montana is required to conduct aquatic biology monitoring twice per year. This monitoring occurs in the Rio Tzala at points SW1 and SW2, the Riachuelo Quivichil at point SW3, and the Rio Cuilco at points SW4 and SW5. The monitoring includes fish and macroinvertebrates. All aquatic monitoring was conducted as required in 2005 except that point SW1 could not be accessed in March, 2005 for the dry season sampling event at that point.

Baseline conditions for fish and macroinvertebrates were analyzed with one rainy season sampling event (third quarter 2002) and one dry season sampling event (first quarter 2003). This is not enough data to establish the natural fluctuations of fish and macroinvertebrate populations. To determine if the mine has any significant impacts on aquatic life, the fish and macroinvertebrate populations will be monitored twice per year during the life of the operation. Any long term and continuing trends will be reviewed to determine if any significant impacts are occurring due to the mine.

Fish

As of the end of 2005, three rainy season sampling events had occurred, beginning with the baseline monitoring in third quarter of 2002. The upstream and downstream sampling locations in the Rio Tzala, SW1 and SW2 respectively, do not indicate any trends/changes in the fish population. The point SW3, below the TSF indicates a decreasing fish population. If this decrease is related to mine activity, it could be a result of sediment loads from the upstream construction area at the TSF. This construction will ultimately be completed and the area revegetated. Interim sediment control measures have been increased to see if this results in a positive change in the fish population at SW3. Any impacts at this point are not currently considered significant, or irreversible. The Rio Cuilco upstream and downstream of the quebrada below the TSF, points SW4 and SW5 respectively, does not indicate any significant trends/changes in the fish population. Results of the sampling are shown in Table 42.

TABLE 42. FISH SURVEY SUMMARY: RAINY SEASON

Fish Survey Summary - Marlin Rainy Season (May - Oct)

Station	Family	Species	Number of Individuals Jul, 2002	Number of Individuals Sep, 2004	Number of Individuals Sep, 2005	IBI Jul, 2002	IBI Sep, 2004	IBI Sep, 2005
SW1	Profundulidae	*Profundulus labialis*	0	0	0	0	0	0
SW2	Profundulidae	*Profundulus labialis*	0	0	1	0	0	15
SW3	Profundulidae	*Profundulus labialis*	62	14	7	20	16	16
SW4	Profundulidae	*Profundulus labialis*	21	30	261	17	17	36
SW5	Profundulidae	*Profundulus labialis*	17	47	31	31	19	33
	Pimelodidae	*Rhamdia, sp.*	0	0	1			

Notes:

IBI	Index of Biotic Integrity
SW1	Rio Tzala - upstream of pit & road disturbance
SW2	Rio Tzala - downstream of pit & road disturbance
SW3	Riachuelo Quivichil - downstream of tailings construction
SW4	Rio Cuilco - after Tzala enter Cuilco, before Riachuelo Quivichil enters Cuilco
SW5	Rio Cuilco - after both Tzala and Riachuelo Quivichil enter Cuilco

As of the end of 2005, only two dry season sampling events had occurred, beginning with the baseline monitoring in the first quarter of 2003. Because only two sampling events have occurred to date, specific trends/changes in the fish population cannot yet be evaluated. Results of the sampling are shown in Table 43.

TABLE 43. FISH SURVEY SUMMARY: DRY SEASON

Fish Survey Summary - Marlin Dry Season (Nov-Apr)

Station	Family	Species	Number of Individuals Feb, 2003	Number of Individuals Mar, 2005	IBI Mar, 2003	IBI Mar, 2005
SW1	Profundulidae	*Profundulus labialis*	12	no access	22	no access
SW2	Profundulidae	*Profundulus labialis*	26	3	31	17
SW3	Profundulidae	*Profundulus labialis*	78	27	63	32
SW4	Profundulidae	*Profundulus labialis*	18	20	45	27
	Poecilidae	*Brachyrhaphis sp.*	6	0		
SW5	Profundulidae	*Profundulus labialis*	34	46	58	43
	Poecilidae	*Brachyrhaphis sp.*	11	0		

Notes:

