


Ok Tedi



Location	Papua New Guinea
Ownership	18%
Type of mine	open pit
Primary metal	■ copper
Secondary metal	■ gold
End product	copper concentrate
Expected mine life	2013
Average reserve grades	copper – 0.8% gold – 1.1 grams/tonne
Infrastructure	concentrate pipeline and river barging
Employees	2,100
Contractors	1,500

Business structure

Ok Tedi Mining Limited (OTML) owns and operates the Ok Tedi mine by virtue of the Mining (Ok Tedi Agreement) Act of 1976 (as amended) and under various mining leases under grant from the Government of Papua New Guinea.

OTML has three owners:

- Inmet Mining Corporation (18 percent interest)
- PNG Sustainable Development Program Limited (52 percent interest), which is independent of the Government of Papua New Guinea
- Government of Papua New Guinea (30 percent interest).

The current shareholder arrangements came into effect in 2002.

The OTML board's structure provides for six directors:

- one nominee representing each shareholder
- three independent directors (including the Managing Director), each with international mining experience who are appointed by mutual agreement of the shareholders.

The current OTML shareholders' agreement does not require us to fund any of Ok Tedi's cash requirements.

About the property

The Ok Tedi mine is on Mount Fubilan in the remote Star Mountains region of Papua New Guinea. It is approximately 18 kilometres east of the international border with the Indonesian province of Papua, 1,800 metres above sea level.

Ore treatment facilities are 1.6 kilometres away at Folomian, 420 metres below the mine. The mine and the nearby processing plant are situated on the upper reaches of the Ok Tedi River, a major tributary of the Fly River. Concentrate is then transported as a slurry through a 157 kilometre pipeline from the mine to the river port of Kiunga,

where the concentrate is filtered, dried and stockpiled. Dried concentrate is loaded onto barges and sent 800 kilometres down the Fly River to a silo vessel in the Gulf of Papua for export.

The Fly River is the primary mine supply and copper concentrate transport route. Use of the river is in part governed by *Arrangements for the Use of the Fly River for the Ok Tedi project*, a 1981 agreement between Papua New Guinea and Indonesia.

The town of Tabubil is 22 kilometres from the mine and currently houses the operating personnel and their families.

Physical characteristics of the deposit

The ore body consists of a massive copper and gold porphyry deposit.

Copper and gold mineralization at Ok Tedi is typical of many gold-rich porphyry-related copper deposits in the circum-Pacific island arc terranes.

Geology

The main body of mineralization at Ok Tedi is related to the intrusion and alteration of a monzonite porphyry stock. Subsequent leaching and redeposition of copper minerals produced a leached cap and an enriched copper zone, which overlies protore sulphide mineralization. Significant residual gold mineralization was dominant in the leach cap where copper was removed in the weathering process.

Similar gold values extend downwards into the copper mineralization in an annulus about a barren quartz stockwork core roughly centred in the Fubilan monzonite porphyry intrusive. The gold values correlate well with copper in the primary sulphide mineralization.

Skarn ore is developed where flat-lying and sub-vertical faults locally controlled the ingress of hydrothermal fluids and subsequent metasomatic alteration of the sedimentary rocks surround the intrusions.

Environmental

In 2002, a new environmental regime and long-term planning process for mine closure was put into effect for Ok Tedi. As part of that environmental regime, OTML converted the test dredging operation into a permanent one to mitigate the future impact of aggradation build-up in the Ok Tedi and Fly River systems.

OTML has included the annual dredging cost in its cash operating costs. It has also established a tax-deductible fund for reclamation of the mine site, which is currently estimated at US \$130 million, and will contribute cash to the fund over the remaining life of the mine.

