ADAMS Template: SECY-067

DOCUMENT DATE: 02/01/1989

TITLE: PRM-020-019 - 54FR05089 - GE STOCKHOLDERS ALLIANCE: RECEIPT OF PETITION FOR RULEMAKING

CASE REFERENCE: PRM-020-019

54FR05089

KEY WORD: RULEMAKING COMMENTS

Document Sensitivity: Non-sensitive - SUNSI Review Complete

STATUS OF RULEMAKING

PROPOSED RULE: PRM-020-019 OPEN ITEM (Y/N) N

RULE NAME: GE STOCKHOLDERS ALLIANCE: RECEIPT OF PETITION FOR RULEMAKING

PROPOSED RULE FED REG CITE: 54FR05089

PROPOSED RULE PUBLICATION DATE: 02/01/89 NUMBER OF COMMENTS: 51

ORIGINAL DATE FOR COMMENTS: 04/03/89 EXTENSION DATE: / /

FINAL RULE FED. REG. CITE: 57FR36611 FINAL RULE PUBLICATION DATE: 08/14/92

STATUS OF RULE: NOTES ON PETITION CONCERNED WITH THE INJECTION OF A DETECTABLE ORDER IN POWER PLANT EFFLUENTS. DENIAL OF PETITION ISSUED BY EDO ON 7/27/92. FILE LOCATED ON P1.

TO FIND THE STAFF CONTACT OR VIEW THE RULEMAKING HISTORY PRESS PAGE DOWN KEY

HISTORY OF THE RULE

PART AFFECTED: PRM-020-019

RULE TITLE: GE STOCKHOLDERS ALLIANCE: RECEIPT OF PETITION FOR RULEMAKING

PROPOSED RULE SECY PAPER:	PROPOSED RULE SRM DATE: / /	DATE PROPOSED RULE SIGNED BY SECRETARY: 01/27/89
FINAL RULE SECY PAPER:	FINAL RULE SRM DATE: / /	DATE FINAL RULE SIGNED BY SECRETARY: 07/27/92

STAFF CONTACTS ON THE RULE

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CONTACT2:	MAIL STOP:	PHONE:

DOCKET NO. PRM-020-019
(54FR05089)

In the Matter of

GE STOCKHOLDERS ALLIANCE: RECEIPT OF PETITION FOR RULEMAKING

DATE DOCKETED	DATE OF DOCUMENT	TITLE OR DESCRIPTION OF DOCUMENT
11/02/88	10/31/88	PETITION FOR RULEMAKING SUBMITTED BY BETTY SCHROEDER ON BEHALF OF GE STOCKHOLDERS' ALLIANCE
01/27/89	01/27/89	FEDERAL REGISTER NOTICE - RECEIPT OF PETITION FOR RULEMAKING
02/17/89	02/12/89	REQUEST FOR A 90 DAY EXTENSION OF COMMENT PERIOD BY BETTY SCHROEDER ON BEHALF OF GE STOCKHOLDER'S ALLIANCE
02/28/89	02/19/89	COMMENT OF MARVIN LEWIS (1)
02/28/89	02/22/89	COMMENT OF ECOLOGY ALERT (E. NEMETHY, SECRETARY) (2)
03/06/89	03/01/89	COMMENT OF SHEILA BROWN (3)
03/15/89	03/13/89	COMMENT OF THE SELF GOVERNMENT CENTER (NEIL STEYSKAL, DIRECTOR) (4)
03/17/89	03/14/89	COMMENT OF DORIS SCHALLER (5)
03/20/89	03/14/89	COMMENT OF FLOYD FRENCH (6)
03/20/89	03/14/89	COMMENT OF JOEL FISHMAN (7)
03/20/89	03/14/89	COMMENT OF C.M.E.R. RIGG (8)
03/21/89	03/16/89	COMMENT OF WILL DOHERTY (9)
03/21/89	03/17/89	COMMENT OF LAKE CITY CONCERNED CITIZENS (CONNIE KLINE, DIRECTOR) (10)
03/21/89	03/18/89	COMMENT OF THERESA BURLING (11)
03/22/89	03/16/89	COMMENT OF JAYNE PIKE (12)
03/27/89	03/19/89	VANCE SAILOR REQUESTS THAT THE COMMENT PERIOD BE EXTENDED FOR AT LEAST ONE YEAR. HE ALSO PROVIDES SEVERAL COMMENTS.

DOCKET NO. PRM-020-019 (54FR05089)

DATE DOCKETED	DATE OF DOCUMENT	TITLE OR DESCRIPTION OF DOCUMENT
03/27/89	03/21/89	COMMENT OF C. HOWARD JONES (13)
03/27/89	03/23/89	COMMENT OF R. JANE HARRINGTON (14)
03/27/89	03/25/89	COMMENT OF CONCERNED CITIZENS OF TENN. HARTSVILLE (FAITH YOUNG, SECRETARY) (15)
03/28/89	03/14/89	COMMENT OF SHIRLEY BURGESS (16)
03/28/89	03/17/89	COMMENT OF CUYAHOGA COUNTY CONCERNED CITIZENS (CRIS TREPAL, DIRECTOR) (17)
03/31/89	03/14/89	COMMENT OF WILBUR INGALLS (18)
03/31/89	03/27/89	COMMENT OF VALERIE HEINONEN (19)
03/31/89	03/27/89	COMMENT OF DOMINICAN SISTERS OF THE SICK POOR (VALERIE HEINONEN, REPRESENTATIVE) (20)
03/31/89	03/29/89	COMMENT OF DOROTHY ELROD (21)
04/03/89	03/28/89	COMMENT OF EMMA HARTZLER (22)
04/03/89	03/30/89	COMMENT OF JOHN HARRIS (23)
04/03/89	04/01/89	COMMENT OF DAN AND CONNIE EMERTON (24)
04/03/89	04/03/89	COMMENT OF PUBLIC CITIZEN (KENNETH BOLEY, SAFETY ANALYST) (25)
04/05/89	03/29/89	COMMENT OF PHILADELPHIA ELECTRIC COMPANY (J. W. GALLAGHER, VICE PRESIDENT) (26)
04/05/89	03/29/89	COMMENT OF DUKE POWER COMPANY (HAL B. TUCKER) (27)
04/05/89	03/30/89	COMMENT OF NUCLEAR INFORMATION AND RESOURCE SERVICE (MICHAEL MARIOTTE, DIRECTOR) (28)
04/05/89	03/30/89	COMMENT OF RALPH GRUNEWALD (29)
04/05/89	03/31/89	COMMENT OF ERIC ZICKGRAF (30)
04/05/89	03/31/89	COMMENT OF LONG ISLAND LIGHTING COMPANY (JOHN LEONARD, VICE PRESIDENT) (31)
04/05/89	03/31/89	COMMENT OF INDIANA MICH. POWER CO. & AMERICAN ELECT (M. P. ALEXICH, VICE PRESIDENT) (32)
04/05/89	04/03/89	COMMENT OF WASHINGTON LEGAL FOUNDATION (DANIEL POPEO, GENERAL COUNSEL) (33)

DOCKET NO. PRM-020-019 (54FR05089)

DATE DOCKETED	DATE OF DOCUMENT	TITLE OR DESCRIPTION OF DOCUMENT
04/05/89	04/03/89	COMMENT OF YANKEE ATOMIC ELECTRIC COMPANY (DONALD EDWARDS, DIRECTOR) (34)
04/05/89	04/03/89	COMMENT OF NUCLEAR MANAGEMENT AND RESOURCES COUNCIL (BRYON LEE, JR. PRESIDENT) (35)
04/06/89	04/03/89	COMMENT OF COMMONWEALTH EDISON (T. J. KOVACH, LICENSING MANAGER) (36)
04/07/89	03/31/89	COMMENT OF WASHINGTON PUBLIC POWER SYSTEMS (G. C. SORENSEN, MANAGER) (37)
04/07/89	04/01/89	COMMENT OF AMERICAN FRIENDS SERVICE COMMITTEE (THOMAS RAUCH, PROJECT DIRECTOR) (38)
04/07/89	04/03/89	COMMENT OF TERRY BEER (39)
04/10/89	04/03/89	COMMENT OF DETROIT EDISON (B. RALPH SYLVIA, VICE PRESIDENT) (40)
04/10/89	04/10/89	COMMENT OF K. PHILIPS (41)
04/11/89	04/06/89	COMMENT OF T. S. WHEELER (42)
04/14/89	04/12/89	COMMENT OF HARRIET SLIVE (43)
04/18/89	04/12/89	COMMENT OF SIERRA CLUB NORTHEAST OHIO GROUP (CHRISTINE TREPAL, PROJECTS CHAIR) (44)
04/19/89	04/05/89	R. FLETCHER, CENTER FOR RADIOLOGICAL HEALTH OF THE MARYLAND DEPARTMENT OF THE ENVIRONMENT REQUESTS AN EXTENSION OF THE TIME FOR THE COMMENT PERIOD.
04/19/89	04/03/89	COMMENT OF J. A. PADGETT (45)
04/24/89	04/17/89	COMMENT OF CITY OF EUCLID, OHIO (O. M. LYNCH, MAYOR) (46)
05/04/89	05/02/89	COMMENT OF JOHN ZELLER (47)
05/08/89	05/03/89	COMMENT OF FATHER MCGUIRK (48)
05/08/89	05/03/89	COMMENT OF COALITION ORGANIZING HANFORD OPPOSITION (LOURDRES FUENTES-WILLIAMS) (49)
05/10/89	04/12/89	SENATOR MIKULSKI FORWARDS TO L. ZECH A LETTER FROM SCHROEDER INFORMING MIKULSKI OF THE PETITION AND ASKING THE SENATOR TO COMMENT TO THE NRC
05/15/89	05/10/89	COMMENT OF LORRAINE CLAGGETT (50)

DOCKET NO. PRM-020-019 (54FR05089)

DATE DOCKETED	DATE OF DOCUMENT	TITLE OR DESCRIPTION OF DOCUMENT
05/16/89	04/21/89	COMMENT OF JAMES & MARTINA HORWATH (51)
08/17/92	07/27/92	FEDERAL REGISTER NOTICE OF DENIAL OF PETITION. PUBLISHED ON 8/14/92 AT 57 FR 36611.

[7590-01]

NUCLEAR REGULATORY COMMISSION

10 CFR Part 20

[Docket No. PRM-20-19]

General Electric Stockholders' Alliance, Denial of Petition for Rulemaking

AGENCY: Nuclear Regulatory Commission.

ACTION: Denial of petition for rulemaking.

SUMMARY: The Nuclear Regulatory Commission (NRC) is denying a petition for rulemaking (PRM-20-19) from Betty Schroeder on behalf of the General Electric Stockholders' Alliance, et al. The petitioner requested that the NRC issue a regulation to require that a detectable odor be injected into the emissions of nuclear power plants and other nuclear processes over which the NRC has jurisdiction. The petition is being denied on the basis that the proposed action is not necessary because: (1) current monitoring and emergency response procedures provide an adequate level of safety; (2) it would not result in any increased protection of the public health and safety and as a result would not meet the Commission's "Backfit Rule," 10 CFR 50.109; (3) the proposed action is not technically feasible; and (4) the injection of odors in

detectable concentrations over the Emergency Planning Zone for a nuclear power plant or suitable area for other nuclear facility would likely be detrimental to the environment.

ADDRESSES: Copies of the petition for rulemaking, the public comments received, and the NRC's letter to the petitioner are available for public inspection or copying for a fee in the NRC Public Document Room, 2120 L Street, NW. (Lower Level), Washington, DC.

FOR FURTHER INFORMATION: Catherine R. Mattsen, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, DC 20555, Telephone (301) 492-3638.

SUPPLEMENTARY INFORMATION:

The Petition

In a letter dated October 8, 1988, Ms. Betty Schroeder, Secretary of the GE Stockholders' Alliance, filed a petition for rulemaking with the NRC on behalf of herself, the Alliance, and "all the people in the country [USA] and all future generations." The petitioner requested that the NRC issue a regulation to require that a detectable odor be injected into the emissions of nuclear power plants and other nuclear processes over which the NRC has jurisdiction. The petition specified that the injected odor be similar to, but recognizably different from, the mercaptans used in natural gas.

Basis for Request

As a basis for the requested action, the petitioner stated that compliance with this requirement would immeasurably improve health and safety of the public by providing for early detection of radiation leaks, giving the public notice of the need to take protective measures. The petitioner recognized that nuclear facilities are required to maintain monitoring stations, but alleges that the accident at Three Mile Island demonstrates deficiencies in the capability to alert the public of dangerous releases. In addition, the petitioner claims that radiation plumes are erratic and unpredictable in their dispersion upon release because of varying weather and geo-physical characteristics of the terrain. Furthermore, the petitioner asserts that scientific studies prove that even the smallest amounts of ionizing radiation cause harmful health effects, stating that there is ample evidence that radiation causes increased infant mortality, genetic abnormalities, cancer and leukemia, and makes the body more prone to disease by "lowering" the immune system.

By example, the petitioner asserts that the natural gas industry requires inexpensive, non-toxic mercaptans (recognizable odors) to be injected into gas to help people detect gas leaks and to provide confidence that the use of gas is safe.

Public Comments on the Petition: Summary and Analysis

On February 1, 1989 (54 FR 5089), the NRC published a notice of receipt of the petition for rulemaking in the Federal Register. Interested persons

were invited to submit written comments or suggestions concerning the petition by April 3, 1989. The NRC received 52 letters of comment in response to the notice: 28 letters from individuals with 3 opposed, 24 in favor, and 1 urging a feasibility analysis; 10 letters from industry and industrial organizations argued against the petition; 13 public interest groups responded with 1 opposed, 10 in favor, and 2 requesting that NRC examine the technical feasibility of such a requirement; and 1 local governmental entity in favor.

