Altum TECHNOLOGIES

Sound into Performance

2016 Best Energy Startup

2017 Slush100 winner

A solution to improve energy efficiency and productivity in process industries

Company, Cases in Food, References, and value drivers for customers

Introduction

PROBLEM = FOULING/SCALING = DIRT
INSIDE EQUIPMENT

2,5% of Global CO2 emissions

=

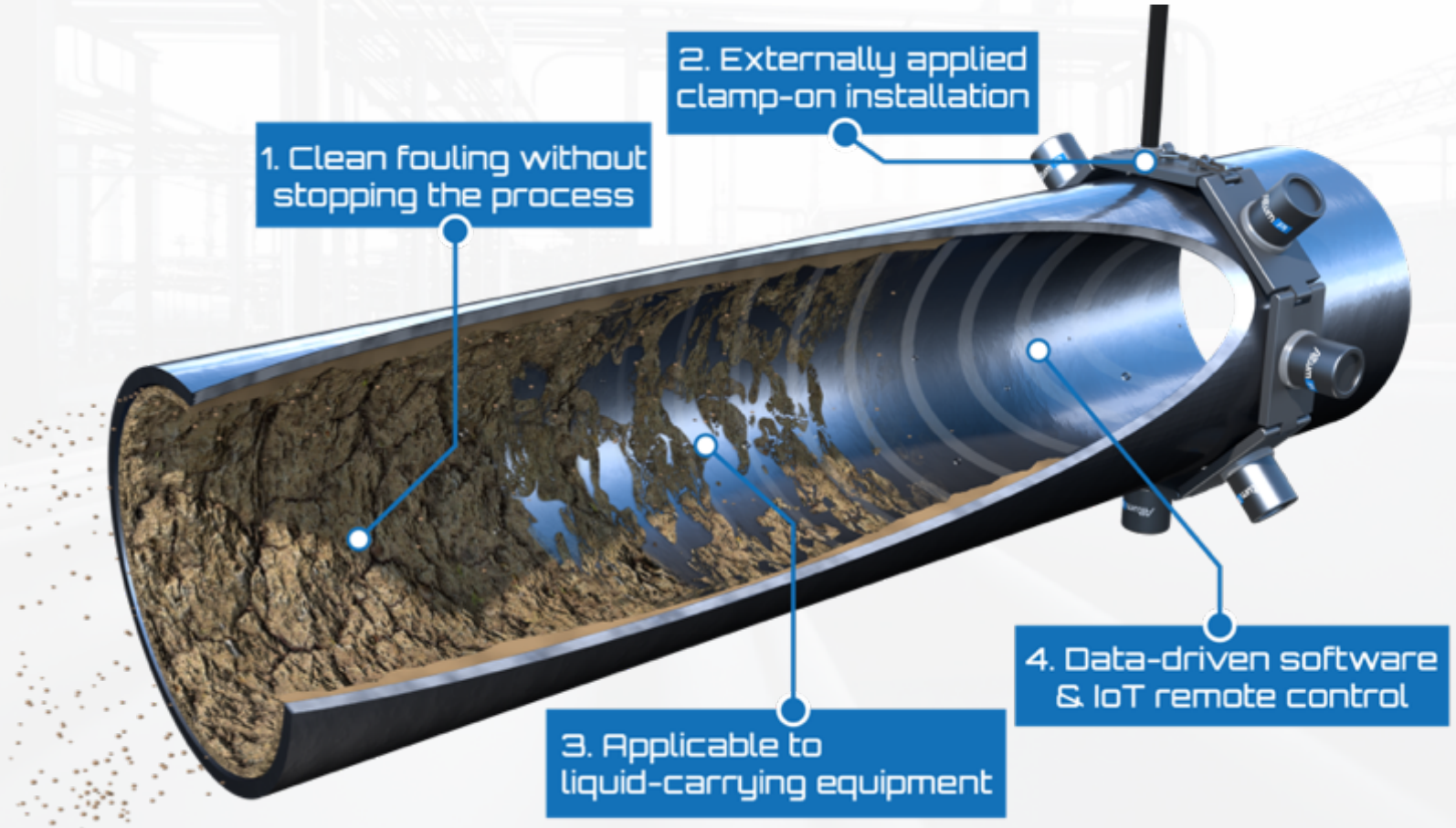
272 coal plants

=

203 million cars (20% of total)

