

Julietta Environmental & Social Action Plan Rev. 2



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1.0 Executive Summary

The Julietta mine site is located in the Omsukchan Region (raion) of the Magadan Oblast, Russian Federation approximately 190 km to the southwest of the village of Omsukchan. It is located within a historical mining region and was first discovered in 1989. The project has been thru several attempts at development and construction since that time. The mine is currently owned and operated by the Omsukchan Mining and Geological Company (OMGC). Bema Gold Corporation holds 79% of the shares of OMGC. Two Russian companies, DMGC (10%) and TOO Nedra (11%) hold the remaining shares.

An initial Environmental Impact Assessment (known as an OVOS in Russia) was completed in 1997. After the Russian financial crisis in 1998, the project was re-designed to become more economically viable. Based on these changes, an update to the OVOS was submitted in 1999. Additionally, an Environmental Impact Assessment (EIA), along with an Environmental and Social Action Plan (ESAP), was disclosed in the World Bank Info Shop (Washington D.C.), Moscow, and Magadan (Russian Federation).

Construction occurred from 2000 thru September 2001. During 2002, OMGC received the Water Use and Discharge Permit, the Air Emission Permit and the Waste Management Permit. OMGC is currently in compliance with all Russian permitting requirements. Additionally, OMGC has been independently audited by SRK, Amec Earth and Environmental and been visited by a senior IFC environmental specialist. During this time there were no major issues discovered. The next visits by independent environmental specialists will occur in Summer 2003 (SRK) and Fall 2003 (IFC).

1.1 Brief Project Description

The Julietta Gold Mine is a small underground mine (the entire license area is 135 ha) that has an annual throughput of 145,000 tonnes per year (400 tonnes/day). The projected mine life is thru 2006. The milling process uses conventional gravity concentration followed by flotation, and cyanide leaching of the concentrate. Merrill Crowe precipitation is used to produce a doré bar that is shipped to Magadan for refinement.

Process water from the flotation circuit is pumped to a lined, primary area of the tailings impoundment. This water is recycled for use in the mill. Process water from the leach circuit is treated by metabisulfite and is pumped to a lined secondary pond in the tailings facility. This water is run thru secondary treatment using alkyl chlorination to ensure low levels of cyanide. The entire tailings facility has a secondary underdrain system designed to capture any spills or seepage in a sump and return the water to the tailings facility.



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Due to the remote location, the site has a mancamp, power generation facilities, a sewage treatment plant and all other necessary ancillary facilities to operate independently. The entire workforce works on rotation with a typical rotation of two weeks at site and two weeks off work.

1.2 Environmental, Social, Health, and Safety Impacts

The Julietta Project is a Category “A” project under World Bank Group Guidelines. Environmental, social, health, and safety impacts were estimated in the original Environmental and Social Impact Assessment (ESIA), 1999. Impacts that have changed from the initial ESIA include: air quality, terrain, soils, surface water quality, and socio-economics.

Air quality impacts were calculated using Russian methodologies. The largest calculated emission source at the site is the powerhouse. Russian methodologies estimated 44 tonnes/year of NO₂, 67.4 tonnes of NO, 22 tonnes/year of soot, 12.2 tonnes/year of SO₂, and 57 tonnes year of CO.

The total land disturbance during construction and operations is 23 ha less than what was estimated in the original ESIA. The total land disturbance at the site is 77 ha. A final Reclamation and Closure Plan will be completed in Summer 2003.

Additionally, more than 35 samples of wasterock have been taken to determine acid generating potential. Of material placed on surface, only andesite/tuft andesite has shown the potential to generate acid. The relatively small amount of wasterock, regional climatic conditions (negative annual temperature), and the proper handling of material should prevent any acid generation.

There are currently 3 surface water discharges at the Julietta Mine Site. These include: mine water, wastewater treatment plant, and the surface water runoff from the diversion ditch system around the tailings facility. All three of these discharges are monitored as part of the Water Use License issued by the Magadan Environmental Committee. All three discharges are in compliance with World Bank Group guidelines. While there were several minor exceedances of the extremely low, calculated limits for discharge set forth in the Water Use License, all water quality standards were met at the in-stream compliance point (500 meters below the last discharge point at site).

During development of the original ESIA (1999), the socio-economic situation of the region was in a serious state of decline. Every major economical indicator showed negative trends as compared to previous data. The situation continued to decline in 2000, but began to improve in 2001. This includes a halt to the net migration of population away from the region, a balanced regional budget in large part thanks to Julietta contributing more than 40% of the taxes collected from local businesses, a drastic decrease in unemployment (particularly in the mining industry where more than 1,400 jobs have been created since 2000), and greater personal earning power



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(Julietta employees earn 2-3 times higher salaries than employees of other mining companies in the region).

There are currently 384 persons listed as indigenous persons within the Omsukchan Region. Of this total, 184 are between 18-55 years old. Of these more than 72% are working within various enterprises within the region. This includes an average of 4 indigenous persons working at Julietta.

As part of IFC's commitment to the project, a Technical Assistance Program is under development for the region. This TA Program will identify a select group of enterprises (mostly Small to Medium Enterprises - SMEs) in the region and offer them tailored technical assistance with the objective to become long-term suppliers to the silver and gold mines in Magadan. Alongside focused enterprise-level work, the Project will run a policy group, which will identify obstacles to effective company operations in the region and seek to resolve them with the local government bodies. To date, OMGC has not been actively involved in the TA Program.

OMGC continues to maintain strong public consultation and disclosure. OMGC conducts most public consultation and disclosure thru public meetings held in Omsukchan. These meetings are very well attended, are well received, and are broadcast over the local television station. The last meeting was held in February 2003 and provided detailed information regarding the company's activities to include environmental, health, and safety issues.

Additionally, OMGC continues to interact with other interested and affected stakeholders. In 2002, OMGC responded to all requests for information regarding the property via written correspondence and thru the company's public liaison officer.

A full Environmental, Health and Safety Plan (EHSP) was created for this project. The framework of the HSP was developed based on the World Bank's Occupational Health and Safety Guidelines, Russian health and safety requirements, and the U.S. Mine Safety and Health Administration guidelines. The minesite has had an exemplary record of health and safety. During construction there was a total of 123 lost days due to injury (out of a total of approximately 72,000 days). There were no fatalities. During operations (2002) the minesite continues to have an exemplary record of health and safety. There was 1 minor injury reported with a total of 59 days lost due to injury (out of a total of total of approximately 72,000 days).

With the development and expansion of Bema Gold Corporation, a new Manager of Permitting, Environmental, Health, and Safety has been hired to oversee all of the corporate level environmental management and permitting issues for all operations that are in exploration, development, and operations. At the Julietta mine, there is currently one environmental person with plans to hire a second person.



2.0 Introduction

The need for implementation of an Environmental and Social Action Plan (ESAP) during development of the Julietta Project is stipulated by the International Finance Corporation¹ (IFC) and Russian regulations². This document is prepared to address IFC requirements. This document is an “open” document and will be updated and modified as needed and serves as the final ESAP used to describe the current operations. This document serves as the basis for the environmental and social monitoring and management programs to be implemented over the course of the project. OMFK will review the frequency and types of monitoring regularly to ensure:

- Compliance with all Russian and World Bank Group (WBG) guidelines;
- Compliance with all permit conditions; and,
- Effective monitoring and mitigation of project impacts.

The ESAP was originally disclosed in December 1999 in the World Bank Info Shop (Washington, D.C.), Moscow, and Magadan (Russian Federation). A site visit was completed by the IFC appraisal team in Summer 2000. Additionally, a senior IFC environmental specialist visited the site in June 2001. As part of the development process, an interim ESAP was submitted to IFC in September 2002 (known as Revision 1) but was not disclosed. Since that time several project developments have occurred to include:

- Commencement of operations;
- Additional permitting; and,
- Completion of an independent environmental audit.

Each of these developments is described in more detail in the following sections. Based on the progress of the project and IFC requirements, this revision will be the last update to the ESAP. All additional information will be reported in the Annual Monitoring report that is required to be submitted to IFC within 90 days of the end of the calendar year.

2.1 Purpose

The purpose of the ESAP is to identify the set of responses to potential adverse impacts, determine requirements for ensuring responses are made effectively and in a timely manner, and describe the means for meeting the environmental requirements.

¹ *Procedure for Environmental and Social Review of Projects – Guidance Note C: Outline of an Environmental Action Plan*, IFC, September 1998, pp. 45-46.

² SNiP 11-01-95 “*Instructions on the process for development, approvals, confirmation, and composition of project documentation in construction of facilities, buildings and equipment*”. 1995



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The ESAP will assess mitigation, monitoring, and other measures that will be taken during construction and operations to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels.

2.2 Scope

The EAP:

- Identifies responses to potential impacts;
- Ensure mitigation measures are implemented in a timely and effective manner; and,
- Describes how these requirements will be met.

The ESAP includes mitigation measures, monitoring, management, and an implementation schedule. This information is provided for operation of the mine, mill, tailings facility, man camp, and ancillary facilities. It includes mitigation and monitoring for:

- Air quality;
- Terrain;
- Soils;
- Permafrost and hydrogeology;
- Groundwater quality
- Surface water hydrology;
- Surface water quality;
- Vegetation;
- Fauna;
- Socio-economics;
- Indigenous peoples issues;
- Archeology;
- Health and safety;
- Spill prevention;
- Waste management;
- Reclamation and closure; and,
- Public consultation and disclosure.

2.3 Project Background

The Julietta mine site is located in the Omsukchan Region (raion) of the Magadan Oblast, Russian Federation. It is 190 km to the southwest of the village of Omsukchan and approximately 137 kilometers from the turnoff just east of Zharkiy.



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The land allotment is 67 hectares for the mine site and an additional 85.6 ha for the road access. The Julietta mining license has the following coordinates:

- 61°07' longitude 153°53' latitude
- 61°13' longitude 153°53' latitude
- 61°13' longitude 154°04' latitude
- 61°07' longitude 154°04' latitude

The Dukat Expedition, the Soviet exploration arm for the Omsukchan region that was subsequently privatized into the Dukat Mining and Geological Company (DMGC), discovered the Julietta mine in 1989 during a regional geological/geochemical expedition. From 1990 to 1993, DMGC continued to conduct investigations, complete reconnaissance, geophysical and geochemical surveys, and diamond drilling.

In 1994 DMGC and the Omsukchan Mining and Geological Company (OMGC) completed a geological and economic evaluation of the property. Based on the evaluation, a Declaration of Intent was completed and submitted by the Magadan Committee on the Environment (Oblkomekologiya). The Declaration of Intent is the first step in completing a Feasibility Study and Environmental Impact Assessment (known in Russian as a TEO and OVOS, respectively). DMGC became a shareholder in OMGC and OMGC continued to develop the project. The preliminary approval for the mine location was via decree by the Omsukchan Administration on June 7, 1994 (letter No. 149).

In 1995, it became necessary to look for a joint-venture partner to secure financing for the project. OMGC was reorganized to form a joint venture-type Closed Joint Stock Company (ZAO) with Arian Resources Limited (a Barbados corporation). A mining and development license, МАГ 01081 БР was issued to OMGC. The license expires on 12/31/2016. Due to world market conditions, Arian Resources Corp., the parent company of Arian Resources Ltd., was unable to secure financing to construct the project and in June 1998, Arian merged with Bema Gold Corporation, a Canadian public company. Currently, Bema Gold Corporation holds 79% of the shares of OMGC. Two Russian companies, DMGC (10%) and TOO Nedra (11%) hold the remaining shares.

In 1995, OMGC conducted additional deposit delineation and developed an investment level feasibility study that was approved at both the local and federal level (Conclusion Letter No. 15, January 20, 1997). The conclusions of the Moscow Expertiza required that OMGC complete an additional construction level feasibility and submit it to the Moscow Expertiza for approval.

The construction level feasibility was completed in the summer of 1997 and an Expertiza Committee was formed on June 2, 1997 (Order #251, Roskomekologiya). Review of the feasibility and EIA was completed and the project was approved on September 5, 1997 (Conclusions Letter No. 373).



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Based on the new economic realities of Russia, Bema Gold revisited the design of the project to minimize construction costs. Several changes were made to the design that not only reduced construction costs, but also made the project more environmentally friendly. This included:

- Change in ore milling process;
- Changes in design for the storage of tailings; and,
- Repair of existing road from Omsukchan to Julietta mine.

In September 1999, OMGC submitted a plan to the Regional Environmental Committee (Oblkomekologiya) updating the project design. As a condition of the Positive Conclusions received from Oblkomekologiya, OMGC was required to develop a detailed design report prior to commencement of operations. This report was submitted in September 2001 and was approved by the Magadan Ministry of Environmental Resources on September 10, 2001.

OMGC commenced construction in Spring 2000 and finished in Fall 2001. The mill began operating in October 2001. As part of normal operations, the Julietta mine site was required to prepare the following documentation:

Additionally, OMGC has submitted the following documentation as part of normal operations:

1. Detailed Engineering for the Tailings Facility: The Tailings Facility Detailed Engineering was submitted by VNII-1 on behalf of OMGC in 2000. This document was reviewed and approved by the Ministry of Environmental Resources (Conclusion No. 519/1 dated June 1, 2001) and the Sanitary and Epidemiological Committee (Conclusion No. 49 MTs.05.079.T.000020.10.01 dated October 1, 2001). Additionally, a regulatory committee was formed to visit and inspect the facility on July 31, 2001. This committee included a representative of OMGC (N.V. Gregorev), Gosgortekhnadzor (A.A. Selivanov), a representative for Promgidroteknika (S.I. Gorbov), and a representative from the engineering firm that completed the detailed engineering report, VNII-1 (T.I. Litovchenko). A positive conclusion was issued by Promgidroteknika in October 2001.

As part of operating a tailings facility in Russia, OMGC was required to complete a “Declaration of Safety” for the tailings facility. This document was completed and approved on October 1, 2001 by Gosgortekhnadzor. Additionally, OMGC completed and submitted the following documents:

- Safety Criteria for the Julietta Tailings Impoundment (2002);
- Safety Measures for the Julietta Tailings Impoundment (2002);
- Emergency Response Plan for the Julietta Tailings Impoundment (2003);



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- Registration of the Julietta Tailings Impoundment – Inv. #1567 (2001);
 - Monitoring Requirements for the Julietta Tailings Impoundment (2003); and,
 - Operating Instructions for the Julietta Tailings Impoundment (annually).
2. Submittal for review and approval of an expansion to the explosives storage area - the explosives storage area is located in the Bulat watershed basin. As part of the preparation for commencement of operations, it has been expanded to accommodate additional explosive material. The expansion was approved in May 2001 (Conclusion #13-ED, OAO Expert).
 3. Reagent Storage Project: The reagent storage project was submitted for approval in July 2002. It was approved by the Ministry of Environmental Resources (Conclusion No. 673/1 dated October 21, 2002), the Sanitary and Epidemiological Committee (Conclusion No. 49.MTs.18.660.T.000097.09.02 dated September 25, 2002), and the Fish and Game Committee (Letter No. 1450 dated August 8, 2002).
 4. Water Use and Wastewater Treatment Project: The Water Use and Wastewater Treatment Project was submitted on behalf of OMGC by VNII-1 in July 2001. It was approved by the Ministry of Environmental Resources (Conclusion 572/1 dated September 17, 2001 – Valid thru September 1, 2004), and the Sanitary and Epidemiological Committee (Conclusion No. 49.MTs.05.042.T.000013.09.01 dated September 3, 2001).
 5. Julietta Water Use License Application: The Julietta Water Use License was prepared and submitted on behalf of OMGC by VNII-1 on May 29, 2002. It was approved by Ministry of Environmental Resources (Conclusion No. 85 dated June 5, 2002 – Valid thru April 1, 2003), the Fish and Game Committee (Letter No. 732 dated May 20, 2002 – valid thru May 20, 2005), and the Sanitary and Epidemiological Committee (Conclusion No. 49.MTs.06.900.M.000198.05.02 dated May 16, 2002 – valid thru May 16, 2003). The approvals require the application to be updated prior to April 1, 2003.
 6. Julietta Project for Development of Maximum Allowable Air Pollution Emission Limits and Temporary Allowable Air Pollution Emission Limits: The Julietta Air Emission Limit Application was prepared on behalf of OMGC by VNII-1 in July 2002. It was approved by the Ministry of Environmental Resources (Registration No. III-113/1 on December 30, 2002 – valid thru July 1, 2007), and the Sanitary and Epidemiological Committee (Conclusion No. 49.MTs.06.660.T.000100.10.02 dated October 2, 2002 – valid thru July 1, 2007).



