

UT PLANT

(KUMHO PNB Chemicals UT Plant)

Fuel Residue Pre-Heat Exchanger Maintenance Report in May/2005

1) EA-1821 and EA821 Pre-Heat Exchanger Tube Cleaning Precess

A) Conditions : Refer the attached photos

- ◆ EA-1821 : 1 year operation with USP. No cleaning is required.
- ◆ EA-821 : 1 year operation without USP. There are lots of fouling(high viscosity tars) inside of exchanger and needs the cleaning.

B) Inspection & Cleaning date: 5/30/2005 ~ 6/1/2005

C) Working Process

NO.	Process	Remarks
1	EA-821 Tube Cleaning	without USP
2	EA-1821 Tube Inspection, no need cleaning	USP Installation

★ EA-1821 (Fuel Oil Pre-Heater for H/O Heater)

▶ 4 transducers was installed on the both tube sheets



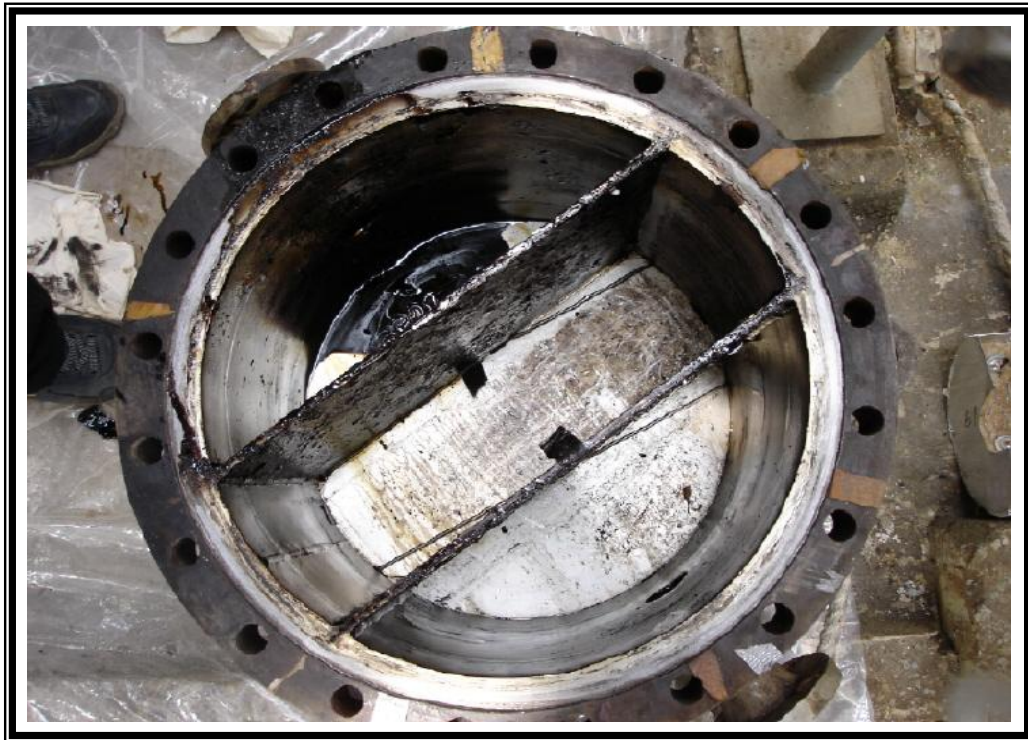
