

A Model Mine Shows Its Cracks

An Independent Report on Environmental Problems At The Kubaka Gold Mine in the Russian Far East

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A. Introduction

The Kubaka gold mine is the first U.S.-Russian gold mine joint venture in the Russian Far East. In December 1997, Russian non-governmental organizations (NGOs) and PERC learned that the mine was encountering a series of potentially serious problems related to its tailings impoundment facility. The Kubaka Gold Mine is operated by Omolon Mining Company, a joint venture of Amax Gold Inc. as the major shareholder and a share of Russian partners including Geometall, Magadan Gold/Silver, Dukat GOK, Electrum, and a local Association of Native Peoples, according to the 1993 Environmental Assessment of the project. Amax Gold, Inc. representatives have indicated that it is in the process of merger negotiations with Kinross Gold, a Canadian mining company interested in developing the controversial Aginskoye deposit in Kamchatka. The Kubaka mine has received substantial funding of up to \$100 million political risk insurance and financing from the U.S. government's Overseas Private Investment Corporation (OPIC) and the multilateral European Bank for Reconstruction and Development (EBRD).

Since January 1998, PERC has engaged the U.S. joint venture partner Amax Gold, Inc. and representatives from OPIC and EBRD in discussions about the environmental issues at the Kubaka mine. These discussions, to date, have culminated in a meeting at PERC's offices on March 11 to discuss PERC's environmental concerns and the situation at the Kubaka mine. This report summarizes the information that PERC has learned about the Kubaka mine, focusing on the problems encountered at the mine, causes of those problems, and the need for remedial actions. The report also identifies implications of actions at Kubaka for other Russian sites, and provides a general set of recommendations for consideration in evaluating mine plans.

B. Objectives

This report will outline what PERC has learned about the Kubaka facility as a result of the meeting, highlight information that PERC still needs in order to better assess the current situation, and propose ideas for follow-up strategies and activities. PERC has initiated the Kubaka review process as a result of interest and concern about environmental impacts of the mine from associates and colleagues in the Russian Far East. PERC has maintained active communication with colleagues in the Russian Far East, including organizing a series of international technical exchanges and conferences on mining as well as forestry, fisheries, and oil and gas issues, since 1992.

PERC is bringing this issue to the attention of Russian and international environmental organizations, government officials and environmental regulators, companies and financial institutions, and the general public to engage you in a dialogue about these issues. PERC considers the Kubaka mine to be not only a critical concern in itself for ensuring monitoring and resolution of site-specific problems, but also an opportunity to discuss how mining companies that operate in the Russian Far East and around the world can best ensure that their activities are truly protective of environmental resources.

As the first international mining investment in the Russian Far East with the participation of a U.S. company and international financial backing, Kubaka Mine sets a precedent for international mining investments all over Russia. The Kubaka partners proudly note this status in the Environmental Assessment that was submitted to the EBRD in October 1993. They state: "The Kubaka Gold Mining Project will be one of the most advanced, if not the most advanced, mining and milling project in the Russian Federation. It will implement a modern, risk reduction based environmental management program to reduce air and water emissions to a minimum, to control runoff and erosion, to manage solid and hazardous wastes properly to protect terrestrial and aquatic ecosystems, and to achieve effective reclamation (recultivation) of the site in a timely and cost effective manner."

To make Kubaka into an effective model, citizens and decision-makers must learn openly about the actual design, construction, and operational performance of the facility. Now that the mine is actually producing gold and related wastes such as tailings and waste rock, citizens and decision-makers must learn about both the positive and the problematic aspects of the mine's actual performance and not rely solely on the projected design and projected economic benefits. Kubaka provides an opportunity to proactively influence future investments in the Russian mining sector. At this important stage in the life of "the most advanced mine in the Russian Federation," PERC believes that the lessons of the Kubaka mine can help mining

companies, government regulators, environmental organizations, and the public avoid similar problems in the future, even as those lessons are being learned.

C. Background on Environmental Concerns at Kubaka

In late 1997, colleagues provided the PERC staff with summaries of a series of unanticipated releases of liquid and contaminants at the Kubaka site. According to this information, Omolon's mine managers and regional inspectors observed a leak 6 meters from the base of the water retention dam in October 1997. Below the embankment, 200 square meters of water that was determined to have originated in the dam facility was observed. The company also observed both vertical and horizontal movement of the dam. On October 14, in response to the observed weakness in the dam, the company strengthened the water retention dam with a buttress of 7 meters high and 25 meters wide.

This information was of concern to PERC, which forwarded the material to its technical mining consultants Wm. Paul Robinson, Research Director at Southwest Research and Information Center in Albuquerque, New Mexico and Mike Long, Director of the Division of Geology and Minerals in the State of Colorado. PERC staff and its technical consultants confirmed that the company was aware of these potentially serious problems related to both seepage and dam settlement and that further investigations were required to fully identify the extent of the problems and the effectiveness of the responses by Omolon.

D. Availability of Technical Information Regarding Kubaka

In 1996, PERC filed a Freedom of Information Act request with OPIC to obtain technical data and environmental information about the OPIC-funded Kubaka mine. Nine months later, in response to the request, OPIC sent to PERC the Environmental Assessment (EA) for the Kubaka Project that had been prepared in November, 1993. The EA provided to PERC was heavily censored, as more than half of the document, including all of the technical information about mine design and planning, had been redacted for "business proprietary" reasons. This censorship effectively prevented PERC from reviewing the adequacy of environmental safety at the site. Under new guidelines drafted by OPIC, if the Kubaka mine were to be proposed today, the company would be required to make the full Environmental Assessment available to the public without redactions.

After PERC learned about the problems in the Kubaka tailings facility, it contacted OPIC and EBRD to obtain current documentation about the situation. Both OPIC and EBRD confirmed that they were aware of problems at the Kubaka mine and that they were investigating the situation.

PERC called Amax Gold, Inc., the U.S. partner company which is the largest shareholder in Omolon Mining Company and which is directing operations at the site, to find out more about the specific circumstances. Fred Banta, chief environmental officer for Amax Gold, welcomed a letter from PERC on January 28, 1998 that included a list of questions about the tailings facility based on the information that PERC had received. The correspondence that followed was intended to address the safety and stability of the tailings facility and to obtain basic information about monitoring at the site, public processes, and issues of environmental liability.

In early February 1998, Amax Gold, Inc. provided a full, unredacted copy of the 1993 Environmental Assessment to PERC based on PERC's 1996 request to OPIC under the Freedom of Information Act.

On February 4, Amax Gold, Inc. provided a written fact sheet to PERC that included brief descriptions of the situation at Kubaka, the problems with the tailings facility, and Omolon's actions to study and remedy the problem.

Based on Amax Gold, Inc.'s fact sheet, PERC sent a second letter to Amax Gold, Inc. on February 12, 1998. The second letter raised a series of technical questions about Kubaka operations and procedures, developed after review of the information contained in the fact sheet by PERC and its technical advisors. The second letter included new questions as well as questions originally posed by PERC that still remained unanswered by the company.

After over a month of telephone discussions and letter writing, the company initiated a meeting at PERC on March 11 to provide a briefing with visual aids and to hold an in-depth discussion about the current situation at the mine. The meeting was attended by:

- Julie Edlund, Russian Far East Program Coordinator, PERC;
- David Gordon, Acting Executive Director, PERC;
- Paul Robinson, Research Director, Southwest Research and Information Center and environmental mining consultant to PERC;
- Erika Rosenthal, environmental attorney, Earth Island Institute;
- Fred Banta, Chief Environmental Officer, Amax Gold Inc., the U.S. Joint Venture partner in the Kubaka mine;
- Don Hayley, principal engineer, EBA Engineering Consultants Ltd., consultant to Amax Gold;
- Nancy Dean, environmental officer, OPIC;
- Mehrdad Nazari, environmental officer, EBRD;
- Doug Norlen, policy analyst, PERC (via phone).

