

## Tailings Impoundment Q&A

These frequently asked questions have been prepared to inform and educate readers about tailings, the current process of paying for an independent third-party stability analysis, and safety.

### **GENERAL INFORMATION**

- **What are tailings?**

Tailings are the material left over after the majority of the valuable metals have been removed from the ore extracted from the Bingham Canyon Mine. The rock is crushed and ground until it is the consistency of fine sand. The ore is then separated from the tailings using a separation process. Tailings are transported to the tailings impoundment as mud-like slurry where the solids settle out and the water is recovered. Tailings storage in the south impoundment began in 1906. By 2001, all active tailings deposition completely ceased and transitioned to the new north impoundment.

- **What do the tailings consist of now?**

Tailings are comprised primarily of silica sand, with some trace metals. The tailings in the impoundment have a similar composition as soils found throughout the western United States but with a slightly higher concentration of copper.

- **Does Kennecott use cyanide during the bulk flotation process?**

No. The primary chemical used in the bulk flotation process is limestone to modify pH levels. Limestone has no known adverse health effects.

- **How big is the tailings impoundment?**

The total acreage for the tailings impoundment is 9,200 acres. The south impoundment covers about 5,700 acres, the majority (more than 99 percent) of which has been reclaimed. The north impoundment covers about 3,500 acres and is designed and constructed to state-of-the-art geotechnical practice to withstand the effects of a catastrophic earthquake.

- **Recent media coverage suggests the tailings impoundment is unsafe. Is that true?**

The recent media coverage addressed the safety of the impoundment in the event of a major earthquake. Historically, there were questions about the safety of the impoundment in a major seismic event like a 7.25 earthquake. These questions have been addressed through upgrades undertaken by Kennecott since

the late 1980's to ensure the impoundment's stability in the case of a major seismic event. These upgrades include:

- **Dewatering Efforts:** Beginning in the late 1980s, dewatering of the south and east slopes of the southeast corner of the tailings impoundment occurred to remove water. This process included the installation of more than 40 dewatering wells, 1,500 wick drains and 200 horizontal drains along this portion of the impoundment. This dewatering program has successfully improved the stability of the impoundment.
  - **Stepback Dikes:** Beginning in 1991 and continuing through the late 1990s, Kennecott began reducing the slope of the southeast corner and moved tailings more than half a mile away from the slope crest. Tailings deposition on the south impoundment completely ceased in 2001.
  - **Transition of tailings deposition to the North Impoundment:** Following an extensive permitting effort that started in the early 1990s, and an expenditure of over \$500 million, Kennecott closed the south impoundment and transitioned all operations to a seismically engineered state-of-the-art impoundment approximately two miles to the north. This allowed Kennecott to reclaim the south impoundment by vegetating the slopes and top surface.
  - **North and South 80<sup>th</sup> West Berms:** By 1998, Kennecott's two independent geotechnical engineering firms projected that a release from the impoundment would not reach any residential areas during a significant earthquake. As an extra precaution, Kennecott constructed "L" shaped tapered earthen berms approximately 15 feet high, near a Magna neighborhood south on 80<sup>th</sup> West and an isolated residence north on 80<sup>th</sup> West, to divert any potential release.
  - **Roadway Notification System:** Kennecott installed warnings signs along Highway 201 and arterial roads that are triggered from seismic monitoring instruments (accelerometers) located around the tailings facility. In the event of a large earthquake, pre-programmed messages would automatically be sent to the signs to advise motorists not to enter and avoid potentially hazardous areas.
- **Does Kennecott have plans for the tailings impoundment?**  
No. Kennecott has already reclaimed more than 5,600 acres of the old south tailings impoundment which is now used for cattle grazing. At this point, there are no other plans for the reclaimed portion of the tailings impoundment.

## INDEPENDENT STUDY

- **Who is going to administer the third party report?**

A committee decided upon by Salt Lake County will administer the third-party review and study. The committee consists of:

- Magna Town Council (1)
- Magna Community Council (1)
- Magna Planning Commission (1)
- Magna Chamber of Commerce (1)
- Magna Water District (1)
- PTA representative from Pleasant Green Elementary (1)
- Magna Residents (6)
- County Councilmen (2)
- County Mayor's office (1)
- Utah House Representative (1)
- Utah Senate Representative (1)

- Non-voting experts

- Engineering
- Geotechnical

This assessment will offer an unbiased determination on the safety of the southeast corner of the impoundment in the event of a major seismic event and potential risks to Magna residents. Kennecott will not participate in the study but will pay for the costs. Kennecott has given Salt Lake County \$250,000 for the study with the intent that whatever amount is left over will be given to a Magna charity. The charity will be identified by Salt Lake County, the tailings impoundment committee and Kennecott Utah Copper.