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7. Julietta Waste Generation and Management Project: The Julietta Waste Generation and Management Plant was prepared and submitted on behalf of OMGK by VNII-1 on December 26, 2002. It was approved by the Ministry of Fish and Game (Letter No. 50 dated January 10, 2003). It is still under review by the Ministry of Environmental Resources, the Sanitary and Epidemiological Committee and the Fish and Game Committee.

All of these approvals are provided in Appendix A.

2.4 Regulatory Audits

Additionally, as a normal part of operations, several regulatory audits have been completed by the various environmental regulatory entities. The 1st inspection to occur in 2002 was completed by the Omsukchan Environmental Committee in April 2002 of the Julietta Mine. The mine received a positive conclusion from the inspection. The only minor outstanding issues cited during the inspection include:

1. Results from wastewater treatment should be provided to the regulators for review. This should include an inlet and exit sample. OMGK collects samples on a monthly basis from inlet and exit and provides these results as part of the quarterly reporting requirements to the Magadan Environmental Committee. OMGK will ensure that the results are provided to Omsukchan Environmental Committee.
2. A warning system needs to be established for pressure loss in the tailings line that alerts the operators that a potential spill may have occurred due to tailings line break. OMGK has an operator that is trained to monitor the tailings facility conditions, to include the tailings line. OMGK is working with the regulators to ensure that they are satisfied with the monitoring of the tailings line.
3. An entire site wide monitoring plan needs to be established and provided to Omsukchan regulatory authorities prior to June 10, 2002. All monitoring is clearly stated in the permit applications that are under development by VNII-1. The Omsukchan regulatory agencies have an opportunity to comment on these reports prior to approval by the Magadan regulatory agencies.
4. Pollution payments for 1st quarter 2002 need to be developed. These payments have been calculated and paid in accordance with Russian legal requirements.

The second environmental inspection was completed by the Sanitary and Epidemiological Committee. They inspected the overall sanitary conditions of the site and provided the following comments:



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1. The concentration of hydrogen cyanide is above worker air quality limits based on Russian standards. OmgTK has attempted to rectify this problem by installing a large ventilation system near the leach tanks that remove HCN gases from the mill. Recent testing (January 2003) indicated that concentrations were significantly lower, but still in exceedance of the Russian worker air quality standard for HCN.

Additionally, the Sanitary and Epidemiological Committee has cited OmgTK as not in compliance with the Russian requirement to take samples of HCN concentrations in working areas no less than every 10 days. This is because the HCN monitor installed by OmgTK does not measure down to the Russian MAC for worker air quality (0.3 mg/m^3). OmgTK has installed a Western, state-of-the-art meter that can measure down to 1.0 mg/m^3 . A device that measures to lower concentrations has not been identified. Instead, OmgTK is attempting to certify the environmental staff at site to be able to take samples 1 time every 10 days and thus, comply with the Russian requirement.

2. Additionally, water quality samples were taken in accordance with the proposed monitoring plan. These samples included metals and bacteriological from the wells, tap at the mancamp, and tap at the mill. All samples were in compliance with Russian drinking water standards and World Bank Group (WBG) requirements.

The third environmental inspection of the year was completed by Magadan Gosgortekhnadzor. They completed an annual evaluation of the tailings facility and requested review of the monitoring plan, operation plan, and criteria for safety. All of these were provided to Gosgortekhnadzor and nothing further was heard regarding operation of the facility.

2.5 Independent Audits and Site Visits

Audits and site visits completed by IFC environmental specialists and outside, independent, environmental consultants. These visits include a visit by a senior IFC environmental specialist, an independent audit by SRK Consulting, and a site visit by AMEC Earth and Environmental. The results of these visits are provided in the following sections.

2.5.1 IFC Environmental Visit

A senior IFC environmental specialist visited the site in June 2001. During this time, the site was near the end of construction and ramping up to operations. The IFC specialist viewed all facets of construction and plans for operations, met with senior mine management, and visited with persons responsible for implementation of the project design documents.



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During this time, the IFC specialists made comments regarding:

- The need for a strong commitment to reclamation (especially interim reclamation);
- The need for a strong Health and Safety program that involved all affected persons and incorporated a strong commitment from the corporate office;
- The need for better surface water drainage management;
- The need to implement measures that ensured safe handling of cyanide, including transportation; and,
- The need for a strong tailings pond management strategy.

All of these issues were addressed by the site and corporate office and a description of the measures incorporated can be found in this ESAP and the attachments. The next site visit by an IFC environmental specialist is scheduled for September 2003.

2.5.2 SRK Audit

SRK visited the site in August 2002. Environmentally, a site inspection was completed with regards to environmental, health and safety. Environmentally, there were no major issues identified and health and safety was rated as adequate. The next site visit by SRK will occur in mid-2003.

2.5.3 AMEC Earth and Environmental

AMEC Earth and Environmental visited the site in August 2002 to assess operations at the tailings facility. Overall, there were no major flaws identified during the site visit. The following bullets summarize the recommendations provided by AMEC.

Flotation Pond

- Culvert intakes on spillway needed repair. This item has been completed.
- Tailings discharge points should be varied across the main dam on a minimum monthly basis to promote creation of a wide beach. This item has been completed. The mill does not move the tailings line as often as is recommended by AMEC but feels that the safety issues around moving the line in winter outweigh the potential issues created by not moving the line as often as recommended.
- The monthly survey pick-up of pond water levels should include survey of the tailings beach. This item has been completed.
- In winter months, tailings discharge lines should be extended to the end of beach to avoid ice entrapment and thereby extend the life of the facility. The mine site disagrees with this recommendation and has not implemented it.



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- Survey pick-up of water levels in winter months should indicate if ice surface or water surface was recorded. Water level is measured near the reclaim line and does not contain ice in the survey.
- Some suggestions were made with respect to safe access for field personnel to the pond during winter months. This item has been noted.

Cyanide Pond

- Remove cyanide drums/containers from pond. This item has been completed.
- Rack supporting pipe leading to submerged pump for cyanide pond evaporators should have protection placed between itself (angle iron constructed) and the liner. The evaporators and support system have been removed.

Diversion Ditches

- All diversion ditches should be surveyed. This item is complete.
- Diversion ditch on east side of Flotation Pond immediately north of Divider Dam at 90 degree corner has insufficient depth. This will likely result in overtopping of ditch and spilling of runoff water into flotation pond during the spring runoff. This area of shallow depth (~0.5m) should be rebuilt by exposing the liner on the pond side of the ditch, increasing the berm height to provide a minimum of 1m depth in the ditch and relaying and securing the liner up the side of and into the new berm. Reconstruction should be over a distance of ~10m upstream and ~25m downstream of the 90 degree corner. This item has been completed.
- If available, additional liner should be sourced for the downstream section of the new ditch alignment that has been constructed in loose material. Significant flows during the spring runoff are likely to aggressively erode the ditch and sideslope downstream of the current terminus of liner. As above, seepage has been observed adjacent to and downslope of the end of the lined portion of the ditch indicating this cross slope will likely experience sloughing and erosion. This seepage will also tend to migrate towards the drainage channel and sump downstream of the main dam. As contaminated water from the cyanide pond is being collected and pumped back from the sump, it is recommended that the ditch liner be extended downstream of the sump in order to reduce pump back requirements. This item has been completed.

Reclaim Lines

- It is understood that during winter months the existing tailings delivery lines carried excess water to prevent freezing resulting in additional requirements



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for reclaim and that this practice will be continued in the upcoming winter. It is further understood that two new Arctic (i.e. insulated) lines are to be installed this fall and that the intention was to use them as back-up should the existing lines freeze. It is recommended that the Arctic lines be utilized and the existing lines designated for back-up thereby reducing the additional water delivery and reclaim requirements. A system has been implemented (including arctic lines) that prevent line freeze-up.

3.0 Updated Project Description

As stated earlier, the Julietta project commenced operations in October 2001. The original description of the project was provided as part of the original Environmental Impact Assessment (EIA) submitted to the International Finance Corporation (IFC) in 1999. This section has been written as an update of the original process description, taking special note when the project description deviates from that submitted in 1999. Where possible, actual data has been used for 2001 and 2002 production periods.

3.1 Mine

The initial mine development was completed in accordance with the approved Julietta Mine Feasibility Study (1997) that was later amended by the updates provided to Gosgorteknadzor, the Ministry of Environmental Protection, and the Sanitary and Epidemiological Committee in 1999 and 2000. The mine is currently operating under the Phase 1 Julietta Mine Development Plan Submitted by OMGC in September 2002. Approvals by Gosgorteknadzor were provided in December 2002.

The majority of productive gold and silver formations are low-sulfide, quartz-carbonate and quartz veins, veinlet zones, and veinlets, arranged in six vein zones with northwest and sublatitudinal orientation of 200-1,800 m and widths ranging from a few meters to 50-80 m. Some veins (ore bodies) within the zones are 200-500 m long, 0.06-0.08 m to 1.5-2.5 m wide and up to 5-6 m wide. The mine is located primarily within the permafrost zone but a small portion is located within a water bearing zone. When mining the local water-bearing zone, it is anticipated that the maximum amount of water encountered will be 100 m³/day (4.2 m³/hr) but is anticipated to be closer to 75 m³/day (3.2 m³/hr). The water is collected at the 750 level in a sump. This water is pumped to the surface using a ETsV 10 pump via a 10.2 centimeter line. The water is discharged to a settling pond located below the waste rock pile near Magnitnyi Creek.

The underground mine is accessed through a new 850 main portal and haulage level located 60 meters to the south of the previous 850 level exploration drift portal. The new 850 level portal is the primary access point to the mine and the previous 850 level exploration drift is used as an exhaust airway and serves as the mine escapeway.



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A second portal has been driven between the new 850 portal and the previous 850 portal to house the main exhaust fans.

3.1.1 Drilling and Blasting

Drilling and blasting in the underground mine is conducted 7 days a week on two 10 hour shifts allowing 2 hours between shifts for shift change. Drilling is conducted during regular shift hours and blasting is done in between shifts.

A regular mining cycle includes:

- drilling holes;
- loading and blasting charges;
- ventilation of heading (stope);
- ensuring heading (stope) safety; and,
- load and haulage of broken ore.

During drilling, fresh water is added to reduce dust. This water is provided from the compressor building at a maximum flow rate of 21 m³/day (0.875 m³/hr).

The amount of blasting material used depends on how the round was drilled and the method of mining to be used. Explosive consumption has been estimated in Table 3.1.

Table 3.1. Explosive Consumption 2002-2006

Device	Year					TOTAL
	2002	2003	2004	2005	2006	
Number of rounds	2,748	3,719	3,364	820	0	10,651
Detonators (units)	66,998	75,017	62,839	17,206	0	222,060
Powder (kg)	133,478	118,793	42,303	8,508	0	303,082
Primers (units)	245,548	451,587	631,571	176,937	0	1,505,643
ANFO (kg)	136,355	291,741	352,429	109,450	0	889,975

3.1.2 Haulage

All broken ore and waste rock, and stope backfill is transported by self-propelled, rubber tired diesel equipment. The mucking fleet consists of two Wagner ST-3.5 scooptrams (2.68 m³), six MTI JCI-100 scooptrams (0.96m³), and four Wagner MT-416 mine trucks (7.5 m³). Additionally, there are three TC 35D4 tractors used to move within the mine, and two GD Minibore Jumbos.

All haulage is through the 850 level haulage drift, out the 850 portal. Ore is hauled to the mill apron stockpile where a wheeled loader feeds the ore to the mill crusher. Waste is hauled to the waste dump located at the 850 portal.



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To date, more than 150,000 tonnes of ore have been delivered to the mill for processing. Current estimates indicate that an additional 580,000 tonnes will be delivered to the mill for processing in 2003-2006.

3.1.3 Wasterock

Additionally, 209,400 tonnes of wasterock were produced in mine development up thru 2002. Current estimates indicate that an additional 23,375 tonnes of wasterock will be delivered to the wasterock pile located near the 850 portal in Magnitny Creek during mining along with low grade ore stockpiles. Table 3.2 shows the amount of wasterock and ore placed in low grade stockpiles. These numbers should be considered high because some of the wasterock will be utilized underground as backfill.

Table 3.2 Waste Rock and Ore Stockpiles

	Wasterock (tonne/yr)	Wasterock (m³/year)	Ore (tonne/yr)	Ore (m³/year)
Up thru 2001	160,000	58,182	11,000	4,000
2002	49,400	17,963	5,000	1,818
2003	23,375	8,500	8,500	3,090
2004	0	0	8,500	3,090
2005	0	0	8,500	3,090
2006	0	0	8,500	3,090
Total	232,775	84,645	8,500	3,090

The wasterock that has been generated consists of: andesite/tuft andesite (50%), diorite/riolite (15-20%), and dacite (20-25%).

3.1.4 Cake Backfill

Mined out areas will be backfilled to address mine pressure issues. In longhole and cut and fill mining, materials are placed after each cycle of operations to prevent regional ground movement. Currently, the mine uses, de-slimes, dewatered cake fill produced from flotation tails or wasterock.

Total amount of backfill produced between 2002-2006 is provided in Table 3.3.

Table 3.3. Backfill Production

	Backfill (tonne/yr)	Backfill (m³/year)¹
2002	124,130	45,974
2003	106,872	39,582
2004	106,872	39,582
2005	106,872	39,582
2006	106,872	39,582
Total	551,618	204,302

¹ Assumes a density of 2.7 tonne/m³.

3.1.5 Ventilation

The ventilation system proposed for the Julietta Gold mine is a dynamically changing system which advances as the mining levels are advanced, however the concept for the design remains the same over the life of the mine. The concept is for a negative pressure system, which consists of an intake circuit and an exhaust circuit that are connected to each other at each mining level. The primary ventilation fans are installed near the end of the exhaust circuit and pull fresh air in and along the intake circuit, through the regulators to the exhaust circuit and along the exhaust circuit to the fans where the air exits the mine. Adjusting the ventilation regulator at each mining level controls the quantity that is pulled to that mining level. Auxiliary ventilation fans, installed in the intake circuit just ahead of the active mining level, direct the fresh air into the mining level and to the working face via vent ducting. The contaminated air from the working area then returns along the mining level to the regulator on that level and is pulled into the exhaust circuit.

For the V-1 ore zone, the exhaust circuit includes the main exhaust fan installed at the 850 Portal that pulls the air into the main haulage from where it travels to the V-1 Incline and after traveling around the levels and raises (broken through with every level) and finally exhausts to the surface through the 850 exhaust fan. For the V-6 ore zone, the exhaust circuit includes the main exhaust fan installed at the 950 Portal that pulls the air into the main haulage from where it travels up the V-6 incline to the active levels and raises (broken through with every level) and finally exhausts to the surface through the 950 exhaust fan.

Both exhaust portals are equipped with an ALPHAIR Model 7200 VAX 2700 fan mounted in a bulkhead. The fans are internally, direct driven with a 75 kWatt, 1200 rpm, 3 phase motor.

3.1.6 Dust Suppression and Water Supply

During drilling, fresh water is added to reduce dust. This water is provided from the compressor building at a maximum flow rate of 36 m³/day (1.5 m³/hr). This water is supplied via a 254 mm diameter line that runs from the compressor building. Water supplied to the compressor building is provided by the main fresh water wells (Wells #7 and #8) located in the alluvium of Ozernyi Creek.

At the portals a heat exchange between the exhaust of two of the compressors is performed and heat elements are used to insure that the water will not freeze in the mine. The exhaust heat compressor is located in the compressor house near the main haulage portal. The water is re-circulated from the mine and the ramps and returned to the portal where it is reheated.



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3.1.7 Compressor Building

The needs for compressed air within the mine has been estimated at 119 m³/minute. This provided by the compressor building located near the opening of the 850 portal. The compressor station is equipped with 3 Ingersoll Rand rotary screw, single stage portable diesel compressors.