Unfortunately, Mr. Nazari of the EBRD objected to the meeting being audiotaped. Nonetheless, the meeting was held with the understanding that any and all information shared at the meeting would be open and shared with PERC's Russian colleagues. Participants also recognized the importance of follow-up activities in Magadan.

The meeting allowed the development of a strong working understanding of operations at the Kubaka mine, but left PERC and its technical consultant Paul Robinson with more questions than answers.

E. Lack of Applicable Information

One of the principal reasons that Fred Banta of Amax Gold, Inc. convened the meeting with PERC was because he recognized that PERC had not received sufficient information to gain an understanding of Kubaka design and operations. Although PERC had -- in February 1998 -- finally received a full copy of the 1993 environmental assessment, Mr. Banta informed PERC and its technical consultants that the 1993 EA did not accurately reflect the actual tailings facilities built and operating on the ground at Kubaka. PERC staff were disappointed to learn that the EA, which had only been provided to PERC under its Freedom of Information Act

request based on its concerns about the current releases and settlement at Kubaka, was not a useful document to try to understand the current situation.

Indeed, at the beginning of the meeting, PERC was told that the original 1993 EA had no relevance to the current discussion since the design for the tailings impoundment facility -- including the location and the very style of construction -- had completely changed.

For example, the 1993 EA called for a traditional tailings pond design with a 60-meter high dam using downstream-type raises from a keyed starter dam. The tailings pond as built was entirely changed from the plan approved with the EA. The new design relied on a pair of semipermeable tailings containment dikes draining to a water retention pond behind a lined dam that is 20 meters in height and that relies on permafrost and an unusual, zig-zagging liner in the dam for impermeability of the structure.

In the 1993 EA, the initial design for the tailings impoundment included a tailings facility with a 60-meter high dam and was described as a "pond which would be sealed and under normal operating circumstances there would be no discharges of water from the tailings pond" (p. 73). The actual tailings facility at the Kubaka site today is significantly redesigned from the design submitted the 1993 EA, with a water retention dam that reaches only 20 meters in height. The actual tailings facility was designed with apparently inaccurate calculations about providing sufficient liquid storage capacity to contain runoff and processed water associated with the first two years of operation, and thus the company has already been forced to request discharge permits.

F. Discussions at the Kubaka Meeting at PERC Offices

An agenda for the meeting was established, based on the draft provided by Fred Banta of Amax Gold, Inc.. The Agenda included:

- I. Introduction
 - II. Kubaka Background and Project Description
 - Kubaka Project Organization
 - Brief History and Overview of Development and Operations
 - III. Tailings Facility Issues
 - Technical Description of Issues
 - Regulatory and Community Involvement
 - Current Status and Plan
 - IV. Discussion, Question and Answer Period
 - V. Summary and Wrap up
- Review key points, next steps and follow-up

After brief introductions, presentations were given by Fred Banta and Don Hayley of EBA Engineering Ltd.

Mr. Banta indicated that Omolon Mining Company operates the Kubaka Mine. Amax Gold, Denver, Colorado, holds a controlling interest in the joint venture of more than 50%. There are seven Russian partners. Amax Gold is in the process of merging with Kinross Gold of Canada, which has an interest in developing such gold deposits in Kamchatka as Aginskoye. Mr. Banta indicated that the companies expect to complete the merger by mid-summer, 1998.

Mr. Banta indicated that the tailings facility that exists today at the Kubaka site was designed and engineered by EBA Engineering, Ltd. Don Hayley was the chief engineer on the project. EBA entirely changed the original tailings design that was included in the November '93 Environmental Assessment. Mr. Hayley indicated that his company specializes in permafrost technology. Thirty years ago most of EBA's work centered around the oil and gas industry and arctic construction. Ten years ago, EBA moved into the mining industry, after having identified it as a growing industry in the Arctic. In Russia, EBA has also worked on mines in Yakutia and Chita. In Chita, EBA is working with Golder Associates to design the tailings facility at the Balei Gold Mine, which is a Canadian-Russian joint venture. EBA has designed tailings facilities at the Red Dog Mine in Alaska, Kidd Creek Mine in Ontario, and several mines in the Yukon territory.

Mr. Hayley explained to PERC that the tailings design installed at Kubaka is very similar to that used by EBA at the Red Dog Mine tailings facility in Alaska, although no design information about the Red Dog facility was provided or identified (see Appendix One).

Mr. Hayley indicated that the concept was based on incorporating permafrost into the design of the facility, which depends on both a liner and the natural impermeability of permafrost. Mr. Hayley indicated that the liner is a double synthetic liner that zig-zags through the tailings dam itself. Mr. Hayley indicated that the dam was built from frozen shale slurry, placed warm in a core trench, and excavated into the permafrost found at the tailings dam site.

As a result of the EBA redesign, it was clear that the design of the tailings dams, their location at the site and their functional capacity had completely changed from the 1993 Environmental Assessment that was approved by Russian federal authorities and the international financial institutions. Mr. Banta indicated that he believes the current design of the tailings facility is improved from the original, more traditional tailings facility design, though he did not explain his reasons. The company and international financial institutions claim that the new design for the tailings facility also received approval from Russian regulatory authorities and international financial institutions for the design changes, although it is not clear why the new mine design did not undergo a full OVOS (EIA) process as mandated by Russian federal law, given the significant changes to original design and environmental impacts.

No information about the applications for or reviews of the permits associated with the redesigned tailings facility was provided by the bank or company representatives at the meeting, nor was the approval process discussed in any detail. PERC has not yet been provided with a copy of the new tailings facility design despite its requests for this information at the meeting and in writing.

G. Environmental Issues of Concern

Several environmental issues were raised during the correspondence and were addressed or mentioned at the March 11 meeting. They included:

1. Management of excess water and severe underestimation of annual precipitation;
2. Seepage through the water retention dam at the tailings facility;
3. Potential for acid mine drainage;
4. Extensive settlement of the water retention dam at the tailings facility;
5. Cyanide in seepage below the old Burkot tailings impoundment and environmental

accountability for that site;

6. Lack of explicit reclamation and closure plans;

7. Unidentified mechanisms for financial guarantees for performance assurance.

1. Management of excess water and severe underestimation of annual precipitation

One of the greatest challenges the company faces is handling excess water in the tailings facility. The average precipitation figures used to design the facility were significantly lower than the actual precipitation in the first two years of operation. The company designed the tailings facility based on estimated precipitation of 340 mm/year. In 1997, actual precipitation measured 478 mm. Amax Gold, Inc. has provided no calculation to estimate peak precipitation at the site, using either 100-year peaks, 500-year peaks or probable maximum precipitation. Seasonal temperature changes have also significantly differed from those anticipated by Omolon Mining Company.

Mr. Banta indicated that the 1996-97 winter in Magadan was exceptionally warm, so freezing occurred late. Among other design and operation problems associated with the excess water on site, diversion trenches around the facility were not as impervious as necessary, thus allowing additional seepage water into the facility, which lacked sufficient freeboard or excess capacity for storage of these liquids in addition to the actual tailings. Both of these factors combined to result in the excess of water in the tailings impoundment that Omolon determined would require an immediate response in October. Mr. Banta indicated that the company responded by modifying the amount of water into the mill, dewatering the tailings through increased evaporation, and actively pumping water from the retention reservoir back to the top of the tailings facility. However, this response will suffice merely as a delay tactic, since the pumped water will continue to return to the retention reservoir. Mr. Banta indicated that the company has yet to complete its design for long-term water management even after recognizing that the facility was inadequately designed for high precipitation or less cold years.

