ERDENES SILVER RESOURCES SALKHIT MINE CLOSURE PLAN PILOT

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PLANNING FOR CLIMATE CHANGE RESILIENCE AND ADAPTATION IN MINE RECLAMATION AND CLOSURE

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Climate change promises to influence the daily lives of everyone across the globe. Mining companies, governments, and researchers are viewing their work through the lens of climate change. Mine closure and reclamation planning and execution must now incorporate the principles of resilience and adaptation to protect human health and safety and ensure environmental protection. This newsletter issue will briefly examine climate change impacts in Mongolia, and how policy and best practice can be applied to manage the risks posed by climate change to mine closure.

UNITED NATIONS CLIMATE CHANGE CONFERENCE 2021

The United Nations Climate Change Conference 2021, or COP26, was held in Glasgow, UK, in early November. The world's eyes were set on the politicians, diplomats, scientists, policymakers, activists, and other delegates who gathered to set the global agenda for managing climate change over the next decade. Scientists state that to limit global temperature rises within 1.5C, carbon dioxide emissions must be further reduced to prevent a "climate catastrophe". Discussions were also held to limit expansion of thermal coal use, reduce fossil fuel subsidies, increase supports to developing countries, cut methane emissions, and to stop deforestation (BBC, 2021). The worldwide mining industry plays an important role in meeting these targets.

CLIMATE CHANGE AND MINE CLOSURE

Mining alters natural landscapes and creates artificial landforms, waste management challenges, and reclamation challenges. Current regulations and best practices require mining companies to design landforms and waste management structures to geotechnical stability standards, to manage water on the site, and to place soil and plant vegetation to return the landscape to a naturalized state suitable for the end land use (agriculture, municipal park, forestry, wildlife habitat, recreation). Climate change poses a significant challenge to mine reclamation and closure efforts worldwide. Changes in weather patterns and more frequent and damaging weather events such as flooding, windstorms, and hurricanes cause costly damage to infrastructure, alter the landscape around us, and cause stress to humans and wildlife. A critical question for mining and reclamation professionals, and policy-makes is: are current regulations, best practices, and technologies sufficient to maintain geotechnical stability, contain waste materials, and sustain reclaimed landscapes as global climate and weather patterns shift?

CLIMATE CHANGE IMPACTS ON MONGOLIA

Quantitative modelling for climate change projection has been performed for Mongolia, using a climate change projection dataset available through the International Panel on Climate Change (IPCC). Various climate change scenarios were modelled, and impacts extrapolated for economic sectors.

Annual mean temperature has increased steadily by 2.14C between 1940 and 2000. Changes in weather patterns have already been noted – 57 days of dust storms were recorded in 2008 as opposed to 18 days in 1960. Extreme cold conditions called "Zud" are also becoming more common. These two environmental conditions have environmental, economic, and societal impact. Other quantified impacts include: a threefold increase in area of barren land (land without grasses), 20-30% rangeland biomass decrease, pasture pest population increases, 70% of grassland is undergoing desertification, and more lakes and rivers are progressively drying up (Ministry of Environment (Japan), undated).

In summary "Mongolia's geographic location, extreme weather and fragile ecosystems, coupled with prominent pastoral livestock and rain-fed agriculture sectors, make Mongolia's economy, livelihood and traditional cultures highly vulnerable to climate change risks." (World Bank Group & Asian Development Bank, 2021).

The Mongolian government has taken action to address the impacts of climate change by participating in international commitments such as COP26, releasing key policy documents such as National Action Plan on Climate Change (2011–2021), and the Green Development Policy (2014–2030). Khurelsukh Ukhnaa, the President of Mongolia, reaffirmed the country's commitment to aggressively reduce greenhouse gas emissions at COP26: "Mongolia, as one of the most vulnerable countries to climate change, fully supports efforts of the international community to reach net-zero emissions and reaffirms its commitments to the Paris Agreement and to mobilize every possible resource to fulfill them." (UNFCC, 2021).

Source: http://g-bilguun.blogspot.com/

Desertification in Mongolia.

Source: http://npost.mn/

Dust storm in Mandalgobi town, Dundgobi province.

PLANNING FOR RESILIENCE AND ADAPTATION FOR MINE CLOSURE AND RECLAMATION

Based on the preceding information, mine closure design and reclamation must incorporate resilience and adaptation into the planning, execution, and monitoring stages.

Mining organizations have developed climate change adaptation policies. For example, the International Council on Metals and Mining (ICMM) released a position statement formalizing member corporations' approach to addressing climate change and is in alignment with the goals of the Paris Agreement and the United Nation Sustainable Development Goals (ICMM, 2021a). The Mining Association of Canada addresses climate change by supporting emission reduction innovation efforts by their member companies, through measures such as the Towards Sustainable Mining Initiative (MAC, 2021). The Mongolian National Mining Association has a Responsible Mining Code, the intent of which is to increase the social responsibility of member mining companies, ensure their sustainable development, and build leadership capacity.

At the planning, design, construction, and operational levels, integrating a risk assessment and risk management approach is necessary to protect an operating or reclaimed mine from the physical risks posed by climate change. The ICMM provides a summary of the climate change related challenges facing the mining industry worldwide and has developed a stepwise process for identifying climate change risks, and some practical measures to manage or resolve them in their publication Adapting to a Changing Climate: Building resilience in the mining and metals industry (ICMM, 2021b) (see diagram below). Furthermore, the ICMM provides tools for mining corporations to address climate change in their Integrated Mine Closure Good Practice Guide, wherein the tool entitled "managing risk, opportunities, and climate change" enables corporations to identify and evaluate how climate change impacts the closure planning process.

Source: http://erdenessilver.mn/

The Salkhit Mine during summer.

Earth moving activities in the Gobi steppe.

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