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# 2<sup>nd</sup> International Seminar on Environmental Issues in the Mining Industry

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**GECAMIN**  
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# FOREWORD

Mining is currently experiencing a period of unprecedented high prices and growth due to the increasing demand for prime materials, which represents an important scenario for the economic and social development of mining countries such as Chile and important challenges on how companies are able to relate to their surroundings, principally with respect to environmental performance.

Decreasing the impact of industrial activities on the places in which operations take place and improving environmental performance sets increasingly demanding challenges in mining and also in other sectors. Despite important advances in environmental management that adhere to the strictest standards and are undeniable achievements, challenges remain to be addressed.

On one hand, the mining industry must constantly search for ways to be more efficient in its processes related to the use of water resources and energy, as well as in accessing new mineral resources in deposits of decreasing ore grade that are being explored at greater depths. This efficiency is important to both control other operational costs and maintain a high standard of environmental performance. On the other hand, neighbouring communities of mining projects have increasingly more access to information related to environmental issues, and the population has an improved level of education that has allowed it to be more actively involved in the different processes that entail the development of a business project. These social changes are positive, and the industry must be prepared to be an additional actor that is involved in constant dialogue with different groups.

It is no longer enough to only comply with existing rules and regulations—instead, companies must operate in accordance with increasingly demanding standards based on continuous improvement management. Transparency will be key in our relationship with the local and national communities, generating dialogues and contributing to communities being better informed of a project's processes and implications. In this way, we will contribute to maintaining the social license to operate sustainably and ensure that communities feel part of the development and well-being that industries such as mining can bring. In a sustainable way, the trust needed for the development of diverse economic activities and new projects can be generated.

For many years, efforts were exclusively centred on treating emissions and effluents generated by mining and metallurgical processes. However, little by little, new concepts in prevention and mining project

design that are oriented towards preserving the environment have been incorporated. Currently, medium and large-scale mining projects focus on the prevention of environmental impacts in all stages, from exploration to closure, integrating the environmental variable into the project design. This requires a major interaction between the team in charge of the conceptual design of the project and environmental specialists—together they must evaluate different options regarding the location of the facilities and the selection of mining processes and equipment. An efficient and responsible environmental management should focus on the correct prediction, prevention and control of all potential environmental impacts associated directly or indirectly with mining activity. Therefore, it is necessary to continue developing more effective tools and methodologies. To control potential impacts, it is necessary to have a cautious attitude and duly evaluate all environmental risks associated with different situations and events to adopt the corresponding control measures. Reporting minor incidents is increasingly relevant in that conscientiousness is developed within each worker regarding the importance of safety issues, both personal and regarding the environment, and the possibility that the incident become more serious is additionally avoided. The final objective of industry initiatives and efforts consists of developing a management based on environmental, social and economic balance.

ENVIROMINE 2011 is organised to contribute answers to these great challenges and to exchange ideas, experiences, best practices and innovations related to the environmental management of mining projects. We believe that the contributions this publication contains are on the right path towards the proposal of solutions to confront these challenges. With the participation of all, we wish to contribute to the construction of a mining industry that is environmentally more sustainable and increasingly more responsible, in which these initiatives leave valuable legacies to the communities and continue supporting the economic and social development of the countries in which it operates.

### **NICOLÁS FUSTER**

ENVIROMINE 2011 Chair

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Issues in the Mining Industry

# PREFACE

There are increasing global demands for stable and assured supplies of minerals and energy to fulfil development needs. With enhanced mining and mineral processing technologies, lower grade and more difficult ore bodies are now able to be exploited to meet these demands. However, this expansion in mining development has the inevitable consequence of generating increased volumes of wastes and hence the increased challenges of stabilising and isolating these wastes from potentially causing environmental harm. From a society perspective, while most recognise the benefits that accrue from the employment and wealth generation created by an expanding minerals sector, it is equally true that most are becoming increasingly aware of the potential impacts of such developments on environments and communities. Societal expectations and demands for the responsible and sustainable development of the minerals industry globally is thus becoming increasingly reflected in more stringent government regulations and restrictions on the industry to ensure such activities only proceed once all the necessary and proper management and control procedures are in place to protect environmental and social values and minimise future risks.

ENVIROMINE, from its first meeting in 2009, has established itself as the premier forum to showcase the most recent technologies and innovative approaches to predict, prevent and control contamination from mining and mineral processing activities, as well as to report on the latest developments in mine site rehabilitation strategies that contribute to recovering areas impacted by such activities. The Seminar has been the opportunity for discussion about both what is known but also about what is still needed to be known, and the linking of academia and industry professionals that this occasion offers is a very valuable way of identifying the problems and tackling the solutions.

In this volume, more than 40 technical papers are presented across a wide range of topics that include mining and hazardous waste management; methodologies and tools for environmental impact assessment; geochemistry of mining environments; acid rock drainage; criteria for environmental design, operation and closure of mining activities; land rehabilitation, revegetation and biodiversity; legal and regulatory frameworks; dust control and monitoring; sulphate and metal removal from mining, processing and metallurgical effluents and carbon footprint assessment and reduction.

Fourteen countries are represented in this volume of the proceedings, and apart from direct industry contributions, the institutions the authors

represent include engineering and consulting firms, equipment and service suppliers, universities, research centres and government organisations.

The Organising Committee and the Editors would like to gratefully acknowledge all of the authors, including those from the international community, for their generous contributions of time and effort in writing the papers and for presenting and contributing to the wider experience of ENVIROMINE 2011.

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Finally, we would like to thank all of the delegates who have attended the seminar, exchanging their valuable knowledge and expertise and thus contributing to the continued success of this second version of the International Seminar on Environmental Issues in the Mining Industry.

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