

Çayeli



Location	Turkey
Ownership	100%
Type of mine	underground
Primary metal	■ copper
Secondary metal	■ zinc
End product	copper and zinc concentrate
Expected mine life	2016
Average reserve grades	copper – 3.6% zinc – 5.5%
Infrastructure	close to roads and 18 kilometres from the port at Rize
Employees	473
Contractors	68

Business structure

Çayeli Bakir İşletmeleri A.S. is a wholly owned subsidiary of Inmet Mining and is incorporated under the laws of the Republic of Turkey. Its main asset is the Çayeli copper and zinc mine.

Eti Holding A.S., which is wholly owned by the Government of Turkey, holds the operating licence for the property and has leased it to Çayeli. The lease expires on July 29, 2044. Eti is entitled to a royalty based on 7 percent of Çayeli's net income.

About the property

The Çayeli mine is located in the province of Rize near the Black Sea coast of northeastern Turkey:

- the plant site is at about 100 metres above sea level, on the western flood plain of the Büyükdere River
- it sits directly across from the town of Madenli, about seven kilometres from the Black Sea coast
- the town of Çayeli is located where the Büyükdere River enters the Black Sea, about 18 kilometres east of the city of Rize
- the surface projection of the ore body covers an area of approximately 203 hectares.

Physical characteristics of the deposit

Çayeli is a Cretaceous-age volcanogenic massive sulphide deposit that:

- has a known strike length of over 600 metres
- extends to a depth of at least 600 metres
- varies in thickness from a few metres to 80 metres, averaging about 20 metres.

The average dip is 65 degrees to the north northwest and the deposit is open down dip and to the north.

The deposit is at the contact between altered footwall felsic volcanic flows and pyroclastic and hangingwall mafic volcanic rocks. It consists of massive and stockwork sulphides. The mineralization includes pyrite, chalcopyrite and sphalerite and smaller amounts of galena and tetrahedrite.

Geology

The massive sulphide ore is classified into:

- Yellow Ore, which is copper-rich and zinc-poor
- Black Ore, which is zinc-rich and copper-poor
- Clastic Ore, which contains copper, zinc and precious metals. In this ore, the sphalerite contains intergrowths and inclusions of chalcopyrite and requires batch processing through the mill.

Stockwork ore, containing pyrite and chalcopyrite in veins, occurs stratigraphically below the massive sulphide ores.

Environmental

The Çayeli surface footprint is small, consisting of mine infrastructure, processing facilities, administrative offices, warehouse facilities and yards. There are three small rock storage facilities which store waste rock from the underground mine. There is no tailings storage facility at Çayeli; tailings from the process plant are transported by pipeline to the Black Sea and are discharged at a depth of 275 metres. The Black Sea is oxygen deficient and hydrogen sulphide-dominant at this depth and is an ideal location for permanent disposal of acid generating tailings. When the mine is closed, Çayeli's infrastructure will be dismantled and any remaining waste rock will be placed underground in the mine. Any contaminated materials will be disposed of properly and we will re-vegetate the site. Çayeli operates under Turkish environmental laws and regulations, many of which have been modified over the past several years to incorporate aspects of European Union directives. The estimated closure cost is \$17 million.

Mining method

Çayeli's mine design is based on underground bulk mining methods with the use of delayed backfill to extract ore in a sequential manner. The primary mining method is retreat transverse and longitudinal long hole stoping with paste fill and loose or consolidated waste rock backfill. The stopes are mined in primary, secondary and tertiary sequencing.