- **Will the independent review look at the old Kennecott studies or will it be a new study?**

It will be a new study, commissioned by an appointed Salt Lake County committee and conducted by an independent third party chosen by Salt Lake County. However, all previous studies regarding the seismic stability of the impoundment will be made available for reference.

- **How long will the study take?**

In Kennecott's experience, the study will likely take three to six months once initiated; however, the schedule will be determined by the Salt Lake County committee and the independent geotechnical firm that they hire.

- **Who does Kennecott's seismic studies?**

Over the past two decades, Kennecott has used approximately 10 geotechnical firms to conduct studies. The most recent studies were from two different independent companies:

- URS Greiner Woodward-Clyde Corporation:  
<http://www.urscorp.com/>
  - AMEC Earth and Environmental Inc: <http://www.amec.com/>
- **Will the study include impacts on wildlife?**  
No, the study will focus on the stability of the southeast corner of the tailings impoundment in the event of a major seismic event.

## **TAILINGS STABILIZATION**

- **How much money has Kennecott spent to stabilize the impoundment?**  
Kennecott has spent over \$500 million dollars to stabilize the tailings impoundment. Measures implemented include dewatering the south slope of the south impoundment, installing stepback dikes and berms, and transitioning active tailings deposition to a north impoundment, allowing for revegetation and closure of the south impoundment.
- **When did Kennecott start dewatering?**  
Beginning in the late 1980s, Kennecott began the installation of more than 40 dewatering wells, 1,500 wick drains and 200 horizontal drains along the south and east slopes of the southeast corner of the south impoundment. This dewatering program has successfully improved the stability of the impoundment.
- **How long will it take to completely stabilize the southeast corner of the impoundment?**  
Utilizing the dewatering program in place today to lower the water table an additional 20 feet in the lower slope of the southeast corner will result in stable conditions following a magnitude 7.25 earthquake. Kennecott believes this can be achieved within the next 10 years.
- **Are homes in the Meadow Green Estates in danger?**  
No. By 1998, Kennecott's two independent geotechnical engineering firms projected that a release from the impoundment would not reach any residential areas during a significant earthquake.

## **ENVIRONMENT**

- **Where does the tailings water go?**  
Water from the dewatering system is directed to a canal and pumped to Kennecott's concentrator for reuse. Water that is currently used to transport tailings to the North Impoundment along with precipitation falling on the North Impoundment is collected in the North Impoundment decant pond and either reports to the

clarification canal where it is commingled with SE Corner dewatering water prior to being pumped back to the concentrator or directed to our permitted outfall. In 2007, approximately 10 percent of the decant pond water was discharge to the lake and the other 90 percent was reused.

- **If Kennecott is drying up the tailings, are there measures in place to suppress the dust?**

Kennecott has revegetated the surface and slopes of the south impoundment with native plants successfully controlling dust. Numerous dust control activities occur on the active North Impoundment that include the use of temporary vegetation, sprinklers that pump out 1,000 gallons of water per minute and substances that bind soils.

- **What type of vegetation is on the tailings?**

The reclamation effort for the south tailings impoundment consists of a natural grasses, plants and trees. Much of this land is used for grazing.

### **HOMES NEAR TAILINGS**

- **Why did Kennecott hide a possible danger from Magna residents?**

The current leadership of Kennecott cannot explain the motivation behind the decisions made 20 years ago by past leadership. Kennecott Utah Copper President, Andrew Harding, has vowed that if there were a similar danger today, residents would be notified immediately.

- **Will property values decrease?**

If the independent study shows that the impoundment will fail in a maximum credible earthquake and impact houses, Kennecott will compensate the affected homeowners.

- **Has the tailings impoundment affected the water quality in Magna?**

No, as required by the State of Utah Division of Water Quality, numerous groundwater monitoring wells located around the impoundment are routinely sampled to ensure no impacts are occurring.