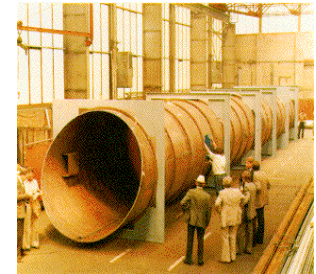


MONARCH'S OFFSHORE DISPOSAL CAISSONS

Treatment Caisson

Designed by Monarch's engineering staff and fabricated at Monarch's manufacturing facility in Houston, Texas, [Monarch's Treatment Caisson \(TC\)](#) is a vertical pipe or vessel incorporating an array of proprietary internal components. Whether separating and capturing free oil and/or residual solids from a produced water process, open or closed deck drains, each Monarch PWTC is designed to meet the demands of the offshore environment and sized for effective removal and disposal from an offshore platform.



MONARCH'S OFFSHORE DISPOSAL CAISSONS



Monarch's Offshore Disposal Caissons...

- Disposal technology designed to prevent free oil discharges from offshore platform's open or closed drain systems.
 - Space saving technology enabling unique disposal and/or treatment of water below sea level.
 - Meets EPA and MMA offshore regulations
-

Disposal Caisson

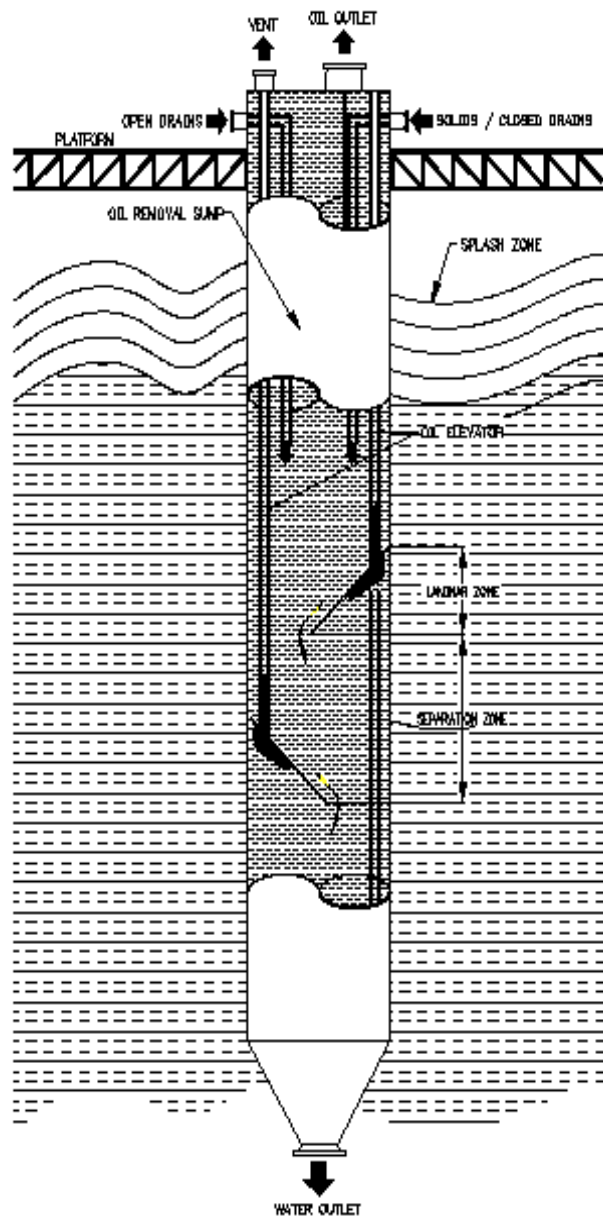
Engineered per our client's specific produced water conditions, Monarch offers disposal caissons with or without our proprietary internals and in two (2) specific designs.

[Monarch's Open Pile Disposal Caissons \(OPDC\)](#) is designed and installed in conjunction with a produced water treatment train, i.e. Monarch Coalescer, Monarch CPI, Monarch Deoiler Hydrocyclone, Monarch IGF and/or combination thereof, and features a water discharge port below the sea level surface and at the lowest point of the unit for free disposal of water.

