



Kennecott Utah Copper

## **Water Management Information Brief May 2010**

**Being good stewards of our assets is an important part of our contribution to sustainable development and our commitment to being good neighbors to our local community.**

### **About us**

At Kennecott, sustainable development is important to our success as a producer of copper, molybdenum, gold, silver, and sulfuric acid, and to the social and financial investment we have made in our surrounding communities. We accept the common definition of sustainable development which is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

While sustainable development cannot be achieved by one organization on its own, we believe that our business can make an important contribution to the ongoing, global transition to sustainable development. The minerals and metals we produce contribute to society's needs, creating wealth to support community infrastructure, health care and education programs, and delivering financial dividends for our shareholders. Our activities also provide the means and opportunity to develop new approaches to solving the world's environmental and human development challenges, such as climate change.

We also recognize that, if not managed appropriately, some aspects of our activities have the ability to detract from sustainable development, such as options for the future use of water and land; amenity impacts on local communities; and greenhouse gas and other air emissions from our operations and the use of our products. As a result, we aim to balance the complex interaction of environmental, economic and social factors that are fundamental to our business success.

### **The importance of water**

Water is an increasingly scarce and valued resource across the globe. Governments, communities and industries are experiencing unprecedented concern as a result of increasing demand from fast growing populations, unsustainable water practices and

persistent droughts. Climate change is expected to place more pressure on available water resources, with some regions predicted to become much drier and other regions wetter.

All Rio Tinto (our parent company) businesses need water to operate. Water is used and reused to process ore, generate power, manage waste, and suppress dust. It is used for cooling equipment, ore and tailings transport and for the everyday needs of employees and their families. In addition to using water, it is sometimes necessary to remove it or change the way it flows around our operations in order to maintain a safe and stable working environment.

**Q: How does Kennecott use water?**

**A:** Water is used in every stage of our operation and business: for exploration, mining, concentrating, smelting, refining, and power generation. Water is needed to process and mine ore, produce metal and power, cool equipment, transport tailings, suppress dust, and for washing and drinking. Our water system is complex, with miles of pipes and associated infrastructure that move water up to 17 miles from one facility to another.

Our operations use different amounts of water with of differing quality. However, most of the water used is derived from recycling. The concentrator, our largest water user, obtains more than 90% of its water from recycling.

**Q: What sources does Kennecott rely upon for the water it uses?**

**A:** We use many water sources that vary in both quantity and quality.

Our primary water sources include groundwater from wells and springs near our operations and surface water. More than 70% of the total water we withdraw comes from groundwater sources with the remainder coming from surface water sources. Importantly, the majority of the water we withdraw is recycled and reused over and over again. On average, we recycle about 60% of the water we withdraw to minimize importing additional water resources.

From a quality perspective, we categorize the water we use as either “fresh water” or “poor water.” We define “fresh water” as potable water or good quality raw water with total dissolved solids<sup>1</sup> (TDS) less than 1,500 milligrams per liter. “Poor water” is defined as raw water with total dissolved solids (TDS) greater than 1,500 milligrams per liter. On average, about 94% of the water we use is categorized as poor water, and 6% is fresh water.

**Q: Does Kennecott discharge water to the environment and what are the environmental aspects of discharging water to the environment?**

**A:** Mining operations can affect the quality of water; for example, there can be water quality changes to flows used in or that come into contact with ore extraction and processing. Whereas water returned to the environment after contact with mining or processing activities can have environmental and social impacts, its management is

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<sup>1</sup> TDS is simply a measure of the concentration of dissolved minerals in water.

closely regulated by state agencies such as the Utah Division of Water Rights and the Utah Division of Water Quality.

At Kennecott, we are permitted to discharge water into specified receiving waters such as Great Salt Lake, but only if those discharges are consistent with our Clean Water Act permit, which has specific water quality compliance limits set by the State of Utah to protect the beneficial uses of the receiving waters. Notably, the Kennecott discharge is a small fraction of the total water managed as part of the mining and processing activities.