Many of the commenters in favor of the petition gave no reasons for their support. Some only provided statements, without giving the basis for their statements, that this requirement would provide assistance in detecting leaks and/or normal releases, that it would provide the public an advanced warning of leaks, or that it would enhance the public's ability to take protective actions or save lives. A number of commenters stated or implied that it would improve public health or safeguard the future. Two commenters suggested property loss and damage would also be avoided. One commenter stated that it would improve NRC awareness of public exposure. Several of the commenters who favored the petition felt it was important to assuage worries of the public, increase public awareness or aid public acceptance concerning nuclear power and radioactive emissions. One commenter, however, suggested that if an odorant were added to all emissions that it could mean the end of nuclear power. One commenter wanted to be able to detect leaks because she does not trust the government. One commenter also stated that if the NRC was unwilling to require the odorant, the NRC would be demonstrating to the public that it was hiding the danger from emissions. One commenter, who was apparently in favor of the petition, simply submitted an article which addressed lasting problems resulting from the accident at Three Mile Island.

A few commenters seemed to be in favor of the odorant only for leaks or abnormal releases, a few clearly believed that information on all releases should be provided to the public in this way. One of these commenters contended that there was no proof that allowable levels of releases were not harmful. Two commenters stated that the public had a right and a need to know about all exposures. Although a few commenters gave an opinion that it would be technically feasible, none gave any information to support that statement other than noting the benefits of the use of mercaptans in natural gas.

None of the commenters presented any information which was convincing concerning the need for or the feasibility of the proposed requirement.

Although the petitioner's proposal, if it were feasible, would provide one method of warning the public, the means currently in place are more effective. As discussed further below, the comparison with mercaptans in natural gas breaks down when one goes beyond the simplest of factors. As for this method providing more information to the NRC on public exposures, current systems for measuring releases, estimating doses to the public, and reporting to the NRC are more accurate than the use of an odorant in emissions would be. As to the public's right and need to know what their exposures are, existing information, though not direct, is available to the public. For example, the NRC publishes an annual report entitled "Radioactive Materials Released from Nuclear Power Plants" compiled by Brookhaven National Laboratory for U.S. Nuclear Regulatory Commission, NUREG/CR-2907[1]. Various volumes cover

[1] Copies of NUREGS may be purchased from the Superintendent of Documents, U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20013-7082. Copies are also available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161. A copy is also available for inspection and/or copying at the NRC Public Document Room, 2120 L Street, NW. (Lower Level), Washington, DC.

different report years (each also summarizes previous data). Whether or not such a requirement in the long run would improve or diminish the public's faith in nuclear power would be difficult to predict; however, the question becomes irrelevant given the many arguments against the use of an odorant.

Three of the commenters that supported adding an odorant to emissions also suggested the addition of a safe, non-toxic colorant.

This suggestion is outside the scope of the original petition. However, the Commission notes that although a colorant might have some small advantage in terms of the timing of any warning, most of the considerations applicable to the use of an odorant would also be relevant to a similar use of a colorant.

The commenters that opposed the petition presented significant reasons for their opposition. Many commenters stated that there would be no significant increase in the protection of public health and safety. A few commenters concluded that the requirement would have a negative impact on public health and safety and the environment. Some concluded this because of the difficulty of choosing an odorant that would not be toxic when using the large quantities that would be necessary. Others were concerned that the safety of plants would be reduced. Some of the reasons expressed for this second concern were that: an odorant would make it difficult for workers to respond in an emergency, problems of odorants at the plant would make a nuclear incident more probable, an odorant might be explosive in the containment or corrosive, an odorant might be detrimental to the functioning of emergency equipment, and modification to systems might be necessary.

A number of the commenters stated that existing effluent monitors and notification procedures are more feasible, more sensitive, and more orderly

and that present regulations require the integration of instrumentation and public notification procedures that would allow an adequate time for protective actions. Some concluded that the use of an odorant would be unreliable and inaccurate.

Many of the commenters indicated that use of an odorant is not feasible and discussed the technical difficulties. The main points were that: (1) the quantity of odorant required for even a threshold detection in an Emergency Planning Zone (radius of about 10 miles) for a nuclear power plant is greater than is feasible, (2) odors could not be related to the amount of radiation because of different half-lives or different concentrations, and (3) it is technically untenable to label fission products with an odor. Some commenters discussed the differences between radioactive emissions and the use of mercaptans in natural gas. They pointed out that: (1) natural gas is piped directly to and used in homes and buildings where there are no other warning devices and where a leak can create an immediate hazard to life and health, (2) mercaptans in natural gas is intended for the detection of very localized leaks, thus very small concentrations are used, and (3) mercaptans are gasses which dissolve into the natural gas. These commenters stated that the situation with radioactive emissions is drastically different with the objective of detecting releases to the unbounded outdoors for miles around.

Some commenters indicated the importance of a unique odor and discussed problems with the choice of an odorant. A number of commenters including one in favor of the requirement pointed out problems with mercaptans or similar compounds. One commenter submitted extensive information concerning the toxicity of various mercaptan compounds. One commenter suggested peppermint

or a specific perfume. Another commenter pointed out that even a usually pleasant odorant could be an allergen to some people.

Other problems pointed out by the commenters were: (1) the odorant would be overwhelming on site and possibly toxic to workers, (2) there would be a likelihood of false alarms as a result of similar odors or because of system malfunctions, (3) the length of time for the odor to reach the public would be unacceptably long, (4) the cost of the system would be an unnecessary financial burden to licensees, and (5) the public would have to be trained to recognize the odor. Some problems pertaining particularly to the use of an odorant in routine emissions were noted: (1) a problem of aesthetics for nearby residents, (2) olfactory fatigue, and (3) the possibility that the odor would become too familiar and not be responded to when appropriate.

Generally, the NRC agrees with those commenters who were opposed to the petition. Although there may have been a few minor overstatements or misstatements, the NRC agrees that all of the basic reasons given by the commenters for opposing the petition are valid.

In addition, two responders submitted that in accordance with 10 CFR 2.803, the NRC should not have instituted this proceeding on the basis that the petition was without merit and a waste of NRC, industry, and public resources and presumably not worth public comment.

The NRC's regulations require that a petition that meets the threshold requirements in 10 CFR 2.802(c) be docketed as a petition for rulemaking. Although publication for comment in the Federal Register is discretionary, it is not a burdensome procedure and affords members of the public an opportunity to participate in the Agency's deliberative processes that would not otherwise be available. Public comment is frequently of value in considering the merits

of a petition, particularly where the petition raises an issue for the first time. Generally, the NRC prefers to err on the side of openness rather than invite public distrust.

Reasons for Denial

The NRC has considered the petition, the public comments received, and other related information and has concluded that the issues raised by the petition are without merit. The following is a discussion of the details of that conclusion.

The primary concern of the petitioner is a perceived need to improve the health and safety of the public by improving the detection of radiation leaks and providing the public with notification to take protective measures. In fact, for the case of nuclear power reactors, systems for the detection of radioactive leaks and the ability to quickly notify the public to take protective measures are in place as required by NRC regulations. A number of these measures were instituted based on lessons learned from the TMI accident.

Sensitive and redundant radiation monitors are located throughout nuclear power plants to provide detection and alarm capability at the point of release. These monitors measure, numerically and directly, the amount of radiation. In contrast, if detection of radiation were dependent upon identification of an odor by a person offsite rather than an instrument, the detection would be delayed by at least the time it would take to reach the first person offsite trained to recognize the odor. At best, the use of an odorant in conjunction with radioactive emissions would be an indirect and not a quantitative indication of the presence of radioactivity.

The petitioner contends that the accident at Three Mile Island demonstrated deficiencies in the ability to alert the population of dangerous releases[2]. After the accident, the NRC did conclude that the requirements for emergency preparedness needed to be significantly upgraded. Consequently, regulations elaborating the scope and contents of emergency plans for nuclear power plants were instituted. Included in these requirements are capabilities to promptly and accurately detect releases of radioactivity, as well as the potential for a release, and to notify the public within 15 minutes of the declaration of an emergency. Before a nuclear power plant is licensed to operate, the NRC must verify that the licensee's emergency plans and procedures are adequate to protect the public health and safety in the event of an accident. Further, the emergency planning for these licensees must be coordinated with local and State authorities. Also, emergency plans must be maintained and updated annually and exercises must be conducted annually (with State and local participation biannually). In addition, the NRC inspects licensees annually to ensure compliance with the regulatory requirements.

In summary, for the case of nuclear power plants, a system is already in place, which the NRC has previously determined provides adequate protection of the public health and safety. It is unlikely that the addition of an odorant to emissions could add any margin of safety to that provided by existing

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[2] The petitioner should note that careful analysis of the actual radioactive release during the accident at Three Mile Island showed that the resultant dose to the public was comparable to that which would result from one or two trans-Atlantic commercial airline trips, and therefore, would not be considered dangerous.

systems. Therefore, the addition of an odorant to the radioactive emissions from power reactors would not meet the Commission's Backfit Rule, 10 CFR § 50.109.

In the case of NRC licenses other than those for power reactors, emergency preparedness is commensurate with the hazard. The potential radioactive hazards from most of these licensees are not sufficient to affect the general public. However, for those licensees with sufficient materials to meet the criteria for requiring an emergency plan, the appropriate surveys and monitoring for radioactive releases are required, as well as timely reporting of radioactive releases to the proper authorities. As in the case of power reactors, the existing required systems have been judged adequate and are superior to the indirect indication that would be provided by an associated odorant.

The petitioner specifically asserts that radiation plumes are erratic and unpredictable in their dispersion upon release because of varying weather and geo-physical characteristics of the terrain.

Plumes of radioactive substances behave in accordance with their physical and chemical characteristics. In this respect, they are no different from plumes of stable elements with the same physical and chemical characteristics, such as temperature, velocity, density, particle size, etc. The NRC, other Federal agencies, and licensees routinely predict the dispersion of radioactive plumes based on dispersion models (that are often computerized) that include factors such as weather and terrain. As with all modeling there are associated uncertainties. These models are used to predict the path of plumes and to enable public officials to recommend protective actions before the plume arrives at downwind, populated areas.

In contrast, the use of odorants would require the arrival of the plume in populated areas to initiate any protective actions. Precautionary evacuation, with virtually no radiation dose to the public, would not be an option with the use of an odorant. An additional problem is that a gaseous odorant may not have the same physical characteristics as the radioactive releases and thus may not follow the same path as the radioactive emissions. If this were the case, the detectability of the odorant may not be a good indicator of the presence or the concentration of radioactivity.

As discussed extensively by some of the commenters, the use of an odorant for the purpose of warning people of radioactive releases is not feasible. Most sources of potential releases are not in a form such that an odorant could be dissolved into or otherwise associated with the radioactive material in a way that they would be automatically released together. It would be necessary to rely on a system of detecting radioactivity, such as existing measuring devices, which would then trigger the addition of odorants to stack effluents or venting systems. It would not be possible to account for all sources of releases, although main stacks or vents would be the primary sources of releases. In part because of the complexity of implementing such a requirement, reliance on licensee compliance and government enforcement would still be necessary. Thus, the problem of lack of trust of a segment of the public in the licensees and the government could not be eliminated.

A further concern is that the concentrations of odorants used would have to be very high at the point of release in order to be detectable at any significant distance. Concentrations reaching people would vary considerably, depending on the distance from the source and other factors, such that odors

would likely be overwhelming onsite and in some locations offsite and quite possibly toxic while being undetectable at other locations. As noted above, it would also be impossible for the chemical and physical characteristics of the odorant to match those of all the releases which are both gaseous and particulate. Thus, the concentrations of odorants would not remain proportional with the concentrations of contaminants. The concentrations of odorants would also not match the relative hazard of contaminants, because the radiotoxicity of various nuclides varies greatly.

The prospect of injecting an odorant into emissions of radioactivity also raises an environmental issue. If the odorant were used in connection with normal permitted releases as specifically suggested by some of the commenters, it would cause the institution of an objectionable and continual insult to the air quality in and downwind from licensed facilities. For example, it is highly likely that the addition of a mercaptan-like odorant to radionuclides used in the nuclear medicine sections of hospitals would be intolerable. Similarly, residents downwind from nuclear power plants would be subjected to a decreased quality of air. It would be difficult, if not impossible, to select an odorant which would not be toxic in the concentrations required. As discussed above, the addition of an odorant would provide little, if any, benefit to the protection of the public health and safety. Therefore, the detrimental effects on the environment outweigh the benefits, if any, of injecting an odorant into radioactive emissions from NRC licensed facilities.

The petition erroneously states that scientific studies prove that even the smallest amounts of ionizing radiation cause harmful health effects. On the contrary, there is a controversy in science on the health effects, if any,

of very small doses of ionizing radiation. Nonetheless, the NRC regulates on the basis of the linear nonthreshold hypothesis which assumes that there is no threshold of dose below which there is no harm, i.e., that even the smallest doses are potentially harmful[3].

Taking all the considerations above into account with respect to the early detection goal of the proposed requirement, the petitioner fails to recognize that more timely and sensitive methods of detection of radioactive emissions are already in place. Similarly, with respect to the ability to notify the public to take protective actions in a timely manner, the petitioner does not recognize that an effective method for notifying the public is already in place.

Therefore, there would be little, if any, increased benefit to the public health and safety as a result of the proposed requirement.

In conclusion, the NRC finds the petition without merit, and denies the petition.

Dated at Rockville, Maryland, this 27th day of July, 1992.

For the Nuclear Regulatory Commission.

James M. Taylor
Executive Director
for Operations

[3]The petitioner also erroneously states that the natural gas industry requires the injection of odors into gas for commercial and domestic use. In fact, it is the Federal government that requires the use of odorants in natural gas as stated in the regulations (49 CFR 192.626).

NO NUKES!

C62
D2

WE SUPPORT THE INJECTION OF A DETECTABLE ODOR IN NUKE PLANT EMISSIONS AS A MINIMUM!

DOCKET NUMBER
PETITION RULE PRM 20-19
(54 FR 5089)

'89 MAY 16 A10:32

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May 10, 1989

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC. 20555

RE: Docket No. PRM-20-19.
to amend 10CFR Part 20

Dear Secretary,

This letter is in support of the idea to have a detectable odor injected into radioactive emissions of all nuclear power plants and other facilities over which the NRC has jurisdiction.

Thank you for accepting this support of mine for the plan.