While dredging the sediments in the Ok Tedi River has reduced the river bed aggradation and overbank flooding, riverine waste disposal at Ok Tedi has had, and continues to have a significant effect on the Ok Tedi and Fly River systems with sedimentation of the river beds resulting in overbank flooding and localized acid rock drainage. Ok Tedi maintains a program to detect the presence of these sediments and monitor their impact as part of its effort to better understand the potential for future acid rock drainage and how this can be managed if it does occur. While there have been ongoing studies to assess the environmental impact, based on current findings from its monitoring program, Ok Tedi believes that these effects will likely be greater and last longer than previously thought. Ok Tedi has launched a program to fully inform the affected communities about the recent findings of the mine's anticipated environmental impact. These findings and future predictions have also been incorporated in the 2007 review of the community mine continuation agreements (CMCAs).

Mining method

Ok Tedi is an open pit operation where up to 80,000 tonnes of ore and 152,000 tonnes of overburden can be mined each day.

Community agreements

PNG Sustainable Development Program Limited is required to use future dividend payments from OTML to fund current and long-term sustainable development projects

in Papua New Guinea and in particular, the Western Province. The great majority of all communities affected by the operation of the Ok Tedi mine provided their consent to its continued operation under the CMCAs.

Under the CMCAs, OTML provides compensation to affected communities over the remaining life of the mine, and is, along with its shareholders, released from claims

relating to future environmental impacts. Approximately 60,000 people in the Western Province will receive about one billion Kina (about US \$300 million) from June 30, 2007 to scheduled mine closure in 2013.

Inmet's share of the payments from OTML is approximately US \$3 million annually.

PRODUCTION

(100% basis)	2009 objective	2008 results	2008 target	2007 results	Change (target to 2008)	Change (2007 to 2008)
Tonnes of ore milled (thousands)	25,300	21,700	25,300	25,800	-14%	-16%
Tonnes of ore milled per day	69,000	59,000	69,000	71,000	-14%	-16%
Strip ratio	1.2	1.8	1.3	1.3	+38%	+38%
Grades	copper (percent)	0.8	0.8	0.8	+13%	+13%
	gold (grams/tonne)	1.1	1.0	1.2	-17%	+11%
Mill recoveries	copper (percent)	84	85	86	+2%	+1%
	gold (percent)	68	73	71	+9%	+3%
Metal production	copper (tonnes)	176,000	174,000	169,200	-8%	-6%
	gold (ounces)	608,000	515,400	674,000	-24%	+9%
Cost per tonne of ore milled (C \$)	\$26	\$24	\$18	\$18	+33%	+33%

In-pit crusher availability limits output; higher copper grades mitigate impact

Mill throughput in 2008 was 3.6 million tonnes below plan and 4.1 million tonnes below 2007, averaging about 59,000 tonnes per day. The main cause of the shortfall was a shortage of ore feed to the mill. Availability and operational problems with the new in-pit crusher and a three-day illegal strike accounted for most of the lost tonnes.

Installing the new in-pit crusher has been a challenging project. To counteract the reduced tonnage, Ok Tedi modified the mine plan to increase the copper head grade. The higher grade and metal recovery regained about half of the potential copper losses. By the end of the year, most of the issues that affected the in-pit crusher's performance in 2008 had been resolved.

The mine waste management project is designed to remove sulphur from the mill tailings. Commissioning began in September, five months later than expected because of late delivery of components and a delay in visa approvals for key construction staff. Ok Tedi has managed sulphur control to date by limiting the mining of ore in the Taranaki area of the deposit. This reduced gold production this year to 515,400 ounces, 24 percent below Ok Tedi's target.

The mine waste management project also involves removing pyrite from the mill tailings and transporting the segregated waste to dredged storage pits at Bige on the Ok Tedi River. Ok Tedi expected the existing river dredge to be able to do this excavation, but productivity was not high enough to both remove the tailings from the river and excavate the pyrite storage facilities. Ok Tedi contracted a second dredge in August that started operation in the first quarter of 2009. The extra construction and operating costs of the mine waste management project should be about US \$155 million or 60 percent above plan.

Water in the Ok Tedi pit currently drains from the pit by gravity to the south. Starting in 2009, the water will no longer drain freely from the pit, so Ok Tedi is in the process of constructing a drainage tunnel to provide for free drainage until the end of its pit life. Ok Tedi began this project in March and completed the commissioning of the tunnel boring machine (TBM) in early October. The TBM achieved its first kilometre of tunnelling on November 6, 2008, and the drainage tunnel should be ready to receive pit drainage when it is needed. If it is delayed, temporary pumping methods have been planned that will allow mining to continue uninterrupted.

