



OSBORS

Oil Stop Bottom Oil Recovery System

Oil Spill Response in the Marine Environment Workshop

February 26-28, 2013

California Department of Fish and Wildlife
Office of Spill Prevention and Response
and Chevron Corporation



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US Coast Guard
Research and Development Center
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DESIGNING A SUBMERGED OIL RECOVERY SYSTEM

“For spills of submerged oil, current methods are inadequate to find and recover the oil with responders having to reinvent the techniques on each occasion. The Coast Guard R&D Center (RDC) has embarked on a multi-year project to develop a complete approach for recovery of spills of submerged oils.....

Even though heavy (sinking) oils have historically accounted for a small percentage of spills, environmental and economic consequences resulting from a spill can be high. Heavy oils can sink and destroy shellfish and other marine life populations in addition to causing closure of water intakes at industrial facilities and power plants. The underwater environment poses major problems including poor visibility, difficulty in tracking oil spill movement, colder temperatures, inadequate containment methods and technologies, and problems with the equipment’s interaction with water.

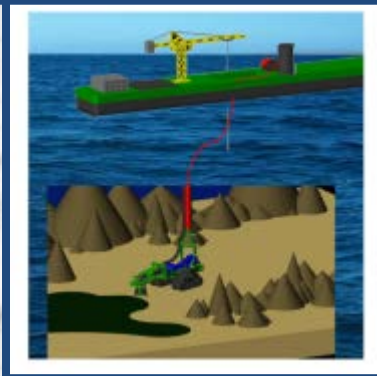
..... the next step of developing an integrated system that can provide the full operational capabilities of detection and recovery of oil sitting on the bottom.”

-- Kurt Hansen USCG, R+D, et. al.
Proceedings, International Oil Spill
Conference 2011

OSBORS CONCEPT – 3 Recovery Modes

SUBDREDGE MODE

- REMOTE OPERATED VEHICLE
- PUMPING 200 FEET VERTICAL (Single Pump)
- UP TO 500 FEET WITH BOOSTER PUMP
- PLC CONTROLLED BOTTOM CUT DEPTH TO 3MM
- 6- INCH PUMP (2000 GPM) OR 8-INCH PUMP (3000 GPM)



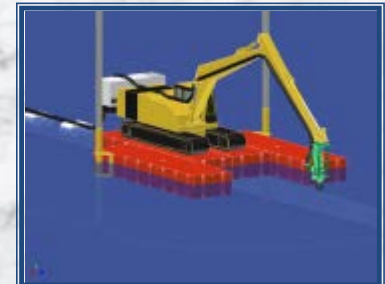
NINJA MINI DREDGE

- Smaller Version of SubDredge
- Hydraulic Operation
- Closed-circuit video monitoring inside cab
- 10 x lighter than SubDredge
- 4-Inch Eddy Pump—1000 GPM; 60% Solids
- 100 feet Operating Distance from Control (Combination length a depth)
- Self-Launch from Shore or crane assisted from vessel



EXCAVATOR MODE

- Custom-made Excavator Arm Attachment
- Power Takeoff from Excavator Hydraulics
- Closed-circuit video monitoring inside cab
- Foot throttle controlled activation and speed
- 4-Inch Eddy Pump—1000 GPM; 60% Solids
- Operating Depths to 40 feet
- Shoreline operation or barge mounted



Tornado Motion Technologies Sub-Dredge



Current Specifications

(Electric Drive)

- Weight: 28,000 Lbs.
- Length: 18 Feet
- Width: 8.5 Feet
- Height: 9 Feet

The Sub-Dredge is completely remote operated by land/barge controls and follows the underwater terrain in order to create level cuts and eliminate over-dredging.

Down pressure controlled in MM to hover and reduce uncontaminated solids recovery

The Sub-dredge also comes equipped with a stinger attachment with diver operated controls for more challenging material removal around debris.

Operates in any depth. Requires booster pump for over 200 feet depth.