The mine was originally designed and permitted with the understanding that it would be a "zero discharge" mine except in exceptional circumstances. Fred Banta of Amax Gold, Inc. continues to assert that the company's intention is to have a zero discharge facility. Nonetheless, the company acknowledged that it has already been forced to ask for an emergency discharge permit from the Regional Committee on Ecology in Spring 1997 as a result of high precipitation and runoff. At that time, the permit was denied. Mr. Banta indicated that in Spring 1998, the company was again forced to ask for an emergency discharge permit. Mr. Banta indicated that the company received approval for the Spring 1998 emergency discharge permit from the Regional Committee on Ecology, allowing the company to discharge liquids from the tailings facility directly to the Kubaka River floodplain so long as the company does not exceed 75,000 cubic meters of discharge and discharge meets allowable pollution norms (PDK). The pollution discharge fee associated with this regulatory action was not discussed and no copy of the actual decision document was provided. Fred Banta of Amax Gold, Inc. informed PERC that the company is in discussions with the Committee on Ecology to clarify under what circumstances the mine will be given a discharge permit in the future. The company would like to see a set of norms for exceptional circumstances that would "trigger" an emergency discharge permit.

In sharp contrast to the uncertainty as to the design capacity for the Kubaka tailings facility, mines in Canada or the United States are typically now required to be built to withstand a certain "storm event." For example, permanent storage impoundments are required to be built to sustain a "probably maximum precipitation" event and diversion structures are required to be built to fully contain a high precipitation event over a 100-year or 500-year period. Unfortunately, it appears as though the Kubaka tailings facility was not designed for such a maximum precipitation year. The only data available from the Kubaka operators are estimates used in the 1993 EA. These estimates merely added 50% to annual precipitation for a site located more than 200 kilometers away from the mine site.

Unfortunately, these figures have no relevance to precipitation at the actual mine site. No data has been presented that relates to the revised tailings design. Indeed, it appears as though the calculations used for designing the facility are not adequate to dealing with even moderately high precipitation years, much less peak event or extremely wet or warm years. The failure to appropriately estimate peak precipitation appears at this time to result from a combination of shortcomings including: the failure to use a reasonable multiplying factor to account for regional variation in precipitation; Omolon's failure to build in buffer capacity based on an evaluation of precipitation figures and corresponding design requirements; inadequacies in the revised design and water balance calculations associated with it; and the lack of regulatory agency and international financial institution staff or consultants to check the figures or review criteria.

PERC continues to be extremely concerned that a mine that was designed as a "zero discharge" mine has not met that design goal and instead has repeatedly sought permission to discharge waste water off the mine site. PERC is concerned that -- as a result of the company using improper design calculations for the amount of expected precipitation - the approval of such discharge permits, rather than upgrading requirements to provide for peak precipitation containment and active monitoring of impoundment capacity, could become the norm for the Kubaka mine rather than the exception.

Such regular discharge would severely undermine the original concept of the mine as a "zero discharge" mine. We recommend that the regulatory and lending institutions focus on developing standards that require assured storm and snowmelt capacity, with active monitoring, as opposed to a regular pattern of exceptions for facility which do not attain zero discharge design goals. In response to the current situation, PERC is recommending that the company, Russian regulatory authorities, and the international financial institutions take all measures to ensure that the mine meets its objective of a "zero discharge" mine and neither seek nor use emergency discharge permits. If such permits are used as last resort, they should be accompanied by major financial fees or levies to support investigation of the causes of such discharges, their effects on ecosystems, and the design of systems to avoid future discharges. An example of this approach appears in the settlement for unanticipated releases from the similar Red Dog mine in Alaska, a summary of which is attached to this report as Appendix One.

2. Seepage through the Water Retention Dam at the tailings facility

Mr. Hayley described the tailings facility as consisting of two levels. Partially dry tailings with a 70% solids factor are dispersed in the upper level. The lower containment, or water retention reservoir, holds the liquid tailings which flow through

two semipermeable dikes that separate the upper containment from the water retention reservoir. The dam at the end of the water retention reservoir is 20 meters high and was built to maintain a frozen core.

Mr. Hayley said that in October 1997, a leak through the water retention dam was detected 6 meters up from the base of the dam. Liquid from the leak had collected at the foot of the dam and formed an ice crust that measured 200 square meters. Analysis of the seepage liquid confirmed that it contained cyanide and had originated in the water retention facility.

Mr. Hayley said that the company has not yet determined the exact cause of the seepage although he surmised at the meeting that the leak was coming around the liner in the tailings dam at a place where the liner adjoins to the abutment of the permafrost tailings facility. It was not clear from his presentation whether the seepage had occurred as a result of improper construction or from a fault in the liner. It was also not clear whether the tailings facility was regularly inspected during construction and whether and by whom the facility was certified as being built according to its design.

In its fact sheet, Amax Gold Inc. confirmed that the liquid that had seeped through the water retention dam contained .08 mg/l of cyanide. The occurrence of cyanide confirmed that the seepage was from the tailings side of the retention dam, since no cyanide, even at a level of 0.08 mg/l, would be anticipated from water entering the dam from non-tailings sources.

PERC has requested but not yet received a complete water quality analysis that would identify the extent of cyanide, solids, and heavy metals that may be present in the water. Those contaminants, as well as cyanide, could lead to ground-water and soil pollution as well as indicate areas of leakage in the dam.

PERC has also requested complete water level, temperature and water quality monitoring data for the water retention reservoir, tailings facility, the seepage below the embankment, and the point of compliance to provide a full picture of the Kubaka mine water and temperature monitoring systems.

The Amax Gold, Inc. representatives indicated that the seepage was discovered in October 1997 because that is the month with the highest water flows. As of January 1, the seepage had frozen. In order to fully repair the dam and prevent future leaks, PERC strongly recommends that the company, regulatory authorities, international financial institutions, and independent experts undertake an investigation to determine the cause of seepage and the follow-up repairs and monitoring that must be completed prior to the June thaw in 1998 in order to ensure no further seepage.

The Amax Gold, Inc. representatives asserted that Omolon would install monitor wells into the area downstream of the centerline of the water retention dam, including the buttresses added to the dam since the seepage and dam settlement (see 4. Extensive settlement of the water retention dam) occurred, to monitor seepage waters. Mr. Hayley indicated that the monitoring wells would be designed to serve as pump-back wells, if future seepage is detected in the area of concern.

3. Potential for Development of Acid Drainage

Acid rock drainage, a process of rock acidification associated with sulfide-mineral ore bodies at many metal and coal mines, is a major source of water pollution associated with hard rock mines. Little data on the mineral content of the ore is provided in the

1993 EA or other documents. Yet Western Pinnacle Ltd., a part owner of Omolon Mining Company after it acquired part of Geometall, reports that at Kubaka, "the principal ore minerals are pyrite, arsenopyrite, galena,..." all of which are which are sulfides of iron, arsenic and lead respectively.

In recognition that acid mine drainage is a problem at other permafrost mine locations, that the potential for acid drainage to create extremely long-term water pollution impacts, and that there is a lack of data available for Kubaka, PERC has also requested data regarding the acid generating potential and mineralogy of the ore body from Amax Gold, Inc. At the meeting, PERC was informed by the company that acid base accounting was not considered necessary at the site because the rock type does not have the potential to create acid drainage. However, knowing that the ore body contains pyrites that can create acid mine drainage, PERC has continued to request relevant documents. PERC has asked for full information on acid generating potential for all rock types at the site and documentation of mineral content, with the emphasis on sulfide mineral content, along with summaries of any tests to demonstrate acid generating potential and acid base accounting calculations for samples from those rock types. Under U.S. regulatory practice, the company would be required to disclose the acid generating potential of the ore bodies.

