

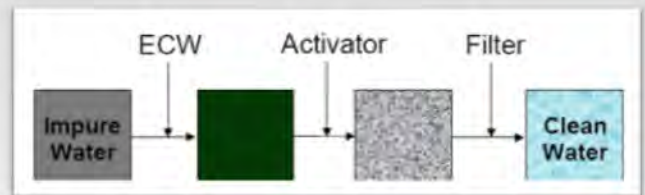
KOCKEN

SISTEMAS DE ENERGIA INC.

DRY OIL™ TREATING OILY WATER



DRY OIL™ uses an ECW Phase Inversion Polymer. ECW is a process for the removal of a broad range of contaminants from water, including hydrocarbons, food particles or dissolved metals. The process binds the contaminants, present in the water, into a polymer matrix that is then removed using a coarse filter.



ECW removes 100% of oil present in the treated water (with the exception of high protein oils such as butter, where a slight emulsion remains), food contamination (such as food processing by-products) and dissolved metals. It is effective in the presence of detergents and other dispersal agents. ECW will remove contamination whether it is present as a film on the water surface, in droplets suspended in the water or as an emulsion.

The process is effectively instantaneous and takes place at ambient temperatures. The polymer is readily separated from the contaminants and may be recovered for reuse. The treated water meets and exceeds all existing discharge standards.

World oil and gas production capacity will continue to increase. Industry surveys of the oil and gas sector indicate that capital expenditure in the sector will continue to rise, supported by high prices and rising production capacity. Although companies are remaining cautious with spending plans, the following factors will ensure that substantial investments continue to be made in production and processing equipment; increased demand and increasing prices will bring marginal wells back into production and increase production in higher cost fields, especially in high potential deepwater areas such as West Africa, the Gulf of Mexico, the eastern and western fringes of the North Atlantic and Brazil. Such increased costs encourage operating companies to seek new technologies to reduce production costs.

CRUDE OIL DEHYDRATION

All oil wells produce water. Wells are taken out of production when the proportion of water rises above economic levels, but the point at which this happens varies according to local practise and condition. For example, wells producing more than 50% water are not considered economical in the Middle East, but wells producing as much as 98% water are maintained in production throughout North America. A full 75% of the oil wells in Texas and Oklahoma are considered marginal, producing less than 10 barrels per day and a great deal of water.

The separation of the crude oil and water is typically carried out using a combination of settling tanks and hydrocyclones – the latter having significant capital and operating costs. A platform mounted hydrocyclone designed to treat 30,000 bpd has a capital cost approx. 1.8 MMUSD and estimates suggest using ECW based equipment would achieve significant savings while at the same time reducing the oil content of the production water to less than 5 ppm.

Industry estimates suggest that as much as 10 billion barrels of water is produced each year world-wide. This number is likely to rise as fields mature and marginal wells are brought back into production. The North Sea alone produces more than 10 million bbls of water each day.

Pilot Plant Effluent vs. Time On-Line

oil type	time(min)	ppm oil in	ppm oil out
A	65	814	4
A	100	791	4
A	140	1735	6
A	265	1786	2
A	305	148	6
A	340	162	1
A	380	162	1
A	480	162	5
A	500	162	4
A	540	162	3
A	605	162	2
A	725	162	2
A	800	162	3
A	830	162	2
	915	177	1
	930	177	1
	945	260	5
	960	260	4
	975	331	5
	990	331	3

Oil Types: A - heating oil 80v + lube oil 20v.

PRODUCTION WATER CLEANING

Production water from offshore oil wells is typically discharged into the sea. Standardized global regulatory limits currently permit 25-45 ppm of oil in production water. The pre-eminent existing technology, the hydrocyclone, can theoretically meet these limits. There is some regulatory pressure to reduce the limits, but there is currently no available proven technology to produce the desired results. ECW based systems are able to achieve oil levels in discharged production water of less than 5 ppm.

PRODUCTION WATER CLEANING

ECW is effective in the removal of all non-dissolved hydrocarbons from water. Applications exist in non-process applications in the oil industry, environmental remediation and bilge water clean-up in the shipping industry.

DESIGN PARAMETERS	
Operating Pressure	
Operating Temperature	
Flow of Water	
Content of Oil in Water	
Water Spec (ppm Oil)	

APPLYING WORLD CLASS TECHNOLOGIES IN PURSUIT OF SUPERIOR EFFICIENCY

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