- Requires stoppages in cleaning
- Decreases energy efficiency
- Shortens equipment lifetime
- Affects end product quality

Solution


1. Clean fouling without stopping the process
2. Externally applied clamp-on installation
3. Applicable to liquid-carrying equipment
4. Data-driven software & IoT remote control

Cleaning Video

https://www.youtube.com/watch?v=5FTDuIGyzkU

Unique Capabilities

By Using Altum Technologies, Your Company Will Be Able To

Remove and prevent fouling

Increase process and equipment efficiency

Decrease production stoppages and energy consumption

Decrease or remove chemical cleaning

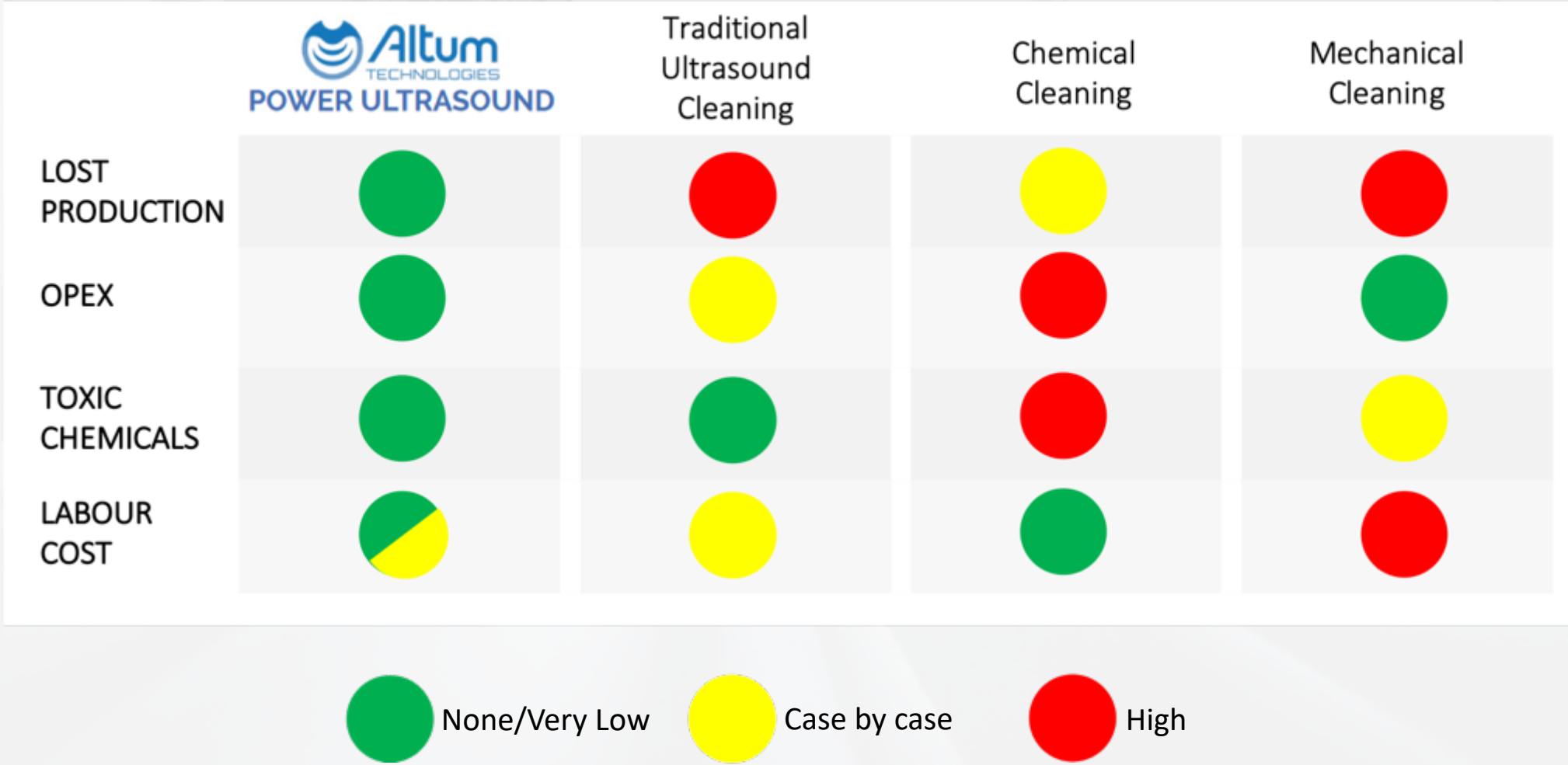
Unique Capabilities

Altum Sustainability Facts

Reducing CO2 emissions as a result of using Altum's software-guided power ultrasound

Reduced water and energy consumption

Comparison

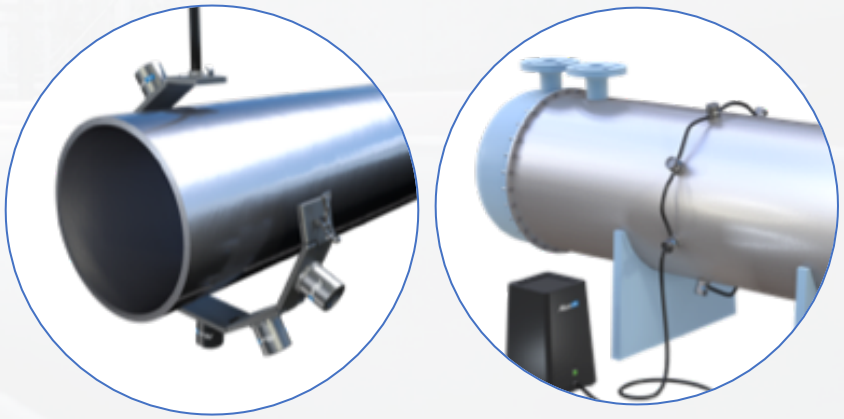

Altum TECHNOLOGIES
POWER ULTRASOUND
Traditional Ultrasound Cleaning
Chemical Cleaning
Mechanical Cleaning
LOST PRODUCTION
OPEX
TOXIC CHEMICALS
LABOUR COST
None/Very Low
Case by case
High

Solution

SOFTWARE

HARDWARE

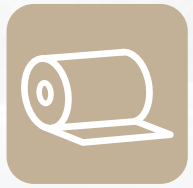
TRANSDUCERS



Customer Industries

Oil and Gas

Energy and Heat



Pulp and Paper

Food Processing

Customer Projects in Food

Results from projects performed with Food companies

- Fouling prevention in tomato paste heat treatment
- Improving vacuum creation by preventing fouling in heat exchanger
- Fouling prevention in coffee production
- Fouling prevention and CIP enhancement in cereals production
- CIP enhancement in Opadry / Titanium Dioxidepipeline
- Cleaning of fat fouling in waste water pipelines
- Improving dry material content in waste water treatment

Case: Heat Treatment in Food

ISSUE

The client was running a max of 7-10 days production runs before needing to do a CIP wash, as steam nozzles were getting clogged and burnt particles were contaminating end-product and causing quality issues.

OBJECTIVE

To prevent tomato paste from sticking and burning in the inner walls of the steam injector to avoids product quality issues and CIP cleaning. Avoiding these issues will also increase the production capacity.

RESULTS

Thanks to power ultrasound, now they produce the whole 85 days season without the need to do any chemical/CIP or mechanical cleaning and have 0 quality issues.

