

**KENSING-  
TON MINE,**

**8/31/06**

# **JOINT HOUSE / SENATE RESOURCES HEARING**

1:00 – 4:00pm / Thursday, August 31, 2006 / Anchorage LIO

## **Kensington Mine Issues**

### **HOUSE MEMBERS:**

Rp. Ralph Samuels, Chairman  
Rp. Jay Ramras (*here*)  
Rp. Paul Seaton (*by T/C*)  
Rp. Olson (*by T/C from California*)  
Rp. Carl Gatto (*here*)  
Rp. Jim Elkins (??)  
Rp. Gabrielle LeDoux (*here*)  
Rp. Harry Crawford (*here*)  
Rp. Mary Kapsner (*may T/C from Bethel*)

### **SENATE MEMBERS:**

Sn. Tom Wagoner (*here*)  
Sn. Seekins (*here*)  
Sn. Fred Dyson (*here*)  
Sn. Ben Stevens (*here*)  
Sn. Bert Stedman (*no*)  
Sn. Kim Elton (*by T/C*)  
Sn. Albert Kookesh (*no*)

### **PRESENTING INVITED TESTIMONY:**

Rp. Bruce Weyhrauch, R-Juneau (*confirmed here*)

DNR – Comm. Mike Menge, Dp. Comm. Ed Fogels, and  
Actg Large Mine Team Leader Tom Crafford (*all three confirmed here*)

DEC – Comm. Kurt Fredriksson, Dp. Comm. Dan Easton, and  
Water Division Director Lynn Kent (*all three confirmed here*)


LAW - Deputy AG Craig Tillery and Cam Leonard, Asst. AG (*confirmed here*)

Alaska Miners' Assn. – Howard Grey (*confirmed here*)


SE Alaska Conservation Council Executive Director Russell Heath (*confirmed here*)

Kensington Mine VP / General Mgr. Tim Arnold (*confirmed here*)

ON LINE

-  EethKerttula
- ~~~~ BobLamb/Courd"Laine/lo
- ~~~~ BobTzach
- ~~~~ CarolineWeishahn/self/LO
- ~~~~ DaveDonaldson/APRN/LO
- ~~~~ DebbieReinwand/BradleyReidAss/LO
- ~~~~ DemienShane/self/LO
-   Fairbanks LIO2
-  Guttenberg

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- ~~~~ Jerry Burnett/LO
- ~~~~ Julia/KTOO
-  Juneau LIO
- ~~~~ KellyKast/CoeurAk./LO
-  KimElton

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- ~~~~ LauraVidik/LO
- ~~~~ MarkTaylor/DOT/LO
- ~~~~ Pat/Kapsner's
-  Peq Warren
-  Seaton

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-  Steadman

Rep Olson  
Seekins

~~Send backup  
to H. REC.  
- LORI ROLAND~~

~~Cody Rice  
leaving  
GATTO~~

get SEACC board  
membership  
- indiv. + orgs

Testimony

Alaska House/Senate Resources Committee Hearing

August 31, 2006

Anchorage, Alaska

Tim Arnold

Vice President & General Manager

Coeur Alaska

Good afternoon.

My name is Tim Arnold, and I am vice president and general manager of Coeur Alaska, which is currently constructing the Kensington gold mine in Southeast Alaska.

I have with me here today, my colleague, Luke Russell, who is our vice president of Environmental Services.

I think you can appreciate that today, I will be limited my testimony to my prepared remarks, and will not be entertaining questions due to the pending litigation in the court of appeals.

I would like to begin by thanking Chairman Samuels, Chairman Wagoner and the members of the committee for inviting me to speak here today. I

also want to thank the committee for taking the time to schedule this hearing.

In addition, I'd like to express appreciation for all the support we have received from the State of Alaska and from U.S. Senators Ted Stevens and Lisa Murkowski and Representative Don Young. We are also very appreciative of the recent expression of support from Governor Murkowski and Democratic gubernatorial candidate Tony Knowles. As they have recognized, the Kensington mine is critically important to the economy of Southeast Alaska and is rightly the subject of ongoing legislative interest.

You have already heard some valuable information on the Kensington project... and what I'd like to do today is to provide an overview of the project itself.

But, before I do that, I want to tell you a bit about my own background. I am a professional mining engineer and have spent 25 years working in and around mines of all types. I have extensive experience in underground mines, surface mines, older mines, newer mines, and development projects. I have worked at mines in 10 states and half a dozen countries in a wide variety of social and political environments. As a matter of fact, 16 years ago, as a young engineer, I managed the first independent mine plan for a prospect in Alaska called the Kensington Gold Mine.

Since graduating from college in 1982, my wife and I have moved 23 different times, and lived in 19 different towns. In the words of Geoff Mack, immortalized by Hank Snow and Johnny Cash, "I've been everywhere."

The reason I tell you this is that it provides helpful context when I also tell you that, from stem to stern, the permitted Kensington Gold Mine has the best environmental design of any project I have ever been associated with. It is blessed with natural attributes that make it unique in mining, being designed with attributes especially appropriate for Southeast Alaska. For more than 17 years, the Kensington Mine Plan has been the subject of intense study, collaboration and design. . . followed by more study, more collaboration, and more thoughtful design. Over the period of those 17 years, the objective was always to ensure that the Kensington mine plan would embody the highest principles of environmental stewardship. At Kensington, we call this policy "producing and protecting."

I am immensely proud of what Coeur Alaska is building, and I think the people of Alaska can be proud of the mine as well. It is a unique project that fully protects Alaska's clean water while providing significant long-term economic benefit for the region and the state. And, as some of you know, the Kensington Mine was recently notified that it has been selected to receive the 2006 Hardrock Mineral Community Outreach and Economic Security Award from the U.S. Bureau of Land Management. This recent award is especially meaningful to us, as it recognizes responsible and

sustainable resource development which is the cornerstone of the Kensington Mine plan.

Now, as to a description of the mine itself. . . Coeur is spending approximately \$190 million of capital to build the Kensington underground gold mine in an area that's been home to gold mining for more than 100 years. In fact, Kensington is in the same geologic gold belt that Bart Thane mined and that Juneau was built upon. When completed, Kensington will be among the newest and most environmentally responsible gold mines in all of North America. We currently hold some 60 environmental and regulatory permits and have nearly 300 workers. More than \$25 million has been spent on nearly 900 environmental studies. The mine has already proven to be a huge boost for the region's economy and, for obvious reasons, enjoys widespread support among business and community leaders, native corporations, and area residents.

Kensington is designed to produce about 100,000 ounces of gold annually. Once it begins operating, the mine will have some 200 permanent workers with \$16 million of annual payroll and benefits. The mine is expected to generate millions more in annual state and local tax revenues. In addition, Kensington has already established a reputation as a pillar of the charitable contributions in the region and as a staunch supporter of the Native community and local businesses.

Despite the many benefits of Kensington, as you have heard about here today, it has attracted legal action from a small and radical segment of the

environmental community who seem to misunderstand or misrepresent many of the basic facts of this project. The project opponents would have you believe that Kensington's environmental permits pose a threat to clean water and also set some sort of precedent for other mines in Alaska. Both of those assertions are false.

Let me take just a minute to tell you why.

As a mining engineer, I'll be the first to tell you that no two mines are identical. That's why the environmental permits for any given mine are always evaluated and issued based on the very exacting set of specifications unique to that mine. Here's a quick comparison of **three** key characteristics of Kensington as contrasted with other mines:

- First, Kensington is an **underground mine**. . . so there is very little to mark the landscape other than the various tunnel entrances and some relatively compact processing facilities; in other words, its "footprint" is very light.
- Second, Kensington will use fairly **simple milling** followed by a relatively benign flotation process to separate the metal from the crushed rock without the use of chemicals such as cyanide to leach metal from ore;
- Third, Kensington's crushed **waste rock (or tailings) will be inert**, looking much like the sand at Sandy Beach in Juneau

At Kensington, about 40% of the tailings will be recycled back into the mine as fill material. For disposal of the remaining tailings, the U.S. Army Corps of Engineers has twice validated a disposal plan which has the least possible impact on the environment. The plan also calls for the full reclamation of the tailings disposal area once we have concluded mining at Kensington.

To sum up it all up:

- The Kensington mine plan reflects the unique characteristics of the project
- Kensington does not set any kind of precedent for other mines
- Kensington is fully compliant with the U.S. Clean Water Act. . . a fact that has been documented by the U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers

As I believe the committee members know, the SEACC last week obtained a temporary injunction from the Ninth Circuit Court of Appeals in San Francisco that affects some of our construction activities in the area of the Tailings Facility. This was granted, even after the Alaska District Court validated the permit by dismissing SEACC's lawsuit earlier this month. Work continues elsewhere at the project site. We remain convinced that the project is sound and that we will prevail on the merits upon appeal.

