



# Marsulex Clarkson Push-Through Knife Gate



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# Background

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Marsulex Alberta Ammonium Sulphate Plant May, 2010

Syncrude Canada has an ammonium sulphate plant owned and operated by Marsulex. It was designed and constructed with two types of knife gate valves: Clarkson KGD push-through type and Series 150 ASME Class 150 rated Guided Shear Gates.

## Problem

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In the photograph beside, a Clarkson knife gate is mounted horizontally in a vertical pipe, shown in the upper left. Push-through knife gates discharge to atmosphere a volume of the process on each and every cycle. This volume increases with time and cycles.

For the original design of the Clarkson, general mining slurries, this normal operating occurrence does not cause much of an issue as sand and water are fairly easy to deal with and clean up. The Clarkson knife gate is a good choice for many mining applications and has a good track record for these.

The problem occurs however when the application is not benign, low cycle or low pressure. Discharged material can and does affect other piping components. In the photograph above you will note the brown and black leakage that has built up under the Clarkson's body.

Its corrosiveness required Hastelloy C gate material and it attacked unprotected peripheral equipment in the plant.

## Solution

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50 of the 54 malfunctioning valves were replaced with Guided Shear Gates constructed of solid Hastelloy C-276 from 2" to 18". In 2009 they were removed for inspection by CGIS who performed minor repairs and all 50 are operating flawlessly. The total repair cost for all fifty valves amounted to less than 1.5% of the valves initial cost and will allow the valves to be re-installed with a new warranty. Marsulex has recently requested a quote for the four additional valves that weren't originally replaced.

Due to the the superior service and asset availability and the problems with the Clarkson's push-through design, the plant initiated a program to replace all Clarkson valves with Guided Shear Gates.

