SOLUTION MINING RESEARCH INSTITUTE
679 Plank Road
Clifton Park, NY 12065, USA

Telephone: +1 518-579-6587
www.solutionmining.org

Technical Conference Paper

1965 – 2025

High-Resolution Acoustic Imaging for Large Diameter Inspections: Multi-Cavern Case Studies

Zachary Evans, DarkVision, North Vancouver, Canada

Lydia Richley, DarkVision, North Vancouver, Canada

SMRI Fall 2025 Technical Conference
29-30 September 2025
Wichita, Kansas, United States

Solution Mining Research Institute Fall 2025 Technical Conference

Wichita, Kansas, United States 29-30 September 2025

HIGH-RESOLUTION ACOUSTIC IMAGING FOR LARGE DIAMETER INSPECTIONS: MULTI-CAVERN CASE STUDIES

Zachary Evans and Lydia Richley

DarkVision Technologies, North Vancouver, Canada

Abstract

High-resolution acoustic imaging for large-diameter casing inspections represents a new standard in cavern inspections, offering a more precise and intuitive approach for operators to proactively maintain their wells. By providing direct, sub-millimetric measurements and complete circumferential coverage, this technology overcomes the limitations of traditional inspections that struggle to address cavern-specific challenges.

The benefits of high-resolution acoustic imaging for cavern operators are significant. Chief among these is the capability to inspect both the internal and external surfaces of large-diameter pipes with medical-grade precision, enabling a comprehensive understanding of corrosion, wall thinning, and defect growth over successive inspections. Additionally, this enables operators to perform more advanced and accurate burst pressure calculations such as Effective Area or RSTRENG, which are not possible when utilizing low-resolution devices. Moreover, the high-resolution acoustics visualizations and integrity analysis of downhole components, such as casing shoes, and completed remedial work like expandable liners and casing patches improves operators' understanding of their assets and ability to plan for the future.

This paper highlights the value and capabilities of high-resolution acoustic imaging for cavern operators over legacy devices and presents multiple operator case studies of large-diameter casing inspections that explore issues such as ovality, connections, expandable liners, and casing patches.