

## Residential Methane Detectors Program



The objective of this project is to create a comprehensive program for achieving full customer adoption of cost-effective, reliable, accurate, and readily available residential methane detectors.

### Project Description

In this program, several discrete initiatives are being proposed as tasks, with initial activities focused on 1) developing a consumer behavior study to better understand how customers react to potential leaks and 2) the development of a “Fit-for-Purpose” standard for residential methane detectors.

This project also includes a comprehensive pilot program to evaluate commercially available detectors that performed well during laboratory evaluations.

### Deliverables

The deliverables for this program include: 1) A fit-for-purpose detection-level determination; 2) a revised UL standard; 3) a consumer behavior study; and 4) pilot study and implementation plan.

### Benefits

Having an early-warning system in residences can improve safety and prevent events from occurring due to unreported or undetected gas leaks.

The results of this research will allow utility companies to add to their environmental and safety public-awareness programs by offering technically validated information regarding the reliability and enhanced safety that in-home methane detectors can provide.

### Technical Concept & Approach

In this program, researchers are conducting a comprehensive testing program on commercially available (both domestically and internationally) residential methane detectors and other efforts to advance the adoption and safety of methane detectors.

Specific tasks include:

- **Formation of a Project Advisory Group**

This group of industry representative will guide the project and engage with manufacturers and utilities in the development of appropriate public-

awareness messaging specific to residential methane detectors and the reporting of natural gas leaks.

- **Consumer Behavior Study**

Although residential methane detectors are currently available, there is not widespread adoption and a general lack of awareness of these safety devices exists. This type of study complements existing market research on low customer adoption of gas detectors and customer responses in regards to leaks. The study will look at issues such as limitations in consumer knowledge, consumer motivation, and decision making. These insights will help utilities develop appropriate strategies to increase the effectiveness of both natural gas odorant and residential methane detectors.

Results from this study will be leveraged to develop a marketing and implementation strategy to improve customer adoption of residential methane detectors and to influence behavior so that customers take action (report a leak) when a hazard is recognized.

- **Development of Appropriate Detection Level and “Fit-for-Purpose” Standard**

Commercially available residential methane detectors currently alarm at 25% LEL, which is also the detection threshold that is specified in Underwriters Laboratories (UL) standard 1484. However the



## Standards for Methane Detectors

Standard	Section	Organization	Details/ Title	% LEL Alarm Activation Point
UL-1484	43.1.1	ANSI/ Underwriters Laboratories	Standard for Safety: Residential Gas Detectors	<25%
BS EN 50194-1:2009	4.3.3	British Standards Institute	Electrical apparatus for the detection of combustible gases in domestic premises - Part 1 : Test methods and performance requirements	3-20%
49 CFR 192	.736	DOT	Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards: Compressor Stations: Gas Detection	<25%
29 CFR 1910	.146	OSHA	"Hazardous atmosphere" means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes: (1) Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL);	10%
2012 NFPA 30A	7.4.7	NFPA	The gas detection system shall be designed to activate when the level of flammable gas exceeds 25 percent of the lower flammable limit (LFL).	25%

Code of Federal Regulations 49 CFR 192 specifies a gas detection level of 20% LEL in confined spaces, while some states such as New York are even lower at 10% LEL. There is a need to determine the appropriate detection level specific for residential methane detectors and to develop a new standard or revise an existing standard that reflects this new level. Existing studies and experiences from other countries will be used to develop installation guidelines which will be incorporated into this standard.

- **Pilot Study**

A pilot program will investigate the performance of detectors in actual home settings, consumer responses to alarms, and where to place the detectors within the household. These factors influence how detectors are used and perceived.

## Results

The first phase of this program determined whether commercially available residential methane gas detectors were susceptible to giving false-positive responses to an assortment of typical household chemicals. Research found that the two most commonly sold devices, which are commercially available at various local hardware and home-improvement stores, were the best performers. The off-brand units that were tested gave significantly more false-positive responses when tested side-by-side with the name-brand units.

In Phase 2, the project team conducted a more comprehensive testing program on commercially available residential methane detectors, expanding the testing program to international products as well. Laboratory testing was conducted with a protocol designed to identify both strengths and deficiencies in these detectors. The

testing matrix included testing for interference gases as well as varying concentrations of methane. The results of this research showed that a domestic unit (one of those also identified in the first test project) had the best overall performance.

## Status

The consumer behavior study is under way. A survey of approximately 1,000 people was completed. Preliminary data states awareness of natural/methane gas alarms or detectors is about 49%, which is the lowest among other safety products such as home security systems, fire alarms, etc. The study also suggests that improvement is needed in regards to natural gas safety education and awareness. A Final Report of the consumer behavior study will be completed in 2016.

The pilot program was initiated and a test plan developed. Three manufacturers were selected based on market share and performance in previous test phases. Approximately 1,000 detectors will be installed in residential homes for up to a one-year period. Each participating utility will be responsible for installation according to manufacturers' instructions. All detectors will be pre-qualified to ensure that they successfully respond to methane at the 25% LEL limit (the current manufacturer design limit). At the end of the test period, each detector will again be tested to verify performance over the pilot period.

## For more information:

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