

Analysis of comparative effect of USP(Ultrasonic Scale Preventer) upon No.1 CDU Heat Exchanger and Plan for further installation

by GS-Caltex

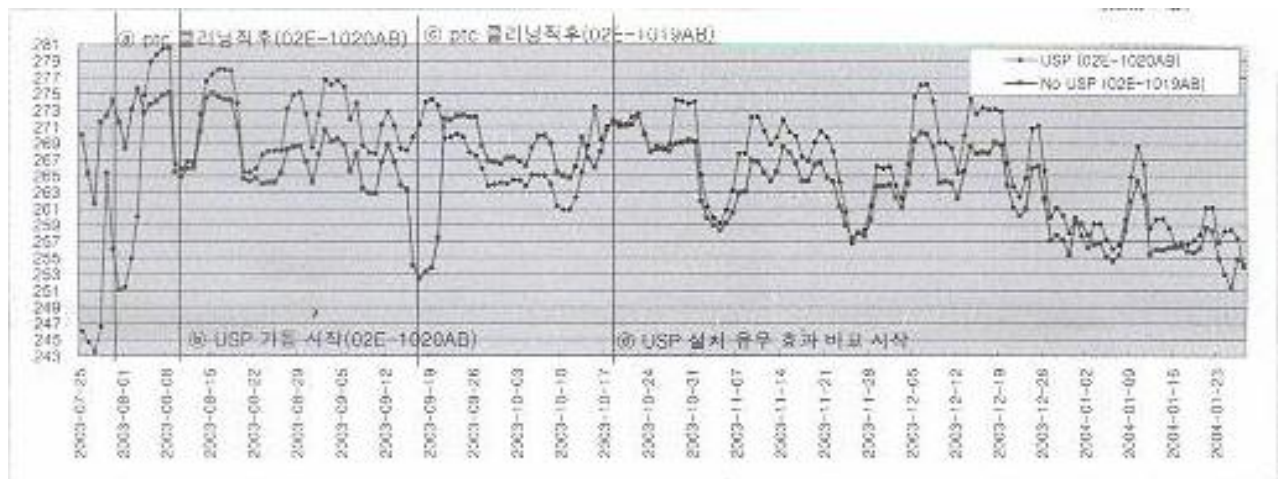
For energy saving by fouling mitigation, we have installed USP (Ultrasonic Scale Preventer) at No.1 CDU heat exchanger, and been operating it. USP was installed at 02E-1020AB RC/Reduced Crude Heat Exchanger located in the front of 02F-102 Heater, but not at 02E-1019AB Heat Exchanger in the front of 02F-101 Heater.

Ptc Mechanical Cleaning was done on 2 trains of 02E-1020AB and 02E-1019AB Heat Exchangers during respectively 2003.7.29 ~ 8.2 and 2003.9.15 ~ 9.19. We have examined them for 6 months since installing USP at the 1st one. In order to get information regarding effect of USP, we collected the data of Heater Inlet Temp and del P of 2 Trains under the same condition since 2003. 9.20. We had consensus on the effect of ptc Mechanical Cleaning by the department memo. (Refer to 2003-08-A2-C13500-41/49)

According to the result analysis, H.I.T.s of 02F-102, 02E-1020AB Heat Exchanger at which USP was installed were comparatively high, and temperature gap of over 3°C was shown especially since 2003.10.14. del P of that Heat Exchanger maintained low, and the effect of USP continued through showing average gap of -0.12kg/cm² since 2003. 12. 19.

The financial effect of USP on the basis of increase and duration of H.I.T. will be at least 200 million Korean Won(US\$ 200K) energy saving per year and reduction of LCD (or DSL) on-line cleaning load by long time duration of the effect.

As the effect of USP was confirmed, extension of USP to other units (No. 4 CDU in progress) is worthwhile. We need to save expense by maximizing heat pick-up. At first, cleaning work of other heat exchangers than No. 1 CDU (2 Exchangers) and No. 2 CDU (4 Exchangers) at which USP was installed should be done. The order of work will be on the basis of thickness of fouling. Currently, we are making the yearly on-line cleaning plan of CDU heat exchangers. Detailed effect of USP is referred to the attached.