Sincerely,
Lorraine B. Claggett

BARBARA A. MIKULSKI
MARYLAND

COMMITTEES:

APPROPRIATIONS

LABOR AND HUMAN RESOURCES

SMALL BUSINESS

United States Senate

WASHINGTON, DC 20510-2003

SUITE 320
HART SENATE OFFICE BUILDING
WASHINGTON, DC 20510-2003
(202) 224-4654
TDD: (202) 224-5223

April 12, 1989

Mr. Lando W. Zech, Jr.
Chairman
Nuclear Regulatory Commission
1717 H Street N.W.
Washington, D.C. 20555

Dear Mr. Zech:

Ms. Betty Schroeder of the G.E. Stockholders' Alliance recently brought to my attention the Alliance's petition for rulemaking asking the NRC to require that a detectable odor be injected into radioactive emissions.

I am enclosing a copy of Ms. Schroeder's letter for your information. The Alliance's petition is an interesting one that merits consideration. I hope that the NRC will take a serious look at the proposal and the feasibility of such a rule.

Thank you for your attention to this matter.

Sincerely,

Barbara A. Mikulski
United States Senator

BAM:drs

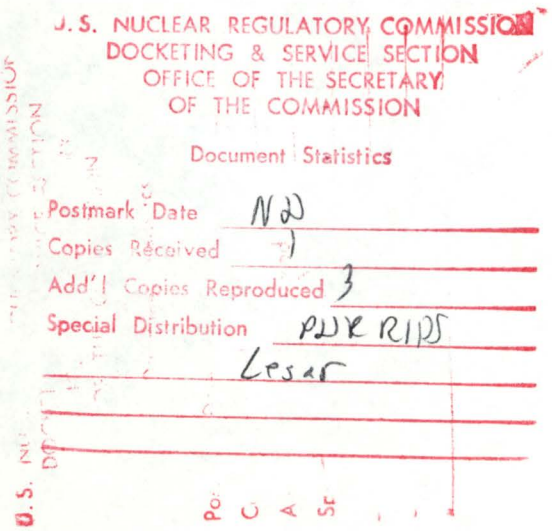
☐ SUITE 253
WORLD TRADE CENTER
BALTIMORE, MD 21202-3041
(301) 962-4510

☐ 3 CHURCH CIRCLE
ANNAPOLIS, MD 21401-1933
(301) 263-1805

☐ SUITE 103
9658 BALTIMORE AVENUE
COLLEGE PARK, MD 20740-1346
(301) 345-5517

☐ SUITE 402
82 WEST WASHINGTON STREET
HAGERSTOWN, MD 21740-4804
(301) 797-2826

☐ CITY CENTER ON THE PLAZA
213-219 WEST MAIN STREET
SALISBURY, MD 21801
(301) 546-7711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GE Stockholders' Alliance

P.O. Box 966 • Columbia, MD 21044 • (301) 381-2714

March 11, 1989

Senator Barbara Mikulski
United States Senate
320 Hart Senate Office Building
Washington, D.C. 20510

Dear Senator Mikulski:

Some weeks ago, I submitted a new idea to the Nuclear Regulatory Commission which has the potential to improve public health in locations downwind of nuclear facilities.

I requested the NRC to require a detectable odor to be injected into all airbourne radioactive emissions of power plants and other nuclear facilities over which the NRC has jurisdiction.

The NRC has taken the idea seriously enough to publish the request in the Federal Register, and to invite comment until April 3.

We have investigated the practicality of the idea among nuclear engineers. Those we have talked with are intrigued with the idea, but hadn't given it enough research to actually confirm its feasibility.

If it is possible to implement the idea, I believe it could greatly improve public confidence that nuclear facilities are being operated safely.

I invite your comment to the NRC on this idea. If the April 3 deadline crowds you to respond to this idea, perhaps you could request the NRC to extend (90 days?) the comment period.

I am enclosing a copy of the Federal Register notice, with its document number and address to which comments would be addressed.

Thank you for your interest and support of this idea.

Sincerely,

Betty Schroeder

Betty Schroeder

NUCLEAR REGULATORY COMMISSION

10 CFR Part 20

[Docket No. PRM-20-19]

GE Stockholders Alliance; Receipt of Petition for Rulemaking

AGENCY: Nuclear Regulatory Commission.

ACTION: Petition for rulemaking; notice of receipt.

SUMMARY: The Commission is publishing for public comment a notice of receipt of a petition for rulemaking dated October 31, 1988, which was filed with the Commission by the GE Stockholders Alliance. The petition was docketed by the Commission on November 2, 1988, and has been assigned Docket No. PRM-20-19. The petitioner requests that the Commission amend its regulations to require that a detectable odor be injected into the emissions of nuclear power plants and other nuclear processes over which the NRC has jurisdiction.

DATE: Submit comments by April 3, 1989.

Comments received after this date will be considered if it is practical to do so but the Commission is able to assure consideration only for comments received on or before this date.

ADDRESSES: Submit written comments to the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington DC 20555, Attention: Docketing and Service Branch.

For a copy of the petition, write the Regulatory Publications Branch, Division of Freedom of Information and Publications Services, Office of Administration and Resources Management, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

The petition and copies of comments received may be inspected and copied for a fee at the NRC Public Document Room, 2120 L Street, NW., Lower Level, Washington, DC.

FOR FURTHER INFORMATION CONTACT: Michael T. Lesar, Acting Chief, Rules Review Section, Regulatory Publications Branch, Division of Freedom of Information and Publications Services, Office of Administration and Resources Management, U.S. Nuclear Regulatory Commission, Washington, DC 20555, Telephone: 301-492-8926 or Toll Free: 800-368-5642.

SUPPLEMENTARY INFORMATION: The petitioner requests that the NRC issue a regulation to require that a detectable odor be injected into the emissions of nuclear power plants and other nuclear processes over which the NRC has jurisdiction. The petitioner requests that the suggested requirement be imposed through an emergency rulemaking. The petition would require an amendment to the regulations contained in 10 CFR Part 20. Part 20 contains the Commission's Standards for Protection Against Radiation. A requirement of the type requested by the petitioner would result in the addition of the provision to § 20.106, "Radioactivity in Effluents to Unrestricted Areas."

The petitioner believes that compliance with the suggested requirement by Commission licensees would immeasurably improve the health and safety of the public by providing for early detection of radiation leaks. The petitioner states that a detectable odor would give the public notice of the need to take health-protective measures.

The petitioner states that scientific studies prove that even the smallest amount of ionizing radiation may cause harmful health effects. The petitioner states that there is ample evidence that radiation causes increased infant mortality, genetic abnormalities, cancer, and a lowering of the immune system which makes the body more susceptible to disease. The petitioner states that records demonstrate that radiation plumes are erratic and unpredictable in their dispersion upon release because of varying weather and geo-physical characteristics of the terrain.

The petitioner also states that the natural gas industry observed the danger of odorless, colorless gas in its original state, and now requires inexpensive, non-toxic, recognizable odors to be injected into gas for commercial and domestic use. The purpose of the odor-additive is to help people detect gas leaks, and thereby provide confidence that the use of gas is safe.

Dated at Rockville, Maryland, this 27th day of January, 1989.

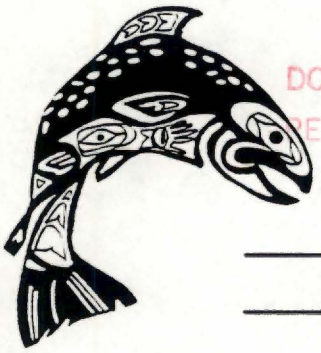
For the Nuclear Regulatory Commission.

Samuel J. Chilk,

Secretary of the Commission.

[FR Doc. 89-2298 Filed 1-31-89; 8:45 am]

BILLING CODE 7590-01-M



Coalition Organizing Hanford Opposition

(49)

% W2122 Dean · Spokane. WA 99201

May 3, 1989

Secretary of the Commission
US Nuclear Regulatory Commission
Washington, DC 20555

RE: docket No. PRM-20-19; to amend 10 CFR Part 20

Dear Secretary,

On behalf of Coalition Organizing Hanford Opposition (COHO) I am writing to request that the Nuclear Regulatory Commission (NRC) be required the addition of a detectable order to be injected into radioactive emissions of nuclear power plants and all other facilities over which the NRC has jurisdiction. We would strongly urge that nuclear weapons facilities throughout the US have to comply with the same regulation.

Had a detectable odor been in the radioactive emissions of nuclear weapon's facilities in the 1940's and 50's the citizens in the Northwest would have been aware of the experimental and deliberate releases by the Hanford Nuclear Reservation in southeast Washington. Instead it is only now that citizens are becoming aware of their exposure to the deadly radiation dosages that they experienced.

If indeed the nuclear power plants and weapons facilities are as safe as we, the citizens, are lead to believe there should be no hesitation on the part of industry to comply with a regulation which has long been in place for the natural gas companies.

Again I wish to express **COHO's support of the detectable odor to be injected into radioactive emissions of nuclear power plants and all other facilities over which NRC has jurisdiction.**

Lourdes Fuentes-Williams

Lourdes Fuentes-Williams
for Coalition Organizing Hanford Opposition

DOCKET NUMBER
PETITION RULE PRM 20-19
(53 FR 5089)

(48)

IMMACULATE CONCEPTION CHURCH

305 SECOND STREET • IRWIN, PENNSYLVANIA 15642

5/3/89

'89 MAY -8 A11:38

Dear Commissioner of NRC,

Please do to nuclear releases what is done to natural gas. Give it a scent so that people can tell when it is released into our atmosphere. (Re: docket PRM-20-19 & Amend 10-CFR-Part 20). I will continue to pray at mass: "For the good earth + for the wisdom + will to conserve it."

In Trinity,

Fr. McGuirk

MAY 25 1989

Acknowledged by card.....

(47)

Dear Sir:

I am writing regarding Docket No. PRM-20-19, to amend 10 CFR Part 20. I believe this new rule is vital to monitor radioactive emissions. I believe it will help all people involved. I support the idea of yours and can provide my vote for this ~~rule~~ change anytime.

Yours truly,

John R. Zeller
2465 Euclid Hts. Blvd.
Clev. Hts., Ohio 44106

U.S. NUCLEAR REGULATORY COMMISSION
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DOCKET NUMBER
PETITION RULE PRM 20-19
(54FR 5089)

(91-89)

(46)

Resolution No. 86-1989

By - Mayor Lynch

'89 APR 24 P3:34

A resolution urging the Nuclear Regulatory Commission to require a detectable odor to be injected into the radioactive emissions of nuclear power plants and all other facilities over which it has jurisdiction.

WHEREAS, the requirement of adding a detectable odor to emissions of nuclear power plants, similar to the existing requirement of adding an odor to normally odorless natural gas, affords the public an instant warning device in the event of a potentially hazardous situation; and

WHEREAS, this Council and the Administration wish to support the request for the addition of a detectable odor published in the February 1, 1989 Federal Register; and

WHEREAS, it is in the interest of the safety and welfare of the citizens of the City of Euclid that a detectable odor be added to the radioactive emissions of nuclear power plants.

NOW, THEREFORE, be it resolved by the Council of the City of Euclid, State of Ohio:

Section 1: That this Council and the Administration hereby urge the Nuclear Regulatory Commission to require a detectable odor to be injected into the radioactive emissions of nuclear power plants and all other facilities over which it has jurisdiction.

Section 2: That the Clerk of this Council shall certify a copy of this resolution to the Secretary of the U.S. Nuclear Regulatory Commission.

Section 3: That this resolution shall take immediate effect.

Attest:

State of Maryland

DEPARTMENT OF THE ENVIRONMENT
2500 Broening Highway, Baltimore, Maryland 21224
Area Code 301 • 631-

William Donald Schaefer
Governor

Martin W. Walsh, Jr.
Secretary

April 5, 1989

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

ATTENTION: Docketing and Service Branch

Dear Sir:

I am in receipt of the Federal Register, Vol. 54, No. 20, Wednesday, February 1, 1989 Proposed Rules, Nuclear Regulatory Commission [Docket No. PRM-20-19] and have contacted the office of Mr. Michael T. Lesar, Acting Chief, Rules Review Section, Regulatory Publication Branch to request an extension of time for the comment period.

The Center for Radiological Health is responsible for formulating Maryland's Emergency Response strategy for nuclear releases. The proposal in question has the potential to positively impact health in those locations downwind of a radiological release from a nuclear facility. In order to more fully evaluate this proposal's feasibility and worth as an emergency response tool, we have requested an extension of time to formulate comments. If the comment period is not extended, we will respond to any proposed rule changes.

If you have any questions, please feel free to contact me or Mr. Paul Perzynski, Emergency Response Coordinator for Fixed Nuclear Facilities, Center for Radiological Health at (301) 631-3300.

Sincerely,

Richard J. Bruso for

Roland G. Fletcher, Administrator
Center for Radiological Health

RGF/PRP/dps

(45)

5724 Crutchfield Road
Raleigh, North Carolina 27606
April 3, 1989

File: 13510C1 Serial: 89HPS102

Mr. Michael T. Lesar, Acting Chief
Rules Review Section
Regulatory Publications Branch
Office of Administration and Resources Management
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Lesar:

Docket No. PRM-20-19

This letter is written to object to the request by a petitioner to require that a detectable odor be injected into the emission of nuclear power plants. There are many reasons for rejection of this petition. I will state just two. They are as follows:

1. The odor would be far more objectionable than the very small increase in radiation exposure that might be received from the plant. I lived in Southport, North Carolina, approximately one mile from two large nuclear units for over five years. My daughter was 12 years old and my son was one year old when we located in the area. The only impact the plant had on our lives was that we could sometimes hear the public address system at night when there was little or no wind. During the same period, an operating menhaden processing facility was located just over three miles away. The odor was very annoying. It was so annoying that I wanted the menhaden processing plant closed. Consequently, I object to the proposal to inject odor into nuclear plant exhausts.

2. The amounts of radioactive material discharged from nuclear power plants are monitored and controlled. The addition of odor would not provide any known benefit. It would not either improve the monitoring or control of these emissions. There is always some risk to health, however small, when materials are injected into the air we breathe. This would be true of any

odor-causing material injected into nuclear plant exhausts. Consequently, I object to the addition of odor based on the potential for increased health risk when I can see no benefit from the proposed injection of odor.

I appreciate the opportunity to comment on the petition.