IBI	Index of Biotic Integrity
SW1	Rio Tzala - upstream of pit & road disturbance
SW2	Rio Tzala - downstream of pit & road disturbance
SW3	Riachuelo Quivichil - downstream of tailings construction
SW4	Rio Cuilco - after Tzala enter Cuilco, before Riachuelo Quivichil enters Cuilco
SW5	Rio Cuilco - after both Tzala and Riachuelo Quivichil enter Cuilco

Macroinvertebrates

Macroinvertebrates are evaluated during the same sampling events as fish. Rainy season macroinvertebrate sampling does not indicate any significant trends over time. Dry season macroinvertebrate sampling has only occurred on two occasions to date and therefore, no significant trends can be analyzed for the dry season sampling at this time. Macroinvertebrate sampling is shown in Tables 44 and 45.

TABLE 44. MACROINVERTEBRATE SURVEY SUMMARY: RAINY SEASON

Macroinvertebrates Survey Summary - Marlin Rainy Season (May-Oct)									
Station	Number of Taxas Jul, 2002	Number of Taxas Sep, 2004	Number of Taxas Sep, 2005	Total Individuals Collected Jul, 2002	Total Individuals Collected Sep, 2004	Total Individuals Collected Sep, 2005	IBI Jul, 2002	IBI Sep, 2004	IBI Sep, 2005
SW1	7	5	11	48	21	20	27	39	53
SW2	5	8	7	21	26	42	34	50	42
SW3	9	4	7	67	22	53	51	35	50
SW4	4	11	13	19	22	42	38	52	68
SW5	4	7	10	6	19	33	30	32	55

Notes:

IBI	Index of Biotic Integrity
SW1	Rio Tzala - upstream of pit & road disturbance
SW2	Rio Tzala - downstream of pit & road disturbance
SW3	Riachuelo Quivichil - downstream of tailings construction
SW4	Rio Cuilco - after Tzala enter Cuilco, before Riachuelo Quivichil enters Cuilco
SW5	Rio Cuilco - after both Tzala and Riachuelo Quivichil enter Cuilco

TABLE 45. MACROINVERTEBRATE SURVEY SUMMARY: DRY SEASON

Macroinvertebrates Survey Summary - Marlin Dry Season (Nov-Apr)						
Station	Number of Taxas Mar, 2003	Number of Taxas Mar, 2005	Total Individuals Collected Mar, 2003	Total Individuals Collected Mar, 2005	IBI Mar, 2003	IBI Mar, 2005
SW1	7	no access	49	no access	48	no access
SW2	5	8	30	119	57	53
SW3	13	8	106	79	80	43
SW4	7	9	36	193	55	58
SW5	4	6	16	282	53	50

Notes:

IBI	Index of Biotic Integrity
SW1	Rio Tzala - upstream of pit & road disturbance
SW2	Rio Tzala - downstream of pit & road disturbance
SW3	Riachuelo Quivichil - downstream of tailings construction
SW4	Rio Cuilco - after Tzala enter Cuilco, before Riachuelo Quivichil enters Cuilco
SW5	Rio Cuilco - after both Tzala and Riachuelo Quivichil enter Cuilco

11.11 Water Treatment Plants

The Marlin Mine does not currently have a water treatment plant. The only point source discharge location will be the metered discharge from the TSF to the environment, anticipated to begin in late 2006, or during the rainy season of 2007. The current program is to monitor the water quality within the TSF to aid in the determination of the need for a water treatment plant for this discharge. This field data will then be compared to the IFC mine effluent water quality guidelines, as well as any identified risk posed to downstream receptors, to determine the need for water treatment.

The INCO cyanide destruction plant was operational in the fourth quarter of 2005; however, this is to treat the tailings prior to their disposal into the TSF and is considered to be part of the process plant. The INCO plant experienced some problems with the agitator in late 2005; however, the agitator was replaced with a temporary agitator while the permanent replacement has been ordered.

11.12 Reforestation/Revegetation Monitoring

The reforestation campaign is part of the Forestry Management Plan presented to and approved by INAB (Instituto Nacional del Bosque). Reforestation was described in this Plan as compensation for the direct impact of tree cutting within the project footprint. Impacts and subsequent reforestation as per the Forestry Management Plan are divided into three years: 2004, 2005, and 2006. 2005 was the second reforestation year and 63 hectares were approved by INAB for tree cutting; however, 21 hectares were actually affected in 2005. It is anticipated that close to the proposed 63 hectares will be affected, however, this will be completed post 2005. For this reason, the full 63 hectares were reforested in 2005 as required. Additional hectares were also reforested in 2005; however, these will be credited during 2006 for that year's requirement.

