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A comparative overview of legal frameworks governing water use and waste water discharge in the mining sector

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ABSTRACT

Mining operations require access to a secure and stable water supply. Obtaining water use and discharge licenses has become increasingly challenging for mining companies in many resource rich jurisdictions. This can be attributed in part due to competing water uses in water scarce regions and pollution caused by existing and legacy mines. This report provides a comparative review of the water management regulatory frameworks of some of the largest gold and copper producing jurisdictions. The jurisdictions reviewed include Australia (Western Australia), Canada (British Columbia), Chile, China, Peru, the Philippines, South Africa, and the United States (Alaska, Arizona, Nevada and New Mexico). Interviews of mining company representatives working on water management issues complement the legal review to highlight the perceived regulatory risk by investors of the analyzed jurisdictions.

1. Introduction

Mining is increasingly associated with water risk – both in terms of water access and surrounding water quality. This is especially so where mines operate in water scarce regions, or upstream of communities that rely on the same water source for consumption or agriculture. Water impacts are also increasingly at the center of social conflicts between local communities and mining companies. In turn, the civil unrest surrounding mines has begun to shape legal frameworks governing water use and waste discharge to varying degrees.

As part of a three-year project – in collaboration with the Water Center at Columbia University and support by Norges Bank Investmnet Management (NBIM) – to assess water related risks in the copper and gold mining sector, the Columbia Center on Sustainable Investment (CCSI) has reviewed the laws and regulations governing water use and discharge by mining operations in 12 jurisdictions in 8 countries, namely Australia (Western Australia), Canada (British Columbia), Chile, China, Peru, the Philippines, South Africa, and the United States (Alaska, Arizona, Nevada and New Mexico). The jurisdictions reviewed were chosen for two reasons: 1) they each produce significant volumes of gold and/or copper, and 2) together, they provide a diverse and comprehensive basis for comparison from both a geographical and a legal perspective. In this regard, note that while Russia is a top gold and copper producing country, it was excluded due to language barriers. To conduct the review process, a standard template was designed and

completed for each jurisdiction on the basis of desk research and interviews with legal, mining and water experts. The main categories assessed in each review included the legal framework governing: water-use, water quality and discharge, monitoring requirements, post-mine closure requirements, and enforcement mechanisms. Readers interested to learn more about a particular jurisdiction reviewed for this project can access all jurisdictional reports.¹ This paper provides a comparative summary of these legal frameworks in the [Annex](#). In so doing, it provides insight into the different approaches jurisdictions have taken to manage their water resources.

The quality of a law alone is not necessarily indicative of the level of risk associated with water use in any one country. Political or administrative discretion, respect for the rule of law, and the capacity of a state to monitor and enforce water and environmental regulations are often crucial factors for determining investment risk related to water use by mining companies. To incorporate some of these factors, the study also included interviews of ten mining company representatives working in water-management or related positions within the jurisdictions analyzed. The interview questions broadly followed the categories of the legal template. They aimed to understand how these regulations translate into practice and what these practices' consequences are for mining companies. The interviewees all worked for large international gold and copper companies at the time of the interview – a prerequisite for the selection process – with some having worked in multiple countries. Key points from the interviews are

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¹ <http://ccsi.columbia.edu/work/projects/assessing-water-related-risks-in-the-mining-sector/reports>

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summarized in text boxes throughout this paper.

The aim of this comparative study is to provide insights for both mature and nascent mining jurisdictions on how others manage similar water related issues. The remainder of the paper is divided into four sections. The first section provides an overview of how jurisdictions allocate water to mines, what the water permitting process is, terms of the water licenses, and other measures implemented to encourage more efficient water use. Section two focuses on water discharge and water quality, comparing the various discharge permit regulations, rules around tailings storage, and post mine closure obligations. The third section outlines enforcement rules of the various jurisdictions and the reporting obligations. Section four summarizes the findings.

2. Water allocation

Access to a reliable source of water is critical for mining operations. Large volumes of water are required for each stage of the mining process to suppress dust, process ore, cool and wash mining equipment, and manage waste tailings. Clean water is also needed for consumption by the mine workers themselves. Hard rock mineral mining is particularly water intensive because of the extensive processing and beneficiation of minerals that is required to separate the minerals from hard rock and other matter.

2.1. Allocation of water as a function of state constitutional structure

The constitutional structure of a country determines at which level of government and from whom the water allocation permits are obtained. For example, in centralized countries like **China**, **Chile**, **Peru**, the **Philippines**, and **South Africa**, a national water department or ministry operating centrally, or through a provincial or local branch determines whether to grant a water allocation permit. In more decentralized countries such as the **United States**, **Canada**, and **Australia**, the power to allocate water has been devolved to the state or provincial government. All jurisdictions reviewed use a water authority approach – based on political or administrative divisions – to allocate water based. None use a water basin approach, whereby all water allocation decisions are made by a separate water basin authority. Only in **China** do the water drainage authorities, which regulate water use from water basins that span more than one province, become involved in a water allocation decision when a water source spans provincial lines.

