



CELEBRATING 10 YEARS OF SEPARATION SOLUTIONS

CASE STUDY & REFERENCE PORTFOLIO

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"The first ever ProSep project, in 2005, was a three phase double ended mechanical electrostatic treater for the Gulf of Mexico. We could eliminate the use of a degasser vessel, because our horizontal flow/vertical grid system can be operated as a three phase unit"

Vince Buchanan, Crude Oil Technology Manager



When we started ProSep, back in 2005, crude oil production had peaked at 67 million barrels per day globally. Since then, total upstream spend has been \$4 trillion USD, of which \$350 billion was spent on US and Canadian unconventional oil and gas, with an additional \$150 billion spent on LNG and GTL (Douglas Westwood). About \$2.5 trillion was spent on legacy crude oil production, which still accounts for about 93% of today's total liquids supply. Despite the large investment, legacy oil production has declined by 1 mmb/d since 2005.

At the same time, the current water/oil ratio was estimated at 2:1 to 3:1 worldwide, converting to a water cut of 50% to 75%. Produced water was, and still is, a major issue for operators. In 2014 alone, 201.4 billion barrels of produced water were generated from oil and gas wells across the globe. Of these, 136.9 billion barrels were disposed of, and over 65 billion barrels were re-injected into oil fields, both onshore and offshore. As a result, produced water volumes are expected to rise to over 340 billion barrels by 2020.

In terms of gas production, it has continued to grow, with fracking and shale gas playing even bigger roles, in extraction and processing methods. The Eagle Ford, and Marcellus plays in Texas, for example, are continuing to see a rise in their production rates, and they need process technologies which are able to efficiently handle changing production rates.

The only constant in the last 10 years, has been the need for innovative technology companies to provide equipment, and solutions to process these ever changing product streams. Process technologies have continued to evolve; they are smaller, lighter, use less energy, less chemicals, and produce better results. Although technologies are evolving, I still use some of the same designs from back in 2005 today, what's that saying? If it ain't broke, don't fix it.

These project references, and case studies represent some of our most exciting, innovative, and challenging projects over the last 10 years. I hope you enjoy reading them as much as we enjoyed designing, engineering, manufacturing, and commissioning them.

CHANGING THE PLAYING (OIL)FIELD



Vince Buchanan, Crude Oil Technology Manager, discusses the changing landscape of the oil, gas, and produced water market, and how process technologies have evolved to meet the needs of operators.

2005 - BHP BILLITON - OIL TREATMENT

FACILITY: Neptune Platform

LOCATION: Deepwater Gulf of Mexico, Offshore USA

EQUIPMENT: One 14' ID x 50.34' T/T Three Phase Double Ended Mechanical Electrostatic Coalescer/Oil Storage Tank

APPLICATION: Oil Dehydration

The Neptune Platform is a tension leg platform (TLP) in approximately 4,250 feet of water requiring wave motion analysis of the process unit. This unit is unique in that it is a true three phase design with an electrostatic grid system under the influence of wave motion. Normally, these unit types (coalescers; dehydrators, desalters) are fluid packed (meaning there is no gas phase) requiring a separate degassing vessel.



DESIGN CONDITIONS:

Oil Flow Rate:	50,000 BPD
Water Flow Rate:	5,000 BPD
Gas Flow Rate:	6.0 MM scfd
Oil API Gravity:	19.41
Oil Density @ Operating T/P:	55.4 Lb/ft ³
Water Specific Gravity @ 60 °F:	1.0541
Water Density @ Operating T/P:	63.50 Lb/ft ³
Inlet / Operating Temperature:	200 °F
Operating Pressure:	25 PSIG
Viscosity @ Treating Temperature:	10.40 cP
Liquid in Gas Outlet:	0.1 gal/ MM scfd

Oil Content in Water Outlet:	200 ppmv
Water Content in Oil Outlet:	0.1 ppmv

This was ProSep's first project, which was won only 6 weeks after the company opened its doors.