Yours very truly,

J A Padgett

J. A. Padgett

JAP/sco

(44)

DOCKET NUMBER
PETITION RULE PRM 20-19
(54 FR 5089)

DOCKETED
USNRC

'89 APR 18 P4:47

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

SIERRA CLUB

Northeast Ohio Group • Cleveland, Ohio

P.O. Box 770743
Cleveland, OH 44107-0035
April 12, 1989

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention Docketing and Service Branch
RE: Docket No. PRM-20-19; to amend 10 CFR Part 20

To Whom It May Concern:

The Northeast Ohio Sierra Club fully supports the request for an emergency rule change to require a detectable odor to be injected into radioactive emissions from all nuclear power plants and all other facilities over which the Nuclear Regulatory Commission has jurisdiction. This detectable odor would go a long way to ease the mind of downwinders who are concerned about fugitive emission from these facilities.

In addition, the Northeast Ohio Sierra Club also feels that the addition of a safe, non-toxic colorant would greatly increase the protection of the public health and safety.

We urge you to require the addition of a detectable odor as soon as possible. Thank you for your consideration.

Sincerely,

Christianne Trepal

Christianne Trepal, Nuclear Projects Chair
Northeast Ohio Sierra Club

Resolutions passed: Nuclear Committee, March 15, 1989
Conservation Committee, April 5, 1989
Executive Committee, April 12, 1989

MAY 25 1989

Acknowledged by card.

(43)

DOCKET NUMBER
PETITION RULE PRM 20-19
(54 FR 5089)

Re: Docket #
PRM-20-19;
to amend
10 CFR part 20

Secretary of the Commission
US Nuclear Regulatory Commission
Washington, D C
20555

Attn: Docketing & Service Branch

'89 APR 14 A11:50
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USNRC

Dear Secretary of the Commission,

I strongly urge that you adopt a rule requiring a detectable odor and a non-toxic visible colorant added to all emissions from nuclear power plants and all other facilities over which the NRC has jurisdiction!

Thank you for your consideration and action.

Sincerely,

Harriet W. Slive
2648 Eaton Rd.
University Hts, OH 44118

MAY 25 1989
Acknowledged by card.....

PR-20
(54FR5089)

Re: Docket # PRM-20-19; to amend 10 CFR part 20

Secretary of the Commission
US Nuclear Regulatory Commission
Washington, D C
20555

Attn: Docketing & Service Branch

Dear Secretary of the Commission,

I strongly urge that you adopt a rule requiring a detectable odorant and non-toxic visible colorant added to all emissions from nuclear power plants and all other facilities over which the NRC has jurisdiction.

Thank you for your consideration and action.

Sincerely,

[signature]

Harriet W. Slive
2648 Eaton Rd.
University Hts, OH 44118

(42)

April 6, 1989

Samuel J. Chilk
Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington D.C. 20555

Attention: Docketing and Service Branch

Subject: NRC Notice of Receipt of a Petition from GE Stockholders Alliance - Detectable Odor

Dear Sir:

The Nuclear Regulatory Commission (NRC) has published for public comment a notice of receipt of a petition for rulemaking, which was filed with the Commission by the GE Stockholders Alliance. The petitioner requests that the NRC issue a regulation to require that a detectable odor be injected into the emissions of nuclear power plants and other nuclear processes over which the NRC has jurisdiction. The petition would require an amendment to the regulations contained in 10 CFR Part 20. I hereby provide general comments on this petition to register my disagreement with this proposal.

- There must be a distinction between nuclear power radiation release and other nuclear processes release in order for this to work.

- The aroma must be distinguishable and unique. For the 110 nuclear power plants licensed for operation in various parts of the United States, it would be difficult to determine a unique aroma considering the numerous aromas already around these areas. How would the public recognize this particular odor?

- Olfactory senses are not acute or reliable. They can be hampered and altered by natural (hayfever, colds, pollen, etc.) and unnatural causes (drugs, medicine, alcohol).

- How would you regulate the scent for those with a weak sense of smell? Every individual's sense of smell is different.

- Minuscule advantages (if any) would be gained from the proposal with unnecessary cost and no safety gain.

U.S. NUCLEAR REGULATORY COMMISSION
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- There is a potential for decreased safety, since chemicals must be mixed and released with the potential effluents:
  - This would potentially impact systems (by inducing corrosion, etc.).
  - There would be added potential dangers from additional chemical handling.
  - Additional waste would be created in mixing, cleaning and maintaining the systems.

Since you can accurately measure extremely minute quantities of radiation (on the order of picocuries), to inject a detectable odor would be superfluous.

Sincerely,

T. S. Wheeler

TSW/

M.A.C. C2M
POST OFFICE BOX 14042, ST. PETERSBURG, FLORIDA 33733

Florida Power
CORPORATION

(41)

We agree with the request for an emergency rule change to the NRC that would require a detectable odor to be injected into radioactive emissions of nuclear power plants + all other facilities which the NRC has jurisdiction.

We feel the public has the right to be warned as soon as possible to evacuate.

Samuel W Philips
Stephanie T Philips

PHILIPS
127 CLARIDON RD.
CHARDON, OH 44024

B. Ralph Sylvia
Senior Vice President

Detroit Edison

6400 North Dixie Highway
Newport, Michigan 48166
(313) 586-4150

April 3, 1989
NRC-89-0087

The Secretary of the Commission
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555
Attention: Docketing and Service Branch

References: 1) Fermi 2
NRC Docket No. 50-341
NRC License No. NPF-43

2) Receipt of Petition for Rulemaking from GE Stockholders Alliance; (Federal Register, Vol. 53, No. 250, dated Wednesday, February 1, 1989)

Subject: Detroit Edison's Response to the GE Stockholders Alliance Petition for Rulemaking

The Nuclear Regulatory Commission (NRC) published for public comment a notice of receipt of a petition for rulemaking dated October 31, 1988, which was filed with the NRC by the GE Stockholders Alliance. The petitioner requested that the NRC amend its regulations to require that a detectable odor be injected into the emissions of nuclear power plants and other nuclear processes over which the NRC has jurisdiction. After reviewing the petition for rulemaking, Detroit Edison would like to file the following comments:

1. Unlike the case of natural gas, in which the main problem is increase in concentration, radiological effluents vary in concentration and dose impact with individual isotopes. Therefore, the amount of odoriferous material injected into the effluent stream would have to be varied depending on the isotopic concentration and dose impact. In addition, the effects of atmospheric dispersion would have to be included. The combination of concentration, dose impact and dispersion would pose a very difficult technical problem which would require extensive research.

2. Selection of an odoriferous medium that could be released as an effluent which would be environmentally acceptable and

pose no health problems would be difficult, if not impossible.

3. These effluents are already carefully monitored in the environment and controlled in accordance with regulatory guidance and requirements. These regulations ensure that radioactive effluents are maintained as low as reasonably achievable to protect the public. Actions are required in plant procedures, technical specifications and other documents to ensure that effluents are maintained within these limits. The plant emergency plan addresses actions that are required should an accidental release occur so that the public is informed and appropriate response measures are taken.

4. In summary, sufficient controls are presently in place to protect the health and safety of the public with respect to the release of radiological effluents. It is not apparent what benefit would be gained from this proposal.

If there are any questions, please contact Mr. Arnold Jaufmann at (313) 586-4213.

Sincerely,

B Ralph Sylvia

cc: A. B. Davis
R. C. Knop
W. G. Rogers
J. F. Stang

attention:
Docketing & Service Branch
RE: Docket # PRM-20-19
to amend 10 CFR Part 20

11 Shawnadese Dr.
Painesville, Ohio
April 3, 1989

(39)

Dear Sir: (54 FR 5089)

I think it would be more feasible to inject a detectable odor into radioactive emissions of nuclear plants.

At least the public would be able to smell these emissions and would be able to evacuate the area if necessary.

Sad to say I don't trust our government to tell the truth most of the time as there have been too many lies told about too many things going on in our country.

Your help in this matter would be most appreciated.

Sincerely Yours,

(Mrs.) Terry Beer

U.S. NUCLEAR REGULATORY COMMISSION
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AMERICAN FRIENDS SERVICE COMMITTEE

ROCKY FLATS DISARMAMENT/CONVERSION PROJECT
1660 LAFAYETTE ST.
DENVER, COLORADO 80218 USA
(303) 832-4508

April 1, 1989

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington D.C. 20555

Attention: Docketing and Service Branch

RE: Docket No. PRM-20-19; to amend 10 CFR Part 20

I am writing on behalf of our organization to support the request for an emergency rule change by which the NRC would require a detectable odor to be injected into radioactive emissions of nuclear power plants and all other facilities over which the NRC has jurisdiction. (A notice of this request was published in the February 1, 1989 "Federal Register".)

I know that in Colorado public utilities providing natural gas to homes, businesses and industries are required to add an odor to normally odorless natural gas, as a safety measure. I assume this requirement obtains in most, if not all, other states. So we believe that a similar requirement for radioactive emissions from nuclear power plants would be very much in the public interest.

So we ask you to impose this requirement on nuclear power plans and all other facilities over which you have jurisdiction.

We appreciate your consideration of our comments.

Sincerely yours,

Thomas M. Rauch

Thomas M. Rauch
Project Director

(37)

(54FR5089)

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

P.O. Box 968 • 3000 George Washington Way • Richland, Washington 99352

March 31, 1989
Docket No. 50-397
G02-89-052

Secretary of the Commission
Attn: Docketing and Service Branch
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: **PETITION BY THE GE STOCKHOLDERS ALLIANCE (DOCKET NO. PRM-20-19)**

Reference: Federal Register, Vol. 54, No. 20, p. 5089, February 1, 1989

The referenced notice invites comment on a petition by the GE Stockholders Alliance which seeks to require that a detectable odor be injected into emissions of nuclear power plants and other nuclear processes under NRC jurisdiction. The Supply System finds the petition to be without merit.

The petitioner asserts immeasurable improvements to public health and safety, presumably attributable to the avoidance of "even the smallest amount of ionizing radiation" (54FR5090). This assertion neglects the fact that the NRC's radiation protection standards are based on a large body of peer-reviewed scientific studies. It appears the petition is a poorly framed challenge to radiological effluent limitations established in 10CFR20.106 and technical specifications on effluents issued pursuant to 10CFR50.36a.

To support its case the petitioner cites the natural gas industry. The analogy breaks down on several accounts. The petitioner must acknowledge that natural gas is a product which is distributed directly via pipelines to vast numbers of homes and commercial establishments. It is a situation completely different from the monitored radioactive emissions at a relatively small number of regulated industrial facilities. In addition to the effluent monitoring, these licensed facilities conduct comprehensive environmental monitoring programs. Invariably, these programs substantiate that there are no discernible incremental radiation exposures to the public due to the operation of these facilities.

In summary, we believe the petition lacks sufficient basis for a rule change and must be rejected.

Very truly yours,

G. C. Sorensen, Manager
Regulatory Programs

Commonwealth Edison
72 West Adams Street, Chicago, Illinois
Address Reply to: Post Office Box 767
Chicago, Illinois 60690 - 0767

36

April 3, 1989

Mr. Samuel J. Chilk, Secretary
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attn: Docketing and Service Branch

Subject: Petition for Rulemaking; Notice of Receipt, GE Stockholders Alliance Requests that a Detectable Odor be Injected Into the Emissions from Nuclear Plants.
(54 Fed. Reg. 5098. February 1, 1989)

Dear Mr. Chilk:

This provides Commonwealth Edison's (Edison's) comments on the above referenced petition for rulemaking recently noticed by the Nuclear Regulatory Commission (NRC). The petitioner, GE Stockholders Alliance (GESA), requests that the NRC amend its regulations to require that a detectable odor be injected into the emissions of nuclear power plants and other nuclear processes over which the NRC has jurisdiction. GESA justifies the proposal as a protective measure which would enable the public to detect and take health-protective measures against radiation leaks. Experience with the injection of an odor into natural gas is given as an example of the safety benefits of such an odor-additive program.

Edison agrees that the public should be warned of the occurrence of radiation leaks which pose a risk to the public health and safety, and supports the current NRC requirements for public notification. Significant radiation releases beyond permissible limits should continue to be made known to the public, both for safety reasons and for public information. An effective notification system is already in place, therefore, Edison does not agree with GESA that public health and safety would be served by the addition of a detectable odor to power plant emissions. This additional notification is unnecessary, would not be effective as a means of alerting the public to radiation leaks, and would present practical problems which make the program unworkable.

Before addressing the specifics of the proposal, it is first necessary to note that its premise is faulty. GESA is concerned that an event could lead to the substantial release of gaseous effluents containing radioactive materials. Such releases are in general not a concern because the containment structure enclosing the primary portion of a nuclear power plant is designed to be leak-tight even under the increased pressure due to an event. Moreover, containments are tested periodically to ensure leak tightness. Thus, the presence of the containments alone renders GESA's petition for rulemaking unnecessary.

The example of an added-odor program given in support of the GESA proposal is the detectable odor added to natural gas. That program, because it is consistent with the unique circumstances of natural gas distribution, has proved effective as a safety measure by helping to identify gas leaks. A comparison of the natural gas situation to that of nuclear power plant emissions makes it clear that such a program cannot work for nuclear power plants. The odor added to natural gas is carried by a gas which dissolves into the natural gas, so that detection of the odor is an immediate indication of the presence of a gas leak. Only a small amount of odoriferous gas needs to be added to the natural gas because the principle danger to be protected against is indoor leaks. For such leaks the odor becomes noticeable as the leaked gas builds up. In the natural gas application, the strength of the odor which is added to natural gas is appropriate for detection of localized leaks, either indoors or in the immediate vicinity of an outside leak. It is not possible to add enough odoriferous gas to natural gas to practically enable the scenting of leaks to the unbounded out-of-doors.

The situation at a nuclear power plant presents the opposite circumstances from the distribution of natural gas. Nuclear power plants routinely emit very low levels of radioactive effluents into the air and water. Thus, unlike the natural gas situation, there is not available a large volume of gas in which to dissolve an odoriferous gas. Even if an event results in the generation or relocation of radioactive gases, the volumes are still quite low compared to those in a natural gas distribution system. These circumstances are particularly important because the concern to be addressed by an odoriferous gas is releases to the unbounded out-of-doors. For such releases to be detectable, large quantities of odoriferous gas would be needed. It is not clear that enough odoriferous gas could even be dissolved in the volumes of radioactive gas which might result from an event to permit the detection of that gas if released.

