Imagem de satélite da mina Morro do Ouro

Gold mining in Paracatu (MG) affects traditional communities and the environment

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DISTRICT
MG - Paracatu

LATITUDE
-

LONGITUDE
-

SUMMARY

The Morro do Ouro mine, operated by Kinross Gold Corporation in Paracatu (Minas Gerais State), is currently Brazil's largest gold mine in terms of extraction area and volume. However, its excessive proximity to the urban area and the high volume of ore extracted strongly impact the territory. For a long time, the local population has been worrying about the environment, especially in relation to contamination by arsenic, since the gold extracted from the mine is found in arsenopyrite-rich rocks. However, a study completed in 2014 by CETEM points out that, in people, in waters (drinking and rivers) and in airborne dust, arsenic levels in the city are low and significantly below the maximum allowed by the World Health Organization (WHO), and do not represent danger to the population.

CASE DESCRIPTION

The city of Paracatu, in northwest of Minas Gerais - 84,687 inhabitants and 8,230 km2 (IBGE 2010) - is one of the gold districts of the greenstone belt (FIGUEIREDO; BORBA; ANGÉLICA; 2006 apud SOUZA; ALAMINO; FERNANDES; 2011) and one of the few active mineral extraction operations in the world held in densely populated area, making it really hard to establish a dividing line between the urban fabric and the ore mining areas (REIS, 2007; VERDE; FERNANDES, 2010, KINROSS, 2010).

The Morro do Ouro mine, belonging to the Canadian mining company Kinross Gold Corporation, is Brazil's largest in volume and area in the sector of gold ore extraction (SOUZA; ALAMINO; FERNANDES; 2011) and the third largest in Brazil in the production of ROM (run of mine) - the first is the Casa da Pedra mine, belonging to Companhia Siderúrgica Nacional (CSN), in Congonhas, and the second is Vale's Carajás Complex. In 2012, the production of the mine was 53 million tons of ROM, equivalent to 6 tons of gold, accounting for about 15% of the total Brazilian production of the metal (REVISTA MINÉRIOS, 2013).

Barragem de rejeito da mina de ouro

Despite the size of the enterprise, which has been generating jobs and income for more than 25 years, the municipality of Paracatu does not stand out on the Municipal Human Development Index (HDI-M). According to latest data, it only reaches a value equivalent to the average for the State of Minas Gerais and the average for Brazil (PNUD, 2013).

Corporate mineral exploitation began in 1987, when company Rio Paracatu Mineração (RPM) – whose shareholding control belonged to the Rio Tinto Brasil Group (majority) and to Autram Mineração (MONTE et al, 2002) - received government authorization to exploit the Morro do Ouro mine, settling in the region and building a vast infrastructure (KINROSS, 2010).

In 2004, Kinross acquired RPM and in 2006, closed a deal to increase the production capacity of the Morro do Ouro mine from 2008 on due to the discovery of new ore reserves (SOUZA; ALAMINO; FERNANDES; 2011). The Kinross premises comprise an open pit mine, a processing plant and an area for disposal of mineral waste, as well as the surface infrastructure (KINROSS, 2010).

In addition to the gold mine, in the municipality of Paracatu, it has a mine of zinc and another of limestone installed in its territory. The enterprise for zinc ore extraction is owned by Votorantim Metais Zinco, one of the companies of the Votorantim Group, Latin America's largest producer of zinc and one of the 10 largest in the world. The mine, named Morro Agudo, lies about 50 km from the urban center of the municipality and is expected to exhaust in 2040.

Unlike zinc exploitation, which is situated in an unpopulated location and has not generated major conflicts with the local community, Kinross gold mining has caused conflicts, controversies and fed fears of environmental contamination, too burdensome for human health of the local population (SOUZA; FERNANDES; ALAMINO, 2011).