PROSCAV™ CASE STUDY - H₂S SCAVENGING

FACILITY: North Sea, Åsgard B & Barge fields

LOCATION: Norwegian North Sea

EQUIPMENT: North Sea (8" ProScav), Åsgard B (24" ProScav) and Barge (16")

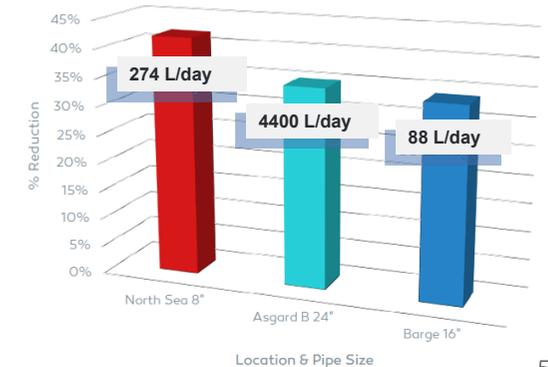
APPLICATION: H₂S Scavenging

The Åsgard oilfield lies on the Haltenbank in the Norwegian Sea, 200 km offshore Norway and 50 km south of Statoil's Heidrun field. The Åsgard development consists of a monohull unit (Asgard A), for oil and condensate production with the world's largest floating gas semi-submersible platform (Åsgard B).



BENEFITS:

- Reduced environmental impact
- No clogging, minimal maintenance
- Reduced liquid H₂S scavenger chemical usage



An average of 37% reduction in scavenger consumption was achieved across all three platforms

TORR™ CASE STUDY - PRODUCED WATER TREATMENT

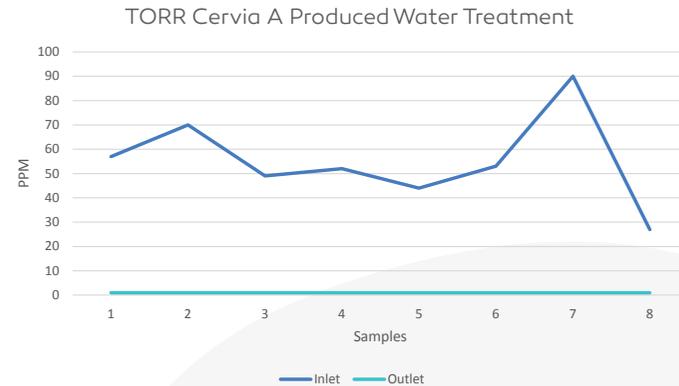
FACILITY: ENI Cervia A

LOCATION: Offshore, Adriatic Sea

EQUIPMENT: One skid of two TORR™ trains, consisting of four vessels with a pre-filtering device for parallel or series operation

- Nominal Flow Rate: 500 BPD
- Dimensions: 12" diameter vessels
- Rated for 150 PSIG
- RPA®-5 Coalescing Elements (1 Element/vessel)

APPLICATION: Produced water treatment (light condensate), stable reverse emulsion, 3.5 - 5 micron oil droplet size



The Cervia natural gas field is located on the continental shelf of the Adriatic Sea. It was discovered in 1972, and developed by Eni. It began production in 1973, and produces natural gas and condensates. The total proven reserves of the Cervia gas field are around 354 billion cubic feet.

2006 - KINDER MORGAN - EOR CO₂ RECOVERY

FACILITY: SACROC Train #3 CO₂ Membrane Plant

LOCATION: Snyder, Texas, USA

EQUIPMENT: Single stage membrane separation unit consisting of eight 36-tube membrane skid packages

APPLICATION: EOR CO₂ Recovery

Discovered in 1948, the SACROC unit is one of the largest and oldest oil fields in the United States using carbon dioxide flooding technology. The field is comprised of approximately 56,000 acres located in the Permian Basin in Scurry County, Texas. Kinder Morgan owns an approximate 97 percent working interest in SACROC and has expanded the development of the carbon dioxide project initiated by previous owners, and increased production over the last several years. In 2013, the average purchased CO₂ injection rate at SACROC was 126 million cubic feet per day.



DESIGN CONDITIONS:

- Feed Flow: 220 MMSCFD
- Feed CO₂: 88.17%
- Residue CO₂: 10%
- Permeate CO₂: 97%



The ProSep membrane systems significantly reduced Kinder Morgan's operating expenses relative to their alternative membrane plant.

PROSALT™ CASE STUDY - CRUDE DESALTING

FACILITY: Mongstad Refinery
LOCATION: Offshore Norwegian North Sea
EQUIPMENT: 14" ProSalt™
APPLICATION: Crude Desalting

The ProSalt was installed in parallel to a conventional globe mixing valve upstream of the 1st-stage desalter (in the 2-stage process). The oil refinery at Mongstad in western Norway is a modern highly-upgraded plant with an annual capacity of near 12 million tonnes of crude. It is the largest facility of its kind in Norway, and medium-sized in European terms.