There is also a diesel fuel storage area near the compressor building used for fueling the compressors (3 m³/day) and underground equipment/surface equipment (averages 10 m³/day). The fuel tank is 67 m³ and gravity feeds the compressors and fueling nozzle located on the side of the compressor building. The tank is located within a lined, bermed area designed to hold more than 75 m³ of spilled material.

3.1.8 Mobile Equipment

Equipment with an internal combustion engine, that is available for use underground, is listed in Table 3.4.

Table 3.4. Underground Mobile Equipment

Equipment	Units at Site	Units per shift	Engine kW/unit
ST-3.5 Scooptram	2	2	138
MT-416 Mine Truck	4	3	138
JCI-100 Scooptram	6	5	37
Ford/New Holland TC35D4	3	3	35

3.1.9 Personnel

The mine operates 365 days per year with a crew rotational shift basis of 14 days work and 14 days rest. The underground crew works on two, 10-hour shifts per day, allowing 2 hours between shifts for blasting and shift change. The number of persons working on any shift, excluding expatriates, is approximately 60 persons.

3.2 Mill

The mill commenced operations in October 2001 and, since commencement of operations, has been making modifications to maximize production, environmental protection, and Health and Safety. In September 2002, Omgk prepared an amendment to the Mill Detail Design Criteria identifying the existing operations of the mill and highlighting reasons for modifying the original process. The amendment is entitled, “Julietta Mill – Modifications to the Mill Design Criteria (Ore Processing and Metal Recovery)”. The following sections highlight changes to the milling operations as they apply to environmental, health, and safety.



3.2.1 Throughput

The plant is currently operating at an average hourly throughput of 16.7 tonnes/hour mill feed and a maximum daily throughput of 450 tonnes/day. The maximum annual throughput that the mill can achieve is 145,000 tonnes per year (tpy). This assumes a slightly greater than 89% availability of the mill. The plant operates 365 days per year, 24 hours per day on two 12-hour shifts.

3.2.2 Process

The Julietta mill utilizes conventional two-stage crushing, single stage ball mill grinding, bulk sulfide froth flotation, flotation tailings backfill sand plant and slimes thickening/disposal, concentrate dewatering thickening, intensive concentrate cyanide leaching, single stage leach residue washing, two-stage drum filtration leach residue wash, primary cyanide neutralization, washed cyanide leach residue tailings disposal, secondary cyanide destruction, Merrill Crowe zinc precipitation, and zinc precipitate smelting unit processes for the production of a silver and gold doré metal from the precious metal bearing minerals contained in the Julietta ores. Gravity concentration and concentrate regrind circuits are available for utilization on any future ore types that require these unit operations for optimum metallurgical performance.

Figure 1 provides a simplified illustration of ore processing at the Julietta mill.

Figure 1. Process Flow Diagram

Process water can be provided from the tailings facility (recycle) and from the fresh water well located on the banks of Ozernyi Creek. In general, the mill uses 4.3 m³/hr make-up water. This can be delivered via a 7.62 cm line from the water wells or from a 10.16 cm HDPE line that recycles water from the primary tailings pond. Currently, the mill operates primarily on recycled water. The overall mill process water balance is provided in Figure 2.

Figure 2. Mill Process Water Balance

3.3 Tailings Impoundment

According to the present mine plan, the Julietta mine and mill facilities will be in operation for 5.5 years. A total of 800,000 tonnes of ore will be processed in that period at an average rate of 400 t/day (145,000 tonnes per year).

The mill produces two tailings streams:

- **Primary Tailings:** tailings from the flotation process contain mostly inert, non-acid generating, gangue minerals. The total annual estimated production is 26,600 tonnes (an average of 3.0 tonnes per hour solids) at a specific gravity of 2.65.

Primary mill tailings are transported to the primary tailings facility via a nominal 3-inch diameter HDPE pipeline and primary tailings reclaim water is transported back to the mill through a nominal 4-inch diameter HDPE pipeline. The piping system includes redundant 3-inch pipelines including one as a heat traced and insulated arctic pipeline.

- **Secondary Tailings:** tailings from the concentrate leaching process contain a significant amount of sulphides (mostly pyrite), cyanides, and thiocyanates. Prior to discharge to the impoundment, these tails undergo a treatment system - Metabisulphite Air (SO_2 -air).

Secondary tailings are transported to the secondary tailings facility via a nominal 2-inch diameter HDPE pipeline and secondary reclaim water is transported back to the mill through a nominal 1.5 to 2-inch diameter HDPE pipeline. The piping systems include redundant pipelines including one 1.5-inch heat traced and insulated arctic pipeline.

Each of the ponds is described in more detail in the following sections.

3.3.1 Primary Tailings Pond

At the beginning of 2002, the flotation tailings pond had more than 80,000 m³ of water. This was above the levels predicted in the Feasibility Study (22,000 m³). To prevent a potential problem, OMGC implemented the following long-term measures:

- Reduced the amount of freshwater necessary by constructing a reclaim line from the flotation pond;
- Reduced the slurry density of the tails by recycling more water than is needed in the plant and using part of the water simply as a dilution for tailings density.

The problem of excessive water in the primary pond was resolved by completing a one-time discharge (approved by the Magadan Environmental Committee Approval



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#17/1058, dated May 31, 2002) of almost 75,000 m³ of water. This discharge occurred during spring run-off of June 2002. After discharge, the volume of water in the flotation pond was approximately 60,000 m³. This corresponded to a pond elevation of approximately 806.7 meters.

Since that time, the mill has implemented the necessary changes to ensure that the water from the flotation pond can be used year round for mill process water. This has created a negative balance in the pond and allowed the minesite to investigate reductions in discharges from other permitted sources. This includes the proposed discharge of secondary tailings water and capture of water from the facility underdrain collection system (see Sections 3.3.2, 3.3.3, and 3.4).

Figure 3 shows the existing water balance at the primary pond and how it will operate for life-of-mine under current operational conditions. Input data for the primary pond water balance is provided in Appendix B.

3.3.2 Secondary Tailings Pond

At the beginning of 2002, the secondary tailings pond contained more than 18,500 m³ of water. This corresponds to an elevation of 812.8 meters (approximately 5 meters below the effective dam height). During the initial feasibility study, it was proposed to treat water (approximately 14,000 m³/year) on annual basis and discharge the treated water during the summer months. A secondary treatment facility (alkyl chlorination) has been constructed but, because the primary pond is running a negative water balance, it has been determined that the treated water can be discharged to the primary pond.

Additionally, the secondary pond has a closed loop, recirculation system designed to prevent the secondary tailing discharge line from freezing up.

Figure 4 shows the existing water balance for the secondary pond and how it will operate for life-of-mine under current operational conditions. Input data for the secondary pond water balance is provided in Appendix B.

Figure 3. Primary Tailings Pond Water Balance

Figure 4. Secondary Tailings Pond Water Balance

3.3.3 Underdrain Sump

In 2002, it was discovered that the piping system constructed under the liner to prevent pressure build-up during liner construction did not freeze as designed. In order to utilize the pipe, OMGK designed and implemented a underdrain catchment system (complete with recycle sump) to add an additional layer of protection to the tailings system. The sump is designed to capture any thaw and/or seepage from the liner and pump it to a treatment facility or the primary tailings impoundment. This system ensures secondary containment of the ponds and prevents suspended solids and salts from entering the environment. The sump is currently collecting water at a rate of 4.0 m³/hr. This water is either pumped to the secondary treatment plant or directly to the primary flotation pond.

3.4 Secondary Treatment Plant

During design of the secondary circuit for the Julietta mill, cyanicides (i.e. metals that interfere with the cyanide solubilization of gold and silver) were not fully quantified. Operations have incurred a significant increase in cyanide consumption over what was predicted due to the unexpected presence of cyanicides. The cyanide destruction circuit at Julietta is insufficient to adequately handle the significantly increased sodium cyanide concentrations in the feed to the destruction circuit that has been brought about by the processing of ores that contain unexpectedly high concentrations of based metal cyanicides. The original design criteria was based on a series of 11 cyanide destruction tests that treated a leached slurry with an average of 429 ppm CN_{total} with sodium metabisulfite, air, lime, and copper sulfate. The test program resulted in an average CN_{total} concentration in the treated slurry of 79 ppm with eight of the tests resulting in an average CN_{total} concentration of 6 ppm. Based on this testwork the treatment system was designed to reduce the CN_{total} concentrations going to the secondary pond to below 1 ppm.

During 2002, the sodium metabisulfite treatment system saw inlet concentrations of cyanide that were higher than those encountered during the test period. While the efficiency of the destruct circuit was significantly better than anticipated, the circuit is undersized to handle the amount of cyanide loading. Because of the undersized cyanide destruction plant, the current concentrations of cyanide entering the secondary tailings pond are well above the original design criteria of less than 1 mg/liter at approximately 700 mg/liter of CN_{total} and 1200 mg/liter CNS (thiocyanate).

In order to resolve the issue of high concentrations of cyanide and thiocyanate in the pond and prevent future build-up of these chemicals, the minesite has developed a secondary treatment system using alkyl chlorination. This treatment is currently operating and is treating the water already in the secondary pond. After secondary



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treatment, this water is discharged to the primary pond where it is recycled to the mill for using in processing.

3.5 Reagent Consumption and Storage

Based on reagents needed during processing, the following chemicals are used during milling of Julietta ore and decontamination of process mixtures (Table 3.5).

Table 3.5 Mill Reagent Consumption

Reagent	Actual ^A Consumption (kg/tonne ore)	Predicted ^B Consumption (tonne/yr)	Storage on site (tonnes)
Sodium Cyanide	2.3	0.550	144
Amyl Xanthate	0.05	0.100	7.3
Frother (MIBC)	0.024	0.012	3.5
Flotation reagent 3477	0.02	0.03	2.9
Anionic Flocculent	0.288	0.050	20.0
Lime	0.75	0.900	50
Sodium Metabisulfite	1.5	0.600	80
Lead Nitrate	0.08	0.005	11.7
Antiscalant	0.07	0.03	10.2
Zinc Powder	0.29	0.350	42.1
Diatomaceous Earth	0.12	0.100	17.4
Quartz sand	0.047	0.057	6.8
Borax	0.01	0.172	25
Sodium Carbonate	0.035	N/A	5.1
Potassium Nitrate	0.058	0.057	8.4
Calcium Hypochlorite	15.1	N/A	300.0
Total		1847.4	759.4

^A Based on 2002 operations.

^B Based on EAP issued December 1999.

The reagents are shipped to site in manufacturer's package - plastic sealed bags or metal drums. The packages are stocked in 20' or 40' sea containers - each reagent in a separate contained except for compatible cargos of small amounts. Upon arrival on site, the containers are placed at the storage area.

The reagent storage area consists of three areas that have a total of 1560 square meters. These areas include:

- a fenced area 16x10 meters located near the mill;
- an open area 70x12 meters located near the mill; and,
- an open area located near the alkyl chlorination plant.



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The fenced area located near the mill is designated exclusively for containers with cyanide. The maximum amount of cyanide that is to be stored on site is 144 tonnes.

The open storage area is located to the north from the fenced storage. It is designed for the storage of other reagents. The containers are placed in one row, wall to wall, doors facing the mill. Containers with the same reagent can be stacked by two. There are 18 types of reagents, the maximum allowed quantity for site storage is 315 tonnes, which can be housed in 32 containers. Normally different types of reagents are stored separately, in their shipping containers. Combined storage is allowed based on compatibility (similar classifications).

The hypochlorite reagent storage areas are provided in a 360 m² open pad, located on the leveled area, 10 m south of the cyanide water treatment plant and along side of the roadway running along the Western side of the secondary pond. The 360 m² reagent storage area is 12 containers stacked in one row; whereas, the roadside area provides space for two 20-ft shipping containers. The containers in the 360 m² area are stacked side by side with the doors facing east, toward the tailings impoundment and roadway with the tailings pipeline. The two-containers near the secondary pond run parallel to the roadway with doors facing towards each other allowing space between them to open the doors and extract the contents.

3.6 Explosive Storage

There is a explosives magazine located 2 km from the site. The permit № 5 of 05/06/02 issued by the Magadan Internal Affairs Office, allows for the storage of up to 146,040 kg or a 6-month stock of explosives in the magazine. Explosives will be delivered to the main haulage portal on a Ford-350 that meets explosives transport requirements.

The ANFO blend unit is used for on-site ANFO production, thus allowing to reduce amount of explosives to be purchased, transported and stored. The average ANFO consumption is expected to be 60-64 tpy (60 t ammonium nitrate and 4 t fuel oil) tonnes annually.

3.7 Fuel Storage

There are four separate fuel storage areas at the Julietta site. They include:

- Mill fuel storage area;
- Mine fuel storage area;
- Mancamp fuel storage area; and,
- Garage fuel storage area.



Mill fuel storage area

The mill fuel storage area consists of 3 tanks, all designed to contain diesel fuel. Two of the fuel tanks have a volume of 1,000 m³ each and are contained in a lined and bermed storage area designed to control 110% of the volume of one of the tanks. These tanks are located immediately west of the repair shop and feed the mill via gravity feed. The third tank has a volume of 75 m³ and is located on a terrace above the two fuel tanks. The tank gravity feeds to the two larger diesel tanks. This area is bermed and lined.

Fueling of the tanks is completed using 2- Viking pumps that are designed to operate in cold weather. Fueling of diesel vehicles is completed at cement, bermed area that is gravity fed from the tanks. The area also has a 1 m³ sump designed to catch any spillage during fueling of vehicles.

Mine fuel storage area

The mine fuel storage area consists of 1 tank that contains diesel fuel. The tank has a volume of 67 m³ and is in a lined and bermed area designed to contain 110% volume of the tank. The tank is located uphill from the compressor building and feeds the compressor building and fuel pumping station via gravity.

Mancamp fuel storage area

A new fuel storage area has been installed at the mancamp approximately 20 meters north of the mancamp on the terrace constructed for the mancamp. The tank has a volume of 50 m³ and is located in a lined and bermed area designed to contain 110% volume of the tank. This tank gravity feeds to the mancamp. Currently, this tank is filled by the site fuel truck. It is anticipated that a pump will be installed to fuel directly from the fuel trucks coming from Magadan.

Garage fuel storage area

There are two areas for fuel storage at the garage. The first area is located immediately behind the garage (west of the garage) and has a 25 m³ tank that holds kerosene. This tank is located in a lined and bermed area designed to contain 110% of the total tank volume.

The other area is a gasoline storage area located approximately 50 meters east of the garage on the lower terrace of the storage area. There are 3-2000 liter tanks that are located in a bermed and lined area designed to contain 110% volume of 1 tank. Fuel is dispensed using gravity feed and a fuel nozzle. These tanks are used primarily for smaller equipment on site such as chainsaws and the few vehicles that require gasoline.

3.8 Cake Backfill Building

Backfill cake, which is produced for the mine is produced in a building adjacent to the mill. On average, 38.5% of total flotation tailings will be used as backfill in the mine. Flotation tailings at 25 percent solids will be pumped to four 100 mm cyclones, underflow of which is directed to the disc vacuum-filter. This cake is conveyed to the cake building where cement is added. Cake will be stored in a storage facility and trucked to the mine to be used as backfill, when necessary.

The current estimates for backfill production are approximately 106,000 tonnes per year. This backfill is transported to the mine and stored in a temporary storage pile located near the 850 portal opening. It is anticipated that this storage pile will never contain more than 15,000 m³ of material at any one time.

3.9 Mancamp

The mancamp contains four separate wings connected by a long corridor. There are enough living accommodations for 180 persons. Additionally, there is a medical center, an entertainment area, laundry services, and a kitchen facility.

The mancamp is heated by a Hydrotherm Multitemp boiler (3 units) and Furnage heaters (30 units). The total fuel consumption for these units is approximately 29 kg/hour a maximum of 19 tonnes per year.

The fuel for the heating system at the mancamp is diesel fuel. This fuel is provided by a fuel storage tank that gravity feeds the mancamp. This fuel tank is located east of the mancamp in a lined and bermed area (see Section 2.8).

Water use at the mancamp is not measured. It has been estimated in accordance with Russian guidelines (SNiP 2.04.01-85) at 32.8 m³/day (16,425 m³/year). This water is delivered to the mancamp by a 7.62 cm line from the fresh water wells (Wells #7 and #8) located 250 meters away from the camp in Ozernyi Creek.

