



Tailings and Waste

June 2013

This Factsheet is designed to answer questions about Oyu Tolgoi's Tailings – the term for waste material that remains after the processing of mined material, as well as questions about other waste, including overburden – the waste material that is displaced by mining but not processed.

About Tailings

What are Tailings?

Tailings, which have the consistency of wet sand, will generally comprise crushed rock, residual minerals with little or no market value, compounds used in the extraction of minerals, and water.

The safe storage of tailings is one of the most important environmental considerations facing mining everywhere. As with all areas of its operations, Oyu Tolgoi has strict processes in place to manage its waste properly. This is to ensure that the local community and environment are protected. As well as meeting all legal obligations, Oyu Tolgoi has to meet strict international standards set by Rio Tinto and its project finance lenders. Full information on Oyu Tolgoi's approach to waste management and the environment can be found in the project's Environmental and Social Impact Assessment at <http://ot.mn/en/about-us/environmental-social-impact-assessment>. This information will be updated as further operational plans are developed.

What sort of chemicals are in the tailings?

The concentrating process includes a number of steps to separate the copper from other non-economic minerals. These include the addition of certain chemicals as well as mechanical processes like the grinding and milling of ore. Consequently, as well as containing naturally occurring substances found underground, some additional chemicals from the concentrating process are left over in the tailings. These include things like calcium, lime and a number of others.

Do the tailings contain arsenic?

Naturally occurring arsenic leftover from the non-economic ore can be found in tailings. A geochemical analysis of trial samples of tailings indicates that our tailings contain a very small concentration of arsenic, below that usually stated as requiring clean up in soils, and even below the level set in animal feed guidelines in the US. The water in the tailings samples also shows very low levels – below

international standards such as those of the World Health Organisation for drinking water and stock water.

Tailings Storage

How are tailings stored, and are they there forever?

All of Oyu Tolgoi's tailings will be safely stored in specifically sited, engineered, constructed and permitted tailings storage facility that meets international standards. If properly managed, the environmental impact of tailings can be minimised and damage to the environment avoided. Over time, the water in the tailings dries out and they harden. Once this takes place, the land can be covered over and rehabilitated.

How do we know that OT's Tailings facility won't leak and damage the environment?

The Tailings are stored in a large lined facility to prevent leakage into the ground. Unlike some other mines in Mongolia, Oyu Tolgoi's tailings facility will be built to international standards. This helps to ensure that the facility is safe and does not cause damage to the environment.

What if there was an earthquake?

OT's tailings storage is built to international standards suitable for the seismic conditions in the Gobi.

Is OT's Tailings facility close to the Undai River?

The two surface water channels that exist in the tailings area are being diverted around the tailings facility and safely conveyed into a channel that meets the Undai River downstream. This will protect the river for herders and wildlife. Our tailings facility has been designed according to international standards to prevent any surface water or groundwater contamination.

How is the tailings area rehabilitated?

As the Tailings dries out, the area is covered over and rehabilitated. Oyu Tolgoi will rehabilitate the land over time as part of plans for once mining is over.

Tailings Dust (White Dust)

What is "white dust"?

While "white dust" is not a commonly used technical or scientific term, it has been referred to in the media as a problem that is sometimes caused by mining operations. It refers to dust which blows off the tailings. This is not the same as the naturally occurring dust found in the South Gobi.

So will white dust be a problem at Oyu Tolgoi?

Unlike some older projects, Oyu Tolgoi's tailings storage is designed to international standards. The tailings contain liquid which prevents dust from being released. Over time, these dry out and are closed off with rehabilitation of the land taking place to protect them from the wind. Therefore, Oyu Tolgoi will not have the problems with "white dust" that have been seen at some other mines.

Wet versus Dry Stack technology

Are tailings the same at all mines?

Generally, the lower the water content the more stable the tailings and therefore, the lower the

environmental risk associated with their storage. In recent years, there has been some debate within the international, academic mining community regarding the use of different technologies for storing tailings, in particular, over the development of 'dry stack' technology. Dry stack technology is not widely used in large scale mining operations internationally and has never been used at a project of the size and scale of OT.

What is the difference between wet and dry stack technology?

Despite their names, both technologies result in tailings which contain significant amounts of water. Dry stack technology contains 20% water or less. Oyu Tolgoi's Environment and Social Impact Assessment states that Oyu Tolgoi's technology will result in tailings that contain around 36% water by weight. However, the tailings process including settling and evaporation will result in final tailings that contain as little as 26% water. Dry stack technology relies on additional, complex technological processes to further remove water.