Despite our many differences with SEACC, Coeur Alaska is in full agreement with SEACC on one key point: Alaskans do, indeed, deserve

clean water. I couldn't agree more. I love Alaska. This is my home, and this is where I am raising my children. Yes, we all deserve clean water, and we must demand responsible mineral development. In this light, I am proud to be associated with the Kensington Gold project . . . a project that will operate in compliance with the highest standards of environmental protection while providing much-needed long-term economic benefits to its community.

Thank you.

## Permitting the Kensington Gold Project



**Mike Menge, Commissioner**  
**Ed Fogels, Acting Deputy Commissioner**  
**Tom Crafford, State Mining Coordinator**  
**Alaska Department of Natural Resources**



**Kensington  
Gold  
Project**



## **State Agencies**

### **LARGE MINE PERMITTING TEAM**

- **Department of Natural Resources**  
(Lead State agency for mining projects)
  - DMLW, OHMP, OPMP
- **Department of Environmental Conservation**
  - Div of Water, Div of Air Quality, Div of Env. Health
- **Department of Fish and Game**
- **Department of Transportation & Public Facilities**
- **Department of Commerce, Community and Economic Development**
- **Department of Law**

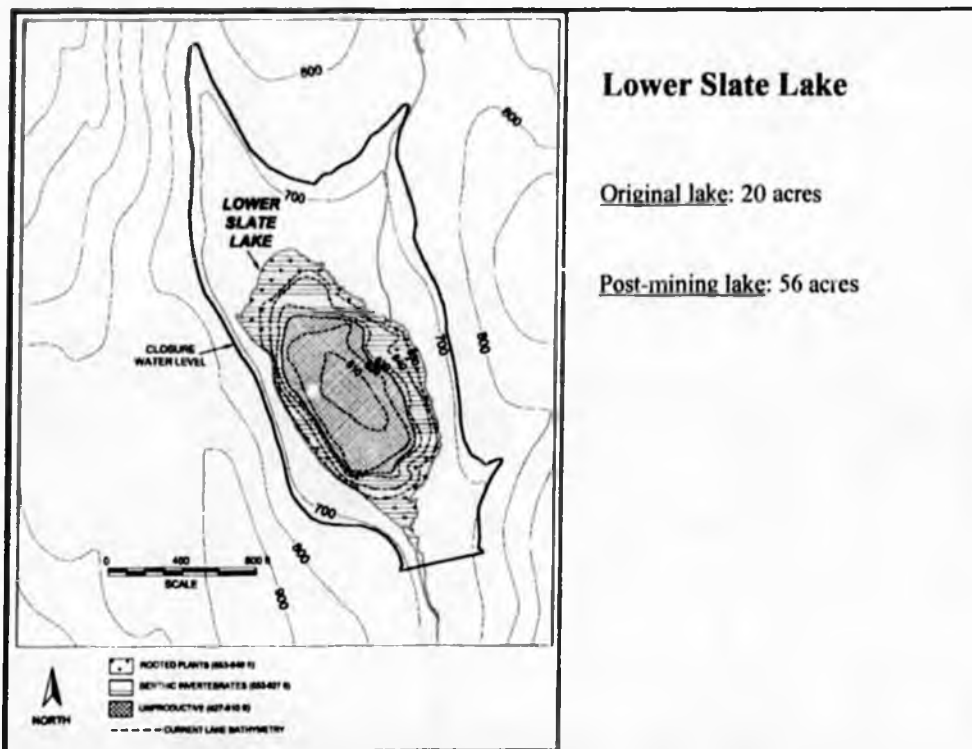
# State of Alaska Major Regulatory Requirements

## Department of Natural Resources

- Reclamation Plan Approval and Bonding
- Title 41 Fish Passage Permits
- Water Rights
- Right of Way/Access authorizations
- Dam Safety Certification
- Tidelands Leases for dock facilities
- Coastal Zone Consistency Determination

## Department of Environmental Conservation

- Section 401 Certification of ACOE Wetlands permits
- Section 401 Certification of USEPA NPDES Permit
- Sewage Treatment System Approval
- Air Quality Permits



## **Mines Must be Reclaimed**

### **RECLAMATION PLAN APPROVAL**

- **ADNR**
- **Minesite must be returned to a stable condition, compatible with the post-mining land use.**
- **Financial Assurance (bond) must ensure State can do reclamation even if company cannot.**

## **Financial Assurance (Bond)**

- **Calculated from detailed engineering analysis**
- **Includes capping of tailings if needed**
- **Periodically recalculated during mine life**
- **How Much? Kensington is \$7.3 million**
- **What Mechanism? Letter of Credit.**

## **Title 41 Fish Habitat/Fish Passage Permits**

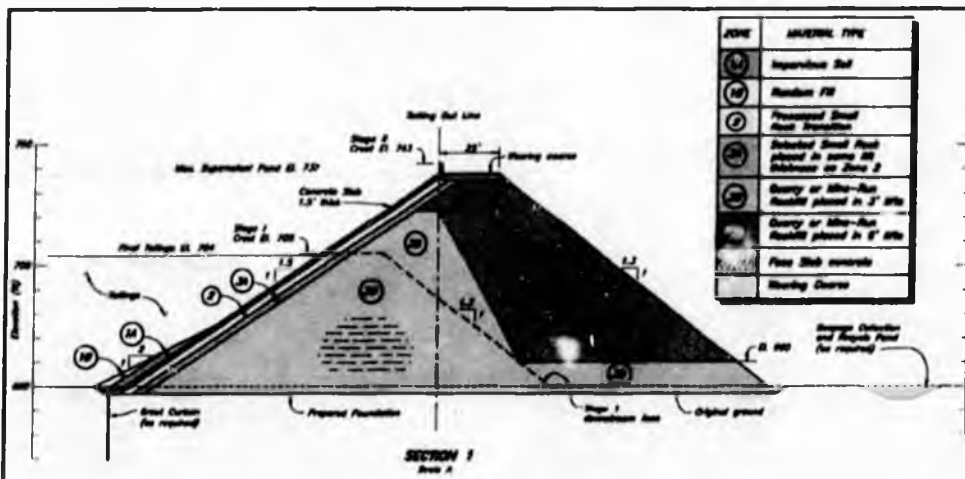
- Johnson Creek Infiltration Gallery
- Johnson Creek Bridge #1
- Johnson Creek Bridge #2
  
- Lower Slate Lakes Tailings Impoundment  
(lake must be reclaimed)

## **Lower Slate Lakes Tailings Impoundment Title 41 Permit**

“The tailings in Lower Slate Lake are expected to have very low toxicity. Following reclamation, the larger and shallower lake is expected to provide habitat for macroinvertebrates and forage fish that will support a population of Dolly Varden char. If monitoring shows the tailings are not suitable for colonization, the tailings will be capped with clean material. We anticipate the reclaimed area will provide over-wintering, spawning, and rearing habitat for Dolly Varden char.”

## Dam Safety Certification

- ADNR
- Slate Lake Dam must be designed to State standards.
- Seismic standards
- Financial Assurance for Long term care and maintenance



**Lower Slate Lake Tailings Dam Cross-section**

## **Federal Agencies**

- **US Forest Service (Lead Agency)**
- **US Environmental Protection Agency**
- **US Army Corps of Engineers**
- **US Fish and Wildlife Service**
- **National Marine Fisheries Service**

## **MAJOR FEDERAL REGULATORY REQUIREMENTS**

- **US EPA Section 402 NPDES Water Discharge Permit**
- **US ACOE Section 404 Dredge and Fill Permit**
- **US ACOE Section 106 Historical and Cultural Resources Protection**
- **NMFS Threatened and Endangered Species Act Consultation**
- **NMFS Essential Fish Habitat**
- **USFWS Threatened and Endangered Species Act Consultation**
- **USFWS Bald Eagle Protection Act Clearance**
- **USFWS Migratory Bird Protection**

# **National Environmental Policy Act (NEPA) Process**

## **Environmental Impact Statement (EIS)**

### **Lower Slate Lake Tailing Facility is the Preferred Alternative**

## **Kensington Process**

- Original application submitted in 1990
- Kensington Gold Project approved and FEIS issued in 1992
- Revised application approved & first SEIS completed in 1997
  
- Current application submitted & EIS Initiated in November 2001
- Public Review of Draft EIS and Public Meetings, Summer 2004
- Final EIS & ROD Completed in December 2004
- State Permits Issued in May 2005
- Federal Permits (404 & 402) Issued in June/July 2005





**CHECK US OUT AT:**

**<http://www.dnr.state.ak.us/opmp/>**

**<http://www.dnr.state.ak.us/mlw/mining/largemine.htm>**

**Thank You!**



# Southeast Alaska Conservation Council

SEACC 419 6th Street, Suite 200, Juneau, AK 99801

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www.seacc.org • info@seacc.org

Testimony of Russell Heath, Executive Director  
Southeast Alaska Conservation Council  
before the  
Joint Alaska House and Senate Resources Committees  
Anchorage, Alaska August 31, 2006

Good afternoon. My name is Russell Heath; I am the executive director of the Southeast Alaska Conservation Council. SEACC is a coalition of 17 volunteer citizen conservation groups in thirteen communities across Southeast Alaska, from Ketchikan to Yakutat. Our mission is to protect the extraordinary resources of Southeast Alaska while ensuring their wise and sustainable use.