### **Demonstrating leadership**

#### **Q: What is Kennecott's general approach to water resource management?**

**A:** In the arid west where Utah is the nation's second driest state, water is an important natural resource. At Kennecott, we manage our water resources to ensure efficient, safe and sustainable use and to protect water resources in and around our operations. Our approach to align day-to-day production with long-term planning includes:

- Minimizing the amount of new, clean water required for copper production operations by recycling.
- Striving to maintain the best water quality possible when our water is returned to the environment.
- Continuously seeking opportunities to more efficiently use our water.
- Separating waters of different quality to optimize the best use.

We have a number of programs to help achieve improved performance, including:

- A water standard that sets the minimum expectations for our operation when managing water.
- A water target that aims to improve the efficiency of water use.
- A water risk review that assesses risk and opportunities and provides a holistic approach to water management.

#### **Q: Does Kennecott have a specific strategy to manage its water use in 2010 and beyond?**

**A:** Yes. Our water use strategy is consistent with the standards developed and followed by us and other Rio Tinto businesses around the world. Our water strategy accounts for day-to-day management as well as long term thinking about water use, while promoting better performance. Our formal water strategy includes the following:

1. Efficient use of water resources (such as understanding, monitoring, and modeling our internal water use and balance; and putting the right water quality to the appropriate use – we strive to not use municipal-quality water in other parts of the operation that can withstand poorer quality water).
2. Optimize water quality (such as not compromising the quality of processing water and discharge).

3. Manage water system infrastructure (such as maintaining existing water infrastructure effectively, and design and constructing new water infrastructure using current best practices to reduce operations costs, waste and risks).
4. Ensure effective communication with water users within our operations to assist with goal of using water more efficiently.

**Q: What has Kennecott done to manage historic groundwater contamination?**

**A:** We began work in the early 1980s to identify areas where groundwater had been affected by mining activities. This included the installation and sampling of hundreds of monitoring wells, and sampling of municipal and private water wells. Working under the oversight of EPA and the State of Utah, we identified two principal areas of contamination, or plumes, evaluated cleanup alternatives, and selected an approach to clean up the contaminated groundwater. This process relied on extensive community involvement with representatives from local communities and townships; local, state and federal governmental agencies; and other entities, such as the Jordan Valley Water Conservancy District.

We have also implemented measures to prevent future groundwater contamination, as well as cleaning the water that was damaged by decades of historic mining activities. These projects include developing a water collection system at the bottom of our waste rock dumps, reconstructing and relining reservoirs, implementing a “pump and treat” system to manage the plume, and continuing to treat water at our reverse osmosis plant. Specific information about these activities can be found in our [2008 reclamation report](#) or on our [South End cleanup web page](#).

**Q: Does Kennecott treat any water on-site?**

**A:** Yes. We treat water using reverse osmosis – one of the most advanced technologies used to treat water today - at several of our facilities (such as at the smelter, copper refinery, and power plant) to be used in different processes. We also treat water at certain sites for washing and culinary use for employees at our operations.

Most notably, in 2006 we completed a large reverse osmosis water treatment plant located on the south end of our operation to treat groundwater that was historically affected by mining activities (see previous question for more information). Impacted groundwater is extracted by pumping a network of wells and then conveying it for treatment at this facility. This facility treats approximately 3,000 gallons of water per minute and provides enough potable water to supply 4,300 homes with water each year. Water from this treatment facility is delivered to the Jordan Valley Water Conservancy District for distribution to its customers.

