Innovation and Integration The Northern Lights Oil Sands Project

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ABSTRACT

The Northern Lights Project is on track to be a fully integrated surface mineable oil sands operation. Located in the Athabasca Oil Sands Area, 110 kilometers north of Fort McMurray, the Project is designed to produce more than 100,000 barrels per day of synthetic crude over a 30-year life, with first production planned for 2008. Synenco Energy Inc, a private company incorporated in 1999, holds Oil Sands Permits 02, 05, 80, and 81, which comprise the Northern Lights Project in Townships 98 and 99, Ranges 5 to 7 west of the Fourth Meridian.

The integration of efforts by a diverse team of specialists in geology as well as geophysical, geotechnical, mine, environmental and process engineering, has resulted in innovative approaches to the geological modeling and plans for economic and environmentally sound exploitation of this large bitumen resource, estimated at over 1.3 billion barrels (measured and indicated).

The mineable oil sand resources are hosted in the Lower Cretaceous (Aptian) McMurray Formation of the Mannville Group The McMurray Formation was deposited within an eroded Devonian landscape, infilling valleys and eventually completely covering the older strata in this area. Later, Quaternary sedimentation removed some of the McMurray in this Project area. The resulting proximity of the oil sands to the surface makes them amenable to exploitation by mining methods.

In many Athabasca Oil Sands project areas, the McMurray Formation is informally subdivided into a lower fluvial member, a middle estuarine member and an upper marginal marine member. In the Northern Lights Project area, the majority of the bitumen is contained within the lower fluvial member, which was deposited by fluvial systems that drained the nearby Precambrian Athabasca quartzite. As a result, most of the bitumen at the Northern Lights Project is contained within relatively clean, medium- to coarse-grained quartz sand. Compared to deposits in the estuarine and marine members, the pore water is relatively fresh, and the amount of “fine” (-44μm) clay material is significantly lower. This ‘low-fines’ situation presents an opportunity to apply innovative mining, ore handling and pre-processing methods, because the relative absence

of ‘fine’ material means that traditional approaches to primary ore processing are not necessary.

The challenge of delineating and modeling of the fluvial channel trends has called for detailed observation and interpretation of sedimentary structures and palynological data. The application of fundamental sedimentology combined with interpreted structural controls is guiding the exploration strategy for the Northern Lights Project. The integration of core interpretation, core analyses and down-hole geophysics has proven to be an effective tool for interpreting the channel trends.

The Northern Lights Project permit areas were previously relatively unexplored. Synenco initiated drill programs of ever-increasing size and scope, which has resulted in a 3D geological model being developed using a very large database of core, borehole geophysical logs and core analyses data. Assessment and modeling of data from over 425 drill holes within the project area has resulted in the delineation of a measured and indicated resource of approximately 1.3 billion barrels of surface mineable bitumen. Over 150 additional drill holes are currently being assessed and integrated into the geological model.

The mine’s footprint will be small due to the use of continuous mining technology, consisting of hydraulic excavators, in-pit conveying equipment and mobile crushers. The mine permit application and associated environmental impact assessments are planned for filing in the fourth quarter of 2004.