Reference case: Burned Cereal paste

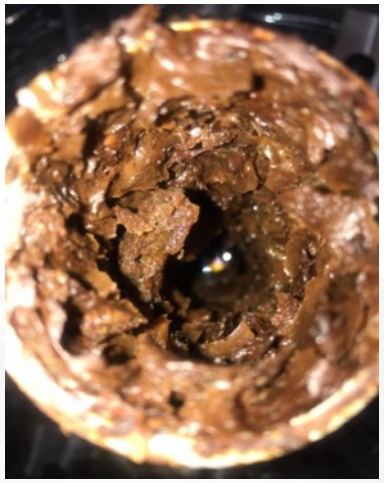
Experiment: Burnt fouling only + water and caustic without ultrasound

- First thing was to add water for 2 minutes, which as expected didn't remove anything.
- Then we added caustic 2% for 2 minutes. It started to weaken the fouling (few pieces detached) but it remained coherent (and didn't collapse like in the previous case after sonication).
- We rinsed and put back caustic for 30 minutes. A bit more left, but eventually we had to use mechanical brushing, and after that the pipe looked like in the production site(patches of fouling here and there).

Experiment: Burnt fouling only + ultrasound

These were possibly the most impressive results. We filled the burnt pipe with water and sonicated with the same 1+4+10 structure.

- With 1 minute sonication fouling structure collapsed,
- within 5 minutes there were only few patches left, and
- within 15 minute the pipe was shiny clean.