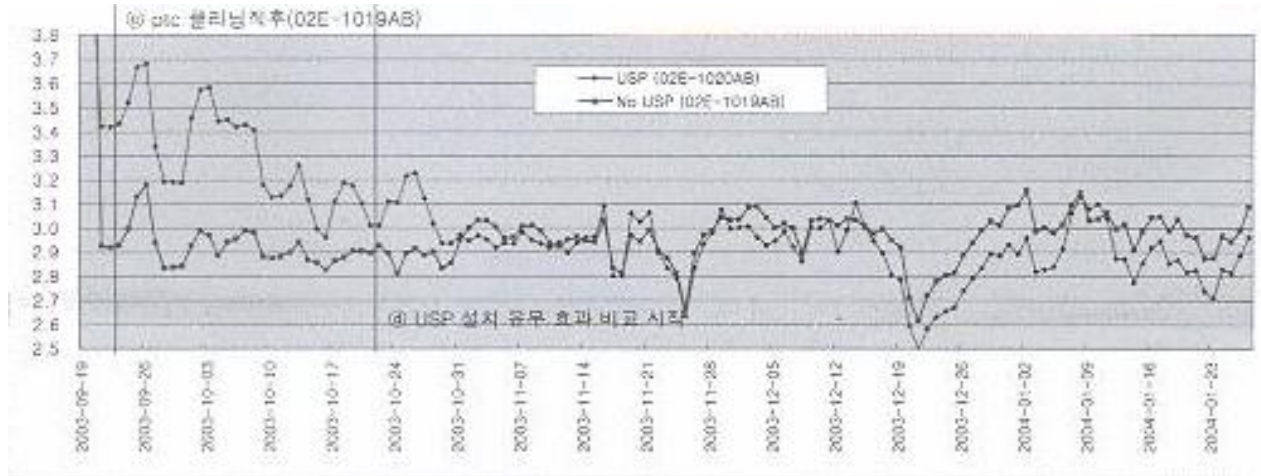
Attached 1. . Trend and Analysis of Heater Inlet Temp (HIT) (Unit : °C)

Analysis ①1st, 02F-102,02E-1020AB, by ptc Mechanical (complete removal of Hard Scale) cleaning, HIT increasing.

②1st, 02F-102, 02E-1020AB, after ptc cleaning and USP installation, HIT High Gap maintained

③2nd, 02F-101, 02E-1019AB, by ptc Mechanical (complete removal of Hard Scale) cleaning, HIT increasing more than that of 02E-1020AB and continued until 2003. 10.22.

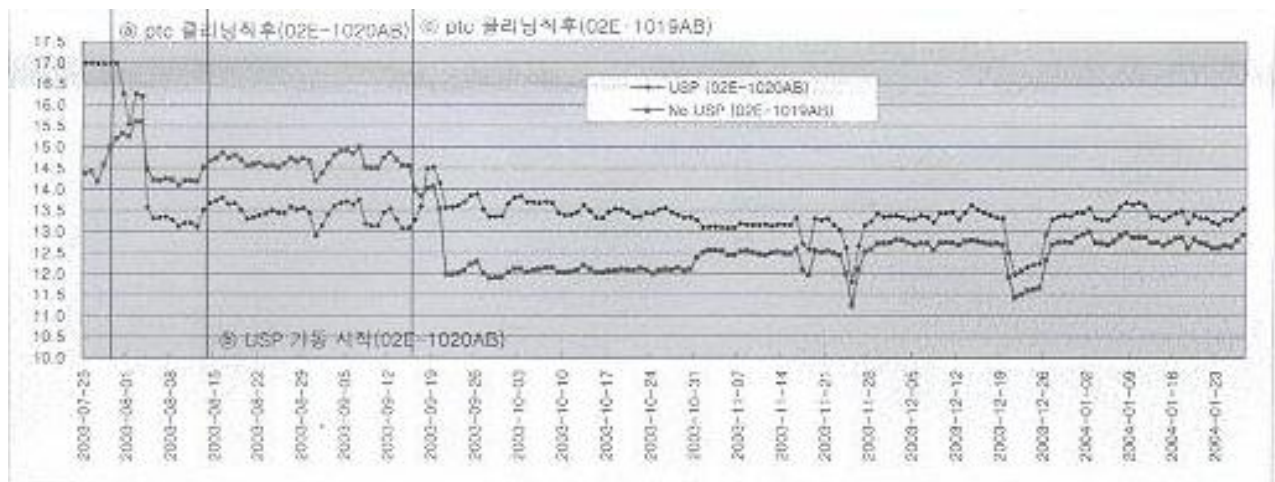
④ HIT of 02F-102,02E-1020AB became higher than that of 02E-1019AB since 2003.10.22. Average 3°C Gap maintained. It may be the effect of USP.



