ENERGY AND TRANSPORTATION

FLASHPOINTS

DATA-DRIVEN SOLUTIONS THAT IGNITE CUSTOMER SUCCESS.

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CAT® ASSET INTELLIGENCE DETECTS FLEETWIDE DIRTY CONDENSER

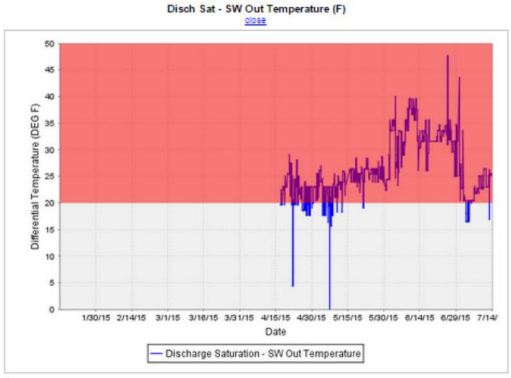
What Happened?

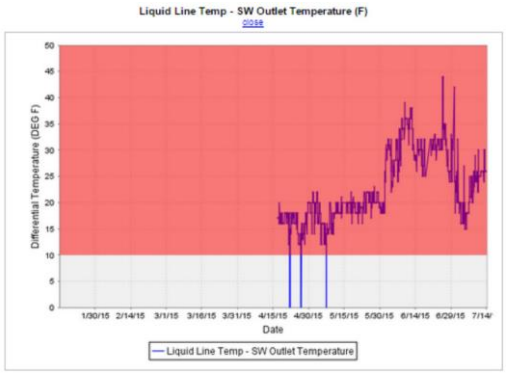
Cat Asset Intelligence uses advanced analytics to qualify raw data into actionable data. Using the Fleet-Wide View, the engineers of Cat Asset Intelligence noticed a high percentage of reported fouled condensers across the entire fleet. This led to an investigation of all units of all hull classes to determine whether this issue of dirty condensers can be attributed to a particular hull class or if it is truly a fleet-wide issue. Greater than 18% of all condensers fleet wide were reported as fouled.

		Dirty Condenser	Refrigerant Low Su	High Chill Water D	SW System
Fleet Average		55%	35%	27%	25%
SHIP1	AC1	100%	0%	59%	0%
	AC2	37%	0%	11%	0%
SHIP2	AC1	0%	0%	0%	0%
	AC2	0%	0%	0%	0%
SHIP3	AC1	35%	14%	100%	100%
	AC2	31%	100%	0%	100%
SHIP4	AC1	83%	0%	6%	10%
	AC2	19%	0%	0%	74%
SHIP5	AC1	0%	0%	0%	0%
	AC2	0%	0%	0%	0%
SHIP6	AC1	0%	0%	0%	0%
	AC2	0%	0%	0%	0%
SHIP7	AC1	100%	94%	100%	100%
	AC2	100%	0%	100%	0%
SHIP8	AC1	100%	84%	14%	27%
	AC2	100%	100%	0%	51%
SHIP9	AC1	100%	100%	100%	72%
	AC2	0%	0%	0%	0%
SHIP10	AC1	31%	0%	14%	0%
	AC2	25%	4%	45%	7%
SHIP11	AC1	100%	100%	2%	0%
	AC2	100%	100%	0%	38%
SHIP12	AC1	99%	67%	94%	19%
	AC2	80%	51%	38%	30%
SHIP13	AC1	100%	0%	10%	0%
	AC2	87%	94%	14%	32%

What Was the Underlying Cause?

The fouling of heat-transfer components such as a condenser can block the flow of water, redistribute flow inappropriately inside the components, or cause damage or corrosion to the components. Evidence of condenser fouling can be found by examining the difference between the discharge saturation temperature and the sea water outlet temperature and the difference between the liquid line temperature and the sea water outlet temperature. If these two differences are higher than set thresholds, then an inspection of the condenser is necessary.



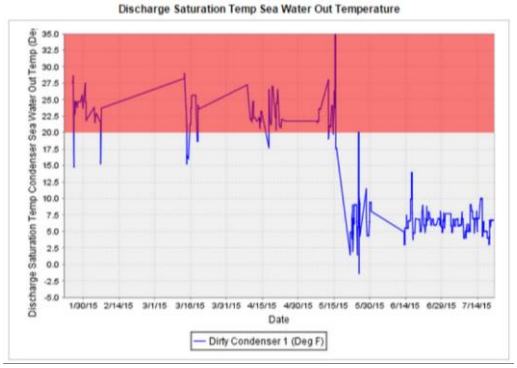


What Was the Value to the Customer?

Utilizing the sensor data to determine when a condenser needs an inspection poses great monetary benefits. Inspecting a condenser takes approximately 1 hour. Assuming labor costs $57 per hour, scheduling one inspection per quarter would cost upwards of $200 per year per condenser in inspection costs alone. If instead the condensers were inspected according to condition-based maintenance, it would cost a fraction of this amount.

Furthermore, a condenser has three major components: the condenser itself, the compressor, and the motor of the compressor. A dirty condenser that goes unattended can cause catastrophic failure potentially requiring all three components to be replaced. This can cost between $2.7M and $10.8M depending on the type of unit. Alternatively, the condensers can and should be cleaned prior to reaching catastrophic failure. The cost of cleaning a single condenser costs approximately $2.3K, at least $2.7M savings compared to total replacement.

The Cat Asset Intelligence customer has a fleet with approximately 550 condenser units. Eliminating inspections would save the customer $126,084 per year. Switching from planned to condition based monitoring would save the customer approximately $3, 926,160 per year. In total, condition based monitoring could save one customer over $4M per year.



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