4. Extensive settlement of the water retention dam at the tailings facility

In addition to the seepage through the dam, Omolon Mining Company observed unexpected structural settlement of the water retention dam. Omolon reportedly observed both horizontal and vertical movement of the dam, and Amax Gold, Inc. representatives indicated that the horizontal movement caused the most concern. In a worst-case scenario, differential settlement has led to catastrophic collapse or failure at tailings dams, notably the 1995 failure of the Omai gold tailings dam in Guyana, which poisoned 17 kilometers of river, and the 1979 breach of the Churchrock uranium tailings dam in New Mexico, USA, which contaminated 80 kilometers of a river in two states.

Amax Gold representatives indicated that the 20-meter-high water retention dam was built using a combination of a frozen core with a double liner system that zigzags, if viewed in cross-section, through the middle of the dam. The dam as built, according to its designer Don Hayley, rests on a frozen foundation that consists of up to two meters of peat over ice-rich silt. During construction of the dam, a warm shale layer was poured and allowed to freeze to create an impermeable frozen base. A core of frozen material was layered up this base, including a synthetic liner, all designed to function as a frozen structure, according to Mr. Hayley. The dam was engineered to maintain a thermal balance in a frozen condition based on stable ambient ground and air temperatures.

Amax Gold representatives noted that the winter of 1996-97 -- during construction of the tailings facility -- was the warmest winter on record. They indicated that construction of the dam and tailings facility had to be modified accordingly, although they provided little supporting detail. Due to the lack of supporting documentation, it is unclear to PERC staff and consultants whether or not the dam and tailings facility were built as designed.

PERC staff and consultants have received no technical documentation regarding the design of the tailings structure other than a single overview schematic. The documents discussed at the March meeting have not yet been provided for PERC

review. This report is based on PERC staff's and consultants' recollection of the materials presented by Omolon and the bank representatives, as no documents were exchanged, audiotaping was rejected by EBRD, and the technical discussions related to viewgraphs and slides were not provided to PERC following the presentation.

In his discussion of the tailings facility design, Mr. Hayley indicated that development in permafrost area can often result in thawing and destabilization of the permafrost. A technology developed to address permafrost conditions is a "thermosyphon" -- a passive system relying on a closed tube of carbon dioxide with one end in the permafrost and one end exposed to air to allow heat transfer sufficient to keep the permafrost area frozen. This system is commonly used in the arctic in Alaska and Canada. Thermosyphons have been a common construction practice in these areas since they were pioneered during the construction of the trans-Alaska pipeline in the late 1960s.

EBA Engineering, which designed the Kubaka tailings facility, has patented its own unique thermosyphon design. Mr. Hayley indicated that the need for thermosyphons was apparently identified during dam design, but EBA and Omolon Mining Company decided to wait until after completion and initial loading of the dam, and after settlement had been detected, to install thermosyphons.

When asked why the company decided not to install thermosyphons right away even though they are commonly used in arctic construction, Mr. Banta indicated that the challenging logistics of the sites and the cost of installing thermosyphons played a role in this decision.

In discussing permafrost relationships, Mr. Hayley indicated that, normally, peat will attenuate the annual thaw but any disturbance can result in a deeper thaw. According to the company, it may have been thawing of the ice silt that triggered the lateral movement of the dam in October 1997.

In Fall 1997, the company decided that the movement of the dam indeed demonstrated the need to install thermosyphons. The company has now installed 120 thermosyphons into the body of the dam, upstream of the liner and the core. During a recent telephone conversation, Fred Banta of Amax Gold informed PERC that half the thermosyphons had been charged and that they were working well to reduce temperatures in the core of the dam and thus maintain the frozen core. PERC has yet to receive any documentation regarding the performance of the thermosyphons and the thermal monitoring of the dams (thermister data) and remains concerned about the observed movement in the dam and the potential for continued thawing of other portions of the permafrost. PERC staff and consultants are particularly concerned about the monitoring of the thermal profile of the dam and other tailings structures and the impact of dam settlement on the liner and other design elements.

It is unclear whether delayed installation of thermosyphons has been standard practice at other arctic mines where a similar approach to tailings management has been used. However, it is apparent to PERC staff and consultants that the thermosyphon systems are integral to the frozen core dam installed by EBA at Kubaka and that the thermosyphons would have significantly reduced the likelihood of the type of settlement which occurred at the water retention dam.

When asked about reasons for the horizontal slope failure movement detected in the dam, Don Hayley of EBA Engineering surmised that it was due to unexpected thawing of the permafrost under the downstream portion of the dam. Neither Mr. Hayley nor Mr. Banta explained the cause of such thawing, nor was an approach identified for assuring that the downstream portion of the dam remains frozen, as no thermosyphons were identified for that area of unanticipated soil thawing.

When it observed the cracks in the dam indicating horizontal movement, Omolon Mining Company added a 7-meter-high and 25-meter-wide buttress to the toe of the dam. This decision was designed to temporarily add strength to the dam to prevent further dam failure while the company studied the situation. After visits by EBA Engineering, Omolon Mining Company has decided to build a second major buttress below the dam, resulting in an engineering structure approximately three times the width of the original dam itself. According to Don Hayley of EBA Engineering, the buttress is designed to hold up the dam even in a worst-case scenario in which all the permafrost under the dam were to thaw, which they claim is not expected. Amax Gold has yet to provide copies of the visual aids used by Mr. Banta and Mr. Hayley in their presentation at the PERC offices. Amax Gold has also not provided reports or analyses to support those presentations, so PERC has no information on the worst-case scenario which actually was analyzed by Omolon.

Mr. Hayley indicated that Omolon Mining Company is using waste rock from the mine to complete these buttresses. The use of waste rock in this effort only increases PERC's concerns regarding the potential long-term impacts of acid mine drainage. As a result, PERC is quite interested in seeing the data that shows the lack of potential for acid generation in the waste rock.

Mr. Banta indicated that Omolon Mining Company is currently in final discussions with regulatory authorities in Magadan to receive approval for construction of the buttress. Mr. Hayley has recently traveled to Magadan to convince Omolon Mining Company of the need to build the second buttress and to convince the workers at Kubaka that they must divert necessary equipment and waste rock to construct the buttress. Indeed, this buttress appears to have been designed as an emergency response to prevent a potential major failure of the water retention dam. Based on the information provided by Amax Gold to date however, it would appear that better execution of the initial design, safer modeling and active monitoring of permafrost behavior, and improved construction of the water retention dam without delayed thermosyphon installation may have averted the problems which have developed since operations began.

According to Amax Gold, Inc., the thaw will begin in June and reach its greatest extent in October. PERC believes that it is absolutely vital for the very safety of the water retention dam to have these issues fully resolved before the thaw begins. PERC has asked Amax Gold, Inc. for monitoring data from the thermal profile of the dam as well as for copies of the charts, graphs, and slides that were presented at the meeting. This information will allow PERC to better understand the dam movement and to understand if there is a relationship to the seepage through the dam.

5. Cyanide in seepage below the old Burkot tailings impoundment and environmental accountability for that site

Omolon Mining Company detected cyanide-contaminated seepage downstream of old tailings on the site of the Kubaka mine. This waste pile is called the Burkot tailings impoundment, left by a former operator called Dukat Mining Company. These materials are located at the mouth of Razlom Creek between Kubaka's current tailings impoundment facility and the Kubaka River.