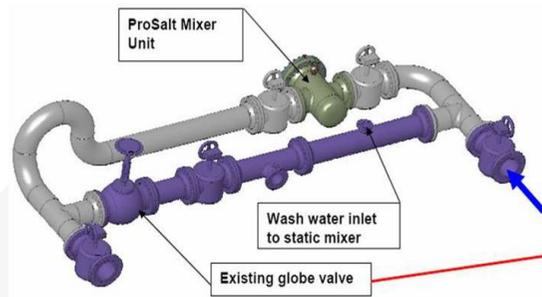


PROCESS CONDITIONS:

Operating Pressure: 145 PSI
 Operating Temperature: 230-266 °F
 Crude API: 37
 Crude Oil Flow Rate: 2.20 M lbm/hr
 Volumetric Flow Rate @ Operating T&P: 8200 bbl/hr

RESULTS:

Pressure drop 3-12 PSI
 Significantly reduced OIW concentration
 Salt spec typically below 2 mg/l; 0.70 ptb
 BS&W spec (0.10 – 0.15 vol %)



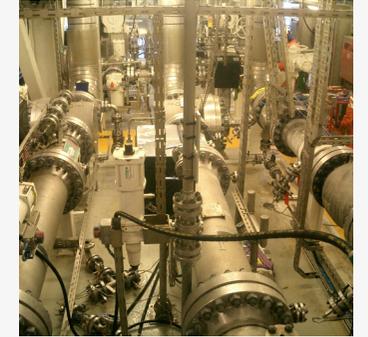
2006 - CONOCOPHILLIPS - CTour™ CASE STUDY

FACILITY: Ekofisk 2/4J
LOCATION: Offshore Norwegian North Sea
EQUIPMENT: Two 6" CTour™ mixer trains and two 14" CTour mixer trains
APPLICATION: Extraction of hydrocarbons in the produced water stream by injecting condensate which acts as a solvent.

The two 6" CTour mixer trains treat between 20,000 - 50,000 BWPD and the two 14" CTour mixer trains treat between 72,500 - 225,000 BWPD. Ekofisk was Norway's first producing field, and is also one of the largest on the Norwegian continental shelf. The reservoir is Cretaceous (chalk) with a 300 meter high oil column. It covers an area of 10x5 kilometers, 3000 meters below sea level.

CTOUR™ EKOFISK PERFORMANCE IN COMBINATION WITH A STANDARD CONVENTIONAL HYDROCYCLONE

Environmental Impact Factor Component Group	CTour™ Process Guarantee %	Avg. Removal Efficiency Achieved %
Naphthalenes	78	86
2 – 3 ring PAH	86	89
4+ ring PAH	89	92
C0-C3 phenols	0	0
C4-C5 phenols	41	29
C6-C9 phenols	60	82
BTEX	35	36
OIW	< 2.2 ppm	< 1.3 ppm



Similar CTour™ performance on other platforms off the Norwegian coast has resulted in the implementation of CTour to treat two thirds of the Norwegian sector produced water.

2007 - SHELL- OIL TREATMENT

FACILITY: FPSO Espirito Santo for BC-10

LOCATION: Offshore Brazil, BC-10 Oil Block

EQUIPMENT: Three treatment trains consisting of the following:

Train A: 3,500mm ID x 15,000mm T/T First Stage Production Separator, 3,900mm ID x 14,500mm T/T Second Stage Separator and 4,500mm ID x 18,200mm T/T Electrostatic Treater

Train B: 2,800mm ID x 10,300mm T/T First Stage Production Separator, and 3,000mm ID x 10,500mm T/T Second Stage Separator

Train C: 3,500mm ID x 15,000mm T/T First Stage Production Separator, and 3,600mm ID x 15,000mm T/T Second Stage Separator



APPLICATION: Gas Stabilization, Bulk Water Removal, and Oil Dehydration

DESIGN CONDITIONS: Various case study design conditions were presented for each unit to show the operator the best and worst case scenarios.

This was the first time ProSep had provided the complete topsides oil train on an FPSO. The vessels for this project were built in Malaysia, and this was one of the first projects for the Kuala Lumpur office, who handled the project management. Startup was accomplished in 2009.

The performance of this equipment was a key factor in Shell's decision to award ProSep the Carmon Creek crude treating project.

