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Chinese Investment in the Peruvian Mining Sector: Corporate Social and Environmental Responsibility

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Executive Summary

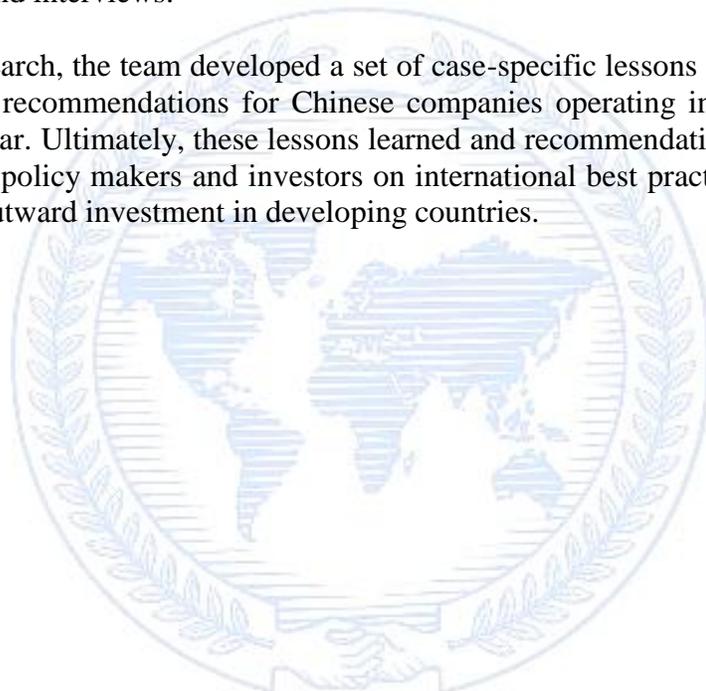
As part of its “going out” strategy, China is actively looking to the rest of the world for investment opportunities in order to fulfill the natural resource needs of its expanding population and economy. These overseas investments involve a range of sectors, including mining and other extractive industries. While many of these Chinese ventures have garnered negative reputations for their lack of regard for the environmental, social, and legal contexts in which they are operating, it remains unclear whether Chinese firms actually behave any better or worse than their Western counterparts.

In order to delve into an investigation of Chinese company performance in overseas investments, the *Corporate Social and Environmental Responsibility: Extractive Industries in Latin America* practicum team partnered with the D.C.-based World Resources Institute (WRI)’s Sustainable Finance Team, which works to improve environmental and social decision making and performance of governments, public and private financial institutions, and companies. The team of environmental politics, international trade, and human rights graduate students was charged with developing three case studies of Chinese mining companies operating in Peru, a country where foreign direct investment (FDI) is readily welcomed, and where Chinese entities are increasingly represented among owners of large-scale mines. The following are the case studies undertaken by the research team:

- Marcona Mine (Shougang Hierro Peru, S.A.A.)
- Toromocho Mine (Minera Chinalco Peru, S.A.)
- Pampa de Pongo Mine (Jinzhao Mining Peru, S.A.)

In order to build the case studies, the team engaged in a comprehensive literature review of development-oriented extractive industry literature, as well as of literature specific to Peru and the three case studies. In addition, the team traveled to Peru in March 2014 to conduct a series of interviews with national and regional level government officials, NGOs, academics, and other important stakeholders associated with each mining project under study. The group then split into three teams of four graduate students each and traveled to the mining regions for more detailed observation and interviews.

As a result of this research, the team developed a set of case-specific lessons learned as well as a series of overarching recommendations for Chinese companies operating in foreign countries, and in Peru in particular. Ultimately, these lessons learned and recommendations will be used by WRI to train Chinese policy makers and investors on international best practices, in the context of growing Chinese outward investment in developing countries.



Index of Acronyms and Abbreviations

AMD | Acid Mine Drainage

ARMA | Regional Government of Arequipa (Peru)

BASC | Business Alliance for Secure Commerce

CDB | China Development Bank

CSR | Corporate Social Responsibility

EIA | Environmental Impact Assessment

EIA-d | Detailed Environmental Impact Assessment

EITI | Extractive Industries Transparency Initiative

FDI | Foreign Direct Investment

FTA | Free Trade Agreement

HCMLE | Humboldt Current Large Marine Ecosystem

ICMM | International Council on Mining and Metals

IFC | International Finance Corporation

ILO | International Labor Organization

INDECI | National Institute of Civil Defense (Peru)

INGEMMET | Geologic Mining and Metallurgy Institute (Peru)

IRMA | Initiative for Responsible Mining Assurance

ISO | International Organization for Standardization

MDPRPM | Dialogue Table for the Resettlement Process of the Population of Morococha (Peru)

MEP | Ministry of Environmental Protection (China)

MINAM | Ministry of the Environment (Peru)

MINEM | Ministry of Energy and Mines (Peru)

MPC | Minera Peru Copper

OEFA | Organism for Environmental Evaluation and Fiscalization (Peru)

PAMA | Environmental Adaptation and Management Program (Peru)

PMSP | Local Solidarity Mining Program (Peru)

SCG | Social Capital Group

SENACE | National Service of Environmental Certification for Sustainable Investments (Peru)

UNGC | United Nations Global Compact

WRI | World Resources Institute

Introduction

The People's Republic of China's "going-out" policy, implemented in 1999, has spurred a massive increase in foreign direct investment (FDI) worldwide. This FDI is primarily concentrated in countries that are rich in natural resources, as Chinese domestic infrastructure projects and manufacturers, as well as the rising material demands of China's growing middle class, require a secure supply of increasing inputs.

As part of this "going-out" strategy, China's mining industry has increased its investment in resource-rich Latin America, and has shown particular interest in Peru. Chinese companies have faced a steep learning curve with regard to operating in new cultures and social contexts, and Chinese mining ventures in Peru are no exception. As a result of the failure of many Chinese companies to comply with and respect the laws and norms of the countries in which they operate, new Chinese FDI ventures are often viewed with deep skepticism by recipient communities.

Through a series of case studies of Chinese mining projects established in Peru beginning in the 1970s up to the present, the following report seeks to demonstrate the evolution of Chinese FDI practices. The report details the social and environmental practices undertaken by three Chinese mining projects: Shougang Hierro Peru S.A.A., Minera Chinalco Perú S.A., and Jinzhao Mining Peru S.A. Based on these case studies, we provide recommendations regarding how Chinese mining companies in Peru can mitigate business risks in a historically contentious sector through greater investment in corporate social responsibility (CSR) projects. We also provide recommendations for the Peruvian government regarding its role in ensuring the promotion of sustainable development and environmental protection in the mining sector.

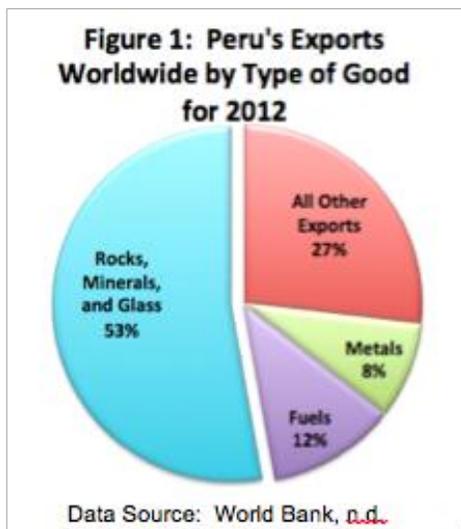
I. Methodology

The research for this report was undertaken by a team of twelve graduate students from American University's School of International Service, at the direction of the World Resources Institute's (WRI) Sustainable Finance Team. The work began with a review of the existing literature on the Peruvian mining industry and Chinese FDI trends and business practices, followed by fieldwork in Peru in March 2014 to conduct interviews with mining sector and project stakeholders. The majority of our research is qualitative, in accordance with the nature of our questions regarding corporate environmental and social risk. Discussions between American University and WRI resulted in the decision to focus solely on Chinese-owned mines in Peru, and case study selection of mining projects was based on literature review that surveyed academic articles, news articles of Peruvian and extra-national origins, mining industry reports, and publicly available financial data. In addition, we gave careful attention to Peruvian public legal documents regarding mining, environment, and foreign investment. Ultimately, three mines were selected to serve as case studies based on duration of operation under Chinese ownership and the availability of literature and data.

Prior to collecting in situ qualitative data, our research team completed the Institutional Review Board (IRB) process and received exemption status. We fastidiously employed the IRB ethics of human-based research throughout the duration of our data collection in both the United States and Peru.

Our field data collection methods included semi-structured interviews with open-ended questions to gather factual information as well as opinions. We cross referenced the data using multiple sources to verify its credibility and neutralize any bias we may have as students of global environmental politics, international trade, and human rights. This approach was important for facilitating the intercultural dialogue between Peruvians, North Americans, and Chinese, as well as for creating a sense of ease and openness for interview subjects. In order to use our short time in Peru most efficiently, we prepared for our trip by conducting phone and email interviews with stakeholders and key players in Peru's mining sector as well as face-to-face meetings with subject matter experts in the Washington D.C. area. In Peru, our research team split its time between the capital city of Lima and the case study sites, completing interviews with national government officials, non-governmental organization (NGO) representatives, academics, mine representatives and employees, affected community members, and other relevant stakeholders. Upon returning from the field, team members conducted follow-up correspondence and additional research in order to prepare the final report.

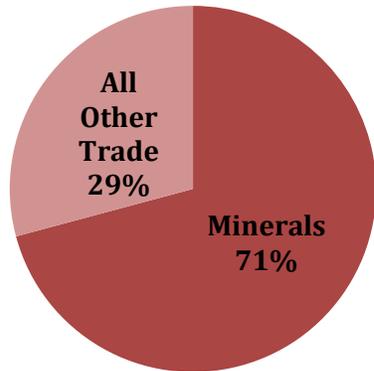
II. Peruvian Economic and Governmental Trends



As a result of significant FDI, the Peruvian economy has grown substantially in the last decade, averaging a growth rate of 7% per year, one of the fastest in Latin America (The Economist, 2013). Although Peru suffered during the economic crises of 2009, it quickly rebounded when commodity prices soared, mainly due to increased Chinese demand. Since then, like several of its Latin American neighbors, Peru has received substantial levels of investment from Chinese state-owned enterprises (SOE) and more recently from private Chinese investment firms (Kotschwar et al., 2012). International investment in Peru's mining sector has a long history and has been much researched; however, deeper study regarding how such investments can be made profitable and environmentally and socially responsible at the same time is warranted. The following section examines major trends in the Peruvian economy, its export portfolio, Chinese investment levels in Peru, as well as issues of economic governance within Peru.

Peru's economy has historically relied on the export of commodities. Rocks, minerals, glass, and fuels compose over 65% of Peru's exports; the rest of its exports are mainly agricultural products, leather goods, and livestock (see Figure 1). In 2012, Peru exported US \$13.86 billion worth of metals, amounting to 30% of its total exports of US \$45 billion (World Bank, n.d.). One theme is clear: Peru's economy continues to be based on the export of primary commodities and is dependent upon the international market.

Figure 2: Exports to China from Peru of Minerals Versus All Other Sectors in 2012



Data Source: World Bank, n.d.

Peru’s primary trading partners as of 2012 were, in order of highest to lowest value, China, the United States, Switzerland, Canada, and Japan. As a reflection of Peru’s mining economy, trade with these countries is also concentrated in the export of primary goods (World Bank, n.d.).

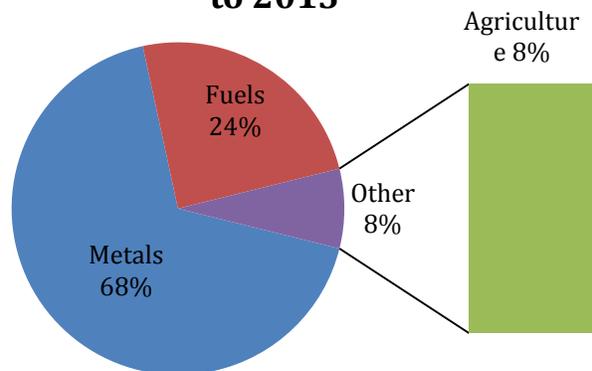
Peru’s commercial relationship with China exemplifies the nature of Peru’s bilateral trading partnerships. As noted in Figure 2, over 71% of Peruvian trade with China is concentrated in the export of minerals, versus 29% of all other sectors (World Bank, n.d.). Chinese investment in Peru mirrors this concentration. Data from the China Investment Tracker (Heritage Foundation, 2014) show that Chinese investment in Peru is largely focused on the extraction of metals - primarily iron ore - as well as on energy (see Figure 3).

Formalization of Artisanal Mining

Peru is in the midst of a major formalization process for small-scale “artisanal” miners. At the time of our field research, the process was under implementation, with national and regional government officials pushing hard to get informal miners to register for legal status by an April 19, 2014 deadline (G. Marquez, personal communication, March 14, 2014). For hundreds of years, small-scale mining has been part of Latin America’s economy, but in light of extensive environmental damage and a US \$3 billion gap between official production statistics and export figures for gold, the Peruvian government has moved to regulate the activity. Only 4,000 of an estimated 110,000 illegal miners have registered during the formalization process. This has been primarily due to miners squatting and mining on lands they do not own. (Iberico Lozada, 2014; Dube & Kozak, 2014).

High gold prices over the past decade have resulted in a massive increase in such mining ventures, carried out by miners from both inside Peru and from neighboring countries. This influx has resulted in a dramatic land-use change; the Amazonian region of Madre de Dios alone saw an increase in the expansion of roads, buildings, and industrial areas of 44% between 2001 and 2011, and the rate of

Figure 3: Chinese Investment in Peru by Sector from 2007 to 2013



Data Source: The Heritage Foundation, 2014

deforestation in the region has tripled. (Scullion et al., 2013).

Illegal gold mining has had a cost to human health. It is estimated that illegal gold miners dump at least 30 tons of toxic metals, particularly mercury, into Peru's rivers each year. Furthermore, indigenous rural communities have been found to have mercury levels five times higher than the acceptable amount in their systems; some individuals have up to 34 times this limit. (Collins, 2013).

The focus on the formalization process presented a significant challenge in our field research. Government officials were preoccupied with illegal gold mining to the extent that it was brought up in the majority of interviews in which we engaged. One official informed us that the majority of mining-related government resources were currently dedicated to this process, and that therefore few resources were being dedicated to large-scale mines, which are generally understood to be under control (G. Marquez, personal communication, March 14, 2014).

III. International Mining Standards and Guidelines

At the international level, a number of initiatives, councils, and membership groups exist that establish global standards with regard to best practices in the mining sector. Each group focuses on a different aspect of the mining process, including issues of financial transparency, labor concerns, and mining under the framework of sustainable development. While numerous groups attempt to bring together mining stakeholders on a global scale, this section focuses on three organizations that directly relate to China's investment in Peru's extractive industry sector. These three coalitions are the Extractive Industries Transparency Initiative (EITI), the International Council on Mining and Metals (ICMM), and the United Nations Global Compact (UNGC).

EITI is an international standard for financial transparency that is assessed at the national level and funded by its member countries and companies. Its simple mechanism is twofold: first, foreign EITI member companies and all domestic companies operating in a given country disclose their payments to the national government; and second, national governments report their revenues from the extractive industry to EITI. The idea is to eliminate discrepancies between private and public sector reporting, and thus contribute to financial transparency in the sector. EITI's members include oil, gas, and mining companies, with a national multi-stakeholder group in each country establishing domestic guidelines for how their country-specific EITI process will work. Peru has been compliant with EITI standards since 2012 and its EITI report for fiscal years 2011 and 2012 was released in early 2014. Currently, EITI standardization is only required for national corporations or foreign EITI member companies, so the Chinese companies presented in this case study are not required to comply with Peru's EITI standards, and no information related to EITI could be found for these firms. (EITI, 2014). According to Cynthia Sanborn, an expert on Peru's extractive industry, Chinese companies operating in Peru would need to receive approval from China before disclosing such financial information, and would most likely not receive it (Personal communication, March 7, 2014).

ICMM was established in 2001 as a result of global mining leaders finally subscribing to the idea that the industry reputation was negatively impacting profits, access to new resources, and the

confidence of investors and employees. The organization publishes a series of documents relating to “Mining’s contribution to sustainable development” in an attempt to better the industry’s performance in sustainability, community engagement, and communication, as well as to promote equitable corporate regulations. The ICMM has published a set of 10 principles, which member companies are required to implement. The performances of member companies against these principles are publicly reported and then benchmarked with the principles of other international standards organizations. Notably, in 2011, the organization began a work program specifically dedicated to the mining industry and climate change, however, none of the three companies presented in this case study are currently members. (ICMM, 2014).

Recognizing the vital role that business plays in globalization, the UNGC began as a strategic attempt to ensure that international commerce equally benefited economies and societies around the world. The compact is an initiative for corporations to connect their policies and operations with 10 principles, which address human rights, labor rights, environmental rights, and anti-corruption. The UNGC Global Corporate Sustainability Report is published annually based on findings from 112 countries to measure and compare how businesses are progressing and committing to the 10 principles. (UNGC, 2014). The Chinese government has officially endorsed the UNGC. Although Chinese corporations are notoriously hesitant to participate in international standards, they are more likely to use the UNGC than they are other international standards based in Western countries. (Zadek, 2012). Thus, UNGC provides an opportunity to hold Chinese companies more accountable to these generally accepted standards. For a comprehensive list of international standards related to the extractive industry, please see Appendix A.

IV. Peru’s Legal Framework

Overview

Peru is considered to be very welcoming to FDI, especially when compared to some of its Latin American neighbors. The country’s 1993 Constitution permits foreign investment in almost all economic sectors and guarantees equal treatment of national and foreign investors, allowing foreign investors to receive the same benefits and incentives such as tax exemptions (U.S. Department of State, 2013) The country’s Ministry of Foreign Affairs supports the production of a biennial investment guide by the Peruvian office of Ernst & Young in Peru (EY Perú), intended to attract prospective investors and provide them with an overview of the country’s economic and regulatory environment. (EY Perú, 2014).

The regulatory scheme governing mining operations falls under Peru’s General Mining Law, which details how and under what conditions companies may acquire mineral rights, how these rights can be maintained or lost, and the commitments that holders of mineral rights must fulfill. Mining concessions in Peru allow for both the exploration and exploitation of minerals; however, separate concessions must be obtained in order to concentrate, refine, or smelt mining products. Peru does not issue concessions for trading minerals; mining companies are free to export their products without limitations. In addition, concessions are not subject to term limits, as long as companies comply annually with minimum production or investment levels as well as concession fees. (EY Perú, 2014).

Because of the nature of land tenure law in Peru, mining concessions only confer ownership of extracted minerals to the concession title owner; in most cases, the surface of the property is owned by an entity other than the concession holder. In these situations, the General Mining Law delineates specific protocols to be observed by concession holders through which they must establish an agreement with private landowners with regard to the use of the surface land. (EY Perú, 2014).

In addition, the Humala Administration signed the *Ley de Consulta Previa* (Law of Prior Consultation) in 2011 based on the ILO's Convention 169. This law formally recognizes the right of indigenous people "to be consulted prior to any legislative or administrative measures that directly affect their collective rights, their physical existence, cultural identity, quality of life and development towns." (Presidency of the Republic of Peru, 2011).

According to Ernesto Ráez Luna, the Senior Advisor to the Peruvian Minister of Environment, the political landscape in Peru is largely dominated by the central government; political authority in the country is still largely centralized in Lima. Though there has been a strong push for decentralization over the past 12 years, administrative and technological capacities are still lacking at the regional and local level. NGOs often have a high level influence on environmental policy in Peru, but do not always have a national reach. NGO presence is also concentrated in Lima, though more are starting to expand with regional offices (personal communication, March 10, 2014).

Despite major changes in regulatory institutions and responsibilities since 2008, a lack of long-term enforcement and accountability has resulted in mining companies often leaving lasting, negative legacies in the country. Peru has recorded thousands of environmental transgressions in the mining sector, a large portion of which do not have an entity that can be held responsible, due to companies having left the site of a mining project long ago or companies dissolving. (E. Ráez Luna, personal communication, March 10, 2014).

Relevant Governmental Structures

Beginning in 2008, a new wave of ministries was established in Peru, including ministries of environment (MINAM), culture (MINCU), and women and social development (MIMDES). This "new breed" of institutions is part of an effort in Peru to relate institutional development to philosophical development, as well as a push to shift focus on the country's development from economic-based to human rights-based (E. Ráez Luna, personal communication, March 10, 2014).

The following are descriptions of each governmental body relevant to the mining sector in Peru:

Ministry of Energy and Mines (*Ministerio de Energía y Minas*, MINEM)

MINEM is responsible for the promotion and coordination of sustainable development of Peru's mining sector, as well as the environmental oversight of mining activities (MINEM, 2014). Within the country's current regulatory scheme, environmental impact assessments (EIA) for various sectors are evaluated and managed by its corresponding government ministry; as such, MINEM is currently responsible for the administration and approval of EIAs for the mining

sector. However, MINEM will transfer this responsibility in 2014 to a new organization, SENACE, discussed below. (E. Ráez Luna, personal communication, March 10, 2014).

Geologic Mining and Metallurgy Institute (*Instituto Geológico Minero y Metalúrgico, INGEMMET*)

INGEMMET is an organization within MINEM, which assumes responsibility for the procurement, registration, management, and distribution of geological research information in Peru, as well as for the administration of underground natural resources. The organization is also responsible for receiving and processing petitions and maintaining records of Peru's mining concessions at the national level (INGEMMET, n.d.).

Ministry of Environment (*Ministerio del Ambiente, MINAM*)

Established in 2008, MINAM is responsible for the advancement of environmental sustainability through the protection and conservation of the environment, natural resources, and ecosystems (MINAM, n.d.). The organization does not currently play a role in the process of EIA approvals, but is slated to take on at least part of this function when SENACE, which falls under the auspices of MINAM, commences its services in 2014 (E. Ráez Luna, MINAM, personal communication, March 10, 2014).

National Environmental Certification Service (*Servicio Nacional de Certificación Ambiental para las Inversiones Sostenibles, SENACE*)

Formed in December 2012 under MINAM, SENACE is scheduled to assume the authority of reviewing Detailed EIAs (EIA-d) for major investment projects in 2014, to ensure the same level of EIA review quality across sectors. An EIA-d is required for complicated projects with a high risk of social or environmental impact; the review of non-detailed EIA's will remain a function of individual sector ministries (El Comercio, 2014).

While the creation of SENACE has been commended as a step toward improving the caliber of EIAs, it is unclear how much of an impact the organization will have on the EIA process given that only approximately 10% of EIAs are EIA-ds. Furthermore, it has been determined that the task of regulating which projects must provide an EIA-d will remain with sector ministries; this means that MINEM will decide which mining sector EIAs will be evaluated by SENACE (Grabski, 2013).

Environmental Evaluation and Inspection Organization (*Organización de Evaluación y Fiscalización Ambiental, OEFA*)

Under the auspices of MINAM, OEFA is Peru's environmental regulation authority responsible for monitoring projects in accordance with Peru's environmental laws, as well as for issuing fiscal and administrative penalties in cases of non-compliance (OEFA, n.d.). Ráez Luna commented of OEFA: "They are our tiger. They are our claws and teeth," (personal communication, March 10, 2014).

In the past several years, the organization has taken several actions to reduce the number of environmental violations in Peru. First, OEFA mandated that all government-imposed penalties cost a company more than the amount it would save by skirting compliance with environmental standards. This condition eliminates the possibility that companies will choose to pay a fee for

violations rather than adequately change their practices. Second, before 2012, companies were able to legally challenge any fine imposed upon them. Now, companies must provide a letter of credit before they are allowed to challenge a fine (E. Ráez Luna, personal communication, March 10, 2014).

Status of Regulatory Control over EIAs

There has been tension recently between MINAM and MINEM over regulatory concerns. In March 2014, the newly appointed Minister of MINEM made the controversial public announcement that oil and gas companies would no longer need to submit EIAs for exploration using seismic tests (Hill, 2014). This caused public backlash and MINAM rhetorically distanced itself from the statement. Later, the MINEM Minister clarified that the procedure for cases of seismic exploration would merely be accelerated, using a purportedly quicker and simpler “Environmental Impact Declaration” (Hill, 2014). Although not directly relevant to mining, this issue illustrates the uneasy relationship between the two agencies as regulatory controls are transferred. In addition, during field research in Peru, our team heard from various sources that EIAs were being rushed through and rapidly approved at MINEM before the process became more stringent under MINAM due to this transfer of oversight between the two agencies.

Mining Canon (Canon Minero)

In February 2014, EITI lauded Peru for being the only member country in which regional and local governments and entities are responsible for over half of the tax revenues generated from extractive industry activities. In all other EITI member countries, the central government controls more revenue from extractive industries than regional or local governments.

Revenues collected by the Peruvian government include royalties and income tax, among others. According to its third EITI report, Peru received US \$12.2 billion in revenues during fiscal years 2011 and 2012, 55% of which derived from the country’s mining sector (EITI, 2014).

Peru regulates the distribution of state-collected industry revenues through various canons, including mining, petroleum, gas, hydropower, forestry, and fishing. The Mining Canon, established in 2001 and modified several times thereafter, mandates that 50% of the tax revenue generated by a mining venture must be returned to the area from which the resource was extracted.

V. Risks to Environment, Human Health, and Livelihoods

Large scale modern mining presents an enormous potential threat to local communities and the surrounding environment. The site of the extraction, waste storage facilities, processing equipment, road networks, and supplying electricity to the project all contribute to a mine’s footprint and can directly impact thousands of hectares. The size and type of mine dictate the types of potential risks to the environment, human health, and livelihoods.

At its core, mining is the separation of economically valuable ores from waste or “gangue” rock. With increasing demand for mineral products globally, mining has begun to push into lower and lower ore grades, significantly increasing the amount of waste produced. Most modern copper mines, for example, target ore deposits with an average copper grade of less than 0.6% (INN,

2014). In addition, iron ore extraction has largely shifted to lower quality magnetite and taconite sources as high-grade hematite sources are exhausted (Chim, 2012). In the process of refining and separating ore from gangue rock a mine produces a waste product called tailings, which normally consist of a semi-liquid slurry of water and extremely fine particles of rock. Tailings contain a variety of heavy metals that, depending on the mineral makeup, vary in their potential to negatively impact the environment. Copper mining, especially, produces notoriously large amounts of waste and “at the extreme...128-196 tonnes of combined copper tailings would be generated to produce 1 ton of copper” (Wang, 2014).

Acid mine drainage (AMD) is one of the ways in which heavy metals within mine waste can be mobilized into the local environment. Sulfide minerals in the rock are exposed by the mining process and, in the presence of water and oxygen, generate acidity capable of dissolving heavy metals, allowing them to drain into, and contaminate, nearby water sources such as lakes and rivers (Johnson & Hallberg, 2005). AMD is particularly nefarious because of its longevity; it can last decades or even centuries after a mine has been closed (Jennings, 2008). The extreme environmental risk from AMD creates enormous financial costs for mines in the form of waste storage. Tailings ponds are an industry standard, though dry tailings storage may be used in places where no suitably large source of water exists to cover the waste. In these cases, care must be taken that the tailings dust is not spread by strong winds. Some of the environmental risks associated with mining, refining, and waste disposal are summarized in Table 2, according to air, groundwater, surface water, and soil pollution (MIT, n.d.).

Table 1: Environmental Risks of Mining

Risk	Affected compartments	Relevant toxic compounds
Overtopping of tailings dam	groundwater, surface water, soil	Water emissions: <ul style="list-style-type: none"> • in most cases radionuclides, mainly thorium and uranium; • heavy metals; • acids; • fluorides; Air emissions: <ul style="list-style-type: none"> • in most cases radionuclides, mainly thorium and uranium; • heavy metals; • HF, HCl, SO₂ etc.
Collapse of tailings dam by poor construction	groundwater, surface water, soil	
Collapse of tailing dam by seismic event	groundwater, surface water, soil	
Pipe leakage	groundwater, surface water, soil	
Ground of tailing pond not leak-proof	groundwater	
Waste rock stockpiles exposed to rainwater	groundwater, surface water, soil	
Dusts from waste rock and tailings	air, soil	
No site-rehabilitation after cease of mining operation	land-use, long-term contaminated land	
Processing without flue gas filters	air, soil	
Processing without waste water treatment	surface water	

Source: MIT, n.d.

