



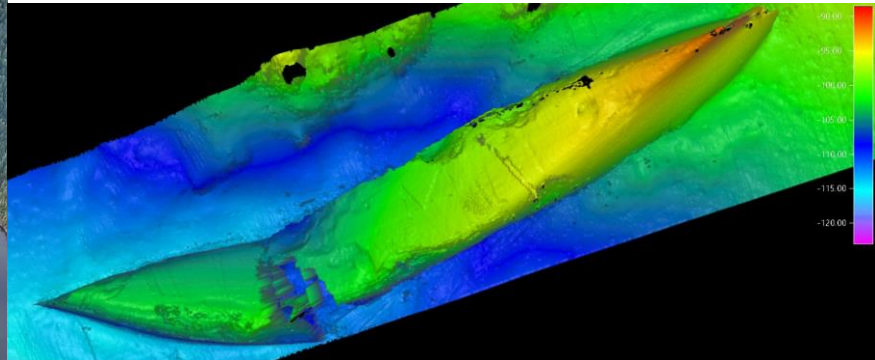
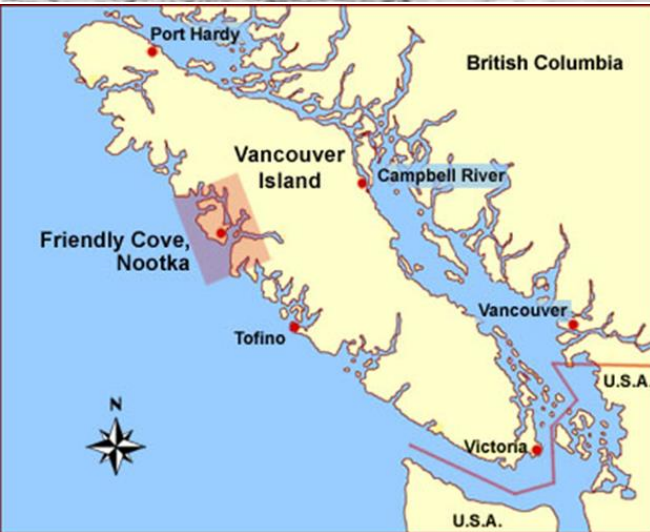
Oil Recover and Water Treatment
From Submerged Shipwreck

MV Schiedyk Oil Recovery



MV Scheidyk Ship Wreck – Bligh Island

- 147-metre cargo ship, sank in 1968 striking a submerged ledge to sink in 120 metres of water on the east side of Bligh Island.
- Sheen reported Dec. 2020, CCG established an Incident Command Post to conduct monitoring and containment operations.
- Heavy fuel oil and diesel posed a significant threat to the pristine marine environment of Nootka Sound
 - (traditional territory of the Mowachaht/Muchalaht First Nation)



Close collaboration between multiple parties



THE OBJECTIVE

Resolve Marine led the operation, including the Canadian-registered Atlantic Condor vessel, which acted as the operations platform on the water.

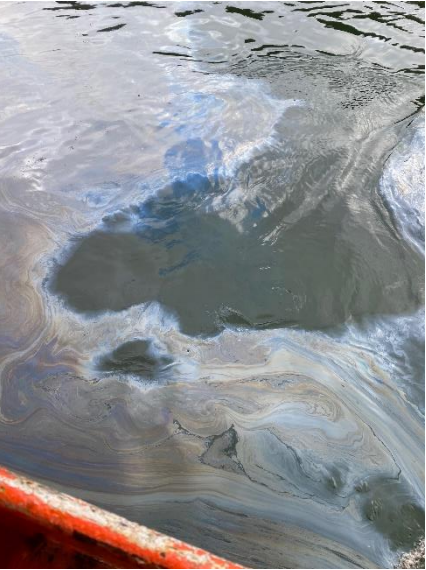
Due to the depth, remotely operated vehicles (Helix) were required to drill holes into the vessel's four fuel tanks and secure a drainage valve with a hose attached for pumping operations.

To remove the heavy fuel oil, hot water was injected into the tanks to improve flow. The oil and water mixture was then pumped to the surface through the hoses and onboard the Atlantic Condor, where the oil and water were separated. The tanks onboard the MV Schiedyk were then flushed until fuel was no longer detected.