2.2. Basis for water allocation

Often for historical reasons, the jurisdictions reviewed allocate water in slightly different ways. All jurisdictions require mining companies to obtain a water permit for the use of a certain allocation of water, and to carry out some level assessment of the availability of water resources, the impact of proposed activities on water sources, and the actual water requirements of the mining operation. This process generally occurs in parallel to the mine permit application process, or after a mine permit has been obtained. In most cases, information about the quantity of water required and the impact on surrounding water-courses must be submitted along with a mine permit application (usually as part of an environmental impact assessment (EIA) or statement). One exception to this is **Chile**, where a mine permit and water license can be approved before an EIA is approved, though the findings of the EIA, once available, can later result in a reduction in the quantity of water originally allocated to the project. In **Alaska** and some other resource-rich U.S. states, the permits required for a mining project, including water permits, are consolidated in a single procedure and application process.

Countries with a common law tradition, such as **Canada**, historically considered water rights to be land-based and attached to the land (riparian doctrine). Landowners whose properties adjoined a stream or other water source had the right to make ‘reasonable use’ of the water

as it flowed along, through or over their properties. In such countries, competition for water was historically regulated by fixing water right allotments in proportion to the frontage of the water source. Today, other factors – such as the environmental impact of a water use or the priority right to access of certain users over others – may also impact the determination of a water allocation decision in such jurisdictions.

In contrast, jurisdictions with a civil law background have adopted an approach based on the old Roman principles, whereby people could only obtain use rights for running water not attached to the land. The legal frameworks of **Chile** and **Peru** reflect this approach in granting use rights: **Chile** has a private water rights system that grants fully transferrable water rights, whereas in **Peru** water rights are not tradable.

The **United States** has a hybrid system. While the laws of the United States derive from common law principles, different states have adopted variations of the land-based riparian approach and the use-based approach to regulate water allocation. Most eastern states follow a land-based riparian approach for allocating water rights, while resource-rich states in the west of the country, including four jurisdictions reviewed (**Alaska**, **Arizona**, **Nevada** and **New Mexico**), have adopted a use-based prior appropriation doctrine based on mining customs established by miners during the time of the Gold Rush in the 19th Century. This use-based prior appropriation approach dictates that the first person to use water, divert it for a beneficial use, or, more recently, apply for a license for a particular water allocation, has the perpetual right to use the water against all subsequent users as long as the appropriator puts the water to beneficial use (“first use in time, first in right”). For these purposes, mining is generally considered to be a beneficial use, and as such, if the right has been granted first in time, then it has priority over other users.

Due to extreme groundwater shortages in parts of **Arizona**, the state has adopted a ‘reasonable use’ doctrine for groundwater use that allows a landowner to withdraw sufficient groundwater to make reasonable and beneficial use of her property. There are strict groundwater use regulations for areas that are extremely water scarce.

Water allocations to Indian reservations across the United States are subject to separate rules, which have subsequently been extended to some federal public lands. Historically, adequate water was allocated to a reservation in order to fulfill the purpose for which the reservation was established (*Winters v. United States*, 1908). In states that follow the use-based prior appropriation doctrine, an Indian reservation’s water right is linked to the date the reservation was established, which often pre-dates the rights of other users.² In 1963, the Supreme Court approved a decision that assumed the purpose of an Indian reservation to be agricultural, and that a reservation should be allocated sufficient water to irrigate all of the “practicably irrigable acreage” within the boundaries of the reservation on the basis of two criteria: (i) the land must be able to reasonably sustain crops; and (ii) the cost of supply water to the crops must not be unreasonable (*Arizona v. California*, 1963). The application of the Winters Doctrine in practice, however, has been complicated by questions on how to quantify “practicably irrigable acreage” and to what water sources it should apply. This has been particularly problematic where other water users, including mining operations, bordering or located on such reservations or federal public lands appropriate the same water sources according to state water allocation laws.

The **Philippines**, which inherited some of its legal principles from Spain (a civil law country) and the U.S., follows a use-based approach to allocating water. However, in contrast to other jurisdictions applying the use-based prior appropriation doctrine, the perpetual nature of allocated water rights can be cut short in the Philippines if the National Water Resources Board revokes or cancels a license, or makes a

² The Winters Doctrine was established in two landmark Supreme Court cases, *Winters v. United States* and the *United States v. Rio Grande Dam and Irrigation Co.*

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