Beyond AMD, large-scale mines can degrade water quality in a variety of ways. Pollution from processing chemicals, sedimentation and erosion from mine activities, and depletion of local water supplies can put serious pressure on local communities, ecosystems, and resources. Environmental risks and impacts do not disappear with mine closure; mines permanently alter their surrounding landscapes and require long-term monitoring after a mine’s production period ends (Johnson & Hallberg, 2005).

Heavy metals can be extremely dangerous environmental pollutants due to their toxicity, lack of biodegradability, and bioaccumulation in living organisms; species at higher trophic levels such

as marine mammals and humans are especially vulnerable to heavy metal pollution. Exposure to close and prolonged contact with heavy metals increases risks for a variety of negative environmental and health effects. The environmental effects include loss of biodiversity and ecosystem collapse, while health effects include abnormal growth, delayed development, respiratory problems, and degenerative diseases. (WHO, 2003).

If proper safeguards are not taken to minimize risks to the environment, these potential impacts can also substantially affect local livelihoods such as fisheries and agriculture. Contamination of local fishing areas may result in decreased fish catch or falling demand for fish sourced in polluted areas, further leading to forgone benefits of income and food source opportunities. Water scarcity and groundwater contamination is also a concern in areas where agricultural production can compete with mining processes for these sources (Dube, 2010).

VI. Civil Society Context

The extractive industry has advanced economic development in Peru exponentially, with the World Bank proclaiming that Peru has “one of the best performing economies in Latin America.” In 2014, Peru’s GDP grew 5.5%, compared to the 2.9% GDP growth that Latin America and the Caribbean experienced as a region. (World Bank, 2014). The growing *país minero* (mining nation) has not only attracted attention for its economic success, but also for the presence of environmental and social protests and controversial transnational activism in the Andean nation. Notable civil society organizations that work to amplify community voices and address social and environmental impacts in the Peruvian mining sector include: CooperAcción, Confederación Nacional de Comunidades del Perú Afectadas por la Minería (CONACAMI), Fundación EcuMénica para el Desarrollo y la Paz (Fedepaz), Grupo Propuesta Ciudadana, International Revenue Watch, and EarthRights International.

In our consultations with a broad variety of stakeholders, and as evidenced in mainstream media coverage, most attention is paid to notorious Peruvian mining cases that have experienced social protest in northern Peru. Examples include the Conga mine, a gold and copper mining project in the Cajamarca region, and struggles in regions such as Madre de Dios due to informal and illegal mining, which have caused devastating impacts. The case studies presented here vary in their social impact; Chinalco and Shougang are often referenced as best and worst cases, respectively (Kotschwar et al., 2012).

Civil society actors who call for increased government regulation of the mining sector have faced intense opposition with the rise of neoliberal market policies since the 1990s. In this trend of economic globalization, disparities in power, money, and influence between transnational corporations and the states in which they operate has created an ongoing tension between the advancement of investment projects and government measures designed to regulate industry. Anthony Bebbington’s book, *Social Conflict, Economic Development and Extractive Industry*, analyzes the perception that anti-mining sentiment is a barrier to sector growth and poses a threat to political stability and foreign investment. In 2007, former Peruvian President Alan Garcia wrote the article “El Síndrome del Perro del Hortelano” (“The Dog in the Manger Syndrome”) explaining Peru’s resource problem: “there are millions of hectares for timber extraction that lie

idle, millions more that communities and associations have not, and will never, cultivate, in addition to hundreds of mineral deposits that cannot be worked” (Bebbington, 2012, p. 8).

In a more extreme interpretation, in Peru, if you are against mining, you are seen as being against development. This intolerance was seen in response to protests and opposition to the Conga mine in 2012, when former Peruvian Prime Minister Oscar Valdés stated: “These rotten people want this country to be a farm” (Mapstone, 2012). As a result, the Peruvian government has made heavy-handed attempts to quash social protest and anti-mining mobilizations. Protesters have been increasingly criminalized and treated as radicals, far-left extremists, and terrorists (Chávez Huapaya, 2012). Not only have there been reports of government spying on anti-mining leaders (Páez, 2009), but Peru has resorted to declaring “states of emergency” to empower local police and military during civil unrest, during which civil liberties such as the freedom of assembly are restricted (Lynd, 2010; Boyd, 2011; Triscritti, 2012).

In practice, mining generates high economic profits but little direct employment, while consuming large swaths of land and presenting high risks of environmental contamination. This has fostered increased social conflict, community protest, and competition for resources between the mining and agriculture sectors of the Peruvian economy. Oxfam USA (2014) reports that watersheds and agricultural land increasingly fall within the borders of mining concessions in Peru, which leads to tensions over the control of land and challenges to governance and development. Currently, 99% of social-environmental conflict in Peru relates to mining (Defensoría del Pueblo, 2014). There is a clear need for companies to invest in due diligence and stakeholder engagement in Peru in order to evaluate environmental and social issues and the rights and concerns of local communities affected by extractive industry operations.

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Appendix A: International Standards Organizations

International Standard	Acronym	Purpose
Extractive Industries Transparency Initiative	EITI	An initiative aimed at comparing the taxes paid by the extractive industry to the revenues collected by the host country in order to eliminate discrepancies. Peru is a member. (EITI, n.d.).
International Council on Mining and Metals	ICMM	A council of mining industry leaders seeking to improve the sector's contribution to sustainable development through publications and benchmarking corporations against its 10 principles (ICMM, n.d.).
Initiative for Responsible Mining Assurance	IRMA	A new independent certification organization developing standards to be released in 2014 that address environmental and social issues related to industrial scale mining (IRMA, n.d.).
International Labor Organization	ILO	An organization that promotes fair working conditions in a variety of sectors. ILO169 is the standard for Free, Prior-Informed Consent (FPIC) for indigenous groups, which is well-known in the mining industry. (ILO, n.d.).
United Nations Global Compact	UNGC	An initiative for corporations to align their practices with 10 universally accepted principles relating to human rights, labor, environment and anti-corruption (UNGC, n.d.).
Equator Principles		A risk management framework for financial corporations for assessing social and environmental risk in projects by establishing a minimum due diligence standard (Equator Principles, n.d.).
International Finance Corporation (World Bank)	IFC	A branch of the World Bank that specifically focuses on private sector development as part of the Bank's overall strategy to alleviate poverty and boost shared prosperity in the developing world (IFC, n.d.).
Publish What You Pay		A global network of over 800 organizations that adhere to full financial transparency in the extractive industry (Publish What You Pay, n.d.).
OECD Guidelines for Multinational Enterprises		A comprehensive government-backed guideline for OECD members for maintaining responsible business conduct in areas including the environment, human rights, bribery and other general policies. Peru is an adhering country. (OECD, n.d.).
Global Mining Standards and Guidelines Group	GMSGG	A group that shares knowledge on best technology, equipment, operational safety and asset management data within the extractive industry (GMSGG, n.d.).
Global Reporting Initiative	GRI	GRI's Sustainability Reporting Framework guides corporations in publishing their social, economic and environmental impacts. Over 60 major Chinese companies use this guideline (Zadek, 2012).

Case Study: Shougang Corporation

By Caitlin Duffy, Alison Minarcik, Cassie Mullendore, and Rebecca Schroeder



A Shougang Hierro Peru sign atop a rocky cliff overlooking Playa Hermosa, along the coastal desert of San Juan de Marcona, Peru. Photo credit: Alison Minarcik

I. Introduction

Shougang Corporation's iron ore mine in the coastal Marcona District was the first major Chinese mining investment in Peru, and remains the most notorious. Shougang's contentious and difficult history is central to the evolution and dynamics of Sino-Peruvian mining relations. Peruvian natural resources are fueling a growing China, while Chinese interests and investments are financing infrastructure and providing a critical source of revenue in the Andean nation. While this relationship is beneficial on multiple levels, it has been tumultuous. Shougang is historically situated at the center of this controversy. Shougang's mistakes have had lasting repercussions for Peruvians' perception of Chinese mining companies. Subsequent cases of Chinese mining investment in Peru have been inescapably viewed through the context that Shougang created, and its evolving legacy is something that new Chinese investors must examine carefully.

Shougang has been a regular case selected for studies on Chinese investment in the Peruvian mining sector. Notable scholarly literature that was indispensable in the crafting of this research paper includes Amos Irwin and Kevin Gallagher (2013), Rubén González-Vicente (2013),

Barbara Kotschwar, Theodore Moran, and Julia Muir (2012), and Peter Nolan and Godfrey Yeung (2000). Building upon the many lessons that have been gleaned from the long history of mining operations and union activity in San Juan de Marcona, and drawing from a site visit in March 2014, this paper will focus on important social and environmental challenges encountered by Shougang Hierro Peru, particularly over the past decade. The company's efforts to minimize risk and reduce conflict will be highlighted, in addition to recommendations for future progress.

II. Methods and Sources

This paper's case study draws on a months-long review of existing literature and field research conducted by four graduate students from American University from March 6 to 18, 2014. Along with the two other mines featured in this series of case studies, Shougang was identified for analysis based on Chinese ownership, duration of operation, and available literature.

Five representatives from the Shougang Workers Union granted interviews about "the reality" of Marcona and provided copies of relevant reports on mining operations in Marcona. Two representatives from the District of Marcona's Department of the Environment discussed current environmental programs being run by the municipality. Attempts to schedule a meeting with a representative from Shougang Hierro Peru confirmed reports of the company's hypersensitivity and defensiveness to inquiries. E-mail and phone outreach, and an in-person visit to the company's office in Marcona, proved difficult. A visit to the office to attempt to meet with Guillermo Alfaro Vallejos, Director of Public Relations and Information, resulted in a referral to the office in Lima and instructions on how to submit a formal request for information, though basic informational brochures were provided upon request. After follow-up by phone with the company's headquarters in Lima, Raúl Vega La Torre responded via e-mail with a PowerPoint presentation with general public relations information. Captain Cesar Llanos of the port agency in San Nicolás, Serpac Agencias, also granted a brief phone conversation. Informal conversations were conducted with a variety of community stakeholders, including a naval officer and marine policeman.

Tremendous debt is also owed to María De Los Angeles Zapata Rodriguez of the Pontificia Universidad Católica del Perú, whose draft thesis and research sources from Fall 2013 and Spring 2014 were instrumental in the preparation of this report.

III. Background

Regional Background

Geographic/Geological

San Juan de Marcona is a coastal port city that lies 530 kilometers south of the Peruvian capital of Lima. It was discovered in 1870 that iron ore deposits lay underneath this stretch of stark coastal desert, and the Peruvian Government declared the Marcona area a national mineral reserve in 1925 (Shougang Hierro Peru S.A.A., n.d.). The first corporation to be granted a mining concession in the area was Corporación Peruana del Santa, in 1945 (Shougang Hierro Peru S.A.A., n.d.). In 1952, an agreement was reached between Corporación Peruana del Santa and an American company, Utah Construction, for the latter company to explore and evaluate the concession (CESEL S.A., 2006).¹ Mining began in the area in 1952, which led to the passage of Law 12314 in 1955 and the founding of the District of Marcona and its capital, San Juan de Marcona (Shougang Hierro Peru S.A.A., n.d.).

The open-pit iron ore mine was operated by the US-based Marcona Mining Company, a partnership between Utah Construction and Cyprus Mines. The company later was nationalized and became a state-owned enterprise, Empresa Minera del Hierro del Peru, with the passage of Law 21228 in 1975 (CESEL S.A., 2006). Faced with a company deficit in the late 1980s, and following market reforms for economic liberalization in the early 1990s to attract more foreign investment, the mine was privatized and acquired by the Chinese Shougang International Group in 1992.² After an initial bid of US \$311 million on a mine that was only valued at \$22 million, the finalized purchase price of \$120 million was the first major Chinese investment in Peruvian mining (González-Vicente, 2013; Congreso de la República del Perú, 2002a; Congreso de la República del Perú, 2002b). The mine, now known as Shougang Hierro Peru S.A.A.,³ serves as the primary source of employment in the District.

¹ CESEL S.A. is an engineering consulting company in Peru.

² See Congreso de la República (2007) and The First Boston Corporation (1992) for more comprehensive histories of the privatization process.

³ S.A.A. refers to “sociedad anonima abierta,” which is a corporation similar to the public limited company designation in civil law.



A panoramic view of San Juan de Marcona and the neat rows of housing units originally constructed in the 1950s.
Photo credit: Municipalidad Distrital de Marcona Website

Social

In 1992, San Juan de Marcona was home to between 22,000-25,000 residents (Sindicato de Obreros Mineros de Shougang Hierro Peru S.A.A., 2012, Congreso de la República del Perú, 2007; The First Boston Corporation, 1992), while the most recent census in 2007 counted 12,876 inhabitants (Municipalidad Distrital de Marcona, n.d.).⁴ Despite the arid environment and reportedly high cost of living in Marcona, the Banco Central de Reserva del Peru reports that in 2007 Marcona was among the five least impoverished districts in Ica with a poverty rate of 11.9% (Banco Central de Reserva del Peru, 2010).⁵ The Municipality's population projections estimate that in 2014, seven years after the last official census, Marcona's population will have grown to 14,790 (Municipalidad Distrital de Marcona, 2013a). Discrepancies in population estimates are common, with Shougang reporting that San Juan de Marcona is home to approximately 18,000 inhabitants (Shougang Hierro Peru S.A.A., n.d.). Among this population, Shougang employs a workforce of approximately 2,000, including *obreros* (workers), *empleados* (employees), and *funcionarios* (officers), and the company reports that since the end of 2012 it has directly and indirectly generated more than 4,200 new jobs (Shougang Hierro Peru S.A.A., 2013f). Shougang's burgeoning workforce includes more than 2,000 externally contracted workers provided by a number of general contractors such as Santo Domingo and San Martin (Sindicato de Obreros Mineros de Shougang Hierro Peru, S.A.A., personal communication, March 14, 2014). For example, in 2010 the company employed 1,907 direct employees and 2,331 contracted and other indirect workers (Irwin and Gallagher, 2013).

⁴ The next census on the population and households, undertaken by Peru's National Institute of Statistics and Information, will be in 2017.

⁵ In comparison, the poorest district in Ica is San Juan de Yanac of Chinca with a 30.9% poverty rate.

To house this large community, the District of Marcona covers approximately 1,955 square kilometers (Municipalidad Distrital de Marcona, n.d.).⁶ In June of 1964 the Peruvian government, through Law 15058, allocated 0.38 square kilometers for the Municipality. This equates to approximately 38 hectares or only .02% of the total land area (Municipalidad Distrital de Marcona, 2013a), while Shougang holds approximately 0.73 square kilometers⁷ of District territory that was decreed in 1977 as property of Hierro Peru (Shougang Hierro Peru S.A.A., 2009). Currently, according to Shougang International’s website, the company has obtained the rights of mining, operating, and prospecting for 670.7 square kilometers without time limit (Shougang International, n.d.).

The Municipality reports that some of the challenges facing San Juan de Marcona and the District’s urban development include a 2% increase in population, deteriorated housing, informal or illegally constructed housing, housing built on loose ground and in dedicated green areas, and overpopulation in restricted areas (Municipalidad Distrital de Marcona, 2013a). The Marcona Mining Company built the majority of housing provided by Shougang in the 1950s. This original construction was organized into distinct neighborhoods, creating a clear social hierarchy that is still evident among the three types of workers employed by the mine. Worker housing is organized in long rows closest to the center of town, employee housing is situated along hills overlooking the town, and officer housing is set apart with beautiful ocean views. Not only do the company’s plans to expand production and growing demand for labor complicate the challenges faced by the Municipality, but the company owns the infrastructure for Marcona’s electricity, water, and drainage, which were also privatized as a result of the sale of Hierro Peru.

In 1997, Shougang established Shougang Generación Eléctrica S.A.A., or Shougesa, to separate the operations of its thermal energy plant in San Nicolás into a separate entity (Congreso de la República, 2007; Shougang Generación Eléctrica S.A.A., n.d.). Shougesa feeds into Peru’s North Central power grid, the “Sistema Interconectado Centro Norte,” which is one of the two main transmission grids in the country. In 1992, Law 25793 decreed that Shougang transfer its electric services to the company Electro Sur Medio, and water and



Funcionario (officer) housing overlooking Playa Hermosa Photo credit: Alison Minarcik

⁶ See Appendix A-Shougang for a map of the District of Marcona.

⁷ We converted the original number of 729,907 square meters into square kilometers for easier comparison.

drainage services to Emusa (Decreto Ley N° 25793, 1992). In 2007, the Comisión del Congreso de Energía y Minas (Congressional Commission of Energy and Mines) concluded that Shougang had not complied with the law requiring the transfer of public services (Congreso de la República del Perú, 2007). Interviews with knowledgeable community members in Marcona reported that said utilities are still under the ownership of Shougang. Thus, the Peruvian government and local stakeholders highlight this matter as a prime of example of inaction on the company's behalf.

Over the years, workers from the Sindicato de Obreros Mineros (Shougang Workers Union) have continually protested over environmental pollution, low pay and inadequate pension funds, and unsafe working conditions.⁸ Employees, contractors, and the community of Marcona have been impacted by Shougang's notably high rate of serious accidents (Economy and Levi, 2014; Irwin and Gallagher, 2013). As recently as January 2014, an explosion at the mine left two workers injured and one dead due to aging equipment (El Comercio, 2014). Worker protests began as early as 1993 when Chinese laborers arrived shortly after the mine's native workforce was



A mineworker from Marcona at an unrelated 2008 protest in Lima, with a sign stating: *"There is iron, there is copper and Marcona is dying of hunger."*¹

slashed in half, angering the local community; however, the massive "headcount reduction" and firings occurred prior to Shougang's purchase of the mine (Irwin & Gallagher, 2013; Congreso de la República del Perú, 2012; The First Boston Corporation, 1992). Prior to the privatization, Roedd Consult S.A. was commissioned by the Peruvian state in 1991 to conduct a study on the restructuring of the mining complex and determined that only 62.11% of the mine's 2,450 workers were productive. This led to two categories of layoffs: 805 older workers were forced to retire, while 700 of the least productive workers were asked to leave (Congreso de la República del Perú, 2002b). Hierro Peru was indeed rife with inefficiency and significant decreases in production, and the Peruvian state took on \$75.2 million of the mine's debts with state institutions prior to the privatization (Congreso de la República del Perú, 2002b; Hierro Peru, 1992). At the time of sale, Shougang committed to invest \$150 million over the next three years, but as will be detailed in later sections, Shougang failed to meet its contractual financial obligations.

Since 1996, six investigatory commissions have been organized by the Peruvian Congress to address irregularities, lack of transparency, and ulterior motives in the privatization of Peruvian

⁸ See Appendix B-Shougang for a timeline of several major protests, company violations, and company milestones.

companies such as Shougang (Manco Zaconetti and Maldonado Santiago, 2003). An investigative report by three Peruvian Congressmen explored the roots of labor conflicts, such as inadequate housing, contamination from oxidation pools used for the treatment of organic waste, and water usage (Congreso de la República del Perú, 2012). Most notably, the report identified decrepit worker housing, including 600 boarded and unmaintained housing units set for demolition which were abandoned after the layoffs in the early 1990s. As stated in the report, Shougang reportedly made claims regarding new housing, repair of 82 existing units during the time of the investigation, and 7 million soles (approximately US \$2.5 million) worth of repairs on 541 housing units in 2011, but no documentation was provided. Furthermore, no documents were provided concerning a housing plan or timeline for accommodations for 67 workers who remained without housing.



A faded sign stating “Future Project” and “Restricted Area” with Shougang’s company logo.

Photo credit: Caitlin Duffy

Shougang Hierro Peru’s official newsletters from 2013 shed light on actions taken by the company, potentially to address the housing concerns articulated in the Congressional report. An October 2013 publication of the company’s newsletter, entitled *Hierro Noticias* (Steel News), featured a story about 18 renovated and expanded housing units in the Miramar neighborhood (Shougang Hierro Peru S.A.A., 2013c). More importantly, in December 2013 the company reported that more than 5 million soles (approximately US \$1.7 million) had been invested in the construction of a new apartment complex with 128 housing units, also located in Miramar (Shougang Hierro Peru S.A.A., 2013b). In other samples of the company newsletter, examples of community investment highlighted by the company, include: an ambulance valued at 170 thousand soles (approximately US \$60,500) to strengthen health services in the area (Shougang Hierro Peru S.A.A., 2013e); a garbage disposal truck valued at 350 thousand soles

(approximately US \$124,600) to improve sanitation services (Shougang Hierro Peru S.A.A., 2013d); and an investment of 14 million soles (approximately US \$4.9 million) toward the renovation of early childhood, elementary and secondary education schools, including new desks, student dining halls and bathrooms, completely equipped science and computer labs, and workshops for teachers (Shougang Hierro Peru S.A.A., 2013d). Lastly, the company also features examples of community engagement in its newsletters, such as: *a Copa de la Amistad* (Friendship Cup) sports tournament and culminating ceremony with music and prizes (Shougang Hierro Peru S.A.A., 2014), a drawing and painting class for *Día del Minero* (Day of the Miner) with prizes for winning artwork by local children (Shougang Hierro Peru S.A.A., 2013a), and an educational health campaign (Shougang Hierro Peru S.A.A., 2013d; Shougang Hierro Peru S.A.A., 2013e).

Mine Background

Shougang Corporation

The China Shougang International Trade & Engineering Corporation (CSITEC)—a subsidiary of China’s fourth largest steel company, the Shougang Group—manages the mining complex in Marcona (Campbell, 2009). It is one of the world’s three hundred largest companies, according to CNN’s annual ranking of the world’s largest corporations. Its revenues were approximately US \$36 billion in 2012 (a 23% increase from 2010) and its 2012 profits were US \$212 million (10% decrease from 2010) (CNN Money, 2012). Shougang Hierro Peru is also highly profitable. For the first quarter in 2014, Shougang posted profits of US \$70 million, down 15% from the previous year (Ribeiro, 2014). The Shougang Group, commonly referred to as Shougang Corp.,⁹ has an extensive 90 year history in China. Historically, the Chinese government has been an important stakeholder in promoting Shougang’s success on multiple levels, and it owns over 50% of the company (CNN Money, 2012).



Shougang company newsletters from 2013 and early 2014. Photo credit: Caitlin Duffy

⁹ This paper uses Shougang Corp., Shougang Corporation, Shougang, and “the company” interchangeably to refer to the same entity.

The Chinese state has relied on Shougang to help further its ambitious industrial goals. China is the world's largest consumer of iron ore, and it is a world leader in ore-grade iron mining operations along with Brazil and Australia (Cuervo Resources, 2014). As part of its industrial policy of “grasping the large and letting go of the small,” the Chinese government selected Shougang as one of four companies it intended to build up to “constitute the core” of the steel industry (Nolan and Yeung, 2000). The steel industry itself plays a crucial role in China's increasing efforts to rival leading global technological firms. While the possibility for Chinese firms to “catch up” to the global leaders in high technology sectors is limited, chances to catch up in low technology sectors such as the steel industry are much higher (Nolan & Yeung, 2000).

Multiple levels of the Chinese government have had financial interests in Shougang. At the time of its acquisition of Hierro Peru, Shougang was the fourth largest company in China in terms of total sales value (Nolan and Yeung, 2000). The Beijing government has been an important financial stakeholder in Shougang's operation for much of the time Shougang was operating in Marcona. This relationship stemmed from a 1981 to 1995 contract between Shougang and the Beijing government, its administrative superior. Though the contract has expired, the two entities remained intertwined for some time. After termination of the contract, the government of Beijing continued to reimburse Shougang Corporation for its profits tax while collecting a much more substantial amount (10% of total sales revenue) from the company as a turnover tax (Nolan and Yeung, 2000).

The financial relationship between Shougang Group and Beijing, however, may have recently come to a close. According to *Want China Times*,¹⁰ the central government has mandated relocation of 20 state-owned enterprises based in Beijing as part of an effort to reduce air pollution in China's capital city. Shougang Group is one of them, and the company stopped steel production in the city as of January 2011. Shougang, the first targeted enterprise to actually leave the city, relocated to a plant 220 kilometers east of Beijing near the Bohai Bay. It is unclear whether Beijing still collects a turnover tax from Shougang. (*Want China Times*, 2014).

Mine Plan and Context

As one of Latin America's largest iron mining complexes, facilities in Marcona include mining, beneficiation, balling and port loading, with the capacity to produce 10 million metric tons¹¹ of iron per year (Mt/y) (Shougang International, n.d.). Over the past two decades, production has been regularly impacted by worker strikes and labor protests, though a US \$1.2 billion expansion, first announced in 2009, is expected to double Shougang's output to 20 Mt/y by mid-2015 (Grabski, 2013; Shougang Hierro Peru S.A.A., 2013f). In 2007, only 5% of output actually stayed in the Peruvian market (Vicente-Gonzalez, 2012). The rest went to the neighboring port city, San Nicolás, which exports approximately 10 million metric tons of iron ore per year (Serpac Agencias S.A.C., n.d.) and facilitates mining operations in the coastal desert region. In 2007, 62% of the exports went to China and the remainder to Japan, India, Mexico, South Korea, Trinidad and Tobago, and the United States (Vicente-Gonzalez, 2012).

¹⁰ *Want China Times* is the English language news arm of the China Times News Group.

¹¹ In the US, the tonne is referred to as the metric ton. 1 tonne=1 metric ton=1,000 kilograms. 1 million metric tons=1 megatonne (Mt). 1 billion metric tons=1 gigatonne (Gt).



Photo Credit: Shougang Hierro Peru, S.A.A.

While Shougang has garnered its fair share of press, Marcona's enviable geographic location at the end of the InterOceanic Highway has attracted attention in its own right. Inaugurated in 2011, the Highway has been lauded as the "highway to the future" (Bodzin, 2011). Initiated in 2006 with an estimated final cost of US \$2.8 billion for construction and renovation, the megaproject revolutionizes transport for millions of Brazilians and Peruvians (Reel, 2014). This first truly transoceanic highway spans

roughly 2,600 kilometers across Brazil and Peru to connect the Atlantic and Pacific, including Brazilian ports in Rio de Janeiro and Santos and Peruvian ports in San Juan de Marcona, Matarani and Ilo. The route not only facilitates trade between the two South American nations, but also literally paves the way for Brazilian access to Asian markets. Furthermore, Marcona now boasts its own wind farm that feeds into the national energy grid (SEIN), with approximately 11 Siemens wind turbines (REVE, 2013a).¹² Parque Eolico Marcona S.R.L., a subsidiary of Cobra Peru S.A. and its Spanish parent company Grupo Cobra, operates the farm, with an estimated project cost of US \$88 million dollars (Inter-American Development Bank, n.d.). Parque Eolico Marcona's concession has the capacity to contribute 32.1 megawatts (MW) for 32,000 families, while the region of Ica reportedly generates 42% of Peru's energy (REVE, 2013b).

In addition to the highway and wind farm, San Juan de Marcona may see more new development. In 2009, CF Industries, a US company based in Illinois, proposed construction for a \$2 billion nitrogen fertilizer complex in the town. The petrochemical facility would be the company's first in the Southern Hemisphere, but a final decision has been continually postponed pending issues of land ownership and the construction of a natural gas pipeline to be supplied by Peru's Camisea consortium. Shougang initially protested that the land allocated for CF Industries fell within its mining concession and contained dolomite deposits, which begged the question of what surface rights Shougang has in its land concessions (Rosales Vargas, 2010).¹³ In February 2010, Shougang signed an Act of Agreement with the Ministerio de Energía y Minas (MINEM) to cede a part of its mining concession for the construction of the petrochemical complex

¹² For more information on the evolution and importance of this clean energy source, which is expected to operate for 20 years beginning in April 2014, the Marcona Wind Farm is registered as Project 7419 with the United Nations Framework Convention on Climate, <http://cdm.unfccc.int/Projects/DB/AENOR1348506085.46/view> (accessed April 30, 2014).