After 1 min of sonication

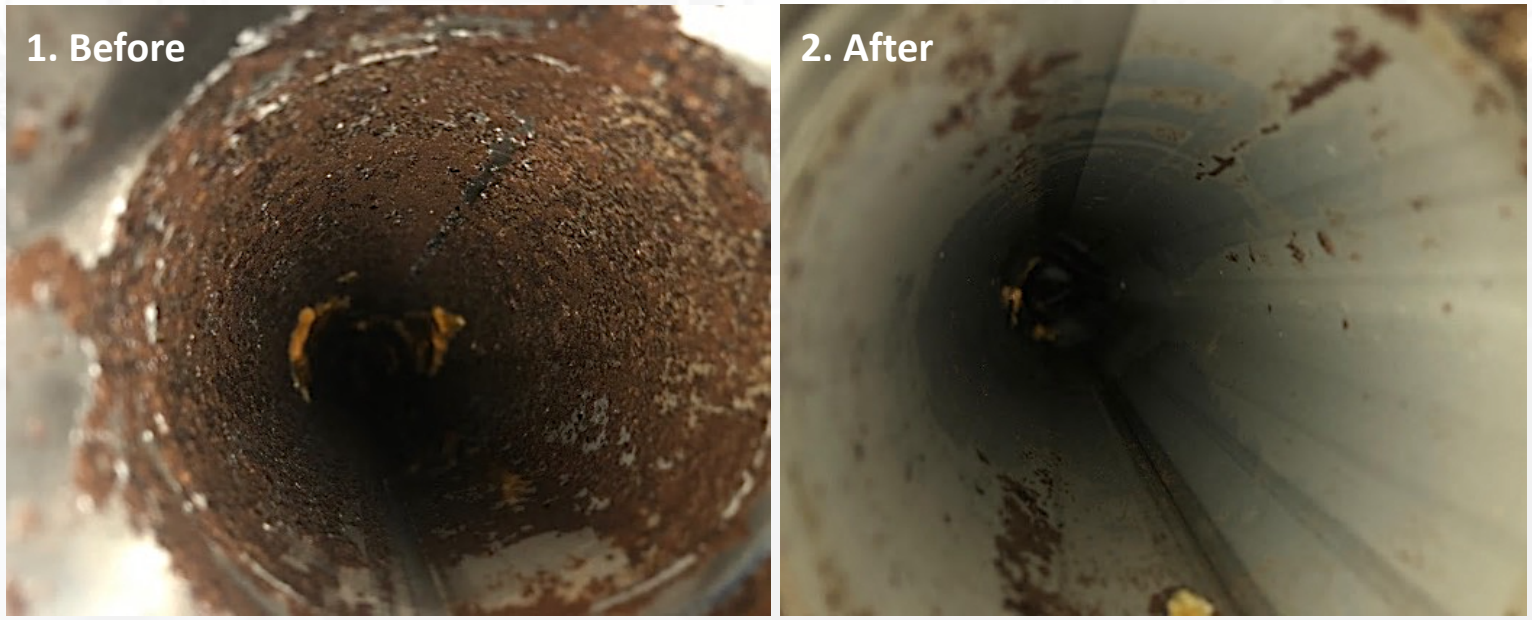
After 5 min of sonication

After 15 min of sonication

Reference case: Burned Cereal paste

Burnt food product:

Either caramelized sugars or Maillard reaction residues are difficult for chemicals to remove. They need much surfactant additives and even with them, washing performance is often poor if layer is anyhow thick. There are found in many heat treatment and hot extraction processes. Ultrasound is able to crack this layer and helps cleaning chemicals to affect deeper and remove burnt residues.



Removal of Maillard reaction fouling in pipes by Software-Guided power ultrasound. Image 1: Pipe after CIP without sonication. Image 2: Pipe after CIP with simultaneous sonication for 30 minutes.

Reference case: Improving dewatering process

OBJECTIVE

To improve customer's dewatering process of wastewater.

RESULTS

The biggest difference in the dry material content, between the times when ultrasonic treatment was on and was not on, was over 5%.

Reference case: Fouling prevention

Nordzucker
Finland

Project

1,3m diameter, 6m high seawater heat exchanger used for vacuum creation

Fouling in 3 months decreases energy efficiency by 25%

Before

After

Case: Evaporators fouling cleaning

Pulp & paper

Pulp & paper

Pulp & paper

RESULTS

Annual mechanical cleaning dropped from 24 to 1

RESULTS

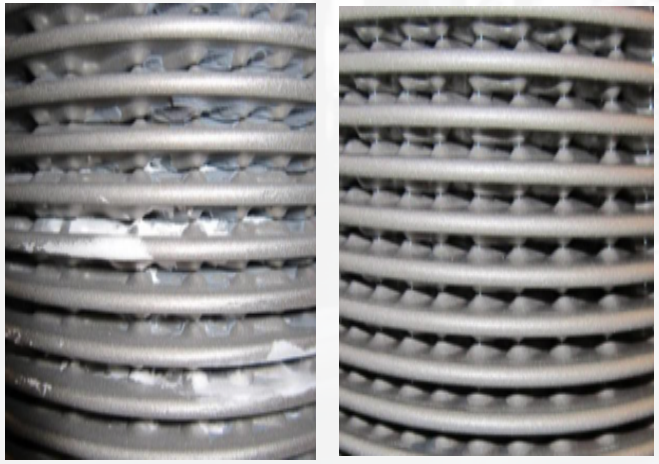
Heat transfer capabilities increased by 57%

RESULTS

Increased separation efficiency significantly

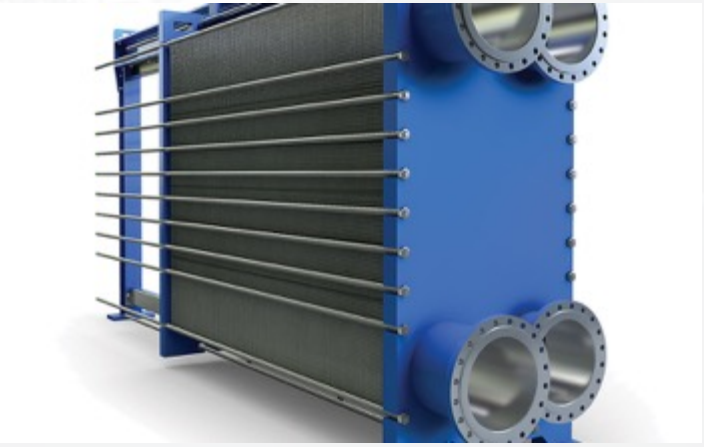
Case: Heat exchanger fouling cleaning

Chemical Production



Energy

Oil &Gas



RESULTS

Altum cleaned the equipment in just 2 hours.