Eddy Pump has capacity of up to 230 cubic meters per hour (1450 Bbls/hr) and low turbidity effect

NINJA Mini Dredge

Fits in bed of a pickup truck
Only 2,900 Lbs.
Second version developed with complete wireless remote control and video feed.
Eliminates umbilical and increase operating range



Closed Circuit Video
For monitoring vehicle progress and visual detection of oil.
Second camera can be mounted on mast for greater field of view

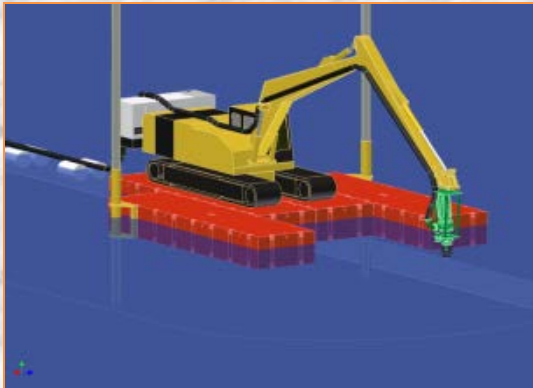
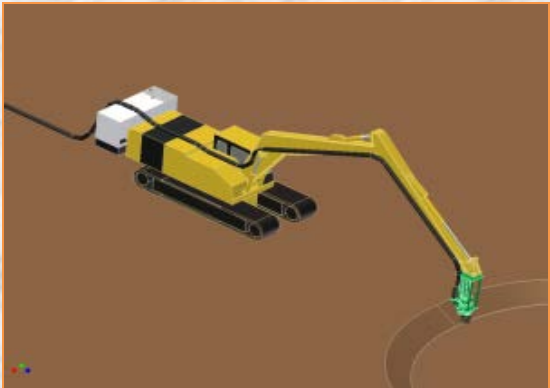
EXCAVATOR MODE



Wheels and Rock Guard Installed



Wheels and Rock Guard Removed



The Eddy Pump

The EDDY Pump is NOT a class of centrifugal pump nor a vortex type pump.

The EDDY PUMP is a patented and proven application of the tornado phenomenon which creates and harnesses a dynamic fluid eddy effect within the pump housing and inlet. This effect is similar to that which occurs in a tornado.

In the EDDY Pump, a very strong synchronized central column of flow develops from the pump rotor to the pump inlet and creates a low pressure reverse eddy flow from the pump inlet to the pump discharge.

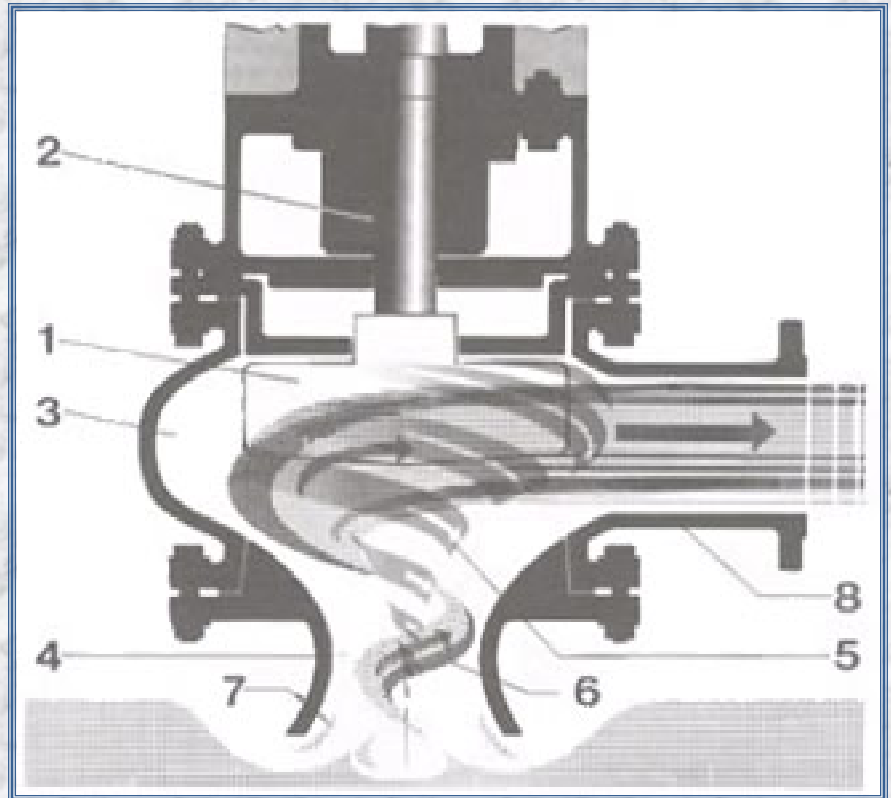
This action enables the EDDY Pump to achieve significant operational and maintenance performance improvements above and beyond centrifugal and vortex pumps.