¹³ Other examples regarding the controversy of surface rights and Shougang's mining concession can be found in the Municipalidad Distrital de Marcona (2013, March) document regarding Marcona's urban expansion.

(MINEM, 2010b Mining Press Peru, 2010b). Just two months later in May 2010, MINEM announced that a Colombian company, Congas Peru, had begun construction on the pipeline, with the objective of bringing natural gas to homes, businesses, and industry in the Ica region (MINEM, 2010a; Mining Press Peru, 2010a). An update on the state of the US \$280 million pipeline was published by MINEM in January 2011, which announced the approval of the project's Environmental Impact Assessment (MINEM, January 2011). Regardless, there have been doubts as to whether CF Industries will move forward with the project due to the decreased price of natural gas in the US, thus creating a space for other investment prospects in Marcona (Andina, 2012).



Construction work on natural gas pipelines in the Marcona desert
Photo credit: Caitlin Duffy

Current Status

Shougang is currently in the midst of two expansion projects for which Environmental Impact Assessments (EIA) have been approved. The company has invested US \$1.2 billion to double the mine's production capacity to 20 Mt (Grabski, 2013). Shougang began the expansion in 2009 and while it was originally expected to reach completion in 2014, the project will now likely conclude in 2015 (Metal Bulletin Iron Ore Index, 2013; Shougang Hierro Peru S.A.A., 2013f). Additionally, Shougang is investing US \$239 million in a project with another Chinese company, Shouxin Peru. This project, also set to finish in 2015, involves construction of facilities to process copper, zinc, and iron ore tailings (Latinomineria, 2013; Shougang Hierro Peru S.A.A., 2013f).

IV. Impacts

Environmental Issues and Mitigation Efforts

Shougang's Marcona mine is located in southern Peru's coastal desert bordering the Humboldt Current Large Marine Ecosystem (HCLME). The HCLME is one of the largest and most productive marine ecosystems in the world, acting as a global center for food security, marine biodiversity, the world's fishmeal production, and climate regulation (Serra et al., 2012). The Humboldt is a cold, low-salinity ocean current that flows north along the west coast of South America from the southern tip of Chile to northern Peru (see Figure 1, Serra et al., 2012). Also called the Peru Current, it is an eastern boundary current flowing in the direction of the equator, and can extend 1,000 kilometers offshore. The HCLME is the largest upwelling system in the world, and its high rates of productivity allow for 20% of the global total fish catch (Serra et al., 2012). The HCLME is periodically disrupted by the El Niño-Southern Oscillation (ENSO) event, which affects fish abundance and distribution. This leads to crashes in global fish stocks and widespread social and economic impacts.



Figure 1. Location of Humboldt Current LME.

Recognizing the importance of coastal biodiversity and the regulatory role of the HCLME, on December 30, 2009 the Peruvian government committed to establishing reserves in order to protect marine resources (The Nature Conservancy, n.d.). This order established the Reserva Nacional Sistema de Islas, Islotes y Puntas Guaneras (Guano Islands, Isles, and Capes National Reserve System), which includes 22 islands and 11 capes along the Peruvian coast (The Nature Conservancy, n.d.). One of these critical marine reserves, Reserva Guanera Punta San Juan, is located 3 km from San Juan de Marcona. The reserve contains 54 hectares of biodiversity habitat across 18 beaches for the conservation of numerous marine mammal and avian species. Most notably, these species include: the South American fur seal (*Arctocephalus australis*) (least concern), South American sea lion (*Otaria byronia*) (least concern), Humboldt Penguin (*Spheniscus humboldti*) (vulnerable), Inca tern (*Lanosterna inca*) (near threatened), Guanay cormorant (*Phalacrocorax bougainvillii*) (near threatened), Peruvian booby (*Sula variegata*) (least concern), and Peruvian pelican (*Pelecanus thagus*) (near threatened).¹⁴

This sensitive reserve is a refuge for 75% of Peru's Humboldt penguin population, 50% of fur seals, and 30% of sea lions (Cárdenas-Alayza and Cardeña-Mormontoy, 2012). Additionally, it is

¹⁴ Conservation status based on IUCN Red List of Threatened Species: <http://www.iucnredlist.org/>.

one of the ten most important breeding sites for guano birds, a common name for an aggregation of three species: Guanay cormorant, Peruvian pelican and Peruvian boobies, which nest together on the islands and islets of the coast and produce large amounts of guano (Proyecto Punta San Juan, 2014). Guano is extracted periodically by the Servicio Nacional de Áreas Naturales Protegidas (National Service of Protected Natural Areas of Peru) and Agrorural, government agencies in charge of ensuring a sustainable harvest that mitigates negative impacts upon the reserve's species (Proyecto Punta San Juan, 2014). The guano harvests are then used throughout Peru as agricultural fertilizer.



Fur seals and sea lions basking on one of many beaches in the Reserva Guanera Punta San Juan
Photo credit: Alison Minarcik

The main environmental impacts of open-pit iron ore mining in this area revolve around the potential risks of mining tailings, untreated wastewater, improper waste disposal, and heavy metal pollution in the coastal and marine ecosystems. Tailings are the toxic waste byproducts of mining and mineral concentration processes and are usually composed of a mixture of soil, minerals, water and rocks. They contain a high concentration of chemicals and elements that alter the environment, so they must be transported and stored properly in tailings ponds. Heavy metals like iron and copper are among the most dangerous environmental pollutants due to their toxicity, lack of biodegradability, and bioaccumulation potential in living organisms. Heavy metal pollution poses a serious threat to the environmental quality of the Reserva Guanera Punta

San Juan and could potentially bioaccumulate to toxic levels within local biodiversity and the humans who consume it.

Shougang has had a historically poor environmental record due to pollution of terrestrial and marine ecosystems, poor waste management, and threats to human health. Shougang has received numerous fines for environmental infractions over the years. In 2002, Shougang was fined \$30,000 for contaminating Marcona's domestic drinking water supplies, after the San Nicolas plant's tailings thickener collapsed (Kotschwar et al., 2011). Shougang was also fined for slurry pipelines that pumped untreated wastewater into the nearby San Nicolas Bay, where its deepwater port is located (Chauvin, 2006). These environmental fines pose a potential financial risk to Shougang's bottom line by creating inefficiencies in production, and may negatively affect the company's image so much that overall profit declines.

Shougang's Environmental Compliance by the Numbers:

- Average of \$21,000 in annual fines for environmental violations
- 72% compliance with environmental standards in 2008
- 71% compliance with environmental audit recommendations

Source: Irwin and Gallagher, 2013



The site of the old wastewater treatment plant, which according to community stakeholders, has yet to be properly cleaned. Photo credit: Alison Minarcik

These environmental impacts led the Ica regional government to declare San Juan de Marcona to be in a state of environmental emergency in 2006 (Kotschwar et al., 2011). Responses from Shougang, however, have been varied and inconsistent. The union previously received promises from Shougang to carry out environmental remediation projects, particularly the cleanup of an oxidation pond, which has yet to be properly cleaned as we witnessed on our site visit (see photo). In contrast, the company's website identifies its environmental

successes in air, water, and noise control and quality monitoring programs, biodiversity conservation, wastewater treatment, and waste management plans. Addressing, managing, and mitigating environmental risks up front may generate substantial costs in the short-term but may help avoid costly remediation projects incurred in the future.

According to Shougang, the company has invested US \$12 million in Programa Adecuación y Manejo Ambiental (PAMA, Environmental Adaptation and Management Program)¹⁵ specific environmental projects, with the company's total investment in environmental projects reaching US \$50 million (Shougang Hierro Peru S.A.A., 2013f). These targeted environmental projects include a new tailings pond and tailings thickener to improve the management of tailings. Historically, the common practice for tailings management under both the Marcona Mine Company and Hierro Peru was to dump tailings waste directly into the sea (Shougang Hierro Peru S.A.A., 2013f). Additional environmental projects include the modernization of equipment in order to provide adequate dust control during the transport of minerals from the mining area to the processing facility and beyond. Finally, Shougang has constructed a new wastewater treatment plant, aiming to halt the practice of sending domestic sewage directly into the sea.

The Municipality of Marcona has taken some environmental matters into its own hands. Founded in 2012, the Department of the Environment has initiated environmental programs regarding solid waste management. Thus far, the department has focused on litter clean-up initiatives, environmental awareness campaigns, and recycling programs (Departamento del Medio Ambiente de la Municipalidad de Marcona, personal communication, March 14, 2014). Moving forward, there is an opportunity for increased cooperation between Shougang and the Municipality in the development of environmental management and risk-reduction programs.

Social Governance Issues and Mitigation Efforts

Community Investment

Shougang Corporation signed a contract with the Peruvian government after it purchased the state-owned Hierro Peru, promising to invest US \$150 million into the local community. However, the company only ended up investing \$35 million because it declared bankruptcy in 1995 (Congreso de la República del Perú, 2002). At this time, Shougang had also stopped negotiations with the workers' union because it had lost all access to credit and was in the midst of a major corruption scandal in China (Irwin and Gallagher, 2013). The union reacted to this breach of contract with protests, in which one worker died. Shougang shut down the protest with a privately hired police force and by firing union leaders (Irwin and Gallagher, 2013). The Peruvian government reacted to this breach of contract in 2003 with a special congressional investigation, examining Shougang's purchase of the mine and failure to meet its obligations (Chauvin, 2006). This resulted in an extensive report concluding that Shougang had violated its contract, but not much came of this (Chauvin, 2006), although the government charged Shougang a US \$14 million fine for rescinding on its promised amount (Kotschwar et al., 2012).

Though Shougang Corporation failed to meet its initial contractual obligations toward the community, it currently has a framework for investments in community development. The corporation's Asociación Civil del Hierro: Progreso y Desarrollo (Civil Association of Iron: Progress and Development) was created in 2007. So far, according to Shougang's website, the company has invested 19,177,187.91 Peruvian soles (approximately US \$6.8 million) in projects

¹⁵ See Section 5: Laws and Regulations for additional information on PAMA.

for the community. These projects include the opportunity for low-income families to earn extra income by making and selling traditional Nasca ceramics, and the provision of additional donations as part of a national initiative (Shougang Hierro Peru S.A.A., 2010b). Shougang's projects and donations under national programs will be discussed later in the paper (see the Social and Environmental Programs sub-section of Laws, Regulations, and Policies). This framework joins the array of community investments that Shougang has made throughout its history in Marcona, including housing for teachers and water and electricity for families in the fishing community (Shougang Hierro Peru S.A.A., 2013f).

Shougang's Community Investment by the Numbers:

- \$13 million on 16 km of highway from Marcona to the Panamerican Highway
- US \$39 million from 2007 to 2012 on services including home repairs, renovation of the drainage network, public lighting, community recreation facilities, and new buses
- \$260,000 in a hyperbaric chamber for the community hospital

Source: Shougang, 2010b; Terra Noticias, 2014

Conflict Between Shougang and Municipality over Urban Development Plan

The protests and strikes of Shougang's unionized workers have drawn much attention over the years, but there exist other strained relationships that warrant further consideration and research. For example, a collection of petitions submitted to the Peruvian Congress in 2011 includes letters written by local residents, the town mayor, worker associations, and civil society groups, which lament



The central plaza in Marcona, funded by Shougang's social investment programs
Photo credit: Alison Minarcik

Shougang's lack of attention to labor rights, the poor conditions of public facilities, and the high cost of public services (Congreso de la República del Perú, 2011). While conflicts between Shougang and its workers have been well documented by union organizers, media,¹⁶ congressmen, and scholars, growing pressure on the city's infrastructure have also strained relations with local government. In August 2009, Shougang won an appeal filed with the

¹⁶ See, for example, "Tensions Over Chinese Mining Venture in Peru" by Simon Romero, published in the New York Times on August 14, 2010.

Constitutional Court of Peru, which opposed the Municipality of Nasca's "Urban Development Plan of the City of Marcona 2006-2016," or Ordinance N° 006-2007-A/MPN. Shougang contested zoning modifications that sought to cancel all mining concessions within the city's urban zone. While the Municipality held that the presence of the concessions in the city limits violated environmental protection rules, Shougang claimed that the changes violated its property rights outlined in the original contract between the Peruvian government and the company (Tribunal Constitucional del Perú, 2008).

In March 2013, the Municipality of Marcona submitted a proposal to the Peruvian Congress to petition Shougang's opposition and question the Court's ruling, requesting approval of a law for urban and industrial expansion of the District of Marcona within mining concessions. The Municipality's submission asserts that Shougang has opposed every Municipality project regarding development and the improvement of quality of life in Marcona, and that the only steps taken to redress contamination in the District have been fines against the company (Municipalidad Distrital de Marcona, 2013b). A year later in March 2014, a media report detailed news of illegal occupation of land in Marcona and plans to remove the unwanted occupants. Mention was also made of an agreement in which Shougang would cede hectares of land for urban expansion (Huayta, 2014).¹⁷ An interview with a Workers Union representative also implied "donation" of land by Shougang (Sindicato de Obreros Mineros de Shougang Hierro Peru S.A.A., personal communication, March 14, 2014).

More recently in April 2014, the tense interactions between Shougang and the Municipality flared when Shougang demanded that construction of a highway to Playa Los Leones through mining concession terrain be halted.¹⁸ Shougang's Assistant General Administrator wrote the mayor, Pedro Ivan Torres Obando, stating that in response to confrontations, the company will seek all legal means to maintain respect for its concession.¹⁹ To mitigate such tensions, Peru's National Office of Dialogue and Sustainability established a "development table" to include Shougang, the Municipality of Marcona, the Provincial Municipality of Nasca, and the Regional Government of Ica, which first met in February 2014 (Municipalidad Provincial de Nasca, 2014). It is notable that the Workers Union and other community voices were not included in this arrangement. MINEM detailed the context for the dialogue in a quarterly report in 2013, writing that the "table" would emphasize the principles of urban development, sustainable social development, and fishing and aquatic development (MINEM, 2013).

¹⁷ On April 15, 2014, the Municipality's Facebook account posted a video of the relocation of 105 individuals to Municipality land in Zona de Villa Verde, from the green areas and mining concession land on which they were residing (<https://www.facebook.com/photo.php?v=1467828846784248>).

¹⁸ The Municipality's Facebook page includes videos that depict the initial highway construction on April 9, 2014 (<https://www.facebook.com/photo.php?v=1465260813707718>).

¹⁹ The document, AGA2014-057, is dated April 23, 2014. The full comment reads, "exhortamos a usted Señor Alcalde a respetar la ley y no incurrir en actos en contra de nuestra empresa; dejamos constancia que esperamos que este acontecimiento sea un hecho aislado y no una política de enfrentamiento por parte de la autoridad, ya que Shougang Hierro Perú S.A.A. hará respetar la concesión minera, utilizando todos los medios legales vigentes."

Activism in Marcona

The type of activism which has arisen in response to Shougang's activities reflects Marcona's lengthy history as a mining town. The town of Marcona exists because of the Marcona Mining Company's operations in the area, and mining has been the primary livelihood of Marconians for decades. Thus, pure anti-extractivism of the environmentalist breed is virtually nonexistent in Marcona, despite its presence in other areas of Peru. Activism centered around Shougang today is largely related to labor issues and organized by the Shougang Mine Workers Union. The union organizes strikes on a regular basis, and reports that the past twelve years have seen consecutive annual strikes.



Figure 2: Average annual man-hours lost per worker, 2001-2008

Source: Irwin and Gallagher, 2013

As evidenced by Figure 2, Shougang has a disproportionate amount of strikes compared to other mines, largely due to the aforementioned tensions between Shougang and the union which began during Shougang's bankruptcy and have never waned. Doe Run, another Peruvian mine, even performed worse than Shougang in a study by Irwin and Gallagher (2013) on nearly every labor indicator, yet still lost 70% fewer man-hours to strikes than Shougang (Irwin and Gallagher, 2013). Recently, Shougang was forced to declare force majeure on its shipments on the nineteenth day of a workers' strike over wages, which completely halted all output (Reuters, 2013). One year earlier, the union had gone on strike for three weeks before the labor ministry mandated that Shougang raise wages (Reuters, 2013). These instances highlight the significant impacts that workers' strikes have on Shougang's production, and since they occur at least annually, they persistently affect Shougang's bottom line and economic stability. However, these impacts are not inevitable, and Shougang could significantly mitigate them with increased efforts to open communication channels. If the company made an effort to have periodic dialogues and open communication with the union about their concerns, they could preempt strikes and ensure a stable production.

Another vein of activism in Marcona is represented by the entity Marcona Protesta. This group's presence is online rather than on the ground, and its activism goes beyond immediate labor or environmental issues.²⁰ Its online material is more politically motivated, with nationalist and anti-neoliberal undertones. An English translation²¹ of Marcona Protesta's self-description on its Twitter account states that they are "a collective of citizens of Marcona who have the single and grand objective of reclaiming our town from the corruption of the Chinese mining company Shougang" (Marcona Protesta, n.d.). Representatives from the Workers Union and Marcona Protesta did not identify a collaborative relationship between the two entities, though Marcona Protesta seems supportive of the union's activities. Research did not suggest that Marcona Protesta has garnered popular support within the community, and if so, it is an undercurrent which seems to have more of a presence online than on the ground. For example, a recent music video for a "liberation song" entitled "Se llama Shougang" was posted to YouTube in January 2014 and includes similar sentiments. The artists assert that Shougang "profits with a resource that does not belong to them" ("lucran con un recurso que no les pertenece") and that "Marcona is Peruvian and will not be a Chinese colony" ("Marcona es del Perú y no será colonia china") (Oscar Lopez, 2014).

Another small collective of local citizens that has previously vocalized opposition and participated in public demonstrations is the Frente de Defensa de los Derechos y Desarrollo del Pueblo de Marcona (Front for the Defense of the Rights and Development of the Town of Marcona).²² Though the group appears to be led by a sole individual and has a diminished presence today, it is referenced as protesting the exclusion of labor issues in the aforementioned "development table" (MINEM, 2013). According to a knowledgeable stakeholder, the group was created during the administration of a previous mayor, Joel Rosales Pachecho, who was a vocal critic of Shougang. Though the majority of press attention revolves around reports on Shougang Union strikes and protests, it is important to acknowledge the presence of other community actors struggling to be heard. While the dissenting voices present in Marcona depart from the archetypal anti-mining activism in other regions of Peru, they provide a critical perspective on Peru's development philosophies.

V. Laws, Regulations, and Policies

Peruvian Standards

Due to the historical prevalence and financial dependence of the Peruvian government on the mining sector, a number of national programs and certifications attempt to ensure that mines operating in the country adhere to a uniform set of standards as well as contribute to local communities. These standards include the completion of EIA for all project proposals, consistent donations and support to social programs, and the implementation and certifications of relevant safety measures.

²⁰ For more information, visit Marcona Protesta's blog at: <http://marconaprotesta.wordpress.com>.

²¹ This is the authors' own translation.

²² For more information, visit their blog at: <http://frentedefensamarcona.wordpress.com/>. It is important to note that an active online presence has not been maintained.

Environmental Impact Assessments

The first national initiative aimed at enhancing environmental safeguards in the mining sector began in 1997 under PAMA, a program which will be discussed in further detail in the following section. However, it was not until 2001 that EIAs became mandatory for new project approval (MINAM, 2009), meaning that while Shougang's first five years in Peru can be characterized as operating with minimal environmental oversight, all of Shougang's infrastructure built in the last thirteen years has been subject to a standardized environmental assessment. To date, Shougang has completed seven EIAs, ranging from water treatment facilities, to landfill construction, to the expansion of transmission lines in order for more energy to reach the production site. Three companies have been involved in Shougang's reports - Vector Perú S.A.C., Geoservice Ingeniería S.A.C. and Consultoría Internacional en Ingeniería y Gestión para el Desarrollo S.A.C. - with every EIA approved by the Peruvian government. The statements follow the standard Leopold Matrix²³ used for evaluating various environmental impacts, including dust, flora, fauna, air, water, ground, noise, landscape and health of people at the construction phase, operation phase and finally the closing of the project. As is standard with the EIA process, all plans must include environmental prevention, mitigation, and corrective measures as well as plans for environmental monitoring, especially if the project involves potentially dangerous chemicals. Thus, Shougang appears to be abiding by the EIA process before undertaking infrastructure projects.



Oxidation ponds in Shougang's wastewater treatment facility located outside of Marcona
Photo credit: Alison Minarcik

²³ The Leopold Matrix is a procedure for evaluating environmental impacts developed in 1971 by the US Geological Survey (USGS). The matrix is composed of columns representing the proposed activities of a certain project and rows of potential environmental impacts that should be considered. The intersection of the rows and columns are assigned a numerical value to determine the magnitude (-10 to +10) and importance (1 to 10) of each activity with respect to each environmental aspect (Leopold et al., 1971). The Leopold Matrix is endorsed at the international level and used in nearly every EIA process worldwide.

Social and Environmental Programs

In an attempt to reap social development benefits from the extractive industry, Peru has experimented with a number of programs aimed at requiring mining companies to invest in local communities and the environment. These programs include PAMA and the Programa Minero de Solidaridad con el Pueblo (PMSP, Local Solidarity Mining Program), also known as Aporte Voluntario Minero de Solidaridad (AMSP, Mining Solidarity Voluntary Support). PAMA, a national program whose objective is mitigation and prevention of environmental damages caused by mining, began in 1997 as a way to protect four broad areas: the physical environment, the biological environment, the socio-economic environment, and the environment as related to human interests (MINEM, 1997). Since completing an EIA did not become mandatory for new projects in Peru until 2001 (MINAM, 2009), PAMA served as a pre-EIA blueprint for incorporating environmental concerns into operations. For Shougang specifically, PAMA was a US \$16.6 million commitment from 1997 to 2006 to invest in infrastructure, tailings construction, water treatment, dust mitigation, and protection against oil spills (Irwin and Gallagher, 2013), but because of new requirements to complete an EIA, the program has become outdated and Peru's government has yet to require new commitments. Since the program's inception in 1997, Shougang has fulfilled the majority of this promised investment, with a current Shougang brochure boasting that US \$12 million has gone to PAMA environmental management projects (Shougang Hierro Peru S.A.A., n.d.). These projects include new tailings deposits, dust and gas mitigation, treatment of effluents, and management of hydrocarbons (Shougang Hierro Peru S.A.A., n.d.).

Derecho Ambiente y Recursos Naturales (DAR) is a Peruvian NGO working to promote sustainable development, good environmental governance and protect the rights of indigenous communities in the Amazon.²⁴ While Marcona is not in the Amazon region of Peru, Shougang advertises DAR's latest report on its homepage, suggesting that the company is at least attempting to incorporate environmental responsibility into its business strategy.

National social programs have also been a government tool to require company investment in Peruvian social capital. PMSP is a voluntary fund, implemented in 2007 and expiring in 2011, that mining companies could choose to pay into in exchange for a small relief from national royalty taxes. The funds collected from PMSP were designed to be implemented at the regional and local level, with a committee consisting of local and regional authorities, non-governmental organizations, and company representatives to determine which projects would be funded by the program (El Comercio, 2012). The program outlines specific areas where investment will be targeted, including a stipulation that at least 30% of the funds must be directed towards nutrition, education, and health initiatives (Shougang Hierro Peru S.A.A., 2010c). Other areas of appropriate investment allow funds to be disbursed for basic infrastructure, development of human capacities, and any projects that are consistent with sustainable development (Shougang Hierro Peru S.A.A., 2010e). According to the company website and brochures, Shougang joined PMSP in 2006 (Shougang Hierro Peru S.A.A., 2010a) and has since contributed 33 million soles (approximately US \$12 million) to its local committee, known as the Civil Association of Iron: Progress and Development (Shougang Hierro Peru S.A.A., n.d.). The majority of Shougang's

²⁴ Derecho Ambiente y Recursos Naturales (n.d.). "Nosotros." Retrieved from <http://www.dar.org.pe/contenido.htm?id=1&s=no&sb=si>

programs through the Association revolve around investment in education, with many of its projects focused on purchasing computers, software, projectors, and printers for local schools (Shougang Hierro Peru S.A.A., 2010b).

In 2011, PMSP reached its expiration date at the same time that the Humala government implemented an increase in mining royalty taxes, making it unclear whether mining companies would keep supporting social programs (El Comercio, 2012). However, Shougang appears to have continued its commitment to the program. In 2014, the company donated 700,000 soles (approximately US \$260,000) worth of medical equipment to the Marcona health center, including an equipped ambulance, a new X-Ray machine and a hyperbaric chamber (Terra Noticias, 2014). The 700,000 soles (approximately US \$260,000) hyperbaric chamber is intended to alleviate an array of illnesses both related to mining operations as well as those that develop from other causes, from carbon monoxide poisoning and mining equipment accidents to migraines and diabetes (Terra Noticias, 2014). This investment in human health represents an encouraging commitment to the wellbeing of Shougang's miners as well as the community of Marcona as a whole.

Safety Standards

In terms of national safety standards, Shougang's website boasts four certifications from Peru's National Port Authority regarding its operations at San Nicolas (Shougang Hierro Peru S.A.A., 2010d). These certifications concern the safety of the port and under Peruvian law must be renewed through a series of inspections every five years. The company website's documents show two expired certifications, with the field visit unable to confirm that these credentials have been updated.

International Certifications and Standards

According to Shougang's website, the company is certified under four different international standards, all revolving around the safety and infrastructure of the San Nicolas Port. These certifications consist of the World BASC (Business Alliance for Secure Commerce) Organization Inc. as well as three International Organization for Standardization (ISO) credentials: ISO 9001:2000, 14001 and 18001 (Shougang Hierro Peru S.A.A., 2010d). ISO is an international body with more than 19,500 global standards covering a wide array of technology and business aimed at ensuring that products and services are safe, reliable and of good quality (International Organization for Standardization, n.d.). Through ISO 9001:2000, 14001 and 18001, Shougang's certifications are designed to demonstrate that the port consistently produces a product that meets customer needs, provides safe maneuvering of all ships entering and exiting the port, and has an effective radio frequency identification for item management, respectively (International Organization for Standardization, n.d.). The BASC certification further validates the safety of the port. It is worth noting that all versions of certifications via the Shougang website are expired copies, although a site visit to Shougang's Marcona office confirmed that all international certifications are currently up-to-date.

Despite its compliance with these various ISO certifications, Shougang has not subscribed to any international mining standards, such as EITI or ICMM. Although Shougang is not a member of EITI, it is required to comply with U.S., EU, and Hong Kong revenue reporting requirements due

to new requirements under the 2010 Dodd-Frank Wall Street Reform Act, which obligates extractive industry companies who are registered under the U.S. Securities and Exchange Commission (SEC) to release payment amounts to the foreign governments of the countries in which they operate (Moran, 2013).

Industry Comparison

An extensive analysis of Shougang's compliance with Peruvian mining regulations by Irwin and Gallagher (2013) suggests that while Shougang's behavior is generally perceived as "a threat to Latin America's labor and environment," the company's performance compared to other mines, both Chinese and non-Chinese, is similar. Their study uses field studies and quantitative data to examine environmental impacts, labor impacts, the issue of wages and contractors, and backward linkages of five mining companies operating in Peru to conclude that labor and environmental issues are endemic to extractive industries as a whole rather than a problem specific to Chinese investments abroad. For example, Shougang receives an average of 21 environmental fines per



Shougang's headquarters in San Juan de Marcona. Photo credit: Rebecca Schroeder

year, compared to 7 at Antamina, 27 at Doe Run, and 59 at Yanacocha, placing Shougang's environmental infractions at an average level. Furthermore, Shougang's record shows an average of 40 labor fines per year, with Antamina receiving 42, Doe Run 75, and Yanacocha 19. Thus, the scholars' study argues that Shougang's poor reputation in the context of the extractive industry operating in Peru is ill-founded.

VI. Lessons Learned and Recommendations

Lessons Learned

Understanding the Shougang Corporation case is crucial to explaining Sino-Peru mining relations. Shougang is generally seen as a failure, a company that made serious mistakes early in its relationship with Peru that has struggled to improve its reputation and relationship with the community for the last two decades. These serious mistakes include a lack of transparency in the privatization process, failure to invest in the mine and community due to company financial troubles, and absence of communication with both the community and Union (Irwin and Gallagher, 2013). The Peruvian government may be willing to forgive the corporation out of

financial dependency, but the affected local community is not (Irwin and Gallagher, 2013). This section will discuss the commendable improvements that have been made by the company as well as make recommendations as to how Shougang should move forward with a more socially and environmentally focused business plan.