This facility was left unreclaimed by Dukat and is not actively used by Omolon Mining Company. Indeed, Omolon Mining Company does not acknowledge any responsibility for the reclamation of the Burkot Tailings Impoundment, claiming that Russian companies are still interested in the Burkot for potential reprocessing of tailings to extract more gold. However, the Burkot tailings are next to and downstream of the Kubaka tailings and Kubaka plant site, and thus could add to releases of water pollution from the Kubaka site.

In September 1997, cyanide was detected in seepage at the outer edge, or toe, of the Burkot facility. According to Amax Gold, Omolon determined that the source of the contamination was a leak in the secondary containment for the portions of the Omolon gold processing mill including the thickener, leach tanks, or cyanide destruction unit. The company indicated that it had cut off the source of the cyanide seepage and continues to monitor the seepage to ensure that cyanides are no longer present.

As with other reports of the Kubaka incidents, no technical documentation for conclusions presented by Amax Gold have been available either from the Amax Gold representative or lending institutions, both of which have had staff -- including Mr. Nazari and Mr. Hayley, who attended the meeting -- at the site since the September and October 1997 incidents occurred. PERC has been provided no information regarding the route the cyanide-contaminated material followed from the Omolon Mill to the Burkot Tailings Impoundment. Amax Gold has not provided diagrams of the mill or identification of areas where cyanide-contaminated residue was detected or removed. Amax Gold also has not provided materials about the repairs or redesign to prevent further such incidents.

While PERC continues to be concerned about the effectiveness of the response by Omolon, Amax Gold, and lending institutions, PERC is more concerned about the long-term responsibility for this Burkot site regarding both environmental controls and post-mining reclamation. The Burkot site is located at a critical spot within the Kubaka site. As such, PERC recommends that it be managed as part of the Kubaka site, including operational monitoring and site reclamation, irrespective of whether or not the tailings are remined for their gold content.

Amax Gold and lending institution representatives recognize that environmental management and reclamation responsibility for the Burkot Tailings Impoundment has not been clarified. Of particular concern for PERC at this time is the apparent location of the point of compliance for water pollution norms for the Kubaka mine. The point of compliance is located downstream from the Burkot Tailings Impoundment. This decision, if accurately understood, further integrates the Burkot tailings into the area of responsibility of Omolon. Due to the lack of monitoring data and the location of the Burkot wastes, PERC is concerned that liability for water quality problems caused either by Omolon Mining Company or the Burkot tailings may not be effectively resolved by either Omolon Mining Company or Dukat Mining Company if responsibility for environmental management of the old operation is not finalized.

This underlines the importance of resolving responsibility for all areas on the site prior to the beginning of operations. PERC strongly recommends that, irrespective of the potential for reprocessing tailings in the Burkot impoundment, government regulators, Omolon Mining Company, lending institutions, and other interested parties come to a final agreement that would guarantee the reclamation of the Burkot Tailings Impoundment and prevent long-term pollution of water quality from this area. Since the lands in question are located on the Kubaka site, PERC recommends that Omolon Mining Company assume responsibility for reclamation regardless of other questions.

PERC has also requested water quality data that should be regularly gathered as part of a monitoring regime and is interested in promoting decisions that would ensure responsibility for the closure and reclamation of the tailings impoundment.

6. Lack of explicit reclamation and closure plans

While the development and implementation of reclamation plans is a part of the mine plan as implied in the 1993 EA and anticipated by the lending institutions, no such plans were identified by the Amax Gold representatives at the March 11 meeting. The 1993 EA states that "reclamation and revegetation measures will be implemented on an on-going basis" and that "the overall reclamation plan will be reviewed and agreed to during operations as the mine is developed" (1993 EA at p. 90-91). At the meeting, the Amax Gold, Inc. representative stated that it did not have any formalized reclamation or closure plans for the Kubaka site. Instead, Amax said that it only has reclamation concepts for the site and that this is part of the overall planning process.

It is unclear why a full reclamation plan was not required for approval prior to permitting of the mine, since this is a requirement under both Russian and U.S. law. Furthermore, development, approval, and implementation of a full reclamation plan should also be of interest to the international financial institutions to ensure against future liability for closure and reclamation of the site.

Indeed, EBRD recognizes the importance of reclamation plans in its public documents. In a 1995 "Environment in Transition" article by EBRD staff on environmental aspects of mining projects, it is stated that "The EBRD's environmental appraisal process attaches considerable importance to the preparation and implementation of an adequate mine closure programme by the project sponsor." The same article states, "The mine closure programme should be incorporated into the overall project plans, to be implemented, to the extent possible, concurrently with the mining operation." It is not clear why EBRD did not follow its own advice in the case of the Kubaka mine. EBRD recognizes that these mine reclamation plans should be in place prior to project initiation, as it states, "As mine closure normally takes place after the EBRD's investments have been repaid and divested, the Bank has no leverage to influence the ultimate environmental performance of a mining project."

The Kubaka mine was designed to have a mine life of seven years. Since the tailings facility has been totally redesigned from the 1993 EA, and no information on the actual waste rock management plan in use at the site has been provided, PERC believes that the completion of a reclamation plan with supporting financial assurance is long overdue. PERC is concerned that the delay in development of the

reclamation plan may result in the plan being approved close to the date of mine closure. Such a precedent would set a very poor standard for reclamation planning at future mines in Russia, as many states and provinces, including Colorado, New Mexico, British Columbia, and the Yukon Territory already require final approval of such plans prior to issuance of a mining permit.

A particularly disturbing reclamation concept which Amax Gold, Inc. did share is that part of its reclamation concepts include removal of the water retention dam once the tailings have supposedly frozen into permafrost. Mr. Hayley of EBA Engineering indicated that the company would also place a cap over the tailings themselves. Since the water retention dam is the only "impermeable barrier" -- assuming effective long-term resolution of the seepage event mentioned above -- at the tailings site, and has been difficult to operate as it was designed, how can the public, the regulators, or the international financial institutions be certain of the long-term durability of the "semipermeable" tailings dikes as the primary long-term containment structure?

Amax Gold, Inc. did not provide enough information for PERC or other interested groups to evaluate any reclamation concepts or plans, but its discussion of these matters clearly indicated to PERC that the time for formal development of reclamation plans is sorely needed and long overdue.

7. Unidentified mechanisms for financial guarantees for performance assurance

Omolon Mining Company has not been required to post a bond or financial guarantee that would ensure reclamation after mine closure. A similar new mine in Colorado, New Mexico, or most other western states, as well as in British Columbia and the Yukon among other Canadian provinces, would be legally required to post a financial guarantee such as a bond, letter of credit or other collateral that would be payable to state or federal regulatory authorities for use solely in the event of abandonment of the mine or bankruptcy of the company. Such a financial guarantee must be posted prior to the initiation of mining activities. The guarantee or bond would be set at the level of actual costs of reclaiming the site, reviewed and adjusted on a regular basis, and could only be used for reclamation. When reclamation is successfully demonstrated, the bond or guarantee is returned, with interest, to the mine operator.

Based on PERC's questions about a financial assurance and performance bonds, Amax Gold, Inc. indicated in its "fact sheet" that it has started a financial accrual to cover the costs of reclamation. In further discussions, it became clear that this is an internal accounting mechanism within Amax Gold, Inc. to earmark funds for reclamation. Such internal accounting procedures are far different than the collateralized financial assurance which Amax would have established had the Kubaka mine opened in the company's home state of Colorado. The "financial accrual" funds as described would not be available to local government authorities if Omolon Mining Company does not meet its reclamation objectives or reclamation requirements under Russian law.