Reforestation occurred both within the project area and in the surrounding municipalities of San Miguel Ixtahuacán y Sipacapa. Reforestation that occurs on land owned by individuals includes payment of forestry incentives per area reforested to the land owner. This incentive is paid for five years. These reforestation areas receive technical assistance from the company for: ground preparation, fertilizers, plague control, etc. for the first five years after which the land owner is completely responsible.

Extensive revegetation for runoff and erosion control was conducted at Marlin in 2005. The majority of this was concentrated in the construction zones. This included:

1. Road fill slopes,
2. Spoil material and topsoil stockpiles in the TSF construction area,
3. Closed exploration roads in the La Hamaca area,
4. The cut slope adjacent to the mine fuel station,
5. The camp area, and
6. The north face of the Area 5 waste rock storage facility.

The total area revegetated in 2005 was estimated to be approximately 11 hectares. The grass species used to do the revegetation was *Bracchiaria decumbens*, a self seeding annual grass species. The success of the species will be monitored over time, however, it was noted in 2005 that good coverage and quick germination was achieved and that the local cattle and sheep are attracted to the species.

In early 2006 some test plots were initiated with four different seed mixes, including some native perennial species. Experimentation with various revegetation species will continue in the next few years to optimize a seed mix for the permanent installation closure such as the waste dump and the TSF.

In addition to revegetation, some additional runoff and sediment control measures were implemented including:

1. Minimization of disturbance where possible,
2. Implementation of drainage channels and sediment control BMPs,
3. Minimization of cut and fill slope angles where possible,
4. Placement of silt fences,
5. Placement of jute-net type material on the face of steep slopes, and
6. Crowning or sloping of roads to direct flow to drainage channels where possible.

11.13 Waste Management

Marlin currently maintains one landfill facility for non-hazardous, solid waste which mainly includes office and construction waste. This landfill is located near the lower platform of the process plant. Additionally, a Waste Management Plan (WMP) was developed to identify the various types of wastes generated at the Marlin Mine, and their preferred disposal practice. The WMP identified best management practices for managing the various waste streams. Solid wastes are disposed of in the landfill, as required, on a daily basis. Dirt cover is then placed over the waste materials as needed on a regular basis to reduce blowing debris, and flies.

In addition to the site landfill, certain inert wastes are buried within the main waste dump in active dump zones. These inert wastes include paper, used tires that cannot be reconditioned, empty cement bags, and wooden pallets. Organic or chemical wastes are not disposed of within the waste dump area.

Three additional installations at the site landfill platform were constructed to manage special wastes. These installations and the waste streams are shown in Table 46.

TABLE 46. WASTE MANAGEMENT INSTALLATIONS AND THE WASTE STREAMS

Installation	Waste Stream Accepted	Final Disposal
Incinerator	Empty cyanide and sodium metabisulfite bags and boxes with residue	Ash – pending analysis. Will be either re-introduced into the process circuit, or used on the compost cell
Bioremediation Cell	Petroleum Contaminated Soil	Remediated Soil – placed in active waste dump and stockpile areas
Compost Cell	Organic Kitchen Waste	Compost – placed in active reforestation & revegetation areas as fertilizer

Another special waste generated by Marlin is lead-contaminated wastes from the fire assay process. This is comprised of potentially lead contaminated cupels, crucibles, and slag. These wastes are re-introduced into the process circuit at the SAG mill.

Two significant waste streams are recycled at Marlin; used oil and scrap metal. The used oil at Marlin is collected by an approved company who then typically sells it to a cement kiln for re-use. The scrap metal is also collected by an approved company and typically sold to a metal foundry for re-melt.

2006 will be the first fully operational year at Marlin and quantities of waste streams generated will be tracked on a monthly basis and reported in the 2006 AMR to the IFC.