2008 - PROSALT™ CASE STUDY

FACILITY: GOSP A & B

LOCATION: Saudi Arabia

EQUIPMENT: One 24" ProSalt™ and one 30" ProSalt installed in two different GOSP's.

APPLICATION: Crude desalting, demulsifier consumption & wash water savings

The ProSalt technology is helping this operator with their continuing effort to reduce ground water consumption as setout per their 2020 corporate target.



PERFORMANCE OF THE 24" PROSALT™ GOSP A:

- 48% reduction in chemical injection rate (from 151.32 to 78.19 gallons). This saving in chemicals is estimated at around **\$170,000 USD per year.**
- 31% reduction in wash water consumption. An average daily saving of 15,000 gallons per day. This equates to savings of around 5.5 million gallons of wash water per year.

PERFORMANCE OF THE 30" PROSALT™ GOSP B:

- 17% reduction in chemical injection rate. The saving in chemicals is estimated at around **\$150,000 USD per year.**
- 12% reduction in wash water consumption. An average daily saving of around 17,000 gallons per day. This equates to savings of around 6.2 million gallons of wash water per year.

PROSEP 10 YEAR TIMELINE

In June 2005, four principals from Kvaerner Process Systems created ProSep Technologies, Inc. as part of PureGroup AS, backed by a Norwegian VC, HiTech Vision, and Statoil

By December of that year, the company had grown to 10 employees, and generated around \$4 million in sales.

2005



2006

In March 2006, the company moved to larger office premises in Houston and re-branded the company with the three circle logo representing the separation of oil, gas and water. During this year, ProSep signed a supply agreement with a proprietary internals company and over the course of the next three years sold over \$15 million of capital equipment with their internals.

In 2007, ProSep opened it's Asia Pacific office in Kuala Lumpur, Malaysia. ProSep's annual sales rose to \$31 million and they created strategic partnerships to enhance their separation capabilities with organizations such as TDE. In the same year, initial talks with FujiFilm commenced and the PureGroup of companies was acquired by TORRCanada.

2007



2013



In November 2013, PWA, Inc., backed by private equity firms, Energy Ventures, and Harris & Harris, Inc., acquired assets of ProSep, Inc. as part of a domestic and international expansion drive. The 2013 acquisition resulted in the addition of the European office. A new leadership team was created to transform the organization.

2014

In March 2014, PWA ProSep re-branded under the name ProSep, and launched their offering to the marketplace. In May of that year, ProSep was awarded their largest contract ever by Shell Canada, supplying oil treating equipment for the Carmon Creek project. In November of the same year, ProSep opened their first office in the Middle East, located in Abu Dhabi.

2015



In 2015, ProSep celebrates 10 years providing the oil and gas industry with innovative oil, gas and produced water separation solutions.

2009 - ECOPETROL - CO₂ SWEETENING

FACILITY: Cupiagua Gas Plant

LOCATION: Cupiagua field, Casanare province, Los Llanos foothills of Colombia

EQUIPMENT: CO₂ gas separation membrane package consisting of two pretreatment skids, and three 84-tube membrane skids

APPLICATION: CO₂ Sweetening

The Cupiagua field produces an average of 17,087 barrels of oil per day. This natural gas processing plant at the Cupiagua field in Colombia will add 140,000 Mcf/d, or 13%, to Colombian gas supplies.



PROCESS DESIGN CONDITIONS:

Feed Flow:	252 MMSCFD
Feed CO ₂ :	5.5%
Residue CO ₂ :	<2.0%

Due to the space limitation at the site and severe earthquake zone requirements, ProSep's design team engineered a quad skid tower to meet the demanding requirements - another ProSep first!

2009 - SHELL - NITROGEN GENERATION PACKAGE

FACILITY: B11-KA Platform

LOCATION: Malaysia Offshore, South China Sea

EQUIPMENT: Nitrogen generation package

General Materials of Construction: Carbon Steel

Equipment Size (LxWxH): 4.3m x 2.5m x 6.5m

Equipment Dry Weight: 7 MT

B11 field is the 4th gas field to be developed by Sarawak Shell Berhad (SSB) in the Central Luconia geological province, to supply gas for the MLNG-DUA project in Bintulu. It lies approximately 170km to the north of Bintulu. The surface facilities for the B11 complex comprise of three n bridge-linked platforms, a 9 slot combined drilling/riser platform B11DR-A, a production



platform B11P-A, and a future compression platform B11K-A, which will be bridge-linked to B11P-A. Platform capacity is currently designed for 600 MMscf/d measured at GMS.