The Eddy Pump consists of an energy generating **ROTOR (1)** attached to the end of a **DRIVE SHAFT (2)** and placed within a **VOLUTE (3)**.

As the ROTOR begins to spin, it sets into motion the ambient fluid present within the VOLUTE and the adjoining **INTAKE CHAMBER (4)**.

At normal operating speed, this spinning fluid is forced down, into the hollow center of the INTAKE CHAMBER where it creates a high speed, swirling **SYNCHRONIZED COLUMN OF FLUID (5)**, which agitates the **MATERIAL (6)** to be pumped (sludge, sand, clay etc.)

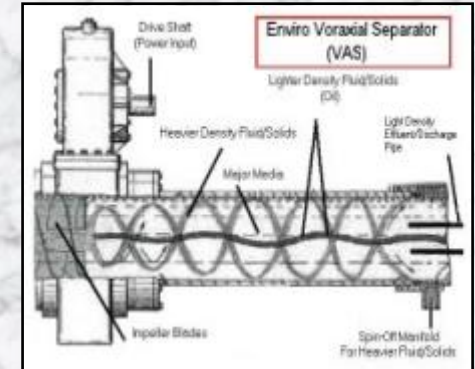
This swirling column of fluid creates a peripheral **"EDDY" EFFECT (7)**, which causes the agitated material to travel by reverse flow, UP, along the sides of the INTAKE CHAMBER, into the VOLUTE. Here the material, under pressure from below, is forced into the **DISCHARGE PIPE (8)**.



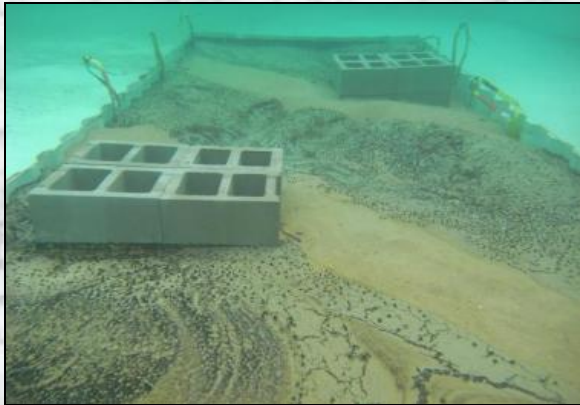
TOP-SIDE SUPPORT



- 3-PHASE SEPARATION (OIL-WATER-SOLIDS)



OSBORS – OHMSETT TEST



OSBORS
OIL STOP DIVISION
OF
AMPOL

250 Ft.

STAGING EMPTY ROLL OFFS

20-yd roll off

20-yd roll off

STAGING EMPTY ROLL OFFS

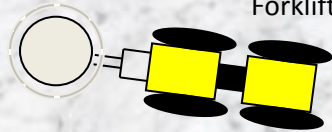
20-yd roll off

20-yd roll off

OIL MAT COLLECTION

20-yd roll off

Articulating Forklift
or Extendable Reach
Forklift



Material Receiving ROLL OFFS



TMT
Subdredge
Support trailer
48' x 8'



High Tide Line +20 Ft.