11.14 Dam Safety

Tailings from the process are treated by the INCO plant for cyanide destruction prior to deposition in the TSF which is formed by a cross valley dam consisting of a rockfill shell and a low permeability core. The TSF will be raised progressively during the early years of the mine

life to an 80 m ultimate height using mine waste rock placed in downstream staged raises. Phase I of the TSF was completed in 2005 and the facility began accepting tailings in late October, 2005. A subsequent phase was started in early 2006.

Montana Exploradora de Guatemala, S. A. retained Robertson Geoconsultants, Inc. as an independent expert to perform a review of the TSF for the Marlin mine in compliance with the principles established in the IFC/World Bank guidance and operating principles OP 4.01 Annex D and OP 4.37. A Tailings Dam Review Board is required to review the development of the dam design, construction and initial dam filling. In this case, Dr. Andy Robertson of Robertson Geoconsultants, Inc., constitutes the Review Board under the terms of this OP. Although this Board is comprised of one individual, this Board was authorized by Montana Exploradora de Guatemala, S. A. to consult with independent technical specialists as needed.

Dr. Robertson was on site February 25th and 26th conducting the annual review of the facility. The review included:

1. As built drawings for Phase I,
2. Construction quality control records,
3. Monitoring records,
4. Preliminary Closure Plan,
5. Additional SOPs for the Operations and Maintenance Plan.

The review included a list of 18 key findings associated with the TSF and six key findings associated with the waste dump. The review document is attached as Attachment E. The review was overall positive, and follow up on the key findings will be conducted by Montana Exploradora de Guatemala, S.A. in the first half of 2006.

11.15 Waste Rock Handling

The Marlin open pit mine initiated waste stripping in July of 2005, with ore production following in August. Previous tests have shown some rock types to be potentially acid generating. This section is a summary of the procedures implemented in 2005, as well as future plans to prevent acid rock drainage at the Marlin mine.

Rock Analysis Procedures

Throughout 2005, all blastholes in waste zones were sampled and analyzed for total sulfur and total carbon content by the site SGS lab using their LECO furnace. These values are then used to calculate the acid generating potential (AGP) and acid neutralizing potential (ANP) of the rock type sampled. The ratio of ANP:AGP is then used to characterize the waste as follows:

1. Non Acid Generating (NAG): Rock with ANP/AGP > 2 and/or S< 0.1%,
2. Potentially Acid Generating (PAG): Rock with ANP/AGP < 2 and >1 and NP < 20kg/t CaCO3, and
3. Acid Generating (AG): Rock with ANP/AGP < 1 and S> 0.1%.

Once each blasthole has been categorized accordingly, blocks of NAG and AG waste are mapped out, flagged in the mine, and managed accordingly by the mine operations department. The PAG and AG waste is treated equally, and hauled to areas for encapsulation.

There are areas where it is impractical to separate small areas of PAG waste from NAG waste. In these cases, the PAG rock is blended with surrounding NAG rock in the waste dump. This only occurs when there is reason to believe the surrounding rock will neutralize the small amount of sulfides present, or when there is no geological evidence of sulfides (pyrite).

Conversely, if an area appears during mining that was mapped as NAG, but appears to be PAG (visible pyrite and distinct gray or green color), and there is low neutralization potential in the area, it will be marked in the field and carried to the appropriate AG encapsulation area.

Dump Designs

All waste rock from the pit was transported to one of two dumps based on its acid generating characteristics. The primary waste dump is located in the drainage upstream of the TSF. All NAG waste was placed in this area. The Area 5 waste dump is located to the east of the office and shop area. This dump was designed to hold all the early AG waste produced by the mines, until a suitable area was constructed in the primary waste dump. All PAG waste is hauled to Area 5, where it is placed in 1.5m lifts and compacted. The outer face consists of a 2m compacted oxide clay rind, covered by topsoil and vegetation. All drainage is directed away from the dump to minimize seepage through the waste rock. Once a platform of suitable size is constructed in the waste dump, all PAG will be encapsulated, with a minimum 10m cap of NAG rock. Again, all surface water will be diverted around and off of the dump to minimize seepage.

2005 Mining Data

During 2005, a total of 75,000 tons of open pit PAG waste was placed and encapsulated in the Area 5 dump. This accompanied approximately 160,000 tons of underground mine waste placed in Area 5. It should be noted that currently all underground mine waste is being treated as PAG.