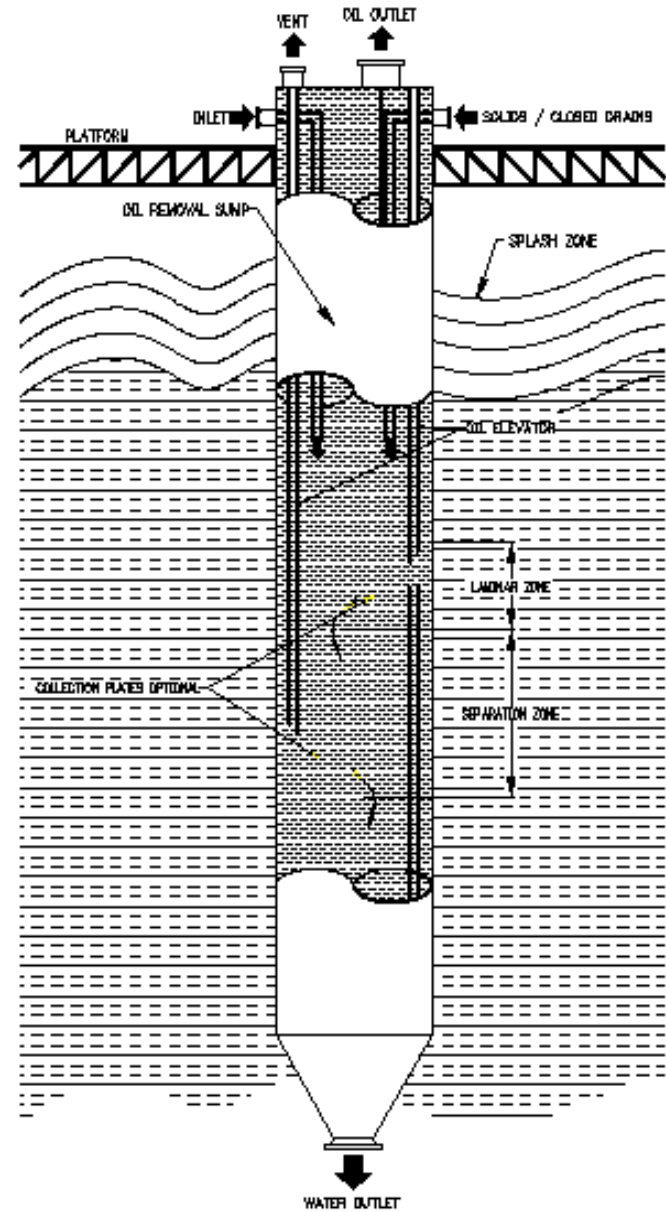
[Monarch's Closed Pile Disposal Caissons \(CPDC\)](#) is designed and installed in the same manner and for the same purpose as Monarch's OPDC. The primary difference is the design of the CPDC's water discharge port and vessel. The CPDC features an external water discharge boot and stable bottom, allowing for below the sea level surface water discharge, while maintaining external control of the operating level within the CPDC

Much like Monarch's PWTC, Monarch's OPDC and CPDC are vertical pipes or vessels designed for the rigors of the offshore environment and for disposal of water beneath the sea level. Monarch's OPDC and CPDC offers design flexibility and utilizes retention time as its primary design component. Monarch's OPDC and CPDC are also designed by our engineering staff and fabricated at Monarch's manufacturing facility in Houston, Texas.