▶ USP Generator



▶ Preparation of inspection

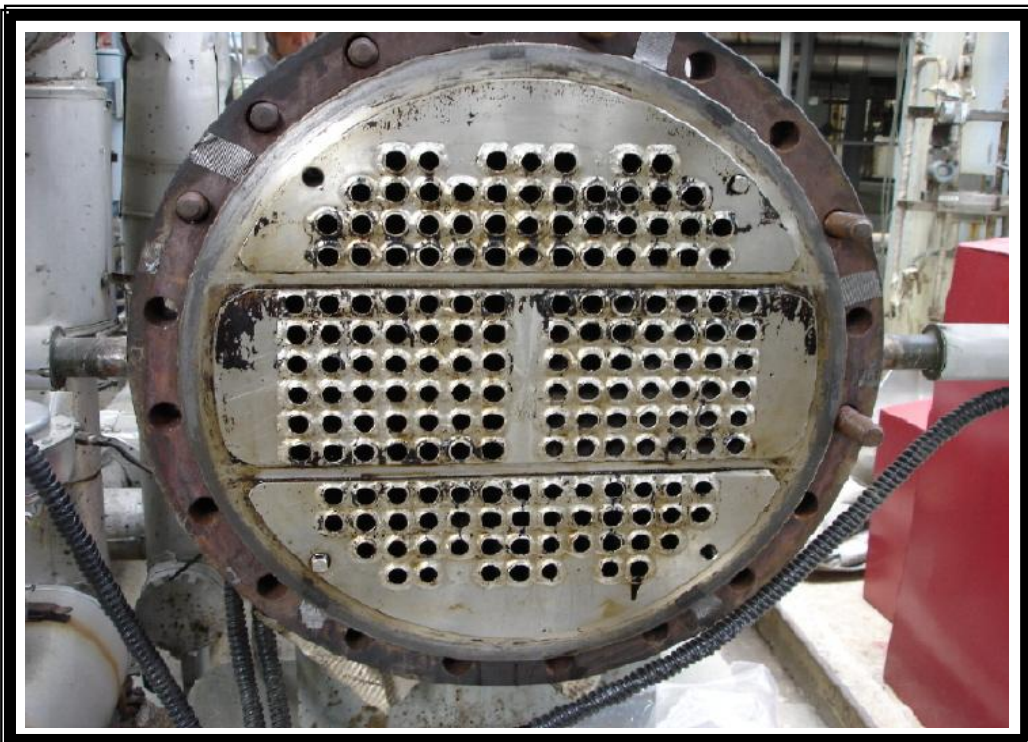


► status after the opening of shell cover – no fouling found and good condition



* Very clean

► status of exchanger shell tube after opening

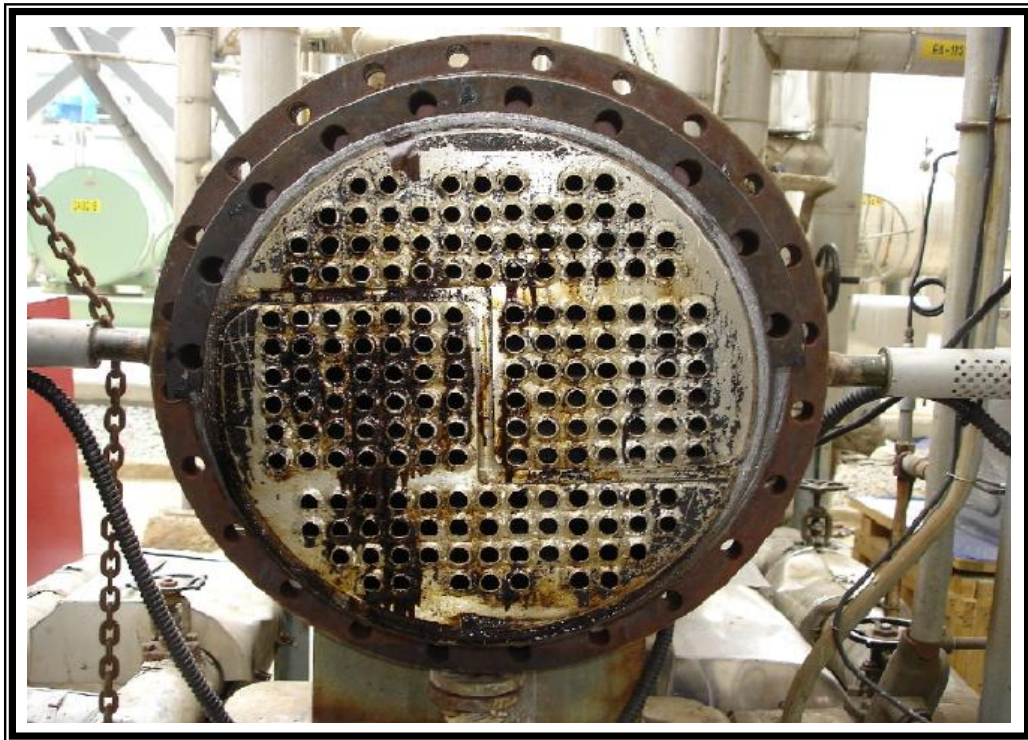


status of tube inside was very clean and no clogged

► status of other side shell cover after opening



► status of other side tube



* Because we are using the B/C oil + Fuel Residue, We have found the bad and high viscosity tars in the tube. As they clogged about 2/3 of tubes, we could not control flow valves. These have been made some troubles in S/D process. Since the USP was installed, no foulings found. Therefore no cleaning process was required.