LOGISTICS CHALLENGE #1 - DEPTH

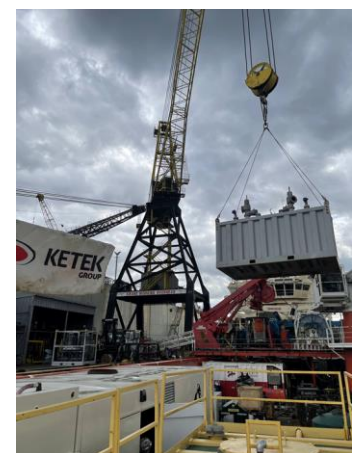
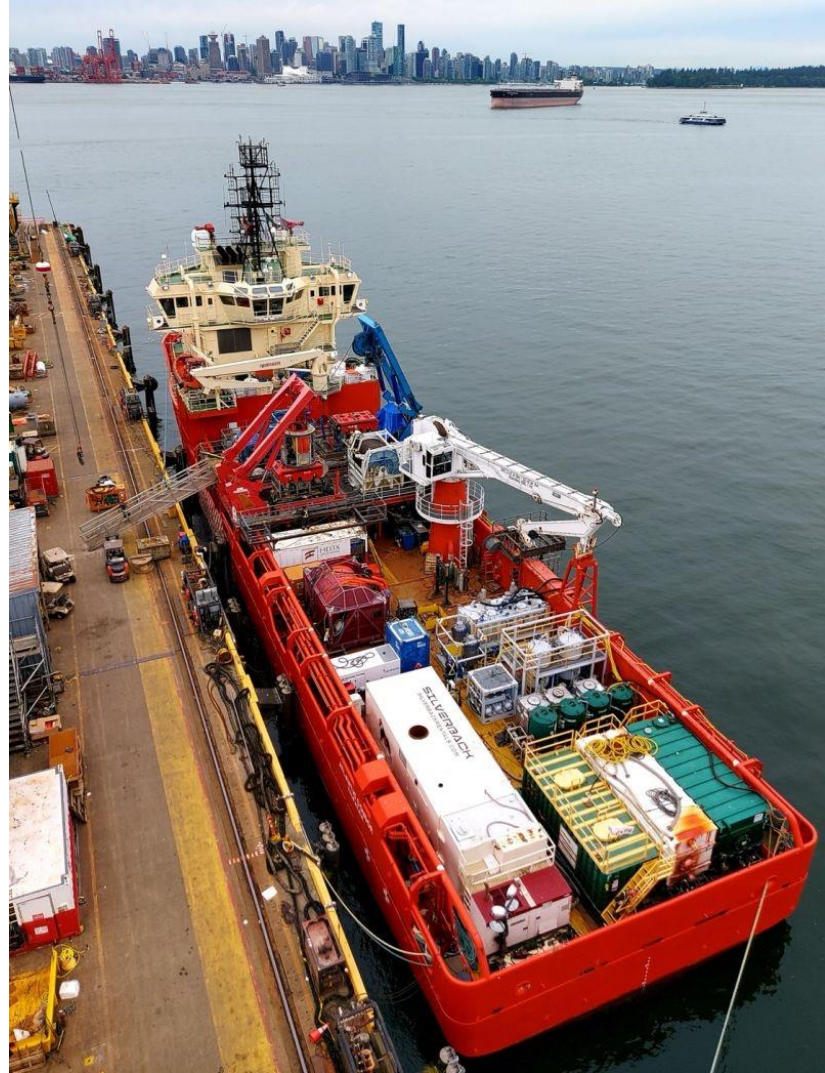
- Specialized ROV carefully drilled holes and secured valves into the hull of the vessel to access the fuel tanks (hot-tapping)
- Hot water generated on the Atlantic Condor will be pumped into the tanks
- The oil-water mixture will then be pumped to the surface/deck where oil will be separated from the water; and the water will be reused in the operation.



LOGISTICS CHALLENGE #2 – WORK SPACE

Equipment to handle both logistical and oil/water treatment scenarios, various contingencies along with requisite redundancy needed to fit within the deck space of the Atlantic Condor PSV.





HEAVY OIL & WATER SEPARATION CHALLENGE

Heavy oil has a very high viscosity and typically heat is needed to increase temperature to allow the oil to be pumped out of the hull of the ship. Fine emulsions are often difficult to treat.

