

Mr. Richard H. Kutzleb  
Manager, Research & Engineering  
Health Consultants, Incorporated  
100 Tosca Drive  
Stroughton, MA 02072

Dear Mr. Kutzleb:

In your recent letter of September 27, 1973, to Mr. Frank E. Fulton you referred to your recent visit to our Office at which you discussed Section 192.625 of the Federal pipeline regulations covering odorization of gas. You state in your letter that Health Consultants, Incorporated, has often been asked, "How does the gas company comply with the odorization requirements of the OPS?" With regard to this general question, you list several specific questions. The following are your specific questions with the OPS comment to each:

#### Question 1

In Part B of the aforementioned section, the odor must be readily detectable at concentrations of one-fifth of the lower explosive limit. By whom? Taking into consideration that the olfactory response of individuals vary, if any average nose is desired, how does a gas company develop an average nose?

#### Comment 1

The Federal gas pipeline safety regulations have been developed, as far as practicable, as performance standards rather than design and construction specifications. They prescribe an adequate level of safety in terms of results, leaving industry free to develop and use means of meeting the requirements. In this particular regulation, the odor must be readily detectable at concentrations of one-fifth of the lower explosive limit by the typical or average person having typical or average olfactory senses. We recognize that olfactory responses of individuals vary; however, we also recognize that most individuals have an olfactory response that is within a certain range. Because this smelling range is normally more sensitive than the recommended concentration of odorant used to reveal the presence of gas in air at one-fifth of the lower explosive limit, there is sufficient built-in safety factor to allow most individuals to smell the treated gas. A gas company, then, will not have to develop an average nose, but can use the smelling senses of any typical employee since the typical employee probably possesses normal olfactory senses which will suffice in meeting this requirement. If a gas company is not satisfied

that the employees being used in this function possess typical smelling responses, then a program of periodically checking the comparable olfactory responses of these people can be implemented.

#### Question 2

In Part C, specifications are given for odorant material. Is hydrogen sulfide considered an acceptable material by these requirements?

#### Comment 2

Hydrogen sulfide is very corrosive, especially to copper. For this reason, OPS has limited the amount of hydrogen sulfide that can be stored in pipe-type or bottle-type holders to 0.1 grain per 100 standard cubic feet. Thus, hydrogen sulfide by itself would not appear to be a desirable odorant.

#### Question 3

In Part E, it is stated that odorization equipment must not introduce odorant with wide variations. What is considered an acceptable range for variation of odorant concentration level?

#### Comment 3

An acceptable range for variation of odorant concentration would be within a range no lower than a concentration which is readily detectable at one-fifth of the lower explosive limit by the typical person in Comment 1. The intent of the regulations is that the operator would not make variations in odorant concentration that could cause unwarranted public reaction. For the most part, each gas operator has determined the range of odorant concentration needed in its system for compliance with regulatory standards.

#### Question 4

In Part F, periodic sampling is required. How often must a gas company test its system to assure compliance?

#### Comment 4

The gas operator must test its system sufficiently to assure compliance with this requirements. The number, location, and frequency of this sampling can best be determined by the operator, based on the experience and characteristics of the particular gas system. Some consideration in determining the sampling period would be the location, size of the system, age of the system, average number of annual leaks in the system, any new lines in the area of the sampling, type of

pipe in the area of sampling, past experience in odorization sampling, type of odorant used, and any other factors that could effect the ability of the gas to maintain the required odorant level.

#### Question 5

How shall a gas company determine the odorant injection rate referred to in Part E so as to comply with Part B? Could a room test or a series of sniff tests involving several individuals be used to establish a level which could then be measured as an odorant concentration chemically throughout the system to assure compliance?

#### Comment 5

The room test that you propose would be an acceptable means of determining the odorant injection rate referred to in Section 192.625(e) so as to comply with Section 192.625(b). Other means could also be used, such as several individuals at different locations in a gas system conducting sniff tests. Any other method that the gas operator determines can adequately establish an odorant injection rate and meet the requirements of Part B would be acceptable.

#### Question 6

Considering that some people are less sensitive to some compounds than to others, would a mixture of odorant compounds be better than odorizing with one compound alone?

#### Comment 6

Consistent with performance type language, OPS requirement and industry experience is that the average individual must be able to detect the presence of gas in air at one-fifth of the lower explosive limit. In line with Comments 1 and 4, as long as odorant compounds meet this requirement, the operator has satisfied the regulations. If the operator wishes to mix odorant compounds and if the mixture is compatible, OPS would have no objection.

#### Question 7 \_

Can a "complaint call" rate be considered an acceptable measure of odor level?

Comment 7

The complaint call rate has been used by some gas operators as an aid in determining the amount of odorant in the system. However, this method should only be used as an aid because it does not in itself meet the performance level criterion in Section 192.625(b).

Sincerely,

/signed/

Joseph C. Caldwell  
Director  
Office Pipeline Safety