PRODUCTION

		2009 objective	2008 results	2008 target	2007 results	Change (target to 2008)	Change (2007 to 2008)
Tonnes of ore milled (thousands)		1,200	1,109	1,100	1,046	+1%	+6%
Tonnes of ore milled per day		3,300	3,040	3,000	2,900	+1%	+6%
Grades (percent)	copper	3.8	3.7	3.8	3.8	-3%	-3%
	zinc	6.5	6.1	6.0	6.2	+2%	-2%
Mill recoveries (percent)	copper	80	80	81	81	-1%	-1%
	zinc	72	71	72	71	-1%	-
Metal production (tonnes)	copper	36,800	32,700	33,600	32,500	-3%	+1%
	zinc	56,400	47,600	47,800	46,200	-	+3%
Cost per tonne of ore milled (C \$)		\$81	\$81	\$71	\$83	+14%	-2%

Record production in 2008

Çayeli successfully increased the overall output of the mine to 1.1 million tonnes, including 292,000 tonnes during the fourth quarter of the year. Production grades and metallurgical performance were as expected and lateral development reached a record level of 4,100 metres during the year.

We completed all critical stope development for the year, giving us access to the lower mining areas. Stope development was less than originally planned, but all that was required.

We completed the mine infrastructure program, commissioned the ore passes, improved the cemented wastefill system, and rehabilitated the main ventilation intake. We also replaced key equipment to improve fleet reliability and overall production performance.

The ore pass system and the new cemented rockfill system improved operational performance in 2008, allowing production and development to proceed uninterrupted. The two parallel raise systems will permit us to develop a program of inspection and repair to ensure their continued reliability.

We continued our efforts to predict, understand and adapt to varying ore types and mineralogical differences. We maintained surface ore stockpiles at a target level of 10,000 tonnes so we could optimize blending to maximize mill performance.

Early in the year, we completed the test work necessary to demonstrate the technical feasibility of leaching zinc from copper concentrates. Unfortunately, operating and capital cost estimates were too high to support the implementation of the project, and falling zinc prices further reduced its economic viability.

Outlook for 2009

Çayeli is on track to increase production levels to 1.2 million tonnes in 2009. We expect copper grades to remain at 3.8 percent and zinc grades to rise to 6.5 percent. Mine development will be approximately 4,000 metres and we will mine an estimated 132 stopes to meet production needs during the year. We will complete dual accesses to each level in block 5 in 2009, which will allow production, development, and rehabilitation to take place concurrently.

The current three-year labour agreement will expire in May 2009 and negotiations with the union will begin in April. Pay increases historically have exceeded inflation levels. We will make a strong effort to manage labour cost escalations to maintain our competitiveness.

PLANNING FOR THE FUTURE

Development of the lower mine, improvements in the ore handling system and the cemented wastefill system – all critical components to higher production levels – are now in place, and Çayeli remains focused on producing at a level of 1.2 million tonnes per year.

Ground conditions remain an important challenge especially as the mine matures and we access deeper ore. To minimize the difficulties, we design and sequence the work areas to reduce the risk of adverse ground conditions.

Movement of the Çayeli headframe, resulting from local ground movement, has been monitored since 1998. We will implement a program in 2009 to remediate the effects of this movement and minimize the potential impact of future surface instability.

Structured programs for continuous improvement will enhance our ability to control costs through productivity and material cost savings. Particular emphasis will be placed on labour, power and water savings.

Three studies will investigate overall flotation performance, chemical parameters of flotation and flotation electrochemistry in an effort to improve metal recovery and concentrate quality at the mill. These studies will continue through 2011 and we will apply the study outcomes progressively as they become available.

Çayeli has budgeted \$0.6 million in 2009 for surface drilling on its property, for underground drilling to test for deep targets within the existing Çayeli ore body and for other exploration around the mine. We will complete this mine area exploration over the next few years.

UPDATE ON CERATTEPE

On March 26, 2008 we received notice from the Rize Administrative Court of its decision to grant an injunction against the Cerattepe property. The injunction prevented us from doing any further development work on the project. On October 24, 2008 the Court ruled to cancel the project operating licences. We have joined with the Turkish Ministry of Energy and Natural Resources in an appeal to the Turkish Administrative Supreme Court. Nonetheless, we have decided that we will not proceed with the project, regardless of the decision on the appeal. All work has ceased on the project and we took a \$34 million charge to write down the assets to net realizable value.