

TREATS AND RELEASES FLUIDS AT SUBSEA LEVELS

NEMOH™



CETCO
OILFIELD
SERVICES

IMPLEMENTATION

Benefits of NEMOH™

- Treats and releases fluids at subsea levels
- Works at depths over 6,000 ft
- Ensures compliance
- Flexible and portable
- Treats a number of constituents since it can be operated with different media types

Applications

- Treating the de-pressurization fluids of a hydro test
- Treating the overflush of fluids from a chemical treatment
- Treating fluids from a de-oiling of difficult to flush lines
- Treating fluid for the addition of subsea architecture
- Treating fluids from repairs and abandonment of lines and wells

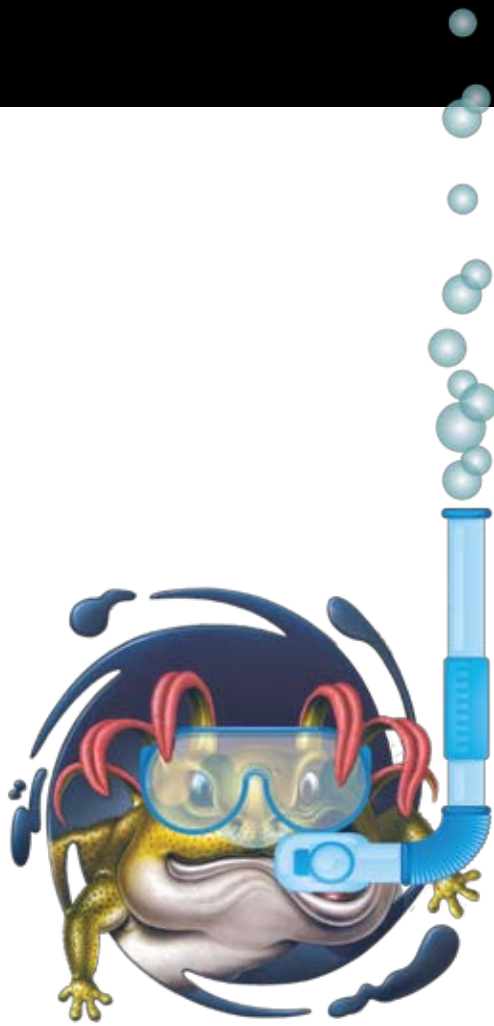


Nomadic Environmental



Subsea Fluid Treatment

- Helps ensure environmental compliance
- Allows operators to protect assets chemically
- Improves intervention efficiency of subsea architecture
- Removes oil, chemicals and other constituents
- Accommodates various media options



NEMOH™ (Nomadic Environmental Media Operated Host), is a novel, patent pending treatment vessel developed by CETCO Oilfield Services for processing and retaining fluid in a subsea environment. It is remotely operated and can operate at depths over 6,000 ft. NEMOH is an innovative solution for the problematic treatment of fluids at subsea levels and offers flexibility – it is able to be recovered in a reverse process, disconnected, or be guided by an ROV using a ship's winch, or it can be

moved along the seabed to another location for another application. It is also extremely effective, since it can treat a number of constituents depending on whether the materials need to be oxidized, coalesced or neutralized because it can be operated with different media types. NEMOH may also be operated as a stand alone vessel (single pass) or in combination in series (multi-pass) with additional vessels utilized for processing fluid with higher levels or multiple constituents.

Media Operated Host



CASE HISTORY

CETCO Oilfield Services Pioneer New Technology for Subsea Water Processing



**PROBLEM:**

A major deep water operator in the Gulf of Mexico had to find a way of treating water inhibited with chemicals in a subsea environment. Typically this work requires a topside facility or the use of multiple boats. However due to project delays, no topside equipment was available. This, coupled with the depth of the connections, called for an unconventional solution to treating the chemically contaminated fluids and releasing them at a subsea level.