★ EA-821 (Fuel Residue Pre-Heater)

– Without USP

(EA-821 was similar status before USP installation)

► Before cleaning



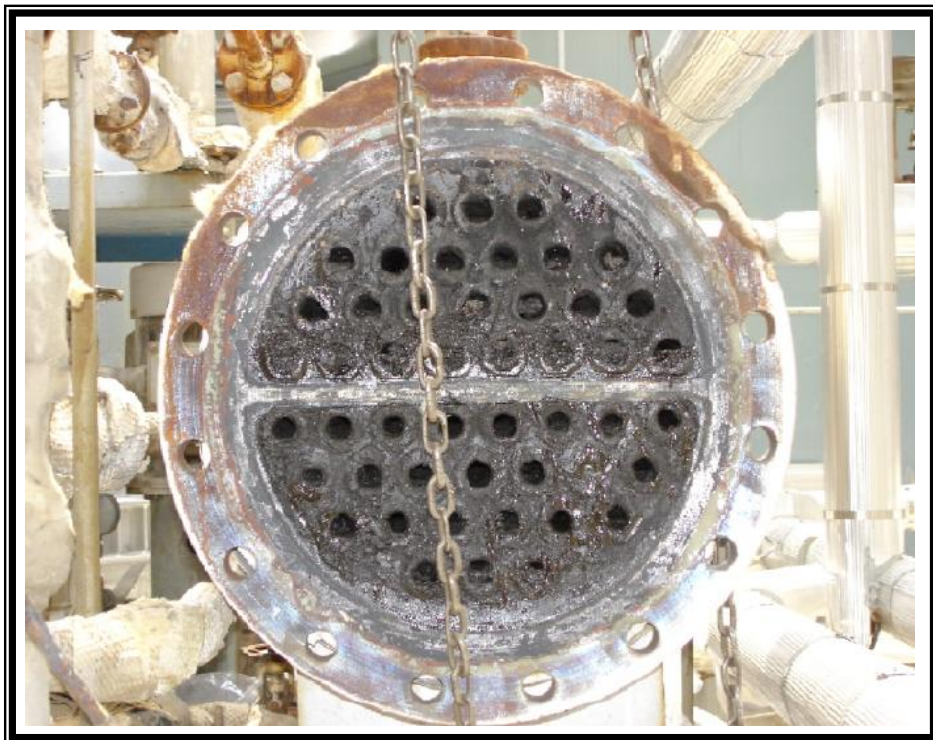
► Status of shell cover after opening



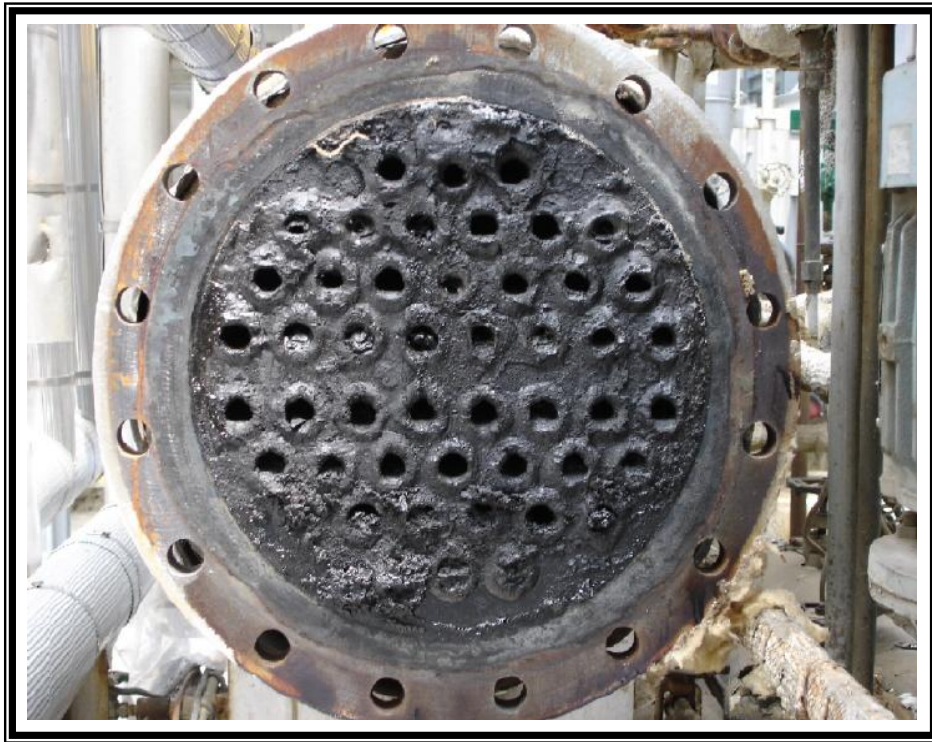
► Status of other side shell cover after opening



► Status of exchanger shell tube after opening



▶ Status of other side of shell tube



▶ Cleaning works



► Cover status after cleaning



► Other side cover status after cleaning



► Status of tube after cleaning



► Status of other side tube after cleaning

