Abstract

It is recognized that industry must reduce its impact on the environment if we are to continue global development for future generations. A major contributory factor will be through the lowering of industrial emissions, which has been catalyzed by a combination of public pressure, environmental legislation and the internal requirement to minimize the loss of valuable feed-stocks. Large proportions of the emissions to atmosphere are caused by the by-products of combustion (notably the oxides of carbon, nitrogen and sulfur), along with known losses of volatile hydrocarbons and steam.

There are mainly two types of emissions: Identified Emissions and Fugitive Emissions. Identified emissions are from known sources like stack, flare, process vents for atmospheric category and process drains for aqueous emissions. The quantity and quality of these types of emissions are known and therefore controlling of these types of emissions is comparatively easy. Fugitive emissions cover all losses of (usually volatile compounds) materials from a process plant, through evaporation, flaring, spills and unanticipated or spurious leaks. It is often defined as; any chemical, or mixture of chemicals, in any physical form, which represents an unanticipated or spurious leak, from anywhere on an industrial site. Because quantity and quality of fugitive emissions are unknown, the controlling becomes a challenging job. Volatile organic compounds' emissions are of significant

environmental concern because some have the potential for Photochemical Ozone Creation Potential (POCP), Global Warming Potential (GWP), toxicity, carcinogenicity and local nuisance from odor. The prevention of VOC emissions is therefore one of the most important issues facing the operations of many industrial processes.

In view of the above background the Central Pollution Control Board of India, is in the process of framing standards for fugitive emissions. It will also cover Synthetic Organic Chemicals Manufacturing Industry like IPCL-MGCC; IPCL-MGCC has therefore proposed to frame out some control strategy for fugitive emissions. The above proposal resulted into the project known "Leak Detection and Repair".

Four approaches for estimating equipment leak emissions are:

1. Average Emission Factor Approach
2. Screening Ranges Approach
3. EPA Correlation Approach
4. Unit-specific Correlation Approach

These four approaches can be used by any chemical-handling facility to develop an inventory of Total Organic Carbon emissions or Volatile Organic Carbon emissions from equipment leaks.

In general, the more refined approaches require more data and provide more accurate emission estimates for a process unit. In the Average Emission Factor Approach and the Screening Ranges Approach, emission factors are combined with equipment counts to estimate emissions. To estimate emissions with the EPA Correlation Approach, measured concentration (screening values) for all equipment are individually entered into general correlations developed by the EPA. In the Unit-Specific Correlation Approach, screening and leak rate data are measured for a select set of individual equipment components and then used to develop unit-specific correlations. Screening values for all components are then entered into these unit-specific correlations to estimate emissions.

To follow the LDAR program it is necessary to repair the component as soon as the leak is detected. The repair options are applicable for online repair only. There are different options for different types of components. For Valves, these options include: tightening of bonnet bolts, tightening of packing gland bolts and injection of lubricant into the lubricated packing. For Open Ends,
these options include providing cap, blind flange, plug or second valve whatever is applicable. For Connectors, these options include: injecting thick lubricants such as grease and tightening of flange bolts.

Key Words : Type of Emissions, Leak Detection & Repair, Average Emission Factor Approach.