I want to thank the joint committees, and particularly Representative Samuels, for arranging this hearing. Many important issues are at stake—issues of jobs, economic development, and the responsible use of our resources—and the more broadly and fully they are understood, the better we, Alaskans, can make wise decisions regarding them.

Before I begin, I would like to make clear that our legal challenge is against the Army Corps of Engineers' permit authorizing Coeur d'Alene Mines Corporation (Coeur) to dump its chemically-processed mine tailings into Lower Slate Lake—it is not a challenge of the Kensington mine itself. The injunction issued by the 9<sup>th</sup> Circuit Court of Appeals does not force the mine to close. The court's injunction, at our request, is narrowly tailored to maintain the status quo at Lower Slate Lake during the appeal by halting construction activities related to turning the lake into a tailings dump.

## Background

SEACC has actively worked on the Kensington Mine Project since 1989. Since then, we have watched it go through several different designs and two full permitting processes. In 1998, Coeur received all necessary permits for a project that ultimately the corporation chose not to pursue. Instead, it redesigned the mine and reinitiated the review and permitting process to arrive at the current mine proposal. SEACC has participated at every step of this process.

Our two chief concerns about the new design are its impact on Berners Bay and the larger implications this particular mine design has for water quality in Alaska and the United States.

ALASKA SOCIETY OF AMERICAN FOREST DWELLERS, Point Baker • ALASKANS FOR JUNEAU • CHICHAGOF CONSERVATION COUNCIL, Tenakee  
• FRIENDS OF BERNERS BAY, Juneau • FRIENDS OF GLACIER BAY, Gustavus • JUNEAU AUDUBON SOCIETY • JUNEAU GROUP SIERRA CLUB • LOWER CHATHAM CONSERVATION SOCIETY, Port Alexander • LYNN CANAL CONSERVATION, Haines • NARROWS CONSERVATION COALITION, Petersburg • LISIANSKI INLET RESOURCE COUNCIL, Pelican • PRINCE OF WALES CONSERVATION LEAGUE, Craig • SITKA CONSERVATION SOCIETY • TONGASS CONSERVATION SOCIETY, Ketchikan • TAKU CONSERVATION SOCIETY, Juneau • WRANGELL RESOURCE COUNCIL • YAKUTAT RESOURCE CONSERVATION COUNCIL

In attempts to resolve these concerns and avoid litigation, SEACC negotiated in good faith with Coeur for over 3 months last year in an attempt to resolve our concerns. In terms of the mine's impacts on Berners Bay, I believe that we found ways to adjust the mine design and its plan of operations to protect the biological and cultural values of the Bay adequately.

We were, however, unable to find common ground on the issue of the tailings disposal. An attempt at mediation, hosted by the City and Borough of Juneau, also failed to resolve the tailings issue.

## Our Concerns

Kensington's plan to dump its tailings into a lake is a big step backwards. It will be the first mine in a generation to dump mine tailings into a lake, river, or stream.

In 1972, when President Nixon signed the Clean Water Act into law, the American people committed to stopping the disposal of industrial waste into America's waters. It has been a massive task, but today fish have returned and kids are swimming in many lakes and rivers that were once dead and poisonous.

If Kensington is allowed to dispose of its tailings in a lake, other mines around Alaska may try to do the same.

Mine tailings do not belong in water. Kensington's proposal to dump chemically treated mine tailings into a lake is a big step backward. It undercuts the hard work Americans have done in the past 30 years to manage our natural resources responsibly.

There is a responsible alternative: storage on land. It is EPA's preferred alternative, it is how the Pogo and Greens Creek Mines manage their tailings, and it is how the Kensington proposed to do it in 1998. If the Kensington took the responsible approach, we could have a mine and clean water.

One of the problems with our natural resources is that their value is often overlooked when we make our economic calculations. Gold might be \$600 an ounce, but how much is a gallon of clean water? What is the value of a lake, a watershed, an ecosystem. In Alaska, clean water supports thousands of jobs: the commercial and sport fishing, tourism, recreation industry depend in large measure on clean water. Gillnetters in Southeast Alaska have started branding their fish as "Rainforest Wild." Key to a successful marketing plan is the perception of consumers that these fish come from pristine waters. Already, Alaskan fishermen claim they are earning an extra dollar per pound for their fish.

Our subsistence economy and overall quality of life also depend in many ways on Alaska's clean water. Thousands of jobs, thousands of lives depend on keeping our water pure. This is what SEACC is defending.

## The Legal Issues

Once again, our suit challenges the Kensington's tailings disposal method — not the mine.

Coeur has been permitted to discharge its effluent (process waters and tailings slurry) into Lower Slate Lake, because mine tailings were redefined as "fill".

The basis of our lawsuit is that a pollutant can not be classified as fill if the EPA has established effluent limits for that pollutant. This fact was specifically acknowledged in the Federal Register when the regulation redefining fill was published in 2002. The EPA has established specific effluent limits for froth flotation mines and thus the effluent from the Kensington should not be classified as fill.

But putting the legal technicalities to the side, dumping mine tailings in a lake violates everything America has been working for over the past thirty years in terms of the responsible management of our water ways.

Because this is an important issue for Juneau and for many workers and their families, we have done everything we can to move this case forward as rapidly as possible. Most recently, in response to our request, the Court of Appeals set an expedited schedule for legal briefs on the appeal. Under that schedule, this matter will be ready for a decision by mid-November.

## Litigation: A Last Resort

Many of you may be wondering if it would be possible to resolve this outside of the courts. Both SEACC and Coeur have tried—through direct negotiations and in a mediated session hosted by the City and Borough of Juneau. Both times we failed, both times on the same issue: tailings disposal. The corporation claims that any other option is too expensive, but we think that the dangers of allowing its current approach are too great.

## Conclusion

We think that this issue—dumping mine tailings into a lake—raises a fundamental issue about how we manage our natural resources. We think it violates both the spirit and the letter of the law—a law that has done much to improve life in America. We believe that Kensington has alternatives, albeit more expensive ones. Safeguarding Alaska's water is worth the investment. We are willing to work with the agencies and Coeur to find a way to expedite the implementation of the alternatives.

## Overview of the Kensington Mine

### **Ownership**

The Kensington mine is wholly owned by Coeur Alaska, Inc., a subsidiary of Coeur d'Alene Mines Corporation based in Coeur d'Alene, Idaho.

### **Location**

The mine site is located between Lynn Canal and Berners Bay, 45 air miles north of Juneau and 35 air miles south of Haines, within the City and Borough of Juneau and the Tongass National Forest. The Kensington mine, which includes the Jualin mine prospects, is situated on federal, state, and patented mining lands.

### **Type of Ore and Projected Production**

The Kensington is an underground gold mine. The mine is permitted for 10 years, and at full production would process up to 2,000 tons of ore per day, 1,900 of which will become waste.

### **Legal Challenge**

In 2005, the Army Corps of Engineers issued a "fill material" permit authorizing Coeur to discharge 210,000 gallons per day of chemically processed wastewater, which includes mine tailings, from its mill facility directly into Lower Slate Lake. The lake is situated on public lands in the Tongass National Forest. The discharges will kill all fish and life in the lake.

The Corps of Engineers' permit is unprecedented. It marks the first time the Corps of Engineers issued a "fill material" permit for this type of discharge directly into waters of the United States. Prior to the Kensington permit, the Environmental Protection Agency (EPA) and Corps of Engineers' definition of "fill material" excluded all pollutants that EPA had adopted pollution control standards for. These standards establish pollutant control restrictions, the heart of the Clean Water Act, to protect the nation's waterways. In 1982, EPA developed pollution control standards for gold mines like the Kensington.

There is no reason to give special treatment to the Kensington mine. In 1998, Coeur developed a mine proposal which avoided discharging its waste directly into waters of the United States. This approach, referred to as a dry stack facility, is in use at the Pogo and Greens Creek mines. According to EPA, it is the environmentally preferable method to Kensington's current plan. Giving the Kensington mine a special exception to use a freshwater lake as its waste disposal site could have broad repercussions throughout Alaska and the United States. It could set the stage for other mines to dispose of their waste into lakes and streams throughout America.

### **Implications of the legal challenge**

The legal challenge is only to Coeur's waste disposal method, not to the mine itself. If the Ninth Circuit holds that the Corps of Engineers' permit violates the law, the mine can still be built. Coeur would have to redesign its plan of operations before the mine could begin operations, but with gold prices at over \$600 per ounce, there is every reason to believe that this can be done.

