

Feature – Rehabilitation



Evaluating risks from abandoned mines in the Puno Region of Peru

Abandoned mines present complex challenges and demand positive action to generate community support for future mining.

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Sheyla Palomino, travelled to Australia for an IM4DC (International Mining for Development Centre) course in Brisbane in 2013. This is where she met University of Queensland (UQ) researchers Corinne Unger and Mansour Edraki. Sheyla and her colleagues had commenced planning an abandoned mine characterisation project in the Lake Titicaca catchment. This project is one of the first pilot projects developed at the Geological Mining and Metallurgical Institute (INGEMMET), addressing geo-environmental research in Peru. A collaborative project between Australia and Peru soon developed with Dr Mansour Edraki and Corinne Unger from The UQ's Centre for Mined Land Rehabilitation (CMLR), Sustainable

Minerals Institute (SMI) travelling to Peru in September. The aim was to support Sheyla and her colleagues at INGEMMET to build capacity in data gathering and interpretation of geochemical impacts from abandoned mines. The Project was commissioned research by INGEMMET to IM4DC (Australian government-funded project).

Project objectives

The objectives of the Project are to:

- Characterise mining environmental liabilities in the Titicaca watershed by taking samples of surface water and mining wastes for analysis in order to understand the geochemistry of the wastes and to delineate areas impacted by abandoned mines – in particular, the distribution of heavy metals in the environment.
- Quantify impacts from legacy mining features and provide data for development of management and remediation plans in order to reduce impacts. Use the data to adjust the risk prioritisation of mines (previously developed by the Ministry of Energy and Mines).

- Map the vulnerability of the environment to potential sources of contamination.
- Contribute to thematic knowledge (geological, geomorphology, geodynamics and geochemistry) for environmental management in the region Puno generally.

Importance of community support

The importance of gaining community support for mining projects is made very clear in a local government poster in a township located near one of the abandoned mines studied: 'We will decide! If you do not have social license it is not possible to mine on our land'. This Project recognises that remediation of abandoned mines is an essential part of social license for future mining.

This field trip was developed in coordination with the local, regional and national authorities in order to involve them and keep up the communication. A particular successful case was the incorporation, in the field trip, of a metallurgist/engineer, who works in the regional government from Puno.



Left: Palca, one of the abandoned mines visited (photo credit: Sheyla Palomino).

Below: Mansour provides guidance to Shianny and Sheyla on water sampling methods - upstream of an abandoned mine in the Lake Titicaca catchment, Peru (photo credit: Corinne Unger).



Remediation of abandoned mines is an essential part of social license for future mining.

Below: Mansour provides guidance to Sheyla on tailings sampling methods in Aladino abandoned mine (photo credit: Magdie Ochoa).



This officer is involved in environmental liability remediation projects in the Puno region and was interested about new technologies in remediation and especially about the Australian experience in abandoned mines management.

Workshop

After a week of fieldwork which ranged from 3800 m ASL at Puno up to 5000 m at Palca, INGEMMET hosted a one day workshop in Lima, planned in collaboration with researchers from CMLR. This forum brought together key stakeholders in the Lake Titicaca catchment, as well as representatives

from mining regulation, research and industry. Together with the Australian researchers we provided an overview of the Project, the causes of Acid and Metalliferous Drainage (AMD) and outlined key elements of mature abandoned mine programs. Participants presented on abandoned mines' laws and related projects aimed at improving water quality in Lake Titicaca. The workshop provided an important foundation for engagement with other agencies and expertise.

Another important output of this collaboration was the implementation of new geochemistry tests for the characterisation of environmental mining

liabilities in the laboratory at INGEMMET in line with recommendations of the Australian researchers. These new tests will be important for the interpretation in this project and in other similar projects that will be developed in Peru.

Conclusion

Abandoned mines pose complex challenges. Hence they require support from multiple stakeholders with cross-functional co-operation within government and multi-disciplinary expertise to understand and address environmental and social impacts. 