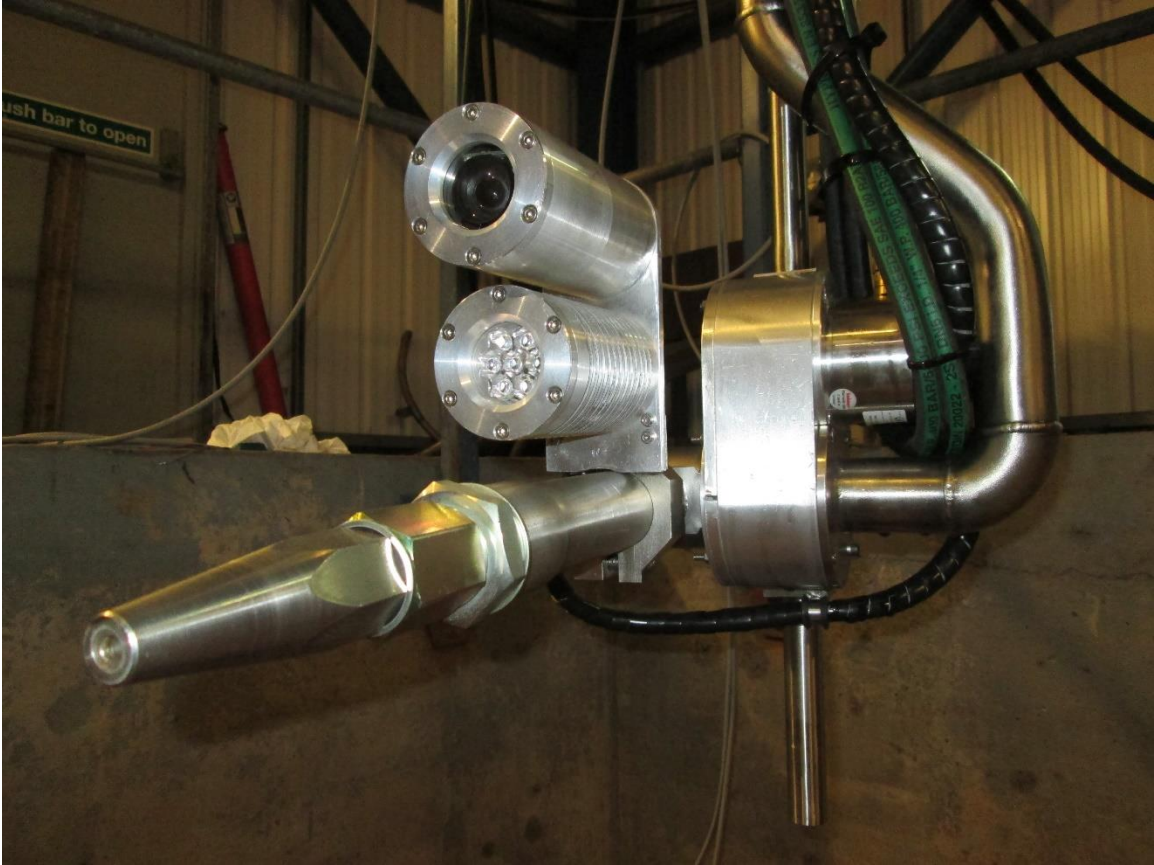




## Mud Cannon System



Remote Systems for Hazardous Environments



## About Us

Established more than twenty years ago, Non Entry Systems Ltd (NESL) is a leading global manufacturer of specialist non-man entry tank cleaning equipment, sludge handling equipment and sludge treatment & oil recovery plants.

NESL is located in Swansea, South Wales in the United Kingdom and operates from an eighteen thousand square-foot facility. As all equipment is conceived, designed and manufactured on-site the facility incorporates offices, R&D, design, fabrication, assembly, testing, preparation & painting, and electrical workshops.

NESL are renowned experts in the design, manufacture and delivery of specialist equipment and systems and offer quality tailored solutions and systems that meet the needs of professional safety conscious contractors. We work closely with our customers, suppliers and end users to ensure compliance with the varying regulatory specifications in different countries. All NESL products are built to operate and last in hazardous environments and as such all products conform with the latest industry regulations such as ATEX, UL, and CE. In addition, all of the company's products are designed with functionality and user-friendliness in mind.