At present, the Ninth Circuit has issued a temporary injunction, prohibiting only construction activities that relate to the use of Lower Slate Lake as a waste disposal site. All other mining activities can continue. The Ninth Circuit's decision to grant the injunction indicates that the Court is likely to conclude that the Corps of Engineers' permit is illegal.

## **Court Orders a Time-Out to Protect Clean Water at Kensington Mine**

**FOR IMMEDIATE RELEASE, August 24, 2006**

**Southeast Alaska Conservation Council ♦ Lynn Canal Conservation ♦ Sierra Club**

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*Contacts:*

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(907) 586-6942, cell 957-0621

Mark Rorick, Juneau Group of Sierra Club, (907) 789-5472

Tim June, Fisherman and Member of Lynn Canal Conservation, (907) 766-3755 (Thursday  
only), (907) 766-2028

*Recent photos of construction at Lower Slate Lake available on request from SEACC, contact  
Beth Peluso at (907)586-6942.*

Today the Ninth Circuit Court of Appeals issued an injunction halting the Kensington Gold Mine's destructive dam construction activities at Lower Slate Lake. If allowed to proceed as planned, the Kensington Mine would be the first mine in a generation to dispose of its chemically-treated mine tailings in a lake or stream. This decision protects Lower Slate Lake while the Court examines the legality of the Kensington Mine's plan to use the lake as a tailings dump.

"This decision sends a strong signal that the Ninth Circuit agrees the Clean Water Act prohibits anyone from dumping 4.6 million tons of mine tailings into our lakes and streams," said Rob Cadmus of the Southeast Alaska Conservation Council (SEACC). "Kensington can store its waste in more responsible ways, as well-run gold mines in other parts of the country do."

"I see this as a time-out to protect clean water; our clean water is worth holding off on the construction at Lower Slate Lake," said Tim June, a commercial fisherman and member of Lynn Canal Conservation. "Managed properly, our fisheries will continue to be a valuable renewable resource for many generations. This time-out will help ensure that fishermen and coastal residents won't have to shoulder the risk of polluted water...or the perception of it."

The injunction halts activities around Lower Slate Lake such as cutting trees, building roads, building dams, diverting streams, or altering the water level of the lake. The mining company is free to keep building the mine and the mill. The only parts of their work that have been stopped are activities relating to the use of the lake as a waste disposal site. Other activities at the mine site can continue. The Ninth Circuit also agreed to accelerate the legal process to resolve the problem as soon as possible.

The Corps of Engineers' permits allow the Kensington mine to dump 210,000 gallons of mine tailings per day into Lower Slate Lake, ultimately totaling 4.5 million tons of waste. The tailings would essentially kill all fish in the lake and make it uninhabitable for aquatic life. After the mine closes in 10 years, the corporation claims it can restore the lake, but technical tests were inconclusive.

"We're looking at the big picture of mining in Alaska. From that standpoint, Coeur is choosing to put its bottom line ahead of keeping Alaska's water clean," said Rob Cadmus of the Southeast Alaska Conservation Council. "If Kensington were allowed to dump tailings in a lake, it would set the stage for other mines across Alaska to discard their waste into our clean water—the heart and soul of our fishing, recreation, and tourism industries."

If the permit allowing the use of Lower Slate Lake as a tailings dump stands, it will set a major precedent, state-wide and nation-wide, for future mines. Allowing a mining company to dump tailings in a lake at the Kensington mine could pave the way for the massive, controversial Pebble mine near Bristol Bay, which Senator Ted Stevens and many Alaskans oppose because of the harm it could do to the \$100-million-dollar fisheries there. Subsistence fishermen are also concerned that Pebble will jeopardize their lifestyle. Many people in the Bristol Bay region are closely following the Kensington case.

"The Clean Water Act is one of America's greatest success stories. We have protected and restored thousands of lakes and rivers in the past thirty years—safeguarding public health, keeping waters livable for fish and wildlife, and making our communities and neighborhoods better places to live," says Mark Rorick of the Juneau Chapter of the Sierra Club. "Dumping mine tailings into a lake is taking a big step backwards."

UNITED STATES COURT OF APPEALS  
FOR THE NINTH CIRCUIT

**FILED**

AUG 24 2006

GATHY A. CATTERSON, CLERK  
U.S. COURT OF APPEALS

SOUTHEAST ALASKA  
CONSERVATION COUNCIL; et al.,

Plaintiffs - Appellants,

v.

UNITED STATES ARMY CORPS OF  
ENGINEERS; et al.,

Defendants - Appellees,

COEUR ALASKA, INC.; et al.,

Defendant-Intervenors -  
Appellees.

No. 06-35679

D.C. No. CV-05-00012-J-JKS  
District of Alaska,  
Juneau

ORDER

Before: GOODWIN and REINHARDT, Circuit Judges.

Appellants' motions to file an over-length motion and over-length reply are granted. The Clerk shall file the emergency motion for an injunction pending appeal and the reply in support of that motion received herein on August 10, 2006 and August 22, 2006, respectively.

Appellee Coeur Alaska, Inc.'s motion to strike appellants' emergency motion for injunctive relief is denied.

06-35679

Appellants' motion for an injunction pending appeal is granted, without bond. The U.S. Army Corps of Engineers, the U.S. Forest Service, and Coeur Alaska, Inc. are hereby enjoined from authorizing, allowing, or conducting any further construction activities relating to the use of Lower Slate Lake as a disposal site for mine tailings, including, but not limited to, cutting trees, building roads, clearing vegetation, excavating or filling wetlands, building dams or other structures, diverting streams, or altering the natural water level of Lower Slate Lake or the natural flow of East Fork Slate Creek, until further order of this court.

Nothing in this injunction shall prohibit measures needed to restore stream flows, stabilize soils, or prevent erosion.

Appellants' request for expedited briefing and hearing of this appeal is granted. The opening brief and excerpts of record are due September 12, 2006; the answering brief is due October 3, 2006; and the optional reply brief is due within seven days after service of the answering brief.

This appeal will be calendared before the first available panel in the week of November 13, 2006.

**JOINT RESOLUTION**  
Of  
Aleknagik Natives Limited  
Chogguing Limited  
Ekwok Natives Limited  
Koliganek Natives Limited  
Saguyak, Inc.  
Stuyahok Limited  
Togiak Natives Limited

**JOINT RESOLUTION NO. 2006-01**

**Resolution supporting Southeast Alaska Conservation Council to  
protect Lower Slate Lake, all fish-bearing lakes, rivers and streams in  
Alaska**

**Whereas,** Aleknagik Natives Limited, Chogguing Limited, Ekwok Natives Limited, Koliganek Natives Limited, Saguyak, Inc., and Stuyahok Limited have executed the Memorandum of Understanding on June 7, 2003, and Togiak Natives Limited joined in 2005 in order to identify areas of mutual concern pertaining to uses of corporate lands, to establish a framework for cooperative relations between the parties and to promote communication between the parties for the benefit of their respective shareholders, descendants and spouses.

**Whereas,** the parties to the Memorandum of Understanding were created under the Alaska Natives Claims Settlement Act of 1971.

**Whereas,** clean water and healthy fish and wildlife habitat are important to our subsistence way of life and thousands of existing Alaskan jobs; and

**Whereas,** Coeur Alaska's proposal to dump chemically-processed mine waste (tailings) into Lower Slate Lake, a fish-bearing lake in Southeast Alaska, would set a precedent that threatens this way of life and these jobs; and

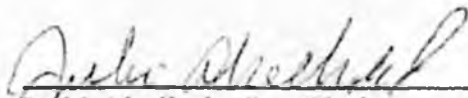
**Whereas,** Coeur Alaska's proposal to dump chemically-process mine waste (tailings) into Lower Slate Lake, a fish-bearing lake in Southeast Alaska, violates the protections afforded us by the U.S. Clean Water Act; and

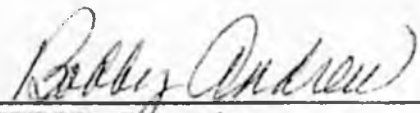
Whereas, if tailings disposal at the Kensington mine is allowed to go through as proposed, it would be easier for Northern Dynasty to fill Frying Pan Lake and other fish bearing lakes, rivers, and streams with mine waste.

**NOW THEREFORE BE IT RESOLVED**, the members of Nunamta Aulukestai "Caretakers of our Lands" opposes the dumping of chemically-processed mine waste (tailings) into Lower Slate Lake and into any other lake, river or stream in Alaska; and

**BE IT FURTHER RESOLVED**, the members of Nunamta Aulukestai "Caretakers of our Lands" supports the Southeast Alaska Conservation Council and other concerned organizations and citizens in their efforts to protect Lower Slate Lake, all fish-bearing lakes, rivers and streams in Alaska, and the Clean Water Act.