Grey and Black water from the mancamp (including water from the kitchen and laundry facilities) report to the sewage treatment plant located 30 meters from the mancamp.

Solid wastes generated from the mancamp include foodstuffs and other domestic wastes. These wastes are collected in a trash bin near the mancamp and dumped, as needed, at the landfill located adjacent to the tailings impoundment. Wastes generation (including other administrative support facilities) is estimated to be approximately 38.3 tonnes annually.



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3.10 Sewage Treatment

The sewage treatment receives sewage from 3 lift stations located at the portal building, the mill, and the mancamp. All pipelines containing sewage are contained within an insulated 400x400 meter pipe box. The total maximum amount of sewage processed by the sewage treatment plant is 45 m³/day (16,425 m³/year). This water is processed thru an aerobic tank, an anaerobic tank, a rotary biological contactor, a settling tank, and finally a polishing tank (where chlorine is added). The treated water is discharged into Magnitny Creek.

3.11 Fresh Water

The site freshwater wells are located within the talic zone in Ozernyi Creek and are drilled to 70 meters. The company has a license to operate these wells (MAG no. 01282 BE). The freshwater system consists of two wells (No. 7 and No. 8. Each well has a Russian pump (ETsV) that is capable of pumping 30 m³/hour (720 m³/day). The wells are located 5 meters apart in separate buildings. The wells are heated and have lights year round. The wells are operated in accordance with the Russian requirements found in GOST 2761-84. The water quality complies with SanPiN 2.1.4.559-96 and World Health Organization Standards and is sampled regularly by the Sanitary and Epidemiological Inspectors.

3.12 Landfill

The site landfill is located south of the tailings facility. It consists of open trenches that are to be backfilled with trash and covered with topsoil after they are full. The landfill also has a scrap metal pile, lined hazardous material area (approximately 30 m³), a container for batteries and mercury lamps, and a lined area for temporary storage of used lubricants.

3.13 Site Water Consumption

Julietta water use is based on maximizing use of recycled water and minimizing fresh water input. The following sections identify water consumption needs throughout the Julietta minesite.

3.13.1 Domestic Water Consumption

To date, domestic water consumption is not measured. All figures are based on Russian guidelines (SNiP 2.04.01-85 “Internal water flow and sewage piping for buildings”) and represent average conditions.

Domestic water is needed at the following facilities:

- Mill production, offices, and sanitary facilities;
- Mill laboratory;
- Offices and sanitary needs at the portal building;
- Offices at repair shop; and,
- Mancamp to include laundry and sanitary facilities.

The estimates include the number of persons, number of facilities, and regulatory guidelines. The total amount of fresh water needed for domestic water related activities are estimated at 16,425 m³/year. (see Table 3.6). All fresh water is provided by the wells located within the talik zone of Ozerny Creek.

Table 3.6. Estimated Average Domestic Water Consumption

Facility	Water Consumption		SNiP 2.04.01-85		Consumption	
	Units	Value	Units	Value	m ³ /day	m ³ /yr
Mill						2533
Main Mill Area	Persons	10	l/day	16	0.16	58
Laboratory	Persons	3	l/day	460	1.38	504
Mill Offices	Person	25	l/day	16	0.4	146
Mill Showers	Showers	10	l/day*shower	500	5	1825
Ancillary Facilities						1913
Portal Building	Persons	5	l/day	16	0.08	29
Offices	Persons	10	l/day*shower	500	5	1825
Showers	Showers	10	l/day	16	0.16	58
Offices in Repair Shop	Persons	10	l/day	16	0.16	58
Mancamp						11432
Living Area	Persons	180	l/day	85	15.3	5585
Laundry	Kg/day	60	l/kg	75	4.5	1643
Kitchen	Meals/day *person	4	l/dish	16	11.52	4205
Safety factor (3.5%)					1.5	548
Total					45.00	16425

3.13.2 Site Process Water

In addition to the water needed in mill processing (Section 3.2.3), the site requires process water for the following activities:

- Dust control during drilling and mining activities;
- Mill laboratory;
- Vehicle washing at the repair shop; and,
- Road watering.

Table 3.7 lists the estimated consumption requirements for site process water.

Table 3.7. Estimated Site Process Water Consumption

Facility	Consumption factors		Consumption	
	Units	Value	m ³ /day	m ³ /yr
Mine				13,140
Dust Suppression	Drills	1.5	36	13,140
Mill				47
Laboratory	Tables	1	0.13	47
Truck wash (1 time per week)	Vehicles	9	1.98	103
Road watering (120 days/yr)	ha	2	8	4545
Safety factor, 3.5%				624
Total				18,459

The overall site water balance is provided in Figure 5.

Figure 5. Julietta Site Water Balance

4.0 Environmental, Social, Health, and Safety Impacts

The Julietta Project is a Category “A” project under World Bank Group Guidelines. It is considered by IFC to be a project that may have diverse and significant environmental impacts. Environmental, social, health, and safety impacts were estimated in the original Environmental and Social Impact Assessment (ESIA), 1999. The ESIA included an assessment the following main types of impacts:

- Air quality (updated);
- Terrain (updated);
- Soils (updated);
- Permafrost and hydrogeology (unchanged);
- Groundwater quality (unchanged);
- Surface water hydrology (unchanged);
- Surface water quality (updated);
- Vegetation (unchanged);
- Fauna (unchanged);
- Aesthetics and visual resources (unchanged);
- Noise and vibration (unchanged);
- Socio-economics (updated);
- Archeology (unchanged); and,
- Wildlife preserves (unchanged).

These impacts were evaluated for processes that occur during construction and operations. The following sections updates impacts that have been estimated based on the “as built” operation of the facility. This section only includes impacts that have been updated since the original ESIA. Section 5 includes a description of the mitigation and monitoring that is on-going at the site to mitigate potential impacts to reduce them to acceptable levels.

4.1 Air Quality

The air pollution emission inventory for the Julietta Mine Site contains 24 emission sources. Of the 24 sources, 17 sources are considered point sources (those that can reasonably be emitted thru a stack or vent) and 6 area sources.

All of the emission sources listed in the emission inventory are provided in Appendix C. These emission sources are scattered around the site and include sources at the mine, mill, powerhouse, compressor building, garage, and mancamp. Total emissions from the site have been calculated to be 270 tonnes per year. Of this total, almost 98% of the emissions are of the following pollutants: NO₂, NO, Soot, TSP, SO₂, CO,



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and hydrocarbons. A full listing of the 33 pollutants that have been listed in the emission inventory is provided in Appendix C.

The single, largest calculated emission source at the site is the powerhouse. Emissions from this source include: NO₂ (44 tonnes/year or 80.5% of the total site emissions), NO (67.4 tonnes per year or 99% of the total site emissions), Soot (22 tonnes per year or 95.2% of the total site emissions), SO₂ (12.2 tonnes or 77.7% of the total site emissions), CO (57 tonnes per year or 81.2% of the total site emissions), and Hydrocarbons (9 tonnes per year or 52.3% of the total site emissions).

The calculated emissions are more than 4 times higher than those calculated using Western methodologies. The minesite is not required to conduct in-stack air pollution sampling due to the lack of equipment for conducting this monitoring in Russia.

4.2 Land Disturbance

The impacts associated with land disturbance include both direct and indirect impacts. Direct impacts include:

- Changes in topography;
- Removal of vegetation and soil cover;
- Reduction in surface water quality; and,
- Changes to hydrobiological indicators.

These changes will last the duration of the project, approximately 8 years.

Indirect impacts include impacts that can occur when direct impacts are not mitigated. They include:

- Wind and water erosion; and,
- Chemical leaching.

The zone of impacts will be confined to the watershed basins directly at the site (primarily Jugajaka and Magnitny) and can last in excess of 20 years without proper mitigation measures. Impacts to topography and land disturbance can also impact flora, fauna and surface water quality.

After construction (2001), the overall minesite land disturbance was approximately 86 ha. More than 85% (73.8 ha) of this area was disturbed prior to the ESIA (1999). OMGC maximized used areas with previous land disturbance and facilities. Additional land disturbance that occurred includes:

- Expansion of mine portal area: 0.2 ha;
- Waste rock area: 0.5 ha
- Expansion of explosive storage area: 2.8 ha;

- Tailings and water lines: 3.0 ha;
- Additional electric lines and substations: 0.5 ha;
- Internal roads: 4.8 ha; and,
- New mancamp: 0.4 ha.
- Total new disturbance: 12.2 ha.

This is significantly less than the 23 ha that was proposed in the ESIA.

Additionally, OMGK commenced interim reclamation during 2002. The 1st area to be reclaimed was the area of the old mancamp. This included a total of 9 ha.

Reclamation measures included removal of existing structures, re-grading of the topography, and placement of an ameliorating agent to promote natural revegetation. This was in compliance with the requirements set forth by the Omsukchan Land Use Committee. This land was returned to the Omsukchan Region in Fall 2002. OMGK will continue to monitor this area over the course of the mine life.

The overall land disturbance at the site is provided in Table 4.1.

Table 4.1 Land Disturbance at the Julietta Mine Site

Period	Disturbance (ha)
Prior to construction (<2000)	73.8
Construction (2000-2001)	12.2
Interim Reclamation (2002)	(9.0)
Current Land Disturbance	77

4.3 Soil Impacts

Impacts to physical characteristics of soil during construction, salvaging and stockpiling will include compaction, soil structure loss, increased core fragment content due to mixing. Soil loss may be induced through transportation and erosion. Increased soil runoff may occur due to decreased infiltration and reductions in permeability.



4.3.1 Acid Rock Drainage

Approximately 209,400 tonnes of wasterock were produced in mine development up thru 2002. Current estimates indicate that an additional 23,375 tonnes of wasterock will be delivered to the wasterock pile located near the 850 portal in Magnitny Creek during mining along with low grade ore stockpiles. Table 4.2 shows the amount of wasterock and ore placed in low grade stockpiles. These numbers should be considered high because some of the wasterock will be utilized underground as backfill.

Table 4.2 Waste Rock and Ore Stockpiles

	Wasterock (tonne/yr)	Wasterock (m³/year)	Ore (tonne/yr)	Ore (m³/year)
Up thru 2001 ^A	160,000	58,182	11,000	4,000
2002	49,400	17,963	5,000	1,818
2003	23,375	8,500	8,500	3,090
2004	0	0	8,500	3,090
2005	0	0	8,500	3,090
2006	0	0	8,500	3,090
Total	232,775	84,645	8,500	3,090

^ABased on operational data

The wasterock that has been generated consists of: andesite/tuft andesite (50%), diorite/riolite (15-20%), and dacite (20-25%).

More than 35 samples have been taken to date to determine the potential to generate acid from the wasterock and low-grade ore stockpiles. A full listing of ABA testing results are provided in Appendix D. Of the material placed in the stockpiles, only andesite/tuff andesite has shown the potential to generate acid.

The relatively small amounts of waste rock, regional climatic conditions (negative annual temperature), and the opportunity to take preventative measures during operations should prevent any impacts to the aquatic environment from acid rock drainage.

Additionally, the tails that report to the cyanide tailings pond are expected to be potentially acid generating. These tails will be located in a lined storage facility and will not impact the environment. Nonetheless, potential impacts can potentially occur after operations during reclamation and closure. If appropriate measures are not taken to ensure that the acid generating tails are covered, the tails have the potential to have long-term impacts on the surface water streams and success of the reclamation plan.

4.4 Surface Water Quality Impacts

Surface water quality impacts were predicted using a Russian mixing model (Zerkalo++) with input parameters “ground truthed” at the Julietta Mine Site. The mixing point is calculated to be 500 meters below the last discharge point in Ozerny Creek. This point is the compliance point for all site discharges. River flows were calculated using the average minimal monthly flow (95th probability) for Ozerny Creek. This translated to a volumetric flow rate of 0.26 m³/sec (0.173 m/sec).

There are currently 3 surface water discharges at the Julietta Mine Site. These include:

1. mine water;
2. Wastewater treatment plant; and,
3. Surface water run-off near the tailings impoundment.

All discharges are considered to be a maximum during dilution calculations and are assumed to be additive to the stream loading. Additionally, consideration was given to the potential for several groups of pollutants to create an adverse impact due to synergistic characteristics.

All three discharges are described in greater detail below. All of these discharges are monitored as part of the Water Use License (see Section 3.3(5)) issued by the Magadan Environmental Committee.

4.4.1 Mine Water Discharge

During drilling in the mine, fresh water is added to reduce dust. This water is provided from the compressor building at a maximum flow rate of 36 m³/day (1.5 m³/hr). Additionally, an additional 100 m³/day (on average) is pumped from the mine during mining of the lower levels. The total actual discharge is 3.5 times the amount used in the dilution calculation (40 m³/day). The original calculation was based on preliminary data collected at the mine about the amount of water to be discharged.

All of this water collects in a sump, is pumped out of the mine and discharged into a settlement pond that is below the wasterock piles near Magnitny Creek. From the settlement pond, the water infiltrates into Magnitny Creek.

The Maximum Allowable Discharge (MAD) from the mine that was calculated to still show compliance in Ozerny is provided in Table 4.3.



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Table 4.3 MAD for Mine Water Discharge

Parameter	Russian Req. ¹ (mg/l)	Russian Req. ² (g/hr)	WBG Req. ³ (mg/l)	WBG Req. (g/hr)
Suspended Solids (TSS)	100	166.67	50	83.33
Petroleum Products	0.1	0.17	20	33.32
Ammonia, NH ₄ ⁺ (N)	0.5	0.83	-	-
Nitrites, NO ₂ ⁻ (N)	0.06	0.10	-	-
Nitrates, NO ₃ ⁻ (N)	15	25	-	-
Chlorides, Cl ⁻	50	83.33	-	-
Sulfates, SO ₄ ⁻	65	108.33	-	-
Copper, Cu	0.05	0.08	0.3	0.50
Zinc, Zn	0.02	0.03	1	1.66
Lead, Pb	0.01	0.02	0.6	1.00
Iron _{Tot} , Fe	0.1	0.17	2	3.33
Manganese, Mn	0.05	0.08	-	-
Strontium, Sr	0.05	0.08	-	-
Chromium, Cr ³⁺	0.1	0.17	1.0 ⁴	1.66
Nickel, Ni	0.01	0.02	0.5	0.83
Cobalt, Co	0.01	0.02	-	-
Total Mineralization	450	750	-	-

¹ Julietta Water Use License. Approved MER, Conclusion No. 85 dated June 5, 2002

²Based on discharge rate of 40 m³/day

³WBG guidelines for Mining and Milling, 1995

⁴PPAH Guideline is for hexavalent chromium

In 2002, the mine, intermittently, commenced discharging underground water. The water was initially high in the following parameters: petroleum products, ammonium, sulfates, nitrates, nitrites, zinc, lead, and strontium. While this water was in compliance with WBG requirements, it did not always comply with Russian requirements. This is due to the extremely stringent discharge limits set because of the modelling criteria. Despite these exceedances, there was only one consistent exceedance of Russian water quality standards at the compliance point. The exceedance was for petroleum products.

In 2002, the minewater discharge met all WBG guidelines for effluent streams at Mining and Milling.

A complete summary of the water quality results can be found in Appendix E.

4.4.2 WWTP Discharge

The total maximum amount of sewage processed by the sewage treatment plant is 45 m³/day (16,425 m³/year). This water is processed thru an aerobic tank, an anaerobic tank, a rotary biological contactor, a settling tank, and finally a polishing tank (where chlorine is added). The treated water is discharged into Magnitny Creek.



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The Maximum Allowable Discharge (MAD) from the WWTP that was calculated to still show compliance in Ozerny is provided in Table 4.4.

