

**Civil Engineer, PgDip*****Expertise***

Civil Engineer with more than 15 years of experience in water & environmental management in projects and operations of mining companies in South America. Has led Development and Operational areas in environmental, water resources, hydrogeology, fluid transportation (water, tailings & Cu concentrate), tailings storage facilities and mine dewatering. While in Itasca, has led the development of conceptual and numerical hydrogeology models in relation with the assurance of water resources of mining operations, environmental impact assessments due to groundwater extraction and open pit dewatering. Additionally, has led monitoring initiatives of water levels and pore pressures, generating necessary data for operational decision making and as support in the elaboration of EIAs.

***Education***

Diploma Mining Business Management, 2010, University Adolfo Ibañez  
PgDip. Water & Environmental Management, 2007, University of Bristol  
Civil Engineer, 2004, Universidad de Chile

***Professional Affiliations***

International Mine Water Association (IMWA)  
International Association of Hydrogeologists (IAH)

***Professional Experience***

2017 – Present

*Itasca Chile, Chile  
Hydrogeology Manager*

2015 - 2017

*Doña Inés Collahuasi Mining Company, Chile  
Water, Tailings and Concentrate Manager*

2013 – 2015

*Doña Inés Collahuasi Mining Company, Chile  
Water Resources Manager*

2010 – 2013

*El Tesoro Mining Company, AMSA, Chile  
Environmental & Water Superintendent*

2008 – 2010

*El Tesoro Mining Company, AMSA, Chile  
Head of Water Resources*

2005 – 2006

*Ifarle Engineering Consultants, Chile  
Projects Engineer*

2004 – 2005

*Conic - BF Civil Engineering Consultants, Chile  
Projects Engineer*

2004

*Aguas Andinas S.A., Chile  
Practicing Engineer*

***Projects Experience***

*Mining Hydrogeology:* Has led the realization of conceptual and numerical hydrogeology models used for assuring water resources for mining operations, environmental impact assessments due to groundwater extraction and open pit dewatering. Additionally, has led monitoring initiatives of water levels and pore pressures, through open wells and grouted in piezometers, generating necessary data for operational decision making and as support in the elaboration of environmental impact assessments. Experience has been gained in El Tesoro (AMSA) and Collahuasi mining companies and working as a consultant for several operations in Chile, Perú, Bolivia and Brazil.

*Groundwater modelling:* In addition to the work done for the mining industry, has developed the hydrogeological conceptual and numerical model (Modflow) of the Valleys of Chicureo and Chamicero for Aguas Andinas, Santiago sanitary company, as part of the Water Management Plan that was prepared to ensure sufficient water resources for the growing urban development in the area.

*Water Management & Planning:* Responsible for the planning and water management in the El Tesoro and Collahuasi Mining Companies. In El Tesoro led the implementation of an Early Warning Plan (EWP) that allowed securing the environmental permits for water extraction, giving continuity to the operation. This EWP, consisted of the deepening of water wells to extract from a deep aquifer disconnected from surface water bodies and at the same time, implemented a complex surface and groundwater monitoring plan. To have better long-term planning tools, it ensured the realization of a series of studies, including rainfall variations due to climate change, evaporation, recharge and water balances at an operational and watershed levels. Additionally, has participated in audits of water management systems in the Los Bronces (Anglo American), Los Pelambres (AMSA) and Quebrada Blanca (Teck) mines.

*Instrumentation for groundwater monitoring & hydraulic tests for hydrogeology characterization of fractured and low permeability media:* Has led processes for the implementation of surface and groundwater monitoring plans to analyze physical and chemical changes in water. Experience in telemetry implementation for remote monitoring points. He also developed monitoring plans and defined the necessary infrastructure to monitor potential impacts on aquifers caused by infiltrations from tailings deposits and leaching piles. Has supervised the performance of packer, step drawdown and variable rate tests to define hydrogeological parameters in karst and sedimentary aquifers.

*Implementation of projects in mining processes:* Has led projects of replacement of HDPE pipes for tailings transport and coated steel for concentrate transport. As part of the responsibility within environmental management, was responsible for the expansion of the Reverse Osmosis Plant (RO) that generated drinking and demineralized water for the processes. Experience in the implementation of solar energy in mining processes. Proposed and led the construction of a thermosolar plant (16 hectares and 1280 collectors) to heat solutions in the SX-EW process, which consisted of heating water with parabolic trough technology, storing it and making water - electrolyte heat transfer. Also led the construction of a Photovoltaic Concentration Plant (CPV) to supply electricity to the onsite Data Center of Cía. Minera El Tesoro.