



The Potential Application of SORDMiner to Large Scale Oil Sand Production

SORD Technologies Limited SORDMiner mining system was initially designed to access the huge global resources of alluvial and marine deposits of gold, diamonds mineral sands and more recently iron sands¹, which, while well documented, are either impossible to mine or are uneconomic to mine using conventional mining techniques. While these commodities remain the short term focus of SORD, it has become increasingly apparent that the applications for SORDMiner are much broader than were initially thought and include the potential exploitation of oil sands, brown coal and high grade tailings recovery.

The potential application of SORDMiner to high production mining of oil sands (tar sands) is particularly exciting as the economic returns could dwarf that of gold, iron ore and the other commodities. We believe SORDMiner has immediate application in the Athabasca deposits in Canada, the Bemolanga deposits in Madagascar and could play a major role in developing the large but so far relatively undocumented (in the West) oil sand deposits in Siberia and the FSU.

The potential application of the technology to the exploitation of oil sands was first brought to SORD's attention by Dr Craig Walker (Divisional Sales and Marketing Director Global) of Weir Warman International, designers and manufacturers of the Warman slurry pump. Craig has been one of SORD's initial shareholders and Warman are the supplier of slurry pumps to SORD. Warman have signed a Co-operation Agreement² to supply the slurry pumps for the SORDMiner project and all technology to transport the sands and gravels from the ore zone to surface free of charge for the prototype development program. Craig supplied the Athabasca oil sands industry with large slurry pumps when based in North America as Warman's Sales and Marketing Manager US and gained a detailed knowledge of the geotechnical characteristics of the deposits. Based on this experience, Craig was convinced that SORDMiner could competitively mine the oil sands in a high production manner.

The bulk of oil sand production in Athabasca is achieved through vast open pit mining using shovels and trucks to deliver the material to the center of the pit where it is mixed with hot water and drawn into large slurry pumps which pump the material up to 5km to the processing plant. The action of the slurry pump on the oil sand water mix actually beneficiates the 'ore', tending to separate the bitumen from the sand prior to delivery at the processing plant. Craig recognized that SORDMiner is basically a "box" to house slurry pumps and could be directly applied to mining oil sands without the environmental problems and depth limitations of the current open pit mining.

To put the Canadian oil sand resource into perspective, the total resource of 2.2-2.5 trillion barrels represents 20% of the known total world oil resource and is 5 times larger than Saudi Arabia's conventional oil resource. Currently the Athabasca reserves are 176.1 billion barrels

¹ See separate letter from HWE on Iron sands

² See letter of support and Co-operation agreement



but only 23-30% of the total resource (354 billion barrels) is considered to be recoverable with current technology (open pit mining and various hot water injection well techniques). However even if this proportion of the resource is recoverable, it is sufficient to provide all of North America's oil requirements at present consumption rates for 100 years.

However there are a number of limitations to mining oil sand deposits using conventional technology. Open pit mining has a maximum pit depth of 80-100m. This limitation is partly due to stripping ratios becoming too great but also because the geothermal gradient makes the oil sands soft and "sticky" once temperatures exceed 18-20°C causing the heavy 418 tonne trucks and large face shovels to sink and lose traction. Wet weather also causes traction problems and loss of production. There are also increasing environmental concerns due to the massive "foot print" of the pits (7-8km x 3km) and the huge volume of groundwater required to dewater for the operations which is lowering the water table and that of the Athabasca River. Deep hot water injection well extraction is currently not efficient and is expensive.

There is a potential window of opportunity for SORDMiner to either replace open pit mining and/or access the interval between the base of current pit mining and around 200m depth, thus increasing the reserve of the region significantly and alleviating the environmental problems. The capital cost of a SORDMiner operation would be vastly lower without the need for a massive truck and shovel fleets running into the billions (each truck costs C\$4.5M). Environmental approvals should also be faster and easier with the limited environmental impact required to establish a SORDMiner operation and overall infrastructure costs would be minimized.

To determine the suitability of SORDMiner to these deposits SORD Syncrude's huge Mildred Lake operations, approximately 30km north of Fort McMurray in September 2004. As a result of this technical appraisal SORD believes that if SORDMiner works as designed (with some modifications such as hot water injection and other changes) the mining system can economically mine such oil sand deposits at rates equivalent to current open pit mining rates using a number of units with large slurry pumps in the 10,000 tph plus range per unit. Current production at Mildred Lake is around 250,000 barrels per day at an all up cost of C\$17 per barrel. Grade averages about 0.5 barrels/tonne.

In summary, the potential for SORD's mining technology to make an impact in this industry, not only in Canada but also in Russia and the FSU is huge.

This need for a technology to access the global oil sands resources is one of the points that Claude Mandil, Executive Director, of the Paris Based International Energy Agency noted in October 2005 was urgently needed if these oil sands resources were to be brought into production. (<http://www.iea.org/>)

The CSIRO, Neil Graham and Carl Swensson recently gave a presentation to the Federal Minister for the Environment, Senator Ian Campbell, in which we presented the oil sands story amongst other issues. This PowerPoint presentation is attached to this summary.

Carl Swensson
Director