CASE STUDY
CH-1823

Ethylene Plant Recovers 20% Compressor Efficiency with COMPTRENE™

eROI℠ by Ecolab

VALUE DELIVERED

PRODUCTIVITY

Overall efficiency increased

+20%

BACKGROUND

One of the most experienced leading Japanese petrochemical company in North Asia operating a world scale olefin plant supplies polyolefin and derivative feedstock to customers around the globe. Over the past many years the Charge Gas Compressor (CGC)'s polytropic efficiency has been steadily declining which greatly impacted the plants overall production.

The plant consulted CGC treatment suppliers to develop a program that would address its efficiency problems. Over the course of 4 years, two independent vendors were utilized and neither could provide a solution. Not only did these competitor treatment programs fail to address the efficiency problem, but the CGC went through multiple unplanned shutdown events as well. The subsequent outages caused by these shutdowns led to even more significant losses than the base efficiency problem. As a result, all competitor treatment programs were shut down. For a short period of time no treatment vendors were used while site leadership evaluated other alternatives rather than risk another failed program.

SOLUTION

Nalco Water was consulted to provide a comprehensive survey of the facilities to identify the mechanism driving the decline in polytropic efficiency. The initial investigation revealed the root-cause of the efficiency loss to be associated with the lack of polymer control especially for dienes in the cracked gas stream. The uninhibited polymer growth led to significant fouling at the machine labyrinths and impellers. Overtime as the fouling continued, machine efficiency plummeted as the compressor tried to keep up with the production target while covered in foulant. Further analysis revealed the foulant was high in as dichloromethane solubility. The customer attempted to clean the machine with wash oil but the result was unsatisfactory.

Nalco Water proposed treating the CGC with its COMPTRENE program in addition to the current wash oil. As seen in Diagram 1, COMPTRENE antifoulant was applied into the wash-oil manifold to ensure the entire system was properly inhibited.

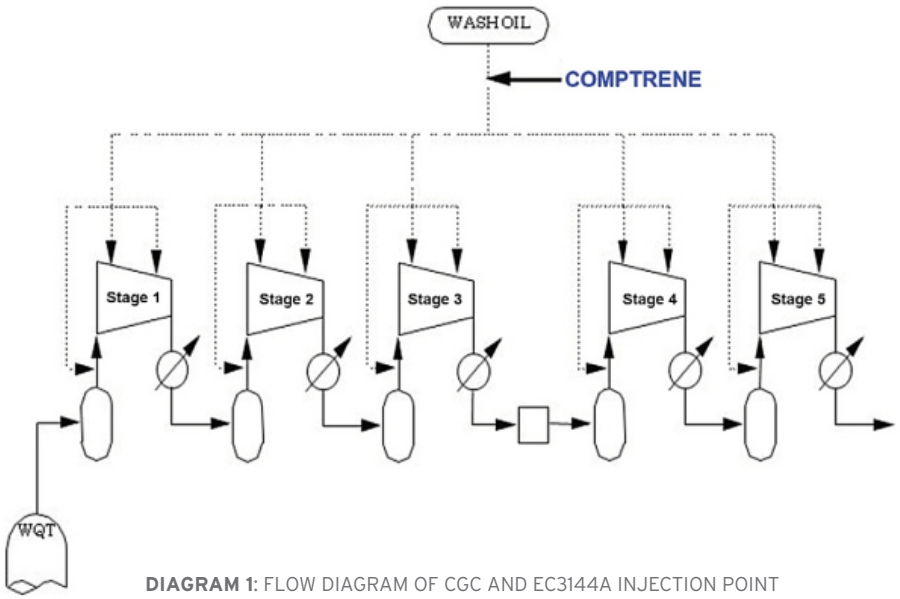


DIAGRAM 1: FLOW DIAGRAM OF CGC AND EC3144A INJECTION POINT

NALCO Water
An Ecolab Company

RESULTS

After switching to COMPTRENE, the customer experienced an increase of 20% in overall efficiency, improved oil-water separation versus competitor offerings, and maintained same knock out quality as non-treat scenarios. The result in Graph 1 shows drastic improvement in polytropic efficiency after COMPTRENE program was implemented.

The dosage was gradually increased to 4ppm over 3 months by increments of 0.5ppm. The result showed that even after the dosage was increased to 4ppm, both oil and water samples were clear of foulant with the oil-water separation unaffected (as seen in the before/after samples in Figure 1).

CONCLUSION

The COMPTRENE program was a major success and the customer has decided to continue using Nalco Water COMPTRENE CGC treatment indefinitely.

