

	<b>PROJECT</b>		<b>Standby SRU &amp; Additional Tanks</b>		
	<b>CLIENT</b>		<b>IOCL Paradip Refinery</b>		
JOB SPECIFICATION FOR CHEMICAL CLEANING OF BOILER BY ALKALI BOIL OUT METHOD	<b>Project No.</b> 080557C001	<b>Document No.</b> 080557C-000-JSC-0093-003		<b>Rev. No.</b> 0	Page 1 of 5

## JOB SPECIFICATION FOR CHEMICAL CLEANING OF BOILER BY ALKALI BOIL OUT METHOD

0	04/12/2019	ISSUED FOR IMPLEMENTATION	KMK	TNVS	TNVS	JMC
<b>REV.</b>	<b>DATE</b>	<b>DESCRIPTION</b>	<b>PREPARED</b>	<b>CHECKED</b>	<b>APPROVED</b>	<b>AUTHORIZED</b>


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## 1. Introduction:

**INDIAN OIL CORPORATION LIMITED (IOCL)** has awarded Fax of Acceptance (FOA) dated 29<sup>th</sup> August 2019 to M/s. Technip India Limited (TPIL) for Consultancy services (PMC/EPCM services) for overall project management, FEED Review / FEED, Detailed Engineering, Procurement & expediting services, Tendering & award, Construction Management & Supervision, Assistance in start-up, Commissioning & performance test runs for installation of a Standby SRU of 525 TPD capacity and execution of Additional tanks for Paradip Refinery, Odisha, India.

## 2. Definitions & Abbreviations

Abbreviation	Definition /Expanded form
IOCL/ CLIENT	Indian Oil Corporation Limited
PMC/ CONSULTANT	Technip India Limited
LICENSOR	Party selected by IOCL for process technology ownership for any UNIT
CONTRACTOR	Party whose services are obtained for performing the works specified as part of LSTK / packages.
EPCM	Engineering, Procurement & Construction Management Services.
LSTK	Lump Sum Turn Key portion of the work to be executed by CONTRACTOR
FEED	Front End Engineering Design
AUTHORISED REPRESENTATIVE	IOCL's/ CONSULTANT's representative authorized to act for and on behalf of them.
VENDOR	Any third party supplying the equipment/materials for setting up the Plant
PROJECT	Indicates Standby SRU and Additional tanks Project, Paradip Refinery
UNIT	Indicates any particular portion of the project to be built which can be Process related or Utilities/Offsites related
SRU	Sulphur Recovery Unit

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### 3. General

This specification describes the minimum requirements for pre-commissioning-Alkali boil out chemical cleaning of boilers for HP/MP steam generation. The purpose of alkali boil out is to remove oil, grease, coating materials, foreign matter etc from the boiler internals. This specification is intended for carbon steel surfaces, materials other than carbon steel should not come in contact with the boil out solutions. Filters, venturies, instruments etc., which are sensitive to alkali boil out solutions should be dropped before alkali boil out. The vendor manual shall be referred for any specific requirements. Any specific requirements of the vendor shall be taken care in detailed procedure suitably by the Contractor.

### 4. Sequence of Operation

The sequence of operation shall be as follows:

- Flushing with DM water / BFW (Boiler Feed Water)
- Alkali boil out with Tri sodium phosphate (TSP) and Caustic soda.
- Final flushing with DM/ BFW water

### 5. Chemicals


- Tri-sodium phosphate, technical grade, conforming to IS:573
- Caustic soda technical grade conforming to IS : 252
- DM water / B.F. water should be used for preparation of chemical solutions and flushing / rinsing.

### 6. Equipment And Accessories

The equipment and accessories consists of a tank, temporary piping, valves and pumps of appropriate capacity suitable to maintain good velocity (about 0.5 m/sec.), If circulation method is used. All necessary fittings, flanges, heater coils, gasket, thermometers, hydrometers, test coupons, spares, lab facilities for chemicals and safety accessories for operation personnel shall be made available at site prior to alkali boil out.

### 7. Alkali Boil Out Procedure

- Alkali boil out shall be carried out with 0.5 wt %. Tri-sodium phosphate ( $\text{Na}_3\text{PO}_4$ ) + 0.30 wt % Caustic soda (NaOH), under actual firing condition of the boiler at half the working pressure for about 24 hours.
  - Filling of the boiler with D.M. Water up to the bottom of the drum.
  - Addition of alkali solution into the boiler drums from top manhole.
  - Filling of boiler up to normal operating level.
  - Fire the boiler and raise the pressures gradually to half the working pressure.

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- Alkali solution of specified concentration should be held at this pressure for about 24 hours with hourly blow down from all individual valves intermittently for 1-2 minutes to remove accumulated sludge & deposits etc. The normal level in the drum is to be maintained with makeup water.
- Boiler water samples to be taken every two hours for analysis of pH, alkalinity, phosphate, oil, conductivity and silica.
- After alkali boil-out, boiler is cooled down to 80°C and drain the alkali solution. Flushing and rinsing with D.M. water till pH of inlet & outlet is same.

**Notes:**

- Economizer can be degreased by hot alkali circulation method (with 0.05% Teepol) separately.
- In case, the firing of boiler is not possible, the above procedure shall be followed by circulation method.

**8. Preservation**

After draining the rinsed water, the system can be taken into circuit or should be completely filled up with Ammoniated hydrazine solution containing 200-300 ppm of Hydrazine at pH 9.5 (with addition of ammonia) for short duration.

**9. Requirement of Chemicals**

- Approximate chemicals required for 1 M3 hold up of system
  - Tri-sodium Phosphate 6 kg
  - Caustic Soda 6 kg
- The hold-up may be taken as hold-up of steam drums, condensers, interconnecting piping and min. liquid level of 300 mm from bottom of the tank.