1

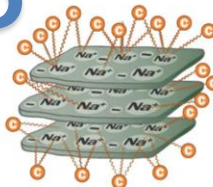


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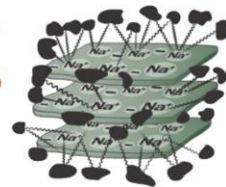


Sodium Bentonite

3



Chemically Altered Clay;
CETCO® ORGANOCLAY



CETCO® ORGANOCLAY
Saturated with Organic Matter

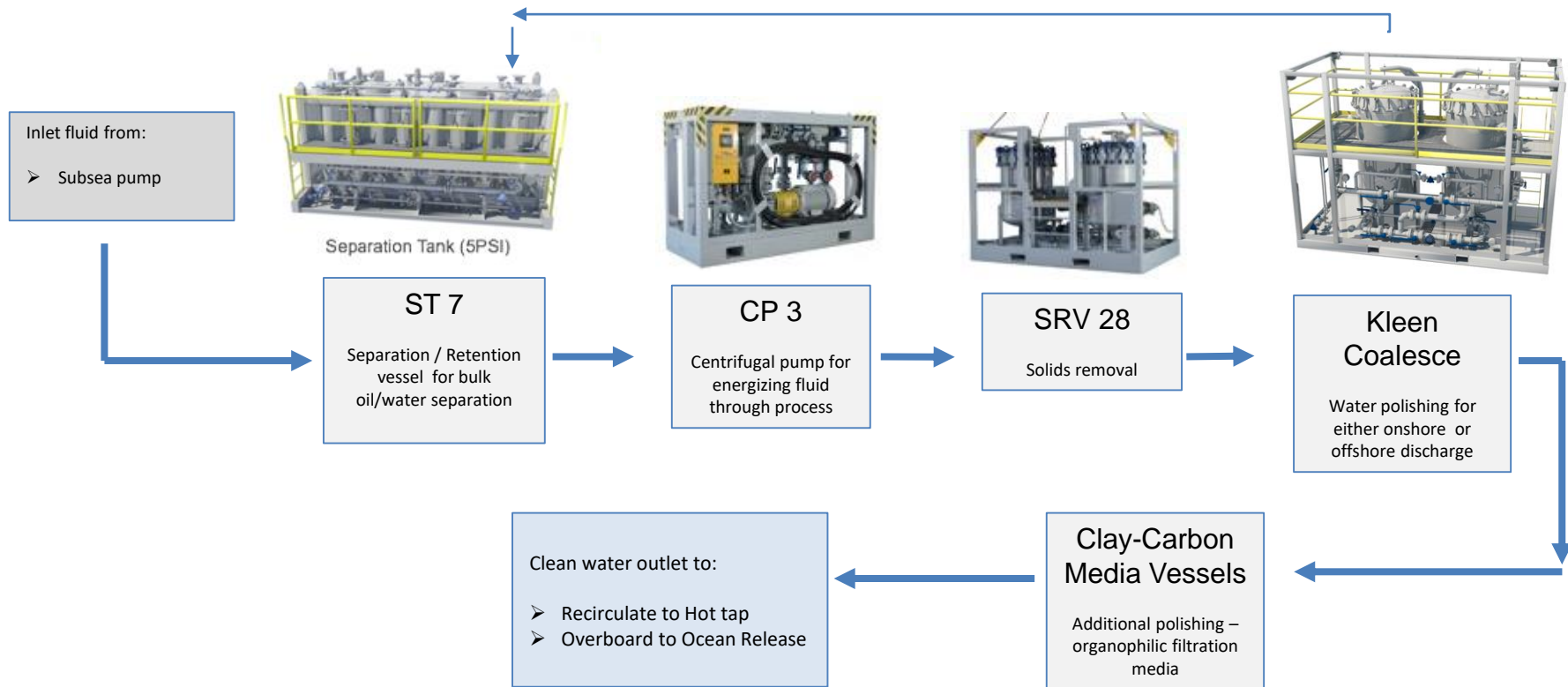


- Low consumables
- Oil removal
- Longevity of operations

Produced water



Process flow for oil recovery application







Produced Water



SUMMARY

- Watched by many government officials and local residence to ensure we did everything as designed and there were no further environmental impacts.
- Project duration - 1 month - with a total of 20 days on the ship recovery the heavy crude from a total of 4 tanks
- Successful removal of approximately 60 tonnes of heavy fuel oil and diesel from the MV *Schiedyk* (*in addition to* , more than 50 tonnes of oil and oily waste recovered since the start of the response in December, 2020)
- Collaborative effort of multiple specialized parties
- *“Oil & Water Separation Equipment and Process used was a huge contribution to the success of the project and has established the new standard”*
----- Canadian Coast Guard

