

THE SITUATION

Agnico Eagle, one of the world's leading mining companies, needed to create a more comfortable work environment in their deep shaft mining operations, approximately two miles underground. Environmental control sales and product engineering experts from HDT Nordic collaborated with Agnico personnel to understand the product requirements and create a solution that would be rugged, reliable, durable, and able to reduce the excess heat and humidity found in this unique environment.

WHAT DID THE CUSTOMER REQUEST?

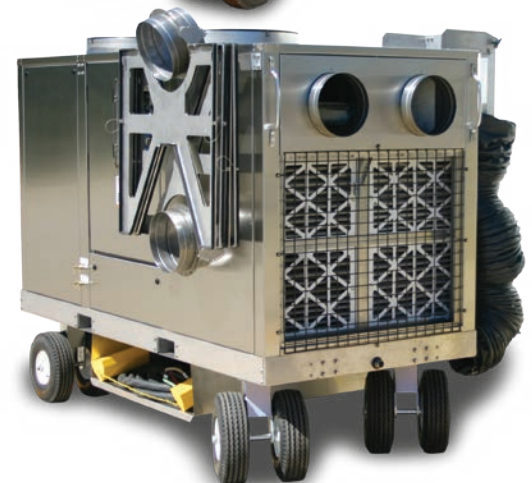
- Agnico Eagle requested that HDT design a portable air conditioner spot cooler to provide relief to miners working on, or doing maintenance on, equipment in specific mine areas (e.g. the rock hammer).
- The air conditioner had to be portable to fit in the mine elevator cage for transport down the mine shaft.
- The air conditioner had to reduce wet/bulb by 10°C (18°F) and also drop the air temperature as much as possible.
- Agnico Eagle placed a high degree of importance on the air conditioner's ability to provide a large drop in wet/bulb, versus simply providing extremely cold air, due to 95% – 98% humidity levels and air temperature levels nearly the same, at 3.21 km (2 miles) underground.

WHAT DID HDT PROPOSE?

HDT's solution was a mobile, self-contained, air-cooled mine shaft air conditioner capable of reliably operating in 35°C (95°F) temperatures with 95% (or higher) relative humidity levels at nearly 3.2km (2 miles) underground.

WHY DID HDT WIN?

- HDT listened to the customer.
- After understanding Agnico Eagle's request, HDT responded that we would be able to design a unit that met their requirements.
- HDT delivered the initial unit, meeting Agnico Eagle's expectations. Its implementation is tremendously successful and Agnico Eagle is very satisfied with the overall performance of the HDT solution.
- After producing the initial unit, HDT collaborated with Agnico Eagle further refining the air conditioner and engineering improvements to the initial design. This further collaboration has resulted in the sale of two additional units.



DEVELOPING A SOLUTION FOR DEEP SHAFT MINING

Details of the HDT Nordic Air Solution



The HDT Nordic's mobile, self-contained, air-cooled mining application air conditioner operates at 35°C (95°F) wet bulb air temperature with a relative humidity of 95% or higher at up to 3.1 km (1.92 miles) underground. Under these conditions, the environmental control unit (ECU) will provide 2,000 – 4,000 ACFM of air cooled from 37°C (98.6°F) DB/34°C (93.2°F) WB to 24.5°C (76.1°F) DB/23.7°C (74.7°F) WB at 2,000 ACFM to personnel or small work areas utilizing two air outlets on the ECU. The lower the WB temperature to start, the lower the WB temperature the HDT ECU would be able to achieve. ECU is capable of ramping to 4,000 ACFM.

FEATURES:

- R-134a high-temp refrigerant for operation in higher temperatures and high dirt
- Two (2) R-134a semi-hermetic reciprocating compressors
- Two (2) 8 fin/inch (8 fin/2.54 cm) epoxy-coated condenser coils
- One (1) 10 fin/inch (10 fin/2.54 cm) 6 row epoxy-coated evaporator coil
- Refrigerant hose and fittings used rather than copper
- 5.08 cm (2") pleated filters and filter rack on evaporator coil
- Serviceable take-apart TXV, no torch required to change
- Filter dryer with flare fittings, Schrader's and ball valves to isolate for quick change, no torch required to replace
- Hot gas bypass
- Electric reheat
- VFD low ambient control
- Two (2) receiver tanks
- 304 stainless steel cabinet construction
- Heavy duty dual pneumatic tires for use on rough surfaces
- Tethered wheel chocks with storage compartment
- 15.24 m (50') of power cable – longer lengths are available if required
- Two (2) blowers to produce up to 4,000 CFM total
- VFD added to control evaporator blower speed and output, located in the control panel
- Two (2) 35.56 cm (14") supply air ducts used
- Each supply duct 22.86 m (75') long (three individual 7.62 m (25') long sections joined together)
- Nozzle added to end of ducts to allow additional control of air velocity (25.4 cm (10") and 30.48 cm (12") nozzles will be provided) with 25.4 cm (10") nozzle unit to produce an outlet air velocity of 3660 FPM
- Two (2) folding supply air duct positioning stands
- All mounted accessories attached to unit with quick release mechanism to allow disconnect of accessories (supply air ducts, duct holders, duct positioning stands, stand holders, power cable and cable holder) prior to moving unit into cage to lower into mine
- Phase monitor
- Disconnect switch
- Emergency stop button
- 575V-3PH-60Hz power
- Unit FLA- 67A Unit MCA- 73A
- Estimated unit weight 1,179 kg (2,600 lbs)