At depths of up to 6,000 ft, subsea pipelines had been filled with water that contained a corrosion inhibitor and biocide which could be hazardous if released into the sea environment. The fluids needed to be treated in such a way that they would be safe to release into the surrounding marine environment.

The operator had to ensure compliance with local legislation regarding the release of a chemically treated discharge. To meet compliance, the water had to pass an acute toxicology test and have no visible sheen.

SOLUTION:

CETCO Oilfield Services was called in to assist on the project and responded with the deployment of a novel, patent pending treatment vessel that could operate at subsea levels of up to 6,000 ft.

NEMOH™, a Nomadic Environmental Media Operated Host, was designed by CETCO Oilfield Services as a hosting treatment vessel for processing and retaining fluid in a subsea environment.

An equalized underwater media vessel, NEMOH is designed to be flexible, portable, and can be used as a temporary installation. It is fitted with a protective cage and lifting frame and following it's immersion in water, is operated by underwater Remotely Operated Vehicles (ROVs). The

technology can operate at varying sea levels and in all types of marine settings including fresh, salt, or brackish water.

Similarly, NEMOH enables CETCO Oilfield Services to treat a number of constituents depending on whether the materials need to be oxidized, coalesced or neutralized since it can be operated with different media types.

When the treatment process is complete, NEMOH can either be recovered in a reverse process, disconnected, or be guided by an ROV using a ship's winch, or it can be moved along the sea bed to another location for another application.

The technology can be used in a closed system to protect a formation for re-injection or as part of a process to protect down stream equipment or process stream. NEMOH may also be operated as a stand alone vessel (single pass) or in combination in series (multi-pass) with additional vessels utilized for processing fluid with higher levels or multiple constituents.

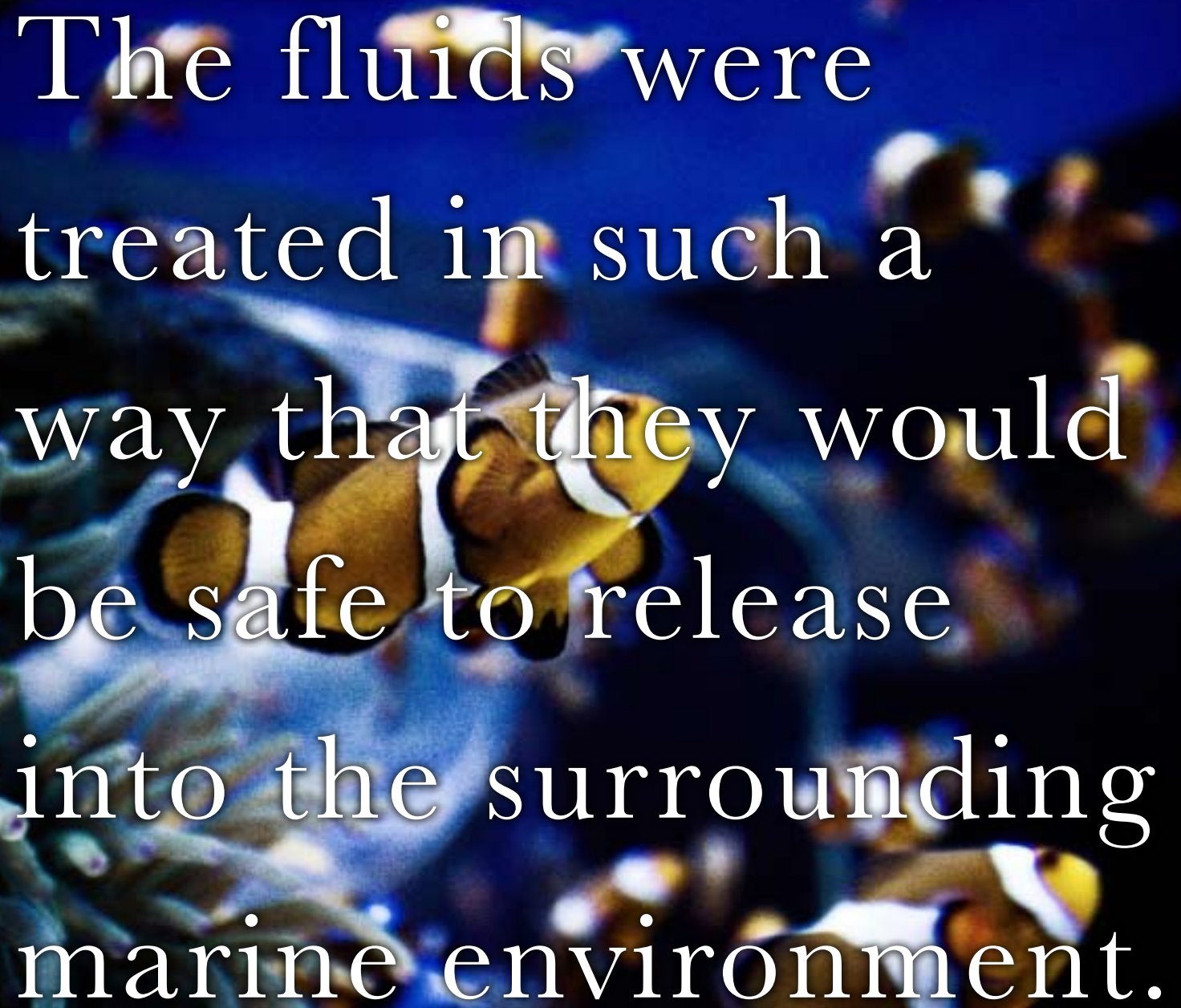
METHOD:

