

Oil Review

Oil · Gas · Petrochemicals

Middle East

VOLUME 21 | ISSUE 8 2018



- Latest developments in marine crew transfer
- Promoting the acceleration of sustainable development
- Saudi Arabia's leading refining & petrochems projects
- Enabling transformation with digital twins
- Buoyant mood at ADIPEC

SEE US AT THE SHOWS:



intersec

Saudi Aramco - sharpening the focus on gas

21
Years

Serving the regional oil & gas sector since 1997

Decontaminating soil using bioremediation

DURING OIL AND gas exploitation in oilfields, pipelines and storage tanks often crack and contaminate soil as a result. Soil pollution with various oils or diesel fuel also happens during exploration and drilling of new wells. When replacing underground reservoirs at petrol stations, it is necessary to remove the soil around the reservoir. This soil is contaminated with gasoline and diesel fuels.

Croatian company CorteCros, part of Cortec Corporation Group, provides environmentally safe bioremediation solutions for these issues with Bionetix products.

In 2015 CorteCros started a pilot project for INA, a Croatian multinational oil company and one of the biggest oil companies in the region. The customer needed to remove all contaminated soil from the oil and gas fields as well as gas stations. The project involved soil bioremediation using Bionetix products. Based on positive results, the customer built a landfill for the treatment of contaminated soil. According to the customer's plans, 3,000-5,000 tons of soil per year need to be decontaminated using the bioremediation process. Contaminated soil was collected from oil fields and transported to the landfill. It then passed several laboratory testings.

BIOSURF and BCP 35S are products especially formulated by Bionetix for bioremediation of soil contaminated by petroleum hydrocarbons and related wastes. BIOSURF is a new biosurfactant treatment designed to help naturally clean up oil spills. It offers high dispersing power and acts as a strong biostimulant to promote hydrocarbon degradation. It is an excellent alternative to synthetic surfactants and dispersants commonly used to disperse oil slicks. Surfactants work by breaking oil apart into smaller droplets that are more accessible to natural biodegradation processes. However, their



Image credit: Cortec Corporation

BCP35S and BIOSURF were mixed with fresh water and sprayed on the surface of the contaminated soil, which is simultaneously agitated.

safety is questioned. In contrast, BIOSURF is a non-toxic biosurfactant extracted from plants and fortified with micronutrients that speed up natural biodegradation.

Bioremediation with BIOSURF and BCP 35S with clean deep soils will also enhance natural processes, eliminate unsightly areas, reduce pollution liability and lower disposal costs.

The customer now successfully uses this procedure. The process of mixing contaminated soil and spraying with the fresh water / BCP35S / BIOSURF mixture is repeated every 10 days. After three to five months, depending on the type of pollution (crude oil, gasoline, diesel), the soil returns to nature completely unpolluted. The bioremediation project generated a high level of satisfaction from the customer.

Pressure surge: a stitch in time saves nine

PIPELINES ARE THE safest and the most economical medium of transporting fluids long distance. Most pipelines are buried, as it provides more safety and less maintenance cost. Many international codes specify the requirement of emergency shut down (ESD) valves or control stations to ensure safe operations. The quick closing and opening of manual or automated valves in the pressurised pipeline can result in the phenomenon of pressure surge in the upstream side with cavitation or vapour formation on the downstream of the valve. In this case, a pressure wave is generated, travels along the pipeline, causes a sudden pressure peak known as a 'pressure surge' and finally results in the high magnitude of forces which can damage the pipeline and break the supports, causing catastrophic failure.

Being a consultant for pressure surge and pipe stress analysis, I have seen many instances where 'No mitigation' would have been needed if the analysis had been carried out at an early stage of the project. Most times the requirement of surge analysis pops up during 'Safety workshops' which happen during the latter half of the project. By this time pump selection and Emergency Shut down valves (ESD) selection is over and sometimes an order is placed. The pump curve, valve Cv (co-efficient of velocity) and valve closing profile play a vital role in the occurrence of the surge phenomenon. The most common mitigations of surge analysis are surge tanks, anti-surge / vacuum breaker valves, surge balancing lines etc. Most of these mitigations can be avoided by just selecting a proper pump, valve closing profile and closing time.

A common mistake is not performing a dynamic stress analysis of the pipeline if the report says 'No surge envisaged'. 'No surge' does not mean 'No force'. If the surge pressure falls below 110 per cent of design pressure then it considered as 'No surge'. But the differential pressure due to surge still can create considerable forces on the pipe, which can call for Thrust Block. Most stress engineers generate Surge



Image credit: Protton Engineering

Gaurav Bhende, founder and director, Protton Engineering.

force as Surge Pressure x Pipe Area, which gives unrealistic forces. Even engineers, without properly analysing the soil, suggest costly Anchor blocks. A proper use of Transient software is recommended with an experienced engineer who understands both phenomena. Unfortunately we rarely get a combination of good stress engineer with knowledge of surge or vice versa.

The hundreds of thousands in costs can be saved by proper engineering at right time. So a stitch in time saves nine.

*Gaurav Bhende, founder and director, Protton Engineering.
Gaurav.bhende@protton.co.in www.protton.co.in*