Attached 2. Trend and Analysis of Heat Exchanger del P (Unit:kg/cm²)

Analysis) ②nd, 02F-101, 02E-1019AB, by ptc Mechanical (complete removal of Hard Scale) cleaning, del P kept decreased.

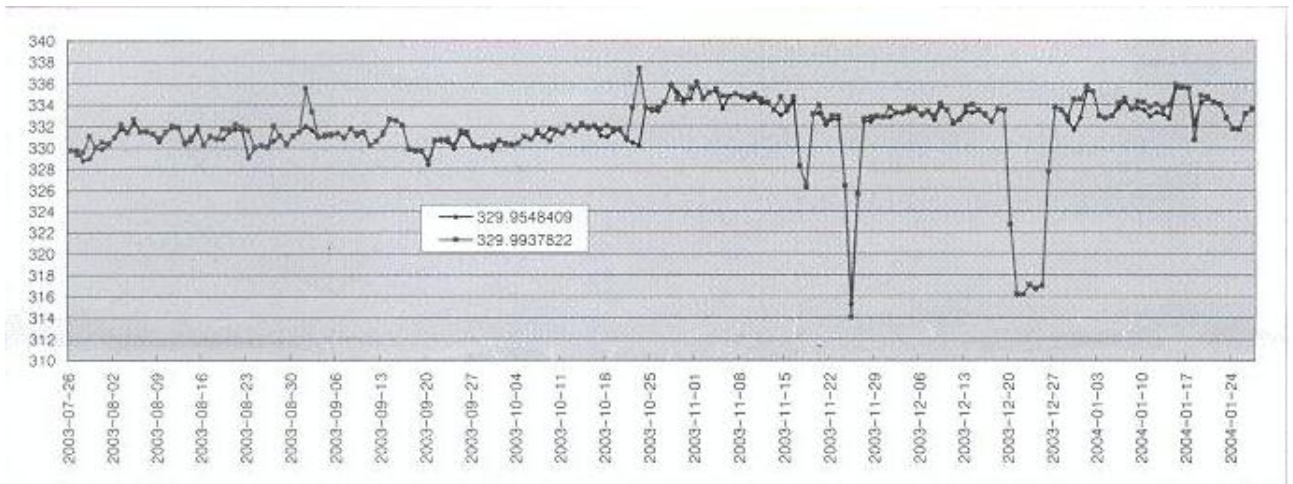
④From 2003.10.22, comparison of del P between them started. Consistent difference was not shown until 2003.12.19. From 2003.12.19, del P of 02F-102, 02E-1020AB kept 0.12kg/cm² lower than that of 02E-1019AB. It may be due to USP installation.



Attached 3. Desalter Down del P (Unit:kg/cm²)

Analysis) ① del P of 20F-102, 02E-1020AB Train showed decreasing trend in the long term.

② del P of 02F-101, 02E-1019AB Train showed slightly increasing trend.



Attached 4. Heater Feed Rate Balance (Unit:kl/hr)

Analysis) 2 Trains of both heat exchangers showed increase of heat feed rate by solved problem of unbalance of feed rate between heaters after ptc Mechanical cleaning.