Coast Guard announces successful removal of bulk oil from the MV Schiedyk shipwreck in British Columbia

[Fisheries and Oceans Canada, Pacific Region](#)

Jul 12, 2021, 12:00 ET

"My sincere thanks to all the partners involved in the response to the MV Schiedyk. This was a challenging operation, given the depth of the vessel and the remote location, but a critical one. Marine pollution is a serious threat to our oceans and the marine life they sustain. The success of this operation is a great relief, and the direct result of the expertise, teamwork and dedication of all involved."

The Honourable Bernadette Jordan, Minister of Fisheries, Oceans and the Canadian Coast Guard





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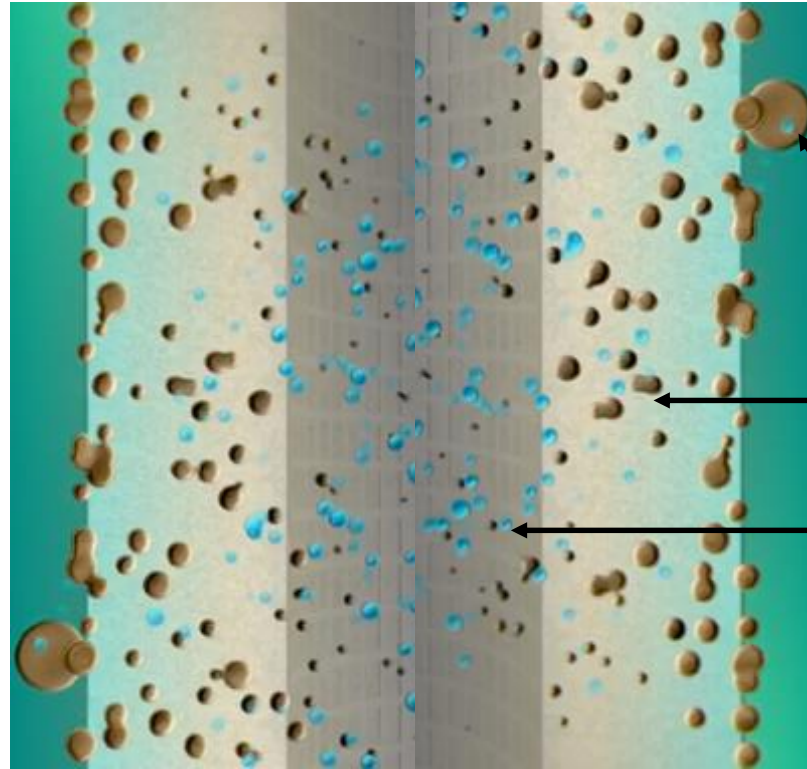
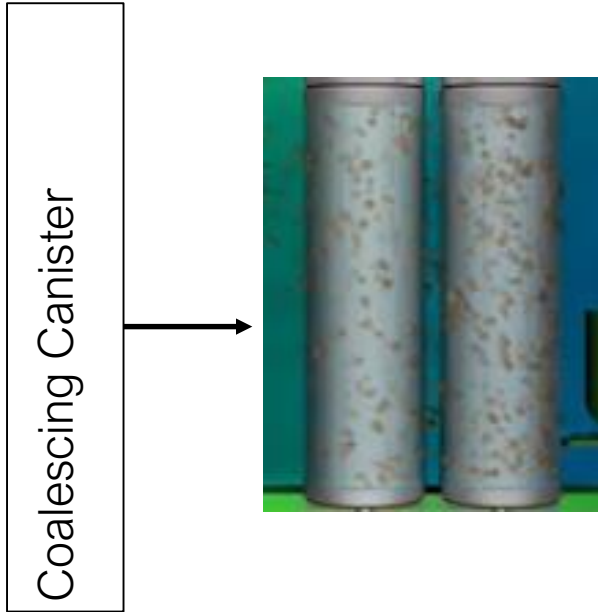
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Theory of coalescing

