



## CASE STUDY

### CUSTOMER

INTERMEDIATE OIL & GAS PRODUCER

### LOCATION

WESTERN CANADA / AUGUST 2019

### EQUIPMENT

1500 HP NATURAL GAS SCREW COMPRESSOR

### APPLICATION

LUBE OIL

ROI



PAYOUT  
IN  
**24 DAYS**

ANNUAL  
COST SAVINGS  
**\$90,140**

“The real win here is the reduction to machine downtime. The frequency of filter related shutdowns have gone from 15-20 annually to ZERO. We have improved seal life, reduced operator exposure, and reduced disposable filter replacement costs. Additionally, for the first time ever, we have extended the oil change interval another 6 months which is an additional \$20k in cost savings.”

- Facility Maintenance Team

### CHALLENGE

An intermediate oil and gas producer in Western Canada was experiencing high levels of Black Powder contamination at their natural gas processing facility. The facility employs a 1500-HP natural-gas-flooded screw compressor; the system is open loop which means the lube oil mixes with the rich natural gas, and is separated out as it passes through the machine. These types of systems are highly susceptible to premature wear because the components are exposed to all types of formation contamination (Black Powder) and solvents during operation. The OEM 3-micron filters have a low holding capacity and would only last 3 weeks on average. Once in bypass, the compressor would shut down due to high pressure differential. In some cases, the OEM paper filters would disintegrate completely, causing a total loss of machine lube oil and very costly cleanup.



### SOLUTION

The maintenance team decided to install a 24" high-flow ADD-Vantage 9000 filter on the lube system of the compressor. The goals of installing magnetic filtration were: (1) eliminate the presence of contamination in the lube oil system, (2) reduce wear and tear on the compressors and pumps, (3) extend the life of the pumps and compressors, and save on maintenance and replacement costs, and finally (4) improve on the performance of the conventional filtration system to reduce costs related to replacement filter cartridges.



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## COMPARISON OF FILTRATION TECHNOLOGIES

CONTROLS	
Compressor Lube Oil Capacity	2.5 barrels
Cost / Barrel of Lube Oil	\$8,000
Cost / Seal Replacement, Labour & Downtime	\$10,000
Hours Allocated per Change-out	2
Average Labour Wage	\$55
Natural Gas Flared / Hour	\$460
Average OEM Disposable Filter Cost	\$90
OEI Magnetic Filter 1 Time Purchase Cost	\$5,000
OEI Magnetic Filter 1 Time Installation & Downtime Cost	\$1,000

### OEM FILTERS

OEM FILTER OPERATING PARAMETERS			
Quantity of Filters in Operation	2		
Filter Replacement Intervals	3 weeks		
Oil Change Intervals	6 months		
Average Running Pressure Differential	17 psi		
Pressure Differential Shut-down Set Points	18 psi		
Average ISO Count	23/21/17		
<ul style="list-style-type: none"> <li>» 5 samples taken between May 08, 2017 and October 10, 2017.</li> <li>» Fluid samples were taken after the filters.</li> </ul>			
OEM FILTER OPERATING COSTS			
INCIDENT	COST / INCIDENT	QUANTITY / YEAR	COST / YEAR
OEM Filter Replacements	\$180	17	\$3,060
Labour	\$110	17	\$1,870
Production Loss	\$1,500	17	\$25,500
Oil Changes	\$20,000	2	\$40,000
Seal Replacement	\$10,000	4	\$40,000
<b>Total OEM Filter Operating Costs</b>			<b>\$115,360</b>

### OEI FILTERS

OEI FILTER OPERATING PARAMETERS			
Quantity of Filters in Operation	1		
Filter Cleanings	6 months		
Oil Change Intervals	18 months		
Average Running Pressure Differential	1.5 psi		
Pressure Differential Shut-down Set Points	6 psi		
Average ISO Count	17/14/10		
<ul style="list-style-type: none"> <li>» 5 samples taken between May 05, 2019 and August 29, 2019.</li> <li>» Fluid samples were taken after the filters.</li> </ul>			
OEI FILTER OPERATING COSTS			
INCIDENT	COST / INCIDENT	QUANTITY / YEAR	COST / YEAR
OEI Filter Cleanings	\$0	0	\$0
Labour	\$110	2	\$220
Production Loss	\$1,500	2	\$3,000
Oil Changes	\$20,000	0.6	\$12,000
Seal Replacement	\$10,000	1	\$10,000
<b>Total OEI Filter Operating Costs</b>			<b>\$25,220</b>





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### RESULTS

After installing the ADD-Vantage 9000, the maintenance team increased oil sampling to once a week, and decided to inspect and clean the magnetic filter monthly in order to establish a baseline maintenance interval for the compressor. Their results were compelling; after installation, ISO Fluid Cleanliness counts decreased significantly and remained low; they were able to extend the magnetic filter cleaning intervals to semi-annually which aligned with their service intervals.

Their most significant achievement with deploying the OEI filter was the reduction in machine downtime. The maintenance team noted:

- » Decreased filter-related shutdowns
- » Eliminated conventional filter cartridge waste
- » 6 month extension of oil change intervals
- » Improved the compressor's seal life
- » Reduced operator exposure



### TOTAL COST SAVINGS

Annual Savings	\$90,140
Payout	24 days

“As far as overall machine longevity goes, we haven't been able to run a complete lifecycle on OEI filtration as of yet, but given the immediate cost savings outlined above; it would just be a bonus if we were able to extend an overhaul. Going forward, we are expanding this trial to the whole machine class which includes 10 more identical machines, and I am excited to see the results.”

- Facility Maintenance Team

*Black powder is a type of particulate contamination that is common in hydrocarbons and it consists of both ferrous and non-ferrous elements and compounds, in varying amounts, typically in high concentrations of particles under 10 microns in size. It is difficult and expensive to remove with conventional filtration, and as a result it has significant negative impacts on oil and gas equipment and facilities; this includes pipelines, pumps, compressors, meters and so on, as well as product quality.*



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