Future Plans

Historical test work has shown that the calculated AGP and ANP based on total carbon and total sulfur values of the marlin waste rock correlates well to the analytical AGP and ANP of the rock. Ongoing monthly tests at outside laboratories will be conducted to confirm this. Each month, 5-10 samples will be submitted to ACZ for a series of tests including sulfur speciation (total sulfur, sulfate sulfur, sulfide sulfur) to determine AGP, the modified Sobek ANP analysis, and paste pH.

The SGS onsite laboratory will also begin performing a forward titration and Net Acid Generation test on roughly 5% of waste samples, which will be included in the blasthole database. This should allow periodic on-site confirmation of the total carbon to ANP and total Sulfur to AGP relationships.

In early 2006, a series of long term kinetic tests will begin onsite. These tests are meant to mimic the natural environment that the waste rock will be exposed to. A series of barrels will be filled with material of certain rock and alteration types, and exposed to the open atmosphere until such time as a determination can be made on the acid generating potential, in some rock types this may be through the life of the mine. The infiltrated water will be collected on a weekly basis during the rainy season and tested for pH and conductivity. These tests will give the best data as to the long term AGP of certain rock types that will make up large volumes of the waste dumps. Depending on these field parameters, samples can also be sent to an outside laboratory for more detailed analytical work on the leachate.

When enough data becomes available, the mine block model will be updated to include more information about the AGP of each specific zone within the mine. This will help in planning and scheduling of PAG waste mining, optimizing placement and encapsulation, and minimizing acid rock drainage.

12.0 HEALTH AND SAFETY MONITORING

Montana strives to provide a healthy and safe work environment, free of accidents and occupational health risks, focused on the control and prevention of all loss of human resources, company property and the environment. It is the philosophy and belief of the company that accidental loss can be controlled through the implementation and administration of an an effective loss control program, which requires the active participation of all the employees. To this end, all employees are provided health, safety and loss prevention instruction and training in to help them carry out their duties and responsibilities according to the rules, policies and practices established by the company. Montana has an internal committee to perform monthly environmental and health and safety inspections.

12.1 Occupational Health and Safety

During 2005, the Marlin Mine had a total of 69 lost-workdays resulting from five lost-time accidents (see Tables 47 and 48). The first two fatalities noted below were not directly related to operations at the Marlin Mine site. They are included in the interest of maximum transparency in reporting the full context in which mining takes place in Guatemala.

TABLE 47. MARLIN MINE HEALTH AND SAFETY INCIDENT STATISTICS: 2005

Occupational Health and Safety Incidents	Number of Incidents	Details
Fatalities	5	A total of eight fatalities in five incidents. See Fatalities section below
Total Lost Time Accidents	5	See Table 46 for a description of lost time accidents
Total number of lost work hours resulting from incidents	552	
Total man hours worked	1,362,997	.2005 Incidence: IFC = 0.00040499
		2004 Incidence: IFC = 0.0006751; US = 135.03037

12.2 Fatalities

- On January 11, in Los Encuentros, Sololá, a contractor was moving the 55 ton ball mill along the Pan American Highway. During a protest against the movement of this equipment, a bystander was killed under circumstances that are still unclear. See Significant Events section for additional information.

- On March 13, in San Miguel Ixtahuacán, a contract bus driver for Montana had an altercation in which he was shot and killed. Witnesses have stated that the person who

shot him was an off-duty contract security guard for the company. He fled the scene and remains at large.

- On May 18, a foreman working for CBI (Chicago Bridge and Iron) fell to his death while working on construction of the cyanide destruction tank. He had a safety harness but it was not in use. CBI conducted an investigation of the accident and a retraining session was conducted with all workers working on the tanks.

- On May 22, at approximately 11:55 PM, a bus accident occurred along the project access road as contract construction workers were being transported to Huehuetenango. The bus went off the road and the driver, the bus conductor and a worker from the contractor Sococo died in the accident. The accident occurred at night; the driver let his wheel drift off the road and lost control of the bus.