Table 4.4 MAD for WWTP

Parameter	Russian Req. ¹ (mg/l)	Russian Req. ² (g/hr)	WBG Req. ³ (mg/l)	WBG Req. (g/hr)
Suspended Solids (TSS)	50	83	50	83
Petroleum Products	0.2	0.33	10	16.67
Detergents	0.5	0.83	-	-
Ammonia, NH ₄ ⁺ (N)	4	6.64	10	16.67
Nitrites, NO ₂ ⁻ (N)	2	3.32	-	-
Nitrates, NO ₃ ⁻ (N)	30	49.8	-	-
Chlorides, Cl ⁻	50	83	-	-
Sulfates, SO ₄ ⁻	90	149.4	-	-
Copper, Cu	0.03	0.05	0.5	0.83
Zinc, Zn	0.05	0.083	2.0	3.32
Lead, Pb	0.03	0.05	0.1	0.17
Iron _{Tot} , Fe	0.3	0.5	3.5	5.83
Manganese, Mn	0.05	0.083	-	-
Chromium, Cr ₃₊	-	-	0.5 ⁴	0.83
Nickel, Ni	-	-	0.5	0.83
Cobalt, Co	-	-	-	-
Total Mineralization	390	649.74	-	-

¹ Julietta Water Use License. Approved MER, Conclusion No. 85 dated June 5, 2002

²Based on discharge rate of 40 m³/day

³PPAH, 1998, General Environmental Guidelines

⁴PPAH Guideline is for total chromium

In 2002, the WWTP discharge did not consistently meet the Russian requirements for the following parameters: suspended solids, petroleum products, ammonium, sulfates, and phosphates. This is due to the extremely stringent discharge limits set because of the modelling criteria. Despite these exceedances, there was only one consistent exceedance of Russian water quality standards at the compliance point. The exceedance was for petroleum products.

In 2002, the minewater discharge met all WBG limits for domestic sewage except for suspended solids. OMGC is actively investigating problems with the WWTP and believes that the discharge will comply with all WBG limits in 2003. One issue that needs to be resolved is the capacity of the WWTP. The WWTP was oversized to treat wastes generated by 180 persons. Currently, the camp is averaging around 185 persons at the camp.

A complete summary of the water quality results can be found in Appendix E.



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4.4.3 Tailings Water Discharge

The Julietta Water Use and Discharge License allows for an annual discharge of treated water from the secondary tailings pond. The average allowable discharge rate is 5.56 m³/hr during the summer months (16,000 m³/yr). The Julietta mine has never discharged water from the secondary pond. The current operational plan is to treat the water and discharge to the primary pond. OMGC must update the Water Use and Discharge License in 2003 and this discharge will be dropped from the application.

4.4.4 Surface Water Run-off

The primary surface water run-off occurs near the tailings facility. This area has a system of diversion ditches that are lined to prevent water seepage into the tailings impoundment. The estimated maximum discharge from the diversion ditch is 1.27 m³/hr. The estimated annual discharge from the diversion ditch is 3630 m³.

The Maximum Allowable Discharge (MAD) from the diversion ditch that was calculated to still show compliance in Ozerny is provided in Table 4.5.

Table 4.5 MAD for Tailings Pond Diversion Ditch

Parameter	Russian Req. ¹ (mg/l)	Russian Req. ² (g/hr)	WBG Req. ³ (mg/l)	WBG Req. (g/hr)
Suspended Solids (TSS)	50	63.5	50	63.5
Petroleum Products	0.2	0.25	10	12.7
Detergents	0.5	0.83	-	-
Ammonia, NH ₄ ⁺ (N)	0.4	0.51	10	12.7
Nitrites, NO ₂ ⁻ (N)	14	17.78	-	-
Nitrates, NO ₃ ⁻ (N)	0.5	0.64	-	-
Chlorides, Cl ⁻	5	6.35	-	-
Sulfates, SO ₄ ⁻	40	50.8	-	-
Copper, Cu	0.01	0.01	0.5	0.64
Zinc, Zn	0.01	0.01	2.0	2.54
Lead, Pb	0.01	0.01	0.1	0.13
Iron _{Tot} , Fe	0.1	0.13	3.5	1.45
Manganese, Mn	0.01	0.01	-	-
Chromium, Cr ³⁺	-	-	0.5 ⁴	0.64
Nickel, Ni	-	-	0.5	0.64
Cobalt, Co	-	-	-	-
Total Mineralization	200	254	-	-

¹ Julietta Water Use License. Approved MER, Conclusion No. 85 dated June 5, 2002

² Based on discharge rate of 1.27 m³/hr

³ PPAH, 1998, General Environmental Guidelines

⁴ PPAH Guideline is for total chromium

In 2002, the diversion ditch discharge consistently did not meet the Russian requirements for the following parameters: total mineralization, ammonium, and



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manganese. Despite these exceedances, there was only one consistent exceedance of Russian water quality standards at the compliance point (petroleum products).

In 2002, the minewater discharge met all WBG limits for surface water run-off. A complete summary of the water quality results can be found in Appendix E.

4.5 Socioeconomic Impacts

During development of the initial ESIA (1999), the socio-economic situation with the Omsukchan Region and Magadan Oblast was in a serious state of decline. Every major economical indicator showed deteriorating results when compared with earlier years. The cost of living was dramatically increasing and inflation was near double digits. The situation continued to decline in 2000, but began to improve in 2001. The overall social impacts of the Julietta mine were expected to be positive for the region and this has become reality.

For the first time since 1988, the migration away from the Omsukchan Region ceased and people are returning to the area in search of jobs. In 1988 there were more than 19,000 persons within the region. This number had dwindled to 8,800 persons in 2000 and then stabilized at around 8,000. Discussions with the Omsukchan Administration indicated that the migration of people to Omsukchan was actually a positive number in 2002 (data not available). This is primarily due to the opening of three mining operations within the region: Lunoye, Dukat, and Julietta.

Lunoye, Dukat, and Julietta contributed almost 70% of all taxes collected by the region. In 2002, the total amount received by the local government from businesses located within the region was 121,300,000 Rubles. Of this amount, OMGC paid nearly 40% (approximately 48 million rubles).

Because of three mines within the region, unemployment/underemployment has been drastically reduced. Of the approximately 8,000 inhabitants of the region, more than 1,400 persons are directly employed by the mining industry. The region has actually experienced a shortage of skilled labor in the mining industry and has begun to recruit from other areas. Julietta has a total of 340 employees. Eighty of these employees are from the Omsukchan region. The number would be significantly higher but most employees, when hired in Omsukchan, move their family to Magadan due to the quality of life in Magadan versus Omsukchan.

Julietta pays 2-3 times higher salary than average salary in the mining industry in Omsukchan. This has caused the overall wage rate to increase 18% in 2002. When compared against the inflation index, the overall wage rate increased 16%.



4.5.1 Indigenous Persons

There are currently 384 persons listed as indigenous persons within the Omsukchan Region. This is much less than the 420 persons listed in 1999. This is primarily due to the fact that a large number of indigenous persons have not received their new Russian passport and, therefore, cannot be officially classified by nationality. The administration liaison with the local indigenous groups states that the migration of indigenous persons within the region has actually been positive with 4 births in 2002 and 8 indigenous persons moving into the region.

Of the 384 persons classified as indigenous persons, 184 are between 18-55 years old. Of these, more than 72% (133 persons) at various enterprises within the region. Women make up more than 54% of the working force (100 persons) but have a slightly lower employment rate than the males (65% employment for women versus 80% employment for males). Of the 133 persons employed, 29 persons are employed by the mining industry. This includes: Julietta (4), Dukat (11) and, Lunoye (14). Of the 4 indigenous persons (average) that work at Julietta, all of them have been males. OMGC is currently investigating ways to find the opportunities at site to hire indigenous women. This includes persons working with the catering and cleaning crews.

Of the 133 employed, only 30 persons are still working in traditional occupations held by indigenous persons (hunting and fishing). Additionally, there is no reindeer herding currently occurring within the region.

Because most indigenous persons were educated in hunting and reindeer herding, they are not receiving opportunities within organizations as “skilled labor”. The Omsukchan Administration set up a program in 2002 to train local indigenous persons for more skilled positions. In 2002, the Administration set aside 381,000 rubles to help pay for tuition, room, and board at any institute within Russia for indigenous persons. Five persons entered the program but all but one has quit and returned to Omsukchan. Of the 381,000 rubles that were set aside, only 151,000 rubles were used.

Additionally, as part of the IFC Technical Assistance Program (see Section 5.5.2), IFC is looking at ways to train and find employment for the indigenous population.

In 2003, the Administration has increased the amount of money earmarked for indigenous persons issues 590,000 rubles. This includes money to help with training, pay for medicine, complete housing renovations, and treat those with substance abuse problems.

4.5.2 IFC Technical Assistance Program

As part of IFC’s commitment to the project, a Technical Assistance Program is under development for the region. This TA Program will identify a select group of



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enterprises (mostly Small to Medium Enterprises - SMEs) in the region and offer them tailored technical assistance with the objective to become long-term suppliers to the silver and gold mines in Magadan. Alongside focused enterprise-level work, the Project will run a policy group, which will identify obstacles to effective company operations in the region and seek to resolve them with the local government bodies.

IFC has set up an office in Magadan and hired a senior-level person to organize the work and begin meeting with local businesses. The senior level person has hired most of the office staff.

4.5.3 Public Consultation and Disclosure

OMGC has continued to maintain strong public consultation and disclosure thru construction and into operations. This includes on-going consultation thru:

- Public meetings and announcements in Omsukchan and Magadan;
- Frequent press releases regarding the project;
- On-going correspondence with local NGO's; and,
- On-going interaction with the indigenous population in Omsukchan.

Each of these activities is described in brief detail in the following sections and expanded upon in Attachment 4 – Public Consultation and Disclosure Plan.

Public Meetings

The most recent public meeting conducted by OMGC occurred in February 2003 in Omsukchan. The meeting was attended by more than 50 local stakeholders and additional government representatives. During the meeting the following presentations were made:

- Mr. N.N. Shadrin (Head of Omsukchan Region): Introductions;
- Mr. N.V. Gregorev (Dep. General Director, OMGC): Mine Description and Exploration Activities;
- Mr. B.A. Pavlov (Head Environmental Staff- OMGC): Environmental Activities at the Julietta Mine for 2002.

Additionally, a report on the environment was given to all who attended. After the presentations, the meeting was opened up for questions. The following questions were answered by OMGC:

Q1: Did OMGC pay any environmental fines in 2002?

A1: (B. Pavlov): OMGC **did not** incur any environmental fines in 2002. OMGC did make pollution payments as required under Russian law in the amount of 93,000 rubles for air pollution, water pollution, and solid waste disposal.

Q2: Has the mine fixed the ventilation problems in the mill?



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- A2: (N. Gregorev): The mill continues to have exceedances of the Russian Sanitary and Epidemiological Air Quality Working Standard in the mill of 0.3 mg/m³ of HCN gas. The exceedances occur primarily in the area near the cyanide reagent mixing tank. OMGC installed a large fan in the mill to exhaust this gas and reduce concentrations of HCN. The most recent testing indicated that, while concentrations are significantly lower, there continues to be exceedances. OMGC continues to work on this problem and is looking at different options to include construction of a new reagent mixing area.
- Q3: Has the mill installed a HCN detection meter that can read down to the Russian standard of 0.3 mg/m³?
- A3: (N. Gregorev): The mill currently has a “state-of-the-art” Western meter that can read down to 1 mg/m³ HCN gas. OMGC is not aware of any device that can be located within the mill that reads to such low concentrations. OMGC continues to search for such a device and is willing to consider all alternatives to include certifying a person to sample the HCN concentrations in the mill every 10 days as is required under Russian guidelines.
- Q4: Why doesn't the mine hire more persons from Omsukchan?
- A4: (N. Gregorev): The mine has hired and continues to hire qualified persons from Omsukchan. The number of people working at the mine that are from Omsukchan is misleading because a lot of people now working at the mine that live in Magadan were hired when they lived in Omsukchan. A lot of employees find it easier to live in Magadan and work at the mine.
- A4: (N. Shadrin): The question is not really a fair question. OMGC has been very diligent in hiring specialists from Omsukchan when they are available. The current situation (with 3 mines operating in the area) is that persons qualified to work at Julietta that live in Omsukchan are difficult to find. The administration is very pleased with OMGC with regards to their hiring practices.
- Q5: Why weren't there enough copies of the text (provided by OMGC prior to the meeting) made for all the participants?
- A5: Forty copies were made for people that are interested. If additional copies are necessary they will be made available at the Omsukchan Administration Building (person asking question is given a copy by OMGC).

At the end of the meeting, participants were invited to come up and discuss any issues that they have, look at photographs of the property, and review activity maps.

The entire meeting was video-taped and replayed on the local television station in the evening. A copy of the video-tape as well as a translation of the environmental report that was given out are provided in Attachment 4 – Public Consultation and Disclosure Plan.



Local NGOs

Previously, the only non-governmental organization within the Magadan Oblast that was interested in the Julietta Mine was the Magadan Center for the Environment (MCE). This organization was consulted during 1999 and 2000 regarding any interest that they had in the project. In 2002, OMGC received requests from a group that splintered off of MCE called “Sodeystvia” (Teamwork). The request came in the form of an official letter from the organization that was received August 15, 2002. OMGC officially responded on September 4, 2002 with the following information:

1. What necessitated water discharge from the tailings impoundment in Spring 2002.
 - A. The Julietta mill commenced operations on September 2, 2002. During start-up, the tailings impoundment received more water than the design calculated due to heavy precipitation (1.8-2.0 times) and the addition of fresh water to the process to prevent the lines from freezing during the winter months. Due to the excessive water, predictions at the time indicated that the pond would overtop prior to the end of 2003.

In May 2002, OMGC received approval to discharge 75,000 cubic meters of water from the flotation pond (no water was discharged from the cyanide pond). The approvals were based on a declaration submitted by OMGC explaining the situation and providing calculations to show how the discharge would impact the environment. Approvals were received from the Magadan Environmental Committee (Letter No. 17/1058 dated 5/31/02) with the following conditions:

- The discharge must comply with the conditions set forth in the letter from OMGC explaining the discharge plan;
- Payments for the discharge must be made with 2nd quarter pollution payments;
- Additional studies (to include chemical analyses and hydrobiological studies) must be completed and submitted to the Environmental Committee for review; and,
- In the event of any upset conditions or change of plans, it is necessary to report these changes to the Environmental Committee.

All regulatory conditions were met during the discharge and VNII-1 is currently preparing the independent report on the impacts of the discharge.

2. Why couldn't the discharged water be recirculated?
 - A. Flotation water IS used in recirculation. The problem was that the water from the mill, coupled with snowmelt was sufficient to concern both the mine staff and the regulatory agencies about the possibility of overtopping. The decision



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was made to discharge the water during spring run-off when river flows and dilution coefficients would be at their maximums to minimize impacts to the environment.

3. Which agencies licensed the discharge?
 - A. As stated previously, the Magadan Environmental Committee approved the discharge.
4. Is it planned to extend the boundaries of the tailings pond during subsequent years of mine operations?
 - A. At this time, there is no reason to extend the boundaries of the tailings impoundment. The tailings facility was designed to have enough capacity to hold tails from all the proven reserves during the Feasibility Study. If new reserves are found (extending the life of the mine), OMGC will determine what is best option for placement of tailings.
5. Are cyanide concentrations in the tailings pond drainage water monitored? Where is the water directed to?
 - A. There is no water that escapes from the tailings facility. OMGC has constructed a system of underdrains and sump catchments that ensure that no water leaves the facility. Any water that reports to the underdrain pumps or sump due to thawing, surface water run-off or other sources is routed back to the tailings impoundment. OMGC is required to monitor (under the Water Use and Discharge Permit) the diversion ditch and the river (Ozerny River) below the pond for any signs of contamination from the tailings impoundment.
6. According to the Feasibility Studies, a watering system is used to suppress dust at the mine site. What sources are used to supply water to the watering trucks?
 - A. In the event that it is necessary to water the roads, fresh water is used and spread with water trucks.
7. Does a Reclamation Plan exist for the mine site?
 - A. A Reclamation Plan has been completed for Julietta by VNII-1. This plan is currently under modification and review by the International Finance Corporation to ensure compliance with international guidelines. After the plan has been reviewed and approved by the IFC, it will be submitted to the Magadan regulatory authorities for approval.



