

Spectrum™ Plus Filter



Superior filtration of produced water
greatly improving downstream processes



eco-tec

Advanced Resource Recovery
& Purification Solutions

Produced Water Treatment

Nutshell media filters are commonly used in the treatment of produced water to reduce the oil and solids content of the water prior to injection for Enhanced Oil Recovery (EOR) or prior to subsequent treatment such as softening the water as feed to steam generators, used in heavy oil production.

The Spectrum™ Plus Filter is a nutshell filter with a difference. It has the unique ability to remove oil and suspended solids to much lower levels than can be achieved by conventional nutshell filters.

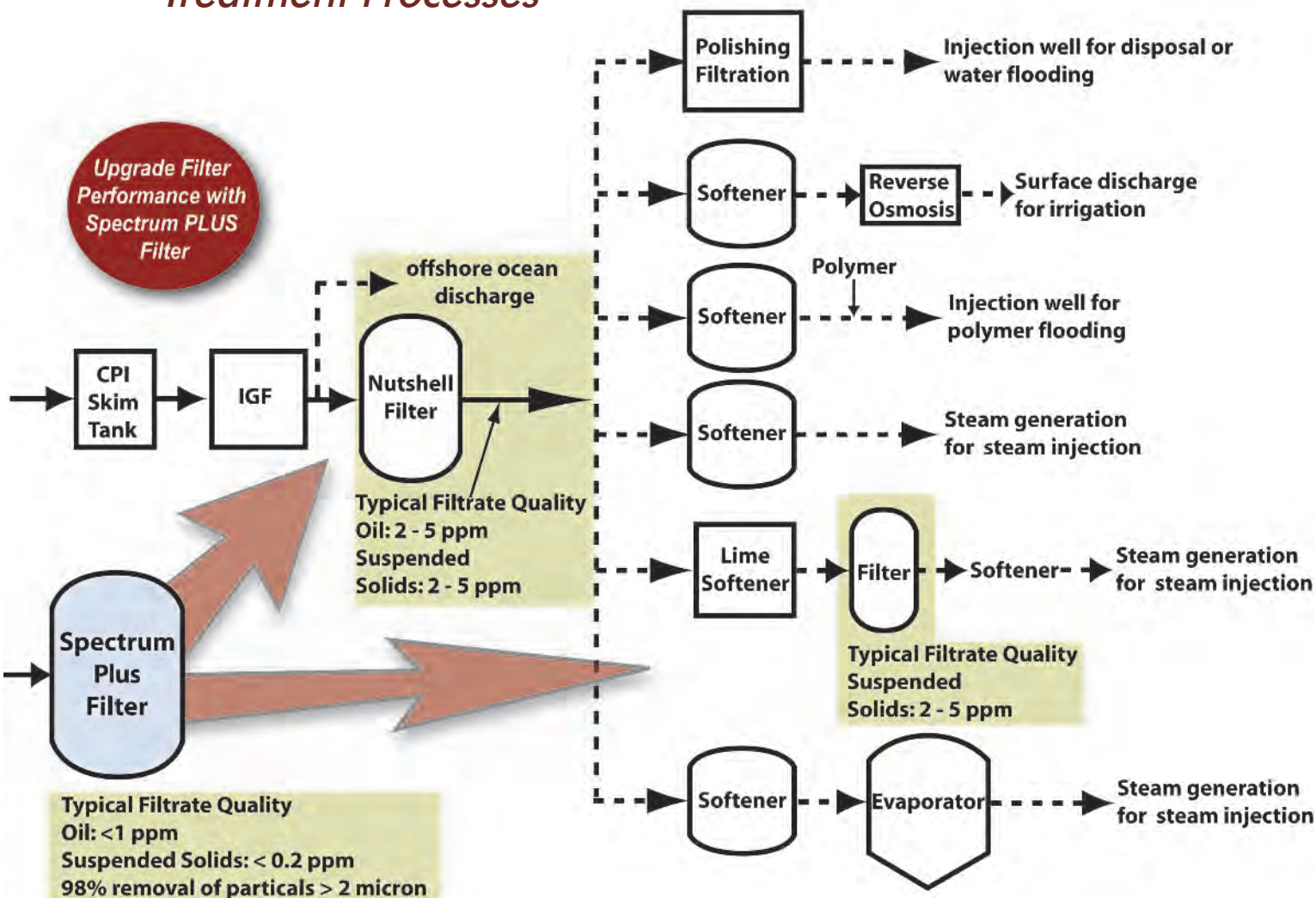
Problem

Residual oil and suspended solids which are present in nutshell filtrate result in downstream operational problems.

