SURVEILLANCE AND INTELLIGENCE

Surface Monitoring Services for the Potash Mining Sector

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Supporting a Key Provincial Industry

Potash mining is one of Saskatchewan's key industries and revenue generators, and the mineral is a vital component in fertilizer for global food production. As potash mining has grown, so too have the province's cities and rural communities. Although the mines are located at a depth of 1,000 to 1,600 metres, most lie below critical aquifers and many now extend under human habitation and infrastructure.

Detecting even minute changes in surface elevation is a vital tool in preventing damage both above and below ground, and serve as indicators requiring remediation efforts before problems escalate and impact operations or their surroundings.

Efficient and Cost-effective Surface Monitoring Strategy

MDA is a world leader in satellite-based information products for the resource sector, notably those generated from Interferometric Synthetic Aperture Radar (InSAR).

InSAR is an established and proven technique that uses two or more radar satellite images acquired over time using identical satellite position and altitude to measure movement of a ground feature with millimetres-level accuracy.

RADARSAT-2, a powerful synthetic aperture radar satellite built and operated by MDA, is capable of imaging the same location on Earth with identical imaging geometry, regardless of cloud cover or lighting conditions. This approach covers broad areas at relatively low cost per kilometre, but provides detailed information on localized areas of detected movement.

Over time, image acquisitions are stored in a digital "stack" that provides a month-by-month time-lapse view of even subtle changes in surface elevation. This provides technical and management decision makers to see where problems occur, and to track the effectiveness of remediation work on both active and discontinued operations.

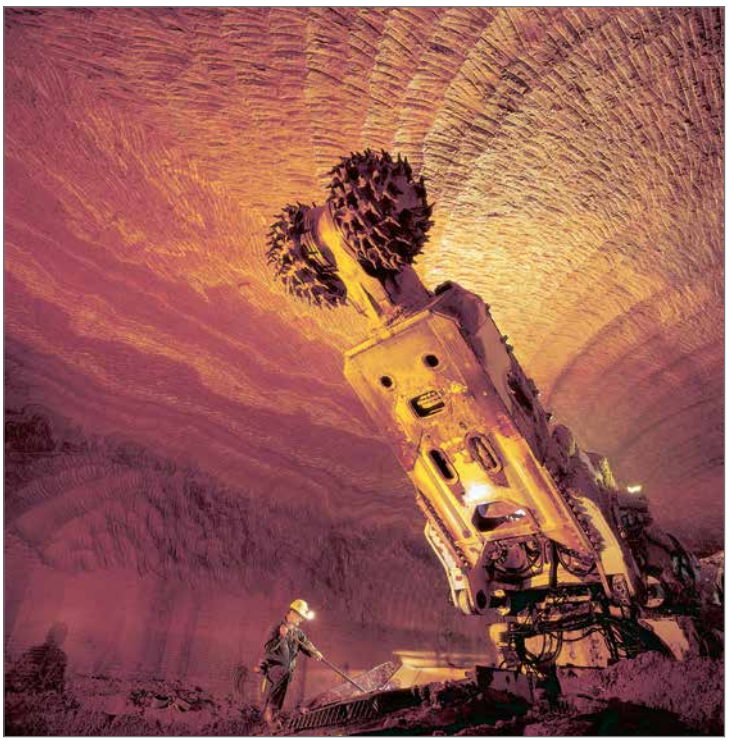
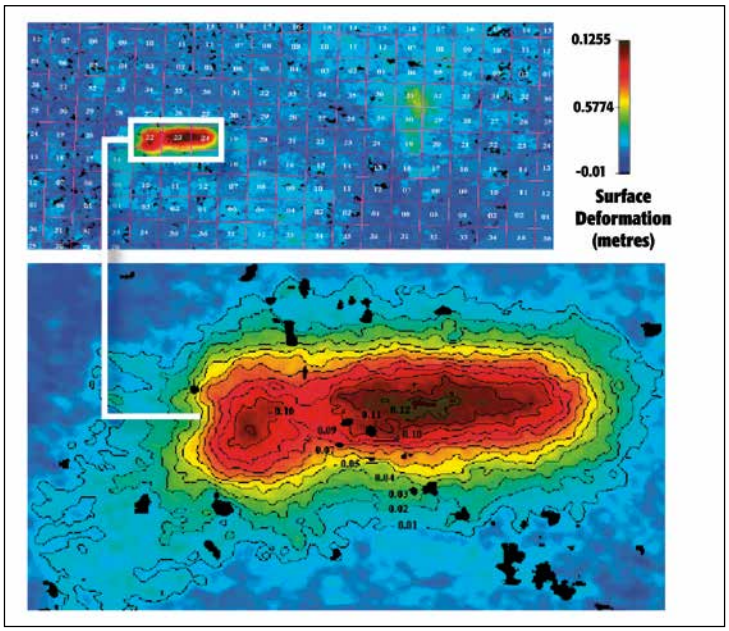


Photo courtesy of PotashCorp

Large, cavernous excavations induce strain on surrounding strata. Detecting surface subsidence protects both underground and surface mining operations.



This example of an MDA InSAR product illustrates a significant area of subsidence (shown in red) above a potash mine in Saskatchewan. Subsidence caused by mining in the province is typically a slow process, however early detection and remediation of causes can offset potentially large future problems that may include suspending operations, and environmental and civil costs for damage to infrastructure.

InSAR subsidence monitoring is also an effective tool for above-ground operations and infrastructure, including physical plants, transportation infrastructure, tailing piles and dam structures. Slope instability and wall movement present comparable levels of risk to that caused by underground factors.

Benefits for the Potash Industry

InSAR benefits the potash mining sector with its ability to assess, on a regular basis, the impact of surface movement on surface and subsurface operations, providing a very cost-effective and unobtrusive method of detecting and mapping ground movement over a broad area. Early detection of changes allows operators to address remediation efforts before problems escalate.

Monitoring surface mine infrastructure such as buildings, headframes, mill and processing, as well as tailings containment areas and waste piles ensures compliance with environmental safeguards and corporate social responsibility. Above, the blue rectangular water features are tailing containment areas, the pink area is a large waste pile. InSAR can detect even slight changes that could jeopardize the stability of both areas.

For potash mine operators, InSAR generates an easily integrated, valuable new stream of information provided in a concise report to supplement existing monitoring methods such as GPS, tiltmeters, and micro-seismic monitoring. Highly intuitive, visual, and easily interpreted, MDA InSAR reports are ready for use in geographic information systems and workflow to enhance site monitoring, environmental compliance, and risk mitigation.

An MDA InSAR monitoring program is a cost-effective means of ensuring the long-term viability of Saskatchewan's vital potash mining sector, and protecting the environment and growing provincial infrastructure from hard-to-detect subsidence.

CUSTOMER SATISFACTION

For more than four decades, MDA has worked with its worldwide customer base to provide information solutions that leverage advanced technologies and improve business efficiency.

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