

Waste rock piles from mining shape the desert for millennia to come

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“We are surrounded by cake,” said the tour guide showing the Chuquicamata mine near the city of Calama in the Atacama Desert of northern Chile.¹ This is the largest excavated pit of any copper mining operation in the world, and it is surrounded by gigantic looming walls of rock waste piles. The process of open-pit mining is characterized by the massive operation of removing the overburden to access veins of mineral and to sift through the material rubble for lower grade ore. The resulting waste rock piles are engineered into towering and immediately identifiable silhouettes with an ironed-flat top and sloping, evenly angled sides referred to in Chile as *torta* or cakes.

These *torta* dominate the landscape around strip mining sites, and as copper extraction intensifies in Atacama the *torta* become an ubiquitous feature that the mines bequeath to the far future of the desert. Minerals take a long time to weather or shift in this arid, high-altitude place, especially when packed down into shapes intended to maintain structural integrity. The excavated materials that make up the *torta* may include toxic elements such as arsenic; further, heap leaching, a process by which rock

and mineral material is formed into smaller embankments with inclined slopes upon which a sulphuric acid solution is watered in order to extract copper, produces *torta* that are highly contaminated.²

The logic of resource extractivism views land as “wasted” unless profit is actively being generated through its exploitation; the narrative of the desert’s uninhabitability and remoteness bolsters the argument that no harm will come of establishing a high density of open-pit copper mines. Nor is there much motivation to clean up the operation and restore the desert once mining is complete and the equipment that can be recycled or salvaged has been removed. Tailings ponds, contaminated water, and toxic leach pads eventually poison the waterways and ground water in areas around such operations. The *torta* themselves are the engineered ruins of the present. At the Chuquicamata mine, the state-owned CODELCO company expanded operations and required more space to deposit overburden *torta*, so the company decided it was most efficient to bury most of the company town (including its brand-new hospital) under actual mountains of gravel. The displaced workers and their families were moved to the nearby city of Calama, though the union managed to negotiate to keep the cemetery uncovered.¹ The Spence copper mine near the town of Sierra Gorda, located approximately 90 kilometers southwest of Chuquicamata, is a multi-billion-dollar construction operating since 2006 that claims to be a model of innovation and efficiency, anticipating a 19-

year operation life.³ It has already yielded similarly massive mountains of overburden.

Despite their location, these mining areas in the Atacama Desert can hardly be understood as peripheral, “remote,” or as neutral sites of industry. Instead, they are centers of power, exploited by global capital for the profit of national and international elites. The self-styled modern “smart” cities of the world—whose technological innovation is reliant on copper, lithium, and rare earths for the manufacture of wireless devices and digital culture—function as the peripheral expressions of the power which is being mined and taken from the desert.

The desert, understood as wasted land, is deemed temporarily productive, then returned to the status of wasteland, now in the sense of land that has been laid to waste, its value exhausted by industry once the viable mineral extraction is done. As Chile increases the density of mines to capitalize on the global demand for minerals, the desert is covered in the *torta* that newly characterize this monumentally transformed desert landscape.

The copper mines in Chile’s Atacama Desert are located in regions that are generally very thinly inhabited, but nonetheless the areas near the mines and along the highways which connect the mines are often littered with random private and household garbage such as appliances, sofas, office chairs, construction materials, and the ubiquitous plastic bags which

eventually disintegrate in the sun to release diapers, clothing, toys. These are reminiscent of the historical leftovers found on the sites of the many abandoned nitrate or Chilean saltpeter mines that line the Pampa west of the copper mines toward the Pacific coast. The nitrate operations were nearly all defunct by the mid-20th century and are easily spotted from the Panamerican Highway by the unmistakable shape of their associated *torta*. Some of the sites still contain extensive concrete rubble as well as incidental domestic garbage left behind by former mine workers, such as shoes, gloves, animal bones and shells from cooking, hairbrushes, or utensils. These former operations or *ex-oficinas* continue to be used for present-day dumping, as trash and ruination attracts more trash, some of which is piled up and burned—such as car tires or a payload of contraband cigarettes—just out of eyesight from the highway behind the *torta*.

Our short film seeks to expressively document the *torta* around copper mines in Atacama, and as we try to imagine the desert in its post-mining future, we make a parallel with the rubble and *torta* left on the historical sites of saltpeter mining. An abandoned shoe or a glove, or the smaller *torta* which are more than 70 years old, appear to have hardly begun to rot or transform in this arid climate. Human design may move quickly to dig a mine and exploit it for 19 years, but what remains is a transformed landscape that will last millennia. This desert is scarred and studded with abandoned things whose afterlife will far outlast their intended use or utility.

1. Tour of CODELCO Chuquicamata copper mine, from author recording of tour guide presentation, Chuquicamata, Chile. April 15, 2019.
2. Glosario. *CODELCO – Corporación Nacional del Cobre, Chile* https://www.codelco.com/glosario/prontus_codelco/2016-06-22/175933.html#vtxt_cuerpo_T18 (n.d.).
3. Spence Project to Operations report, March 19, 2007. *BHP* <https://www.bhp.com/-/media/bhp/documents/investors/reports/2007/spenceanalystvisit19march2007.pdf> (2007).