Dry stack technology is of most benefit to small operations with high environmental risks such as regular seismic activity or planned, deliberate discharge of water.

Why isn't OT using dry stack technology, and what difference will this make?

Realistically, an operation on the scale of OT cannot justify the adoption of dry stack technology. There are no comparable operations, anywhere in the world, that have adopted this technology.

The only operation that OT is aware of that deals with a significant amount of tailings using dry stack technology is the La Coipa gold-silver operation in Chile. Even then, La Coipa only generates approximately 15% of OT's expected tailings.

Apart from La Coipa, the only identifiable dry stack operations are small, high value ore bodies in high risk environments - such as Raglan nickel mine in northern Quebec and Greens Creek polymetallic mine in Alaska (located in Admiralty Island National Monument, in a high seismic zone with net water discharge). In comparison, as well as being up to fifty times bigger in scale, OT operates with zero water discharge and in an area with a significantly lower risk of seismic activity.

OT's water use is carefully controlled in order to ensure no negative impact on the surrounding communities and environment. OT can minimise its environmental impact and have no negative effect on the availability and quality of water in the South Gobi without the need to introduce dry stack tailings storage.

How did OT come to this decision?

In 2006/2007 when Oyu Tolgoi was planning its tailings storage facility, further reducing the water content to 20% through the use of dry stack technology was not identified as a realistic option. Even a middle ground option, so called 'paste tailings' (containing 22-24% water), was not found to be justified due to the complexity and high costs that would be required at an operation on the scale of OT. Golder Paste Tec, an international consultant, evaluated this option on behalf of OT at the time. Despite reducing the water content of tailings, there are several concerns associated with dry stack technology,

aside from the prohibitive capital and operating costs that would be faced by an operation on the scale of OT. These include:

- Dust generation. Lower water content can lead to higher dust generation, an issue that Oyu Tolgoi already has to manage carefully due to the arid climate of the South Gobi.
- Freezing of tailings. As a result of lower pressures caused by more viscous material during transfer of tailings, the material is more likely to freeze causing shutdowns and operational problems.
- Lack of additional water storage: A wet tailings facility can provide additional water storage, maximising the ability to store and re-use water.

How will OT's use of wet storage technology impact on the environment?

Because OT is utilizing some of the best environmental technologies in the world, the environmental impact of the choice of wet technology is negligible. All of Oyu Tolgoi's tailings will be safely stored in specifically sited, engineered, constructed and permitted facilities that meet high international standards. If properly managed, the environmental impact of tailings can be minimised. Whether an operation uses wet or dry stack technology, this careful environmental management is essential to ensure that environmental damage is avoided.

OT is committed to reducing waste as much as possible and dealing with any remaining material using safe and innovative solutions. This means that OT will reduce and manage its waste to international standards. Unlike OT, most operations that use dry stack technology discharge water from their operations into the local environment. The vast majority of water at OT is reused.

How will this be monitored to ensure that OT meets its environmental commitments?

All of OT's operations meet local and national laws and requirements, as well as the international standards expected by Rio Tinto. OT monitors the environment and water supplies around the mine in consultation with local authorities, communities and herders. For example, OT monitors water at over 400 springs and water holes to ensure that its quality and availability remains unaffected.

How much water would OT save if it introduced dry stack storage?

While this technology would allow OT to re-use more water, the levels of reuse are already very high – 100% of all recovered water. OT's water is sourced from a previously undiscovered, deep aquifer which is completely separate from the local water supplies used by herders and animals. OT is only permitted to use 20% of the water in the aquifer. This means that Oyu Tolgoi does not affect the quality or quantity of water available to local people. This is monitored continually as set out above with remedial action put in place to the satisfaction of local people should there be any effects.

Consequently, the use of dry stack technology would not provide any positive effects on the local water supply as this is already carefully managed to high international standards.

Non-tailings waste

What is overburden?

Overburden is simply waste rock - the material that is extracted from the earth as part of the mining process but not processed due to little or no saleable mineral content. This can be safely stored on the surface at specific sites within the mine license area the land rehabilitated over time.

What about domestic waste from the mine and the workforce?

OT has strict processes in place to ensure that the creation of domestic waste is minimised. You can find out full information under the 'waste' tab at the following link: <http://ot.mn/en/environment/our-approach>

And how about waste water?

When it comes to the water we use for mining, Oyu Tolgoi is designed to be one of the most water-efficient mines of its kind in the world. Up to 80% of all the water used for mining is continually recovered and reused. When it comes to domestic water, 100% is captured, treated in waste water treatment facilities and reused for processing and dust control. These measures have a major positive impact on OT's use of resources.