- On October 31, at approximately 10 AM, a water truck crashed on the down grade approaching Siete Platos from the Marlin Mine. The driver had worked the night before and it is believed he fell asleep. The driver and an assistant were killed

TABLE 48. DETAILS OF MARLIN MINE 2005 LOST TIME ACCIDENTS			
Accident Description	**Date**	**Causes**	**Corrective or Preventative Measures**
Working in underground mine when a co-worker dislodged a rock, which fell against the subjects leg resulting in contusions and trauma	01/21/2005	1. loose rock resulting from water infiltration. 2. Failure to inspect for loose rocks in work area. 3.Failure to tack proper precautions for small work areas.	Reviewed guidelines for working in small area with loose rocks.
Upset of wheelbarrow full of rocks resulting in lacerations on wrists of the worker pushing the cart.	03/02/2005	1. Worker overfilled cart. 2. Worker did not observe articles in wheelbarrow's pathway.	1. Reviewed procedures proper loading of wheelbarrow and on clearing obstacles from pathway.
Rock dislodged during boring in the underground mine, fell on workers hand resulting in trauma.	09/22/2005	Failure to properly secure work area.	Reviewed procedures for securing walls and ceilings when working in underground areas.
Worker working with air and water tubing in underground mine disconnected a hose without turning off the air and was struck in the face with mud	10/11/2005	Failure to follow safety procedures regarding turning off and draining of tubing before disconnecting.	Reviewed procedures for working with air and water tubing.
A worker in the underground mine opened an electric transformer without ensuring that the electricity was turned off and was burned on the face when the electricity arced.	10/30/2005	Working on electrical apparatus without ensuring that the electricity was turned off.	Reinforced procedures for disconnecting power before working on electrical apparatus and proper labeling of such apparatus

12.3 Training

Table 49 below details Marlin Mine introductory and annual refresher Health and Safety training courses provided during 2005. All Marlin Mine and contractor employees receive industrial health and safety training shortly after they are employed and a refresher on an annual basis.

TABLE 49. MARLIN MINE HEALTH AND SAFETY TRAINING: 2005	
Course	**Number of Employees Trained**
Introduction to Industrial Health and Safety	167 newly hired employees
Annual Health and Safety Training	3,064 (all employees) company and contractor throughout the year

The following outlines the content of the intrductory and annual refresher courses.

Introduction to Industrial Health and Safety

Each employee is given a one-day long introductory course on the industrial health and safety rights and responsibilities for miners including:

- Company health and safety policies, standards and procedures
- Industrial health and safety overview
- Rules of safety and general conduct
- Risk prevention
- Environmental preservation
- Emergency transportation and communication procedures
- Safety procedures and care of the work environment
- Emergency evacuacion and escape plans
- Personal protection equipment
- Introduction to First Aid
- Land.control issues
- Industrial health, safety and hygiene
- Electricital safety
- Safe use and managment of explosives
- Safe use and management of chemical products
- Fire extinguisher use

Annual Refresher Training

Each employee is required to attend an anual safety refresher training course. Topics include the following:

- Contingency committee organization and training
- Emergency action plan
- Operating continegency manual of Contingencies
- Evacuacion
- Earthquakes
- Fire prevention and supression
- Fire supression teams
- First aid
- Use and management of emergency equipment
- Use and managment of chemical products

12.4 Employee Workplace Monitoring

Noise and Air Monitoring

Workplace monitoring was conducted by CTA in compliance with the Department of Energy and Mines (MEM) requirment specified in the report SCDM-INF-EXTNo. 236-2004f

For the assessment field sampling results are compared against MSHA for air quality in underground mines and againts OSHA for surface locations. The field work consisted of in situ sampling which occurred on September 14, 2005.

Underground Mine Noise Exposure Levels

Audio measurements were conducted inside the underground mine tunnel. OSHA dosimeter parameters used for the smpling are described below:

- Peak Weighting — Un-weighted
- Detector Rate — Show
- Level of change — 5 dB
- Level Threshold — 80 dB
- Criterion Level — 90 dB
- Criteria Time — 8 hours

The results obtained from the audio dosimetry sampling shows that sound levels in the underground mine tunnels are above OSHA standards for unprotected exposure. Thes include a time weighted average (TWA) of of 97.3 dB (>90 dB), exposure level of 58.0% and a projected eight hour exposure level equal to 274.5% (>100%). Consequently, auditory protection devices must be worn inside the underground mine at all times.