Consequently, for the GESA proposal to work, the plant's air and water would have to injected with large quantities of the odor to be detected beyond the perimeter of a plant site. The result would be intolerable working conditions for the workers in the plant. It also would be an unwelcome addition to the plant's atmosphere because there would be a continuous release of the odor even when no dangerous radiation leak existed. The public safety aspect of the odor would thus disappear as the odor became a familiar, if unwelcome, feature of every plant.

Even if an odor could somehow be added only to emissions containing radioactivity, there are practical problems in making it a useful indicator of a dangerous leak. All plants release radioactivity in small quantities as part of their operation. Those releases must be within permissible limits consistent with public health and safety. GESA does not make clear whether such permissible emissions must receive the added odor. If it were added to all such emissions, every plant would simply acquire a familiar scent, whether it was operating safely or experiencing a dangerous leak. If, on the other hand, the proposal is to somehow release the odor only during an excessive radiation release, the odor would simply be the equivalent of another alarm system. Not only would such an additional alarm be unnecessarily redundant, it would also not work because the odor would have to be very strong to be a reliable indicator over many miles and would thus render the atmosphere near a plant noxious whenever the "odor-alarm" was in use. Additionally, the odor would not be helpful to plant workers attempting to deal with an emergency and, to the extent it hampered repairs, could constitute a public health threat.

In the absence of a demonstrable need for the addition of an odor to nuclear plant emissions and in view of the practical problems of implementing such a program, Edison urges the NRC to reject GESA's petition for rulemaking. Warnings of radiation leaks can be and are provided, far more effectively and without the unpleasant side effects, by systems presently in place.

Edison appreciates this opportunity to comment on this petition for rulemaking.

Sincerely,

T.J. Kovach
Nuclear Licensing Manager

rf/5611k-4

NUCLEAR MANAGEMENT AND RESOURCES COUNCIL

1776 Eye Street, N.W. • Suite 300 • Washington, DC 20006-2496
(202) 872-1280

Byron Lee, Jr.
President & Chief
Executive Officer

April 3, 1989

Mr. Samuel J. Chilk
Secretary
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Docketing and Service Branch

RE: GE Stockholders Alliance;
54 Fed. Reg. 5089 - February 1, 1989
Receipt of Petition for Rulemaking
Request for Comments

Dear Mr. Chilk:

These comments are submitted on behalf of the Nuclear Management and Resources Council, Inc. ("NUMARC") in response to the request of the U.S. Nuclear Regulatory Commission ("NRC") for comments on the NRC's Petition for Rulemaking filed by the GE Stockholders Alliance (54 Fed. Reg. 5089 - February 1, 1989).

NUMARC is the organization of the nuclear power industry that is responsible for coordinating the combined efforts of all utilities licensed by the NRC to construct or operate nuclear power plants, and of other nuclear industry organizations, in all matters involving generic regulatory policy issues and on the regulatory aspects of generic operational and technical issues affecting the nuclear power industry. Every utility responsible for constructing or operating a commercial nuclear power plant in the United States is a member of NUMARC. In addition, NUMARC's members include major architect-engineering firms and all of the major nuclear steam supply system vendors.

The Petitioner requests that the NRC issue a regulation to require that a detectable odor be injected into the emissions of nuclear power plants and other nuclear processes over which the NRC has jurisdiction. The Petitioner states that compliance with the suggested regulation by Commission licensees would immeasurably improve the health and safety of the public by providing for "early detection of radiation leaks," based on the Petitioner's presumption that a detectable odor would give the public notice of the need to take health-protective measures. This petition is without merit and should be summarily dismissed by the NRC.

In normal operation, there are both gaseous and liquid emissions from nuclear power plants, all of which are stringently controlled by federal regulations to ensure that public health and safety is not endangered. Any radioactive materials that are released can be and are measured by a variety of detectors, both onsite and offsite, to assure compliance with regulatory

requirements and to enable appropriate protective actions to be taken if necessary. Any releases of radioactive materials that are not planned or are not within those stringent regulations must be promptly reported to the Nuclear Regulatory Commission and will cause appropriate corrective action to be taken. The measurement of unanticipated radiation in the effluent streams that has potential offsite consequences triggers the plant's emergency plan, which includes detailed procedures, facilities and equipment for responding to a large range of potential accidents, including the release of radioactive materials offsite. A major feature of the emergency systems is the permanently installed sirens and other public notification methods used to ensure prompt warning of the general public in the vicinity of the plant. These systems are far more effective than the addition of an odorant could be in providing notification of the public regarding a radiation leak of significance.

The Petitioner incorrectly equates the addition of an odorant to natural gas supplies with the situation that exists with respect to nuclear power plant effluents. The odorant in natural gas is justified because detectors are not installed in homes or buildings, where the product is used, to detect a gas leak which can create a hazard immediately dangerous to life and health. In contrast, nuclear power plant effluents are carefully monitored by very reliable and sensitive equipment that is completely integrated into plant design. Thus, any leak going undetected is extremely unlikely, and any leak of significance would be immediately identified. Further, radiation detection devices are installed outside the plant to detect any releases of radioactive materials from the plant from other than the directly monitored systems. The addition of an odorant to nuclear power plant emissions, ostensibly to be able to track radioactive releases, would be less effective than using the sophisticated radiation detection devices and systems currently installed.

The introduction of any persistent odorant into the normal emission release path would be noxious in the vicinity of the plant, be of no value because of dispersal factors at any significant distance from the plant, and would not in and of itself indicate the presence of radioactive materials. To our knowledge, no odorant exists, nor is one suggested by Petitioner, that would have the necessary characteristics of being suitable for indicating the presence of radioactive material, of being readily identifiable in small concentrations, and of having a long life that would not have possibly significant adverse consequences.

The petition should be dismissed. Further, we believe that this petition should have been evaluated by the Commission and a decision made, in accordance with 10 C.F.R. § 2.803, not to even institute this proceeding. The consumption of the resources of the NRC, the industry, and the public on an issue so obviously without merit is inappropriate. The Commission has the authority and should have exercised that authority to determine that sufficient reason exists to not institute a proceeding and to so inform the Petitioner that the petition was denied.

If you have any questions concerning these comments, please feel free to contact me or my staff.

Sincerely,

Byron Lee Jr.

Byron Lee, Jr.

BL/RWB:bb

YANKEE ATOMIC ELECTRIC COMPANY

Telephone (508) 779-6711
TWX 710-380-7619

GLA 89-030
FYC 89-004

(34)

580 Main Street, Bolton, Massachusetts 01740-1398

(54 FR 5089

April 3, 1989

Secretary of the Commission
United States Nuclear Regulatory Commission
Washington, DC 20555

Attention: Docketing and Service Branch

Subject: GE Stockholders Alliance Petition for Rulemaking (54FR5089)

Dear Sir:

Yankee Atomic Electric Company (YAEC) appreciates the opportunity to comment on the subject proposed petition to revise 10CFR, Part 20, to require that a detectable odor be injected into the emissions of nuclear power plants. YAEC owns and operates a nuclear power plant in Rowe, Massachusetts. Our Nuclear Services Division (NSD) also provides engineering and licensing services for other nuclear power plants in the northeast, including Vermont Yankee, Maine Yankee, and Seabrook.

The Nuclear Utility Management and Resources Council (NUMARC) is submitting detailed comments regarding the subject petition for rulemaking. YAEC, which is a member of NUMARC, supports those comments. We would also like to add the following.

Fear and suspicion continues to fuel the debate about whether low levels of radioactivity emitted by nuclear power plants have led to harmful health effects. As the Commission is well aware, numerous epidemiological studies have been conducted to date by respected members of the scientific community. Many of these studies have been conducted in response to allegations similar to that being made and used, as a basis for the subject petition. The results of these studies have been uniformally negative; that is, no casual link has been identified between the extremely low levels of radioactivity released from a nuclear power plant and occurrence of cancers or other health effects near commercial nuclear power plants. Even the Three-Mile Island accident releases, which were the subject of at least ten major studies, were found to have had no physiological effects on the surrounding public.

Furthermore, as NUMARC has discussed in some detail in its comment letter, the NRC ensures a high level of public health and safety through imposition of stringent limits on commercial nuclear power plant operations; this includes limits on radionuclide emissions. As NUMARC also pointed out,

NRC further requires extensive, detailed emergency preparedness plans to deal with off-normal plant conditions, and requires demonstration of those plans on a regular basis. It is with this in mind, along with the absence of any demonstrated link between extremely low levels of radiation and detrimental health effects, that we urge the Commission to deny the subject petition. It would appear to us that even if such a proposal were technically feasible, which we seriously doubt, that the safety benefit would be miniscule compared to the costs associated with developing, installing, and maintaining such a system.

We also wish to take this opportunity to comment on the NRC's use of the rules of practice for rulemaking petitions. According to 10 CFR Sections 2.802 and 2.803, even if a petition meets the threshold criteria for docketing, the NRC may dispense with the petition without requesting public comment. In its June 12, 1978 letter to the Commission on the subject of petitions for rulemaking, the Public Citizen Litigation Group (Public Citizen) noted that the NRC has expert knowledge to apply to the resolution of whatever problem is identified in a filed petition. We agree. We note, however, that resolution of a problem must also include, as an option, denial of the petition if the NRC already has available sufficient evidence demonstrating that the petition is without merit.

The NRC certainly has expert knowledge with regard to the subject petition. It is disappointing to us that the NRC did not use its breadth of knowledge and experience gained under existing operations and emergency planning regulations to dispense with what is obviously a meritless petition. During a time when agency and licensee resources must be allocated to many competing activities, we urge the Commission to carefully weigh rulemaking activities and dispense with those of lesser value. It seems to us that such action would have been appropriate for the subject petition.

Sincerely,

Donald W. Edwards
Director of Industry Affairs

DWE/dhm/0331x

WASHINGTON LEGAL FOUNDATION
1705 N STREET, N. W.
WASHINGTON, D. C. 20036
202-857-0240

April 3, 1989

Mr. Samuel J. Chilk
Secretary of the Commission
Nuclear Regulatory Commission
Washington, D.C. 20555
Attn: Docketing and Service Branch

Re: [Docket # PRM-20-19] Petition for rulemaking by G.E. Stockholder Alliance --- Request for Comments

Dear Mr. Chilk:

The Washington Legal Foundation ("WLF") wishes to express its opposition to the petition for rulemaking filed by the G.E. Stockholder Alliance [54 Fed. Reg. 5089 February 1, 1989), Docket # PRM-20-19] which if passed would amend 10 C.F.R. § 20.106. WLF is a non-profit, non-partisan public interest law and policy center with a nationwide membership of 120,000 individuals and organizations. WLF engages in litigation and participates in the administrative process regarding matters which affect broad public interest and welfare.

WLF contends that the idea of inserting some type of warning odor into nuclear power plant emissions is totally without merit and urges its dismissal by the Nuclear Regulatory Commission ("NRC"). This absurd proposal is simply an attempt to harass America's nuclear power industry and foster public animosity and distrust of nuclear energy. The petition is further example of the ridiculous lengths some individuals and organizations will go to use the administrative process to waste government time and taxpayer money. WLF opposes the G.E. Stockholder Alliance petition for these and the following reasons.

The proposal would be extremely impractical to implement because of numerous technical problems. There are currently acceptable limits of emissions from nuclear power plants. [see 10 C.F.R. § 20.106] The odor probably could not be kept out of allowable emissions. People living in close proximity to nuclear power plants would

have to live with a constant stench and somehow discern when it is strong enough to indicate a possible leak. In addition to being too powerful in areas immediately surrounding nuclear facilities, such an odor would be ineffective in outlying locations because of dispersal factors.

Even if it were possible to solve the problems of acceptable emissions and dispersion at distance, which is extremely doubtful, the proposed scheme would still either be useless or cause more harm than it was worth. The reactions of people living or working near nuclear facilities would inevitably fall into two categories: 1) Persons who would be overly cautious and panic every time they smelled rotten eggs in a neighbor's garbage, and 2) those who, if the warning odor was ever released, would have no idea what it was and would ignore it. Worse still, in the same way fire alarms are often disregarded if there is no smell of smoke, people would likely ignore sirens and other legitimate radioactivity warning devices currently used if there was no unusual odor in the air.

Finally, the proposed device would amount to an unnecessary expense which makes a mockery of current safety efforts, procedures, and equipment utilized by the nuclear power industry. The G.E. Stockholder Alliance attempts to analogize their proposed policy with the requirement that mercaptains be injected into products sold by the natural gas industry. This analogy is a poor one because the industries are so different. Natural gas products are <u>designed</u> to be used in homes and buildings where there are <u>no other warning devices</u>. In addition, people can recognize the peculiar odor injected into natural gas and know how to calmly react when they detect it. The petitioner does not offer any suggestions as to how the public will be educated to identify the scent injected into nuclear power plant emissions or to react when the aroma is perceived.

The nuclear power industry already has public warning devices, such as sirens and other public notification plans, which people will recognize. In addition, any radioactive leak would be discovered immediately and tracked by radiation detection systems much more sophisticated than the noses of the citizenry.

This proposal is another thinly veiled effort to create a public feeling of insecurity regarding nuclear energy and it should not be taken seriously. Nuclear power is not something to be feared, but is, if used properly, a source which has great potential for safely

and cheaply satisfying America's future energy needs. This petition for rulemaking should be dismissed.

