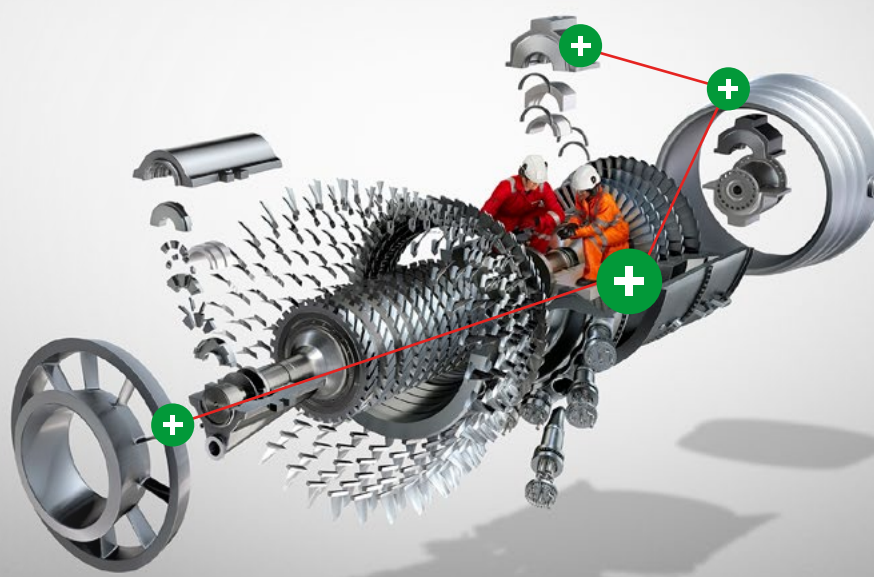




**SMARTGAINS** + + +™

## CASTROL PERFECTO HT 5 DELIVERS **ESTIMATED \$275K IN SAVINGS FOR FPSO OPERATOR**

How expert used oil analysis (UOA) interpretation and technical SmartGains support from Castrol engineers helped maximize efficiency, limit maintenance costs, and reduce downtime.



### THE PROBLEM: GAS TURBINES AT RISK OF VARNISHING

A floating production storage and offloading unit (FPSO) customer was planning a flush and change-out of lubricants on three out of five gas turbine generators (GTGs) and approached Castrol for advice on procedures/routines. One of our technical experts reviewed historical used oil analysis (UOA) on all five GTGs and discovered that the two not scheduled for maintenance had UOA failure modes indicating increased risk of varnishing – a problem that could lead to GTG failure, unplanned downtime and loss of production revenue.

### THE CASTROL SOLUTION: CASTROL PERFECTO HT 5 AND SMARTGAINS EXPERTISE

By reviewing UOA data, Castrol identified that a further two turbines had potential for oxidation by-products and varnishing. It was also discovered that the customer's changeover procedures did not include a highly soluble flushing fluid and electro-static filtration to remove soft carbon deposits. Our recommended flushing fluid, Castrol Perfecto HT 5, replaced the additional volume of the in-service lubricant which allowed for flushing at a lower unit cost per litre. In addition, Castrol's expert consultancy services reduced the customer's operational expenses and improved their understanding of the failure modes associated with turbine lubrication and UOA.

### THE RESULTS: IMPROVED RELIABILITY, AVAILABILITY AND MAINTAINABILITY (RAM) AND REVENUE GENERATION

Identifying the undetected UOA failure mode on the two additional turbines has potentially prevented a catastrophic component failure linked to varnishing.

By collaborating with the customer, various OEMs, and third-party gas turbine specialists, Castrol experts were able to develop procedures that optimized the condition of GTG lubrication systems and improved future maintainability by reducing overall mean time to repair (MTTR). The new detailed flushing and UOA programme focuses on reducing potential for oxidation, thereby reducing downtime to conduct repairs.

As a result of Castrol's intervention and subsequent actions by the on-site team, the mean time between failures (MTBF) has increased, in turn improving reliability statistics. Improved reliability allied with improved maintainability leads to improved availability statistics, and increases the FPSO's overall performance. This creates potential for more uptime, production, and associated revenue generation.

IT'S MORE THAN JUST OIL. IT'S LIQUID ENGINEERING.



## THE FIGURES: SMARTGAINS ACHIEVED

SMARTGAINS AREA	SAVINGS	COST TO CUSTOMER TO IMPLEMENT CHANGE	CREATED VALUE PER YEAR
<ul style="list-style-type: none"> <li>●● Technical review and troubleshooting on turbine oil condition for five turbines based on historical trending of UOA reports.</li> </ul>	Risk mitigation of potential Gas Turbine Generator (GTG) equipment failure, cost of maintenance and unplanned shutdown avoided. Downtime calculated @ 16,000 barrels per day. USD\$63 per barrel average price May/June 2019, Exchange rate 0.70 = AUD\$90 per barrel. Downtime Cost per hour \$60,000; Minimum downtime avoided 4 hours x \$60,000 per hour = \$240,000	N/A	\$240,000
<ul style="list-style-type: none"> <li>●●● Discussions regarding varnishing in GTG, how to remove and next steps.</li> </ul>	Understanding underlying causes of varnishing and potential solutions. Negates need for 12hr hire external consultant @ \$150/hr	N/A	\$1,800
<ul style="list-style-type: none"> <li>●●● Varnish removal campaign analysis.</li> </ul>	Varnish removal campaign was cancelled as the existing lubricant would not have been within specification even after polishing. Campaign costs not incurred. Polishing cost calculated @ \$2,000 per unit x 3 = \$6,000	N/A	\$6,000
<ul style="list-style-type: none"> <li>●●● Development of turbine oil changeover procedure and recommendations on flushing requirements.</li> </ul>	Processes developed including mitigation of potential errors in lubricant changeover and flushing process to minimise downtime. Negates need for 36hr hire external consultant @ \$150/hr	N/A	\$5,400
<ul style="list-style-type: none"> <li>●●● Assessment and selection of flushing lubricant.</li> </ul>	Perfecto HT5 chosen for superior flushing ability and lower cost per litre. 24,000L @ \$0.25 lower cost	N/A	\$6,000
<ul style="list-style-type: none"> <li>●●● Joint discussions with Castrol team, customer team, OEM and external third party turbine maintenance specialists to review proposed process and then reassess after first campaign.</li> </ul>	Reviewed procedures based on the first changeover of GTG, particularly on the flushing process, risk reduction, ongoing varnish removal and to improve overall efficiency. Negates need for 36hr Hire external Consultant @ \$150/hr	N/A	\$5,400
<ul style="list-style-type: none"> <li>●●● Review of parameters in UOA programme for turbine oils with UOA laboratory on behalf of the customer.</li> </ul>	Presentation of Castrol recommended UOA parameters and intervals to supplement the existing UOA programme provided by UOA laboratory to extend oil life via polishing and Condition Monitoring utilising a Condition Based Maintenance Strategy (CBM). Negates need for 66hr hire external consultant @ \$150/hr	N/A	\$9,900
<b>SMARTGAINS Total</b>			<b>\$274,500</b>

●●● Estimates verified with the customer   ●● Credible assumptions based on market knowledge   ● Estimated mitigated costs, risk, or created value.

Based on a case study from a single customer. SmartGain results can vary depending upon the type of equipment used, its maintenance, operating conditions, and any prior lubricant used.  
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Discover how Castrol could optimize your oil and gas performance with high-performance lubricants and our SmartGains methodology.

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