

1.5.2 Leak Detection using Flame Ionization Detection (FID)

Overview:

Flame ionization detection. In this detector, the sample of atmosphere to be tested is fed into a hydrogen flame. Two electrodes connected to a battery are located in the flame. If the sample contains hydrocarbons, the number of charged particles or ions formed in the flame increases substantially. This increase is accompanied by an increase in the electrical current flow between the two electrodes. A very sensitive ammeter measures the rate of electrical current flow and generates a corresponding electrical output signal that can be recorded. Flame ionization detectors have even greater sensitivity than infrared detectors. Laboratory instruments are capable of detecting 0.01 ppm of methane in air; field units can have a sensitivity of 0.1 ppm. On the other hand, flame ionization units are not selective, but respond to any hydrocarbon. Portable flame ionization units are used in walking surveys along the pipeline R/W.

Purpose:

Because the above procedure is so sensitive at indentifying leaks it is an excellent tool to use. When a leak is discovered, it is given a classification based upon its' severity .

Class 1: Requires immediate attention.

Class 2: Requires attention but is not hazardous at the time of the survey.

Class 3: Are small in nature and do not represent any hazard. These leaks can be repaired along with routine maintenance or scheduled outtages.

Other anomalies along the pipeline R/W are documented while the FID survey is being done. i.e. missing pipeline signs or damaged, exposed pipeline, vegetation overgrowth, etc.

Background:

It is important to note that FID will **not** prevent a leak from happening. It is strictly a tool to be used for locating a leak.

Neither the EUB (Alberta Pipeline Act) or CSA Z662 - 99 requires facility owners to use FID specifically. The EUB did state that facility owners are required to provide documentation showing good due diligence, using FID supports some of this needed documentation.

Several major natural gas producers and gas transmission companies, were questioned as to how often or if they FID their pipelines. The results varied with either companies not using FID, to having a program in place where a portion of the pipelines were scheduled to be done annually.

Early detection of a leak gives the facility owner the advantage of minimizing gas losses within the system, scheduling repairs around other outages, reducing the possible impact on landowners and environment.

AML Policy:

Licensed substance Of Pipeline	Frequency of FID survey
Sweet Natural Gas	4 years.
Sour Natural Gas	2 years.
HVP	2 years.

As more statistical data is gathered from FID reports or other supporting documentation, the frequency of FID may change.

Procedure:

Basic plan:

In keeping with the above policy, the pipelines will be divided into quadrants or areas and surveyed on an annual rotating basis. This will make the FID program more manageable, both from a budgeting and personnel time aspect.

When a new pipeline is installed or purchased, it will be incorporated into the appropriate area.

Reporting:

A detailed final report will be provided with every FID survey done by a Contractor. It will include a summary of the survey results, Leak Summary, Repairs and General Maintenance Listing, and a General Maintenance Analysis.

The FID annual report will be filed according to the year of the survey, and in the same location as the cathodic reports, the reports will be retained for a period of 6 years from the date that the report was filed.

The "Repairs and General Maintenance Listing" section of the report will be modified to include a location where a name and projected completion date will identify who will be responsible for the item.

Also to be kept on file, will be an outline of future quadrants or areas to be surveyed. This will help ensure that no pipelines will be overlooked.

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