These improvements include increased transparency on the company website, infrastructure investment through the current expansion, continued development of environmental plans, and continued adherence to social programs through the company's opening of a new health center in Marcona. First, while Shougang's website still contains less information than those of Antamina or Yanacocha (*America's Quarterly*, 2013; Kotschwar et al., 2011), the company's recognition that increased transparency is the way forward is a good sign for its future in Peru. Second, the current expansion can be seen as Shougang's attempt to make up for its initial investment failure by heavily investing in the mine's expansion (Irwin and Gallagher, 2013). As mentioned, the project is expected to double the mine's output as well as make repairs to old machinery (Irwin and Gallagher, 2013), the latter demonstrating an understanding of worker safety procedures and the economic benefits of new technology. While the financial issues in the mid-1990s helped to give Shougang a reputation for dishonesty, the hope is that the current investment project will work to gain back some of the lost trust, especially between the company and the people of Marcona (Irwin and Gallagher, 2013). Third, according to the company website, Shougang Hierro Peru has embarked on a number of conservation projects, including Air, Water, and Noise Monitoring and Control Program, a Waste Management Plan, and a Treatment Plan for Effluents. While there are no years listed on the plans to determine their date of inception, their lack of mention in the existing literature suggests that they are new for the company. However, repeated attempts to obtain copies of these plans were rebuffed, illustrating the continued difficulty of transparency that has plagued the company throughout its time in Peru. Fourth, Shougang's donation of a hyperbaric chamber to the town of Marcona can be regarded as a positive investment in the community, especially since the completion of PMSP leaves social requirements and laws for mining companies in a somewhat ambiguous state. Additionally, Shougang's support ensures that specialists and trained professionals will be brought to the center to manage the equipment (Terra Noticias, 2014). Shougang's investment in the hyperbaric chamber can be seen as an investment in the health of Marcona, as well as an investment in the health of the mine's employees.

However, as indicated in this section, Shougang's improvements over the course of its 22 year history in Marcona have been limited. The company's upgraded website, new investments, environmental plans, and donation of a new health center are positive, but also inadequate to securing a viable environmental and social future of the region. In continuation, a number of recommendations will be discussed that, if undertaken by Shougang, will markedly improve both the company's image and the long-term environmental and social sustainability of its mining operations.

Recommendations

Shougang still has much work to do to make peace with local communities and increase its environmental sustainability. Mining in Peru rests on a complex relationship between corporations and the Peruvian government; the government seems to allow some of Shougang's

bad behavior due to financial dependence on the mining industry (Gonzalez-Vicente, 2013). Lax regulation does not encourage companies to make social and environmental improvements; yet as green projects and sustainability campaigns become more prevalent in the business world, it is crucial that Shougang adapt, regardless of existing Peruvian rules and regulations.

Shougang Corporation seems to acknowledge the necessity, yet difficulty of increasing efforts in social and environmental responsibility in the future: one report suggests that the company is looking for ways to improve and admits that it still faces many challenges (Shougang Hierro Peru S.A.A., 2013f). In order to overcome these, Shougang cites three areas where the company should focus its efforts: contribute to local economic development of Marcona, increase investment in the company and community, and find solutions to current problems while continuing to grow the company. Interestingly, none of these suggestions mention the environment, despite the fact that the pictures associated with the goals and challenges section involve penguins and the ocean. Furthermore, a graphic included in the company report implies that lesser importance is lent to the local community and state government, which are important actors with whom to collaborate on such initiatives. The recommendations below all contribute to the preceding goals, while keeping a specific emphasis on the environment.

Based on the secondary literature available, interviews with knowledgeable stakeholders, and field visits to Lima and San Juan de Marcona, we propose a series of recommendations for Shougang that will make it more competitive in today's increasingly social- and environmentally-driven economy. These recommendations include investing in local economic development, updating outdated equipment, continuing to increase transparency, supporting the municipality's efforts, and improving environmental plans.

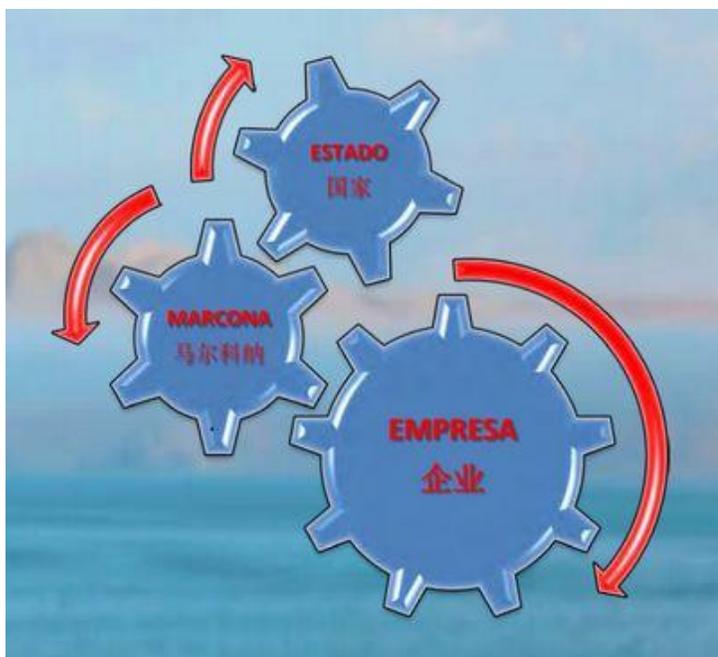


Photo credit: Shougang Hierro Peru S.A.A

First, while promising steps have been taken by Shougang to meet the needs the of the community, the most outstanding development concerns of the community have yet to be resolved after more than twenty years of operation. Even though the town's population has decreased exponentially since 1992, the infrastructure on which the mining town subsists, including housing, water, and electricity, is in dire need of investment. Despite this, Shougang has turned its attention, and wallet, to a large production expansion project. It is possible that this investment could address many concerns expressed by the Workers Union regarding worker safety and aging equipment, yet the project would also greatly expand the mine's workforce, therefore amplifying need and social pressure for adequate and affordable resources in San Juan

Recommendations for Shougang

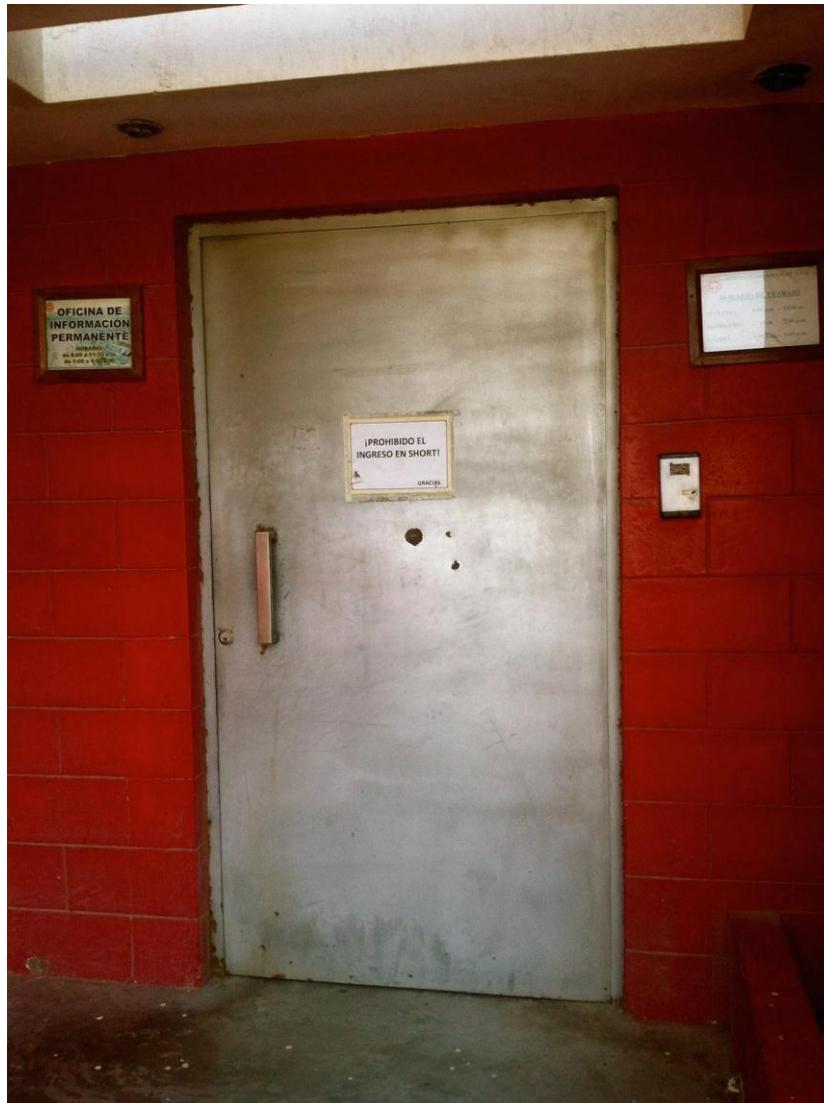
1. Shougang should continue investing in company housing. The company should also comply with existing Peruvian laws and transfer its ownership of electricity, water and drainage infrastructure.
 2. Shougang should make a substantial commitment to new equipment.
 3. Shougang must continue to improve its transparency regarding environmental plans, accessibility to the public, and available data on its website.
 4. Shougang should make its support of the Marcona Municipality explicit and consistent.
 5. Shougang should enhance its current environmental plans and develop a long-term sustainability strategy.
-

de Marcona. The controversy over adequate housing has been repeatedly mentioned in congressional reports and interviews with local stakeholders, thus, it is clear that Shougang's investment in housing has been insufficient and warrants substantial upgrades. As mentioned in the beginning of this case study, the Shougang Group as a whole is highly profitable, therefore, certain local investments should be made in order to continue this economic well-being. In addition to housing infrastructure improvements, Shougang should comply with existing Peruvian laws and transfer its ownership of electricity, water and drainage infrastructure to the Marcona Municipality. As a business decision, this would free the company from being responsible for directly funding infrastructure improvements to the water and electricity sectors.

Second, while Shougang presentations and pamphlets promote specific investments in machinery, the company Union representatives are quick to point to old machinery as one of the company's major shortcomings. According to the Union, Shougang has invested very little in machinery and mine infrastructure, using quick fixes like cement on machines from the 1970s and 1980s rather than purchasing newer, safer equipment (Sindicato de Obreros Mineros de Shougang Hierro Peru S.A.A., personal communication, March 14, 2014). Shougang's lack of investment in machinery threatens both the safety of its workers and undoubtedly causes environmental harm. In the last 12 years Shougang has experienced 12 worker deaths, primarily as a result of faulty equipment or inadequate safety standards (Sindicato de Obreros Mineros de Shougang Hierro Peru S.A.A., personal communication, March 14, 2014). Furthermore, it is unlikely that machinery and infrastructure used in the 1970s and 1980s follow the same strict environmental standards that today's equipment is produced under, thus, investing in new machinery could reduce environmental degradation. To conclude, a substantial commitment by Shougang to new equipment will demonstrate both a concern for worker safety and an adherence to higher environmental standards, two areas in which Shougang could benefit from improvement.

Third, the company must continue to improve its transparency regarding environmental plans, accessibility to the public, and available data on its website. Copies of all environmental plans should be clearly provided on the website, as well as all relevant EIAs. Mining

is inherently destructive to the environment, but demonstrating explicit efforts that the company is taking to mitigate this destruction could greatly improve its reputation by increasing its accountability. Furthermore, in terms of external relations, Shougang should make its process for obtaining interviews and information more clear. During the research trip to Peru it became clear that Shougang Corporation makes it very difficult for the public to speak with its administrators, most likely due to the wide prevalence of academic literature detailing the company's negative reputation in Marcona. This guarded attitude does little to improve said reputation, but a clear policy that outlines how to request information should at least be published on the website.



The entrance to Shougang's offices in Marcona; perhaps a symbolic reflection of the transparency yet to be achieved. Photo credit: Cassie Mullendore

Fourth, Shougang should make its support of the Marcona Municipality explicit and consistent. In particular, the Department of Urban Development and Department of the Environment should be given special attention and assistance by the company. As demonstrated

throughout this paper, Shougang's investment in urban expansion and town infrastructure has been minimal and insufficient for the area's long-term sustainability. Thus, a collaboration between Shougang and Marcona's Department of Urban Development could help alleviate both social and environmental concerns within the community. Furthermore, since its creation just two years ago, the Department of the Environment has embarked on a number of initiatives aimed at educating the town residents about the importance of protecting the region's ecosystem, cleaning local beaches, and crafting a more sustainable trash collection system. These efforts are relatively new, but they demonstrate the increasing concern for environmental issues within the town. Furthermore, Department of the Environment officials describe their relationship with Shougang as sporadic, expressing that sometimes the company supports these environmental projects, while other times it stays silent (Departamento del Medio Ambiente de la Municipalidad Distrital de Marcona, 2014). It is clear that the Department of the Environment does not expect Shougang Corporation to fund all initiatives or solve the town's environmental problems, but considering that the company engages in environmentally destructive practices and is by far the largest investor in the area, its support of the Department of the Environment is critical to environmental sustainability. To conclude, a collaboration between Shougang and key departments at the Marcona Municipality would greatly enhance the company's reputation within the community through this outreach effort as well as contribute to social and environmental sustainability.

Finally, while the presence of current environmental plans and initiatives is commendable, the company strategy does not go far enough to ensure the long-term sustainability of the region. In terms of waste management, Shougang's current strategy should be improved. As of 2014, landfill space along the coast is quickly reaching capacity and a new plan of waste treatment will be necessary for both mining operations and the town of Marcona in the near future. Additionally, the location of the current tailings pond and landfill borders the ocean, which is poor environmental planning especially in light of climate change impacts such as flooding and typhoons that all stand to sweep the landfill's trash into the ocean. Moreover, since the landfill, wastewater treatment plant, and tailings pond are located on cliffs next to the sea, it is likely that rising ocean levels due to climate change will impact the structural stability of these cliffs, leading to erosion and potential landslides. Thus, the long-term environmental sustainability of the Marcona area should be considered a top priority for Shougang considering the potential pollution violations and fines the company will face as the climate increases in volatility.

In summation, through the lessons learned from Shougang's twenty two year history in Peru, it is clear that there are many improvements that Shougang can undertake. These improvements will help safeguard Shougang's production operations and net profit in the long-term. Minimizing environmental and social risks maximizes efficiency, guards against production shut-downs due to worker discontent, and makes good business sense.

VII. Conclusion

As demonstrated through this case study, Shougang's relationship with Marcona and the Peruvian state is complex. The company's tumultuous beginning has given Shougang and Chinese mining companies a negative reputation throughout Peru. However, Marcona's deep

iron deposits ensure that mining operations will continue in the area for decades to come, meaning that Shougang's investments will remain critical to the social and environmental character of the region.

Shougang must acknowledge its good fortune in comparison to many other controversial mining operations in Peru. Marcona is a well-established mining town that embraces natural resource extraction as an avenue for local development and growth. The concerns of the Workers Union, which are mainly related to health, safety, and housing, can be met with proper negotiation and investment, and Shougang should address these expediently. In order to maximize potential for a mutually-beneficial relationship between Shougang and the District of Marcona, and to establish a case for positive outcomes of Chinese investment in Peru, Shougang must prove that its presence meets the developmental needs of its Peruvian stakeholders. The presence of an anti-neoliberal minority group, however muted its voice, illustrates the potential for a broader lack of trust and apprehension with regard to foreign ownership of resources. Therefore, Shougang must actively incorporate the diverse voices within its host community and Peru into its community development initiatives and efforts to address outstanding issues. Anti-neoliberal sentiments could threaten Chinese investment in Peru, and opposition to future Chinese investments may become more widespread if the Peruvian people feel as though their needs are not being met and that they no longer hold a stake in their own future.

Shougang's negative social and environmental impacts pose financial risks to the company itself and to its investors. Fear of accidents and unmet needs can reduce worker morale and only serve to hurt business operations. Protests can also affect worker productivity, company image, and even temporarily halt production, as was mentioned previously. By investing in both the social and environmental sectors, Shougang stands to mitigate business risks. In terms of social programs, community engagement and investment help promote a healthy and educated workforce and a much improved reputation. Additionally, increased environmental protections positively affect the human health of the community and contribute to a reduction in business costs by focusing on the prevention of degradation, rather than clean-up. Thus, it is imperative that Shougang make environmental and social improvements as part of its business risk-mitigation strategy.

In summation, the case of Shougang illustrates the need for Chinese companies and investors to collaborate and cooperate at the most local level in an effort to ensure a welcoming and sustainable investment climate. In response to Shougang's historical faults, the Peruvian public has become increasingly wary of Chinese mining companies in general. Therefore, all Chinese investment and recipient communities would benefit from high social and environmental standards--not just rhetorically, but in practice. Shougang's history in Peru also provides the company with a unique opportunity; though much of the attention Shougang has received is negative, it is important to note that the company has affected the community positively in some ways and improved in certain problematic areas. If Shougang truly commits to establishing a strong participatory relationship with community stakeholders in order to remedy outstanding issues and establish safeguards for future investment, the company could rebrand itself and transform into a leader in corporate social and environmental responsibility. If Shougang continues to improve despite its historically poor reputation, the company could inspire a shift in

Peruvian perceptions of Chinese investment. A rebranding of Shougang could rejuvenate Sino-Peruvian financial relations; all that is left is for the company to commit itself.

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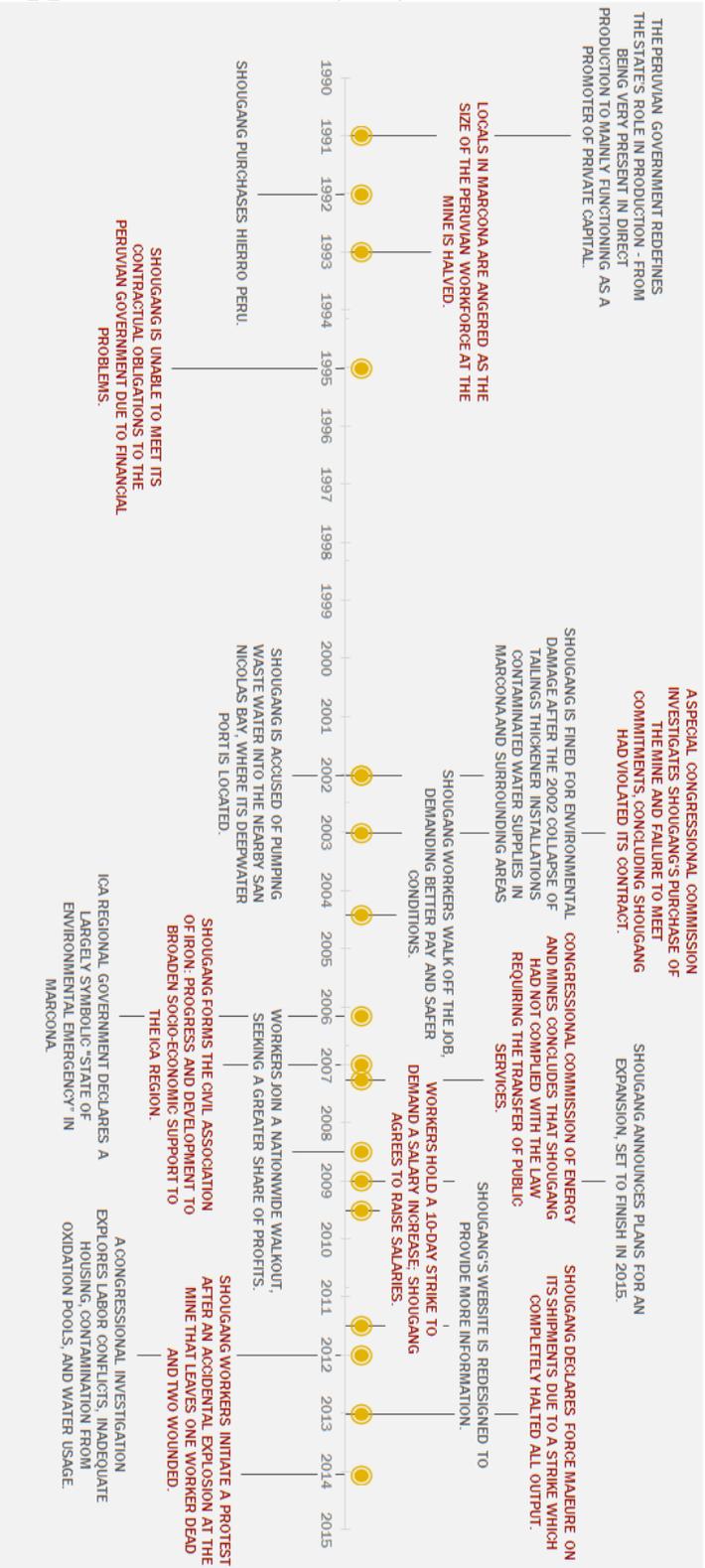
Appendix A – Map of San Juan de Marcona



Appendix B – Shougang Hierro Peru Timeline

Timeline: Shougang Hierro Peru in Marcona

*This timeline is meant to provide a sampling of important events and does not mean to serve as an exhaustive catalog.



Case Study: Chinalco Toromocho Mine

By: Claudia Carrete Sanchez, Sarah Helinek, August Slater, and Howard Weir



City of Morococha²⁵

I. Introduction

Located 90 miles east of Lima in the heart of the Andean mountains at an altitude of 4,540 meters, the Toromocho copper mine has been a controversial project since its purchase by the Chinese state-owned enterprise Chinalco in 2007. The residents of Morococha – the century-old, tailings-riddled mining town located next to Mount Toromocho – have long embraced mining as a livelihood. In an indication of their support for the mine’s expansion, they voted in favor of a resettlement in 2006; the Toromocho Project will eventually engulf the entirety of the old town. Chinalco has been lauded for its handling of the relocation, which has been primarily coordinated by the Lima-based firm Social Capital Group (SCG). By many accounts the effort has been a success, with SCG holding dozens of workshops over several years to ensure that citizens’ preferences for their new town, Carhuacoto, were respected. However, despite the new houses, paved streets, and promises of employment, there is a conspicuous rift within the community regarding the benefit of Chinalco’s presence in the Morococha District. This rift, initially revealed by several protests and the mayor’s reluctance to move, is now evidenced by

²⁵ Except where noted, all photographs within this section were taken by the authors, who reserve rights.

the holdout of approximately 100 families who, as of March 2014, are still refusing to relocate to Carhuacoto. An additional setback occurred in March, when acid mine drainage contaminated two lakes in the region and OEFA ordered operations be suspended until required improvements were completed. Although production has restarted, this incident has called into question the company's commitment to environmental standards. Given these obstacles, it is unclear whether Chinalco will be able to maintain its reputation as China's poster child company in Peru.

II. Research Methods and Sources

This case study aims to examine the social, environmental, and political lessons that can be learned from Chinalco's conduct with regard to the Toromocho mine. Specifically, the study focuses on the successes and challenges associated with the relocation of the citizens of Morococha and identifies improvements that should be made to ensure community safety and support of the mine. Although the Toromocho project will have significant environmental impacts, much of the project is taking place in areas that have already been degraded by past mining activities; this serves to mitigate some of the project's new impacts.

The research for this case study began with a survey of existing literature on the Chinalco Corporation, the Toromocho project, and existing governmental and regional mining laws. Sources included previous research by scholars including Cynthia Sanborn and Victor Torres, and Barbara Kotschwar, Theodore Moran, and Julia Muir. Another key source of material came from Chinalco's Environmental Impact Assessment (EIA), written by Knight Piésold, a multi-national science and engineering consulting company. Government officials, Peruvian environmental NGOs, and academics were identified and interviewed during field research in Peru, which occurred from March 6 to 17, 2014.

Unfortunately, despite repeated attempts to contact Chinalco through phone calls and emails, our team was unable to secure an interview with a representative of the company. In addition, when we visited Chinalco's listed office location in Lima, we were told that the company was in the midst of moving offices, and that we would be unable to gain access to Chinalco's new office location without an appointment; additional messages left with Chinalco's main telephone line received no response.

However, while in Peru our team spoke extensively with representatives from SCG - a professional services firm contracted by Chinalco to assist with the relocation - at their main office in Lima. From Lima, we traveled to the Junin Region to conduct a site visit to the Morococha District, where the Toromocho Project is located, and to the seat of the regional government in Huancayo. The tours of Morococha, the town adjacent to the mine, and Carhuacoto, the town built by Chinalco to which most former residents of Morococha resettled, were provided by representatives of SCG, who were forthcoming in answering questions regarding the relocation process. After the tours, we had the opportunity to engage in informal interviews with members of both communities.

III. Background

Regional Background

Geological/Geographical

The Morococha District has long played host to Peruvian mining and smelting interests due to its extensive deposits of copper, silver, and other metals. Archeological records show that pre-Colonial metallurgy began during a period of decentralization due to the demise of the Wari Empire, around 1000 A.D. A study of lake sediments collected from Laguna Pirhuacocha, located several kilometers from contemporary mining sites, indicates that these early smelting activities targeted copper. This finding is corroborated by the predominance of bronze in the archeological records of this time. A deviation in the geochemical signature of lake sediments after 1450 A.D. suggests a shift from copper to silver extraction and smelting, which corresponds to the rise of the Inca, who utilized silver for symbolic ceremonial purposes. A similar geochemical signature is present in lake sediments after 1600, which is consistent with known clandestine and formal Colonial silver mining activity after the Spanish conquest. There were also increases in elemental lead (Pb) in lake sediments during this time, likely due to the use of Pb-based flux technology to obtain silver. By the 1920s, construction of the central Peruvian railroad and establishment of the La Oroya smelter led to a dramatic increase in mining development in the region. (Cooke, Abbott, Wolfe, and Kittleson, 2007).

In the decades following the establishment of this infrastructure, numerous mining companies have settled in the Morococha District, including the Pan American Silver Corporation, Austria Duvas, and the Argentum Silver Corporation. These corporations began excavating vast amount of minerals, leaving behind tunnels full of water. In 1932, Cerro de Pasco Copper engineer, Harold Kingsmill, ordered the construction of a tunnel in order to drain liquids from the underground mines. Named after its creator, the Kingsmill Tunnel begins in Morococha and runs for 11 kilometers, at a depth of 500 meters, flowing into the Yauli River. The Kingsmill Tunnel has deposited acid run-off at the rate of 1,100 liters per second since its creation. The water that flows from the tunnel is saturated with high levels of metal, specifically iron, manganese, zinc, lead, arsenic, aluminum, and cadmium. (Minera Chinalco Perú, n.d.[c]).

Toromocho Project

The Toromocho Project is one of the largest copper mines in Peru and the first mine in Peru to be developed entirely under Chinese ownership. The US \$3.5 billion dollar project is an open-pit mine and, as the pit grows, mine operations will eventually raze Mt. Toromocho and most of the town of Morococha, necessitating the relocation of the town's residents. The relocation has exceeded expected costs of US \$50 million (BNAmericas, 2010) and has now surpassed US



Location of Toromocho Project
Source: Chinalco Toromocho Website

\$200 million (Behr Dolbear, 2012).

The project uses extraction techniques common in many large-scale copper mines. The ore is initially routed through a primary crusher in order to expose the target minerals and separate them from the “gangue” or waste rock. From the crusher, ore is transported via a series of conveyor belts through various steps - including the largest Semi-Autogenous Grinding (SAG) mill in the world - that serve to further grind the ore and decrease the particle size (Emery, 2013). Eventually the ore undergoes “froth flotation,” a process which separates the minerals contained within the ore, causing target minerals to collect around bubbles that float to the surface of a vat of liquid, where they are then skimmed off. The process of froth flotation is more efficient at higher pH levels and Chinalco has secured access to a nearby lime quarry so the company will have the materials to increase the alkalinity of the solution (Knight Piésold, 2009).