Solution

Improved filtration provided by Spectrum™ Plus Filter results in significant improvement to downstream processes.

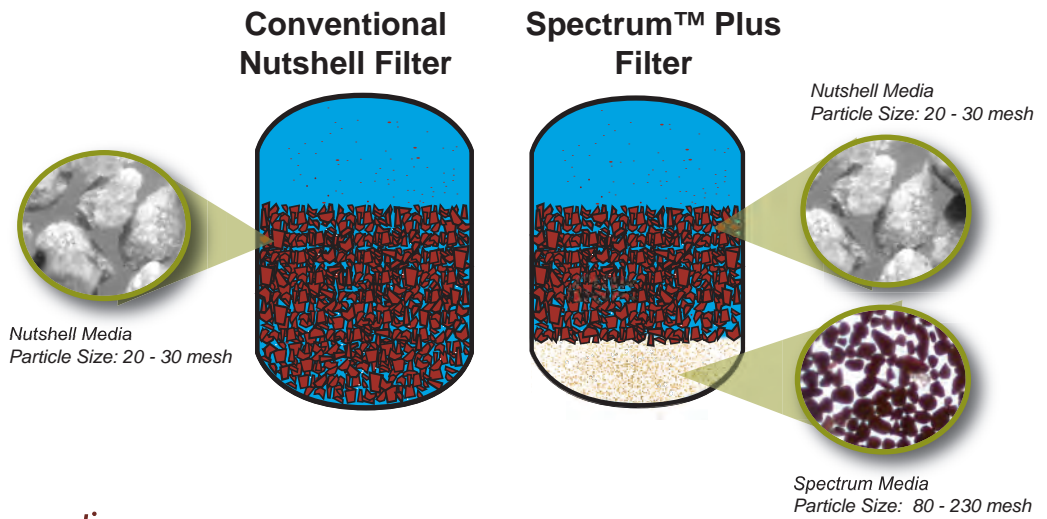
Typical Produced Water Treatment Processes



Spectrum Plus Filter

Superior Design

Spectrum's lower layer of filtration media features a very small particle size and acts as a barrier to small suspended solids. The Spectrum media is a proprietary, inert, long-life (virtually permanent) media. It is much heavier in density than nutshells or sand which ensures that it reclassifies (resettles below the nutshells after backwashing) and is virtually impossible to backwash out of the filter vessel.

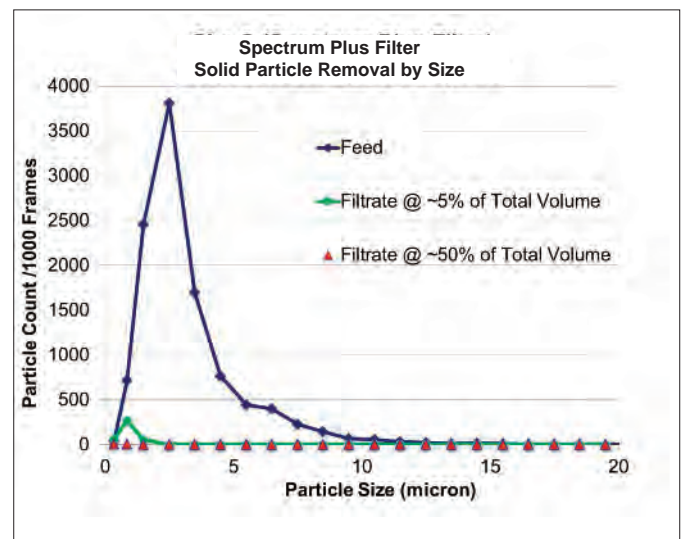
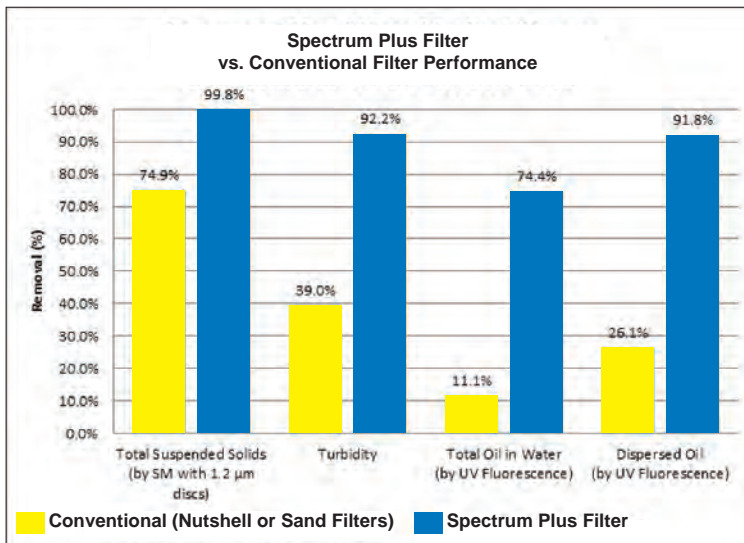


