

## Using MSAR™ As An Alternate Fuel Solution

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### ABSTRACT

MSAR™ (Multiphase Superfine Atomized Residue) is a new fuel introduced by Quadrise Canada Fuel Systems Inc. as an alternate fuel solution for thermal heavy oil (SAGD) projects, power generators and industrial users having energy requirements over 10,000 mmBTU/d. MSAR™ is a stable oil-in- water emulsion with a target droplet size of which over 90% is less than 10 microns. The key characteristics of MSAR™, as demonstrated by the Canmet burn test facility in Ottawa, Canada, and other field trials are;

- similar burn characteristics and parameters to natural gas
- 100% carbon burnout under normal operating conditions, with low excess O<sub>2</sub>
- 20% higher heat transfer rate than natural gas
- can be manufactured from -10 API to 14 API hydrocarbon feedstock
- stable for a period extending from a few days to several months
- 25% less CO<sub>2</sub> and NO<sub>x</sub> emission than coal
- can be manufactured close to the burner tip
- does not require steam atomization
- requires preheat to only 60° C
- is a non-Newtonian fluid with viscosities similar to paint

MSAR™ is a product of Akzo Nobel Surface Chemistry AB of Sweden and is protected by licence agreements and patents held by Akzo Nobel and Colt Technologies Inc. of Canada. Quadrise Canada has the exclusive rights for the use of MSAR™ emulsion fuel technology in Canada.

Substantial sample testing has been undertaken using Athabasca, Cold Lake and Lloydminster oil sands bitumen and heavy oil feedstocks. MSAR™ has been successfully manufactured from bitumen, vacuum residues, asphalts and asphaltene samples. First field operations using MSAR™ in a full scale SAGD application will commence in mid 2004. Quadrise Canada has several commercial scale proposals currently under evaluation.

Western Canada heavy oil and bitumen contain sulphur and require flue gas desulphurization for commercial scale projects using MSAR™.

Typical commercial applications for MSAR™ include;

- Thermal insitu projects

- Cement plants
- Power plants over 50 megawatts
- Pulp mills
- Potash facilities

A combination of a ROSE<sup>®</sup> Solvent Deasphalting (SDA) Unit and MSAR<sup>™</sup> can be used as a partial field upgrading solution to improve oil quality and eliminate need for transportation diluent. The deasphalted oil (DAO) off the ROSE<sup>™</sup> Unit is a high quality product requiring little or no diluent to meet pipeline specifications and the residue is converted to low cost MSAR<sup>™</sup> fuel.

As a further enhancement, the combination of the ROSE<sup>®</sup> SDA Unit and MSAR<sup>™</sup> can be used to process upgrader or refinery residual products to improve feed quality and plant throughput for Thermal Crackers, Cokers and Hydro-cracking/Hydro-processing units. The residue can be converted to MSAR<sup>™</sup> as an alternate fuel solution to gasification or coking.

A fuel switch to MSAR<sup>™</sup> from natural gas or coal will provide the producer with;

- Lower operating cost for energy
- Capped long term energy solution, immune to rising costs of natural gas
- Lower NOx and CO<sub>2</sub> emissions, as compared to burning coal
- Secure energy supply for thermal heavy oil producers (SAGD)