Petroleum Science and Technology ›
Volume 20, 2002 - Issue 9-10

Original Articles

MANAGEMENT OF OIL SANDS TAILINGS

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Pages 1025-1046 | Received 17 Oct 2001, Accepted 02 Dec 2001, Published online: 14 Feb 2007

Cite this article https://doi.org/10.1081/LFT-120003695

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ABSTRACT

In Alberta, oil sands bitumen is utilized for synthetic crude oil (SCO) production by surface mining, bitumen extraction followed by primary (coking) and secondary (catalytic hydrotreating) upgrading processes. SCO is further refined in specially designed or slightly modified conventional refineries into transportation fuels. Oil sands tailings, composed of water, sands, silt, clay and residual bitumen, is produced as a byproduct of the bitumen extraction process. The tailings have poor consolidation and water release characteristics. For twenty years, significant research has been performed to improve the consolidation and water release characteristics of the tailings. Several processes were developed for the management of oil sands tailings, resulting in different recovered water characteristics, consolidation rates and consolidated solid characteristics. These processes may affect the performance of the overall plant operations. Apex Engineering Inc. (AEI) has been developing a process for the same purpose. In this process oil sands tailings are treated with $Ca(OH)_2$ lime and CO_2 and thickened using a suitable thickener. The combination of chemical treatment

and the use of a thickener results in the release of process water in short retention times without accumulation of any ions in the recovered water. This makes it possible to recycle the recovered water, probably after a chemical treatment, as warm as possible, which improves the thermal efficiency of the extraction process. The AEI Process can be applied in many different fashions for the management of different fractions of the tailings effluent, depending on the overall plant operating priorities.

ACKNOWLEDGMENTS

The authors greatly appreciate the financial support provided by IRAP, NRC Canada (Contract Number: 28565U), Syncrude Canada Ltd.'s courtesy in providing tailings samples and the technical advice provided by Bill Shaw, Ted Kizior, Michael Rogers and Wayne McKee of Syncrude Canada Ltd. Gilbert Wong and Ken Leung of the Geotechnical Group of the University of Alberta diligently and carefully performed the experimental program.