**Q: Does Kennecott support the selenium standards for the Great Salt Lake?**

**A:** Yes. We support protection of beneficial uses of Great Salt Lake through balanced regulation. We recognize the important multiple beneficial uses of the lake including ecological habitat, recreation, brine shrimp cyst harvest, and mineral extraction; we fully support due protection and promotion of these uses. The lake also meets an important community and industrial need as a receiver of wastewater discharge from

permitted facilities. While it is important that regulations be written to protect these beneficial uses, it is equally important that such regulations do not impose undue treatment requirements on dischargers to achieve effluent quality levels that provide no real or measurable ecological or other benefit to Great Salt Lake. (For more information about this topic, please see additional position papers and Q&As on our website at [http://www.kennecott.com/environmental-topics/.](http://www.kennecott.com/environmental-topics/))

### **Measuring our performance**

#### **Q: How does Kennecott measure water use?**

**A:** Every year, we measure a variety of parameters, such as the total amount of water input (from poor and freshwater sources), total water use, and total water recycled. We also measure fresh water consumption in terms of water efficiency total volume and use per unit of product produced, specifically freshwater withdrawn per metric tonne of copper product. Therefore, we have set goals and targets to reduce our water use. In addition, we also have a target and have implemented plans to increase how much water we recycle. All water usage is reported to regulatory agencies such as the Utah Division of Water Rights and the Division of Water Quality.

Moreover, Kennecott has implemented new technologies to improve how we measure and monitor our water use. We have made significant improvements by integrating advancing metering techniques, telemetry and integrating cutting-edge data collection methodologies and modeling. We have also installed and are using remote water quality sensors at various locations around the operation to improve how we manage water quality.

### **Reducing our impact**

#### **Q: What is leaching? Does Kennecott leach the waste rock dumps today?**

**A:** Beginning in the 1920s, early miners at Bingham Canyon began applying water to waste rock piles to dissolve, or leach, the low grades of copper in the waste rock. They collected and processed the leach water from the toe of the piles to recover the copper. The leach system was upgraded and expanded over the years. However, in 2000, we stopped the application of water on the waste rock. Rain and snowmelt continue to infiltrate the waste rock and we continue to capture this water at our collection structures.

#### **Q: How does Kennecott manage acid rock drainage now? What about after closure?**

**A:** We collect and treat water that contacts the waste rock to prevent pollution. A series of 29 acid-resistant concrete walls have been constructed in the drainages below the waste rock emplacements on the east and south side of the pit. These walls extend below the surface to bedrock and capture surface water and shallow groundwater. We continue to recover copper from this water, then mix the acidic water with mill tailings to neutralize the water.

**Q: What is Kennecott doing to make sure that groundwater is not contaminated in the future?**

**A:** Tremendous resources have been allocated in the construction of cut off walls and complex water collection and conveyance systems consisting of double-lined pipes and holding ponds; primary and secondary containments have been established for all potential contaminant storage containers and areas, coupled with an extensive and state-of-the art monitoring program. We also capture all the meteoric water (or water that comes from natural precipitation, such as rain or snow) that falls on our waste rock repositories.

**Q: Will groundwater remediation be completed by mine closure?**

**A:** We are currently cleaning up a large plume of contaminated groundwater east of the Bingham Canyon Mine. We anticipate that this cleanup will take a number of decades and could last beyond closure of the mine. This has been anticipated in agreements that we have made with the U.S. Environmental Protection Agency and the Utah Department of Environmental Quality. As specified in the *South Facilities Groundwater Operations, Maintenance, and Replacement Plan* which is part of a Federal Consent Decree, at least three years prior to closure, we must provide a plan for post-closure treatment of contaminated groundwater and construct the treatment system by the time of mine closure. We have provided \$15 million in financial assurance to EPA to assure that this work is completed. We will also be treating contaminated groundwater to produce drinking water for the community through at least 2046 under a settlement with the State of Utah for damage to natural resources.

**Continued improvement**

Moving forward, we are committed to development and application of innovative and responsible approaches to managing the resources we need and use. Our objective is to manage water efficiently and to prevent future contamination issues.

Specifically, we aim to:

- Continue to use “poor” quality water first in our operations to minimize fresh water withdrawal and use.
- Continue to recycle as much water as practicable.
- Develop and implement strategies for more efficient resource management and use.
- Direct involvement and support worldwide with the scientific community in advancing technologies and education in improving best practices and methodologies.
- Educating our workforce in best management and housekeeping practices.