Outlook for 2009

Ok Tedi expects to process 25.3 million tonnes of ore grading 0.8 percent copper and containing 1.1 grams per tonne of gold. This should produce 176,000 tonnes of copper and 608,000 ounces of gold. Ok Tedi expects an 18 percent increase in its gold production compared to 2008 because of the higher content of skarn ores in the mill feed.

The effects of the delay in commissioning the mine waste and tailings management plant will be mitigated by limiting mill feed to an average of 6 percent sulphur grade for the first six months of 2009, after which we expect the plant should be running and should expect a rise in sulphur grade to an average of 8 percent. The sulphur constraint will limit the consumption of higher grade gold ore from the Taranaki pit during the first half of the year.

Over the years, Ok Tedi's community relations and environmental control activities have grown substantially, and in 2009 will cost US \$88 million or US \$0.23 per pound of copper. Ok Tedi views these as necessary to sustain its social licence to operate, and permit the mine to operate for the period 2010 to 2013.

PLANNING FOR THE FUTURE

Ok Tedi discharges both tailings and waste rock into the Ok Tedi River. These discharges have led to sediment build-up in the river beds, resulting in overbank flooding, forest die-back, reduced navigability and adverse effects on the environment in and around the Ok Tedi and Fly Rivers. There has also been and is the potential for acid rock drainage resulting from oxidation of sulphur from the mine-related sediments deposited in the Ok Tedi and Fly Rivers. These sulphide-bearing sediments may be prone to oxidation if they are exposed to air during periods of dry weather. Then if they are exposed to water, they may form dilute sulphuric acid.

Ok Tedi has implemented a comprehensive mine waste management program to substantially reduce the risk of future acid drainage from mine waste, as part of its objective to improve its long-term environmental performance. The program includes the sulphur removal plant that, together with ongoing dredging and the addition of limestone to the waste rock, should mitigate the environmental impact of Ok Tedi's operations by reducing the amount of sulphide in the mill tailings discharged into the Ok Tedi River system.

Successfully commissioning the sulphur removal plant and the pyrite concentrate disposal system at Bige is critical to the achievement of Ok Tedi's plans for 2009 and in future years. To the extent that the pyrite plant cannot control the sulphur in the mill tailings, control will be achieved by ore blending in the mine. This limits flexibility in the mine and eventually will limit the amount of ore available for processing. Ok Tedi has separated these auxiliary operational areas into two distinct management areas, and allocated additional resources, to be sure that a proactive, long-term management approach, are applied to both.

Recent projects at Ok Tedi have suffered significant delays and cost overruns. Ok Tedi intends to conduct a detailed review of its project design and management processes in 2009. The goal will be to implement robust project management processes to minimize risk and cost overruns, develop fit-for-purpose designs, and ensure that existing risks are identified and made transparent.

High metal prices and increasing demand for services and materials raised prices, increased staff turnover, and made project design and management more challenging. The dramatic reduction in metal prices should result in a slackening of these impacts. Operational improvement programs at Ok Tedi are focused on capturing the opportunities to improve the quality of contracted services as well as reduced prices in the face of the current economic downturn.

Ok Tedi's ability to generate electrical power, ship concentrates to its customers and bring supplies to the operations depends on the amount of rainfall in the area. When rainfall levels are low, sand banks in the river prevent the barges from passing and concentrate is stockpiled at the river port. Low water levels can also potentially delay shipments of supplies of fuel and explosives to the mine.

If there are prolonged dry weather conditions, the mine may not be able to generate electrical power, and may have to cut back or suspend production.

Ok Tedi has taken the necessary steps to minimize the impact of dry weather on the operation by keeping concentrate stockpiles at the lowest possible levels, and increasing its inventory of diesel fuel and other consumables. This should allow the mine to operate for 45 days without interruption during a complete drought, and for 90 days during a drought where there is intermittent rainfall.