The ore extracted from the Paracatu gold mine is originally in arsenopyrite-rich rocks, a mineral that has high levels of arsenic. Similar geological features often occur in the world; in Brazil, they are located in the Iron Quadrangle (Minas Gerais); in Crixás (GO) and in Fazenda Brasileiro (BA) (MATSCHULLAT et al., 2000), among others. In all these locations there is a considerable amount of arsenic in the extracted material and therefore in the tailings from the mining process as well (SOUZA; FERNANDES; ALAMINO, 2011). Is it noteworthy pointing out that because the extractive activity by Kinross in Paracatu is open pit, it releases large amounts of particulate matter into the atmosphere (SILVA, CASTILHOS, SILVA, 2012).

Another relevant aspect is that the open-pit mine of the Kinross complex has the smallest gold content in the world – with an average of 0.40 grams of gold per ton of ore (HENDERSON, 2006). This means that the amount of earth removed in the production process is huge (FURTADO, 2008). Moreover, in situ gold prospecting has taken place, which has contaminated the environment with heavy metals, especially mercury - used for gold separation - present in the form of powder in the mud extracted by the miners (SOBRAL, et al., 2008).

Vista aérea da Mina de Paracatu

There is much controversy about the real extent of the human and environmental impacts caused by the gold extraction activity in Paracatu, due mainly to the fact that Kinross, in recent years, has carried out a major expansion of its enterprise. Expansion of the mining activities to adjacent lands increased the mine's longevity in approximately 30 years (FURTADO, 2008), which at first would reach exhaustion in 2016 and has now been extended to 2036. The volume of ore mined has almost fourfolded, going from 17 million tons per year for a nominal capacity of 61 million tons/year (HENDERSON, 2006).

Currently, the company performs no strip mining. Ore extraction is made through scarification [mechanical disaggregation of solids] with the aid of explosives (SOUZA; FERNANDES; ALAMINO, 2011). Since 2010, 180 holes are blown with explosives at 4:00 pm every day, in the open, dismantling 180,000 tons at once, which are removed daily for treatment. To give an idea of the volume, equivalently it would take more than 20,000 tipper trucks – daily - to transport this material, since each truck has capacity of about eight tons. It is estimated that by 2040 the northwest part of the mine will have "dived" about 200 meters deep, five times more than today (CANÇADO, 2011).

Production increase depended directly on deepening the mine 90 meters and on the construction of a toxic tailings dam of 2,000 hectares of surface, about 10 times greater than the area of the Pampulha Lagoon, in Belo Horizonte. The initial dam stores more than 1 billion tons of tailings (FURTADO, 2008).

A report prepared by the Regional Supervision of Environment and Sustainable Development of the Northwest of Minas (Supram Nor) - the Minas Gerais government agency in charge of preparing the reports for the environmental licensing of Kinross' mining project – presented a favorable opinion on the maintenance of the installation license, thus consenting on expansion of operations and construction of the dam. The study evaluated that the mine expansion will bring positive increments towards municipal employment, income and tax collection (GOVERNO DO ESTADO DE MINAS GERAIS, 2007).

Land issues have always been one of the causes of conflict between the company and the local population. Kinross' new tailings dam occupies a valley that originated the quilombolas – the communities of Machadinho, Família dos Amaros and São Domingos -, who have been in the region since the 19th century. The mine is located between two quilombos. On one side, lies the now extinct community of Machadinho, who gave way to the new dam. On the other side, São Domingos still keeps some of the traditions of the first slaves who arrived in the city. The descendants of the slaves who worked in Córrego Rico and in Morro do Ouro have sold their land and moved to the outskirts of the city (MARTINS, 2010). However, at least four families have resorted to justice not to leave their farms. The mining company has informed that they are under negotiation with these families and trying to find the best solution for the impass (FREIRE, 2010, INCRA, 2010).

According to the Federal Public Prosecutor's Office (MPF), mining practices cause several moral and patrimonial damages to the quilombola families who live in the region, not only due to the expulsion of residents but also to the breakdown of their cultural identities (MPF-MG, 2010). However, subsequent decisions of the Federal Court denied requests for compensation to the quilombola communities for the expansion of the Kinross enterprise, on the grounds that not all descendants of former slaves can be considered a quilombola because, then, they would have to prove they descend from fugitive slaves. The Public Prosecutor's Office of Minas Gerais appealed in 2014, asserting that the anthropological criterion for self-identification of the ethnic group was recognized by Convention No. 169 of the International Labor Organization (ILO) and ratified by the National Congress (CEDEFES, 2014).

