

## REFINERY CATALYST DUMPING OPERATIONS

### Application Description

Refineries use large "cracking towers" as a part of their operations. These towers can be approximately 100 feet tall and are filled with a catalyst which assists the conversion of oil into lighter fuels. Periodically, the catalyst must be removed, the tower cleaned out, and new catalyst added. In order to remove the old catalyst, workers must enter and remain inside the tower wearing full protective gear. As the old catalyst is being removed, flammable and hazardous vapors can be emitted. As a result, a gas monitor must be used to monitor the condition of flammable vapors, oxygen levels, and normally H<sub>2</sub>S and CO also.

Since the tower is purged with Nitrogen, there is ideally no oxygen present. An increase in the volume of oxygen would mean that the Nitrogen purge is not adequate. Therefore oxygen detection is normally set for an increasing alarm between 2% to 4% volume, to warn of an increasing oxygen situation. For monitoring LEL with a catalytic sensor, a dilution fitting must be used, since the catalytic sensor requires oxygen in order to operate. (Note that an IR sensor cannot be used for this application because it is possible that hydrogen could be one of the flammable gases present, and an IR sensor cannot detect hydrogen).

Normally this testing must be done 24 hours a day for several weeks. Although a continuous monitor can be used, quite often portable monitors are used for this application due to their flexible nature and ease of use. The test area is extremely dirty with fine catalyst dust, and so any sample drawing instrument must utilize appropriate filters to avoid pump and flow problems. It's also important that a gas monitor's sample drawing pump be able to draw a sample over 100 feet to test deep within the tower.



### RKI's Solution

#### EAGLE One To Six Gas Portable Monitor:

1. **Continuous Operation** - The EAGLE can operate continuously from a 115 VAC continuous operation adapter. Also, if desired, it can run from batteries and it will operate for 30 hours from 1 set of Alkalines.
2. **Dilution Fitting For Accurate Combustible Readings** - The EAGLE can be provided with a removable dilution fitting. This fitting quickly snaps onto the instrument's inlet

fitting, and the hose connects to it. Since this fitting blends 50% sample with 50% ambient air, it provides sufficient oxygen for the Catalytic sensor to operate if the instrument is located in a fresh air environment. The instrument can be calibrated to read directly either with the dilution fitting in place or without the dilution fitting. To read the oxygen level inside the tower, the dilution fitting can either be removed, or the dilution hole can be covered with a finger for a minute to draw 100% sample into the instrument.

3. **Permanent Internal Dilution Fitting** - As a special option, the EAGLE can be supplied with a permanent internal dilution fitting. In this case, the dilution is present for the LEL sensor at all times, but the flowpath of the instrument is designed so the dilution does not effect the Oxygen, H<sub>2</sub>S, or CO readings.
4. **Powerful Pump** - The EAGLE has a very strong pump and can be provided with a sample hose up to 125 feet long. Without dilution, a sample will draw through this hose in less than one minute.
5. **Filters For Dirty Applications** - The EAGLE has many effective filter options. It can be provided with a probe which contains a sizeable, effective, and easily replaceable pleated paper dust filter. This is essential for this application. In addition, it can be provided with a large hydrophobic and fine dust filter inside the unit as a final stage of protection.
6. **Buzzer Options** - The EAGLE can be provided with an extra loud buzzer added in addition to the standard buzzer. This creates noise levels of about 95 db at 3', to help in high noise areas. Another attention getting option is a remote horn and strobe light on the end of a 20' cable.
7. **Adjustment Lockout Switch** - This switch is located inside the EAGLE, and can be used to assure that only authorized personnel have access to set up controls such as calibration and alarm point options.
8. **Weatherproof** - The EAGLE is fully water shedding and gasketed by design and is fully functional in the rain. It can also be placed into water several inches deep, while operating, without fear of damage or water entry.

The EAGLE has proven itself at many refineries to perform excellently for this application and to hold up well despite the harsh conditions of use.