Mr. Banta of Amax Gold, Inc. indicated that differences between American and Russian accounting practices mean that while Amax Gold, Inc. has begun such a financial accrual, this accrual is apparently not reflected on Omolon Mining

Company's books. According to Mr. Banta, this difference is based on the Russian accounting practice that costs cannot be assumed as a liability until they are actually spent on the activity. According to Mr. Banta, such expenses can only be reflected on Omolon Mining Company's accounting records when reclamation activities are undertaken. PERC's staff and consultants were extremely concerned that representatives from Amax Gold and the lending institutions considered the establishment of reclamation surety a mere accounting matter when they recognize that Omolon Mining Company has not yet followed through on its commitments to establish a reclamation plan. PERC is concerned that this deferral of full-scale reclamation planning and the lack of a financial guarantee sets the wrong standard for a modern mine where reclamation must be planned for and funded prior to start-up as an integral part of the overall mine plan.

EBRD also recognizes these concerns in its 1995 article, noting the "shortcomings of accounting provisions" and the importance of "securing a funding mechanism for a mine closure programme [that] may vary and can include corporate guarantees, trust funds, bonds and securities, and insurance. The mechanism chosen should ensure that sufficient funds are available and are strictly restricted to the implementation of the mine closure programme." According to EBRD, this will help prevent the possibility that "the owner/operators may be tempted to 'walk away', before satisfactory implementation of a mine closure programme." Again, it is not clear why EBRD did not follow its own advice by requiring such a financial guarantee for the Kubaka mine.

The absence of a reclamation bond or financial guarantee increases the urgency and importance of having an agreed upon and approved formal reclamation and closure plan. First and foremost, this plan will assist Omolon Mining Company and government regulators to estimate the full costs required for reclamation. PERC recommends that a full reclamation and closure plan be developed immediately and presented to the public and government regulators for discussion and approval. Furthermore, PERC strongly urges Amax Gold, Inc., Omolon Mining Company, government regulators, and the international financial institutions to discuss and implement a mechanism by which Omolon Mining Company is required to set aside funds for reclamation and closure, funds which will be made available to government regulators for reclamation and closure if Omolon Mining Company is not able to complete reclamation and closure.

H. Information Disclosure and Relations with NGOs

Since the beginning of the Kubaka project, it has been difficult for PERC and its colleagues in the Russian Far East to obtain accurate information about the Kubaka mine. This poor information disclosure, in spite of the effectiveness of the computer-based communications that Omolon Mining Company has established at the site, creates significant problems for citizens' organizations that are interested in monitoring the mine to ensure that the mine is truly being protective of ecological resources. When PERC first asked OPIC in 1996 for the Kubaka environmental assessment, OPIC did not respond. PERC later filed suit against OPIC for the violation of the Freedom of Information Act by not providing environmental information about the Kubaka mine and other U.S.-financed projects in the Russian Far East.

As a result of the lawsuit, OPIC finally gave PERC a partial version of the 1993 Environmental Assessment of the Kubaka mine. Yet this version did not contain any

of the technical information needed to evaluate Omolon Mining Company's plans or designs for the mine to ensure that it was protecting environmental values. Only when PERC approached Amax Gold, Inc. and the financial institutions with concerns about the environmental problems already occurring at the mine -- the seepage through the tailings dam and the movement of the tailings dam -- did Amax Gold, Inc. and OPIC provide a full version of the 1993 document with the technical plans. But this full Environmental Assessment from November 1993 is not an accurate or current document for review of the operations at Kubaka. It does not accurately reflect the tailing management methods or site and its annual precipitation calculations were identified by PERC as more than 50% below the actual rainfall in the second year of operation. Indeed it appears that no climate data were gathered by the Kubaka partners during its work prior to preparation of the 1993 EA. While the discussions at the meeting showed that the 1993 EA was erroneous for the tailings area, no time was available to discuss other site design areas of concern, particularly waste rock and pit management, and how those plans may vary from those presented in the 1993 EA.

Even though the Environmental Assessment - part of the Feasibility Study -- did not reflect the design or site used for actual design of the tailings impoundment facility, the document was used to obtain Russian regulatory approvals, to obtain financing from OPIC and EBRD, and then became part of the contract between the company and the banks. As this document is so outdated, PERC is very concerned about the quality and accuracy of the documentation used by the lending institutions to monitor their \$100 million investment in Kubaka. The 1993 EA, despite its lack of relevance to the project, is the only document that the public would have received for review.

The company stated that its modified designs were approved by Russian regulatory authorities, OPIC, and EBRD prior to implementation. However, PERC has not been provided with these design documents for review and is not aware of any opportunities for the Russian or international public to review those modifications. PERC believes that it is essential for effective public participation in the host country and internationally to receive the current design of the mine and to understand the processes used to approve these significant changes from the original project proposal.

These issues have relevance not only for the Kubaka site but also for future mining projects in the Russian Far East. Such a lack of transparency has ramifications in Russia for local communities in those regions where activities are proposed. It also has relevance in the United States for citizens groups that want to review proposed U.S.-financed investment projects in other countries. It is essential to ensure the highest environmental standards prior to project financing and approval, and to do this, citizens need access to information. The public must be part of the entire decision-making process, including any decisions to modify original plans.

Fred Banta of Amax Gold, Inc. has encouraged PERC to engage in direct communications with representatives from Omolon Mining Company. Similarly, Mr. Banta has encouraged all interested NGOs in Magadan Region and throughout the Russian Far East to communicate with Omolon Mining Company directly. Mr. Banta believes it is vital to engage Omolon Mining Company at this stage since Omolon will be integrally involved in all activities at the mine. He also has stated that, with the current merger between Amax Gold, Inc. and Kinross Gold, it is unclear what

responsibilities Amax Gold, Inc. will retain for the Kubaka mine. As such, it is important to establish communication directly with Omolon.

PERC is pleased that Amax Gold, Inc. is encouraging direct communication with Omolon. PERC is also pleased that representatives of Omolon Mining Company have stated their willingness to discuss all issues of the Kubaka mine with concerned citizens and NGO representatives. Amax Gold, Inc. has also invited PERC and its NGO colleagues to visit the Kubaka mine in order to see the situation for ourselves. While PERC hopes to have the opportunity to accept this invitation, it is clear that a one-time site visit does not replace the importance of having a mechanism to receive and evaluate on-going monitoring data and technical information about the mine. Having such data and technical information prior to a site visit will help greatly in ensuring that participants can ask more informed questions and gain better understanding during the site visit.

PERC has been pleased with Amax Gold, Inc.'s willingness to engage in discussions about the mine. Simultaneously, PERC notes that most of these discussions have been quite general and have lacked the comprehensive and detailed responses to technical issues that would allow PERC or other members of the public concerned about the environmental impacts of the operations to make any judgment about the environmental safety of the Kubaka mine.

PERC is also pleased that representatives of OPIC and EBRD have participated in these discussions. This participation signifies an awareness on the part of the financial institutions that they have played an integral role in the development of the Kubaka mine. As such, these financial institutions also have a responsibility to ensure that the mine is operated in a safe manner and in accordance with the original understanding of the mine's design and to correct any shortcomings in project implementation. An important first step in this process is to help ensure full transparency and openness of information for citizens' groups that are interested in independently reviewing the materials.

Not surprisingly, PERC's meeting with Amax Gold, Inc., OPIC, and EBRD generated more questions than answers. As a result of the meeting and follow-up discussions, PERC sent another letter to Fred Banta at Amax Gold, Inc. outlining the technical reports, data, images, and charts either presented at the meeting or referred to by the Omolon representatives and which should be readily available. These include water quality monitoring reports, acid generation data for the rock types, actual design of the tailings facility, and reclamation concepts, among others.