**PASSED AND APPROVED** by the Members of Nunamta Aulukestai "Caretakers of our Lands" on 7th day of March, 2006, by a duly constituted quorum of the Members. With 7 Yes Votes 0 No Votes, and 0 Abstaining.

  
\_\_\_\_\_  
Luki Akelkok, Sr., Chairman

  
\_\_\_\_\_  
ATTEST: Recorder

## THE PEBBLE-KENSINGTON CONNECTION

"Our way of life depends on the salmon and freshwater fish that we have caught for generations from the streams, rivers, and lakes in the Bristol Bay drainage. The Pebble mine could ruin that. If the Kensington mine goes forward as planned and is allowed to dump waste in Lower Slate Lake, it will help pave the way for Pebble. We're concerned about what happens at Kensington because the outcome could put our clean water and subsistence at risk."

—Bobby Andrew of Aleknagik Natives Limited in Dillingham.



Clean water supports fish, commercial fishing jobs, and the way of life of thousands of people in Bristol Bay and Southeast Alaska.

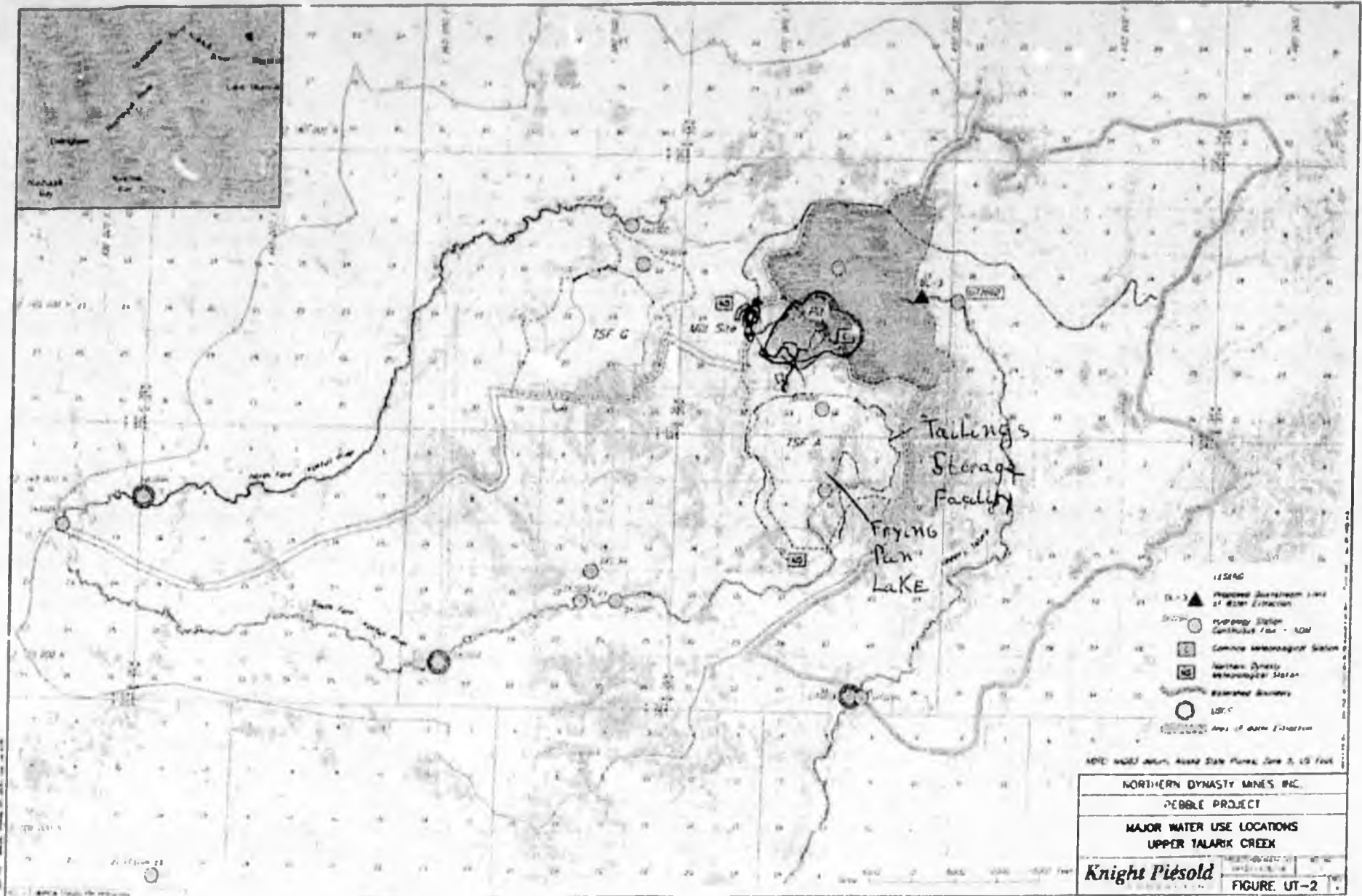
Future generations have the right to take part in the traditions of the Bristol Bay people and share in the land's abundant resources. The Pebble mine will lead to the development of a 1,000 square mile mining district and pollute the clean water of the Bristol Bay watershed, one of the most productive salmon fisheries in the world. According to the Department of Natural Resources, Pebble is considering filling Frying Pan Lake and other fish-bearing lakes, rivers, and streams in the region with mine waste.<sup>1</sup>

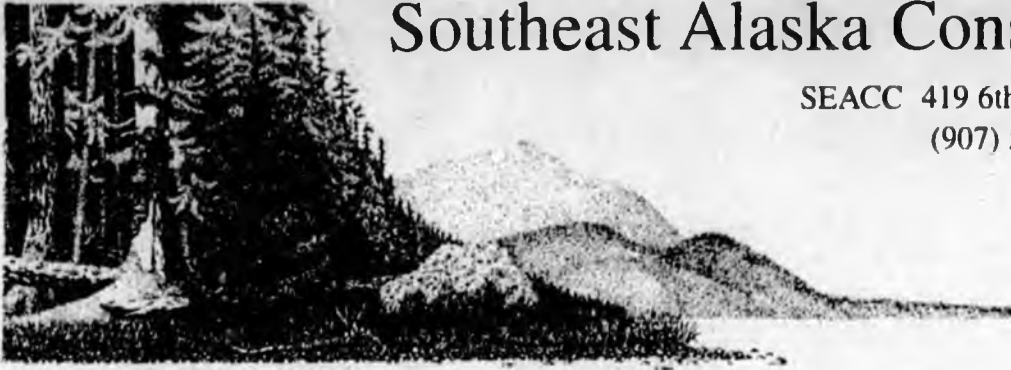
If the Corps of Engineers allows mining waste to be dumped into a lake in Southeast Alaska, the same thing can happen to the lakes, rivers, and streams elsewhere in Alaska, including the Bristol Bay watershed.<sup>1</sup> That's why 7 tribal corporations in the Bristol Bay region, members of the Nunamta Aulukestai (Caretakers of our Lands), passed a resolution opposing dumping mine waste in Alaska's lakes, rivers, and streams.

Since Congress passed the Clean Water Act in 1972, mining corporations have not been allowed to use freshwater lakes as disposal sites.<sup>2</sup> In June 2005, the Army Corps of Engineers authorized Coeur Alaska to dump 210,000 gallons of toxic mine tailings per day directly into fish-bearing Lower Slate Lake for the proposed Kensington gold mine project north of Juneau.<sup>3</sup> The mine will dump 4.5 million tons of industrial waste into the lake over the life of the mine, killing all aquatic life.<sup>3</sup> What happens at Kensington sets the stage for other mines across the state.

**Alaskans deserve clean water and jobs—now, and in the future. Let's do it right!**

- 1- Ed Fogels, Alaska Department of Natural Resources. 2005. In: *Bristol Bay residents concerned about Pebble mine tailings*. Alaska Public Radio Network.
- 2- Plaintiffs' Opening Brief. 2005. Southeast Alaska Conservation Council, et al. v. US Army Corps of Engineers, et al. J05-0012 CV (JKS).
- 3- US Army Corp of Engineers. 2005. Kensington Gold Mine Section 404 Permits.





# Southeast Alaska Conservation Council

SEACC 419 6th Street, Suite 200, Juneau, AK 99801  
(907) 586-6942 phone • (907) 463-3312 fax  
[www.seacc.org](http://www.seacc.org) • [info@seacc.org](mailto:info@seacc.org)

September 5, 2006

Representative Ralph Samuels  
716 W. 4th Ave Ste 630  
Anchorage, AK 99501-2133

Dear Representative Samuels,

I want to thank the Alaska House and Senate Resources Committees for inviting SEACC to present our concerns regarding the Kensington Mine. I appreciated the care and thoroughness with which the committee examined the Mine. Many important issues are involved—jobs, economic development, and the responsible use of our resources—and the more broadly and fully they are understood, the better we, Alaskans, can make wise decisions regarding them.