Respectfully Submitted,

Daniel J. Popeo
General Counsel

Paul D. Kamenar
Executive Legal Director

Robert B. Houston
Assistant to the
General Counsel

Indiana Michigan
Power Company
P.O. Box 16631
Columbus, OH 43216

(32)

INDIANA
MICHIGAN
POWER

'89 APR 3 P1 :09

AEP:NRC:0508G

Donald C. Cook Nuclear Plant Units 1 and 2
Docket Nos. 50-315 and 50-316
License Nos. DPR-58 and DPR-74
COMMENTS ON PETITION FOR RULEMAKING 20-19
INJECTION OF ODORANTS INTO EMISSIONS OF
NUCLEAR POWER PLANTS AND OTHER NUCLEAR PROCESSES

U. S. Nuclear Regulatory Commission
Secretary of the Commission
ATTN: Docketing and Service Branch
Washington, D. C. 20555

Attn: Samuel J. Chilk

March 31, 1989

Dear Mr. Chilk:

The American Electric Power Service Corporation (AEPSC) and the Inidana Michigan Power Company (I&M) are pleased to submit for your consideration our comments with regard to the petition for rulemaking (PRM) 20-19. This petition for rulemaking would require that 10 CFR 20 be amended to include a requirement that a detectable odor be injected into the emissions of nuclear power plants and other nuclear processes over which the NRC has jurisdiction. It is the position of AEPSC and I&M that the adoption and implementation of the proposed rulemaking is not prudent because:

1) The use of such odorants could reduce the protection afforded to the public health and safety, and

2) The use of such odorants would present a potentially significant negative impact to the human environment and would be impermissible per the requirements of the National Environmental Policy Act (NEPA).

The basis for these concerns is documented below.

The petitioner in this matter "believes that compliance with the suggested requirement . . . would immeasurably improve the health and safety of the public by providing for early detection of radiation leaks." In order to detect the leakage of gaseous radioactivity with the use of odorant materials, it would be necessary for licensees to inject such odorants directly into containment atmospheres and in order to ensure that the odorants might be detectable at a distant

downwind location, extremely large concentrations would have to be used. Typically low molecular weight mercaptans (R-SH compounds) are used as odorants in the natural gas industry and would presumably be used in this proposed application. These sulfur containing compounds have fairly low flash points and because the upper and lower explosive limits are often not known, it would be necessary to inert the containment atmospheres to preclude the possibility of formation of an explosive mixture. Another problem with the use of high concentrations of mercaptans in containment is the products of radiation-induced decomposition of the mercaptans. When mercaptans undergo decomposition, they form various sulfur oxides (i.e., SO_2, SO_3) which are highly corrosive. Such corrosive environments could significantly degrade the reactor coolant pressure boundary. A further concern with the use of mercaptans is their impact upon control room habitability should a release of the mercaptans occur either with or without a simultaneous release of gaseous radioactivity. Because of its strongly repugnant odor, releases of mercaptans either by accident or planned (i.e., during containment venting, purging, or release of waste gas decay tanks) could make the control room uninhabitable without the use of ventilation cleanup systems. The routine use of control room ventilation cleanup systems under such conditions would significantly increase the running time of the system and would significantly decrease the usable lifetime of the charcoal absorbers due to their depletion by capture of the airborne mercaptans. Any of the three concerns alone could increase the possibility of a nuclear incident. These factors - inerted containment atmosphere, corrosive mercaptan decomposition products, and control room habitability concerns - are only one aspect of how the use of mercaptans could reduce the public's health and safety.

Another non-nuclear concern with the use of such odorants is the possibility of confusing the source of the odor. Homeowners who use natural or liquified gases and who live close to a nuclear power plant may easily misconstrue the odor of a gas leak as a gaseous radioactive discharge. Should this situation occur and the person takes shelter in his residence, there is a distinct possibility that death by asphyxiation or explosion could occur. Another possible result of the use of mercaptan (or other odorants) would be olfactory fatigue with a corresponding increase in the olfactory threshold. Should the olfactory threshold of an individual increase as a result of the use of odorants in routine releases, the affected individual's threshold could increase such that the odorant concentration contained in the gas products would not register. Thus, an individual may die as a result of the olfactory threshold shift. These non-nuclear concerns with the use of odorants for detecting leaks would appear to actually decrease the health and safety protection afforded to the public. These factors - both nuclear and non-nuclear - appear to be sufficient arguments in and of themselves to preclude adoption of the proposed rule.

Another concern with the proposed use of odorants such as mercaptans is the impact such use would have on the human environment. Because of the repugnant smell of these compounds, a significantly negative environmental impact from the use of these odorants would result. As previously stated, high concentrations of the odorant are required to ensure that it is detected at great distances downwind (i.e., 5 to 10 miles). Such high concentrations would result in the area outside the site boundary being uninhabitable due to the smell and, in many cases, the concentration of the mercaptans could exceed the concentrations considered by OSHA/NIOSH as being immediately dangerous to life. Such usage would not be permitted under the NEPA requirements. Again, a reduction in the protection afforded the public's health and safety could be expected just from the exposure to the odorant alone. Should the odorant be released during a rain or snow storm, some of the odorant could be washed out with any radioactive particulates and iodines that might be present in the release. Such washout would not necessarily significantly impact the offsite doses while the washed out mercaptans and any decomposition products would be deposited on the ground at a slightly reduced pH. Thus, the use of mercaptans for the proposed purpose could lead to a slight increase in the acidity of precipitation. Therefore, these environmental impacts that result from use of odorants would also appear to preclude the adoption of the proposed rule.

With regard to the claim that the odorants commonly used are non-toxic, a review of the Material Safety Data Sheets for various low molecular mercaptans indicates that these materials are categorized as health hazards and are entered on the Environmental Protection Agency's TSCA inventory. Further, since the use of odorants in natural gas products is for the detection of local, small leaks, the concentrations of the odorants can be kept to a safe level. The use of odorants at nuclear power facilities would be to warn individuals downwind of the facility, possibly at a significant distance, of a radioactive release. Thus, the concentrations of the odorants could not be kept to an absolutely safe level for onsite workers, nearby residents, and residents at a significant distance from the facility at the same time. Therefore, while the use of the odorant is the same (to provide warning of leaks), the conditions of usage are significantly different and thus what is valid for use with natural gas products is not necessarily valid for use at a nuclear facility.

The concerns identified above with respect to the use of odorants in gaseous discharges from nuclear facilities -- potentially reducing the protection afforded the public's health and safety and negatively

impacting the human environment -- are sufficient to preclude adoption of the proposed rule. Please find attached to these comments a copy of the Material Safety Data Sheets and other toxicological information on various organic mercaptans typically used as odorants.

Very Truly Yours,

M. P. Alexich,
Vice President

attachment

cc: D. H. Williams, Jr. w/o attachment
W. G. Smith, Jr. - Bridgman w/o attachment
A. B. Davis - Region III w/attachment
Resident Inspector w/attachment

ATTACHMENT TO AEP:NRC:0508G

MATERIAL SAFETY DATA SHEETS FOR:

ETHYL MERCAPTAN
n-PROPYL MERCAPTAN
ISOPROPYL MERCAPTAN
BUTYL MERCAPTAN
sec-BUTYL MERCAPTAN
tert-BUTYL MERCAPTAN

October 31, 1988

USA and Canada WORLDWIDE Other Countries

Material Safety Data Sheet

ETHYL MERCAPTAN

PHILLIPS 66 COMPANY
A Subsidiary of Phillips Petroleum Company
Bartlesville, Oklahoma 74004

PHONE NUMBERS
Emergency:
Business Hours (918) 661-3865
After Hours (918) 661-8118
General MSDS Information:
(918) 661-8327

A. Product Identification

Synonyms: Ethanethiol
Chemical Name: Ethyl Mercaptan
Chemical Family: Mercaptan
Chemical Formula: C2H6S
CAS Reg. No.: 75-08-1
Product No.: M02400

Product and/or Components Entered on EPA's TSCA Inventory: Yes

B. Hazardous Components

Ingredients	CAS Number	% By Wt.	OSHA PEL	ACGIH TLV
Ethyl Mercaptan	75-08-1	99.7	10 ppm*	0.5 ppm

* Ceiling value.

NA - Not Applicable NE - Not Established

C. Personal Protection Information

Ventilation:	Use adequate ventilation to control exposure below recommended exposure level.
Respiratory Protection:	Not generally required. In case of spill or accidental release, use NIOSH/MSHA approved supplied air respirator. For escape, use NIOSH/MSHA approved self-contained breathing apparatus.
Eye Protection:	Chemical goggles if splashes of liquid could occur.
Skin Protection:	Rubber, neoprene or vinyl gloves if splashes of liquid could occur.

NOTE: Personal protection information shown in Section C is based upon general information as to normal uses and conditions. Where special or unusual uses or conditions exist, it is suggested that the expert assistance of an industrial hygienist or other qualified professional be sought.

D. Handling and Storage Precautions

Avoid inhalation and skin and eye contact. Wash hands after handling. Store in a cool, dry, well-ventilated area. Protect from sources of ignition. Provide means of controlling leaks and spills. Bond and ground during liquid transfer. Use product in a closed system.

E. Reactivity Data

Stability:	Stable
Conditions to Avoid:	Not Established
Incompatibility (Materials to Avoid):	Oxygen and oxidizing materials.
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid:	Not Established
Hazardous Decomposition Products:	Sulfur oxides.

F. Health Hazard Data

Recommended Exposure Limits:

See Section B

Acute Effects of Overexposure:

Eye:	Vapor may cause mild eye irritation.
Skin:	Liquid may cause mild irritation.
Inhalation:	Vapor may cause headache, nausea, weakness, fatigue and slight irritation to mucous membranes.
Ingestion:	May be aspirated into the lungs if swallowed, which may result in pulmonary edema and chemical pneumonitis.

NA - Not Applicable NE - Not Established

Subchronic and Chronic Effects of Overexposure:

No known applicable information.

Other Health Effects:

No known applicable information.

Health Hazard Categories:

	Animal	Human		Animal	Human
Known Carcinogen	___	___	Toxic	___	___
Suspect Carcinogen	___	___	Corrosive	___	___
Mutagen	___	___	Irritant	___	___
Teratogen	___	___	Target Organ Toxin	_X_	_X_
Allergic Sensitizer	___	___	Specify - Lung-Aspiration Hazard		
Highly Toxic	___	___			

First Aid and Emergency Procedures:

Eye: Immediately flush eyes with running water for at least fifteen minutes. If irritation develops, seek medical attention.

Skin: Immediately wash with soap and water. If irritation develops, seek medical attention.

Inhalation: Remove from exposure. If illness or adverse symptoms develop, seek medical attention.

Ingestion: Do not induce vomiting. Seek immediate medical assistance.

Note to Physician: Gastric lavage using a cuffed endotracheal tube may be performed at your discretion.

G. Physical Data

Appearance:	Colorless Liquid
Odor:	Repulsive
Boiling Point:	95F (35C)
Vapor Pressure:	16.2 psia (838 mmHg) at 100F
Vapor Density (Air = 1):	2.1
Solubility in Water:	Slight
Specific Gravity (H2O = 1):	0.845 at 60/60F
Percent Volatile by Volume:	100
Evaporation Rate (Ethyl Ether = 1):	<1
Viscosity:	0.290 cs at 68F

NA - Not Applicable NE - Not Established

H. Fire and Explosion Data

Flash Point (Method Used):	-55F(-48C) (Estimated)
Flammable Limits (% by Volume in Air):	LEL - Not Established UEL - Not Established
Fire Extinguishing Media:	Dry chemical, foam, carbon dioxide (CO2).
Special Fire Fighting Procedures:	Use NIOSH/MSHA approved self-contained breathing apparatus and/or garments described in Section C if conditions warrant. Shut off source. Water fog or spray may be used to cool exposed equipment and containers.
Fire and Explosion Hazards:	Sulfur oxides released when burned.

I. Spill, Leak and Disposal Procedures

Precautions Required if Material is Released or Spilled:
Wear protective equipment and/or garments described in Section C if exposure conditions warrant. Protect from ignition. Contain spill. Keep out of water sources and sewers. Promptly neutralize spill by adding dilute (5%) aqueous (water) solution of calcium hypoclorite (HTH) with stirring. Alternatively, household bleach (Clorox, Purex) in a dilute solution may be used. Concentrated or dry bleach must not be used. Absorb in dry inert material (sand, clay, sawdust, etc.).

Waste Disposal (Insure Conformity with all Applicable Disposal Regulations):
Burn under controlled conditions or place in other permitted waste disposal facility.

J. DOT Transportation

Shipping Name:	Ethyl Mercaptan
Hazard Class:	Flammable Liquid
ID Number:	UN 2363
Marking:	Ethyl Mercaptan, UN 2363
Label:	Flammable Liquid
Placard:	Flammable/2363
Hazardous Substance/RQ:	Not Applicable
Shipping Description:	Ethyl Mercaptan, Flammable Liquid, UN 2363
Packaging References:	49 CFR 173.141

K. RCRA Classification - Unadulterated Product as a Waste

Ignitable.

L. Protection Required for Work on Contaminated Equipment

Wear protective equipment and/or garments described in Section C if exposure conditions warrant. Contact immediate supervisor for specific instructions before work is initiated.

NA - Not Applicable NE - Not Established

M. Hazard Classification

_X_ This product meets the following hazard definition(s) as defined by the Occupational Safety and Health Hazard Communication Standard (29 CFR Section 1910.1200):

___ Combustible Liquid	___ Flammable Aerosol	___ Oxidizer
___ Compressed Gas	___ Explosive	___ Pyrophoric
___ Flammable Gas	_X_ Health Hazard (Section F)	___ Unstable
_X_ Flammable Liquid	___ Organic Peroxide	___ Water Reactive
___ Flammable Solid		

___ Based on information presently available, this product does not meet any of the hazard definitions of 29 CFR Section 1910.1200.

N. Additional Comments

As of the preparation date, this product did not contain a chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

NA - Not Applicable NE - Not Established

industrial hygiene and toxicology

PHILLIPS PETROLEUM COMPANY HUMAN RESOURCES - MEDICAL DIVISION BARTLESVILLE, OK 74004 918 661-6600

TOXICITY STUDY SUMMARY
ETHYL MERCAPTAN

ACUTE INHALATION TOXICITY
(1987)

A group of 10 rats (5 males and 5 females) of the Crl:CD(SD)BR strain was exposed to ethyl mercaptan at a mean measured concentration of 991 ppm by inhalation (head-only) over a period of 4 hours. This corresponded to a nominal atmosphere concentration of 1445 ppm. A similar group of 10 rats was exposed to filtered air as a control. The chamber air flow rates were 16 and 19-21 l/min for the control and test groups, respectively. Exposure was followed by an observation period of 14 days. Thorough necropsy and microscopic examination were conducted upon all animals which succumbed during the test period and upon those sacrificed at the end of the 14-day observation period.