Designed for simple, low cost operation

- Nutshell media is effectively scoured using air or gas - no separate pumps or agitators are required
- 15 standard models ranging from 1,500 - 60,000 BPD (50 - 2,000 gpm, 11 - 450 m³/hr)

Superior Performance

According to field testing on produced water going into and out of filters during normal heavy oil production operations - Traditional Sand/Nutshell Filters vs. Spectrum PLUS Filters



Spectrum removes 99.8% of particles compared to 75% by traditional filters. Measured by a Standard Method test 1.2 micron Millipore paper

Spectrum Plus Filter effectively removes virtually all particles down to 1 micron. According to Particle Size Analyzer

Benefits of Superior Filtration by Spectrum™ Plus Filter

<i>Downstream Process</i>	<i>Problems With Conventional Nutshell</i>	<i>Benefits With Spectrum Plus</i>
Injection Well	<ul style="list-style-type: none"> Suspended solids result in rapid clogging of well or reservoir 	<ul style="list-style-type: none"> Longer injection well operating life and improved flow through oil field
Cartridge Filters Before Injection Well	<ul style="list-style-type: none"> Suspended solids result in high material and labor costs in cartridge filter replacement 	<ul style="list-style-type: none"> Cartridge filters can be eliminated saving capital cost and significant labor and material costs Spectrum Filter filtrate is comparable to a 1 micron cartridge filter – far better than the 5-10 micron rated filters often used in such service
Ion Exchange Softener	<ul style="list-style-type: none"> Suspended solids result in flow restrictions and/or channeling in resin beds Oil results in fouling of resin Results of above are either higher hardness in treated water which causes other downstream problems or Higher operating costs in terms of regenerant chemicals and resin replacement in order to maintain softened water quality 	<ul style="list-style-type: none"> Elimination of fouling of downstream ion exchange by suspended solids – the very small solids that pass through a Spectrum Filter will pass through a conventional ion exchange softener Reduction of oil fouling of ion exchange resins Results of above are more consistent ion exchanger performance and consistently softer treated water Cleaner resins require less regeneration and cleaning chemicals and labor to maintain them Cleaner resins last longer, reducing downtime and cost for resin replacement
Lime Softener	<ul style="list-style-type: none"> Oil interferes with chemical performance of lime softener 	<ul style="list-style-type: none"> Reduced oil entering lime softener improves lime softening process because particles do not become coated with oil Less chemicals may be used Fewer process upsets
Evaporator	<ul style="list-style-type: none"> Oil interferes with operation of evaporator 	<ul style="list-style-type: none"> Reduced oil entering evaporator improves crystallization and overall process and reduces scaling potential



A 30,000 BPD Spectrum Plus Filter™ feeding an Eco-Tec RecoPur® SAC brine regenerated softener supplying a steam generator.

Contact Eco-Tec for more information about RecoPur® water softeners!



For more information, or to request a quick proposal, visit our website or contact:

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