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8. How will environmental conditions (to include monitoring of drainage water from the tailings impoundment) be monitored after mining and reclamation of the deposit have been completed?
 - A. The Reclamation Plan requires on-going monitoring at the site that includes all facets of environmental monitoring for a minimum of two years after closure. It is not anticipated that there will be significant drainage from the tailings impoundment after closure. The water that is in the pond at closure will be treated and, after meeting water quality guidelines, discharged. Additionally, after closure, the tailings facilities will be contoured to prevent further infiltration or ponding of water.
9. How will reclamation activities be financed after mining is complete?
 - A. Julietta has established a cash account that receives quarterly deposits that can only be used to fund reclamation activities. The total estimated funds that will be used for reclamation will be approximately \$US 1,000,000. The use of this money for reclamation purposes is monitored by the International Finance Corporation to ensure that the money is used solely for reclamation purposes.
10. What activities does the company have planned to be more open to the public?
 - A. Currently, the company handles public consultation through public meetings, news interviews, and meetings with interested parties. This function is handled primarily by the Deputy General Director of OMGC.

OMGC is committed to public consultation and is always striving to improve communications. The company is open to discussions on how to improve consultation and public perception of the project.

There have been no additional requests or meetings with Sodeystvia in 2003.

IP Consultation

As required by IFC, OMGC has implemented a public consultation and disclosure plan for the project that includes separate consultation on issues concerning IP's. This includes meeting with both the government IP representative and the Russian Association for Indigenous Peoples of the North (RAIPON) representative.

Currently, the RAIPON is not very active within the Omsukchan Region. The Association has, for all practical matters, dissolved. There is an Association president, Tatyana Papelova, which works closely with the Omsukchan Administration IP Specialist.



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The only issue presented to OMGC during the last two years is a request for financial support for IP families over Christmas. The request was for 35,000 rubles. Omsukchan supported this cause both years.

Additionally, an OMGC representative meets regularly with the Omsukchan Administration IP Specialist to determine if there are any outstanding issues. The last meeting occurred in February 2003 and it was determined that there are no outstanding issues. The only request was to determine if OMGC could potentially hire one or two women IP's. OMGC agreed to search for a position, potentially with the catering service that is serving Julietta.

5.0 Mitigation of Environmental, Social, Health, and Safety Impacts

This section includes the main design solutions that have been implemented to ensure that the project works in an environmentally sound manner. These measures will be implemented throughout the life of the project, from construction through closure, to ensure that the site will be returned to the Russian government in a satisfactory condition following closure and decommissioning. Mitigation measures can be changed during the life of the project based on management requirements, regulatory guidance, or identification of inefficient practices.

5.1 Mitigation of Air Pollution

The major pollutants that are emitted during mining operations include: particulate matter, sulfur dioxide, oxides of nitrogen, oxides of carbon, and soot. Emissions were calculated using Russian methodology and emission factors. Calculations show that the greatest potential air pollution emission sources are the powerhouse and fugitive dust sources.

5.1.1 Mitigation of Powerhouse Emissions

Emissions from the powerhouse were calculated using Russian emission factors developed decades ago. Additionally, calculations assumed that all 4 generators would operate simultaneously, year round. OMGC has made a conscientious effort to minimize use of the generators. To date, during summer, two generators are used and, during winter, three generators are used. Also, the generators are Western generators designed to operate well under the emission factors used in Russian calculations.

OMGC ensures that the generators are operating under optimal conditions at all times by ensuring that an expatriate is on site at all times that can optimize generator operation.

5.1.2 Fugitive Dust Sources

OMGC has developed the Julietta ore body using underground mining methods and backfilling of tailings. This significantly reduces dust compared to other options. Additional fugitive dust sources include emissions from the wasterock piles and tailings area. The single largest mitigation measure that OMGC uses to prevent fugitive dust is minimization of land disturbance and aggressive reclamation. OMGC continues to maintain a policy of not creating new land disturbance and has already reclaimed more than 9 ha.

5.2 Soils

Impacts to soil may occur due to erosion or potential acid generation. Mitigation of soil erosion is completed using minimization of surface disturbance, aggressive interim reclamation, and a complete diversion ditching system with sedimentation ponds designed to minimize run-off in exposed areas.

Mitigation of potential acid generation is completed using mining methods that minimize the amount of wasterock generated, regular ABA testing to ensure that potentially acid generating material is confined to one area, proper stockpile grading, prevention of water infiltration and erosion, and reclamation of wasterock piles after mine closure.

Additionally, acid generating tails are placed within a lined structure and reclaimed after mine closure.

5.3 Surface Water Quality

Mitigation of surface water quality impacts includes the appropriate use erosion control measures and proper treatment of effluent streams prior to discharge.

5.3.1 Surface Water Run-off

The largest disturbed area at the site is the area around the tailings impoundment. This area (approximately 30 ha) is completely protected with diversion ditches and a settlement pond designed to prevent soil erosion due to surface water run-off. The diversion ditches in this area have a depth of 0.8-1.0 meters and a slope of 0.004-0.12. The maximum water velocity is 0.5-0.9 m/s. All of the diversion ditches in this area are lined.

Additionally, there are smaller diversion ditches around the wasterock pile, mine roads, mancamp, mill facility, garage, and explosive storage area.

5.3.2 Mine Water Discharge

Mine water from underground flow and dust suppression is collected in a large sump at the 745 level of the mine. From there, the water is pumped out of the mine and discharged below the wasterock piles, into a settling pond. From the settling pond, the water infiltrates into Magnitny Creek.

Oil and grease pollution is mitigated through proper maintenance of the equipment and steam cleaning during routine servicing. This water is then run through an oily water separator prior to discharge.

Suspended solids are mitigated by discharging the water into a settling pond where a semi-porous membrane filters out the suspended solids (along with metals trapped in the solids) prior to discharge.

5.3.3 Wastewater Treatment Plant

Domestic effluent pollution is mitigated by treating the water in a wastewater treatment plant prior to discharge. Treatment includes an aerobic cycle, anaerobic cycle, biological treatment, settling, and chlorination. This water is then discharged to Magnitny Creek. Discharge of the wastewater after biological treatment is not expected to have long-term impacts and therefore, no additional mitigation measures are proposed.

5.3.4 Tailings Management

Tailings dam management and proper tailings handling is of the largest potential impacts. OMGK can ensure acceptable risks by properly operating and maintaining the tailings facility. A tailings deposition report has been completed and currently used in operations at the minesite.

5.4 Vegetation

Impacts to vegetation during operations are expected to be reduced via an aggressive reclamation plan that calls for reclamation of any area that is not used during operations. The reclamation plan anticipates overall land disturbance will be reduced by 35 ha.

During operations, the only impacts to vegetation will be localized. Impacts to vegetation may result from dust generated along the haul and access roads for the facility. These impacts will be limited to a maximum of 4 months during the year and will occur primarily during heavy traffic periods. These effects are considered insignificant and short-term.

Mitigation measures include:

- Minimizing new land disturbances;
- Minimizing air pollution and fugitive dust; and,
- Implementation of a sound surface water run-off diversion program.

5.5 Hunting and Poaching

A firm policy against hunting and poaching has been implemented by the project sponsors. The policy serves to mitigate impacts to any large game species from poaching or hunting in the area. Additionally, OMGC allows free access to regulators to police the access road.

5.6 Socio-economics

To date, the overall social impacts from the Julietta Project have been positive due to hiring of workers, extensive training conducted by the company, above average wages, and payment of taxes to all levels of government. The following additional subsections identify positive mitigation measures for social impacts.

5.6.1 Local Employment

Currently, there are more than 340 employees working at Julietta. The majority of employees reside in Magadan (260) and the remaining employees live in Omsukchan/Dukat. These employees have received Western training and are becoming attractive to other Russian mining operations. OMGC is finding it more and more difficult to retain employees due to the location of other mines nearer to home.

5.6.2 Community Development

In order to create sustainable development for the communities that are currently stakeholders in the Julietta Mine, OMGC has begun working with IFC's Technical Assistance Program. IFC has set up an office within the Magadan Oblast to create a technical assistance program for small to medium enterprises (SME). The goal of the Project is to improve the environment for private sector development by extending the impact of the Canadian/IFC investment in the mining industry of the Magadan Oblast. The Project has five specific objectives:

- Increase access to markets for SMEs;
- Raise the level of local management skills;
- Improve access to financing;
- Reduce administrative and legislative barriers; and,
- Educate and inform the public of the importance of the private sector.

This is the second quarter of full operation for the Project. During this quarter, the project accomplished a number of important milestones and has had its first two successes: a local SME was approved as a new supplier by Sodexho, and one local bank declared its willingness to finance Sodexho suppliers.

Project highlights this quarter include:

- “Tauyskaya Dolina LLC” has sold 1.5 tons of its potatoes as a test lot to Sodexho. Sodexho has found the product satisfactory and a long term agreement for 60 tons per year is being negotiated;
- Demand analysis was completed and Supplier Kits now exist for food products, parts and consumables, as well as for services (latter is in Attachment 1 to this report). Distribution of these kits to local SMEs is continuing;
- The Magadan Branch of Rosselkhoz Bank has become quite supportive of the Project efforts and has announced that it is willing to extend financing to agricultural SME suppliers who manage to secure contracts with Sodexho, as well as assist the Project in identifying such suppliers;
- The Project launched its joint effort with FIAS to conduct an assessment of the administrative barriers to investment in Magadan. Two focus groups with businesses as well as a seminar for government officials were conducted. These activities were well attended by the local government and received media coverage;
- A business association expert from IFC Belarus has conducted a review of the Native Peoples Association of Magadan Oblast.

A progress report on the IFC-led initiative is provided in Attachment F.

5.7 Archeology

Investigations conducted by an archeological expedition to the Julietta site identified traces of activities of ancient man near the project site, along the edge of the Jugajaka River. During construction, steps were developed to protect and preserve existing and other possible archeological monuments. There were no artifacts uncovered during construction.

These steps will continue after construction. Additionally, a firm policy will be implemented to ensure archeological monuments during operations. Mitigation measures implemented to ensure that archeological monuments, if discovered, will be protected include:

- Upon discovering any potential artifacts during construction or operations, work will be temporarily halted in this area;
- If any bones have been discovered, they will be covered with cloth, and earth and sod placed over them to protect them from the elements; and,



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- A specialist will be summoned to catalog the find.

5.8 Health and Safety

A full Environmental, Health and Safety Plan (HSP) has been created for this project. The framework of the HSP was developed based on the World Bank's Occupational Health and Safety Guidelines (World Bank, 1988), Russian health and safety requirements, and the U.S. Mine Safety and Health Administration (MSHA, 1980-1998) guidelines. The EHSP includes information on:

- OMGC policy statement;
- Worker responsibilities;
- Emergency procedures;
- Accident investigation procedures;
- General health and safety guidelines;
- Personal protection;
- Cyanide handling and transportation
- Laboratory safety;
- Employee information and training; and,
- Transportation safety.

The full HSP is found in Attachment 1 of the EAP. The HSP will continue to be updated as part of the EAP to incorporate the contractors HSP as more information becomes available.

During operations, OMGC has a full-time health and safety person for the mine site. This person is responsible for implementing the Health and Safety Plan and compliance with Russian Health and Safety Requirements. The health and safety department reports directly to the Mine Manager and indirectly to the General Director and corporate health and safety department.

5.9 Spill Prevention, Control, and Countermeasures Plan

The Spill Prevention, Control, and Countermeasures Plan (SPCC) identifies the procedures required to ensure that the potential for, and risk resulting from, accidental releases of potentially hazardous materials is minimized to the greatest degree possible.

The materials used at the mine and mill are common to other mining facilities of this type located elsewhere and include diesel fuel, lubricants, petroleum solvents, miscellaneous laboratory chemicals, and a variety of process reagents. A list of the major chemical reagents to be used at the Julietta mine and processing plant,



including the estimated rates of consumption, is provided in the SPCC Plan (see Attachment 2).

The SPCC includes information on:

- Materials, properties, quantities, and containers;
- Transport of materials;
- Spill responsibility;
- Readiness;
- Accidental release notifications, and protocols;
- Spill prevention;
- Spill control and countermeasures; and,
- Employee training.

5.10 Waste Management Plan

The Waste Management Plan was created within the framework of mining in Far Eastern Russia. Some standard practices available in the West are not available in Russian Far East. This management plan details the various aspects of waste disposal including management supervision, waste classification, and arrangements for regular waste removal. The Waste Management Plan applies to operations and closure of the project.

It includes management of wastes generated during construction, operations, and closure. The following types of wastes are covered in the plan:

- Domestic liquid effluent;
- Domestic solid wastes; and,
- Industrial solid wastes.

Disposal methods proposed include collection and sorting of materials and then placement of the materials within a secured and appropriate landfill designed to meet World Bank Group guidelines. Additionally, general management guidelines are provided in this plan. The full Waste Management Plan is provided in Attachment 3 of the EAP.

5.11 Reclamation and Closure

The purpose of reclamation is to return the disturbed areas to stabilized conditions following mining and ore processing activities as well as ensure long-term protection of land and water resources in the area. Any interim reclamation completed will have



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the goal of stabilizing a given area as soon as possible after mining activities are completed in that area. The overall reclamation plan will have the following goals:

- Establish stable topographic and drainage conditions that are compatible with the surrounding landscape and controlling erosion;
- Establish surface conditions that are conducive to regeneration of a stable plant community through removal, stockpiling, and re-application of a suitable soil cover; and,
- Establish a long-term productive, self-sustaining, biotic community compatible with the proposed future land uses and comparable to what currently exists at the site by seeding disturbed areas using species adapted to site conditions.

Currently, OMGC is finalizing the reclamation plan based on the preliminary plan developed in 1999. It is anticipated that this document will be available for disclosure in June 2003.

The long-term revegetation goals for the areas reclaimed at the project site will be to achieve perennial plant cover similar to those measured in an adjacent vegetative community or reference area.

Total costs for reclamation, including recontouring, rehabilitation of reindeer pastures, biological stabilization (forest planting for erosion protection, seeding of perennial grasses) and physical stabilization (anti-erosion measures) are approximately \$US 1,250,000. This amount will be corrected depending on the results of the reclamation plan that will be submitted prior to commencement of operations.

This money will be accrued (\$US 125,000 dollars/year) in a separate escrow account held by OMGC to be used solely for the purposes of Reclamation and Closure. Each year, as part of the Annual Monitoring Report submitted to IFC, an annual reclamation plan will be submitted to IFC for review. As of March 31, 2003 the company has accrued \$US 153,000 that can be used for reclamation purposes.

After reclamation and closure, in accordance with the mining license (MAG 01081 BR, Enclosure No. 6), OMGC is required to submit to the Territorial Geological Fund a deed of performance of liquidation (reclamation) of operations signed by the representatives of the regional agencies, OMGC, Sevvostgeolkom, departments on subsoil protection, Gosgorteknadzor, and Gosgeolkontrol. Acceptance of this deed will signify that the company has adequately reclaimed the Julietta deposit.

6.0 Monitoring of Environmental, Social, Health, and Safety Performance

This section presents a discussion of the proposed Environmental Monitoring Program (EMP) for the Julietta Project. The monitoring that is occurring at Julietta is in compliance with the Air Pollution Emission Permit, Water Use and Disposal Permit and the Solid Waste Management Permit.

The primary purpose of the EMP is to ensure that the project is in compliance with Russian operating permits and environmental regulations as well as World Bank Group policies and guidelines, and to evaluate the effectiveness of the environmental mitigation measures as described herein. The results of the monitoring program will be reviewed by project management on a periodic basis. If adverse environmental changes occur as a result of the project, appropriate remedial measures will be implemented to reduce or eliminate project-related effects. Specific details of any mitigation measures associated with unforeseen project-related effects will be developed based on the results of the monitoring.

Environmental monitoring is proposed for the following environmental components and mine facilities:

- Site meteorology/air quality;
- Groundwater quality;
- Surface water quality;
- Aquatic resources;
- Tailings impoundment;
- Acid rock drainage; and,
- Aquatic resources.

The following sections provide more detail.

6.1 Meteorology

Meteorological data is important to determine ambient air concentrations, risks of contamination during upset conditions, weather conditions that might be adverse to operation, water balances, and other air pollution dispersion measurements. OMGK has constructed a Western weather station at the site. It is a Campbell Scientific Meteorological Station with CR10 Datalogger. This weather station comes with a 10-meter mount and is considered a world-wide standard for meteorological monitoring. The system includes a data logger, wind speed, wind direction, temperature, relative humidity, rain gauge, and power supply. It is located immediately west of the mancamp near the helicopter landing pad.

