The history of Bingham Canyon Mine

• Bingham Canyon was settled in 1848 by the Bingham brothers, Thomas and Sanford, who were ranchers with no mining experience.

• In 1863, soldiers stationed at Fort Douglas in Salt Lake City explored the canyon and discovered lead ore. Utah’s first mining district was created in the Bingham Canyon area that same year.

• In 1893, Daniel Jackling, a metallurgical engineer, and Robert Gemmell, a mining engineer, studied the deposit and recommended developing the ore body through a revolutionary open-pit mining method and processing the ore on a large, industrial scale.

• The miners and their families lived near Bingham Canyon in places called Highland Boy, Copper Heights, Copperfield, Carr Fork, Heaston Heights, Telegraph, Dinkeyville, Terrace Heights, Greek Camp and Frog Town. At one point, the population in the area approached 20,000 people.

• In 1903, the Utah Copper Company was formed to develop the mine, based on the recommendations of Mr. Jackling and Mr. Gemmell.

• In 1906, the first steam shovels began mining away the waste rock that covered the ore body. The ore was found in a part of the mountain that divided the main canyon.
The geology of the Bingham Canyon Mine

• Every deposit of ore in the world is unique. There are no two ore bodies that are alike.

• Geologic forces were at work in the Oquirrh Mountains between 260 and 320 million years ago (Late Paleozoic Period).

• About 30 to 40 million years ago, molten, metal-bearing rock deep within the earth's crust began to push toward the surface and formed Bingham's ore deposit. Volcanoes erupted above the evolving ore body. This particular ore body contains primarily copper, gold, silver and molybdenum.

• Tiny grains of ore minerals, mostly copper and iron sulfides, are scattered within what is called “host rock.” Because there is far more host rock than there are minerals, it is known as a low-grade ore deposit.

• Because this is a low-grade deposit, a ton of ore contains only about 10.6 pounds of copper.

• For every ton of ore removed, about two tons of overburden must first be removed to gain access to the ore.
How big is the Bingham Canyon Mine?

• Kennecott Utah Copper’s (KUC) Bingham Canyon Mine has produced more copper than any mine in history—about 18.1 million tons.

• The mine is 2¾ miles across at the top and ¾ of a mile deep. You could stack two Sears Towers (now known as the Willis building), on top of each other and still not reach the top of the mine.

• The mine is so big it can be seen by space shuttle astronauts as they pass over the United States.

• By 2015, the mine will be more than 500 feet deeper than it is now.

• If you stretched out all the roads in the open-pit mine—some 500 miles of roadway—you’d have enough distance to reach from Salt Lake City to Denver.

• KUC mines about 55,000,000 tons of copper ore and 120,000,000 tons of overburden per year.
Mining equipment and operations

- There are 11 giant electric shovels and one hydraulic shovel operating in the mine.

- The largest electric shovel has a 56-cubic-yard dipper that scoops up approximately 98 tons of material in a single bite, a weight equivalent to about 50 automobiles.

- The newest electric shovel costs more than $20 million and weighs 3.2 million pounds.

- There are about 70 gigantic haulage trucks operating in the mine. These trucks carry from 255 to 320 tons of material in a single trip.

- A new haul truck costs about $3.5 million.

- The fleet of haul trucks will travel a total of more than 10,000 miles a day at an average speed of 13 miles per hour.

- The mine has eight large drills that stand between 75 and 100 feet tall and drill blast holes 55 feet deep. On average, 200 holes are drilled in a typical day and packed with 1,200 pounds of special blasting agents.

- The in-pit crusher reduces ore to less than 10 inches in diameter or about the size of a basketball. Very fine dust particles are captured in an air pollution control device called a bag house—similar to a very large vacuum cleaner.
The mining process

**Bingham Canyon Mine**  This is where the mining process begins. Every day, Kennecott Utah Copper mines about 150,000 tons of copper ore and 330,000 tons of overburden. The ore containing copper, gold, silver and molybdenum is hauled and deposited in the in-pit crusher and sent to the Copperton Concentrator.

**Copperton Concentrator**  From the mine, ore is transported on a five-mile conveyor and stockpiled at the Copperton Concentrator. There the ore is ground into fine particles. The smaller pieces are then combined with air, water and chemical reagents to separate the valuable minerals from the waste rock. The mineral bearing concentrate is then transported to the smelter through a pipeline.