ProSep provided a Nitrogen Generation Package to Shell specifications inclusive of the Nitrogen receiver tank and the package was designed using high efficiency hollow fibre membranes.

PERFORMANCE:

Nitrogen gas at higher purity $\geq 95\%$ at normal flowrate 110 Sm³/h

Nitrogen generation packages are one of ProSep's Asia Pacific's core expertise product offerings.

2009 - KUWAIT OIL COMPANY - OIL TREATMENT

FACILITY: Ratqa and Abdali Early Production Facility

LOCATION: North Kuwait

EQUIPMENT:

(1) 15' ID x 86' 4" T/T LP Separator V-100

(2) 13' ID x 60' 4" T/T Electrostatic Dehydrator V-200 A/B

(2) 13' ID x 54' 4" T/T Electrostatic Desalter V-210 A/B

EQUIPMENT TYPE:

Separator and Dehydrators: Three Phase Double Ended– Horizontal Flow Design

Desalter: Two Phase Double Ended– Horizontal Flow Design

APPLICATION: Liquid Stabilization, Bulk Water Removal, Oil Dehydration, and Desalting.



ProSep supplied two complete crude oil processing trains for separation, dehydration, and desalting with ProSalt™ mixers utilized in the process design.

PERFORMANCE:

The dehydrators and desalters have been performing well in meeting the 0.1% BS&W requirement. Meeting the salt spec has taken some time, but it has been accomplished. There are several reasons for this; dramatic fluctuation in inlet process flow rates, variations in process composition (both API makeup and oil water relationship over very short period of time), and lower winter temperatures than expected.

ProSep collaborated with Process Unlimited to develop the optimized process solution and plant design which spanned 18 months of FEED & detailed engineering, 5 different process concepts and 2 years of fabrication work prior to start up.

2010 - BP - CTour™ PRODUCED WATER TREATMENT

FACILITY: Valhall

LOCATION: Offshore redevelopment project in the Norwegian Continental Shelf

EQUIPMENT: 8" CTour™ injection mixer package for produced water treatment

APPLICATION: Injection of condensate in order to simplify extraction of oil in produced water

The Valhall IP produced water handling system was not capable of cleaning the produced water to an acceptable level for neither re-injection nor dump. The PCP produced water handling system is therefore in use on a continuous basis for water from both first and second stage separator. This option discontinues when PH is installed. The PCP system is already used to its maximum capacity and it is not anticipated that it will be possible to upgrade it.



To improve this situation, BP Norge installed new water treatment equipment to account for handling of produced water from PCP and PH. Based on results from a pilot trial with CTour / Epcor in February 2008, BP decided to install a system consisting of a CTour process unit in series with an Epcor flotation unit. The CTour retrofitted an existing process to improve treatment capacity and efficiently remove dissolved hydrocarbons in produced water, allowing the producer to exceed strict overboard discharge regulations.

PROCESS DESIGN CONDITIONS:

Feed Rate:	20,000 BPD
Inlet pressure (P) barg:	14
Operating Temperature °C:	40
Density @ T,P (kg/m ³):	1045
Viscosity @ T,P(cP)	0.4

The full scale installation of this system occurred after field trials of the CTour™ process on this platform to ensure its effectiveness.

2011 - BUMI ARMADA - PRODUCED WATER TREATMENT

FACILITY: Armada TGT FPSO

LOCATION: Offshore Vietnam

EQUIPMENT: Produced water treatment package: Produced water deoiling hydrocyclone and IGF vessel

- General Materials of Construction: Carbon Steel - NACE
- Equipment Size (LxWxH): 13.0m x 7.0m x 8.0m
- Equipment Dry Weight: 65 MT

APPLICATION: Produced water treatment

The FPSO can handle 55,000 BOPD and has a storage capacity of 620,000 barrels of oil.



The produced water treatment package is designed using ProSep's induced gas flotation (IGF) process, a highly-efficient, motion-insensitive vessel ideal for space limited applications. It efficiently removes small particles of oil contaminants from produced water, allowing oil and gas producers to meet specifications for reinjection or regulatory requirements for overboard discharge.

The water is pretreated in conventional hydrocyclones located upstream of the IGF. All equipment is supplied on an integrated skid platform, designed for FPSO motion, and certified by ABS Offshore.