Measurements are made automatically every 15 seconds. These measures are used to compute hourly and daily values.

6.2 Air Pollution

In accordance with Russian requirements, OMGC conducts three types of air pollution monitoring:

- Ambient air monitoring;
- In stack sampling; and,
- Air quality in working zones.

Each type of sampling is described in greater detail in the following sections.

6.2.1 Ambient Air Monitoring

In accordance with the Maximum Allowable Air Pollution Emission Limits and Temporary Allowable Air Pollution Emission Limits (approved by the Ministry of Environmental Resources, Registration No. III-113/1 on December 30, 2002 – valid thru July 1, 2007), the Julietta mine must take quarterly sampling of ambient air quality near the mancamp on a quarterly basis. Samples must be taken for total suspended particulate (TSP), nitrogen oxide (NO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂) and hydrogen cyanide gas.

The Russian methodology for collecting dust samples is by pumping a known volume of air across a filter paper and then measuring the difference. The volumetric flow of air must be no less than 20 liters/min. The one time sample is measured after 20 minutes. The average daily concentration is a summation of 4 different measurements taken throughout the day at 5-minute intervals.

The Russian methodology for collecting gas samples is similar except that a known volume of gas is collected in a rubber bag and then the gas is analyzed for components.

Previous experience with the Russian air sampling equipment indicates wild variations in results. OMGC is currently negotiating with the Magadan Ministry of Environmental Resources to use Western equipment to comply with Russian guidelines and WBG requirements. The first samples will be taken at the end of the 1st quarter, 2003. Parameters that will be measured include:



Table 6.1 Ambient Air Monitoring Sampling Protocol

Ambient Air Quality Sampling				
Pollutant	Russian Std. (mg/m ³) ^A		WBG Std (mg/m ³) ^B	
	1-time	Daily	Daily	Annual ^C
Dust	0.3 ^D	-	0.07	0.05
NO	0.4	-	N/A	N/A
NO ₂	0.085	-	0.150 ^E	N/A
SO ₂	0.5	-	0.05	0.125
HCN	-	0.01	N/A	N/A

^AMeasurement taken at mancamp

^BMeasurement taken at property boundary

^CAnnual measurement is average of quarterly measurements

^DMeasurement assumes SiO₂ content of dust to be 66.8%

^EAssumes NO + NO₂ = NO_x

6.2.2 In-Stack Monitoring

In-stack sampling is required for the wet scrubber on the crushing circuit and the baghouse on the laboratory. Samples are taken before and after the control device to determine efficiency of the equipment. Samples are required for particulate matter on a quarterly basis. The 1st samples will be taken at the end of 1st quarter 2003.

6.2.3 Worker Zone Air Quality

In accordance with Russian requirements GN 2.2.5.686-98 and GN 2.2.5.691-98 “Maximum Allowable Concentrations for Hazardous Substances in the Workplace”, OMGC is required to conduct occupational health and safety monitoring for the following airborne pollutants:

Table 6.2 Workplace Air Quality

Parameter	Location	Frequency (per year)	MAC (mg/m ³)
Dust	Mill Operator	Once	0.1-1.0
	Crusher Operator	Once	
	Underground drivers	Once	
	Lab Crusher Area	Once	
Oily Aerosol	Underground drivers	Once	5.0
Oxides of Carbon	Drillers	Once	5.0
Hydrocarbons	Powerhouse operators	Once	300
Oxides of Nitrogen	Welders	Once	5.0
Lead Vapors	Fuel Farm Area	Once	0.007-0.01
Welding Aerosol	Welders	Once	0.2
Oxides of Chromium		Once	0.01
Oxides of Manganese		Once	0.05-0.3
Oxides of Iron		Once	0.007-0.01
Ammonium	WWTP	Once	20.0
Hydrogen Sulfide		Once	10.0



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Hydrogen Cyanide	Mill Operator	Twice	0.3
Caustic Vapors	Crusher Operator	Twice	0.5
Sulfuric Acid Vapors	Lab Worker	Twice	1.0
Xanthate	Mill Metallurgist	Twice	1.0

All of the samples listed in Table 6.2 must be taken by a certified laboratory. Currently, the only occupational health and safety laboratory located within the Magadan Region is the government Sanitary and Epidemiological Laboratory located in Magadan. OMGC is in the process of determining if the mill laboratory can receive certification and conduct this sampling on a more frequent basis.

6.3 Surface Water Quality Monitoring

In accordance with Russian regulations and WBG guidelines, OMGC monitors surface waters as well as discharges and areas that have the potential to impact surface waters on a regular basis to ensure that operations are conducted in a safe and environmental sound manner. The following sections outline the surface water monitoring conducted by OMGC at the Julietta mine site.

6.3.1 Surface Water Monitoring

Figure 7 shows the surface water monitoring in relationship to areas of potential impacts at the Julietta mine site. There are a total of 3 creeks that can potentially be impacted at the site. These include:

Bulat Creek:

Bulat Creek is a left tributary of Ozerny Creek. Monthly distribution of annual run-off for waterways of this area is extremely irregular. The main volume of runoff occurs in May and June. A stable ice cover forms in mid-October and melts in late May. The potential sources of impacts are the explosive storage area and sedimentation due to surface water run-off. This river is sampled both upstream of impacts and prior to the confluence with Ozerny Creek on a quarterly basis during periods when there is a flow (2 times per year) to determine whether or not the flow is impacting the compliance point in Ozerny Creek. Table 6.3 highlights parameters that are monitored in Bulat Creek. Results of all monitoring since the project was founded are provided in Appendix E.

Magnitny Creek:

Magnitny Creek is a right tributary of Ozerny Creek. Monthly distribution of annual run-off for waterways of this area is extremely irregular. The main volume of runoff occurs in May and June. A stable ice cover forms in mid-October and melts in late May. The potential sources of impacts include the mine water discharge, run-off from wasterock piles, mill spills, reagent storage area, fuel farms, discharge from the



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WWTP, and sedimentation due to surface run-off. This river is sampled both upstream of impacts and prior to the confluence with Ozerny Creek on a monthly basis (approximately 7 times per year) when there is a flow (2 times per year) to determine whether or not the flow is impacting the compliance point in Ozerny Creek. Table 6.3 highlights parameters that are monitored in Magnitny Creek. Results of all monitoring since the project was founded are provided in Appendix E.

Ozerny Creek:

Ozerny Creek starts from a series of lakes that have a total surface area of 2.0 km². These lakes regulate seasonal run-off, accumulating runoff from snowmelt, and summer-autumn precipitation. It runs past the mine site and discharges into the Jugajaka River. It collects all surface water pollution from the minesite. The river is sampled 500 meters upstream of the mine site and 500 meters below the last discharge point (tailings impoundment diversion ditch) on a monthly basis to determine site impacts. The monitoring point below the last discharge point has been designated by the Magadan Environmental Resources Committee to be the Site Compliance Point. Results of all monitoring since the project was founded are provided in Appendix E.

Figure 7. Surface Water Monitoring Map

Table 6.3 Surface Water Quality Monitoring

6.3.2 Surface Water Discharges

There are currently 3 surface water discharges at the Julietta Mine Site. These include:

1. Mine water;
2. Wastewater treatment plant; and,
3. Surface water run-off near the tailings impoundment.

Each of these discharges is monitored on a monthly basis to ensure that all Russian in-stream requirements are met at the Site Compliance Point.

Mine Water Discharge:

In accordance with the Water Use and Discharge Permit and WBG guidelines, Table 6.4 lists the parameters that are monitored in the mine water discharge.

Table 6.4 Mine Water Discharge Monitoring

Parameter	Russian Req. ¹ (mg/l)	Russian Req. ² (g/hr)	WBG Req. ³ (mg/l)	WBG Req. (g/hr)
Suspended Solids (TSS)	100	166.67	50	83.33
Petroleum Products	0.1	0.17	20	33.32
Ammonia, NH ₄ ⁺ (N)	0.5	0.83	-	-
Nitrites, NO ₂ ⁻ (N)	0.06	0.10	-	-
Nitrates, NO ₃ ⁻ (N)	15	25	-	-
Chlorides, Cl ⁻	50	83.33	-	-
Sulfates, SO ₄ ⁻	65	108.33	-	-
Copper, Cu	0.05	0.08	0.3	0.50
Zinc, Zn	0.02	0.03	1	1.66
Lead, Pb	0.01	0.02	0.6	1.00
Iron _{Tot} , Fe	0.1	0.17	2	3.33
Manganese, Mn	0.05	0.08	-	-
Strontium, Sr	0.05	0.08	-	-
Chromium, Cr ³⁺	0.1	0.17	1.0 ⁴	1.66
Nickel, Ni	0.01	0.02	0.5	0.83
Cobalt, Co	0.01	0.02	-	-
Total Mineralization	450	750	-	-

¹ Julietta Water Use and Discharge License. Approved MER, Conclusion No. 85 dated June 5, 2002

² Based on discharge rate of 40 m³/day

³ WBG guidelines for Mining and Milling, 1995

⁴ PPAH Guideline is for hexavalent chromium



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Wastewater Treatment Plant:

The wastewater treatment plant discharges directly into Magnitny Creek below the mancamp. Both the inlet and exit streams of the wastewater treatment plant are sampled to determine effectiveness of sewage treatment. In accordance with the Water Use and Discharge Permit and WBG guidelines, Table 6.5 lists the parameters that are monitored in the mine water discharge.

Table 6.5 WWTP Monitoring

Parameter	Russian Req. ¹ (mg/l)	Russian Req. ² (g/hr)	WBG Req. ³ (mg/l)	WBG Req. (g/hr)
Suspended Solids (TSS)	50	83	50	83
Petroleum Products	0.2	0.33	10	16.67
Detergents	0.5	0.83	-	-
Ammonia, NH ₄ ⁺ (N)	4	6.64	10	16.67
Nitrites, NO ₂ ⁻ (N)	2	3.32	-	-
Nitrates, NO ₃ ⁻ (N)	30	49.8	-	-
Chlorides, Cl ⁻	50	83	-	-
Sulfates, SO ₄ ⁻	90	149.4	-	-
Copper, Cu	0.03	0.05	0.5	0.83
Zinc, Zn	0.05	0.083	2.0	3.32
Lead, Pb	0.03	0.05	0.1	0.17
Iron _{Tot} , Fe	0.3	0.5	3.5	5.83
Manganese, Mn	0.05	0.083	-	-
Chromium, Cr ₃₊	-	-	0.5 ⁴	0.83
Nickel, Ni	-	-	0.5	0.83
Cobalt, Co	-	-	-	-
Total Mineralization	390	649.74	-	-

¹ Julietta Water Use License. Approved MER, Conclusion No. 85 dated June 5, 2002

²Based on discharge rate of 40 m³/day

³PPAH, 1998, General Environmental Guidelines

⁴PPAH Guideline is for total chromium

Surface Water Diversion Ditch:

The primary surface water run-off occurs near the tailings facility. This area has a system of diversion ditches that are lined to prevent water seepage into the tailings impoundment. This is the last discharge point from the site prior to monitoring at the Site Compliance Point. In accordance with the Water Use and Discharge Permit and WBG guidelines, Table 6.6 lists the parameters that are monitored in the mine water discharge.



Table 6.6 Diversion Ditch Discharge Monitoring

Parameter	Russian Req. ¹ (mg/l)	Russian Req. ² (g/hr)	WBG Req. ³ (mg/l)	WBG Req. (g/hr)
Suspended Solids (TSS)	50	63.5	50	63.5
Petroleum Products	0.2	0.25	10	12.7
Detergents	0.5	0.83	-	-
Ammonia, NH ₄ ⁺ (N)	0.4	0.51	10	12.7
Nitrites, NO ₂ ⁻ (N)	14	17.78	-	-
Nitrates, NO ₃ ⁻ (N)	0.5	0.64	-	-
Chlorides, Cl ⁻	5	6.35	-	-
Sulfates, SO ₄ ⁻	40	50.8	-	-
Copper, Cu	0.01	0.01	0.5	0.64
Zinc, Zn	0.01	0.01	2.0	2.54
Lead, Pb	0.01	0.01	0.1	0.13
Iron _{Tot} , Fe	0.1	0.13	3.5	1.45
Manganese, Mn	0.01	0.01	-	-
Chromium, Cr ³⁺	-	-	0.5 ⁴	0.64
Nickel, Ni	-	-	0.5	0.64
Cobalt, Co	-	-	-	-
Total Mineralization	200	254	-	-

¹ Julietta Water Use License. Approved MER, Conclusion No. 85 dated June 5, 2002

²Based on discharge rate of 1.27 m³/hr

³PPAH, 1998, General Environmental Guidelines

⁴PPAH Guideline is for total chromium

6.4 Groundwater monitoring

In accordance with the Russian Water Use and Discharge Permit and WBG guidelines, OMGC monitors drinking water quality and groundwater quality around the site to determine if there are any impacts to any localized or deep aquifers. The following sections describe the groundwater monitoring at the site.

6.4.1 Drinking water

The site freshwater wells are located within the talic zone in Ozernyi Creek and are drilled to 70 meters. The drinking water is monitored on a monthly basis for chemical parameters, quarterly for microbiological parameters and annually for radiation. Samples are taken at the wells (the wells are continuously operating) and from the taps in the kitchen and mill break area. In accordance with the Water Use and Discharge Permit and World Health Organization guidelines, Table 6.7 lists the parameters that are monitored on a monthly basis for drinking water. Appendix E lists the complete results of drinking water monitoring.



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Table 6.7 Drinking Water Monitoring

Parameter		Russian MAC ¹ (mg/l)	Russian MAC ² (mg/l)	WHO MAC (mg/l)
pH (dimensionless)		6-9	6.5-8.5	6.5-9.5
Total mineralization		1000	1000	-
Petroleum products		0.1	0.1	-
Phenols		0.25	0.1	-
Na	Sodium	200	200	200
Fe _{Total}	Iron (Total)	0.3	0.3	0.3
Cl	Chlorides	350	350	350
SO ₄	Sulfates	500	500	250
NO ₃ (N)	Nitrates	45(10)	45(10)	50
NO ₂ (N)	Nitrites	3(1)	3(1)	3
PO ₄ (P)	Phosphates	3.5(1.1)	3.5(1.1)	-
Cu	Copper	1	1	2
Zn	Zinc	5	1	3
Pb	Lead	0.03	0.03	0.01
Mn	Manganese	0.1	0.1	0.5
Sr	Strontium	7	7	-
Ni	Nickel	0.1	0.1	0.02
Co	Cobalt	0.1	0.1	-
Cr(+6)	Chromium (+6)	0.05	0.05	-

Note: Additional parameters required under Russian and WHO guidelines not present.

¹MAC for drinking waters, Ministry of Health, SanPiN 2.1.4.1074-01, 2001

²MAC for nonpotable water use, Ministry of Health, GN 2.1.5.689-98

6.4.2 Groundwater monitoring at tailings area

There are three piezometric standpipes located in the main dam. Additionally, there are another three piezometric standpipes located around the tailings impoundment and down gradient of the landfill. All of these standpipes have a large enough diameter pipe to be sampled in the event that water is noted. To date, none of these wells have had water, except for some trapped ice in the bottom of the standpipe. These standpipes are monitored on a monthly basis and the elevation of ice/water is recorded in a log book on-site. The location of these standpipes is shown in Figure 7.

6.4.3 Groundwater monitoring at old mancamp

Additionally, the deep well (70 meters) at the old mancamp has been available for overall site groundwater monitoring. The same chemical parameters (plus cyanide) were monitored to ensure that there were no impacts to the deep aquifers that were not detected in the drinking water. This well was monitored until October 2002 on a monthly basis when the well froze due to the fact that it was not used or heated (due to lack of electricity) and was liquidated. Monitoring results for this well are provided in Appendix E. The location of this well is shown in Figure 7.

6.5 Tailings Impoundment

A monitoring program for the tailings impoundment is maintained to evaluate and document the performance of the tailings facility. This monitoring program is divided into the following parts:

- Geotechnical observations;
- Water quality monitoring;
- Review of proper implementation of construction and deposition plans; and,
- Water balance review.