Some apprehension was expressed during the hearing that our challenge to the Kensington Mine's proposal to dispose of its tailings in a lake would, if successful, prevent any future mining projects in the state. This is not the case. Our challenge, which is specific to a recent regulatory change, would not affect any mine that used other, currently legal, methods of tailings disposal. Our challenge would not even prevent the Kensington Mine from proceeding if the mine were to adopt a dry stack tailings disposal method similar to its 1998 proposal. I would like to note, also, that the dry stack method is the EPA's preferred alternative: it is both practicable and environmentally less damaging than lake disposal. It is also the method employed at both the Pogo and Greens Creek Mines.

It is SEACC's position that protecting Alaska's clean waters will ultimately pay far greater dividends, economically and otherwise, than will short term projects such as the currently designed Kensington Mine. Thus, it is Alaska's responsibility to ensure that any mining project is designed and permitted to safeguard Alaska's waters and the multitude of uses and jobs clean water supports.

Sincerely,

Russell Heath  
Executive Director

## SEACC BOARD OF DIRECTORS

Organization	First	Last	City
AK Society of Forest Dwellers	Joseph	Sebastian	Petersburg
Associate Director	Bart	Koehler	Juneau
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At Large Member	Cheryl	DeWitt	Ketchikan
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At Large Member	Mike	Sallee	Ketchikan
At Large Member	Wayne	Weihing	Ward Cove
Chichagof Conservation Council	Steve Molly	Lewis Kemp	Tenakee
Customary & Traditional Gathering Council of Kake	vacant		
Friends of Berners Bay	Vacant		
Friends of Glacier Bay	Bill	Brown	Gustavus
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Lisanski Inlet Resource Council	David	Duffey	Pelican
Lisanski Inlet Resource Council	Jim	Slater	Pelican
Lower Chatham Conservation Society	Anissa	Berry-Frick	Port Alexander
Lynn Canal Conservation	George	Figdor	Haines
Narrows Conservation Coalition-Alternate	Eric	Lee	Petersburg
Prince of Wales Alternate	Scott	Ownbey	Craig
Prince of Wales Conservation League	Mike	McKimens	Craig
Sierra Club, Juneau Group	Mark	Rorick	Juneau
Sitka Conservation Society	Jack	Ozment	Sitka
Taku Conservation Society	Mary Lou	King	Juneau
Tongass Conservation Society	Gregory	Vickrey	Ketchikan

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Wrangell Resource Council Alternate	Peter	Branson	Wrangell
Wrangell Resource Council-	Stephen	Todd	Wrangell
Yakutat Resource Conservation Council	vacant		

# STATE OF ALASKA

FRANK H. MURKOWSKI, GOVERNOR

DEPT. OF ENVIRONMENTAL CONSERVATION

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DIVISION OF WATER  
DIRECTOR'S OFFICE

September 6, 2006

The Honorable Jay Ramras, Co-Chair  
House Resources Committee  
119 N Cushman Street, Ste 207  
Fairbanks, AK 99701

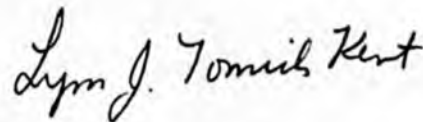
The Honorable Ralph Samuels, Co-Chair  
House Resources Committee  
716 W 4<sup>th</sup> Avenue, Ste 630  
Anchorage, AK 99501-2133

The Honorable Thomas Wagoner, Chair  
Senate Resources Committee  
145 Main Street Loop, Ste 226  
Kenai, AK 99611

Dear Representatives Ramras and Samuels and Senator Wagoner:

Thank you for inviting the Department of Environmental Conservation to testify at the August 31 joint House and Senate Resource Committee hearing regarding the Kensington mine. During the hearing a committee member requested information regarding the toxicity of Kensington mine tailings. Enclosed is a December 6, 2004 summary report prepared by a contractor for the Department. Please let me know if I can provide any additional information.

Sincerely,



Lynn J. Tomich Kent  
Director

Enclosure

**Review of Data on Toxicity and Acid Rock Drainage Potential of  
Tailings at Kensington Mine**

**December 6, 2004**

**Prepared for:**

Alaska Department of Environmental Conservation  
Division of Water  
410 Willoughby Avenue, Suite 303  
Juneau, Alaska 98001

**Prepared by:**

Ecology and Environment, Inc.  
840 K Street, Suite 100  
Anchorage, Alaska 99501

# 1. Introduction and Definition of Concepts

## 1.1 Purpose of Paper

Ecology and Environment, Inc. (E & E) was contracted by the Alaska Department of Environmental Conservation (DEC) Division of Water to review available data on the toxicity and acid rock drainage (ARD) potential of tailings from the Kensington Mine, located 45 miles north-northwest of Juneau, Alaska.

The first final environmental impact statement (EIS) was completed in 1992. Since then there have been changes to the proposed actions including ore processing and disposal of tailings (Tetra Tech 2004). Some of the data provided to E & E for review were based on previously proposed approaches including processing of ore using a cyanide leach recovery process and submarine disposal of tailings in Lynn Canal. E & E reviewed the available data and evaluated the applicability of previous studies to the currently proposed approaches for ore processing and disposal of tailings in a subaqueous tailings storage facility (TSF) in Lower Slate Lake (Tetra Tech 2004).

The reviewers present a summary of the available data including applicability to current approaches and tentative conclusions. This review does not include data verification or validation of the referenced reports, but rather is intended to present a summary of existing data regarding toxicity and ARD potential.

## 1.2 Definition of Concepts

### 1.2.1 Toxicity Tests

Toxicity tests are used to determine if chemicals in environmental media have the potential to adversely affect living organisms. The effects or endpoints typically evaluated include survival, growth, reproduction, and bioaccumulation. Toxicity tests may be conducted with surface water, whole sediment, and sediment porewater. Standardized test methods have been developed for freshwater fish and plankton (USEPA 1994b); freshwater benthic invertebrates (USEPA 2000); marine and estuarine fish and plankton (USEPA 1994c); and marine and estuarine benthic invertebrates (USEPA 1994a).

Sediment toxicity tests are conducted by placing laboratory-reared benthic invertebrates into field-collected sediment from an area of concern. Test-organism survival, growth, and reproduction in site samples are statistically compared with these endpoints in the control and reference samples to quantify adverse effects. Perhaps the most commonly used freshwater sediment toxicity tests are the 10-day survival and growth tests with *Hyalella azteca*, a freshwater amphipod, and *Chironomus tentans*, a freshwater midge (ASTM 1999). Longer versions of both tests are available and can be used to evaluate reproductive effects (USEPA 2000). Similar tests have been developed for marine benthic species (USEPA 1994c).

### 1.2.2 Acid Drainage Potential

ARD is a well-documented and known environmental problem at many mineral mines and can cause enhanced solubility and leaching of various heavy metals to the environment. ARD describes the acidic drainage from mine waste rock, mine tailings, and other mine features as a result of the oxidation of iron and sulfur by oxygen and water. When rock containing sulfide and elemental sulfur are exposed to the weathering affects of oxygen and water, the sulfide minerals may oxidize to form acidic water carrying dissolved metals. Effects of ARD include pronounced toxicological effects to the environment due to generated acid(s), leaching of heavy metals, and subsequent chemical metal and other acid byproducts.

Factors affecting ARD and acid production potential (AP) include the amount of acid generating (i.e., sulfide) materials and acid neutralizing (i.e., carbonate) materials present. Factors influencing the rate of acid generation include the type of sulfide and carbonate material present, available water and oxygen, particle size, and available bacteria for acid generation (Geochemica 1994; USEPA 1994d). The primary sulfide mineral most often available in the greatest quantities is iron sulfide or pyrite. Pyrite is the primary sulfide ore associated with gold bearing callverite (gold-telluride) ore, and native (free or elemental) gold at the Kensington Mine (Geochemica 1994; Rescan 2004).

## 2. Summary of Available Data

A large number of reports have been produced over the past five to 10 years regarding the toxicity and ARD potential of tailings from the Kensington Mine. This section provides a list of materials reviewed in development of this whitepaper. A summary of the materials reviewed for both the toxicity and ARD potential of Kensington Mine tailings are provided in the following subsections.