Underground Mine Air Quality

This report presents the results of the measurement of oxygen (O_2), carbon monoxide (CO) and carbon dioxide (CO_2) monitoring carried out during September 2005 in the underground mine tunnel. For air quality monitoring purposes, nine monitoring stations were established in side the Marlin under ground mine at 150 meter intervals, measured from the mine entrance, including stations at 1,50 300, 450, 600, 750, 900, 1050, 1200 and 1350 meters. Table 50 presents monitoring results for oxygen and carbon dioxide.

TABLE 50. MARLIN MINE UNDERGROUND MINE CO_2 MONITORING: 2005

Puntos	Ubicación relativa al portal de entrada	% O_2	CO_2 ppm	Temperatura °C	% Humedad Relativa	Punto de Rocío °C
1	150 m	20.9	1702	23.4	77.9	19.3
2	300 m	20.9	1557	22.9	79.0	19.0
3	450 m	20.9	1321	23.4	76.2	19.0
4	600 m	20.8	1780	23.1	86.5	20.7
5	750 m	20.9	1215	22.9	81.1	19.5
6	900 m	21.0	764	20.1	76.4	15.8
7	1050 m	21.0	748	19.0	79.2	15.3
8	1200 m	20.9	765	19.7	80.6	14.5
9	1350 m	20.8	985	21.8	88.5	19.8
% O_2 recomendado por MSHA		19.5[1]				

% O_2 refers to the percentage in volume of oxygen in the air within the tunnel.
% Relative Humidity refers to the water vapor content of the air.
DewPoint is the temperature at which a determined mass of air is saturated with water vapor and thus condenses.

According to CTA's monitoring results, oxygen levels in the Marlin tunnel were above the MSHA standard contained in 30 CFR 57.5015 at every sampling station, which indicates that the ventilation syystem are adequately sized and functioning properly.

Table 51 presents the results of carbon monoxide monitoring, presented as concentrations in parts for million of CO in the interior of the tunnel.

TABLE 51. MARLIN MINE UNDERGROUND MINE CO MONITORING: 2005

Puntos	Ubicación relativa al portal de entrada	CO ppm	CO_2 ppm	Temperatura °C	% Humedad Relativa	Punto de Rocío °C
1	150 m	7	1129	22.1	78.2	18.1
2	300 m	10	1272	22.4	85.4	19.9
3	450 m	14	1614	23.8	81.4	20.4
4	600 m	1	734	20.4	74.2	15.6
5	750 m	0	703	19.9	77.0	15.8
6	900 m	0	885	18.9	80.5	15.5
7	1050 m	0	735	17.3	84.9	14.8
8	1200 m	8	1411	22.5	79.7	18.9
Concentración máxima de CO recomendada por OSHA		200[1]				

As it can be seen from the Table, levels of carbon monoxide in the Marlin underground mine tunnel are within limits recommended by OSHA (CO in labor environments are 200 ppm exposure for samples of 5 minutes). The highest level measured in the tunnel (14 ppm at 450 m) is almost 14 smaller times that the maximum recommended level.

12.5 Fire Safety Monitoring

Table 52 below presents Marlin Mine fire safety monitoring data for 2005.

TABLE 52. MARLIN MINE 2005 FIRE SAFETY ACTIVITIES

Fire Safety Verification Activities	Number Performed
Fire Drills*	3
Fire safety inspections	196
Portable Fire Extinguisher Inspections	34
Portable Fire Extinguisher Recharging	29

12.6 Environmental Health and Safety Monitoring

A total of 177 internal environmental health and safety inspections were carried out at the Marlin Mine during 2005.

Montana held the first internal inspection with the committee formed by the Operations Manager in December. Several issues were raised and have been or are being addressed by the various departments.

12.7 External Monitoring

The Ministry of Energy and Mines (MEM) conducted four on-site inspections of the Marlin Mine during 2005, the Ministry of Environment and Natural Resources (MARN)

conducted two and the National Institute of Forestry (INAB) conducted eleven. No citations were issued and no serious problems encountered.