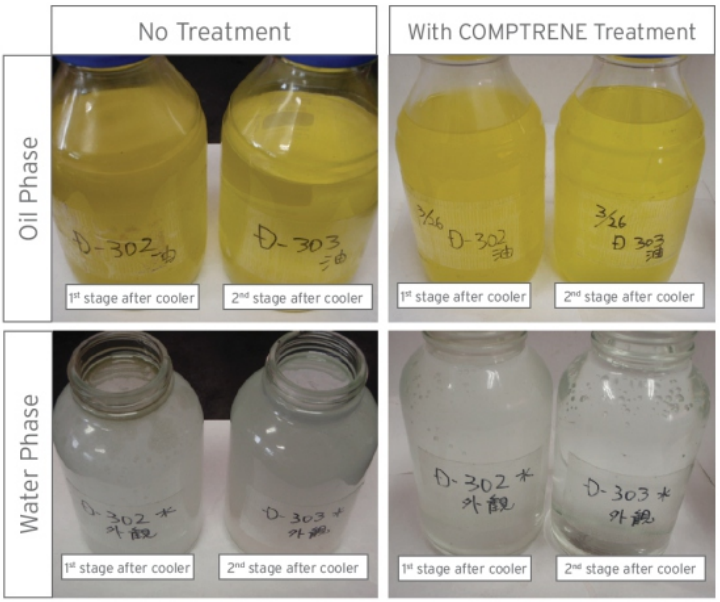
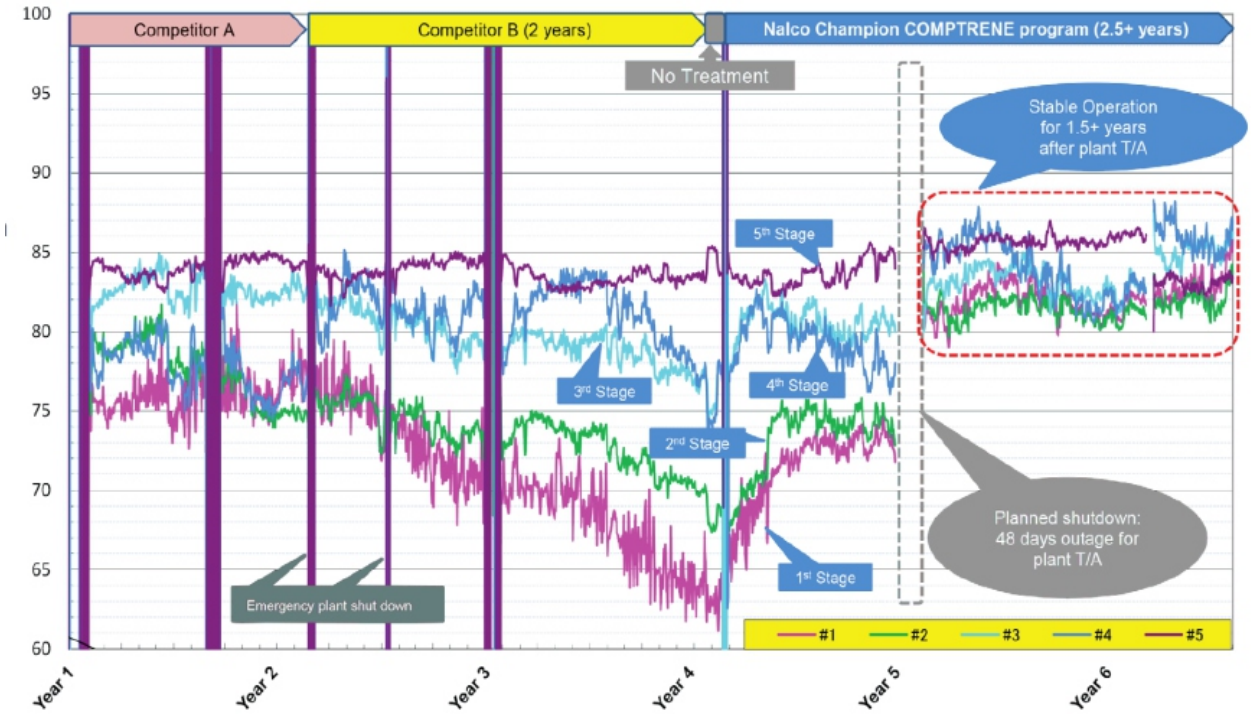


FIGURE 1: ABOVE SHOWS WATER SAMPLES FROM KNOCKOUT DRUM HAD NO VISIBLE EFFECT ON BOTH WATER AND OIL QUALITY AFTER COMPTRENE

GRAPH 1: POLYTROPIC EFFICIENCY



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