There were no deaths during the course of the study. The only clinical signs attributable to treatment with the test article were transient chromodacryorrhea, nasal secretion, and respiratory distress on the day of treatment. A small temporary body weight loss in control and test animals was considered to be attributable to the procedure used for animal restraint. There was no evidence from the macroscopic and microscopic examinations of any treatment-related changes.

Since there were no deaths, the acute inhalation median lethal concentration (LC50) was considered to be greater than 991 ppm for ethyl mercaptan.

ACUTE INHALATION TOXICITY
(1983)

Albino rats of the Sprague-Dawley strain weighing 200-350 g were selected as the experimental animals. Five male and five female animals were individually housed in stainless steel wire mesh cages which were placed in a glass and stainless steel exposure chamber. The animals were exposed to vaporized ethyl mercaptan for 4 hours at a nominal concentration of 1.93 mg/L (actual concentration 27.15 ppm*1). The animals were then observed for 14 days. No gross signs and symptoms of intoxication were noted. Animals appeared normal at every observation interval (exposure and post-exposure) during the study. On Day 14 of the observation period, all the animals were euthanized and submitted to thorough necropsy. There were no gross pathological findings related to test material administration. Since no test animals died, the acute inhalation LC50 for ethyl mercaptan is considered to be greater than 27.15 ppm.

RESPIRATORY TRACT IRRITANCY
(1983)

Male mice of the outbred SPF (CD-1,COBS) strain weighing 20-25 g were selected as the experimental animals. A group of four animals was exposed head only to vaporized ethyl mercaptan at a nominal concentration of 1.93 mg/L (actual concentrated 35.02 ppm.*1) Each animal was housed in an individual plethysmograph to permit monitoring of respiration. After the animals became acclimatized, they were exposed to vaporized test material for 1 minute and permitted to recover for 10 minutes while being exposed to room air only. Following this, the animals were exposed to vaporized test material for 1 minute, then to room air for 5 minutes. During this time their respiratory patterns were continually monitored. Based on these results, exposure to ethyl mercaptan at a concentration of 35.02 ppm via inhalation failed to produce upper airway irritancy in mice.

AMES TEST
(1983)

Five Salmonella typhimurium tester strains, TA1535, TA1537, TA1538, TA98 and TA100, were utilized as the experimental organisms. Each strain was exposed to a minimum of five doses of ethyl mercaptan both with and without metabolic activation by and Aroclor-induced rat liver microsomal fraction. The test compound dose levels were determined by a preliminary multidose-ranging study with the optimal concentration allowing survival of about fifty percent of the cells. Ethyl mercaptan solubilized at approximately 100

mg/ml in dimethylsulfoxide. The maximum dose selected for the mutagenicity test was approximately 10,000 ug/plate because it exhibited growth inhibition.

The mutagenicity assay was done directly by the plate incorporation method. Each of 2 ml of complete top agar, 0.1 ml of an overnight broth culture of each tester strain, 0.1 ml of the test compound or diluent and 0.5 ml of the S-9 mix, for the activated tests only, were combined, mixed thoroughly, and poured onto VBE minimal agar plates. Each concentration of the compound and the positive and negative controls were plated in triplicate. Plates were gently rotated and tilted to assure uniform distribution of the top agar, allowed to harden on an even surface for 1 hour, inverted and put in a dark 37+/- 0.5 degree Centigrade incubator. After 2 days, the colonies on both test and control plates were counted using an electronic colony counter and the density of the background growth was noted.

Exposure to five graded doses of the test material in the presence of and in the absence of metabolic activation did not increase the reversion to histidine prototrophy of S. typhimurium strains TA1535, TA1538, or TA100. While slight increases were observed for strains 1537 and TA98, this response was not dose related. Therefore ethyl mercaptan is not considered to be mutagenic in this test system.

MOUSE LYMPHOMA FORWARD MUTATIONAL ASSAY
(1985)

This assay was performed with the TK+/- phenotype of L5178Y mouse lymphoma cells from subline 3.7.2C using a minimum of eight doses of ethyl mercaptan with and without metabolic activation by an Aroclor-induced rat liver microsomal fraction. Appropriate negative, solvent, and positive controls were included with each assay. The test compound dose levels were determined by a preliminary multidose-ranging study with the highest dose tested being selected to give approximately fifty to ninety percent inhibition of suspension cell growth depending on the solubility of the compound. Ethyl mercaptan solubilized at 1000 ug/ml in dimethylsulfoxide. The maximum dose selected for the mutagenicity test was 1000 ug/ml because it represented the limits of solubility of the test material.

Each test concentration was prepared to contain the test dose in 0.1 ml volumes. Six million precleansed TK+/- cells in 6 ml of F10P were added to centrifuge tubes. An additional 4 ml of the S-9 mix were added to half of the tubes. Immediately thereafter, 0.1 ml of the 100x concentrations of the test chemical dilutions or the positive controls, and 0.1 ml of the solvent were added to the appropriate tubes. Each tube was mixed, gassed with a

mixture of CO2 and air, and incubated at 37+/- 0.5 degrees Centigrade on a revolving roller drum for 4 hours. Following this incubation the tubes were centrifuged and the treatment solutions decanted. The cells were washed twice with F10P and resuspended in 20 ml F10P after the second wash. The tube cultures were then gassed and reincubated for a 2-day expression time. The cell cultures were readjusted to 300,000 cells/ml as necessary. At the end of the expression period, a sample of each of the cultures was centrifuged and the cells resuspended at 500,000 viable cells/ml in F10P. The concentrated cells were serially diluted and appropriate dilutions were plated in triplicate in cloning medium with and without TFT. Approximately 500,000 cells were plated on each of 3 selective medium plates containing 2 ug/ml TFT, and 100 cells were cloned on each of 3 non-selective plates for each test concentration and a control tube. The plates were incubated for 12 +/- 2 days. The mutant colonies (TK-/-) were counted on the selective TFT containing plates and the survivors (TK+/- and TK-/-) were counted on the non-selective medium plates.

Exposure to 8 graded doses of ethyl mercaptan resulted in three valid doses (>10% survival) both with and without metabolic activation. One of the three dose levels without activation (90.5 ug/ml) resulted in an increased induction of forward mutations in L5178Y Mouse Lymphoma cells at the T/K locus that was two-fold greater than the DMSO solvent control. However, in the presence of metabolic activation, no significant increase was obtained at any dose level tested. Since only one dose level, in the absence of metabolic activation, elicited a two-fold response, the results of this test on ethyl mercaptan were considered to be equivocal.

IN VITRO SISTER CHROMATID EXCHANGE
(1984)

This assay was performed using Chinese Hamster Ovary Cells and a minimum of five doses of ethyl mercaptan with and without metabolic activation by an Aroclor-induced rat liver microsomal fraction. Appropriate negative, solvent and positive controls were included with each assay. The test compound dose levels were determined by a preliminary multidose-ranging study with the highest concentration of the chemical tested depending upon its solubility. Ethyl mercaptan appeared miscible at approximately 500 mg/ml in dimethylsulfoxide. The maximum dose selected for the mutagenicity test was approximately 2,500 ug/ml because it exhibited growth inhibition.

Cells were treated in an exponential stage of growth by setting up cultures with 2 to 5 x 100,000 cells per 25 cm2 flask, 24 hours prior to treatment. Cells were exposed to

the chemical for 2 hours, and washed twice and then 5-bromodeoxyuridine (Brd U) was added to each culture. All cultures were sampled a minimum of 24 hours after addition of Brd U to ensure completion of two full cell cycles. Duplicate cultures were set up for each dose level and all controls. Twenty-four hours after the above initiation of the cultures, the cells were treated with the test chemical in the presence of an S-9 rat liver activation system for 2 hours and washed twice in a balanced salt solution. The cells were then sampled and treated as described above. Two hours after, colcemid (0.2 g/ml) was added to each tube and metaphases were collected by mitotic shake-off. The cells were swollen in a 0.075M KCL hypotonic, and washed three times in an acetic alcohol fixative. Slides were prepared and stained. Fifty cells in the metaphase stage of mitosis were scored at each dose level for the number of sister chromatid exchanges (SCE).

In the first test exposure to five graded doses of the test material in the presence of and in the absence of metabolic activation, ethyl mercaptan showed a statistically significant increase in the number of SCE's per chromosome at the 840 ug/ml dose level without metabolic activation. All cells recovered at 2,500 ug /ml were first division metaphases which could not be analyzed for SCE's. A repeat test was performed with 2,500 ug/ml in which the chromosomes were recovered 43 hours after exposure in order to allow for two cell divisions. In this second test, a statistically significant increase in SCE's was seen at 2,500 ug/ml both with and with out metabolic activation and a greater than two-fold increase in SCE's was seen both with and without activation.

Under these conditions, the experimental compound, ethyl mercaptan, did exhibit a positive response and is, therefore, considered to be mutagenic in this test system.

DATE: 1/28/86

*1Actual concentrations were calculated from the total hydrocarbon analyzer response reported in methane equivalents.

December 18, 1988

USA and Canada WORLDWIDE Other Countries

Material Safety Data Sheet

n-PROPYL MERCAPTAN

PHILLIPS 66 COMPANY
A Subsidiary of Phillips Petroleum Company
Bartlesville, Oklahoma 74004

PHONE NUMBERS
Emergency:
Business Hours (918) 661-3865
After Hours (918) 661-8118
General MSDS Information:
(918) 661-8327

A. Product Identification

Synonyms: 1-Propanethiol
Chemical Name: n-Propyl Mercaptan
Chemical Family: Mercaptan
Chemical Formula: C3H8S
CAS Reg. No.: 107-03-9
Product No.: M04400

Product and/or Components Entered on EPA's TSCA Inventory: YES

B. Hazardous Components

Ingredients	CAS Number	% By Wt.	OSHA PEL	ACGIH TLV
n-Propyl Mercaptan	107-03-9	99.2	NE	NE
Isopropyl Mercaptan	75-33-2	0.5	NE	NE
Related Compounds	NA	0.3	NE	NE

NA - Not Applicable NE - Not Established

C. Personal Protection Information

Ventilation: Provide adequate ventilation.

Respiratory Protection: Not generally required. In case of spill or accidental release, use NIOSH/MSHA approved air respirator.

Eye Protection: Use safety goggles and/or face shield. For splash protection, use chemical goggles and/or face shield.

Skin Protection: Rubber, neoprene or vinyl gloves is skin contact is possible. Use other protective garments, as needed, to prevent skin contact. Launder contaminated clothing before reuse.

NOTE: Personal protection information shown in Section C is based upon general information as to normal uses and conditions. Where special or unusual uses or conditions exist, it is suggested that the expert assistance of an industrial hygienist or other qualified professional be sought.

D. Handling and Storage Precautions

Avoid inhalation and skin and eye contact. Wear protective equipment and/or garments described above is exposure conditions warrant.

Store in cool, dry, well-ventilated area. Protect from sources of ignition. Provide means of controlling leaks and spills. Bond and ground during liquid transfer. Use product in a closed system.

E. Reactivity Data

Stability: Stable
Conditions to Avoid: Not Applicable
Incompatibility (Materials to Avoid): Oxygen and strong oxidizing materials

Hazardous Polymerization: Will Not Occur
Conditions to Avoid: Not Applicable
Hazardous Decomposition Products: Sulfur oxides

F. Health Hazard Data

Recommended Exposure Limits:

Not Established

Acute Effects of Overexposure:

Eye: May cause slight irritation.

Skin: May cause slight irritation.

Inhalation: May cause headache, nausea and difficult breathing.

Ingestion: May be aspirated into lungs if swallowed resulting in pulmonary edema and chemical pneumonitis.

Subchronic and Chronic Effects of Overexposure:

No known applicable information.

Other Health Effects:

No known applicable information.

Health Hazard Categories:

	Animal	Human		Animal	Human
Known Carcinogen	___	___	Toxic	___	___
Suspect Carcinogen	___	___	Corrosive	___	___
Mutagen	___	___	Irritant	___	___
Teratogen	___	___	Target Organ Toxin	_X_	_X_
Allergic Sensitizer	___	___	Specify - Lung-Aspiration Hazard		
Highly Toxic	___	___			

First Aid and Emergency Procedures:

Eye: Flush eyes with running water for at least 15 minutes. If irritation develops, seek medical attention.

Skin: Wash with soap and water, If irritation or adverse symptoms develop, seek medical attention.

Inhalation: Remove from exposure. If illness or adverse symptoms develop, seek medical attention.

Ingestion: Do not induce vomiting. Seek immediate medical assistance.

Note to Physician: Gastric lavage using a cuffed endotracheal tube may be performed at your discretion.

NA - Not Applicable NE - Not Establi

G. Physical Data

Appearance:	Colorless Liquid
Odor:	Repulsive
Boiling Point:	154F (68C)
Vapor Pressure:	5 psia (265 mm Hg) at 100F
Vapor Density (Air = 1):	>1
Solubility in Water:	Negligible
Specific Gravity (H2O = 1):	0.847 at 60/60F
Percent Volatile by Volume:	100
Evaporation Rate (Ethyl Ether = 1):	<1
Viscosity:	0.399 cs at 68F

H. Fire and Explosion Data

Flash Point (Method Used):	-5F (-21C) (TOC, ASTM D1310)
Flammable Limits (% by Volume in Air):	LEL - Not Established UEL - Not Established
Fire Extinguishing Media:	Dry chemical, foam or carbon dioxide (CO2)
Special Fire Fighting Procedures:	Use NIOSH/MSHA approved self-contained breathing apparatus and/or garments described in Section C if conditions warrant. Shut off source. Water or fog or spray may be used to cool exposed equipment and containers.
Fire and Explosion Hazards:	Sulfur oxides released when burned.

I. Spill, Leak and Disposal Procedures

Precautions Required if Material is Released or Spilled:
Wear protective equipment and/or garments described in Section C if exposure conditions warrant. Protect from ignition. Contain spill. Keep out of water sources and sewers. Promptly neutralize spill by adding dilute (5%) aqueous (water) solution of calcium hypochlorite (HTH) with stirring. Alternatively, household bleach (Clorox, Purex) in a dilute solution may be used. Concentrated or dry bleach must not be used. Absorb in dry inert material (sand, clay, sawdust, etc.).