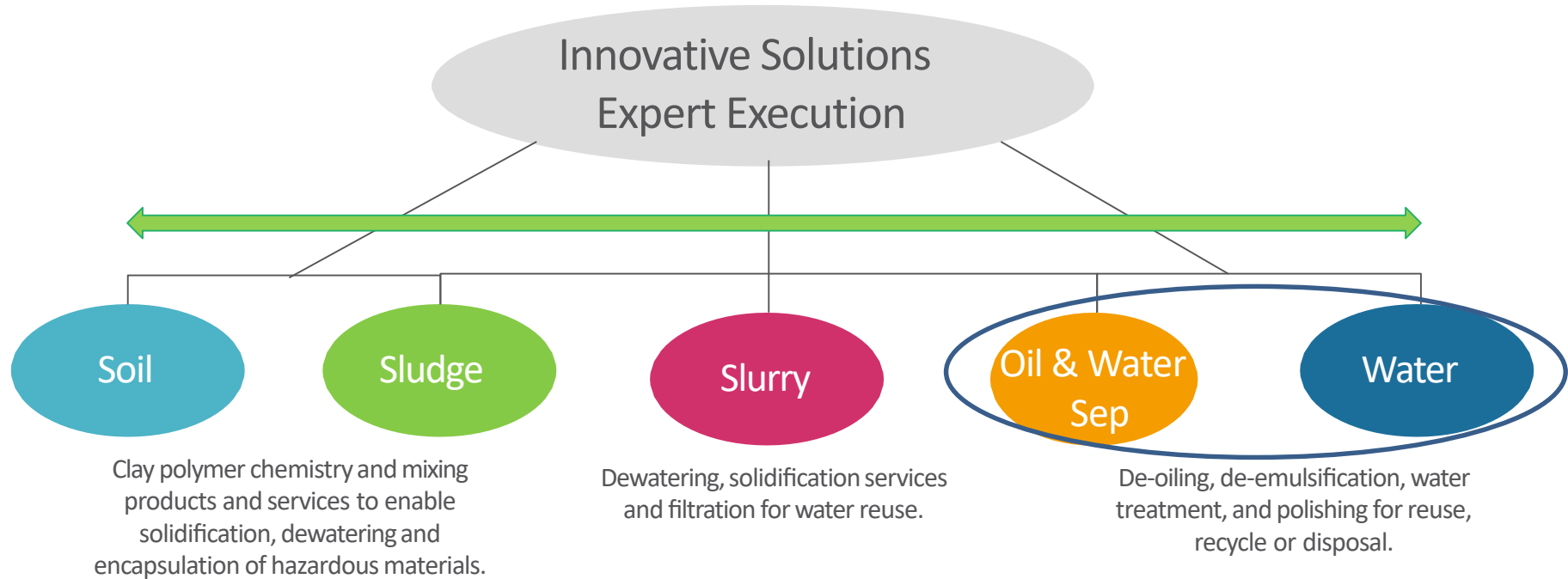


Larger oil droplets rise

Droplets merging

Small oil droplets

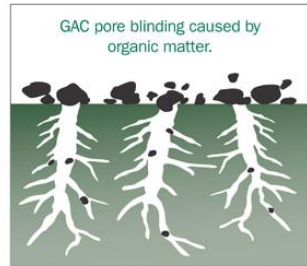
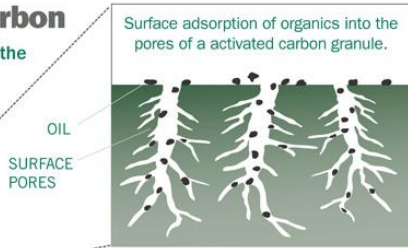
Claytek Spectrum of Capabilities



Removing organic contaminants from water or sediment

Granular Activated Carbon

GAC loses efficiency due to blinding of the surface pores by oil and grease.



A little goes a long way - and reduces costs

Because ORGANOCLAY can be used as a pre-treatment to Granular Activated Carbon (GAC), ORGANOCLAY can increase overall efficiency by preventing surface pores in GAC from blinding.