Residents are also concerned about the company's large use of the Paracatu River waters, as well as the use of other sources like the Machadinho Creek, which is retained in the company's new dam. Besides damming water from natural courses, the Morro do Ouro mine captures a large volume of water in long distances from streams of the São Francisco River basin for the process of gold concentration (SOUZA; FERNANDES; ALAMINO, 2011; MAPA DA INJUSTIÇA AMBIENTAL E SAÚDE NO BRASIL, 2012).

In October 2013, the Public Prosecutor's Office (MPF) inspected the mine and other Kinross' premises and detected that the mining company handles cyanide [a highly toxic substance that is added as one of the ingredients of the concentration process of the natural gold rock] in the process of gold production. The substance is not totally destroyed after production, being stored in tailings dams, coated with HDPE tarpaulin and ferrous clay, a material that shortens the lifespan of the dam and causes high pressure on the ground or massif. MPF's concern is that the dam breaks and the toxic material reaches groundwater (NOTÍCIAS DE MINERAÇÃO BRASIL, 2013).

In 2014, the results of a study commissioned by the City of Paracatu to CETEM/MCTI in 2010, showed that more than 95% of the studied population presented low concentrations of arsenic in urine. Arsenic levels in the population's hair also indicated low exposure (CASTILHOS, 2014). The study sample was made up of residents of two neighborhoods served by Family Health Clinics, who were over 40 years old and have been living in the city of Paracatu for at least 20 years. (CASTILHOS, 2014; SANTOS et al., 2013). The survey was conducted during 34 months by more than 70 independent researchers linked to six public research institutions and the results were presented on March 18, 2014 at a public hearing at the City Council of Paracatu (PARACA, 2014; KINROSS, 2014; PARACATU.NET, 2014; IBRAM, 2014).

Vista geral das instalações da empresa de ouro

During the study, water - for domestic supply and from streams - was collected, atmosphere filters were installed and the soil was analyzed. The study Coordinator and CETEM researcher explained that the waters for domestic supply in Paracatu showed low levels of arsenic and are not contaminated. Regarding respirable dust in the city, the study found arsenic within the range found in urban areas in several locations worldwide. However, in the areas near gold mining and on prevailing wind direction, despite being within the range, the values were higher, which, according to the researchers, suggest they should be subject to detailed monitoring by the public authorities (CASTILHOS, 2014; PARACATU.NET, 2014; SANTOS et al., 2013; MATOS et,al., 2013; SÁ et al., 2013; FERREIRA et al., 2013; MARQUES, PINHO, 2013).

The study also indicated that, in surface waters and soils, the levels found for arsenic - although they have been shown unsuitable for human consumption - are below the maximum limits stipulated by the Brazilian legislation for use in livestock watering and irrigation (CASTILHOS, 2014; SANTOS et al., 2013; MATOS et,al., 2013; SÁ et al., 2013; FERREIRA et al., 2013; MARQUES, PINHO, 2013).

The study report also makes several recommendations to the Government of Paracatu, namely: a systematic and comprehensive environmental monitoring; a study focused on obtaining information regarding the gold mining company's

employees, for they are the group most vulnerable to arsenic exposure and, despite being invited, did not participate in the research; further studies on arsenic exposure in children living in the areas close to mining sites, due to the hand-to-mouth habit, very frequent in preschool age; an in-depth evaluation of the behavior of arsenic and other contaminants in agricultural soils by use of irrigation water (CASTILHOS, 2014).

Finally, the researchers have expressed their concern about the sustainable development of the municipality proposing actions to be carried out in the short, medium and long terms, which may prepare the city for the closing of the gold mine, which should occur in 2032 (CASTILHOS, 2014).

GEOGRAPHIC LOCATION

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