PERFORMANCE DATA: 82,500 BWPD treated to 25mg/L OIW

2012 - EXXONMOBIL - TEG PACKAGE

FACILITY: Tapis rejuvenation platform

LOCATION: Tapis field, Offshore Malaysia, South China Sea

EQUIPMENT: TEG gas dehydration & TEG regeneration system

- General Materials of Construction: Carbon + 316L Stainless Steel Clad & Duplex Stainless Steel
- Equipment Size (LxWxH): 15m x 6.5m x 15m
- Equipment Dry Weight: 110 MT estimated

APPLICATION: Tapis rejuvenation project



The Tapis EOR project is Malaysia's first large-scale enhanced oil recovery project and will utilize the immiscible water-alternating-gas process to recover remaining oil reserves from the Tapis field by gradually sweeping remaining oil to the producing wells, increasing the overall recovery of the field.

This project demonstrates ProSep Asia Pacific's expertise and understanding of client requirements as they were able to meet ExxonMobil's strict specifications.

2013 - PROCEGAS - OIL & PRODUCED WATER TREATMENT

FACILITY: Sèmè Field

LOCATION: Sèmè is the only producing field offshore the Republic of Benin. It sits in the Gulf of Guinea and consists of three platforms, one well head, and two production facilities

EQUIPMENT:

OIL: An oil train was developed consisting of a free water knockout (FWKO) feeding two trains of scavenger heat exchangers and thermal electrostatic treaters.

WATER: Produced water treatment train. Primary separation is achieved with a corrugated plate interceptor (CPI). As the water exits the CPI, there is a secondary stage of treatment; an induced gas flotation (IGF) vessel.



The treating temperature for a thermal treater is considerably higher than that for an FWKO, in order to meet the strict water content specification of 0.5% BS&W, by removing the remaining emulsified water from the process stream.

ProSep was tasked with treating 11,000 bbl/d of water with a 2000 ppm inlet, 100 ppm inlet solids, down to a discharge quality of 20 ppm of oil in the water. The government's requirement is that the field needs to have at least 20 years life expectancy. But, after five years, SAPETRO need to start producing from a second block, as the amount of water produced from the current block will continue to increase while the oil decreases. After five years, there will be less than 1000 bo/d, so the longevity will need to come from another block. This is the first time ProSep technology will be used in West Africa.

This project represents another first for ProSep - the supply of both the crude separation/treating and produced water treatment solutions for one platform.

2014 - OSORB® MEDIA CASE STUDY - PRODUCED WATER

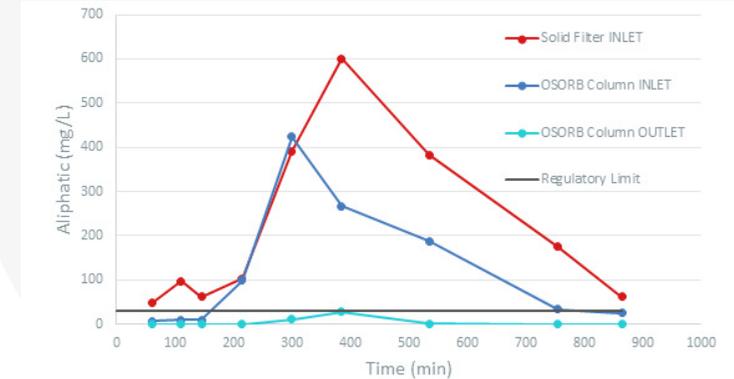
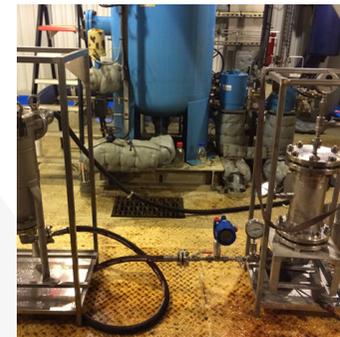
LOCATION: Offshore North Sea

EQUIPMENT: Osorb® Media OTC006

APPLICATION: Removal of dispersed and dissolved oil during artificial lift using foam injection

OBJECTIVE: Maintain less than 30 mg/L dispersed oil and remove as much BTEX and foam as possible

The overboard discharge limit of 30 mg/L oil in water is exceeded during artificial lift operations using foam because conventional water treatment technologies rely on mechanical separation which is inhibited in the presence of the foamer. This problem is compounded by the fact that one of the wells cannot be produced without the addition of foamer.