Fred Banta indicated that he would be discussing PERC's request for information internally at Amax Gold, Inc. and with Omolon Mining Company. Unfortunately, Mr. Banta has not yet been able to provide PERC with a positive response that Amax Gold, Inc. will make these materials available, nor has he provided PERC with a timeline for receipt of the materials. Mr. Banta also stated that the merger of Amax Gold, Inc. with Kinross Gold may create difficulties in providing this information. PERC is hopeful that Amax Gold, Inc. will recognize the importance of sharing these materials but is concerned that these materials - which should be publicly available - have not yet been provided.

In regard to monitoring reports, PERC was informed by Amax Gold, Inc. that it believed that it would not be useful to share the monitoring reports submitted about

the Kubaka mine to Russian regulatory agencies because they are "cryptic" and often Amax Gold, Inc. itself does not fully understand these monitoring reports. PERC was extremely disturbed by this conclusion. The company's concern about "cryptic" monitoring reports indicates a misunderstanding between regulatory authorities and the company and does not engender confidence that current monitoring of the site is ensuring environmental safety.

PERC has made it clear that its intent is to objectively review materials about the Kubaka mine on behalf of Russian and U.S. colleagues and citizens' groups that are interested in ensuring that the mine is operated in a way that truly protects ecological resources. PERC is also interested in encouraging a better example for an operation that was designed to be "the most advanced mine in the Russian Federation" implementing a "modern risk reduction based environmental management system."

To do this effectively, PERC strongly believes that full and accurate documentation regarding design and operation developments at the mine, and in particular major modifications of designs and unanticipated releases, must be readily available from the operators, lending institutions, and government regulators. NGOs and local citizens must have the necessary information and data to evaluate the performance of such a "model" mine and to make a fair and scientifically substantiated assessment.

PERC anticipates that its staff and consultants will monitor developments at Kubaka closely and continue to keep its colleagues both in Russia and the U.S. informed of its further interactions with the company, the information (or lack thereof) provided by the company, and further follow-up activities.

Lessons from Kubaka and Recommendations for Action

The Kubaka mine is a precedent for U.S. investment into the mining sector in the Russian Far East. The Kubaka mine has been hailed as a model of how U.S. mining companies can help improve Russian mining practices. As a "model," and with support of \$100 million from international lending institutions, it is appropriate for the company and lending institutions to demonstrate that high standards are set in design, performance, and public involvement.

Unfortunately, based on PERC's initial analysis of the problems at the Kubaka mine, it believes that it is indeed accurate to call the Kubaka mine a model -- a model of a mine that could cause significant long-term environmental impacts as a result of poor design, improper implementation, and lack of public oversight. Problems include poor disclosure of design modifications, poor baseline data for critical precipitation models, seepage and slope settlement on the critical dam at the tailings impoundment, cyanide-contamination at an inactive tailings site on mine property, and a lack of effective reclamation plans well after the mine is already in operation. The lack of timely response to public requests for information and the response with out-of-date materials sets a poor standard for this first effort in the Russian Far East.

Many western companies promote themselves as being more environmentally responsible than Russian mining companies. It is true that strong citizens' and governmental oversight in the United States has forced a significant improvement in mining practices in the last 20 years. The early lessons from the Kubaka situation

underscore the extreme difficulty of mining in an appropriate manner in Siberia and the Russian Far East and show that even U.S. companies can create significant and potentially long-term environmental problems in the Russian Far East unless there is regular and effective oversight from governmental authorities and the public. The lessons from the California-based Homestake McLaughlin Gold Mine, in which a mine made a transition from generating unforeseen acid rock drainage problems to establishing redesigned waste rock piles and tailings reclamation plans that are a positive model, could also be applied to Kubaka. The means that Omolon Mining Company uses to address its environmental challenges that have arisen due to current performance problems and the lack of demonstrable reclamation plans will determine if Kubaka can become recognized as an effective model of mining performance. Otherwise, the Russian Far East will have to wait for a more effective model of an "advanced" mine.

PERC's staff and Russian colleagues, based on experience in the region, recognize that some areas of the Russian Far East may be inappropriate for mining activity due to the potential damage to fragile and pristine wildlands and watersheds. In other areas, mining may be determined to be an appropriate activity. For those areas where it may be appropriate to mine, we believe that important lessons can be drawn from the environmental problems encountered at the Kubaka mine thus far. These lessons include recognition of the need for:

- Accurate environmental impact assessments that are closely reviewed;
- Thorough public oversight of the environmental impact assessment with full documentation and opportunities for independent expert review that are available well ahead of public meetings;
- Full reclamation and closure plans reviewed and approved prior to project approval with periodic updates to ensure that plans are current;
- Precipitation modeling using on-site data that are gathered for at least one year and precipitation modeling using long-term peak events;
- Planning that incorporates worst-case scenarios for water balance, tailings and waste rock site capacity, and structural safety considerations;
- Full openness and transparency of information, including technical information and monitoring and inspection reports readily available in a timely manner with opportunities for effective dialog among interested parties;
- A bond or financial guarantee that ensures fulfillment of reclamation and closure plans in place prior to construction or operation of facilities covered by the reclamation guarantee;
- Stronger review and oversight from international financial institutions that support these projects, including written independent technical assessments, consultation with independent resource development analysts, and opportunities to convene independent review teams for evaluation of extractive resource proposals;
- Stronger review and oversight from federal and regional Russian regulatory authorities;
- Continual inspections during construction, operation, and reclamation of the mine, especially of the tailings impoundment facility and waste rock units;
- Full agreement by all parties about the company's responsibilities for abandoned mine workings, including tailings in the area of development.

Looking toward the future, PERC recommends a number of activities for follow-up by Amax Gold Inc., Omolon Mining Company, OPIC, EBRD, and local and international NGOs. Activities must be undertaken to ensure a high degree of safety at the Kubaka mine and its tailings impoundment facility, especially in relation to seasonal thaw, during the May - October period and its effects in and around the tailings facility.

PERC recommends:

- Strong government, public, and international financial institution oversight of all activities at Kubaka, given the unforeseen and serious nature of the environmental design and operational problems at the site;
- Disclosure of all relevant and current technical information and monitoring reports about the mine to interested NGOs for independent review;
- A long-term monitoring program to ensure that mining operations do not harm water quality in the region and the full disclosure of results from this monitoring;
- Immediate establishment of a firm timetable for development of and agreement on a full reclamation and closure plan for the Kubaka mine;
- Immediate establishment of a schedule for resolution of confusion regarding responsibility over the old Burkot Tailings Impoundment;
- Immediate establishment of a schedule to create a bond or financial guarantee that will guarantee reclamation and closure at the Kubaka mine while a comprehensive reclamation plan is prepared and reviewed.

From PERC's investigation, it is clear that -- despite public documents from the EBRD -- the practices at the Kubaka mine are not yet "consistent with good international mining practice." It is incumbent on the company and the international financial institutions -- OPIC and EBRD -- backing the project to resolve the problems at Kubaka and ensure that the mine does improve its performance to meet strict environmental standards. PERC suggests that OPIC and EBRD consider withholding any outstanding funds and suspending financial backing until resolution of the above activities and that the banks and company convene an emergency multi-party working group to address the problems at the Kubaka mine.

Conclusion

PERC will continue to work with NGOs in Magadan and across the Russian Far East to organize and conduct a seminar in Magadan that will discuss mining and the environment. PERC recommends that NGOs, government regulators, company representatives, and international financial institutions be invited to this seminar, which would use the Kubaka situation as one case study for discussion. A site visit to the Kubaka mine could be incorporated into the seminar. Such a seminar can help further an on-going discussion among NGO, governmental, and scientific communities in the Russian Far East about how to ensure that mining is protective of ecological resources and how to ensure compliance with strict environmental standards. Such a seminar could also focus attention on such concepts as zero discharge, which according to Amax Gold, Inc. remains a goal for the Kubaka mine. PERC recommends that this joint seminar occur as soon as possible, preferably in June, and also include the involvement of representatives from NGOs and regulatory agencies from such neighboring regions as Kamchatka.

