Successful use of Ice Pigging™ in the Oil and Gas Sector

Case Study – OMV Austria Prottes Ring Main

Ice Pigging™ applied to increase pressures and flow rates in brine injection network.

The issue

OMV had recently installed a new water treatment plant at Gänserndorf, to treat brine produced from the oilfield, before its re-injection into the Prottes Ringschluss network.

Despite the excellent water quality produced at the plant, historic build-up of iron sulphide in the distribution pipes was causing significant pressure losses across the network and water quality issues at a nearby polymer plant.

The solution

Traditional pigging would have required costly enabling works, as well as network down time during the pigging process, so OMV approached SUEZ to discuss applying its Ice Pigging™ technology. This was one of the first field applications in the oil and gas sector.

The 8,500m network mainly consisted of a DN250 and DN200 ring main and some smaller diameter branch pipes feeding individual injection wells. The pipework was broken into seven separate sections for Ice Pigging™, ranging from 800m to 1,750m in length. In most sections the ice slurry could be inserted and removed by adapting existing network fittings, so very few enabling works were required.

SUEZ manufactured all ice locally, using our mobile ice generation system which was set up at Gänserndorf treatment plant. The normal network operating temperatures are 35°C, so OMV arranged for tankers of cool water to be inserted before the ice, to reduce melting during the operation.

The results

Due to the close communication and planning between SUEZ and OMV, the operations went very smoothly. The longest operation took just 3.5 hours and many took less than two, after which the injection network was immediately returned to service.

Effluent samples analysed by OMV show that significant quantities of iron sulphide and bacterial growth were removed from the pipework; in some cases in excess of 500kg from sections with average length of 1000m. The removal of this material resulted in hydraulic improvements in the network, including a 0.5 bar increase at the end of the network.

There was also a pronounced improvement in the flows observed on the small diameter pipes feeding the injection wells, with some seeing increases of 30% after Ice Pigging™.

500KG OF SEDIMENT REMOVED
from a single section

30% FLOW RATE INCREASE
in small diameter pipes

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How it works

Ice Pigging™ is a pipeline cleaning process utilising a two-phase ice slurry which forms a semi-solid 'pig' within the pipe. The slurry is pumped into the main like a liquid, but when moving through the pipework it behaves like a solid material; detaching contaminants and fouling from the pipe wall and carrying them out of the pipe entrained within the ice pig.

The pig is pushed through the section by the network pressure, so the pipe is under no additional stress. The process can be undertaken on all pipe materials, at diameters of up to 600mm and on sections several kilometers in length. Ice Pigging™ cleans in a single pass, so is incredibly fast and water efficient, as well as requiring no harmful chemicals.

Differentiating factors

- Ice Pigging™ has the benefits of foam pigging, but without any of the associated hazards
- The ice slurry is inserted and ejected using small diameter existing fittings

- The Ice Pig™ flows through complex pipework such as bends, changes in diameter and butterfly valves
- Minimum outage times; most pipes are cleaned in a few hours
- In the unlikely event of becoming stuck, the ice can be left to melt
- Existing section valves and pump inlet valves can be used to control the ice pig velocity and movement easily.

The future

Ice Pigging™ has proven to be very effective at removing iron sulphide and bacterial growth from produced water injection networks in the oil industry. We are confident that similar results can be achieved in other oil industry applications.

About OMV

The largest Austrian and internationally active energy company, OMV stands for limitless, responsible mobility. It provides high-grade petrochemical products and efficient natural gas solutions for city and countryside, along with ongoing efforts to find revolutionary solutions for the future.

About SUEZ

Since the end of the 19th century, SUEZ has built expertise aimed at helping people to constantly improve their quality of life by protecting their health and supporting economic growth. With an active presence on five continents, SUEZ and its 90,000 employees strive to preserve our environment's natural capital: water, soil, and air. SUEZ provides innovative and resilient solutions in water management, waste recovery, site remediation and air treatment, optimising municipalities' and industries' resource management through "smart" cities and improving their environmental and economic performance. The Group delivers sanitation services to 64 million people and produces 7.1 billion m3 of drinking water. SUEZ is also a contributor to economic growth, with more than 200,000 jobs created directly and indirectly on an annual basis, and a provider of new resources, with 4.2 million tons of secondary raw materials produced. By 2030, the Group is targeting 100% sustainable solutions, with a positive impact on our environment, health and climate.

For more information

Please contact: Phil Pettit, Business Development Manager, SUEZ
Email: Phil.Pettit@suez.com
Mobile: +44 (0) 7980 616590

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> **Ice Pigging™ proved to be very effective at removing iron sulphide from brine injection networks and it was much easier to apply to the network than conventional foam pigs. We are very pleased with the improvements in flow on the small diameter injection pipes and the pressure increase overall.**
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> — Alexander Weilhartner – Advisor Production, Oil – OMV Austria

SUEZ Smart & Environmental Solutions Severnside Energy Recovery Centre, Severn Road, Hallen, Bristol, BS10 7SP
Phone: +44 (0) 1454 804040 Twitter: @suezUK
www.suez.co.uk