PERFORMANCE:

Initial testing results showed dissolved and dispersed oils are reduced by 99.9% in the presence of foamer and the Tri-Foam 821 was reduced by up to 88%. The results from the tests showed complete removal of >100 mg/L oil and >30 mg/L BTEX by the Osorb system, even in the presence of foamer.

ProSep's Osorb Media is the only treatment technology found to remove the hydrocarbons and surfactant to meet European discharge criteria.

2014 - SHELL CANADA - OIL TREATMENT

FACILITY: Carmon Creek

LOCATION: Northern Alberta, Canada

EQUIPMENT: Two oil trains consisting of a single Degasser vessel, two Production Separators and two Production Treaters. A Slop Oil Treater is provided to process any out of spec oil in small quantities allowing for larger chemical dosage if required to meet specifications.

APPLICATION: All vessel types are gas packed and designed to stabilize the liquid at the operating conditions by liberating the gas. The Degasser is a two phase vessel with a gas / liquid interface and the remaining vessels (Production Separators, Production Treaters and Slop Oil Treater) are three phase with gas / oil and oil / water interfaces. The Production Separators, Production Treaters, and Slop Oil Treater are design to meet separation and dehydration requirements set forth in Shell's specifications.



Solid's accumulation in the vessels is a big concern. Automated jet wash and solids removal systems have been included to prevent this accumulation, and ensure that the designed flow paths remain open in all the vessels. The production treaters and slop oil treaters utilize ProSep's unique horizontal flow with multiple vertical grid design. This allows for true three phase operation of the equipment, and improved separation characteristic on heavy to medium crudes.

Shell is progressing the construction of the Carmon Creek Project on its Peace River heavy oil leases. The project will produce 80,000 barrels of bitumen per day using vertical steam drive wells.

**Note that this project is still ongoing*

This project represents our largest value, single project to date. ProSep was selected as the supplier for this equipment based on the performance of the BC-10 project, as well as the solutions developed in conjunction with Shell during the bidding stage.

2014 - APURA CASE STUDY - CO₂ SWEETENING

LOCATION: Bakersfield, California

EQUIPMENT: 1 test bank of Apura membranes (49 modules)

APPLICATION: CO₂ sweetening

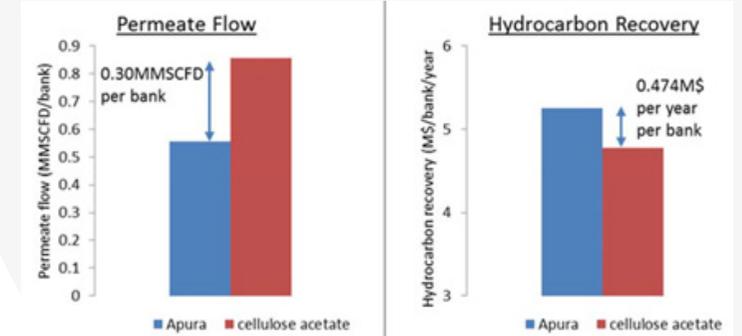
OBJECTIVE: 140 MMscfd feed gas. Treat product CO₂ concentration from 5% to <2% to meet pipeline specification.

DESIGN CONDITIONS:

Gas flow rate = 140 MMscfd

Feed pressure = 900 PSIG

Feed temperature = 105 – 110 °F



PERFORMANCE:

Over the three-month pilot, the performance of the Apura membrane elements was evaluated and confirmed to have reached the performance criteria as specified in the test and agreed with the operator. The performance target was a lower limit of 86.5 percent hydrocarbon recovery, with Apura achieving recovery of 87.5 percent and almost 10 percent higher recovery versus incumbent CA-elements. This rate of hydrocarbon recovery is estimated to be worth \$474,000 per year per bank (at a gas price of \$4.5/Million British Thermal Units (BTU)), versus the cellulose acetate elements, with a payback of less than nine months

For the entire membrane gas plant (7 x 42-tube skids), an additional \$20,000,000 revenue per year is predicted. Meanwhile, the Apura permeate flow rate was 0.556 million standard cubic feet per day (MMSCFD) per bank, against the performance target upper limit of 0.577 MMSCFD. As such, the Apura elements reduced the permeate flow by 35 percent, a reduction of 0.300 MMSCFD per bank.

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