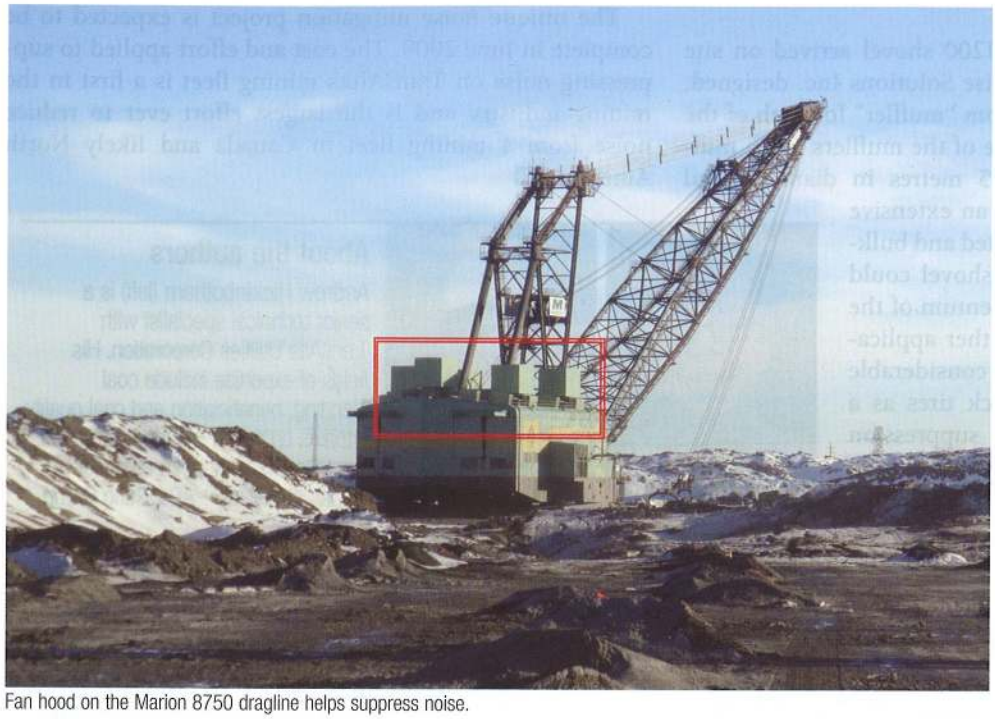
Shushing the giants

A unique, first-in-Canada noise mitigation project ensures TransAlta's neighbours sleep soundly



Fan hood on the Marion 8750 dragline helps suppress noise.

by Andrew Hickinbotham and Graeme Fitz

TransAlta's Highvale mine is the largest surface strip coal mine in Canada and uses some of the biggest available earth-moving equipment to feed the Sundance and Keephills generating stations. Located south of Lake Wabamun, about 70 kilometres west of Edmonton, mining operations at Highvale sometimes operate in close proximity to homeowners and cottagers.

Noise levels have increased as new, ultra-class shovels and trucks have been added to the mining fleet. Operated by Prairie Mines & Royalty Ltd. (PMRL), over the past few years the mining fleet has been changing from a pure dragline to a dragline/pre-strip operation, in response to an increase in the amount of overburden as the mine progresses south and eastward.

As challenging noise limits exist related to mining operations at Highvale, TransAlta engaged the expert advice of noise specialist Faszer Farquharson & Associates (FFA). The specialists in acoustics and noise control employed a detailed noise model to accurately predict sound levels in different locations as mining operations would move across the landscape.

A noise plan was developed, which included retrofitting sound suppression equipment on 32 pieces of mining equipment.

The results of the modelling indicated that noise levels measured near a few residences could exceed the sound limits established by the provincial regulator. To address this issue, TransAlta contracted Noise Solutions Inc., leading-edge sound suppression technology engineers and installers, to design noise reduction equipment for some of TransAlta's mining fleet.

Noise levels from the existing mining equipment were simulated using the sound level information gathered by FFA consultants. Information for future mining equipment that had not yet entered into service was measured in other mining locations. Each noise source was measured while at high engine speeds and from "pass-bys." As a result, a noise plan was developed, which included retrofitting sound suppression equipment on 32 pieces of mining equipment, including draglines, shovels and trucks.

Noise Solutions Inc. designed, fabricated and installed custom sound suppression devices for the mining fleet. Advice from the equipment manufacturers regarding operational safety and efficiency were incorporated into the design. TransAlta's dragline fleet was the first to be retrofitted — each dragline had custom fan shrouds installed to help suppress noise.

The ongoing noise mitigation program that includes a Terex RH200 hydraulic shovel, Letourneau L1400 and L1850 loaders, six Cat 789 haul trucks, six

Liebherr T282B haul trucks, four Komatsu 930 haul trucks and ten Cat 776 coal haulers focuses on the highest sources of noise — radiator fans, ventilation fans, engine casings, wheel openings and engine exhausts. Solutions being deployed include apron curtains, engine enclosures, radiator silencers, wheel enclosures and upgraded exhaust mufflers.

For example, the Terex RH200 shovel arrived on site with no exhaust silencers. Noise Solutions Inc. designed, fabricated and installed a custom "muffler" for each of the engines. As a result of the scale of the mufflers (each muffler was 3.5 metres long, 1.5 metres in diameter and weighed nearly three tonnes), an extensive structural analysis was conducted and bulkheads were reinforced so the shovel could swing and withstand the momentum of the extra weight. Similarly, in another application there was concern for the considerable weight on the front haul truck tires as a result of the additional noise suppression equipment, in addition to an obstruction of sight lines, which posed a safety concern.

The project team is still working to design a solution with the manufacturers to determine how to decrease the back pressure on a truck engine that already exhausts through a heated truck box. This would allow the elimination of pressure relief ports, a significant source of noise.

The unique noise mitigation project is expected to be complete in June 2009. The cost and effort applied to suppressing noise on TransAlta's mining fleet is a first in the mining industry and is the largest effort ever to reduce noise from a mining fleet in Canada and likely North America. CIM

About the authors

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