Once it reaches full production, the mine is expected to boost Peru’s production of copper by approximately 17% (Emery, 2013). Toromocho officially began production on December 10, 2013. The deposit is thought to contain approximately 1.5 billion tons of copper ore at an average grade of 0.48% - or 4.8 grams of copper for each kilogram of ore. There are also smaller, but still significant, deposits of silver and molybdenum. At peak operation the mine is expected to remove about 265,000 tons of material each day and process about 117,200 tons per day of ore. From this raw ore the mine will average 1,838 tons per day of copper concentrate - which contains 26.5% copper - and 25.7 tons per day of molybdenum oxide. All of the processed material will be sent by rail to the port of Callao, adjacent to Lima. (Knight Piésold, 2009).

The first ten years of operation will be the most fruitful as the higher quality ores are the first to be exploited. This allows Chinalco to more rapidly recoup its multi-billion dollar investment. The mine is expected to have a thirty two year operation life followed by a four year closure period (Knight Piésold, 2009). Water treatment and other environmental mitigation efforts may have to continue indefinitely after mine closure due to the potential risks of acid mine drainage.

Social

The town of Morococha was first populated in 1539 and was initially used for mining operations by the Incas and small indigenous tribes. It was not until the late 19th century that the land was taken over by a mining company, the Cerro de Pasco Copper Corporation, which created mining camps in the region. Although based in La Oroya, the company built local camps in various parts of the Yauli Province. Realizing the importance of the Toromocho Mountain, Cerro de Pasco developed the settlement of Morococha, Toromocho’s mining camp (Knight Piésold, 2009). In 1907, they established the camp on the mountain next to a small lake, Laguna Morococha, near most of the mining tunnel entrances.

At the turn of the 20th century, many miners and small mining companies headed to the Toromocho Mountain to excavate the rich minerals. A decade later, the camp had developed into a mining town home to hundreds of families. By that time, different mining companies co-existed in the area, digging into the mountain in different angles and directions. On December 5, 1928, one of the excavation tunnels collapsed, killing 30 people instantly and leaving dozens trapped (Coronado, 2009). This initial incident created a domino effect, collapsing most of the tunnels in the mountain; the water quickly filled all of the mining tunnels and emptied the lake above. This incident is known as the disaster of 1928, which led the Morocochan mining

community to unionize. The town miners gathered to form a union, through which they demanded better living standards. Although many died in this incident, the day is a turning point in Morococha's history; the now-empty lakebed provided the town room for growth, attracting more people to the town to work in the mines. The town was then divided into two, Viejo Morococha and Nuevo Morococha, the latter being built on the dried lakebed.²⁶

The mining camp belonged to the Cerro de Pasco Corporation until the expropriation of the company after Juan Velasco Alvarado took over the presidency in a coup d'etat on October 3, 1968. At this time, the mining sector became nationalized; Central Peru Mining Company (CENTROMIN) purchased the land and took Cerro de Pasco's place (Knight Piésold, 2009). Three decades later, in the early 1990s, the government re-privatized the mining sector, but the mine did not find a buyer until the early 21st century (Attwood, 1997). Although the area has been governed by both private and public authorities, the essence of the town has not been touched: Morococha is a mining town and always has been. Before the move to Carhuacoto, the new and old Morococha together had a population of around 5,000 people. All of these residents were profiting from mining either directly, as miners, or indirectly, as taxi drivers or cooks for the miners, metal handlers, and the like.

Mine Background

Chinalco: Aluminum Corporation of China

The Aluminum Corporation of China (Chinalco) was formed on February 23, 2001 as a Chinese state-backed mineral extraction company. According to the company website, Chinalco is “the world's second largest alumina producer, the third largest primary aluminum provider and the fifth largest fabricated aluminum producer” (Chinalco, n.d.[a]). Its primary dealings are in aluminum production through extraction and smelting. The umbrella corporation owns 66 firms in 20 countries around the world (Chinalco, n.d.[a]), including Minera Chinalco Perú, S.A., the subsidiary that owns the Toromocho project. Chinalco is listed on the Hong Kong, Shanghai, and New York stock exchanges and is currently among the top global resource companies in the world (Sanborn & Torres, 2009).

As one of China's largest mining companies, Chinalco is central to China's “going out” policy. As a state-owned enterprise, Chinalco acts as a close or direct representative of the government, which exemplifies China's global strategy of advancement in the extractive industries sector. In addition to increasing its investments in Peru and Latin America as a whole, China is also looking to diversify its own domestic offerings in the natural resource sector. For example, in 2008, Chinalco collaborated with Yunnan Copper Group to expand mining operations in Yunnan province in Southwest China (Sanborn & Torres, 2009).

Similarly, Chinalco has formed partnerships with other mining companies across the globe for exploration purposes. In keeping with the above ideal, Chinalco announced in November of 2013 that it would be exploring a technology partnership with Rio Tinto, an international mining organization based in the U.K. This partnership would propel advanced mining technology to the

²⁶ Morocha is divided into two sections, Viejo Morococha and Nuevo Morococha; Nuevo Morococha should not be confused with Carhuacoto, which is sometimes referred to as Nueva Ciudad de Morococha.

forefront, ultimately adapting to and providing more efficient, safe, green, and sustainable processes and products in the mining industry. (Rio Tinto, 2013).

Project Acquisition

The Toromocho project was first purchased by the Cerro de Pasco Copper Corporation in 1928 and was later sold to Centromin Perú, a nationalized company, in 1974. The Peruvian government attempted to auction the concession in 2001 and again in 2002 but failed to do so, citing a lack of interest in the international market, low global mineral prices and the anticipated complications and costs of moving an entire city in order to begin work. Finally, in 2003, a third request for bids resulted in the sale of the project to Minera Peru Copper (MPC), a Canadian junior company. As part of their purchase agreement MPC had to meet minimum investment benchmarks including the establishment of a trust of US \$15 million to begin work on a water treatment plant to address the poor quality of water running through the aforementioned Kingsmill Tunnel (Sanborn & Torres, 2009). According to Minera Chinalco Perú's website (n.d.[c]), the plant uses high density sludge process in order to increase the pH of the water to adequately remove most of the metals and neutralize the water flowing into the Yauli River, which has been deeply polluted by historic mining activities in the area. The Toromocho project will use 50% of the water treated by the Kingsmill Tunnel Plant, which was constructed at a cost of approximately US \$45 million (Behr Dolbear, 2012).

In order to move forward, MPC needed buy-in from the residents of Morococha with regard to the proposed relocation. A vote on the relocation was held on August 14, 2006, in which it was reported that more than two thirds of the town's population voted "yes" on the move, which was slated to begin in 2008 based on an agreement that Morococha residents would receive land, housing, and public services. At the time of the vote, it was estimated that the relocation would cost between US \$30 and \$40 million. As a result of the community outreach and relocation vote conducted under MPC, Chinalco purchased not just any project, but one that was essentially ready to commence production (Sanborn & Torres, 2009). Furthermore, because MPC's end goal was to sell the Toromocho project, the company rigorously complied with all applicable international standards - i.e., International Finance Corporation (IFC) standards - when working with the Morococha community (J. Casas, personal communication, March 11, 2014).

IFC has developed a number of "Performance Standards on Environmental and Social Sustainability" that address various principles to be followed during investment projects, including standards related to managing environmental and social risk, pollution prevention, involuntary resettlement, and maintaining cultural heritage. Within these standards, IFC encourages project implementers to reduce the environmental and social risks associated with large-scale investment projects by utilizing effective assessment tools to determine project impacts, risks, and opportunities, as well as adequately and transparently collaborating and consulting with community members on managing the effects of the project. (IFC, 2012).

Chinalco's offer for MPC and the Toromocho Project was made on June 25, 2007 through one of its subsidiaries, Chinalco Canada B.C. Holdings, Ltd. The offer of US \$791.30 million was accepted and recommended unanimously by the directors of MPC. That month, Chinalco purchased 9.9% of MPC's shares, and on July 31, 2007, Chinalco announced that it had purchased the remaining shares. After the sale to Chinalco, MPC's Gerard Wolfe stayed on as

CEO and President of Minera Chinalco Perú; in addition, Chinalco kept on some of MPC's Peruvian management. (Sanborn & Torres, 2009).

The sale initially caused controversy within Peru, due to the fact that MPC shareholders allegedly were not required to pay capital gains taxes on the sale of their shares to Chinalco; regional and local leaders in the Junín region were particularly upset by the Chinalco purchase. In response to the disquiet regarding the Toromocho deal, Chinalco made promises of large scale investment in the project and commitments to maximizing the output of the mine with state-of-the-art technology. It further committed to respect Peruvian labor laws, provide employment for the residents of Morococha, and respect the environment (Sanborn & Torres, 2009). Wolfe, Huang Shanfu's predecessor as CEO, stated that US \$83 million would be invested in social and environmental projects (Mercado y Construcción, 2009).

Toromocho Mine Financing

According to the Toromocho project contract on file with MINEM (2009), the investment plan approved by the Peruvian government includes total financing of approximately US \$2.16 billion, with US \$710 million (33%) to be contributed by the title holder, Minera Chinalco Perú, and an additional US \$1.44 billion (67%) to be contributed by the China Development Bank (CDB). In addition, according to the project's prospectus, on December 1, 2010 the Export-Import Bank of China agreed to provide Chinalco with a loan facility of US \$2 billion for the Toromocho mine. (Chinalco-CMC, 2013).

Chinalco's relationship with Chinese banks has become increasingly favorable. In 2009, the Chinese banks granted Chinalco US \$21 billion - the Chinese Development Bank alone, loaned US \$19.5 billion of the total amount - in support of its now-failed Rio Tinto bid (Friends of the Earth, n.d.). The 2.65% interest became the foundation of the relationship between Chinalco and Chinese banks. The relationship further developed when CDB financed Chinalco's initial purchase of a 9% of Rio Tinto's shares in February 2008, thus able to claim credit for playing a central role in the deal to buy strategic natural resources overseas. Chinalco has raised the economic gains as well as social benefits for CDB. Chinalco's success has led to the favored support given by the Chinese banks. (Carew, 2009).

IV. Impacts

Social Impacts

Relocation of Morococha

The relocation of residents from Morococha to the new town of Carhuacoto has generated substantial attention for the Toromocho project both nationally and internationally. Peruvian social activists expected that it would be highly



School Children in Carhuacoto

controversial and were surprised that the resettlement has gone so smoothly (C. Monge, personal communication, February 28, 2014). The relocation is the first of its kind in Peru; never before has an entire town been built for residents displaced by mining activity. Due to Chinalco's social awareness and care for detail, Morococha is now known as the first successful relocation of a town (Presidencia del Consejo de Ministros, 2014). Chinalco's conduct during the relocation has the potential to color people's perceptions of not just Chinalco, but all Chinese companies operating in Peru. To facilitate the potentially sensitive move, Chinalco retained the previously hired Peruvian-based consulting firm, Social Capital Group (SCG). SCG began their work who in Morococha in 2005 under MPC and are expected to finish their contract with Chinalco in 2014 (J. Casas, personal communication, March 11, 2014).

The consulting firm SCG has been extremely important for the success of the relocation of Morococha. Founded in 1999, the multinational company specializes in "the analysis and management of the social issues and risks associated with complex public and private sector investment projects" (J. Casas, personal communication, March, 11, 2014). These skills were put to the test during the resettlement of 5,000 people from Morococha to Carhuacoto. Though Chinalco has hired other contractors and consultants to take care of tasks such as writing the EIA and tackling engineering problems, SCG's task in relocating the people of Morococha has had the greatest potential to define the project. If the relocation was to be bungled, Chinalco would find itself with 5,000 angry residents actively protesting their flagship project.

According to community outreach documents produced by Chinalco and SCG, the Toromocho project provides the opportunity to improve the quality of life for residents of Morococha by resettling them to a location better suited for a town (Minera Chinalco Perú, 2010). Morococha was built specifically to be a mining camp and has been a mining grounds for centuries. The town has been constructed on and around mine tailings from previous mining operations and the area has been contaminated by heavy metals from the resultant acid mine drainage. The tailings and the effects of mining are so present that when women hang clothes to dry, the clothes become so permeated with tailings that they feel as if they have been sprayed with starch. The town experiences many complications caused by centuries of mining: the water is not potable, there are no trees, plants, nor grass in the whole town, and children have no safe area to play. Still, the citizens of Morococha have adapted to living in these conditions; for example, they cover the community faucet with rags to avoid maggots and they've built small, grassless soccer fields for children and adults to play. (P. Chachi, personal communication, March 13, 2014).

Although people have adapted to this way of life, it is clearly not an ideal living. Peru's Instituto Geológico Minero Metalúrgico (INGEMMET, Geologic Mining and Metallurgy Institute) has categorized the area as zone of high risk, due to the history of concentrated mining (Presidencia del Consejo de Ministros, 2014). For this reason, if the relocation of Morococha is conducted properly, it can be a win-win situation for both the people and the company. The idea that resettlement can be done in a manner that benefits the affected people is not a new one, especially for the Chinese.

China has a long history of involuntary relocations, forcibly resettling almost 50 million people over the past 50 years and with most of those relocated suffering a litany of negative consequences as a result. The concept of resettlement with development grew from the desire to

treat resettlement projects as an opportunity to improve the lives of those who were forced to move. By sharing in the benefits of the project in the form of social investments, the hope is that those resettled will find themselves better off in the long run both socially and economically. (McDonald, 2008).

It is perhaps China's reputation of forcible resettlement that has made Chinalco so insistent that the relocation of Morococha be entirely voluntary. We spoke with several SCG employees who claimed Chinalco was adamant that the relocation be unforced and that those who chose to move to Carhuacoto would do so without pressure from the Peruvian government.



Washing Clothes in Morococha

Open Drainage System in Morococha

In 1993, the national census reported that Morococha's population was 7,347 citizens; that number dropped to 4,681 in 2005 due to a lack of jobs in the area's mining sector. Once the plan for the resettlement was revealed in 2006, word quickly got out and sparked a new wave of migration to the town. Foreseeing the benefits of the resettlement, the population of Morococha grew to 5,297 within the year. In 2006, the people of Morococha agreed to resettlement and potential sites for the new town had to be determined. SCG conducted a series of 19 workshops during which Morocochans indicated their requirements for the new town. (Knight Piésold, 2009).

SCG quickly began to work with the community to identify not only the requirements for the new town, but researched the demographics of the citizens of Morococha. Because of the rapid increase in population, Chinalco determined that community members who could prove permanent residency in Morococha between 2006 and 2009 would be considered "beneficiaries," meaning they would be eligible for housing in the new town as well as compensation for property. (Minera Chinalco Perú, 2010).

Initially, when the Toromocho project was owned by MPC, a round table dialogue consisting of the many stakeholders was to be established in the event of a relocation. When Chinalco acquired the project in 2007, they were reticent to fulfill this obligation, perhaps out of a desire to retain control of the project. However, in January of 2009, Chinalco finally agreed to fulfill the promise they inherited from MPC and established a dialogue. The Mesa de Diálogo para el Proceso de Reasentamiento Poblacional de Morococha (MDPRPM) was led by the Junin Regional Government and the Archbishop's Office of Huancayo, and had participation from the

Morococha Municipality, MINEM, Minera Chinalco Perú, the Multi-Sectoral Commission of Morococha, and Defensoría del Pueblo. (Arzobispado de Huancayo, 2012).

The objective of MDRPMP is the voluntary resettlement of the population of Morococha in a respectful manner (Presidencia del Consejo de Ministros, 2014). The government, Chinalco, and the population of Morococha - through the Archbishop - were all represented in the dialogue.

However, some Morocochans demanded community representation rather than proxy representation. In 2012, community members that believed their voices were not being heard and felt the results of the relocation were not as clear often held protests. Amid one of the protests, more than 300 people waited outside the Archbishop of Huancayo's office during a dialogue meeting chanting "Morococha has woken up"²⁷. The peaceful protests quickly escalated to a confrontation with local police as the citizens of Morococha demanded more from Chinalco for their relocation (El Comercio, 2012). In October of that same year, the MDRPMP unanimously approved the move to Carhuacoto (Presidencia del Consejo de Ministros, 2014).

In order to involve community members in the relocation process, SCG held more workshops during which eligible beneficiaries were able to express their needs and concerns about the relocation. The workshops, along with the MDRPMP, led Chinalco to consider three potential sites for the new town and, in 2009, after an additional 29 workshops were conducted about the options, the residents voted on their preference. Carhuacoto, then called Hacienda Pucará, was the overwhelming choice, receiving 69% of the vote. (Minera Chinalco Perú, 2011a).

In retrospect, selecting Carhuacoto seems inevitable. It was the only site in the Morococha district that was large enough to include both the new town and an operations base for Chinalco while still meeting the other requirements of the residents. If the town were to be relocated outside the district of Morococha, they would forfeit the mining royalties of projects occurring within the district - such as the Toromocho project. Though selecting the location of the new town was almost a foregone conclusion, negotiations over compensation for the Morocochans have been quite complicated. (Minera Chinalco Perú, 2011a).

Those opposed to the new location and the resettlement, though a minority, included some of the wealthiest and most influential residents of Morococha. The mayor, Marical Salomé, of Morococha, was especially opposed to the resettlement (MINEM, n.d.). According to The Guardian (Collins, 2012), Mayor Salomé



Cleaning the Streets in Carhuacoto

wanted Chinalco to compensate US \$300 million for "loss of identity, culture and tradition from the move." He went so far as to build new playgrounds and clinics in Morococha in order to gain

²⁷ Translation from Spanish to English is authors' own

leverage against the company in the hopes of receiving a more attractive resettlement package (P. Chachi, personal communication, March 13, 2014). His strategy did not work as well as hoped; for example, the new clinic went unused and unacknowledged by the regional government due to poor sanitation and the presence of tailings in the foundation. The mayor has now joined the majority in Carhuacoto.

Current Status of Relocation

On October 29, 2012, the relocation of Morococha's residents was initiated with the move of 50 people into their new homes in Carhuacoto. Chinalco assumed responsibility for moving costs for anyone and everyone who moved out of Morococha, regardless of whether they were eligible for a house in Carhuacoto (Presidencia del Consejo de Ministros, 2014). Approximately 20% of the community owned property in Morococha, while the remaining 80% were either renters or squatters. Due to the complicated nature of the status of beneficiaries and non-beneficiaries as well as of property owners and renters in the community, SCG categorizes relocatees into five separate groups (J. Sanchez, personal communication, March 13, 2014):

- **Property Owners - Beneficiaries:** 148 of 156 property-owning families (94%) have sold their houses to Chinalco and moved to Carhuacoto;
- **Renters - Beneficiaries:** 661 of 753 families renting houses in Morococha (87.8%) have moved to Carhuacoto;
- **Renters - Late-Qualifying Beneficiaries:** Chinalco determined that 28 families - 112 people - who did not initially meet the beneficiary status qualifications could indeed be considered beneficiaries if they had lived in Morococha between 2008 and 2013; this change in beneficiary status was made possible by additional empty lots available in Carhuacoto. These 28 families have moved to Carhuacoto;
- **Renters - Non-Beneficiaries:** 109 families - 324 people - without beneficiary status have moved to Carhuacoto and are responsible for paying rent to Chinalco, unlike those with beneficiary status who received house titles for free.
- **Non-Carhuacoto Renters - Non-Beneficiaries:** 200 families - 433 people - who were not eligible for beneficiary status chose to move from Morococha to nearby mining towns or Huancayo. Although they did not move to Carhuacoto, Chinalco covered the moving costs for these families.

As of December 2013, 3,316 members of the Morococha community had been relocated to Carhuacoto (J. Sanchez, personal communication, March 13, 2014). In September 2013, Congress officially recognized Carhuacoto as the capital of the Morococha district (Presidencia del Consejo de Ministros, 2014). While the vast majority of the community has agreed to the relocation process, as of March 2014, approximately 100 families, or 350 individuals, remained in Morococha for various reasons, including the allegation that Chinalco did not offer sufficient compensation for their properties or dwellings. In addition, some individuals were demanding that Chinalco pay for houses that were built after the terms of the resettlement process were determined (P. Chachi, personal communication, March 13, 2014).



Carhuacoto from the Central Highway

The situation has been further complicated by a State of Emergency declaration in the District of Morococha, issued by national supreme decree on August 25, 2013 due to the government's assessment that the town was in imminent danger of mass earth movements. According to the 60-day decree, the zone in question was in danger of experiencing slope erosion, rockslides, floods, and other geologic hazards. In addition, the government indicated that a seismic event could cause the underground mining passages in the area to collapse, potentially leading to extensive damage to structures in Morococha. The decree ordered that the National Institute of Civil Defense (INDECI), the regional government and local government, as well as various ministries, undertake appropriate actions to reduce and minimize the high risk in the affected area. It also permitted immediate action to be taken to protect residents against environmental and seismic risks, and allowed the government to enforce a temporary relocation of those citizens still residing in Morococha. As a result of the continued high risks associated with the area, the government extended the decree twice, on October 24, 2013 and then again on December 24, 2013. Since the issuance of the decree, INDECI has been coordinating with various offices under the Regional Government of Junín and the Province of Yauli, as well as with Chinalco, to administer the relocation to Carhuacoto of both the municipality's offices and the families still remaining in Morococha. For those families without access to housing in Carhuacoto, the government is providing temporary housing near Carhuacoto. (INDECI, 2014).

Despite the efforts being made to mitigate the environmental risks faced by community members still residing in Morococha, concern has been raised over the condition of the government-provided temporary housing in Carhuacoto. In a memo published on February 28, 2014, Archbishop Barreto Jimeno expressed misgivings regarding the quality of the small tents assigned to those who agreed to live in temporary housing, noting that there is only a space of 40 centimeters between each tent. According to the Archbishop, "These overcrowded conditions are an abuse against the physical, psychological and social integrity of the population of

Morococha.”²⁸ In addition, the Archbishop called for the restoration of electricity for those residents in the old town who did not, at the time of the memo’s writing, have access to a new house in Carhuacoto. (Barreto Jimeno, 2014).

Additionally, there is speculation among the community and civil society groups that the government issued the emergency decree solely as a means of forcing out the remaining holdouts in Morococha and not out of any concern for the environmental conditions. For example, in a memo regarding the situation in Morococha posted on March 7, 2014 to its website, the organization Pueblo Unido (2014) stated:

In order to expel around 50% of the population - approximately 470 families - who are still resisting the “resettlement” call and who are still in Morococha, the government invented a supposed “imminent danger” of shifting soils, decreeing two consecutive states of emergency in the zone, intimidating the population with the presence of police and with Chinalco’s thugs, and harassing them until they leave Mororocha.²⁹

The veracity of this claim regarding the government’s motive for issuing the emergency decree is uncertain; according to SCG (J. Casas, personal communication, March 11, 2014), the central Peruvian government had plans to issue the decree for many years due to the unsafe nature of the area, but delayed doing so because of the expected backlash from the community. When the government proposed that the decree be promulgated at the beginning of the relocation, Chinalco rebuffed the idea, insisting that citizens move voluntarily after negotiating compensation. It was only after a majority of residents had moved out that the government issued the decree.

The numbers cited by Pueblo Unido are also questionable. While the organization claims that approximately 470 families remained in Morococha as of early March 2014, SCG stated that as of March 13, only 96 families were still living in the city (P. Chachi, personal communication, March 13, 2014). Regardless of the validity of such assertions by civil society groups, the fact that these assertions exist is problematic for Chinalco, if indeed the company’s aim is for all citizens to relocate voluntarily from Morococha to Carhuacoto. Despite the problems, resettlement has been an attractive option for most residents. By resettling, residents are able to enjoy cleaner air and water away from the legacy pollutants of previous mining activities around Morococha. Carhuacoto’s streets are paved and the homes built by Chinalco have electricity and potable running water. Being lower in altitude, Carhuacoto also enjoys a milder climate with a greater abundance of flora and fauna. (Minera Chinalco Perú, 2011a).

A great deal of effort was expended to build the new town in accordance with expectations of the residents. Schools, churches, markets, and medical facilities were constructed and both SCG and Chinalco have offices in the town to help resolve outstanding issues. To ensure that the new town feels familiar and the community’s identity is not depleted with the relocation, its layout mimics the old Morococha. Additionally, most residents have been settled with their old neighbors to help them retain feelings of community (Minera Chinalco Perú, 2012). It seems likely that minor issues will continue to crop up over the next several years but that any complaints will remain limited in scope.

²⁸ Translation from Spanish to English is authors’ own.

²⁹ Translation from Spanish to English is authors’ own.

Although the relocation of Morococha has been successful in many ways, Chinalco has yet to fulfill its employment promises. Before the relocation, Chinalco promised to create 3,200 construction jobs and 2,400 mine operation jobs, granting priority to the citizens of Morococha and the Junin region (Minera Chinalco Perú, 2010). As part of their initial effort to achieve its employment promises, Chinalco developed the “Toro Boys” recruitment program in order to train and capacitate individuals from the community to work in an open-pit mine. According to a news bulletin on the Toromocho project website, 174 community members - 39 women and 135 men - have engaged in the program (Minera Chinalco Perú, n.d.[b]). According to SCG, thus far only 70 individuals from the recruitment program have been directly employed by Chinalco. In total, as of December 2013, 385 community members have been contracted by Chinalco, while only 356 people have been directly employed by company; in addition 1,751 individuals have gained indirect employment, though it is unclear what is meant by indirect employment (J. Sanchez, personal communication, March 13, 2014).

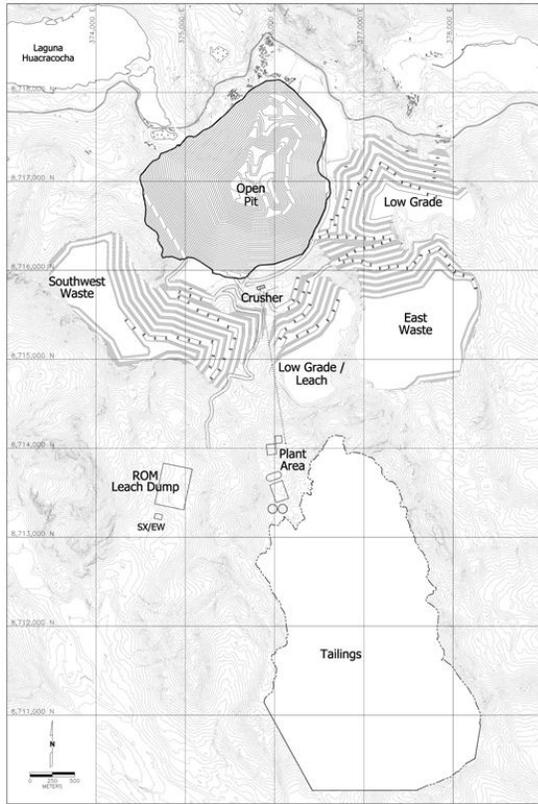
Today, there are just a few hundred residents half-heartedly resisting the move but mostly resigned to leaving old Morococha. Although Chinalco seems to have taken a hands-off approach to the project, the company they hired to oversee operations appears to have been the right one. Perhaps aware of the negative reputation that Chinese firms have in Peru - not least because of the Shougang mine - Chinalco seems intent on keeping the public at arms’ length. We were given the impression that SCG was Chinalco’s mouthpiece and representative; the relocation from Morococha to Carhuacoto was carried out entirely by employees of SCG, as the first point of contact for any issues residents may have. When asked why Chinalco had not actively tried to create good press over the, so far, successful relocation of Morococha, we were told that they preferred to stay under the radar away from public attention (J. Casas, personal communication, March 11, 2014). The sentiment seemed to be that in the mining industry no attention is good attention.

Environmental Impacts

Commencement of Operations

The Toromocho project entered into production on December 10, 2013. However, its production estimates for the first part of 2014 were revised because of issues obtaining an adequate power supply. Though Chinalco expects the mine to reach full production by Fall 2014, this disruption has caused the company to lower its initial production estimates to 120,000 tons of copper concentrate in 2014, a significant drop from the previously estimated 190,000 tons per year (Mining Journal Online, 2013).