Five reports were identified that contained original toxicity data. These reports are:

- *Results of 42-day Hyalella azteca Habitability Tests with Tailing Sample from Dawson Metallurgical Laboratories, Utah and Lake Sediment Samples from Lower Slate Lake, Alaska, Samples Received June 9-14 (ASCI 2000b).*
- *Results of Life-cycle Chironomus tentans Habitability Test with Tailing Sample from Utah and Lake Sediments from Alaska, Samples Received June 9-14, 2000 (ASCI 2000a).*
- *Kensington Project, Underwater Tailings Placement Studies: Bioaccumulation/Habitability Testing (EVS 1999b). Partial copy available, only.*
- *Kensington Project, Underwater Tailings Placement Studies: Tailings Habitability Testing (EVS 1999c). Partial copy available, only.*
- *Kensington Project, Underwater Tailings Placement Studies: Whole Effluent Toxicity Testing (EVS 1999a). Not available for review.*

Other reports relevant to the issue of toxicity of Kensington tailings and process water include Kline (2000, 2004a, and 2004b), Rescan (2004), and Tetra Tech (2004). These reports are largely concerned with interpreting the data from the EVS and ASCI Corporation (ASCI) reports cited above and/or with additional ecological risk evaluation, such as comparing metal concentrations in tailings with sediment benchmarks.

The following reports were reviewed for applicability to the ARD potential discussion:

- *Flotation and Leaching Studies* (CMRI 1998). Partial copy available, only.
- *Kensington Gold Project Preliminary Final Supplemental Environmental Impact Statement: Internal Agency Working Draft* (Tetra Tech 2004).
- *Analysis of Acid – Base Accounting Data Kensington Mine Project* (Geochemica 1994).
- *Milling Reagent Analyses Report CMRI Pilot Scale Ore Milling Test Kensington Mine Project* (Maxim 2000b).
- *Particle Size Distribution and Chemical Composition of Suspended Sediment Samples, Lynn Canal, Alaska* (Maxim 2000a).
- *Kensington Mine Project Rougher Tailings Evaluation Report* (Montgomery Watson 1996).
- *Kensington Project Assessment of the Geochemical Stability of Tailings Placed in a Submarine Environment* (Rescan 1999).
- *DRAFT Kensington Gold Project Review of Geochemical Interactions of Flotation Rougher Tailings* (Rescan 2004).
- *Review of Development Rock, Ore, and Tailings Characterization Testing Kensington Gold Project, Alaska* (SRK 1996).
- *Technical Resource Document for Water Resources Kensington Mine Project* (SAIC 1997).

## **2.1 Kensington Toxicity Data**

This subsection focuses on toxicity data from the five primary references identified above. The available freshwater toxicity data and tests conducted with marine species are discussed below. The two AScl reports, which present results from sediment toxicity tests conducted with freshwater benthic invertebrates, are the most relevant to tailings disposal in Lower Slate Lake. The three EVS Environment Consultants (EVS) reports describe results of tests conducted with marine species and thus are less applicable to Lower Slate Lake, but still relevant.

### **2.1.1 Freshwater Tests**

Sediment toxicity tests were conducted with *H. azteca* and *C. tentans* to evaluate possible effects of tailings disposal in Lower Slate Lake. AScl (2000b) presents results from a 42-day sediment toxicity test with *H. azteca*, a common freshwater amphipod species. AScl (2000a) presents results from a life-cycle sediment toxicity test with *C. tentans*, a common freshwater midge species. United States Environmental Protection Agency (USEPA; 2000) methods were used in both studies.

Four samples were tested: (1) Kensington Mine tailings, (2) shallow sediment from Lower Slate Lake, (3) deep sediment from Lower Slate Lake, and (4) a laboratory control sample, which consisted of clean sediment from a lake near the testing laboratory in Minnesota. The Kensington Mine tailings sample was a slurry of mine tailings and interstitial process water (Kline 2004b). Survival, growth, and reproduction were evaluated for *H. azteca* and survival, growth, emergence, and egg production were evaluated for *C. tentans*. The freshwater toxicity results are summarized in Table 1.

No significant difference in survival or growth of *H. azteca* was observed between the laboratory control and Lower Slate Lake samples. Survival of amphipods exposed to Kensington Mine tailings was 5%; significantly lower ( $p < 0.05$ ) than in the other three samples. Growth of *H. azteca* in Kensington Mine tailings was not significantly different than growth in control sediment. However, because the number of individuals available for growth measurements was limited in the tailings sample, the growth comparison between the tailings and control sample is unreliable. No offspring were produced in the Kensington Mine tailings sample.

**Table 1. Freshwater Toxicity Test Results**

Summary of Results from 42-day Sediment Toxicity Test with <i>Hyaella azteca</i>				
Sample	Survival (%)	Growth, Weight (milligrams per organism)	Growth, Length (millimeter per organism)	Offspring Produced (per female)
Laboratory Control	83	0.4	3.6	4.3
Shallow LSL Sediment	76	0.35	3.7	1.8
Deep LSL Sediment	62	0.33	3.7	1.9
Kensington Mine Tailings Slurry	5*	0.29	3.3	0†
Summary of Results from Life-cycle Sediment Toxicity Test with <i>Chironomus tentans</i>				
Sample	Survival (%)	Growth, dry weight (milligrams per organism)	Emergence (%)	Eggs Produced (per viable female)
Laboratory Control	100	1.26	70	858
Shallow LSL Sediment	98	0.98	85	772
Deep LSL Sediment	87	0.95	53	810
Kensington Mine Tailings Slurry	83	1.69	43**	602

Source: ASci 2000a and 2000b.

Key:

LSL = Lower Slate Lake.

\* Significantly less ( $p < 0.05$ ) than laboratory control, shallow LSL sediment, and deep LSL sediment.

\*\* Significantly less ( $p < 0.05$ ) than laboratory control and shallow LSL sediment.

† No males survived.

There was no statistically significant difference in midge survival, growth, and egg production in Kensington Mine tailings compared to the laboratory control and lake

sediment samples. Emergence was adversely affected by exposure to the tailings sample; it was significantly lower in the tailings sample compared with the laboratory control and shallow lake sediment sample but not the deep lake sediment sample. Reduced emergence would be expected to affect midge reproduction because the adults cannot mate and produce eggs unless they emerge.

As mentioned above, the tailings sample was a slurry of mine tailings and interstitial process water. The concentration of many heavy metals was lower in the Kensington Mine tailings than in the Lower Slate Lake sediments (Tetra Tech 2004; Kline 2004b) and less than freshwater threshold effects levels (TEL) presented by the National Oceanic and Atmospheric Administration (NOAA; 1999). Arsenic exceeded the TEL but was lower in the tailings than the lake sediments. The concentration of chromium and nickel in the tailings has been detected at concentrations greater than both the TEL and the lake sediments (Tetra Tech 2004). The concentration of organic milling reagents in effluent from a tailings sample used for marine whole effluent toxicity tests was greater than minimum acute toxicity values found in the literature for potassium amyl xanthate and sodium dialkyl dithiophosphate (Kline 2000).

### 2.1.2 Marine Water Tests

Whole effluent toxicity tests with Kensington Mine tailings and/or process water were conducted to evaluate potential adverse effects associated with disposal of these wastes in Lynn Canal (Kline 2004a; EVS 1999a). Neither a full or partial copy of the original report (EVS 1999a) was available for review.

EVS (1999b; 1999c) conducted habitability tests with Kensington Mine tailings to determine their toxicity to marine benthic species. Partial copies of these reports were available for review. EVS (1999b) presents survival results from a 28-day test with *Macoma nasuta*, a marine clam, exposed to Kensington Mine tailings and Lynn Canal sediment. Percent survival of *M. nasuta* in tailings (98%) and Lynn Canal sediment (98%) was high and no different statistically than percent survival in the laboratory control (94%). Effects on growth or reproduction were not evaluated. The information available did not specify the testing methods that were used.

Results for three separate sediment toxicity tests are reported in EVS (1999c): (1) 10-day survival and avoidance test with *Rhepoxynius abronius*, a marine amphipod; (2) 10-day survival and avoidance test with *Ampelisca abdita*, a marine amphipod; and (3) 20-day survival and growth test with *Neanthes arenaceodentata*, a marine polychaete. Three samples (Kensington Mine tailings, Lynn Canal sediment, and laboratory control) were tested with each species. The specific test methods used could not be determined from the information available.

The test results from marine toxicity tests are summarized in Table 2. *R. abronius* survival in tailings was significantly lower than the laboratory control but not significantly different than the Lynn Canal sediment samples. Survival in Lynn Canal sediment was also significantly lower than the laboratory control. There was no

significant difference in avoidance or reburial behavior between samples (EVS 1999c). The test conducted with *Ampelisca* failed to meet the control-validity criterion of greater than 90% survival. Hence, the results from this test are unreliable and are not considered further in this whitepaper. The test results for *Neanthes* showed survival was 100% in tailings, Lynn Canal sediment, and the laboratory control. There was no significant difference in growth between samples.

Overall, the test results from EVS (1999c) suggest that Kensington Mine tailings would have little or no effect on survival and behavior of marine amphipods and no effect on survival and growth of marine polychaetes. Reproductive effects were not evaluated in EVS (1999c).

EVS (1999b) conducted tests to evaluate the bioaccumulation of metals from Kensington Mine tailings by selected marine benthic invertebrates. The tissue-chemistry results from this study were not available for review.

