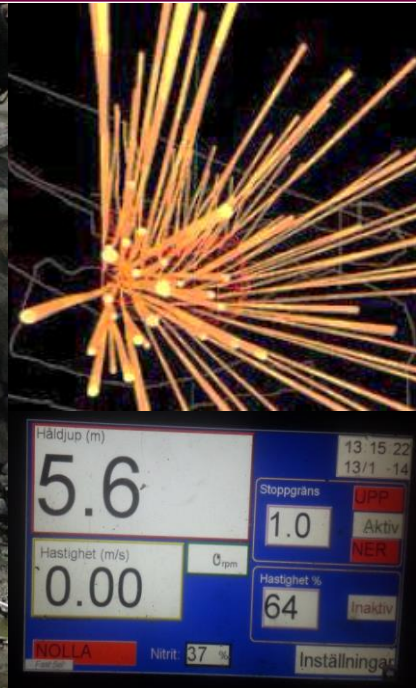


UNIQUE UP-HOLE CHARGING TECHNOLOGY COMBINED WITH TAILORED SERVICES PROVES TO BE A SAFE & PROFITABLE FOR SWEDISH UG GOLD MINE

CLIENT	MANDALAY RESOURCES CORP.
SITE	BJÖRKDAL MINE
PLACE	SKELLEFTEÅ, SWEDEN
DATE	2013-PRESENT



OBJECTIVES & CONSTRAINTS

- The Björkdal Gold Mine, owned by Mandalay Resources Corp., is located in northern Sweden, 28 km northwest of the town of Skellefteå, near the Boliden mining district which has been mined for a century
- About 60% of the mill feed is generated by the underground operation and 40% from the open pit. Underground mining is accomplished by long hole stoping.
- Harsh climatic conditions combined with a complex and unusual geology required the development and customisation of a specific software tool, teamed with a dedicated explosives formula and unique loading equipment (one unit for drifting and one for up-holes), delivered by a highly experienced, committed and versatile team of engineers.
- Embracing Bjorkdal's blasting objectives, turning these challenges into opportunities. Through partnership, service, know-how and technology, EPC-Sverige delivered a safe, valuable and efficient approach, in alignment with the EPC values and vision.

KEY FIGURES

- Producing some 800,000 tonnes ore/year
- 345m deep, dual ramps
- On vein open stoping
- Drill drifts 3,7*5.5 & 5*5,5 ramps
- Drifts drilled 4,5m with 48mm bits
- 64mm diameter up-holes 10-30m deep
- Max. temperature range: - 25 to +25°C
- All blastholes filled with pumped emulsion
- Using some 60 tonnes emulsion/month





EPC's UNIQUE ANSWER TO BJORKDÄL CHALLENGES

CONTINUOUS IMPROVEMENT OF SAFETY

- Technical support to improve vehicles safety, vehicle safety, (unique design detonator box for the safe underground transportation of initiating material)

ADDRESSING EMULSION CHARGING CHALLENGE

- The Challenge: 30m up-hole charging during a continuous mining process, in addition to standard horizontal hole charging, to be carried out with a reliable, user-friendly system adapted to local temperatures and weather conditions.
- EPC developed an innovate safe, robust, easy to use, reliable, fully automated remote control up-hole pumping technology. Offering accurate control feed and smart retraction of the charging hose. Clear & visible PLC control of hydraulic functions makes calibration easier.
- Custom emulsion formula (viscosity and density)

A TAILORED D&B SERVICE PACK

- Unique hole depth measurement of up-holes deviation to optimize blast pattern outputs
- Specific development of EPC's design software EXPERTIR to address Bjorkdäl's needs
- Partnership for new technology integration (GPS based devices to track muck pile movement and ore dilution)

RELIABILITY

- In-house designed & built loading systems using standard components for timely and cost effective maintenance
- Integration on an existing carrier and energy source (Volvo wheel-loader)

A SATISFIED CUSTOMER

« Scheduled frequent site meetings between the parties ensured proper follow up on focus areas»

Per Jannerts, Mine manager

«Experienced hands-on support staff makes it possible to be proactive and solve any issues before they became an issue»

Bo Österstrand Underground Superintendent

«EPC Software and participation in the BMM tests have proven very helpful in order to minimize ore dilution»

Aire Fredlund Mining engineer

	S afety	✓ REMOTE CONTROLLED UP-HOLE CHARGING FROM THE GROUND
	P assion	✓ SPECIFIC DEVELOPMENTS ON EPC'S DESIGN SOFTWARE TOOL EXPERTIR
	I ntegrity	✓ INNOVATIONS WITH NO COMPROMISE ON COMPLIANCE
	R espect	✓ DELIVERING JUST THE NECESSARY EMULSION QUANTITY THROUGH UNIQUE TECHNOLOGY
	I nnovation	✓ STANDARD COMPONENTS FOR TIMELY AND COST EFFECTIVE MAINTENANCE
	T eamwork	✓ SUCCESSFUL COLLABORATION BETWEEN EPC'S R&D DEPARTMENT (EPC) & OUR SWEDISH TEAM

