# Incidence of Boiler Furnace Explosion at RCF Trombay Unit

## Incident

There are three boilers which are supplying steam to ammonia, urea and complex fertilizer plant at RCF, Trombay. On 2nd July 2016, two of the three boilers were in operation. The number 2 boiler was under maintenance for boiler inspection and was being put on standby mode on that fateful day after getting clearance from boiler inspectorate. In order to restore fuel supply, the slip plate on the main line was removed and gas charged in the line momentarily to check if there is any leakage in the slip plated flange. This action resulted in explosion in the furnace of the boiler, which ripped open the furnace box and led to fatality of three contract workmen who were clearing the area after completing the fixing up of manhole cover plate of the furnace. Five other personnel, who were in the vicinity of the boiler were also injured. The other two adjacent running boilers were not impacted in any way.

**On 2nd July 2016, there was an explosion in Boiler no. 2 at RCF Trombay, which was getting ready for start-up after planned maintenance. The explosion resulted in 3 fatalities and 5 injuries. The investigation concluded that one of the boiler trip valves (out of total eight) was partially open though it was indicated to be in closed condition at panel. A momentary opening of fuel gas main valve by the operator to check the leakage in the flange resulted in formation of explosive mixture inside furnace of the boiler due to the passing valve. Operating procedure has been modified to prevent recurrence of this incident.**

## Root Cause

The root cause for the explosion was due to formation of explosive mixture in the furnace due to passing of one of the burner trip valves of the boiler. There are eight burner trip valves in the boiler which gets closed upon shutting down the boiler as per safety interlock. Upon investigation it was observed that burner trip valve No. 6 was found partially open, though all eight trip valves were marked in closed condition on DCS panel. The momentary opening of the main gas valve for checking the flange leakage led to entry of the fuel gas into the furnace in spite of the bleed line in the fuel line remaining open to atmosphere. The source of spark causing the ignition could not be ascertained, and could be possibly a spark generated from some work initiated by the contract workmen at the manhole cover who were clearing the area/collecting the tools after completing the job.

## Lessons Learned

- Boilers, furnaces and reformers to be charged with fuel gas only when furnace draft fans are put into operation. Standard operating procedure modified accordingly.
- Fuel gas line leak test to be strictly done with nitrogen.
- Proper interdepartmental communication to be ensured between maintenance supervisor and control room and work area to be cleared of contract workmen before initiating start-up activities.

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