

## Enviro-Cell™ EC-3V Vertical Induced Gas Flotation Unit

The produced water treatment system is an integral part of any offshore production facility. All produced water generated in an offshore field is treated on the facility with the produced water treatment equipment available. This equipment must be able to meet stringent discharge requirements, or risk environmental impacts and hefty noncompliance citations and fines.

In an effort to increase platform production through the addition of wells while correcting excessively high levels of oil in the overboard discharge, leading to sheens and noncompliance, a Gulf of Mexico Major Oil Company Facility, processing 2,400 barrels of produced water daily, directed its engineers to find the best available technology on the market for secondary produced water treatment. After extensive comparison, the Enviro-Cell™ (EC-3V) Vertical unit was chosen for rental and testing due to its advanced features and benefits over many mechanical style vertical designed Induced Gas Flotation (IGF) units.

The benefits of the Enviro-Cell™ IGF unit includes:

- Vertically aligned cylindrical design for structural stability, minimum corrosion, and reduced space consumption.
- No mechanical moving parts inside the equipment.
- Lower maintenance requirements with hydraulic style Eductor compared to the mechanical style agitators.
- Elimination of wiper system by using innovative spillover v-notch weirs.
- Online maintenance without equipment shut-in.
- High oil and grease removal efficiency of 90-98% with varying produced water characteristics.
- Operating and maintenance costs associated with Enviro-Cell are lower over the equipment's life span.



*Enviro-Cell™ (EC-3V) Vertical Used in testing Process*

Possessing similar attributes to the a Horizontal IGF, the Enviro-Cell (EC-3V)

Vertical is capable of processing 3,000 BWPD while capitalizing on its compact design for reduced space consumption; making this unit perfect for applications where space availability is limited.

Positioned downstream of the existing skimmer, the Enviro-Cell (EC-3V) Vertical is the most effective and efficient vertical induced gas flotation (IGF) unit available for secondary oil/water separation. The Enviro-Cell (EC-3V) Vertical consists of multiple active cells; the oily produced water enters the Enviro-Cell (EC-3V) Vertical tangentially at the inlet near the top of the vessel. The inlet is strategically located to enhance the incoming flow, creating a centrifugal vortex allowing immediate free oil removal and facilitating the remaining flotation process to properly function in aiding increased separation. The oily water is then directed downward for additional droplet coalescence, allowing the droplets to rise and combine at much shorter distances for separation; thereby, accelerating its removal.

The Enviro-Cell (EC-3V) Vertical unit uses a four chambered eductor system to create minute bubbles incorporating advanced Venturi principles. These bubbles attach to the remaining oil particles and carry it through the coalescing pack to the top of the vessel where it joins the already separated free oil and are removed as the oily froth flows over a V-notched weir into a single oil bucket.

Online maintenance of the vessel can also be carried out without shutting down the equipment operation as there is always a standby pump. The samples are using inlet and outlet sample connections provided with the tank. The collected oil is sent back through the facility process while the clean water is discharged overboard.

In order to validate the effectiveness of the Enviro-Cell (EC-3V) Vertical, sample points were selected at both the inlet, which was fed directly from the existing skimmer and the outlet, then discharged overboard. The samples were taken and tested periodically. Enviro-Tech Systems' Advanced Sensors Oil in Water Analyzer provides instant remote evaluation of overboard water quality by utilizing UV fluorescence, spectroscopy, microscopy, or for samples taken inline. The unit also has a continuous online ultrasonic cleansing process for inline cleaning. Chemicals were used for enhanced oil/water separation.

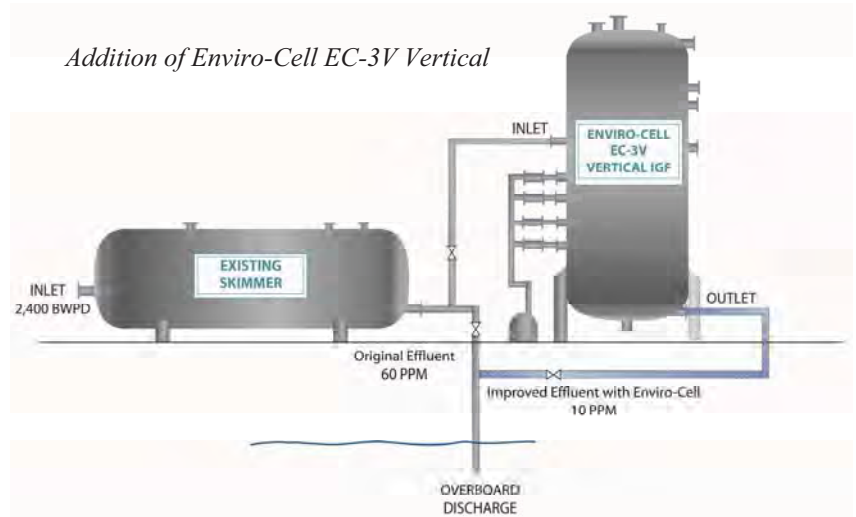


*Advances Sensors OIW Analyzer*

The operating parameters such as inlet water flow rate, gas blanket pressure, temperature and pH of inlet and outlet water streams, and oil and water discharge flow rates were monitored during the tests. The water samples were taken at both sample points and the results are as follows.

Reduced production capacity due to the inability to meet overboard produced water effluent requirements is a problem encountered by many processing facilities. It was found that the Enviro-Cell (EC-3V) Vertical with an inlet oil concentration of 60 ppm performed at a much higher level, as expected, with overboard oil-in-water content of less than 10 ppm continually. The Enviro-Cell (EC-3V) Vertical unit performed best with higher inlet hydrocarbon content indicating that the Enviro-Cell can handle surges and upset process conditions more effectively

*Addition of Enviro-Cell EC-3V Vertical*



than the existing skimmer. Therefore the addition of the Enviro-Cell (EC-3V) Vertical reduced the overboard oil concentration in the effluent allowing for operation to increase oil production to be within the maximum flow rate and still meet overboard discharge requirements.

For information on how Enviro-Tech Systems can improve your produced water process please visit the website at [www.EnviroTechSystems.com](http://www.EnviroTechSystems.com), or phone (985)809-6480.