6.5.1 Geotechnical observations

Geotechnical instrumentation and monitoring have been performed throughout the construction and will continue thru operation of the tailings management facility in order to assess performance and to verify actual conditions are consistent with the design assumptions. Data obtained through a monitoring program will allow design modifications to be made (if necessary) to the facility throughout the operating life and into closure.

There are a total of 8 thermistors around the tailings facility. The location of these thermistors is provided in Table 6.8.

Table 6.8 Tailings facility thermistor location

<u>Number</u>	<u>Northing</u>	<u>Easting</u>	<u>Depth</u>	<u>Note</u>
T-1 (NC-MD-1)	383859	-84824	~25 m	At the Main Dam crest, drilled 5 m into Foundation (~elevation 790 m). String length: 15 m
T-2 (NC-MD-2)	383828	-84812	~25 m	At the Main Dam crest, drilled 5 m into Foundation (~elevation 790 m). String length: 15 m
T-3 (NC-DD-3)	383676	-85026	~20 m	at the Divider Dam crest, drilled 5 m into Foundation (~elevation 800 m). String length: 15 m
T-4 (NC-B-4)	383821	-84927	n.a.	Placed in 1m trench along the west slope of Primary Tailings Pond; first thermistor point installed at the base of the slope. String Length: 3 m
T-5 (C-B-5)	383605	-85058	n.a.	Placed in 1m trench along the south slope of Secondary Tailings Pond; first thermistor point installed at the base of the slope. String Length: 3 m
T-6 (C-SW-6)	383586	-85076	n.a.	Placed in 1m trench along the southwest slope of Secondary Tailings Pond; first thermistor point installed about mid slope. String Length: 3 m
T-7 (NC-SN-7)	383847	-84954	n.a.	Placed in 1m trench along the west slope of Primary Tailings Pond; first thermistor point installed about mid



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				slope. String Length: 3 m
T-8 (NC-SS-8)	383747	-84895	n.a.	Placed in 1m trench along the south slope of Primary Tailings Pond; first thermistor point installed about mid slope. String Length: 3 m

The purpose of the thermistors is to monitor the ground temperature to assess how the permafrost conditions are being influenced by the disposal of tailings within the ponds. The thermistors are monitored on a regular basis by the on-site Environmental staff and reported monthly. Results of monitoring are provided in Appendix G.

6.5.2 Water balance monitoring

A mill and tailings impoundment water balance has been developed and is updated on a monthly basis based on variations in operations and meteorological conditions. Monitoring of the water balance serves to indicate if any significant and unexplained water losses or gains in this system are occurring and long-term capacity of the tailings impoundments.

The current tailings water balances for both the primary and secondary pond are provided in Figures 3 and 4. Input data for the water balances are provided in Appendix B.

6.6 Waste rock drainage

Existing waste rock piles and ore stockpiles have been sampled during the first years of operations. The waste rock piles have undergone static testing to determine acid generation potential. Only andesite/tuff andesite has shown the potential to generate acid. Additional sampling will occur on a basis of not less than 1 sample per 10,000 tonnes of waste rock placed in the pile. Additional sampling will be required if there is development of new zones or irregularities (as noted by the Head Geologist) in the ore body.

In addition to the Acid-Base Accounting (ABA) sampling of the waste rock, OMGC plans to install three thermistors in the piles to determine the amount of freezing that has occurred in the piles. This will assist in determining the long term liability of the piles and final reclamation solution.

The cyanide tailings pond will also have potentially acid generating materials during the project. In the reclamation plan design considerations will be listed for covering and isolating the potentially acid generating tails.

6.7 Aquatic Resources

Monitoring of the environmental conditions of the surface waters will be conducted using hydrobiological indicators (benthos) to give an objective appraisal of the



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engineering measures used to mitigate impacts at the site. The following section highlights the proposed monitoring program for aquatic resources.

6.7.1 Benthic monitoring

In accordance with GOST 17.1.3.07-82, Benthos is monitored approximately bi-annually. The monitoring occurs at the same locations where streams are sampled for water quality. The first monitoring after commencement of operations occurred in Summer 2002.

Results of 2002 monitoring indicated that:

- Magnitny Creek can be classified as a “very clean” river due to the mass and diversity of benthic structure. This is similar to its classification in 2000; and,
- Ozerny Creek can be classified as a “very clean” river due to the mass and diversity of benthos. This is better than the 2000 classification and indicates a stabilization of the benthic communities within the waterway.

The full list of results is provided in Appendix H.

6.8 Pollution Payments

In 2002, OMGC was responsible for payments of more than 91,167 rubles for fees associated with pollution. This included more than 35,983 rubles for air pollution emissions, more than 43,074 rubles for water pollution discharges, and more than 12,550 rubles for solid waste disposal. Of this total amount more than 1/3 (33,025 rubles) is due to the permitted discharge from the primary tailings pond in Summer 2002.

6.9 Health and Safety Monitoring

The Health and Safety Program presented in Attachment 2 requires that sources of health hazards be closely monitored, which include the monitoring of noise and toxic mine gases. Monitoring is conducted on a regular basis to ensure that the project complies with all Russian requirements and WBG guidelines. Parameters that are currently measured at the mine are provided in the following sections.

6.9.1 Noise exposure

The objective of noise exposure monitoring is to identify and characterize the noise exposure for mine workers of each job category who work at facilities with high noise levels, and to ensure that regulatory limits are met (i.e., < 90 dBA for 8 hours exposure per day, and < 87 dBA for 12 hours).



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Feasible administrative and engineering controls will be employed to reduce the average noise levels in normal work areas. Plant equipment will be well maintained to minimize noise levels. Personnel will wear hearing protection when exposed to noise levels above 85 dBA.

Additionally, the Russian noise exposure level for industrial facilities is <80 dBA. This level is measured on an annual basis by the Sanitary and Epidemiological Committee at all industrial areas at the Julietta mine. In 2002, all measurements were below the limit (the Sanitary and Epidemiological Committee does not report actual values to the company – but rather whether or not the company was in compliance).

OMGC is in the process of certifying their own internal auditors to monitor all occupational health parameters (noise, vibration, sound, radiation, lighting, and temperature). This person will be responsible for monitoring occupational standards on a monthly basis.

6.9.2 Injury and lost time statistics

OMGC maintains a full-time Health and Safety Officer at the site at all times. This person is responsible for ensuring safe operations, training operators, maintaining compliance with Russian guidelines and WBG H&S requirements, and reporting to corporate H&S officers on all issues regarding health and safety. The Russian guidelines require extensive monitoring and reporting of health and safety of the project. A summary of the Health and Safety Plan implemented at the mine is provided in Attachment 1 (Julietta Mine Health and Safety Plan).

The minesite has had an exemplary record of health and safety. During construction there was a total of 123 lost days due to injury (out of a total of approximately 72,000 days). This is equivalent to an Incident Rate of 5.6. This is less than the average Incident Rate (IR = 6.7) for hard rock mines in the US (with less than 250 employees) during the same time period. The lost time rate for injuries occurring during construction was 0.17%.

During operations (2002) the minesite continued to have an exemplary record of health and safety. There was 1 minor injury reported with a total of 59 days lost due to injury (out of a total of total of approximately 72,000 days). This is equivalent to an Incident Rate of 2.7. The lost time rate for injuries occurring in 2002 was 0.08%.

Table 6.9 highlights all of the incidents reported by the H&S Department at the Julietta minesite thru 2002.



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Table 6.9 Lost Time Accidents at the Julietta Minesite

Date	Location	Description	Days Lost
2/22/01	Underground	Cut finger on L. Hand	0
8/24/01	Surface	Cut finger on L. Hand	0
9/17/01	Surface	Slipped and hurt leg	63
10/5/01	Underground	Slipped and broke leg	60
Total days lost for 2001			123
4/14/02	Underground	Hurt leg jumping from equipment	59
Total days lost for 2002			59

6.10 Social monitoring

Monitoring will be undertaken of the following key socio-economic components:

- Impacts on indigenous peoples;
- Public consultation and disclosure process; and,
- Impacts on local employment levels to include:
 - Number of local individuals directly employed by the project;
 - Number of households directly employed by the project;
 - Entrepreneurial activities associated with the project;
 - Changes in income profiles; and,
 - Changes in overall community development.

These social components and indicators will be audited annually as part of the auditing procedures to be set up by OMGC. Any improvements to the process will be identified and implemented. The mine commenced operations near the end of 2001 (October) and did not collect data for that year. Data becomes available for 2002 at the end of the 2nd quarter and will be presented in the Annual Monitoring Plan required by IFC at the end of the 1st quarter 2004.

Additionally, OMGC has continued to conduct public consultation and disclosure as required by the PCDP (see Attachment 4, Public Consultation and Disclosure Plan). This includes continued consultation with NGO's, indigenous peoples group, and other key stakeholders identified by the project. The latest public meeting occurred in February 2003 in the village of Omsukchan. A videotape of the meeting as well as a summary of the information presented is provided in Attachment 4.

7.0 Environmental, Social, Health, and Safety Management

The only project currently under development by OMGC is the Julietta Project. Currently, OMGC has two Health and Safety persons, 1 environmental person, and 1 person acting as the Public Relations person.

7.1 Capacity Development

With the development and expansion of Bema Gold Corporation, a new Manager of Permitting, Environmental, Health, and Safety has been hired to oversee all of the corporate level environmental management and permitting issues for all operations that are in exploration, development, and operations.

The corporate level Manager of Permitting, Environmental, Health, and Safety has the following responsibilities:

- Training local persons;
- Maintaining contact with regulatory agencies associated with all projects from exploration thru closure;
- Ensuring subcontractors complete work to international standards;
- Hiring of the local environmental staff;
- Developing and maintaining corporate policies and guidelines that pertain to permitting, environment, health, and safety; and,
- Assisting the corporate office with any other environmental, social, health or safety problem at any of the other Bema Gold operations.

7.1.1 OMGC personnel

Two environmental persons will eventually be hired by OMGC to work on rotation at the mine site to fill the company's environmental needs. To date, the company has hired one environmental person. This person is a chemist with an environmental background. The current schedule is to work 2 weeks at the site, one week in Magadan and have one week of break. This person reports to the mine manager and the corporate environmental consultant. The current responsibilities of the on-site environmental manager includes:

- Monitor all environmental parameters;
- Ensure compliance with all regulatory guidelines and permits;
- Develop annual reports as required under Russian and IFC guidelines;
- Develop annual budgets for the environmental department at the mine; and,
- Develop long-term programs to ensure protection of the environment.

The full job description is provided in Appendix I.

7.1.2 OMGC Magadan Personnel

OMGC is actively seeking a 2nd environmental person that is based in Magadan and can act both as a Senior Engineer and Permit Coordinator. Currently, all permits and regulatory documents are generated by on-site personnel with the assistance of both Russian and Western consultants. All regulatory submittals are monitored by the OMGC General Director.

7.1.3 Environmental Training

OMGC continues a strong policy of environmental training at the Julietta minesite. Environmental training will be conducted using specialists from Russia and the U.S. that are familiar with both Russian and World Bank guidelines to ensure compliance with all permitting requirements.

7.1.4 Public Consultation

OMGC will continue a strong policy of public consultation and disclosure. This program is implemented by the Deputy General Director of OMGC. These duties will include:

- Acting as a resource for complaints and concerns from stakeholders;
- Acting as OMGC's representative for interface with the indigenous population;
- Ensuring adequate public consultation and disclosure is completed in a timely and effective manner; and,
- Acting as an interface on OMGC's community programs.

7.1.5 Reporting/Monitoring Procedures

Currently, the on-site environmental person is required to report to the corporate level Manager of Permitting, Environment, Health, and Safety no less than one time per week thru informal means (phone/e-mail). Additionally, the site is required to prepare a monthly Environment, Health and Safety report that is provided to the corporate E,H&S manager no later than the 7th day of the calendar month. This report is translated and summarized for senior Bema Gold Corp. staff. Additionally, a summary is incorporated into the monthly operating report that Bema Gold Corp. provides to IFC.

8.0 Implementation and Scheduling

Table 8.1 provides the:

- cost and implementation schedule for the Julietta EMP; and,
- cost and implementation schedule for the Julietta Social Monitoring Plan (SMP)..



Table 8.1. EAP Implementation and Completion Report (Revised May 2003)

Item No.	Budget	Description	Detailed Studies	Timing of Implementation/ Completion	Estimated Costs (\$US 1000's)	
				Date	Provision	Recurrent
C-1	EMP	<i>Environmental Management Program:</i> Submit OMGC environmental structure to include job descriptions and clear responsibilities for environmental, H&S, and social programs	Prepare and submit a detailed staffing report and reporting structure on Environmental, Social, Health, and Safety matters for IFC review and approval.	July 30, 2001 (in EAP) This item was completed July 15, 2001	5	-
C-2	EMP	<i>Environmental Monitoring Program:</i> Procure all environmental monitoring equipment and prepare for field season	All equipment proposed in EAP and approved in Russia	July 30, 2001 (in EAP) This item was completed July 15, 2001	35	10
C-3	EMP	<i>Environmental Training Program:</i> Train local environmental staff to ensure compliance with EMP	Report on progress, training levels to OMGC	July 30, 2001 (in EAP) The initial phase was completed July 15, 2001 but training is on-going	15	5
C-4	EMP	<i>Environmental Action Plan (to include Erosion Control Plan):</i> Finalize EAP following detailed design and during construction	Submit updated EAP to IFC for review and approval Revised EAP to be disclosed in World Bank Info Shop	July 30, 2001 Interim Report completed	2	2



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Item No.	Budget	Description	Detailed Studies	Timing of Implementation/ Completion	Estimated Costs (\$US 1000's)	
				Date	Provision	Recurrent
				September 2002. Final EAP completed May 2003.		
C-5	ERP	<i>Emergency Response Plan:</i> Develop and finalize ERP to include Mine Evacuation Plan and transportation/handling of hazardous materials.	Submit plan to IFC for review after regulatory approval	August 31, 2001 Completed August 2001	-	-
C-6	RCP	<i>Reclamation and Closure Plan:</i> Develop detailed Reclamation and Closure Plan including mitigation of any ARD issues	Submit plan to IFC and Magadan regulatory agencies for review and approval	October 31, 2001 Interim Completed September 2002. Final Plan to be completed in June 2003.	-	-
		Annual report on reclamation activities	Annual Reclamation Work Plan submitted as part of Annual Monitoring Report	No later than 90 days after end of calendar year	-	-



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C-7	WMP	Waste Management Plan: Develop detailed Waste Management Plan as part of shift from construction to operations	Submit plan to IFC and Magadan regulatory agencies for review. Based on <i>Solid Waste Discharge Permits</i> issued in Russia	September 30, 2001	5	-
		Annual report on WMP activities	Updates to WMP submitted as part of Annual Monitoring Report	Interim completed September 2002. New guidelines require this document to be amended. Due June 2003. No later than 90 days after end of calendar year	-	-
C-8	SPCC	Spill Prevention, Control, and Countermeasures Plan: Develop final SPCC Plan as part of shift from construction to operations	Submit plan to IFC and Magadan regulatory agencies for review.	August 31, 2001	-	-
		Annual report on SPCC activities	Report on SPCC as part of the Annual Monitoring Report	Interim Completed September 2002. Final Completed April 2003. No later than 90 days after end of calendar year	-	-



C-9	EMP	<i>Tailings dams Independent Review:</i> Independent review of tailings dam stability and operation in accordance with WB policy OP 4.37	Tailings dams (flotation and cyanide) Terms of Reference to be provided by IFC and agreed on by OMGC.	September 30, 2003	15	-
C-10	EMP	<i>Tailings dam discharge:</i> Prepare assessment and study on tailings dam discharge to surface water	Prepare and submit to both IFC and Magadan regulatory agencies a detailed study on the potential impacts of the tailings dam discharge to include additional baseline studies upstream and downstream of the discharge point.	Spring 2002 Completed	10	-
C-11	EAP	<i>Social Monitoring Program:</i> Finalize and disclose OMGC's plan for involvement in IFC-led Technical Assistance program in Magadan Oblast	Submit concept paper to IFC for review, based upon IFC internal Feasibility Study due in June 2001 and disclosure in the World Bank Info Shop.	August 31, 2001 OMGC has not been involved in this program to date.	5	-