On March 28, 2014, the Toromocho project suffered a setback in the form of an audit by OEFA. The project was ordered to cease operations due to contaminated runoff entering the Huacrococha and Huascacocha lakes, though the cause of the contamination was initially unclear. By March 30, Chinalco had complied with the order and ceased mine operations, though mineral processing was allowed to continue (Gestión, 2014). In an official press release dated March 31, Chinalco claimed that the temporary cessation of activity was unlikely to have a significant effect on the project's plan of entering into full production by Fall 2014, nor would it reduce their overall production numbers (Chinalco-CMC, 2014b). The company's management



Toromocho Mine Operations Layout
Source: Independent Mining Consultants

released more information on April 4, and then again on April 14, attributing the source of the contamination to the heavy monsoon rains running through the project's quarry, which led to the contaminated waters running into the lakes near the project. To correct the problem, Chinalco made improvements to their drainage systems, including tanks for storing runoff, and on April 11, OEFA inspected the improvements and determined that the project could resume operations. Chinalco continues to maintain that these setbacks will not affect 2014 production numbers (Chinalco-CMC, 2014a).

The speed with which Chinalco worked to correct the issue is encouraging, however the origin of the problem was foreseeable and proper drainage systems should have been in place well before the start of the rainy season. Going forward, Chinalco needs to be aware that a lack of forethought over environmental risks can lead to a financial loss in the form of reduced or suspended production. Environmental contamination also risks sparking protests or even labor strikes in the local population that could further impact production of the mine.

Environmental Impacts of Toromocho Project According to EIA

As is the case for the majority of open-pit mines, Project Toromocho will be exploiting relatively low-grade ores. For Toromocho, the only economically viable means to do this is through an open-pit mine, meaning that one of the largest environmental impacts of the mine will be its footprint. The main pit will be formed in the current location of Mt. Toromocho, which is adjacent to the town of Morococha. The mountain will be removed and a pit 400m deep will be created in its place, for a total elevational change of 810m. At its largest extent, the main pit will be approximately 2,250m on each side and will cover an area of 410 ha. (Knight Piésold, 2009).

About half of the excavated material will have no economic value and will be placed in two large piles next to the main pit. Each pile will contain between 585 and 596 million tons of excavated

material. The western deposit will eventually grow to 200m in height and will cover an area of 345 ha while the south eastern deposit will reach 300m in height and will cover 235ha. The other half of the excavated material, comprising economically viable ores, will be sent to the primary crusher for processing. Once processed, the tremendous volumes of mine waste must be stored. Of the 117,200 tons per day of ground ore processed, 115,676 tons per day of tailings will be produced and, as is common practice within the industry, the Toromocho Project will create a tailings impoundment by blocking off a nearby valley. (Knight Piésold, 2009).

Tunshuruco basin - south of Morococha - will be turned into an area for storing as much as 950 million tons of mine tailings and will cover an area of 790ha. The ravine will be blocked with a dam that, growing gradually over the life of the mine, will eventually reach 230 meters in height. The tailings will be spread evenly throughout the basin and will slope gently towards the dam blocking the entrance to the valley. Given the amount of seismic activity within the region, the dam and other mine infrastructure must be built to withstand strong earthquakes; the largest recorded in the region, occurring in 2007, was a magnitude 8.0 and was located 195 km from the mine site. Once finished, the tailings impoundment will be the single largest direct impact of the mine and will affect drainage systems throughout the basin including the destruction of Tunshuruca lake. (Knight Piésold, 2009).

In order to save room, increase stability and lower the risk of infiltration into groundwater, the tailings will be thickened into a slurry comprised of 69% solids. The high percentage of solids also allows a greater quantity of tailings to be stored in less space. The Tunshuruco valley has room for about 30 years of tailings production, just shy of the 32-year expected lifetime of the mine. This means that a second site will need to be developed in order to deposit tailings for the final two years of the mine's operation. (Knight Piésold, 2009).

Chinalco is using relatively new thickening techniques and there is some risk that the project will not reach its target of 69% at the outset. If the project is forced to deposit tailings below that number for prolonged period then they will run out of space in the Tunshuruco basin faster than planned and will need to increase the size of a secondary storage site. (Behr Dolbear, 2012).

After 5 years of operation, mining activities will begin to encroach on the minimum safe distance of the highway. The minimum safe distance is necessary due to the quantity of explosives that the project will need to destroy the mountain and excavate material. Chinalco already has plans in motion to reroute the highway and expects to be done well in advance of the 5 year deadline. Moving the highway also makes other copper, molybdenum, and silver deposits available that the mine may expand into. (Knight Piésold, 2009).

Air quality will also be impacted by both the construction of the mine and its operation. During construction and operation, the primary impacts will come from blasting, moving earth, vehicle emissions, and emissions from infrastructure used for mineral processing. Dust will be controlled by covering truck beds and by using water for suppression. Keeping vehicles and other equipment well maintained will help reduce emissions of carbon monoxide and nitrous oxide. Local communities, due to their distance from the mine site and the prevailing winds, are unlikely to be affected by these impacts to air quality. (Knight Piésold, 2009).

A comprehensive monitoring program seeks to keep track of the various impacts caused by the Toromocho project so that they can be compared to the baseline study done at the project's beginning. This will allow the company to modify its practices to reduce impacts if it so chooses and will also provide information necessary for the mine closure and reclamation. (Knight Piésold, 2009).

Effects on wildlife

The Toromocho project, due to its sheer size, will have some dramatic effects on the surrounding landscape. While the area directly around Morococha consists mostly of bare soils and has been impacted by mining for hundreds of years, other areas, such as the Tunshuruca valley, have more diverse and extensive ecosystems and have not been previously impacted by mining operations. The negative impacts of the mine can be lessened substantially by using best practices, but a mine this size will always have substantial impacts. One of the chief concerns for flora and fauna in the region is the potential disruption of the biological corridor that runs through the site of the mine. The construction and operation of the mine is likely to lead to some habitat fragmentation for species. The impacts of the mine will manifest themselves in several ways. The first, and most direct, will occur through the removal of soils and the deposition of wastes physically disrupting or destroying habitats. There will also be a substantial loss of ground cover due to the removal of soils necessary for various stages of construction, such as the concentration plant, water filtration pools, the tailings dam and conveyor belts used for transporting minerals. (Knight Piésold, 2009).

Less direct impacts occur from the sound and vibrations associated with the mine's construction. Blasting, digging and the movement of vehicles can disturb fauna far beyond the range of the direct physical impacts. To help manage the mine's impacts to the surrounding area, Chinalco performed environmental baseline studies. This led them to conclude that there were three species especially at risk from mine activities. (Knight Piésold, 2009).

The first, a small bird called the white bellied cinclodes (*Cinclodes palliatus*), lives exclusively in high Andean wetlands and is on the endangered species list. Wetlands are of particular concern due to their role as water regulators, storing excess during the wet season and releasing it gradually during the dry season. Approximately 50 ha of wetlands are expected to be lost as a result of the project. This number accounts for approximately 2% of the land within the project's footprint - on average wetlands cover 1% of the landscape around Morococha. The second, a large, nearly flightless bird called the Giant Coot (*Fulica gigantea*) is at risk due to its low mobility and its territorial behavior; it remains in the same area throughout its life. Any animals around the mining operations would be negatively affected but would be unable and unwilling to leave. The third species is the vicuña, (*Vicugna vicugna*), renowned for its remarkably fine wool, this camelid is a relative of the alpaca and llama. Once considered endangered, conservation efforts over the past decades have been largely successful. The Toromocho project has the potential to disrupt a biological corridor for this species in addition to any other habitat destruction that may occur. (Knight Piésold, 2009).

Managing the risk to these species has been done in a variety of ways. Where possible, Chinalco has sought to avoid destruction of habitat important to all three species, especially wetlands. Capture and relocation has also been used when direct and indirect impacts to habitat were

unavoidable and monitoring programs are in place to keep track of local populations. Education and outreach programs also seek to teach mine employees and local communities about the importance of the various species in the region. (Knight Piésold, 2009).

Reclamation Plans

If all goes according to plan, the project will enact its four-year closure plan after 32 years of mining. Low-grade ore stored on site for the duration of the mine's operation will then be processed. All infrastructure will be dismantled and removed and, where possible, equipment will be sold or scrapped. Once the mining facilities have been removed, some areas will be revegetated to reduce the risk of acid mine drainage and to help stabilize slopes. This will be especially important for the two large piles of excavated material adjacent to the main pit, as each pile contains millions of tons of acid generating rock. (Walsh, 2011).

For similar reasons, the tailings impoundment in the Tunshuruco valley will be covered and sensors installed to monitor any potential leakage of tailings or a reduction in stability of the tailings dam. In accordance with Peruvian Law, Chinalco will perform annual checks for five years after closure to ensure the integrity of the tailings storage. They will similarly monitor the stability and runoff from the main pit and the piles of excavated material. (Global Legal Group, 2014).

Runoff from acid generating materials will be routed to the Kingsmill Tunnel Plant where it will be treated before being discharged into the Yauli river. Chinalco, as part of their purchase agreement for the Toromocho Project, is obligated to maintain operations at the Kingsmill Tunnel Plant in perpetuity. This obligation speaks to the incredibly long timescales needed to manage mine waste due to the threat of acid mine drainage. (Walsh 2011).

Additional Environmental Considerations

Chinalco has taken many steps to minimize the footprint of the Toromocho project on the region while managing any negative impacts that do exist. However, it must be noted that copper mining is, even within the mining sector, notorious for producing tremendous volumes of waste. One estimate suggests that, "at the extreme...128-196 tonnes of combined copper tailings would be generated to produce 1 ton of copper" (Wang, 2014). While plans are in place at the Toromocho Project to store a tremendous volume of tailings, the integrity of the waste deposits will only be monitored for five years after the closure of the mine, a number that seems woefully inadequate given the risks of seismic activity within the region and the longevity of the potential threat represented by mine wastes.

Additionally, though it is admirable that Chinalco has agreed to maintain the Kingsmill Tunnel Plant in perpetuity, that promise should be treated with some skepticism. AMD can last for centuries or millennia and it is highly unlikely that Chinalco will be able to live up to its obligations for the same period of time. This is not to say that Chinalco's strides towards environmental and social responsibility should be ignored, only that mining is inherently a long term endeavor and that it is important to think about mining with an eye towards the distant future.

Finally, despite the seemingly barren nature of the region there are many species that have found an ecological niche that cannot easily be replaced. Also concerning is the remoteness of the region, making the effects on the local flora and fauna far easier to overlook and monitor.

However, if Chinalco is able to act with the same care they have shown towards the relocation of Morococha then they will likely succeed in minimizing their impact on the wildlife in the region.

V. Laws, Regulations, and Policies

Chinalco's Environmental, Social, and Corporate Policies

Chinalco claims that the company advocates for a sustainable and safe working environment, and that one of their goals is to “eliminate potential hazards” that would corrupt the environment, affecting the community and safety of their workers. Chinalco purports to abide by laws and standards of the national government in the country in which it is operating, promoting “clean production” while minimizing impacts such as pollution or potential illnesses as a result of mine production (Chinalco, n.d.[b]). In addition to the aforementioned Kingsmill Tunnel Plant, Chinalco also constructed a greenhouse located near the mine workers’ residence, which is aimed at improving vegetation varieties, restoring tree production, and studying endangered species living within the area. (Minera Chinalco Perú, n.d.[a]). According to the Toromocho project website, Chinalco has also adopted various corporate social responsibility (CSR) initiatives aimed at advocacy for and protection of community residents. The community initiatives include education, health, productive development, and strength of social organizations; these initiatives are funded by a “Toromocho Social Fund” established by the company, though it is unclear how large this fund is or for how long it will be maintained (Minera Chinalco Perú, n.d.[d]).

Despite the various environmental policies and projects that Chinalco has implemented, it is not a member of EITI, ICMM, or any other leading international voluntary standards programs (Kotschwar et al., 2012). Although Chinalco is not a member of EITI, it is required to comply with U.S., EU, and Hong Kong revenue reporting requirements due to new requirements under the 2010 Dodd-Frank Wall Street Reform Act, which obligates extractive industry companies who are registered under the U.S. Securities and Exchange Commission (SEC) to release payment amounts to the foreign governments of the countries in which they operate (Moran, 2013).

Role of the Regional Government

The Junin Regional Government, located in the city of Huancayo, plays a minimal role with regard to large scale mining projects within the region, including the Toromocho mine. According to interviews conducted by the research team with the regional government’s offices of Environment and Natural Resources, Economic Development, and Energy and Mines, Peru’s regional governments are not responsible for the oversight or regulation of large scale mining activities, though they do maintain control over the approval of EIAs for small scale and artisanal mining. In addition, the Junin Regional Government had the opportunity to participate in the Morococha dialogue table, though again its role was a limited one.

The monitoring of water sources falls within the jurisdiction of the region’s Autoridad Local del Agua (Local Water Authority), however it was emphasized during the interview that rivers in the

area of the Toromocho project have been contaminated for several decades, making it difficult to assign blame for the pollution to one particular mine. Finally, despite its lack of supervision authority over the large scale mining sector, the region does receive income from large scale mining projects within its jurisdiction through the Canon Minero. After they are acquired from the national government, Canon Minero funds are administered by Junin Region's central government, which is under the auspices of the office of the Regional President (P. Montoya Torres, M. Cerrón Ruiz, and R. Rojas Cruzatti, personal communication, March 14, 2014).

VI. Lessons Learned and Recommendations

Lessons Learned

Despite the numerous obstacles that have arisen during the start-up phase of the Toromocho project, it is clear that Chinalco has made significant strides in mitigating the myriad of social and environmental risks inherent in the development of a mine of such large magnitude. It is also apparent that Chinalco has learned from the mistakes of its predecessor, Shougang, and is aware of the negative reputation that precedes Chinese companies in Peru. In an interview with the New York Times, Chinalco's Vice president of Environmental and Corporate Affairs said, "We have to go a little farther because we come with this reputation that has been very bad in Peru" (Neuman, 2013).

Chinalco has proven that a model of community engagement and transparency is more successful than one that hinges on antagonism and mismanagement. The distinction between the two companies is evident when considering the manner in which Chinalco has approached the social and environmental challenges it has encountered thus far (Poulden, 2013; C. Monge, personal communication, February 28, 2014).

Although many Morocochans depend on the mining sector for employment and the project was largely supported by the community from the outset, Chinalco faced a formidable social challenge when it purchased the Toromocho project from MPC. Chinalco mitigated the risk of social unrest by involving the community throughout the entirety of the relocation process and by establishing mechanisms - i.e., workshops, polls - by which community concerns and preferences were incorporated into the decisions made by Chinalco's management. The key to Chinalco's relative success in the relocation process was its employment of Social Capital Group (SCG), the Peruvian professional services firm previously contracted by MPC.

After considering the community's opinions on the location of the new city, Chinalco managed the environmental and geologic risks by hiring top engineers to conduct in-depth technical studies on the condition of Carhuacoto's soils. After initial studies revealed a risk of soil instability due to the prevalence of water in the area, Chinalco reduced the risk associated with construction by implementing various infrastructure projects to ensure the integrity of the building foundations in Carhuacoto (M. Villavicencio, personal communication, March 11, 2014). For example, according to company literature, Chinalco constructed a canal in order to minimize the risks of flooding from the Pucará River, which runs through Carhuacoto (Minera Chinalco Perú, 2011b).

At the mine site itself, Chinalco experienced its first major setback when heavy rains overwhelmed drainage systems in late March 2014, contaminating two nearby lakes with AMD. The environmental lapse resulted in the suspension of all mining activities by OEFA. However, the company responded quickly and was able address the drainage problems, receiving permission to resume operations on April 11. Although environmental concerns have long plagued Morococha as a result of decades of intense mining activity, it is critical that Chinalco avoids the careless approach taken by past ventures in the area. Maintaining a high level of control over its activities is of paramount importance in cultivating a positive reputation with the community. Furthermore, any future production stoppages due to environmental infractions or other potential issues such as labor strikes could cost the company in lost revenue. For example, the state-owned mining company of Chile, Coldeco, suffered three weeks of strikes in 2008, costing the enterprise an estimated US \$400 million in lost revenues and other damages (Emery, 2008). Acting responsibly towards local communities, workers, and the environment requires significant up-front investment, but due to the long time periods over which mines operate, those costs are easily recovered in the form of stable production.

Along with utilizing SCG as its relocation contractor and consultant, Chinalco's success can be attributed to its relationship with CDB. Due to Chinalco's economic success in previous mining projects, CDB has become a leading lender for Chinalco (Carew, 2009). CDB's willingness to lend large sums of money to Chinalco has contributed to the positive social and environmental projects coordinated and financed by Chinalco. These good practices may in turn lead to other Chinese banks' eagerness to lend to mining companies.

Recommendations

Many observers consider Chinalco to be a rising star in Peru's mining sector after witnessing the company successfully navigate both expected and unexpected risks associated with the Toromocho project (C. Monge, personal communication, February 28, 2014). Most prominently, Chinalco was able to negotiate a largely successful voluntary resettlement of the residents of Morococha - the largest resettlement of its kind in Peru. However, improvements can still be made to both the social and environmental aspects of the project, particularly when considering its 36-year lifespan - including the four year closure period. The following recommendations look at ways in which Chinalco can improve operations both unilaterally and through cooperation with the Peruvian government.

Improve Direct Chinalco-Community Relations

Though Chinalco's hiring of SCG to manage the relocation was a judicious move that allowed the resettlement to proceed smoothly, it has also distanced the company from community interaction. Residents we spoke with in both Carhuacoto and Morococha felt that Chinalco's presence in the community was weak, and they indicated frustration with their inability to speak directly to representatives from Chinalco, instead having to use SCG as an intermediary. These worries likely stem from the perception among some community members that once SCG has finished its contract the resulting organizational vacuum will go unfilled by Chinalco, leaving residents with no way to address issues that might arise in the future. In order to mitigate the community's discontent with the lack of communication and presence of the company, Chinalco should take advantage of its Carhuacoto communications office in order to engage with the

residents. For example, residents that we spoke with revealed a large humidity problem in their homes. During our visit, we witnessed SCG taking responsibility of this problem, but Chinalco must personally address these issues by communicating with its residents. The work provided by SCG must merely aid Chinalco's public communications office rather be the mouthpiece and representative of Chinalco to the people.

Ensure Fulfillment of Agreements with Community

Furthermore, it appears that Chinalco has not yet fulfilled the totality of its employment pledge to the community, be it direct or indirect, through the Toromocho Project. SCG informed us that as of December 2013, Chinalco had created 2,492 direct, contracted, or indirect jobs for community members. In addition, the company has ensured steady business for local store owners by requiring its offices as well as those of its contractors to be located within Carhuacoto; however, employment numbers have not yet reached the level previously promised by the company. This may be a result of the fact that the mine has not yet reached full production levels. Regardless, Chinalco must address the perception among community members that the company is not following through on its employment promises.

One area of particular concern is Chinalco's promise to train community members on open-pit mining operations. Because the skills required to be employed in an open-pit mining operation are much more complex than those required to work in the pre-existing subterranean mines in the Morococha District, most of the miners in the Morococha-Carhuacoto community are not currently qualified to work for the Toromocho Project. Though both SCG and the project website indicate that Chinalco is providing the training necessary for open-pit mining, it was evident from our discussion with community members that there is discontent regarding the low levels of direct employment.

This matter is further complicated by the prevalence of mining-related illnesses (i.e., respiratory ailments) among miners in the community who have spent their adult lives employed in subterranean mines. Various community members indicated that Chinalco is wary to hire older miners, who may prove to be a medical liability as a result of these illnesses. These community members stated that Chinalco is requiring a high level of medical and fitness testing for employee applicants, which may make it more difficult the residents to obtain employment.

Finally, the company has failed to foresee non-mine related employment issues associated to the relocation. For example, Chinalco and SCG did not anticipate that the relocation to Carhuacoto would diminish the need for taxis. In Morococha, taxi drivers were in high demand by residents traveling across the town on unpaved roads, particularly during rainstorms. However, due to the construction of paved roads and overhanging roofs on all buildings in the new town, people are likely to walk to their destination rather than take a taxi, even while it rains. This unexpected loss in taxi demand has contributed to the rise of unemployment in Carhuacoto.

Regardless of the veracity of claims by community members, it is imperative that Chinalco improve its communication strategy with the community regarding employment. Despite SCG's employment statistics and the existence of Chinalco's training program, it is clear that there is a perception among some community members that the company is backtracking on its promise. In order to mitigate the risk of compounding community resentment with regard to employment,

Chinalco must clarify its job creation timeline and its training plans, as well as by provide more transparency on its medical requirements for mine workers.

Guarantee Commitment and Transparency

Peru is a compliant country of the extractive industry transparency initiative; Chinalco however, is not a member of EITI (Knight Piésold, 2009). EITI promotes company transparency and openness of the companies' and governments' financial and management sector. Having Chinalco as a member of the global initiative would symbolize a clear commitment to enhancing accountability and responsibility to Peru's national government and local communities. EITI member association could further influence other Latin American countries to welcome Chinalco's business. Chinalco should engage in the global coalition of governments and companies promoting transparency and openness of revenue from natural resources.

Clarify Post-mine Closure Commitments to Community and Environment

Though Chinalco has clearly stated its planned operations during the life of the mine, there are still concerns related to the mine's closure after 32 years. The continued operation of the water treatment and tailings management needs to be addressed more explicitly before the end of Chinalco's contract with the Peruvian government. For example, while Chinalco has stated they will continue to operate the Kingsmill Water Plant in perpetuity, the provision of funds for post-closure operations should be outlined.

Chinalco should also exceed the requirements of Peruvian law in regards to its post-closure monitoring. Currently, in accordance with Peruvian law, Chinalco will monitor the mine for five years after official closure. Monitoring will consist of an annual site visit to check on the stability of the waste piles and tailings impoundments. However, this amount of time is insufficient given that negative effects can show up years after a mine has closed. Acid mine drainage and other unforeseen problems can occur decades after a company has left the area. Extending the monitoring period would not seriously increase Chinalco's costs but would significantly enhance their credibility when claiming to be an environmentally sustainable mining company. With a reputation for long-term environmental and social commitment, Chinalco would be more welcoming reception to its projects and would decrease expenditures previously needed to circumvent strong resistance to new mine projects.

VII. Conclusion

It is clear from this case study of Chinalco's Toromocho Project that in order to minimize risk, there must be continuous and fluid communication among stakeholders, specifically in cases where disengagement can alienate the public. It is very important for Chinese investors to consider the consequences of negative first impressions. Familiarity with both the areas of investment and the surrounding town and community is of extreme importance for investors. Environmental impact assessments should be conducted by representatives of the company, national government, and local government to effectively address the concerns of those involved, especially community members who will inherit the effects of mismanagement long after the mine finishes operation.

After building good will through projects like the Kingsmill Tunnel Plant, Chinalco found that the community of Morococha was more receptive to its proposals. The community was willing to discuss the relocation plans and - after some back and forth - agreed to move, largely without incident. By spending time, money and effort up front, Chinalco was able to avoid a drawn out fight with both the community and the regional government. Though the relocation has cost the company more than US \$250 million, the project will generate billions in revenue over its lifetime. Using numbers found on Chinalco's website, copper production alone will account for roughly US \$1.6 billion in revenue (assuming a copper price of US \$3/lb). Upfront expenditures on social programs minimize the risk of production shutdowns due to strikes and protests.

Despite the strong first steps Chinalco has taken, they are still at the beginning of a very long journey. Though they have shown they can take the long view in their treatment of the residents of Morococha, Chinalco's plans post-closure remain murky. How Chinalco responds to future challenges, especially in these first few years, will be illustrative of their ability to manage the project.

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Case Study: Pampa de Pongo

By: Jason Campos, Virginia Jameson, Margaret Ledyard-Marks, and Stephanie Williams



Fishermen's Pier in Lomas
Photo credit: SIRANP

I. Introduction

The Pampa de Pongo iron ore mine is a recent investment for the Jinzhao Mining Peru S.A. (Jinzhao) corporation in the Peruvian mining sector. This mine is not yet operational; rather, the company has only recently completed project component feasibility studies, secured financing, and is drafting the project-wide Environmental Impact Assessment for evaluation by MINEM this year (BN Americas, 2014). Even in these early stages, however, the project warrants study, as it has the potential to represent a new model for Chinese investment in Peru and globally.

This case study is important because the project is ranked fifth out of Peru's top 25 projects in terms of investment and scale, and so far appears to take social and environmental responsibility into careful consideration (Mining Directory of Peru and Chile 2014-2021). Our hope is that this project is indicative of a positive trend toward increasing corporate social responsibility (CSR) in Chinese investment in Peru, or at the very least, a heightened awareness to the international community's skepticism of the extractive industries.

Have Chinese mining companies learned from the poor track record of Shougang and come to determine that up-front CSR investments are more profitable in the long term? Have they made the calculation that including local communities in decision-making is less costly than fighting

them later? Although Pampa de Pongo is in the preliminary stages of project implementation there are some early signs that point to a potentially positive outcome. For example, Jinzhao's General Manager, Xiaohuan Tang, studied environmental engineering and grew up in Peru (SME, 2009). Our research reviewed Jinzhao's detailed project plans and intention to use less resource-intensive processing methods, and willingness to engage with the local community. Jinzhao has shown a high level of awareness regarding aspects of mining that have created great social upheaval in the past. If the company continues on the current path of transparency and cooperation, it may obviate much potential strife.

II. Research Methods and Sources

We conducted an initial literature review in Washington D.C., giving careful attention to Peruvian public legal documents regarding mining, the environment, and foreign investment. Next, we travelled to Peru, spending time in Lima and the regional government seat of Arequipa. While in Arequipa, we met with regional government officials and local NGOs. Due to logistical constraints, we were unable to make a site visit to the remote towns of Bella Union and Lomas, but communicated with local stakeholders via phone and email.

We were able to gain access to a wide array of key stakeholders including academics, experts in the field, conservationists, community members, representatives of local and international NGOs, government officials and employees, and business leaders in both Lima and the city of Arequipa. The data we collected has been compared with other sources to establish themes and add to the validity of the pre- and post-travel qualitative research. We cross-referenced data from multiple sources to ensure a comprehensive understanding of the opportunities and risks for the stakeholders of the Pampa de Pongo project and neutralize any bias we may have as students of international business and environmental policy.

The company was cautious with regard to what information they gave us. Citing confidentiality concerns as the primary barrier to transparency, Jinzhao declined to provide information regarding its financing or community engagement work. Whether this level of opacity represents circumspection that protects corporate competitiveness or a continuation of secretive policies by mining companies is unclear.

III. Background

Regional Information

The Pampa de Pongo mine will be located in the Caravelí Province of the Arequipa region of Peru. The mine site is located 50 km south of the city of Nazca and 550 km southeast of Lima. The region surrounding the Pampa de Pongo mine and accompanying projects is a coastal desert with an average temperature of 21.6°C (The Nature Conservancy, 2014).

The community closest to the mine site is the small rural town of Bella Union, which is located 18 km by road to the southeast (Bella Union Municipality, 2014). Also in Pampa de Pongo's area

of direct influence (19 km by road) is the coastal village of Lomas, which hosts the storage facilities for the project (Jinzhao, 2014).



Olive Grove in Bella Union. Photo credit: Oro del Sur

Society

Bella Union. Bella Union is a small town that was founded in 1955 and “born through the means of irrigation technology,” (Zapata & Romero, 1997, p. 13). The economic activities in the area are focused around agriculture and livestock. The primary crop is olives, which are processed locally into olive oil and other derivative products for local, national, and international consumption. Other agricultural products include string beans, which are exported to the United States, *lúcuma* (a local subtropical fruit), cotton, and grapes. There is also a forestry project, as well as a small artisanal fishing industry in the Annex Chaviña, which produces seafood products intended for people living in the town and district of Bella Union and the nearby Acarí district (Bella Union Municipality, 2014).

Infrastructure in Bella Union is lacking; there are minimal paved roads, an unreliable electrical grid, and no public green spaces. Running water was installed in 2012 (Espinoza Colán & Serrano Guevara, 2013). Bella Union also lacks adequate health facilities to meet the population’s needs. (Aleph Asociados SAC, 2010).