To ensure the highest standards possible, NESL has its own project managers who oversee each and every build. Components not manufactured in-house are sourced from trusted suppliers not only locally but from around the world that meet the same high levels of excellence as NESL. Each major component is catalogued, every serial number recorded and each item of equipment built by highly trained and experienced individuals.

All of the company's products and systems are the result of decades of design, testing, engineering expertise, innovation, dedication and first-hand experience of tank cleaning and its challenges. All these factors have contributed to NESL's equipment operating on storage facilities and refineries around the globe. Through our network of global agents, we are able to respond to any request, at any time.

## Clients Include

- Department of Energy – United States
- IBKA – Europe
- Veolia – Europe & United States
- Evergreen – Canada & United States
- Waste Reduction Services Ltd – United Kingdom
- KSS – Kazakhstan
- Environ – Nigeria
- Sepor – Spain
- Clean Harbors – United States
- PSC – United States
- NG – Norway
- Denholm Macnamee – United Kingdom
- PetroTech Services – United Kingdom

## Products & Services

Whatever requirements you or your client have we have a solution available and in the rare circumstances we don't have one readily available, we'll work with you and your client to find one. NESL have been put to the test many times in the past and have always been able to provide an innovative, cost effective and safe solution.

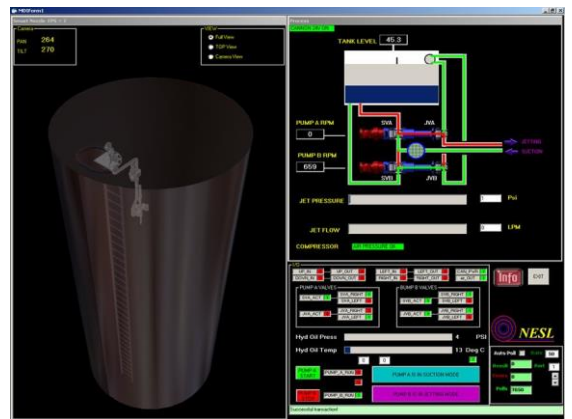
The system came together as a result of repeated requests from contractors who required a method of cleaning drilling mud tanks aboard ships that didn't use vast quantities of water and chemical. Building on years of innovation a modified cannon was used along with various other new products and the Mud Cannon Systems was born. The cannon system can be further modified by changing certain components to produce a higher outflow for the cleaning of FPSO tanks.



The Mud Cannon System is comprised of three main elements:

- The Wash System
- The Recovery System
- The Separation Process

One of the advantages of the system is that it is designed to closely mimic the actions of the tank being cleaned manually. The nozzle has an HD camera and high intensity light installed; the nozzle is directionally controlled (370° in the horizontal plane and 190° in the vertical plane) by an operator sitting at a control desk in the ATC. The operator has a video screen allowing him to see "what the nozzle sees" and a trigger which will initiate flow through the nozzle. The operator controls and views the cleaning progress from the control desk and has the capability to add predefined volumes of the micro-emulsions, trigger (and stop) the washing jet, adjust the wash jet flow / pressure and initiate cleaning of the camera and light lenses from the console. The operator also has access to various process and equipment alarms and statuses which are necessary to ensure consistent and safe operation of the cleaning system.



The wash system incorporates an operator control station, a jetting pump, Smart nozzle and the umbilical which reaches between the ATC and the nozzle head. The recovery system can comprise of a vacuum truck which has been fitted with a modified top man way hatch which has a floating suction installed, and the vacuum hoses between the PSV tank and the vacuum truck. The separation process starts in the vacuum truck, where the liquid and solid portions of the recovered waste are separated, and extends into the ATC where the fluids are transferred through a filtration system into the wash fluid reservoir using the one of the jetting pumps. Within the wash fluid reservoir, a further separation takes place using a top weir and surface skimming system to remove the oil element of the liquid transferred from the vacuum tanker.

The nozzle is installed into the PSV tank via a man-way adaptor plate, which also has fittings to allow the vacuum hose (for removal of waste) to be installed. The nozzle is connected to the ATC via a multi element umbilical which includes the hydraulic power lines for nozzle movement control, electrical connections for the camera and light, wash fluid delivery hose and the camera & light lens cleaning lines and the gas detection system electrical connections. 70m of umbilical is provided and stored on a dedicated reel.



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