In order to effectively treat and discharge the fluid safely, CETCO Oilfield Services pioneered and deployed its NEMOH technology to the Gulf of Mexico.

NEMOH was immersed to depths of approximately 6,000 ft by a ship's crane that lowered it below deck until it was sighted by an ROV.

Once visualized, the operators of the ROV directed the winch and the movement of NEMOH to ensure that the skid had a safe landing on the bottom of the ocean. Once landed, the winch wire was disconnected and recovered to the surface.

WATER TREATMENT

A school of clownfish swimming in a blue ocean with coral. The fish are orange and white with black stripes. The background is a deep blue with some coral visible on the left side.

The fluids were treated in such a way that they would be safe to release into the surrounding marine environment.

The ROV communicated with NEMOH by a device known as a hot stab or quick couple hose line into the inlet. The ROV then connected the other end of the line to the outlet, known as the Pipeline End Termination (PLET).

All NEMOH equalization valves were closed to ensure the path of flow was through the inlet and outlet of the vessel only. Valve positions on both the PLET and on NEMOH were checked for correct positioning. NEMOH was then ready to receive fluids.

The same process can be undertaken on the downstream of NEMOH if valves are installed for outlets going to further processing, sampling devices, or into other equipment or pipelines.

OUTCOME:

An innovative technology for processing water at subsea level, CETCO Oilfield Services utilized NEMOH to treat fluids where there were no permanent facilities. By performing operations quicker than traditional topside methods, CETCO Oilfield Services was able to enhance production and ensure the operator complied with discharge legislation.

Following the success of this project, the operator chose to employ NEMOH technology to treat the field's entire subsea system. The project also demonstrated how NEMOH can allow operators to use chemicals to protect valuable subsea equipment and ultimately enhance asset protection and management.

Since then, CETCO Oilfield Services has been able to deploy its NEMOH technology to assist in various niche operating markets.



WATER TREATMENT | PIPELINE | WELL TESTING | WASTEWATER | RENTALS | NITROGEN | REELED TUBING



CETCO
OILFIELD
SERVICES

New Orleans, Louisiana 504.636.3500
Broussard, Louisiana 800.432.0054
Houston, Texas 281.578.8911

cetcooilfieldservices.com



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