**Table 2. Marine Toxicity Test Results**

<b>Summary of Results from 10-day Sediment Toxicity Test with <i>Rhepoxynius abronius</i></b>				
<b>Sample</b>	<b>Survival (%)</b>	<b>Avoidance<sup>1</sup></b>	<b>Reburial (%)<sup>2</sup></b>	
Laboratory Control	96	0.50	100	
Lynn Canal Sediment	64*	0.08	98	
Kensington Mine Tailings	90*	0.08	93	
<b>Summary of Results from 20-day Sediment Toxicity Test with <i>Neanthes arenaceodentata</i></b>				
<b>Sample</b>	<b>Survival (%)</b>	<b>Individual Dry Weight (milligrams per worm)</b>	<b>Individual Growth Rate (milligram/worm/day)</b>	<b>Total Dry Weight (milligrams)</b>
Laboratory Control	100	12.9	0.62	64.5
Lynn Canal Sediment	100	14.7	0.71	73.3
Kensington Mine Tailings	100	13.8	0.66	68.8

Source: EVS 1999c.

<sup>1</sup> Number of amphipods on sediment surface per jar per day (out of a maximum of 20).

<sup>2</sup> Percentage of surviving amphipods able to rebury in clean sediment within 1 hour after a 10-day exposure.

\* Significantly different ( $p < 0.05$ ) than laboratory control. Tailings not significantly different ( $p < 0.05$ ) than Lynn Canal sediment.

## ***2.2 Kensington Mine ARD Potential Data***

Over the past decade, testing at the Kensington Mine has been conducted to investigate the ARD potential of development rock, ore, and tailings. Predicting the AP of rock material involves an understanding of the geology and mineralogy that will be encountered during mining, and prediction of AP and ARD using static and kinetic testing. Static tests (e.g., acid-base accounting) measure the theoretical potential for acid generation by comparing the AP and neutralization production potential (NP). Kinetic tests (e.g., humidity cells or column leach tests) simulate actual weathering reactions in the laboratory. Kinetic tests are indicators of the rate and amount of acid that a given sample may generate and provide an indication of drainage water quality (USEPA 1994; Price and Errington 1998).

Presently, actions under consideration include the mining, milling, and concentration of a gold and sulfide bearing concentrate on site, with the concentrate being transported off-site for processing (Tetra Tech 2004). Gold bearing ore will be milled to a fine-grained slurry utilizing recycled process water. Gold and associated sulfides will be concentrated and removed from tailings via a process referred to as flotation. This process involves the addition of flotation agents (potassium amyl xanthate and sodium dialkyl dithiophosphate), frothing agent (MIBC), and a flocculent (polyacrylamide). The process actually floats the gold and sulfides atop the slurry as a concentrate, which is subsequently removed and shipped off-site for economic gold recovery. The tailings will be disposed of in a TSF built in Lower Slate Lake (Tetra Tech 2004).

The proposed processing of ore has changed over time. Earlier studies (Montgomery Watson 1996) were conducted on tailings after cyanide leach gold recovery. These studies are not directly applicable to the current proposed process, but provide useful data concerning neutralization potential of the ore and tailings, which may be considered supporting documentation of more recent studies.

The following subsections summarize the geochemistry of Kensington Mine ore and tailings, and the results of acid-base accounting and leachability tests.

### ***2.2.1 Geochemistry of Tailings***

The Kensington Mine ore body consists of quartz vein swarms within a Jualin diorite, which accounts for more than 95% of the ore deposit. A metavolcanic unit to the north of the deposit account for less than 5% of the mine development rock (Geochemica 1994). Gold occurs in the mineral callverite (gold-telluride), and as elemental or native gold in association with pyrite (iron sulfide). Pyrite is the predominant sulfide mineral in the ore, comprising one-half to 4% of the rock mass; however, traces of chalcopyrite (copper-iron sulfide) have been identified. Trace metal content of the ore is very low (Maxim 2000a; Rescan 2004); metals within the 100 to 1500 parts per million range include copper, barium, and manganese; and trace metals include gold, silver, lead, antimony, zinc, molybdenum, cadmium, chromium, nickel, tellurium, tungsten, vanadium, and some mercury. Of importance for neutralization potential, calcite (calcium carbonate) is found in substantial quantities within the deposit with significant levels identified in the tailings (Rescan 2000). Other predominant minerals include

silicate structures of potassium, aluminum, iron, and magnesium, among others. (Rescan 2004).

Previous studies have indicated a total sulfur content of the ore to be low, averaging 1.83% (Geochemica 1994). The current plan involves mining a higher-grade portion of the ore deposit (Tetra Tech 2004). Previous studies have indicated that the total sulfur content increases with an increase in gold concentrations (Geochemica 1994). Via the flotation process, the predominance of gold, silver, copper, iron, tellurium, mercury, and sulfides are removed, leaving tailings with concentrations of arsenic, barium, cobalt, chromium, manganese, molybdenum, lead, antimony, zinc, vanadium, mercury and traces of other metals. Of importance is the removal of sulfides, which impart acid production. Greater than 90% of sulfides in the ore are removed during the froth flotation process (Rescan 2004). The average total sulfur content of the rougher tailings has been measured at 0.005% (Maxim 2000).

The geochemical stability of heavy metals is a complex system involving several variables, the most important of which are the acid production potential, neutralization potential, and metals leachability of the system. These factors are expanded upon in the following subsections.

### ***2.2.2 Results of Acid Potential, Neutralization Potential, and Acid Leachability Tests***

Acid-base accounting has been used to describe the ARD potential of Kensington Mine ore and tailings. Acid-base accounting compares the neutralization generating potential and acid generating potential of a given sample. A ratio of NP:AP greater than 3:1 indicates a high probability that the rock will not be acid generating. Ratios less than 1:1 indicate a high probability for the rock to generate acid, and ratios between 3:1 and 1:1 indicate a zone of uncertainty where rock may be acid generating if the kinetics of weathering favor rapid reaction of sulfides over carbonates (USEPA 1994).

Multiple acid-base accounting tests have been conducted on Kensington Mine ore and tailings and have indicated low potential for acid generation due to high neutralization potential. Two studies (Geochemica 1994; SRK 1996) were available for this whitepaper. Tests performed on Kensington Mine ore by Geochemica (1994) consisted of 94 development rock samples, and 39 gold ore samples. No development rock samples exhibited an NP:AP ratio of less than 3:1 and 60 samples exhibited NP:AP ratios of >21:1, indicating high neutralization potential. One gold ore sample exhibited an NP:AP between 1:1 and 3:1 (average NP:AP of 2.24:1). The remaining samples had an NP:AP of >3:1, indicating low potential for acid generation.

Staffen Robertson and Kirsten, Inc.'s (SRK's) study consisting of 591 ore samples and 75 potential development rock samples supported the Geochemica results. The NP:AP ratios for development rock ranged from 4.5:1 to 672:1, with 88% of the samples exhibiting NP:AP in excess of 10:1, indicating the ore has low potential for acid generation. In addition, the pH tests indicated the development material is alkaline in

nature (SRK 1996). Of the 591 ore samples, all but one indicated low acid generation potential due to high neutralizing potential.

These data offer compelling evidence that acid production and subsequent ARD is not anticipated in Kensington Mine ore. Furthermore, much of the AP in the form of sulfides will be removed via the flotation process. These results are based upon analyses of a limited number of ore and development rock samples. Determination of the statistical and structural representativeness of the samples was not conducted.

### 2.2.2.1 Freshwater and Marine Water Tests

Previous plans for the Kensington Mine involved the placement of mine tailings in Lynn Canal, a submarine environment. In order to determine the characteristics of Kensington Mine tailings in the submarine environment, leach testing was conducted. The tests were designed to assess the short- and long-term reactivity of tailings under a seawater cover (Rescan 1999). Within 24 hours, dissolved concentrations of arsenic, molybdenum, aluminum, and manganese in the water column increased rapidly. Fluxes of these metals decreased over time, dropping to a very low or negligible level at the end of a 60-day test. The long-term flux of the tailings in a marine environment indicated the concentrations of dissolved metals did not appreciably increase over time. In addition, the concentration of dissolved oxygen and metals in sediment pore water was measured following 60-days of deposition in seawater. The results indicated tailings were not contributing significantly to the dissolved metal concentrations in the pore water, with the possible exceptions of molybdenum and zinc. Dissolved oxygen in pore water diminished rapidly across the seawater-tailings interface.

The combined effect of these factors implies a short-term flux of some metals, and subsequent slower steady state equilibrium over time resulting in near zero release of heavy metals to the water column. This reduction in tailings reactivity is attributed to diminished dissolved oxygen within tailings pore water, post-depositional iron-manganese coating of tailing particles, and a reduction of exposed tailing particle surface area caused by subaqueous storage.

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