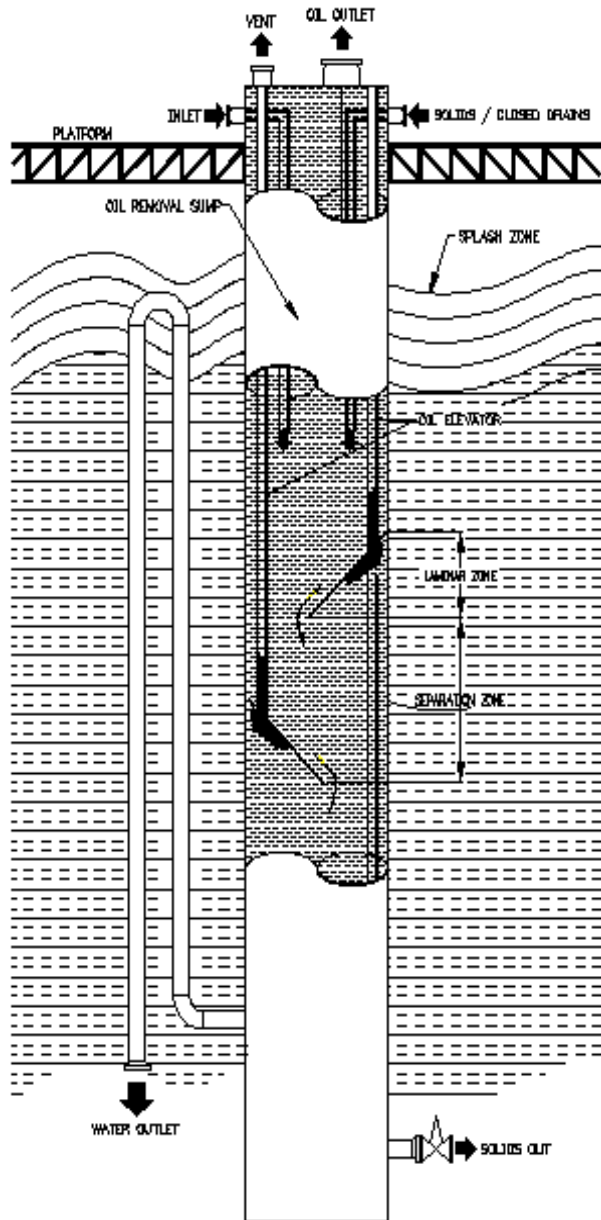
MONARCH'S TREATMENT CAISSON (TC)



MONARCH'S OPEN PILE DISPOSAL CAISSON (OPDC)



MONARCH'S CLOSED PILE DISPOSAL CAISSON (CPDC)



Primary Process Design Parameters:

Inlet/Outlet Process Parameters: Inlet micron size and outlet removal micron size must be determined to effectively design the Monarch Offshore Disposal Caissons. This is a primary parameter of Stokes Law, one of the governing principles behind determining the performance of a Monarch Offshore Disposal Caisson.

Flow Rate: Monarch's Offshore Disposal Caissons are designed for worst case, intermittent flow parameters. As with most water treatment equipment, flow rate must be considered to effectively design the hydraulic demands and performance requirements of the Monarch Offshore Disposal Caissons. All platform flow rate sources must be considered by the process engineer including wash-down water, produced water, and open or closed drain water.

Water Depth: Establishing the details of the operating environment or water depth enables us to analyze and determine the best Monarch Offshore Disposal Caisson.

Caisson Retention: Monarch's Offshore Disposal Caisson's retention time is optimized to meet the performance and economic requirements of the project. Depending upon the particular application and design experience, retention times range from 5-30 minutes and the Reynold's Number is maintained below 1000 to assure laminar conditions with the caisson.

Offshore Disposal Caisson Sizing Information:

Company: _____ Address: _____
 Contact: _____ Phone: _____
 Fax: _____ Email: _____

Caisson Specification:

Monarch Design (TC)(OPDC)(CPDC): _____
 Water Depth EL: _____ Wash Water Temp (Min/Max): _____
 Deck Elevations: Cellar: _____ Boat: _____ Other: _____
 Operating Wave: _____ to + _____
 Required Splash Zone Protection: _____
 Maximum Length: _____ Maximum O.D.: _____
 Wall Thickness: _____ Pump Pressure Req'd: _____
 Internal Paint Spec's: _____ External Paint Spec's: _____
 Utilities: Power: _____ Air/Gas: _____ Other: _____

Process Data:

Oil S.G.: _____ H2O S.G.: _____
 Viscosity: _____ Temp (Min./Max): _____
 Rainfall Data: _____ Deck Area: _____
 Oil PPM Inlet: _____ Oil PPM Outlet: _____
 Oil Micron Inlet: _____ Oil Micron Outlet: _____