This report has been prepared for the benefit of the public, non-governmental organizations, and government regulators in Russia and the United States. The report is fully accessible to the public, and PERC can provide further information about the Kubaka mine and other mines in the Russian Far East upon request. For more copies of the report or to provide feedback, [please contact PERC](#).

Appendix One: The Red Dog Mine

It should be noted that EBA Engineering Ltd. pointed to the Red Dog Mine (a lead-zinc mine) as a model for the Kubaka tailings facility for its permafrost design. An internet search on the Red Dog Mine revealed that in 1997, Cominco Alaska Inc. (the operator of Red Dog Mine) agreed to pay \$4.7 million in a civil fine and for environmental protection projects to settle allegations by the U.S. Department of Justice that the mine had allowed hundreds of violations of the federal Clean Water Act. PERC is concerned that the Red Dog Mine, unfortunately, could indeed be a model for the Kubaka mine in the pollution that it has caused. Problems at both the Red Dog Mine and the Kubaka mine underline the complexities and difficulties of mining in a permafrost environment in a way that will fully protect environmental values. The press release is attached.

1) <<http://www.usdoj.gov/opa/pr/1997/July97/294enr.htm>>

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MONDAY, JULY 14, 1997

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ALASKA MINING COMPANY AGREES TO \$4.7 MILLION ENVIRONMENTAL SETTLEMENT

WASHINGTON, D.C.-Cominco Alaska Inc. today agreed to spend more than \$3 million on three environmental protection projects and pay a \$1.7 million civil penalty to settle allegations that it committed hundreds of federal Clean Water Act violations. According to a lawsuit brought by the U.S. Department of Justice, the violations occurred at the company's Red Dog Mine and the mine's Chuckchi Sea port over a four-year period.

The Red Dog Mine - the world's largest lead and zinc mine - is located above the Arctic Circle within an Alaska river system which is the spawning ground for important marine and fresh-water fisheries.

The settlement, which if approved by the court would settle the lawsuit, was lodged today by the Justice Department in U.S. District Court in Anchorage, Alaska on behalf of the U.S. Environmental Protection Agency.

"The consent decree brings to a close one chapter, and opens another," said Chuck Clarke, EPA's Northwest regional administrator in Seattle. "The agreement with Cominco puts the violations behind us, and marks the start of some ambitious efforts by the company to help make sure no harm comes to the aquatic resources on which native Alaskans depend."

"The message here is that companies must abide by their waste discharge permits or they will pay a big price," said Lois Schiffer, Assistant Attorney General in charge of the Justice Department's Environment and Natural Resources Division. "I am pleased that Cominco has agreed to perform several projects that will contribute to the health of the environment around the Red Dog Mine."

"This action shows that the federal government holds polluters accountable for the damage they cause," said Steve Herman, EPA Assistant Administrator for Enforcement and Compliance Assurance. "Besides paying a significant penalty for its multiple violations of the Clean Water Act, the settlement requires Cominco to assess the extent of current and potential ground and surface water contamination, and to take steps to prevent future harm to the marine life and the watershed in and around the Red Dog Mine."

The three environmental projects Cominco will fund are designed to provide long-term protection to aquatic life and water quality in the watershed system surrounding the Red Dog Mine, which is located north of the Arctic Circle, about 90 miles north of Kotzebue and 50 miles inland from the Chukchi Sea. A road connects

the mine to a port on the sea.

Under the today's agreement, Cominco will:

- conduct long-term, ongoing groundwater and permafrost monitoring to learn whether contaminated wastewater from the Red Dog tailings pond is seeping or could seep into groundwater and, from there into surface waters. Cominco estimates the groundwater monitoring program will cost more than \$2.7 million to develop and install, plus \$210,000 a year for maintenance and operation;
- construct a barrier to keep native fish populations away from Red Dog mine discharges at an estimated cost of \$238,000, plus \$7000 in annual maintenance expenses;
- conduct a study to determine whether the mine discharges are affecting the health of aquatic life in and around the Red Dog Creek system, at an estimated cost of \$98,000.

The lead and zinc ore are mined from an open pit, milled into a concentrate and then hauled to the port. Wastewater and mine tailings from the mine are stored in a 200-acre impoundment covering the former bed of the south fork of Red Dog Creek.

The government's lawsuit, filed at the same time as the proposed settlement, alleged several hundred violations of the allowable limits for metals and pH contained in the mine's federal wastewater permit. It also alleges unpermitted discharges of sanitary waste from a temporary housing facility at the mine site. In addition, the lawsuit alleged more than a thousand violations from 1990 to 1993 at Cominco's sanitary sewage treatment system at the port.

The settlement lodged today is subject to public comment and court approval. A notice of the proposed settlement will be published in the Federal Register. That notice will launch the start of the 30-day public comment period.

Appendix Two: About the Authors

Julie Edlund is Russian Far East Program Coordinator focusing on mining issues with the Siberian Forests Protection Project at Pacific Environment and Resources Center. Ms. Edlund has worked on environmental and mining issues in Kamchatka, Magadan, Amur, Chita, and Kemerovo Regions in Siberia and the Russian Far East and has coordinated exchanges for Russian environmentalists, scientists, government officials, and indigenous peoples to learn about mining regulations and practices in the U.S.

[David Gordon](#) is Acting Executive Director of Pacific Environment and Resources Center. Since 1991, Mr. Gordon has co-directed the Siberian Forests Protection Project, which works with citizens in Siberia and the Russian Far East to protect forest and wildland ecosystems and prevent environmentally destructive development. Mr. Gordon has coordinated technical reviews of mining proposals in the Russian Far East, most notably for the proposed Aginskoye mine on the Kamchatka peninsula.

Wm. Paul Robinson is Research Director and Mining Analyst at Southwest Research and Information Center in Albuquerque, New Mexico. He has taught "Environmental Evaluation" and "Natural Resource Planning Methods" as an Adjunct Professor in the Community and Regional Planning Program of the University of New Mexico since 1985. Mr. Robinson has written widely on the environmental aspects of mining, including articles in publications by Colorado School of Mines, the British Columbia Chamber of Mines and New Mexico Bureau of Mines and Mineral Resources. He has

reviewed mining operation plans for several dozen professional clients as well as provided Congressional Testimony on mining policy matters. He has worked with NGO representatives and scientists in Siberia and the Russian Far East on mining issues in 1996 and 1997.

Pacific Environment and Resources Center is on the forefront of confronting ecological threats in the Pacific Rim by working with local citizens and communities to protect endangered ecosystems and prevent environmentally destructive development through grassroots advocacy, environmental education, and law and policy analysis. Since 1991, PERC's Siberian Forests Protection Project has worked with environmental organizations, scientists, government officials, and indigenous peoples to exchange information, review and publicize the environmental effects of proposed development projects, and implement cooperative environmental protection strategies. PERC's other programs include the China Biodiversity Conservation Program, the Campaign on Asia Pacific Economic Cooperation (APEC) and Forests, and the Global Environmental Education Program.

Southwest Research and Information Center is a non-profit scientific and educational organization based in Albuquerque, New Mexico since its founding in 1971. SRIC provides timely and accurate technical analysis of resource development and environmental projects to policy makers and affected communities on a wide variety of subjects. SRIC professional staff specialize in the review and analysis of mining, oil and gas, nuclear waste, and US-Mexico border environmental issues and policies. Its staff serve as technical advisors and consultants to a wide variety of community organizations and local governments, including tribal governments, on matters related to the environmental impact of existing or proposed resource development projects and the reclamation or restoration of lands and resource damaged by such projects.