**Tailings**  Tailings are the leftover rock material that have had most of the valuable metals removed. Tailings are sent through a pipeline from the Copperton Concentrator to the tailings impoundment north of the town of Magna where they are stored.

**Smelter**  At the smelter, the copper concentrate is transformed into liquid copper through a flash smelting process. The copper matte is processed in the furnace to produce 98.6 percent blister copper. From there, the 720 pound copper plates, called anodes, are sent to the refinery.

**Refinery**  At the refinery, anodes are lowered into electrolytic cells containing a stainless steel blank and acidic solution. For 10 days, an electric current is sent between the anode and the cathode, causing the copper ions to migrate to the steel sheet. The other impurities, including gold and silver, fall into the bottom of the cell and are recovered in the Precious Metals plant. This process forms a plate of 99.99% pure copper. The copper is separated from the steel sheet and sent to market.
Fun facts about copper

• The first known use of copper was around 10,000 years ago.

• The Salt Lake City 2002 Winter Olympic Medals were made from gold, silver and copper (bronze is made from copper and tin) from the Bingham Canyon Mine.

• The Statue of Liberty contains 179,000 pounds of copper. After one hundred years of enduring biting sea winds, driving rains and the beating sun, the copper skin of the Statue of Liberty has not only grown more beautiful, it has also remained virtually intact.

• “Copper” comes from kyprios, the Greek word for the island of Cyprus, where ancient people mined copper.

• To make all the pennies, nickels, dimes, and quarters in 1999, the U.S. Mint used about 36,000 tons of copper. That amount of refined copper would take 41 days to produce at Kennecott Utah Copper.

• It requires about 15 different minerals to make a car, 30 minerals to make a computer and as many as 42 different minerals to make a telephone. Copper can be found in each of these products.

• On average, each person in America uses about 30 pounds of copper every year.

• The typical new home contains about 500 pounds of copper – found mostly in wiring, plumbing and brass fixtures.

• Copper boils at 4,000 degrees Fahrenheit; water boils at 212 degrees Fahrenheit.
Our commitment to sustainable development

- Rio Tinto is an industry leader in finding, mining and processing the earth’s mineral resources in a way that’s economically, socially and environmentally responsible.

- In doing so, Kennecott Utah Copper’s (KUC) strategic focus includes following the sustainable development model. This model includes assuring Economic Prosperity, Social Well-Being, Environmental Stewardship and Governance surrounding our operation. When intertwined, these practices help promote an economically strong, productive and responsible company.

- KUC constantly strives to be a good steward of its resources. For example, KUC works to conserve and generate energy and reduce the environmental impacts of our operation.

- KUC strives to work with communities, government and nongovernmental organizations to achieve mutually beneficial goals.

- KUC recognizes that people are its most important resource and safety is the highest value. Helping to ensure a safe working environment for our employees is always a top priority.

- Kennecott Land’s Daybreak community is an example of Rio Tinto’s commitment to sustainable development. Daybreak sits on 4,126 acres in the city of South Jordan. The Daybreak community is a mixed-use, walkable community that incorporates quality education, a healthy and renewable environment, and a vibrant local economy.
About Kennecott Utah Copper

As the second largest copper producer in the United States, Kennecott Utah Copper (KUC) provides about 13 percent of the country's copper needs. Kennecott's Bingham Canyon Mine is the largest manmade excavation on earth. It has produced more copper ore, some 18.1 million tons, than any mine in the world. Every year, Kennecott produces approximately 300,000 tons of copper, along with 500,000 ounces of gold, 4 million ounces of silver, about 30 million pounds of molybdenum, and about 1 million tons of sulfuric acid, a useful by-product of the smelting process. Rio Tinto purchased KUC in 1989 and has invested about $2 billion in modernization projects. KUC has also spent more than $350 million on the cleanup of residual mining waste and $100 million on groundwater cleanup.

About Rio Tinto

Rio Tinto has been a world leader in mining and exploration for 130 years. The company mines and processes the earth’s mineral resources and metals essential for making thousands of everyday products. Rio Tinto has operations on every continent and the company’s products include aluminum, copper, diamonds, energy products, gold, industrial minerals and iron ore.

It is headquartered in the United Kingdom (UK), combining Rio Tinto plc, a London and NYSE listed company, and Rio Tinto Limited, which is listed on the Australian Securities Exchange.

If you would like more information about Kennecott or Rio Tinto, please visit us at:
www.kennecott.com
www.riotinto.com

© 2009, Rio Tinto