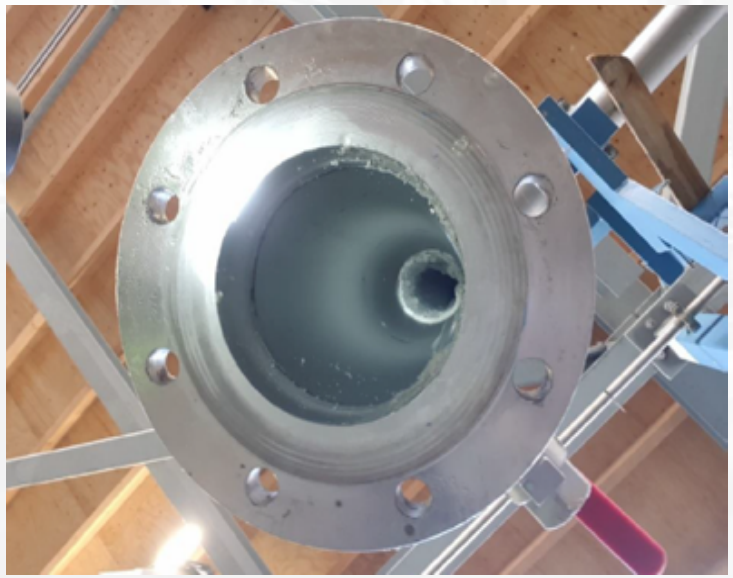
RESULTS

Heat transfer capabilities increased by 30%.

RESULTS

Cleaning interval extended from 1 to 2,5 months leading to increased production

Case: Pipe fouling cleaning

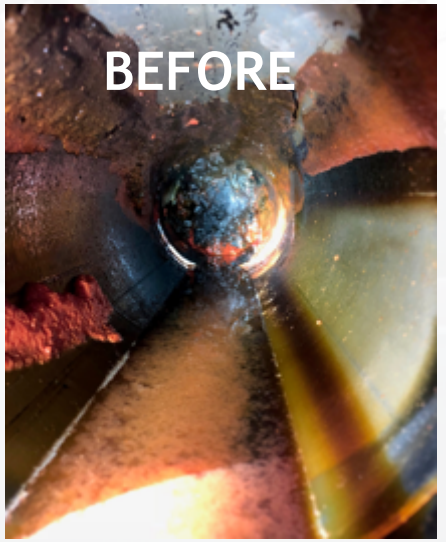


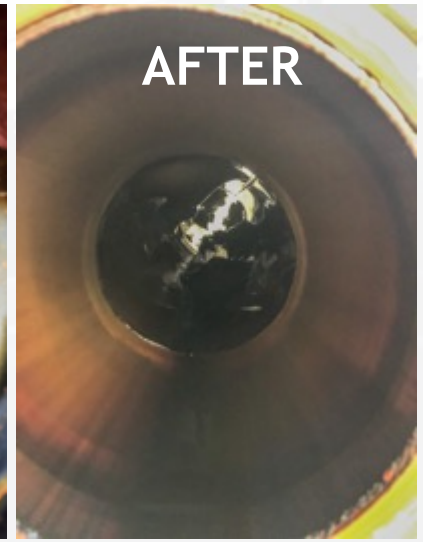
RESULTS

Phosphoric acid fouling was completely cleaned.

RESULTS

Hardened fat fouling was completely cleaned.





RESULTS

Attachment of burning tomato paste to the pipe can be prevented.

Case: Valve fouling cleaning

Chemical Production

RESULTS

Fouling was removed and customer was able to close the valve.

Mining

RESULTS

Fouling was removed and the valve could be operated normally

Oil and Gas

RESULTS

Normal valve operation restored after sonication

Discussion

Q&A

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