Table 1: Bella Union Facts

Bella Union	
Population	District: 4,296, which is 66% male and 34% female (INEI, 2007) Town: Bella Union has 1,255 inhabitants (Aleph Asociados SAC, 2010) Birth rate is 2.6 births per 1,000 inhabitants (Municipality of Bella Union)
Major Industry	Olives, olive oil, other olive products, string beans, cotton, grapes
Education	Preschool to secondary education: 6 public institutions (Aleph Asociados SAC, 2010) Post-secondary education: Arequipa, Ica or Lima (Espinoza Colán and Serrano Guevara, 2013)
Prevalent illnesses	44.7% acute respiratory infections ranks 10.7% infectious intestinal diseases 10.4% urinary system diseases (Aleph Asociados SAC, 2010)



Unloading the day's catch at Puerto de Lomas
Photo credit: Angela Espinoza

Las Lomas. The village of Las Lomas is considered a tourist destination for Peruvians because of its beautiful beach. Aside from tourism, the local economy is based on fishing and harvesting marine products including *corvina* (croaker), mussels, clams and kelp. Such products are consumed locally and sold at markets in Lima and Ica. The port in Las Lomas was closed to all but local activity in 1945 (Lauer, 2011).

Las Lomas, like Bella Union, has a limited number of paved roads, lack of sanitation, and spotty electrical grid. The port itself is in need of repair, and Jinzhao has indicated that the area's mussels and seaweed are being overharvested, upon which the people of Las Lomas rely (Espinoza Colán & Serrano Guevara, 2013).

According to the EIA for the exploration phase, young adults tend to migrate to larger cities with better infrastructure, better employment opportunities, and for higher education (Aleph Asociados SAC, 2010).

Table 2: Las Lomas Facts

Las Lomas	
Population	<i>District:</i> 1,183 (INEI, 2007)
Educational Institutions	Primary and secondary educational institutions (Aleph Asociados SAC, 2010)
Major Industry	Fish, kelp, mussels, clams, other marine products, tourism
Prevalent Illnesses	Unknown

Mine Background

Company Profile

Jinzhao Mining Peru, S.A. is a subsidiary of Zibo Hongda Mining, which is in turn a subsidiary of Nanjinzhaogroup Co., Ltd (China Iron Ore Weekly Monitor, 2013). According to Cardero Resource Group, Nanjinzhaogroup was established in 1992. The company headquarters is located in the Nanjin Village of Zibo City, in the Shandong Province of China. It has a registered capital of US\$81 million, total assets of US\$1.9 million and 6,000 employees. The company “has

developed an integrated enterprise,” which includes iron ore mining, pig iron and steel production, the production of metallurgical coking coal and related derivatives including benzene, coal tar and coal gas, the operation of thermal heating, and power plants. It also operates associated rail and harbour facilities. In 2007, Nanjinzhao had USD \$2.4 billion in revenue and a profit and tax of \$150 million (Cardero Resource Group, 2008).

Jinzhaio Mining Peru, S.A. was founded in 2009 for the purpose of creating the Pampa de Pongo mine and has no previous record of performance. Its company headquarters are based in Lima, Peru and Pampa de Pongo is its only project in Peru.

Project Financing

Jinzhaio completed the purchase of the Pampa de Pongo mine from Cardero Resource group in 2009 (Cardero Resource Group, 2009). Although information regarding the initial financing of the project could not be identified at the time of this writing, the final payments were made to Cardero Resource Group from Jinzhao’s “own corporate resources,” and amounted to US\$ 88 million (2009).

According to Tang, the project will require an investment of “no less than \$1.5 billion, including the mine and all related infrastructure such as the conveyor belt and the port” (Global Business Report, 2014). In a previous interview, Tang stated that the financing would have to be syndicated, and that Jinzhao was seeking funding in China as well as internationally “in order to diversify [its] options” (Cardero Resource Group, 2009).

As opposed to publically-funded Shougang and Chinalco companies, Jinzhao is a private Chinese firm. While a private company can facilitate faster decision making processes, financing through Chinese banks is a more rigorous process (Gregory & Tenev, 2001). As Dr. Cynthia Sanborn of the *Universidad del Pacífico* explained, having the status of “private” as opposed to “state-owned” is prestigious for a Chinese company (personal communication, March 7, 2014).

Mine Plan and Context

The Pampa de Pongo deposit was discovered by Rio Tinto, a British-Australian mining corporation, in 1994 as part of a regional Iron Oxide Copper Gold (IOGC) exploration program (Cardero, 2008). Currently, Jinzhao only has an exploration contract with the Peruvian government but the mine is expected to be operational in 2016. The operational life of the mine is estimated to be 30 years and Jinzhao is anticipating a first-phase annual production of 10-11 million tons of magnetite concentrate. When the mine is at full capacity, production is expected to reach 20-22 million tons annually (GBR Roundup, 2014). The total deposit is estimated to contain 350 million tons of iron ore.

Underground Block Caving

A thick blanket of sands and gravel is layered on top of the deposit in the Caravelí Province, therefore an open-pit mine is not feasible for the Pampa de Pongo project. Underground block caving, also known as sublevel caving, will be employed (Helsen, 2005). This less-commonly used technique is expected to become mainstream as future mines go deeper and extract lower-quality ores. According to Dan Oancea for Resource Investing News, this capital-intensive

method has been used at fewer than twenty mines worldwide as of 2013 (Oancea, 2013). The technique involves cutting underneath the deposit, causing the ore body to collapse under its own weight. Funnel-shaped sections of rock are progressively drilled so the iron ore rubble can fall into the space below and be extracted through a pre-constructed system of horizontal hauling tunnels (Encyclopedia Britannica, 2014). As the collapsed sections approach the surface of the mining area, a sinkhole will be visible from above ground. This mining technique requires an increased number of skilled laborers in comparison to open-pit mines.

Underground block caving alters the flow of groundwater and can contaminate aquifers with toxic heavy metals from acid rock drainage. This mining method has also been known to spur seismic activity such as manmade earthquakes and rock bursts (Oancea, 2013). Once the iron ore rubble is extracted from the ground, it goes through further processing on site before it is shipped out as iron ore pellets from the deepwater port. The following section explains the processing technique expected to be employed by Jinzhao.

Dry Magnetic Separation Process

The post-extraction processing of iron ore is usually very water-intensive. According to the US Environmental Protection Agency, beneficiation uses between 600 and 7,000 gallons of water per ton of iron concentrate produced (U.S. Environmental Protection Agency, 1994). Jinzhao will use a dry magnetic separation process to extract the valued minerals from waste rock. The treatment plant will send the ore through multiple phases of crushing, magnetic separation and high-pressure grinding rolls before it is ready for shipment. Although Jinzhao will be reducing its water consumption by using dry magnetic separation, large amounts of water will still be required to handle the dust emissions that result. This dry technique is more energy intensive and expensive than standard wet processing techniques and machinery tends to overheat (McGraw-Hill, 2007). It remains to be seen whether the entire process at Pampa de Pongo will be dry and exactly how much water will be needed to process the iron ore. There has been no public report from the company about how the waste rock and tailings leftover from iron ore processing will be handled, but this is expected to be addressed in the EIA.

Infrastructure Upgrades

Many infrastructure upgrades will be required prior to the start of mining operations in 2016. These include road pavement, electric grid and transmission line upgrades, and construction of a deepwater port, desalination plant, and seawater pumping station.

Road Pavement and Construction

The majority of roads in Bella Union and Las Lomas are not paved (Espinoza Colán & Serrano Guevara, 2013). Jinzhao will pave roads to connect the mining site to Bella Union, Lomas, the Pan American Highway, and deepwater port. Jinzhao has already constructed roads at the mining site to facilitate the transportation of equipment that was used throughout the exploration phase.



Road Construction in Caravelí
Photo credit: Espinoza Colan and Serrano Guevara

Deepwater Port

The Lomas commercial port has been in disrepair since 1945 and is used solely by local fishermen. Even if Jinzhao were to update the port, it lacks sufficient depth for large cargo ships to dock. Instead, Jinzhao plans to build a deepwater port at Playa Sombrerillo (14km north of Lomas) that will have the ability to load “cape-sized” cargo ships with a capacity of between 180 and 300 deadweight tons (DWT). According to Jinzhao, over 60% of all the iron ore extracted will be refined at the port prior to loading. The ore will be transported from the mine to the port using a complex system of industrial belts, before being loaded on to departing ships using dry bulk loading equipment.

Desalination Plant and Seawater Pumping Station

Due to the arid climate, the Pampa de Pongo mine will require supplemental water sources for both human consumption and certain mining operations. Jinzhao is planning to build a desalination plant and seawater pumping station in order to bring the required quantities of water directly to the mine. According to Jinzhao, the mine will primarily use salt water for dust control at the mine, and desalinated water will be used for human consumption on the company campus. Studies and plans are still in process regarding the exact location of the plant and seawater pumping station.

Electric Grid and Transmission Line Upgrades

Bella Union and Lomas were only recently connected to the national energy grid. According to MINEM’s Regional Director, Fredy Alberto Butron Rodriguez, their electric infrastructure is poor and has insufficient capacity to power the mine. Jinzhao will be responsible for the construction of new transmission lines and electric grid upgrades. Additional energy projects are expected to come online prior to the start of mining operations in 2016. According to Peruvian law, no prior consultation of residents is required for this part of project since it does not pass through indigenous or protected land (personal communication, March 14, 2014).

In a memorandum from MINEM dated February 28, 2014, Jinzhao selected ATN 1 S.A. as its primary contractor for the engineering and construction of the transmission lines. The electric grid upgrades are expected to provide up to 220 megavolts (MVA), higher than the project-required 200 MVA (Regente Ocmin, 2014). The new transmission lines will run from the electric substations of Poroma and Sombrerillo to the mine, and will also connect cities of Bella Union and Lomas. Jinzhao will have sole responsibility for the US \$82.5 million cost of the electric grid upgrades. The project will take over 40 months to design and construct, and will have a lifespan of 30 years. MINEM has approved the semi-detailed EIA but has not yet received the detailed EIA for final approval (Regente Ocmin, 2014).



Figure 1: Map of Future Mine Site, Projects, and Surrounding Area
Source: Google Earth

Current Status

As of April of 2014, Jinzhao finished the exploration phase of the Pampa de Pongo project. This required approval of an exploration phase EIA that outlined the drilling sites, and possible environmental and social impacts. During the exploration phase, there were no environmental regulatory infractions noted. Following the completion of the exploration phase, Jinzhao received approval of the semi-detailed EIA for the required electric grid upgrades and transmission lines in February of 2014. Jinzhao is expected to submit a project-wide EIA to the Peruvian government at the mid-year mark of 2014. It is not clear whether the newly created SENACE or MINEM will evaluate the project-wide EIA because the delineation of responsibilities between these two agencies has not been clarified. Regardless of the approving

government agency, a Jinzhao employee was confident it would meet Peruvian regulations (personal communication, March 11, 2014).

IV. Policies, Laws and Standards

Corporate Social and Environmental Policies

As stated previously, Jinzhao is a young company that was formed specifically for the Pampa de Pongo project. Accordingly, their corporate policy could be formulated to fit the region in which they currently plan to operate. Jinzhao's vision statement is "to be the most famous mining company in the world for value creation based on the excellence of our operations, respect for the environment and achieving human development of the populations of our areas of influence" (Jinzhao, 2014). No information regarding the corporate social or environmental policies of Nanjinzhao or Zibo Hongda could be found.

Specific objectives for Jinzhao include:

- Promoting transparent and fluid communication between the company and the community
- Promoting harmonious relations within areas of direct and indirect influence
- Promoting development-oriented activities within the zone of influence in coordination with local authorities

Jinzhao also has a Social Responsibility Program, the objective of which is to "improve the quality of life of the population, through projects that have a vision of sustainability and participatory approach that prioritizes three lines of action: education, health and productive activities." (Jinzhao, 2014).

Although we were unable to find a corporate policy specifically relating to the environment, Jinzhao purportedly is working closely with their contractor, AMEC, on the EIAs for the mine, port and transmission line as well as developing environmental practices to be implemented throughout operations (Jinzhao, 2014).



Arequipa Office of Ministry of Energy and Mines (MINEM). Photo credit: Stephanie Williams

Peruvian Government and Legislation

The Arequipa regional government has a limited role in the oversight of large-scale mining operations like Pampa de Pongo. During our interview with Márquez, she noted that they oversee licensing and EIA development for regional small scale mining activities (personal communication, March 14, 2014).

Jinzhao entered into an agreement with MINEM on September 26th of 2012, which outlined the scope of exploration in the region and required the allocation of US \$1,638,000 in funds. The State, through MINEM, guaranteed the investment, sites of operation, as well an immediate valued-added tax (IVA) exemption for the services and goods procured in the exploration process.

There are numerous laws Jinzhao is expected to follow now and throughout the life of the mine. Notably, in accordance with the *consulta previa* law, Jinzhao performed three community outreach seminars and focus groups in the cities of Bella Union and Lomas. Regarding taxes and royalties, Jinzhao will not contribute to Peru's mining canon until the mine is in operation when initial investments have been recovered and the mine is profitable. Also, Jinzhao will be required to report extraction rates to MINEM via INGEMMET. Additionally, Peruvian law requires that Jinzhao establish "preferential hiring practices" for the citizens of communities surrounding the mine (MINAM, 2003).

International Standards

There are a number of different international standards relating to mining, project finance and corporate social and environmental responsibility that apply to Pampa de Pongo. Voluntary international standards are a reassurance potential investors.

First of all, Jinzhao has listed compliance with a number of different ISO standards to include the following:

- ISO 9001:2008: System of Quality Management
- ISO 14001:2004: System of Environmental Management
- ISO 26000: Social Responsibility

The International Council on Mining and Metals (ICMM), whose goal is to "strengthen the contribution of mining... to sustainable development," is applicable to Pampa de Pongo (ICMM, 2014). Jinzhao's Social Development plan lists two guiding documents from the ICMM: Mining's Contribution to Sustainable Development and The Community Development Toolkit. The first document discusses how "society must continue to improve the way it extracts, processes and uses metals in order to make a positive, long-term contribution to people and the environment" (ICMM, 2014). The second document describes the way in which community development should be planned and run by the communities themselves rather than imposed by the mining company. Companies should act as catalysts to increase the likelihood of sustainability. While Jinzhao can be lauded for mentioning the ICMM in their social development program, they have not shown evidence of having employed ICMM recommendations. Contrary to ICMM's suggested participatory development standards, a

Jinzhaio employee revealed that decision-makers in China elect which social projects will be implemented in Bella Union and Lomas (personal communication, March 11, 2014). In addition, Innova Rural, the organization working with Jinzhao on social development projects, could not reveal their inclusion process due to a nondisclosure agreement (personal communication, March 24, 2014). The ICMM toolkit also offers advice on proper monitoring and evaluation (M&E) in order to measure progress, but we were unable to locate an M&E plan for Jinzhao.

In its documents, Jinzhao refers to many international standards, but does not indicate means of implementation. Jinzhao lists “Global Objectives” in its Social Responsibility Plan, indicating a higher degree of awareness in comparison with the other Chinese companies analyzed in this report. Jinzhao lists the Millenium Development Goals, one of which is to “promote gender equality and the empowerment of women,” in their community objectives, but does not mention gender in their projects (UN, 2014). Jinzhao also refers to the 10 Principles of the United Nations Global Compact, which address human rights, labor rights, environmental rights and anti-corruption. Chinese corporations are hesitant to participate in international standards; however, the UN Global Compact is more commonly adhered to by the Chinese than international standards based in Western countries (Zadek, 2012; personal communication, March 7, 2014). The Equator Principles, which are mentioned in Jinzhao’s plan, address social and environmental responsibility, stakeholder engagement, monitoring and reporting, and transparency for finance corporations that fund large scale international projects. Finally, Jinzhao references the pop-culture *Green Book* by Elizabeth Rogers and Thomas M. Kostigen, raising skepticism that they are “greenwashing” their social responsibility plan and detracting from the credibility of their stated intentions to follow international standards (Espinoza Colán & Serrano Guevara, 2013).

V. Potential Impacts

In an interview in Lima on March 10, 2014, senior advisor to Minister of Environment, Ernesto Ráez Luna stated that the ministry’s biggest tools for catalyzing positive change are public opinion and the demands of citizens. Any resistance by the government to implement higher social and environmental standards would prompt widespread backlash. According to Ráez Luna, communities have been historically marginalized by both the Peruvian government and foreign companies. Only recently have companies and the Peruvian government realized that this marginalization constitutes both a social and economic risk. The following section explores the impacts of the Pampa de Pongo project. These include analysis and risk mitigation efforts from an environmental, social, and reputational perspective.

Environmental Impact Risks

We expect the final EIA for the Pampa de Pongo mine and related projects to be published later this year. Therefore, we based our analysis of environmental impacts upon interviews with national and regional government representatives, environmental NGOs and experts, and official Jinzhao documents describing risks identified thus far. Although the Pampa de Pongo mineral deposits are located in the remote coastal desert, many potential environmental risks still exist for the surrounding region related to biodiversity, air and water. The desert ecosystem is a delicate balance and Jinzhao is responsible for minimizing its impacts to the areas surrounding the port and mine.



Endangered slender-billed finch
Photo credit: *Birds of Peru*

Flora and Fauna

Professor Agustin Palacios at the National University of San Agustín in Arequipa described the Peruvian coastal desert as a delicate ecosystem (personal communication, March 13, 2014). The unique *lomas*, which the Nature Conservancy describes as, “isolated, oasis-like pockets of vegetation sprinkled throughout the Peruvian desert,” bloom annually between July and November, providing essential food and water for wildlife. Despite seeming desolate, the region is the home to a variety of species, which include endemic mice – *Calomys sp.*, the Grey fox – *Pseudalopex griseus*, South American White-tailed deer – *Odocoileus virginianus sp.*, and endemic scorpions – *Orobothriurus atiquipa*. Seasonal fog allows for temporary increases in wildlife populations, which draw upon water caught by the endangered *tara* trees –

Caesalpinia spinosa (The Nature Conservancy, 2014). The region also features more than 80 bird species which include the endangered slender-billed finch – *Xenospingus concolor* (The Birds of Peru’s Coastal Desert, 2014; The Nature Conservancy, 2014). The fragile ecosystem is built on limited resources; even a small disruption in the food chain or water sources could have a potentially devastating effect (Singh, Kundu, & Singh, 1998).

Air and Water Contamination

As stated previously, the future Pampa de Pongo mine site is located in a very arid region. Water for the Bella Union district primarily comes from the Acarí river. Funding for the construction of the Iruru reservoir is undergoing approval from the Peruvian congress (Business News Americas, 2010). The reservoir is anticipated to provide irrigation for 9300ha of agricultural land (Business News Americas, 2010). Both the Bella Union and Lomas districts have limited potable water and relatively rudimentary sewage systems (Aleph Asociados SAC, 2010). Jinzhao did not test the surface water and no water samples were taken for the 2010 exploration phase EIA. The upcoming project-wide EIA will include results of ground and surface water samples, making risk analysis easier to achieve.

Additionally, like other forms of mining, underground block caving and dry magnetic processing have the potential to release toxic compounds into the air and water. Rainwater and air react with harmful concentrations of minerals and heavy metals from tailings which cause acid mine drainage. This can pollute the area surrounding the mine and beyond (Miranda et al., 1998). Dust from the dry magnetic processing can also contain toxic heavy metals which can be inhaled by humans and animals and settles in the soil and water (Oancea, 2013). It can travel across oceans and continents and moves faster than water or soil pollution. (Csavina, et al., 2012).

Significant amounts of seawater will be required for dust mitigation during ore extraction and processing. This could reduce water supplies and the region’s water table (McGraw-Hill, 2007). This is of particular concern since Jinzhao is expected to use sea water during the mining process and for dust control. The salt and minerals will leach into the groundwater and underground streams (Jinzhao, 2014). In addition, Jinzhao’s General Manager pointed out that “some

quantity” of fresh water will be used during the desalination plant’s construction period (Global Business Reports, 2014).

Marine Habitat

Jinzhao will build a deepwater port at Playa Sombrerillo, fourteen kilometers north of the small, coastal village of Lomas. There are risks to the marine ecosystem during both the construction and operation of the port. The seafloor dredging and pile driving are of particular concern and could negatively affect the ecosystem. The mine is located in the Humboldt Current Large Marine Ecosystem. The Humboldt Current flows from south to north, meaning there may be impacts from the deepwater port development, which will disrupt the ecosystem to areas north of the village, including the protected *Reserva Guanera Punta San Juan*. This ecosystem is a critical habitat for marine life and an important fishery in the area (The Nature Conservancy, 2014). A full description of the biodiversity and ecological importance of the Humboldt Current can be found in the Shougang case study.

Marine ecosystems may also be negatively impacted by the desalination process depending on where Jinzhao chooses to discharge the brine byproduct. Brine is denser than normal seawater and sinks to the ocean bottom, exposing organisms to toxic levels of salinity (California State Water Resources Control Board, 2014). This particular effect can be easily prevented by implementing diffuser that mixes brine with the ambient sea water (2014).

Protected Areas

While there are no protected areas adjacent to the Pampa de Pongo mine site, the Lomas de Atiquipa Nature Reserve is 54 kilometers south of the mine and may be negatively impacted by infrastructure development and increased traffic along the Panamerican Highway (Ministerio de Educación, 2014). In an interview, Márquez noted that ARMA does not have jurisdiction to monitor environmental contamination in protected areas. Therefore dust particles that drift from the mine site could contaminate fog catchment systems at the reserve and reduce plant photosynthesis. In order for ARMA to be involved, they would have to be approached by nature reserve officials (personal communication, March 14, 2014).

Environmental Impact Mitigation Efforts

The Pampa de Pongo project has great potential to transform the local economy and contribute to regional development. Due to the size of the mine, however, there will be environmental impacts that the company can attempt to mitigate and unavoidable impacts that they can minimize. These will need to be addressed in the EIAs for the mine, port, desalination plant, which is being conducted by AMEC, a Canadian company. They will also analyze the impacts of the project on flora and fauna, perform surface and groundwater monitoring, and analyze soils (Jinzhao, 2014).

Specific mitigation measures addressed in the exploration phase EIA’s Environmental Management Plan included a plan to recirculate 70% of the industrial water used during the drilling process, reducing tank usage to 8m³ per day from a potential 26.5m³ (Aleph Asociados SAC, 2010). This EIA also used a cause-effect matrix to determine potential effects of the exploration activity, which identified risks such as noise and vibration impacts from exploratory drilling and disposal of drilling fluids into sealed ponds (Aleph Asociados SAC, 2010). If the

exploration phase EIA serves as an indicator of the quality of the project wide EIA, one can anticipate a document that is compliant with and addresses baseline requirements for any EIA, with some efforts at mitigating the environmental footprint of the mine site through measures like the water recycling described above. In fact, a Jinzhao employee confidently promised that the final EIA would pass muster, no matter which government agency ends up having jurisdiction to evaluate it (personal communication, March 11, 2014).

We could not find any specific mitigation and outreach measures related to environmental impacts (Jinzhao, 2012). This lack of specificity may be an indicator that Jinzhao will focus heavily on addressing social impacts of the mine, while environmental impacts receive less priority.

Social Risks

Health Risks

There are many health risks associated with iron ore mining and underground block caving. Mine employees and citizens in the nearby cities of Bella Union and Lomas face being exposed to dust and particulates from iron ore mining. Dust causes airway inflammation that lasts long after exposure (Adelroth et al., 2006). Other complications from exposure include acute and chronic occupational hazards include, but are not limited to, physical injury, hearing loss, skin disorders (burns, dermatitis, cancer), musculoskeletal disorders, intoxication, acute pneumonia and damage to internal organs, both of which can lead to disability and premature death (ICMM, 2009; Centers for Disease Control Office of Mine Safety and Health Research, 2013). Many of the heavy metal particulates generated by mine sites are known carcinogens. Children are especially vulnerable to the neurotoxic effects and numerous other health impacts (Csavina et al., 2012). Based on a variety of mathematical models that predict the range dust can travel when emitted from mining operations, a distance of 18km does not guarantee that the citizens of Bella Union and Lomas will be protected from the risk of exposure to dust (Csavina et al., 2012). Hopefully, the final EIA project-wide will use such models to understand the extent of potential dust impacts.

Underground block caving is dangerous and various safety measures are required. Jinzhao employees' lives could be endangered if there is not a controlled continual collapse of ore. When there is an unplanned collapse of ore it creates a potentially deadly surge of air known as a "windblast" (Mattox et al., 2012). A similar accident took place in an Australian mine causing multiple fatalities (Oancea, 2013).

Despite Jinzhao's plans to use dry processing methods, drinking water could be contaminated, as mentioned in the Mining Context section. This poses health risks to people who are exposed through drinking water and consumption of agriculture products. It has been linked to cancer, developmental disabilities in children and a number of other illnesses. Another potential risk relates to the possibility of a conflict of interest at the company-funded health facility in Bella Union. One stakeholder expressed concern, based on his previous experience, that doctors hired by mining companies may downplay the relationship patient illnesses have to environmental impacts from the mine (personal communication, March 21, 2014).

Other potential related impacts of the mine include increase prevalence of drug and alcohol abuse and prostitution, which are well-documented as being associated with the mining industry (Laite, 2009; Addiction Treatment Magazine, 2013).

Local Employment

The Pampa de Pongo project is expected to surpass Shougang and become the largest iron ore mine in Peru and will require a significant amount of labor. In addition, underground block caving requires specific skills for underground blasting and drilling activities as well as the extraction of the collapsed rocks (Oancea, 2013). In an interview, Tang expressed concern with Jinzhao’s ability to find such technical expertise, not only in the region but in the entire country. Peru’s skilled labor has been directed toward precious metals and copper extraction as opposed to the extraction of iron ore. This will directly impact employment levels for port construction and the mine (GBR, 2014). Although Jinzhao was able to temporarily employ a number of local people during the site’s exploration phase, it is unknown how many unskilled labor positions will be available for local employment during mine construction and operations (Espinoza Colán & Serrano Guevara, 2013).

The number of laborers to be employed at Pampa de Pongo, skilled or otherwise, has not been publicly disclosed and no plans for employee training were made available. Indirect jobs in the service industry may increase during the project construction phase as workers flow to the region, but the people of Caravelí should not anticipate a sharp increase in job availability.



Government employees visit the future mine site
Photo credit: Jinzhao Mining Peru S.A.

Gender Disparity Risks

In extractive industries, evidence shows that men tend to receive the majority of the benefits via employment and income, while women bear more of the costs of environmental degradation and family and social disruptions. (Eftimie, Heller, & Strongman, 2009) Not specifically promoting an even distribution of such costs and benefits not only exacerbates gender disparity, but also can have a major impact on the community granting a mining project the “social license to operate,” for which women often play a decisive role (Eftimie, Heller, & Strongman, 2009, p.1). The extractive industries are often linked to increased prostitution and therefore, sexually transmitted diseases, putting women at further risk. In addition, women are often responsible for caring for sick family members. (Eftimie, Heller & Strongman, 2009, p 3) According to ICMM, the “social license to operate” is widely accepted by the mining community as a fundamental indicator of success, in addition to the legal license (ICMM, 2012). In the province of Caravelí, the

demographic composition of the population already consists of a larger proportion of men to women, perhaps increasing susceptibility to gender disparities (INEI, 2007).

Social Risk Mitigation Efforts

In addition to the anticipated benefits from the mining canon, direct social investments from Jinzhao will provide local citizens with improved access to health care. In addition to the existing clinics in Bella Union and Lomas that Jinzhao has funded, they have indicated that they will put on free seminars on specific public health topics, such as nutrition, alcoholism and drug abuse, and sexually transmitted diseases (Espinoza Colán and Serrano Guevara, 2013). The latter topics also address public health issues that are commonly associated with mining (Laite, 2009; Addiction Treatment Magazine, 2013).

To address labor-related risks, Jinzhao has a security and occupational health plan. The plan promises “efforts to achieve a zero accident rate in each of our activities” (Jinzhao Mining Peru S.A., 2014). They also intend to use standardization from the ISO and the Peruvian Committee for Occupational Safety and Health (CSSO) as well as formalized training for employees (Jinzhao, 2014).