Free Water Return

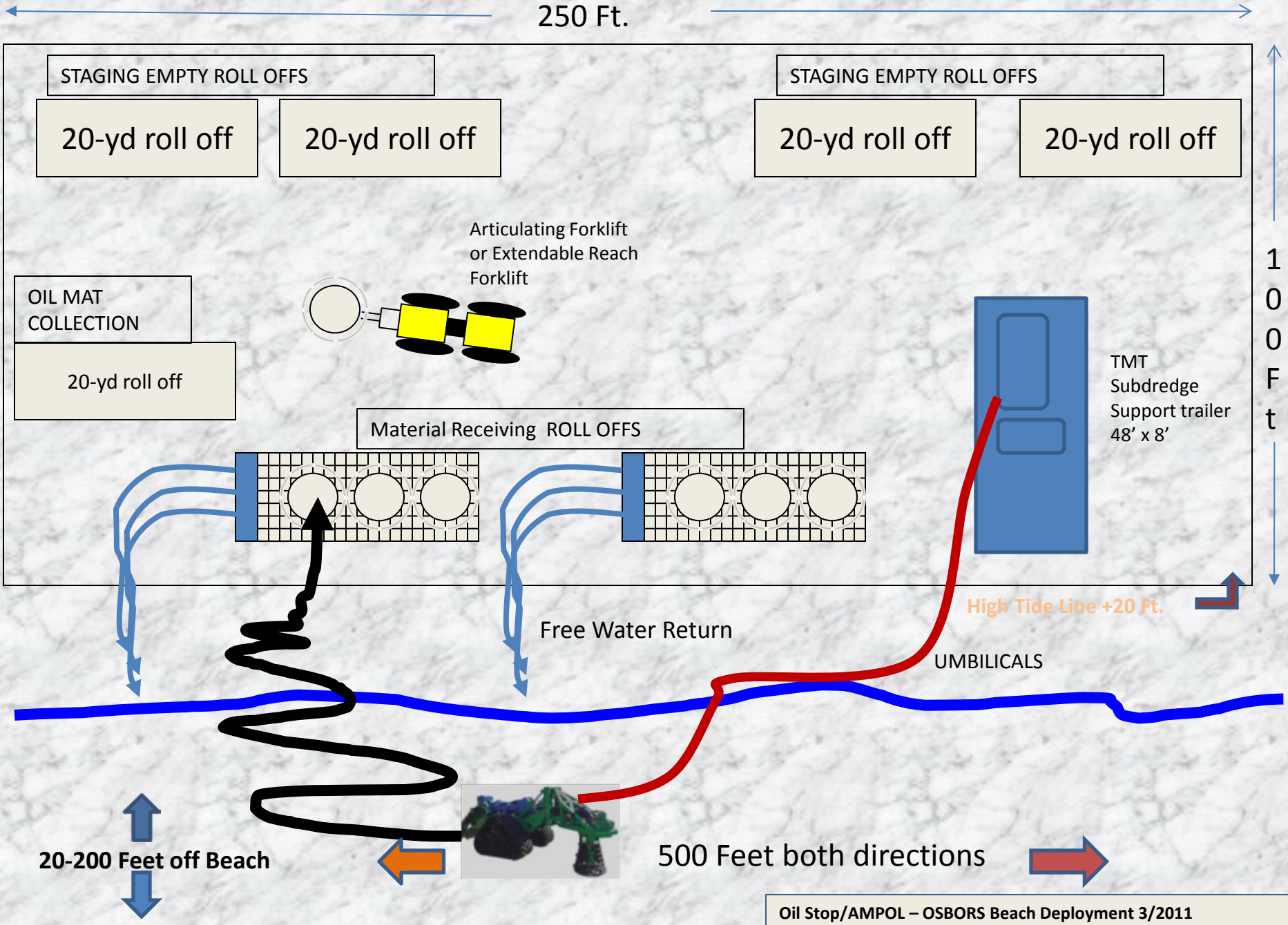
UMBILICALS

20-200 Feet off Beach

500 Feet both directions

Oil Stop/AMPOL – OSBORS Beach Deployment 3/2011

100 Ft



OSBORS – SUBMERGED OIL REMOVAL – BEACH OPERATIONS