Economic Risks

Displaced Livelihood Risks

Marine-based Economies. According to Márquez, the studies for the deepwater port had already been completed without prior consultation of the fishermen in the region. Only after the initial outreach seminar performed by Jinzhao, did the local fishermen’s union air grievances to Jinzhao (personal communication, March 14, 2014). The union was specifically concerned with their ability to fish in relation to Jinzhao's deepwater port. According to Anibal Diaz of LABOR, an NGO that was involved in the mediation process, Jinzhao approached the union directly to address their concerns and go over options for accommodation (personal communication, April 10, 2014). Currently, the fishermen’s union appears to be satisfied by Jinzhao’s proposal to move the port 14 kilometers farther north than originally planned. Márquez pointed out that neither the fisherman nor Jinzhao have expressed grievances or asked for additional assistance from ARMA. She suggested that although it is possible that both groups may be currently satisfied, it is unlikely that the fishermen fully understand the implications of the mine. The fishermen from Lomas simply do not have experience with large scale mines, nor the education or capacity to fully comprehend how this mega-project will affect their livelihoods once it is in operation (personal communication, March 14, 2014).

Agriculture. Agriculture in the region may potentially be affected by the Pampa de Pongo project. The nearby town of Bella Union relies on growing olives and the olive oil industry for its primary source of income. It is likely that this industry will be impacted by increased water demand from the mine (G. Márquez, personal communication, March 14, 2014). Mining projects are increasingly located in the arid coastal region of Peru. Communities and farmers have expressed concern over water scarcity (Dube, 2010). Another significant concern is dust from site development and routine mining processes. It could negatively impact agricultural production by inhibiting photosynthesis. Additionally, according to Professor Palacios, dust

produced from nearby mining has been known to settle in the fur of livestock such as alpaca, reducing the profitability of their wool (personal communication, March 13, 2014). The region is already impoverished and even a slight decrease in income could have broader effects, pushing some citizens into extreme poverty.

Sustainable Development Risks

While some risks, such as labor disputes, are relatively short-term, many others are potentially irreversible. If the regional water table drops or becomes contaminated as a result of the megaproject, local livelihoods will be threatened. If proper environmental mitigation efforts are not taken, the region could become uninhabitable. Mining and capital investment is not a panacea for poverty. Professor Palacios stressed that there are many towns in Peru that have been mining for over seventy-five years and continue to live in poverty (personal communication, March 13, 2014). The communities surrounding the Pampa de Pongo mine risk economic losses, health impacts, and a damaged ecosystem for development revenue that is not guaranteed.

High expectations from mining projects can be dangerous for both the community and the corporation. An article from the Peru Support Group pointed out that regional governments in Arequipa have seen income from mining royalties drop by US \$43 million, since 2012 as a result of volatile commodity prices (Horton, 2013). This deficit proved to be of particular importance, since the regional governments had become dependent on this revenue for up to 80% of their expenditures. Arequipa's mining canon was roughly half of its projected amount. This has had an impact on social programs and government at large. The reduced revenue has triggered protests and civil unrest in Arequipa (Horton, 2013). Mining companies tend to be blamed when anticipated economic developments do not materialize. This further demonstrates the need to qualify expectations.

Economic Risk Mitigation Efforts

Tang showed a great deal of awareness of mining's impact on sustainable development. In our interview, he stated that "The [Pampa de Pongo] project cannot increase inequality in the region" (personal communication March 11, 2014). The planned development projects and company policies of Jinzhao appear to support this statement. Jinzhao's territorial development strategy has been aligned with the Ministry of Women and Social Development's (MIMDES) publication titled, "Territorial Development: An approach for overcoming poverty, inequality, and exclusion" (Espinoza Colán & Serrano Guevara, 2013). The publication focuses on regional development and aligns with Peru's goals to decentralize and build local capacity.

Employment

Jinzhao's only publicized policy for the employment of locals states that they will coordinate with subcontractors during the hiring process to consider sourcing locally. The feasibility study will determine the types and numbers of professions needed (Espinoza Colán & Serrano Guevara, 2013). An anonymous Jinzhao employee confirmed that the number of locals to be employed is not known (Personal communication, March 11, 2014). It is highly likely that the number of employees from Bella Union and Lomas will be relatively low due to the lack of trained mining professionals and high-skill set required for underground block caving.

Displaced Livelihoods

As mentioned previously, the mine will have direct effects on the marine and agricultural economy in the region. Direct dialogue between Jinzhao and the local community, primarily with the fishermen's union have been fruitful. Jinzhao announced plans to assist with repairs for the port in Lomas and will offer training in management, conservation and repopulation of marine products such as species of clams, algae, limpets (Espinoza Colán & Serrano Guevara, 2013). Jinzhao has also procured refrigerated and plexiglass boats for the fisherman for rent (Jinzhao, n.d.)

To aid the agricultural economy in the region, Jinzhao plans to offer education in crop diversification, including Hass avocados and the indigenous fruit, *lúcuma*. The training will also focus on new agricultural techniques in irrigation and pest management (Espinoza Colán & Serrano Guevara, 2013).

Jinzhao hopes to further diversify the economy by providing business courses. They will offer training in small and micro business entrepreneurship, such as business strategy and market study, marketing and financial business planing. As an incentive for participation, Jinzhao plans to give out a financial award to the best investment project plans made by community members (Espinoza Colán & Serrano Guevara, 2013).

Education

Jinzhao intends to further mitigate the economic risks in the region by focusing on education. The development plan for education appears to be the most robust. This is particularly important since education builds local capacity and autonomy, while also being a building block to sustainable development. At the primary education level, Jinzhao has proposed a teacher training program to improve comprehension levels. This particular portion of their development plan is currently under way at the *IE Secundaria Francisco Flores Berrueto* in Bella Union that has roughly 130 students and 8 teachers (Espinoza Colán & Serrano Guevara, 2013; de Peru, n.d.).

In secondary education, Jinzhao has stated it is committed to working with the National Service for Industrial Training (SENATI) and the National University of Engineers to offer scholarships for local youth, so that they can have opportunities for higher learning and someday return to work for Jinzhao. They also plan to start an initiative called "*Matemáticas para Todos*," or "Math for Everyone," which focuses on what Jinzhao's website describes as "one of the most serious problems [in] Peru's education system" (Jinzhao, 2014).

Jinzhao has a number of potential projects for continuing adult education. They plan to work with the organization PROMOLIBROS to promote literacy amongst citizens of Bella Union and Lomas. They also are planning educational programs focused on subjects such as environmental stewardship, leadership, and self esteem (Espinoza Colán & Serrano Guevara, 2013).

It is important to note that while these social projects seem impressive, the majority of them are still in the planning stages. Additionally, the number of classes offered, their respective scope, and expenditures is not publicly available. Outside oversight will be required to gauge the efficacy of these projects. Despite the preliminary nature of these plans, Tang stated that, "Social and environmental investment [are] important for long-term profitability" (personal

communication, March 11, 2014). Successful implementation will lead to a truly sustainable development model.

Reputational Risks

Reputation is an important part of foreign direct investment. Previous experiences with certain industries or investments from particular countries can impact the success of a new company within the same industry. Almost every Peruvian stakeholder interviewed mentioned examples of a “good mine” or “bad mine” without being prompted. Whether first hand experience, or through media reports, the impressions of “good mines” versus “bad mines” leave a lasting impression. China has had a presence in Peru for decades, yet the reputation of Shougang has overshadowed other investments. Although one source suggests that Chinalco has taken the approach of minimizing Peruvians’ exposure to its Sino background, Jinzhao has put its logo on every donated school desk and box of earthquake relief supplies in an attempt to rebrand Chinese investment. It is evident that Jinzhao understands the preceding reputation of Chinese investment in Peru and what it must overcome and change its negative connotation, while also avoiding social conflict. Their Territorial Development Approach plan states that:

Of the US\$54 billion to be invested in the mining sector Peru between 2012 and 2018, US\$17 billion investment are detained due to social conflicts. Social conflicts occur because mining companies have failed to generate sustainable development in our social environment. We have confused Corporate Social Responsibility, with welfare or with corporate philanthropy (Espinoza Colán and Serrano Guevara, 2013).

This reputation does not only come from being Chinese, but comes from simply being a foreign investor and the poor reputation of the mining sector as a whole. Jinzhao has many reputational barriers to overcome, and appears to be addressing them adequately.

Company reputations have implications for impacts at the local, national and international level. Even if costs, benefits, or risks are only perceived, a company’s reputation is at risk (ICMM, 2012). If the communities of Bella Union and Lomas show the first signs of dissatisfaction with Jinzhao’s presence, social conflict may arise more rapidly in a preemptive and defensive manner due to Peru’s previous experience with Chinese mining companies. If the corporation were seen in a more favorable manner, the community would be more likely to take a diplomatic approach. Carroll and Shabana explained that strong relationships with the local community can reduce the amount of supervision and regulations required by a corporation since they will be “perceived as a “sanctioned member of society” (Carroll & Shabana, 2010, p. 97)

At the international level, a good reputation is important for attracting investors. Jinzhao is a fairly young company, and Pampa de Pongo will set the stage future investment opportunities. If Jinzhao’s successful in its CSR activities they will face fewer barriers to entry into new foreign markets. A 2002 PricewaterhouseCooper survey stated, “70 percent of global chief executives believe that CSR is vital to their companies’ profitability” (Carroll & Shabana, 2010, p. 93).

International Impacts: A New Model of Chinese Development

If Jinzhao's CSR plan succeeds, it could change the way mining projects are structured and conducted in Peru. Currently, we see two different ends of the mining spectrum; the *Shougang Model*, which is characterized by a lack of social engagement and disregard for environmental health, this has negatively affected both the reputation of the company and its bottom line. On the other side of the spectrum, the *Chinalco Model*, characterized by greater upfront social investment and community involvement, has set a new precedent in mining operations and has become "the golden standard" for Chinese mining investment in Peru (C. Monge, personal communication, February 28, 2014). Jinzhao has the potential to surpass the standard set by Chinalco; social and environmental policy have a substantial effect on the initial mining process, and are valued as integral to their future financial profits. The *Jinzhao Model* features socially inclusionary practices and dialogue with the local stakeholders; if successful, Pampa de Pongo could eventually become a model for other Chinese investments globally. This method of doing business mitigates the risks traditionally associated with the mining by and airing grievances at their onset, as opposed to once they have hit a boiling point. This applies not only to Chinese government subsidized investment firms, which traditionally direct fewer resources to social programs, but may also influence other international companies, both public and private, which are seeking to invest in the Peruvian mining sector. Additionally, the success of the *Jinzhao Model* may determine whether this method of doing business is exported to other developing countries that are rich in natural resources and seek to increase FDI.

The rise of Peruvian ecological standards, as noted by the government organizations of OEFA and MINAM, demonstrate a change in Peruvian thinking. Previously, FDI was sought at whatever social and environmental cost, but is now balanced against a heightened awareness of projects and their potential impacts. Jinzhao's use of prime international consulting firms for the completion of extensive environmental and social impact studies throughout the exploration process demonstrates an understanding of Peruvian environmental practices and regulations. Future monitoring and evaluation will be required in order to see whether Jinzhao follows through with its social and environmental agenda, and whether its development model can be applied to other mining projects in Peru, as well as other sectors and regions.

VI. Recommendations

Recommendations for Jinzhao

Given the early phase of the Pampa de Pongo project, Jinzhao has the unique opportunity to include these recommendations early in the operations process to engage with the local community and build a positive reputation for new Chinese investment.

Increase Transparency

Despite reaching out to Jinzhao and conducting external research, information regarding Jinzhao's funding sources and financial information was largely unavailable. We were also unable to locate statistics on planned employment programs at Pampa de Pongo. Innova Rural,

Jinzhao’s social and agriculture consultant, was unable to disclose any information due to client-confidentiality restrictions. The lack of transparency is of concern given that Jinzhao will face increased scrutiny in Peru. It is important to not just provide surface level information on the project, but must be accessible by stakeholders at all levels.

Continue Community Engagement

Jinzhao has made considerable efforts in engaging local communities throughout various stages of the project as mandated by Peruvian law. We advise Jinzhao to continue their community engagement efforts and encourage them to ensure that community members fully comprehend the potential impacts of the project. Based on our interviews with Márquez, Butron Rodriguez and Diaz, we are not convinced that the citizens of Bella Union and Las Lomas fully understand the scope of this project because they lack the capacity to engage and negotiate with large mining companies (personal communication, March 2014). Continuous, open communication and engagement at each stage of the project is beneficial to Jinzhao both financially and reputationally.

Establish an Independent Monitoring and Evaluation Plan

Monitoring and measuring the progress of Jinzhao’s social projects can safeguard Jinzhao from investing capital in a project that will not yield results. It is important to pinpoint inefficiencies or failings in project implementation, which can allow the issues to be addressed or approached at a new angle. In addition, an M&E plan carried out during the life of the mine will be more likely to guarantee the best outcomes for the least amount of investment.

Address Gender in Social Programs

Although gender may seem like a minor aspect of a large mining project, it has the potential to drive Jinzhao’s success. The development of a region cannot be sustained without the inclusion of women. For example, the British-Australian mining company Rio Tinto recognizes that evaluating social programs through a gender perspective can lead to longer-lasting outcomes and a better return on investment in social outreach programs (Rio Tinto, 2009). Jinzhao must take gender into account in social projects to be granted a “social license to operate” in the Caravelí region.

Recognize Differences between Peruvian Government and Society

Our fieldwork in Peru has shown that there are substantial differences of opinion between the government at national and regional levels. Jinzhao’s decision-makers must be cautious in accepting the central government’s official position as an accurate reflection of local communities’ sentiments.

We found inconsistencies in Peruvian governmental officials’ understanding specific information regarding the Pampa de Pongo project. For example, during our interview with Butron Rodriguez, he stated that agriculture was not part of the the Caravelí region’s economy and that local communities welcomed the economic opportunities Pampa de Pongo would provide (personal communication, March 14, 2014). However, Márquez, stated that the communities felt marginalized by Jinzhao’s initial plans and were concerned about the effects of the mining activities on olive groves and other agricultural production in the region (personal

communication, March 14, 2014). Chinese investors must take the potential for varying viewpoints into consideration. Jinzhao can navigate these types of inconsistencies by consulting with local experts such as representatives of NGOs such as CooperAcción or LABOR who special in mining sector issues to accurately assess situations.

Recommendations for Peruvian Decision Makers

Improve Intra-Ministry and Inter-Ministry Collaboration

As mentioned previously, we found discrepancies in information provided by government officials at different levels of government. Despite decentralization efforts, there continues to be a lack of coordination and understanding of the scope of jurisdictions. Peru's government organizations must increase communication and collaboration to run more efficiently and ensure the highest level of governance in the mining industry.

Establish Capacity Building Programs to Train Local and Regional Representatives

Government officials in Caravelí, such as the mayors of Bella Union and Lomas do not have experience dealing with foreign mining companies. These officials have had minimal experience with the mining industry, social development projects and the allocation of mining canon funds. Training should be provided so that local government representatives understand what to ask of mining companies and what is expected of them as leaders. Peru can decrease the likelihood of exploitation by building the capacity of local leaders.

Be Cautious in Anticipated Revenues and Benefits from Mining

Currently, the communities of Bella Union and Lomas are satisfied with Jinzhao's social development plans. However, as Márquez explained, it is highly unlikely the citizens in Pampa de Pongo's zone of influence fully understand the scope and impacts of mining operations (personal communication, March 2014). Caravelí residents may look forward to the potential economic stimulus the project may bring, but volatile commodity prices can change mining canon return rates. Warnings from Márquez, coupled with the social unrest seen in Arequipa from disappointingly low revenue from the mining canon suggest that expectations need to be more realistic. This is a very exciting time for the region and we do not chide these communities for their anticipation of the arrival of paved roads, running water, a steady supply of electricity and employment, among many other benefits. However, we strongly suggest that expectations be managed in terms of the advantages and disadvantages of welcoming this iron ore megaproject into their region. This mine operation and social investment will not be a panacea for regional development. The environmental NGO, CooperAcción has suggested a "transparent discussion" with the government on how tax breaks and corporate efforts to reduce liability are diminishing public resources (Horton, 2013).

VII. Areas for Further Research

As Pampa de Pongo is not projected to begin operations until 2016 at the earliest and the final EIA for the mine and its supporting projects has not been released to the public yet, we have many unanswered questions. Our investigation into the corporate social and environmental

responsibility of Jinzhao and the Pampa de Pongo project lays the foundation for further research. The release of Jinzhao's EIAs should resolve many of these questions, some of which include:

- *Desalination plant:* During the desalination process, salt and minerals are removed from salt water to produce fresh water. The byproducts are discharged as hyper-saline brine. Because brine is denser than the receiving ocean water, depending on discharge methods, it may settle on the ocean bottom. The accumulation of brine on the seafloor can have potentially adverse effects on marine organisms (California State Water Resources Control Board, 2014). How does Jinzhao plan to dispose of the brine?
- *Dust:* What are the specific measures Jinzhao will take to combat dust emissions from mining operations? Usually dust is suppressed with water. How much water does Jinzhao anticipate will be used for this process and how will the contaminated water be handled?
- *Seismic activity:* Underground block caving methods have been known to contribute to seismic activity. What research has Jinzhao done on pre-existing fault lines in the area and the likelihood of seismic events to take place? Are there any mitigation plans?
- *Deepwater Port:* What are the anticipated impacts on the marine ecosystem surrounding the deepwater port? What measures will Jinzhao employ to avoid disruption of the ecosystem?
- *Job Creation and Training:* How many people will Jinzhao employ? If local people and Peruvians do not have the technical expertise required for underground block caving or iron ore mining, from where will these employees come? What can Jinzhao do to employ as many locals as possible?

VIII. Conclusion

Jinzhao has demonstrated a distinct awareness of the past controversies surrounding other mining projects, and has carefully planned to mitigate potential impacts associated with a project of this scale. The company has gone to great lengths to demonstrate good will and an intent to foster regional social and economic development. Should the company carry out these policies and programs, it will be contributing to a new model for Chinese investment.

Jinzhao's investment in social programs, such as education, health, and capacity building, coupled with the proposed infrastructure projects, have the potential to contribute to building a positive company image and of Chinese investment. Though more information is needed from the final EIA to assess their environmental mitigation plans, up to this point Jinzhao has shown a distinct acumen in understanding and complying with Peruvian laws and regulations.

Jinzhao sets a strong example for transparency. This, plus policies for gender mainstreaming of development projects, the inclusion of independent monitoring and evaluation plans, cautiousness with regard to government oversight responsibilities, and adherence to international standards, will allow for comprehensive risk-management.

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Discussion and Conclusion

Though previous research has demonstrated that Chinese companies tend to perform no worse than their Western counterparts in Peru, the skepticism surrounding Chinese firms necessitates that potential investors take a more careful and deliberate approach to new projects. However, given the pressure mining companies face to maintain strong profit margins, long-term environmental and social goals have been habitually sidelined. Companies would do well to learn from the past, wherein lax attention to these goals resulted in costly social upheaval and environmental damage.

It is important for potential investors to understand that the political climate and governance structure within Peru are changing. The public is increasingly aware of the environmental impacts of mining and is beginning to demand better safeguards for social and environmental health. In response, new ministries have been created to provide greater oversight of these issues. Given the decades-long lifespans for most mining projects, anticipating these changing circumstances must be integral to any investment strategy. A lack of foresight early in the planning and operations stages can have lasting negative effects that may plague a project throughout its lifetime. Up front investments to alleviate social and environmental concerns will generate positive long-run returns in the form of production that is unimpeded by protests and strikes, fines, shut downs, or environmental damages, all of which can lead to millions of US dollars in lost revenue.

Recommendations

Based on our findings, we have distilled the lessons learned over decades of Chinese investment experience in Peru's mining sector to several basic recommendations. Though the primary focus of this report is to provide information for potential Chinese investment, it seems prudent to consider the changing politics in Peru and address both the Peruvian government and Chinese mining companies and government in the following recommendations. While Chinese mining companies should strive to be more socially and environmentally responsible, the Peruvian government also has an obligation to enact and enforce policies that incentivize best practices within the mining sector.

- **Implement a new chapter in the China-Peru Free Trade Agreement (FTA) on mining** - In the FTA that was signed between China and Peru in 2009, there is little mention of mining and its effects on the environment. The sole area that elaborates on the environment is a Memorandum of Understanding (MOU) for increased "Cooperation on Forestry Matters and Environmental Protectionism" (China-Peru Free Trade Agreement, 2009, p. 101). China's ever-increasing role in Peru's mining sector and the large environmental and social impacts of these projects warrant additional oversight and cooperation at the bilateral level. A new chapter should be added to the existing FTA that focuses on new methods of technical cooperation, labor rights, safety of sector workers, environmental enforcement mechanisms, and environmental mitigation efforts. The addition of this chapter would strengthen ties between mining stakeholders and increase the sustainability of current and future projects.

- **Establish cooperation between China’s Ministry of Environmental Protection (MEP) and Peru’s MINAM** - MEP and MINAM are directly connected via increasing economic ties in the mining sector. Both ministries are newly established and have been considered relatively weak in comparison to older ministries in their respective countries (Bloomberg News, 2014; E. Ráez Luna, personal communication, March 10, 2014). An official cooperative agreement between the two ministries could help both organizations gain more relevance and legitimacy with regard to environmental governance in the coming years, as well as ensure that there is some type of formalized environmental collaboration within Sino-Peruvian relations. Specifically, MINAM should look to the MEP-U.S. Environmental Protection Agency partnership and scientific and technical cooperation MOU as a guiding example (U.S. EPA, 2010).
- **Increase transparency** - Each of the three companies studied for this report struggled with transparency. Access to company representatives, financial information, and long-term plans was accomplished with difficulty or not found at all. Additional transparency would highlight areas where the company is excelling, as well as identify and point to action on areas that need improvement. This would facilitate oversight, strengthen accountability, and promote a culture of best practices for social and environmental responsibility. Furthermore, firms should join EITI to demonstrate their financial transparency, a task made easier by Peru’s already established membership.
- **Join international organizations** - As described in the introduction of this series of case studies, a number of international organizations exist that establish mining standards and best practices for the extractive industry. Joining these organizations indicates a commitment to adhere to social and environmental responsibility – areas where Chinese companies currently have a poor reputation. Thus, although these groups are voluntary, associating with organizations like ICMC, IRMA (Initiative for Responsible Mining Assurance) and the UN Global Compact would increase competitiveness of Chinese companies in the global market by improving company reputation and general mining practices.
- **Improve Environmental Impact Assessments** - Realistic and comprehensive EIAs that assess the potential impacts of a mining project may add upfront costs and make some projects seem less attractive, but EIAs also reveal the true value of projects and allow for the anticipation and prevention of problems that might reduce profitability in the long run. Such EIAs should be readily available to the public.
- **Improve environmental monitoring and enforcement** - Although many companies have extensive monitoring practices, they have little incentive to report violations. Self-monitoring is inadequate for environmental protection. For this reason, it is important for governments to work with companies and NGOs to ensure independent monitoring and enforcement. Third-party monitoring should address water, air, and soil quality, noise pollution, and geochemical stability in the impacted mining area. Additionally, it is the responsibility of the Peruvian government to ensure that fines for environmental violations accurately reflect the amount of damage caused by the violation and encompass all necessary costs associated with proper remediation, so that the threat of

finer is a real deterrent. While OEFA's mandate was designed to address this by increasing fines proportional to environmental damage, it is critical that this key government agency have the capacity to monitor on a consistent basis throughout Peru. Thus, through improved monitoring and enforcement, company cost-benefit strategies will lead to increases in precautionary measures, resulting in greater environmental protection.

- **Use independent monitoring and evaluation plans for social projects** - Establishment of independent monitoring and evaluation plans are a wise way for Chinese companies operating in Peru to ensure that money allocated to social development projects is being used in the most efficient way possible. M&E plans quantifiably measure the progress of development and assess whether the expected benefits are being delivered. By continually evaluating the implementation of projects, independent M&E contractors can identify issues and ensure they are resolved at the earliest point to save money and promote project success.
- **Strengthen institutional capacity** - As Peru continues to decentralize, there is a sense of confusion with regard to the responsibilities of governmental organizations, especially at the regional level. Currently, only the national government has jurisdiction over large-scale mining projects. Regional governments must be empowered to play a part in managing the large-scale projects that fall within their jurisdictions.
- **Establish a sovereign wealth fund** - In recognition of the volatility of markets for commodities, Peru should implement a sovereign wealth fund. Converting the rich mineral wealth of the country into tangible, lasting benefits for Peruvian citizens would build both citizen and investor confidence in the government's ability to manage the ever-growing levels of FDI. For example, Peru's copper-rich neighbor, Chile, established an Economic and Social Stabilization Fund in 2006 that mandates contributions from fiscal surpluses during boom cycles in order to cushion the Chilean economy during worldwide economic recessions or when the price of copper decreases (Ministerio de Hacienda, n.d.).
- **Clarify mine closure plans** - Both mining companies and the Peruvian government need to devote additional attention to periods leading up to and after mine closure. Mine site accidents, even long after production has ceased, can still be costly and tarnish a company's reputation. Acid mine drainage in particular can plague a mine site for years after the official cessation of operations. As more mining projects approach closure, the importance of an explicit plan for monitoring and managing former extraction sites will be needed.
- **Continue adaptation** - Chinese mining companies have shown a strong ability to adapt and learn from their past experiences worldwide. In the case of Peru, the Chinese were initially surprised when the government's acceptance of a project did not necessarily translate to acceptance by the local community. Understanding the need for both a social license to operate in addition to a legal one has been part of a steep learning curve. We

encourage Chinese investment firms to continue to anticipate the complexity of relationships between local communities and their governments.

- **Promote technical capacity building and value-added services** - Many large-scale mine projects are unable to hire locally due to a paucity of skilled workers near mine sites. Training programs instituted by both the government and mine companies have the ability to make local work forces more attractive for employment, which will save on costs, increase employment opportunities, and enhance the social license to operate. Peru should also increase its technical capacity to add value to mineral products. Modifying mineral export laws and funneling money to the establishment of more advanced refineries and smelters would allow Peru to retain more of the value from minerals extracted within the country. Peru should also consider requiring investors to add value by processing raw commodities in country.
- **Engage local stakeholders** - Although a certain amount of community participation is required at the beginning of mining projects by Peruvian law, continuing to work with local stakeholders throughout the life of a mining project can help ensure that conflict is minimized. This may include hosting regular community meetings to address grievances, as well as involving local community members in infrastructure decisions and social development projects and hiring local community members in managerial roles.
- **Invest in innovative technologies** - Chinese companies should explore and promote technologies that increase efficiency, decrease inputs and outputs, and minimize costs, all while incorporating relevant environmental and social externalities. Examples of innovative technologies in mining include dry processing, use of wastewater for dust suppression, and recycling of tailings. In particular, companies around the world are already researching tailings recycling technologies for iron ore mining operations (Zhang et al., 2006), demonstrating that innovative methods for coping with mining byproducts can create a closed environmental loop.

Clearly, the above recommendations differ in their levels of feasibility. However, taken as a whole, following these recommendations will allow China to occupy a more favorable position in the Peruvian mining sector, and will allow the Peruvian government to live up to the promise that foreign direct investment can provide long term benefit for the country's development. A strong reputation for corporate responsibility will give Chinese-owned mining companies the license to operate in what might be considered challenging conditions. Chinese companies have often been viewed as part of a monolithic force whose goal is to buy up and take over a country's resources. It is in the interest of Chinese companies to work to ensure that their reputation gives them greater access abroad, rather than generating apprehension and a reluctance to accommodate Chinese investments.

It is very likely that China will continue to be a major player in the mining sector globally. Chinese companies have proven to be quite resilient in the face of changing social and regulatory environments. Our research has demonstrated the evolution of Chinese mining company practices in Peru, and indicates that there is a positive trajectory toward greater corporate social and environmental responsibility.

There is overwhelming evidence that CSR improves the financial and social viability of industry in the long run, regardless of sector. Chinese companies have been the subject of significant negative media attention in Peru and worldwide. Developing a model for socially and environmentally responsible operations that can be exported to mining projects in other countries, as well as other extractive industries, could substantially improve China's reputation abroad, increasing its opportunities for outward foreign investment in the future.

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