Waste Disposal (Insure Conformity with all Applicable Disposal Regulations):
Incinerate or place in other permitted waste disposal facility.

J. DOT Transportation

Shipping Name:	Propyl Mercaptan
Hazard Class:	Flammable Liquid
ID Number:	UN 2704
Marking:	Propyl Mercaptan/UN 2704
Label:	Flammable Liquid
Placard:	Flammable/2704
Hazardous Substance/RQ:	Not Applicable
Shipping Description:	Propyl Mercaptan, Flammable Liquid, UN 2704
Packaging References:	49 CFR 173.141

NA - Not Applicable NE - Not Established

K. RCRA Classification - Unadulterated Product as a Waste

Ignitable

L. Protection Required for Work on Contaminated Equipment

Wear protective equipment and/or garments described in Section C if exposure conditions warrant. Contact immediate supervisor for specific instructions before work is initiated.

M. Hazard Classification

_X_ This product meets the following hazard definition(s) as defined by the Occupational Safety and Health Hazard Communication Standard (29 CFR Section 1910.1200):

___ Combustible Liquid	___ Flammable Aerosol	___ Oxidizer
___ Compressed Gas	___ Explosive	___ Pyrophoric
___ Flammable Gas	_X_ Health Hazard (Section F)	___ Unstable
_X_ Flammable Liquid	___ Organic Peroxide	___ Water Reactive
___ Flammable Solid		

___ Based on information presently available, this product does not meet any of the hazard definitions of 29 CFR Section 1910.1200.

N. Additional Comments

As of the preparation date, this product did not contain a chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

NA - Not Applicable NE - Not Established

industrial hygiene and toxicology

PHILLIPS PETROLEUM COMPANY HUMAN RESOURCES - MEDICAL DIVISION BARTLESVILLE, OK 74004 918 661-6600

TOXICITY STUDY SUMMARY

n-Propyl Mercaptan

Acute Dermal Screen

Six young adult New Zealand albino rabbits, 3 males and 3 females weighing between 2 and 3 kg, were used to test the acute dermal toxicity of Phillips n-Propyl mercaptan. Within 24 hours before dosing, each animal was clipped free of hair on the back, sides, and belly around the abdomen. A heavy plastic bag was opened on both ends to form a tube which was placed over the midsection of each animal. One end was securely fastened and 2 ml/kg body weight of n-Propyl mercaptan was expelled under the plastic sheet with a blunt 13 gauge needle fitted to a syringe. The end of the plastic tube was securely fastened and the plastic was wrapped with fabric and taped securely. Twenty-four hours later the covering materials were removed and any excess n-Propyl mercaptan was lightly sponged off. Each animal was fitted with a plastic restraining collar which was worn for the duration of the experiment.

Observations of each animal occurred twice daily during the first three days and approximately every 24 hours thereafter for 14 days total. Deaths and gross toxic signs were noted and each animal was weighed prior to dosing, day 7, and day 14. All animals were subjected to a thorough necropsy within 16 hours of animal termination.

All 6 animals exhibited erythema and induration. One male and two females also exhibited eschar formation on day 3 and nasal drainage on day 12. Cross necropsy performed on all six animals appeared normal except the female mentioned above whose upper right lung lobe appeared blistery and rough.

The Dermal LD50 for Phillips n-Propyl mercaptan was determined to be greater than 2 ml/kg body weight in albino rabbits.

Primary Eye Irritation

Twelve New Zealand white albino rabbits weighing approximately 2 kg were used to determine the potential ocular irritation of Phillips n-Propyl mercaptan. A dose of 0.1 ml of undiluted n-Propyl mercaptan was placed on the everted lower lid of the right eye. The upper and lower lids were then gently held together for 4 seconds and the released. The test eyes of six rabbits were flushed with 40 mls of room temperature saline. The left eye remained untreated and served as the control. Observations for ocular lesions were made at 1, 24, 48, and 72 hours and 4 and 7 days after treatment. Grading and scoring of irritation were done using the method of Draize*.

In both the washed and unwashed groups, dark redness, swelling, and discharge were common at the 1-hour observation. Three lesions were observed at the 24-hour observation, one in the unwashed group and two in the washed group. All animals appeared normal at the 7-day observation.

Phillips n-Propyl mercaptan demonstrated irritation in 6 out of 6 rabbits in both washed and unwashed groups. The mean primary eye irritation score for the unwashed group was determined to be 3.3 and for the washed group was determined to be 1.8 in albino rabbits.

Primary Skin Irritation

Six New Zealand albino rabbits were used to test the primary skin irritancy of Phillips n-Propyl mercaptan. The backs of each animal were shaved free of hair. One side of each animal was selected and abraded. A 1-inch square gauze patch was positioned over the abraded area and another was placed on the opposite side of the rabbit and fixed in place with nonallergic adhesive tape. One edge of each pad was raised and 0.5 ml of the n-Propyl mercaptan was expelled under the patch onto the skin with a micropipette. The patches were secured and a heavy plastic tube was placed over the body of the animal and securely fastened at each end. The plastic sheath was then covered with several wraps of fabric which were secured to prevent mechanical irritation by the animal. After 24 hours, all covering material was removed and any excess n-Propyl mercaptan was slightly sponged off.

Observations were made at 25-hours (one hour after removal of the wrappings), 72-hours, and 7 days after dose administration. The abraded and unabraded sites were both scored according to the Draize system*.

Phillips n-Propyl mercaptan did demonstrate very slight erythema in 3 out of 6 animals on both abraded and unabraded sites at 25 hours after treatment. At 72-hours following treatment, 1 animal exhibited very slight erythema on the abraded site only. On day 7 all animals appeared normal.

Phillips n-Propyl mercaptan demonstrated a slight irritance in 3 out of 6 rabbits using the Primary Skin Irritation Test. The mean primary irritation index was determined to be 0.2 in albino rabbits.

*Draize, J. H.; Woodard, G.; and Calvery, H. O. (1944): Methods for the Study of Substances Applied Topically to the Skin and Mucous Membrane. J. Pharmacol Exp Therap 82:377.

TOXICITY STUDY SUMMARY

n-Propyl Mercaptan (Phillips)

Acute Oral Toxicity

Four groups of 5 male and 5 female young adult Sprague-Dawley ablino rats weighing between 150 to 300 grams were used to test the oral toxicity of n-Propyl mercaptan. Four dose concentrations were selected (2.0 ml/kg, 2.4 ml/kg, 2.9 ml/kg, and 3.5 ml/kg body weight) and administered by gavage to each animal as a single dose of the undiluted test material. Initial body weights were determined after 18 to 24 hours of feed deprivation. Immediately after dosing the animals were allowed to return to ad libitum feeding. Females showed high susceptability to death at all dosage levels tested. For each dose level, except the 2.4 ml/kg level, all the females exposed died by day 2. At the 2.4 ml/kg dose level, 4 females died by day 1, leaving only 1 female which survived until the end of the study.

Common pharmocological symptoms included staggering, docility to no activity, ruffed fur and a respiratory condition. Squinting of eyes, lacrimation and paralysis occurred in the higher dose groups, i.e. 2.9 ml/kg and 3.5 ml/kg body weight. Those animals which died exhibited the above symptoms prior to death. Those that survived recovered from their symptoms by day 6 or 7 of the observation period.

Body weights were comparable in all dosage groups with steady gains throughout the study.

In all 4 groups, necropsied animals showed abnormalities in some of the following tissue: lungs, liver, stomach, intestines, kidneys, spleen, adrenals, and 1 animal in each group exhibited a mushy brain. Thymus abnormalities were also observed in dose level groups 2.4 ml/kg and 2.9 ml/kg. The skin of 1 animal in 2.4 ml/kg group exhibited a green tint, and the skin of 1 animal in 2.9 ml/kg group had diffuse blood vessels.

The Acute Oral LD50 for n-Propyl mercaptan was calculated to be 2.22 ml/kg body weight in albino rats. The 95% confidence limits for the LD50 fall from 1.04 to 2.62 ml/kg body weight.

TOXICITY STUDY SUMMARY

n-Propyl Mercaptan

Acute Inhalation Toxicity Screen

Young, albino rats, Sprague-Dawley strain weighing between 200 and 300 grams were selected as the test animals. Two groups of 5 males and 5 females were exposed for a 4-hour period to air atmospheres of thermally vaporized test material at analytically determined concentrations of 6920 ppm and 8170 ppm of air. Exposures took place in rectangular dynamic exposure chambers with conical top and bottom sections having total volumes of approximately 184 liters. For the 6920 ppm exposure, the air flow rate was 51.4 l/min and the nominal concentration was calculated to be 22.2 mg/l (8290 ppm) in air. For the 8170 ppm exposure, the air flow rate was 55.1 l/min and the nominal concentration was calculated to be 23.7 mg/l (8970 ppm) in air. During both exposures the test animals exhibited depressed activity, squinting, ataxia, shaking movements and labored breathing. The depressed appearance of the animals continued for the 14-day postexposure observation period. No animals died during the 4-hour exposure at either concentration. However, 2 females died in the 8170 ppm exposure group during the first postexposure day.

Abnormalities at necropsy consisted of hemorrhage in the thymus, spots and areas of hemorrhage in the lungs and a white spot on one kidney for the 6920 ppm exposure group. For the 8170 ppm exposure group abnormalities at necropsy included spots in the lungs, red lungs, red and enlarged adrenals, and gaseous intestines filled with yellow liquid. The acute inhalation LC50 for n-Propyl mercaptan would be considered to be greater than 8170 ppm for albino rats.

December 18, 1988

USA and Canada WORLDWIDE Other Countries

Material Safety Data Sheet

ISOPROPYL MERCAPTAN

PHILLIPS 66 COMPANY
A Subsidiary of Phillips Petroleum Company
Bartlesville, Oklahoma 74004

PHONE NUMBERS
Emergency:
Business Hours (918) 661-3865
After Hours (918) 661-8118
General MSDS Information:
(918) 661-8327

A. Product Identification

Synonyms: 2-Propanethiol
Chemical Name: Isopropyl Mercaptan
Chemical Family: Mercaptan
Chemical Formula: C3H8S
CAS Reg. No.: 75-33-2
Product No.: M03200

Product and/or Components Entered on EPA's TSCA Inventory: YES

B. Hazardous Components

Ingredients	CAS Number	% By Wt.	OSHA PEL	ACGIH TLV
Isopropyl Mercaptan	75-33-2	96.0	NE	NE
N-Propyl Mercaptan	107-03-9	3.0	NE	NE
Ethyl Mercaptan	75-08-1	0-0.5	10 ppm	0.5 ppm
Related Compounds	NA	1.5-2.0	NE	NE

NA - Not Applicable NE - Not Established

C. Personal Protection Information

Ventilation: Provide adequate ventilation.

Respiratory Protection: Not generally required. In case of spill or accidental release, use NIOSH/MSHA approved air respirator.

Eye Protection: Use safety glasses with side shields. For splash protection, use chemical goggles and/or face shield.

Skin Protection: Rubber, neoprene or vinyl gloves if skin contact is possible. Use other protective garments, as needed, to prevent skin contact. Launder clothing before reuse.

NOTE: Personal protection information shown in Section C is based upon general information as to normal uses and conditions. Where special or unusual uses or conditions exist, it is suggested that the expert assistance of an industrial hygienist or other qualified professional be sought.

D. Handling and Storage Precautions

Avoid inhalation and skin and eye contact. Wear protective equipment and/or garments described above if exposure conditions warrant.

Store in cool, dry, well-ventilated area. Protect from sources of ignition. Provide means of controlling leaks and spills. Bond and ground during liquid transfer. Use product in a closed system.

E. Reactivity Data

Stability: Stable
Conditions to Avoid: Not Applicable
Incompatibility (Materials to Avoid): Oxygen and strong oxidizing materials

Hazardous Polymerization: Will Not Occur
Conditions to Avoid: Not Applicable
Hazardous Decomposition Products: Sulfur oxides

F. Health Hazard Data

Recommended Exposure Limits:

Not Established

Acute Effects of Overexposure:

Eye: May cause slight irritation.

Skin: May cause slight irritation.

Inhalation: May cause headache, nausea and difficult breathing.

Ingestion: May be aspirated into lungs if swallowed resulting in pulmonary edema and chemical pneumonitis.

Subchronic and Chronic Effects of Overexposure:

No known applicable information.

Other Health Effects:

No known applicable information.

Health Hazard Categories:

	Animal	Human		Animal	Human
Known Carcinogen	___	___	Toxic	___	___
Suspect Carcinogen	___	___	Corrosive	___	___
Mutagen	___	___	Irritant	___	___
Teratogen	___	___	Target Organ Toxin	_X_	_X_
Allergic Sensitizer	___	___	Specify - Lung-Aspiration Hazard		
Highly Toxic	___	___			

First Aid and Emergency Procedures:

Eye: Flush eyes with running water for at least 15 minutes. If irritation develops, seek medical attention.

Skin: Wash with soap and water. If irritation develops, seek medical assistance.

Inhalation: Remove from exposure. If illness or adverse symptoms develop, seek medical attention.

Ingestion: Do not induce vomiting. Seek immediate medical assistance.

Note to Physician: Gastric lavage using a cuffed endotracheal tube may be performed at your discretion.

G. Physical Data

Appearance:	Clear Liquid
Odor:	Repulsive
Boiling Point:	127F (53C)
Vapor Pressure:	8.8 psia (454 mm Hg) at 100F
Vapor Density (Air = 1):	2.62
Solubility in Water:	Slight
Specific Gravity (H2O = 1):	0.820 at 60/60F
Percent Volatile by Volume:	100
Evaporation Rate (Ethyl Ether = 1):	Approximately 1
Viscosity:	0.369 cs at 68F

H. Fire and Explosion Data

Flash Point (Method Used):	-30F (-34C) (Estimated)
Flammable Limits (% by Volume in Air):	LEL - Not Established UEL - Not Established
Fire Extinguishing Media:	Dry chemical, foam or carbon dioxide (CO2)
Special Fire Fighting Procedures:	Use NIOSH/MSHA approved self-contained breathing apparatus and/or garments described in Section C if conditions warrant. Shut off source. Water fog or spray may be used to cool exposed equipment and containers.
Fire and Explosion Hazards:	Sulfur oxides released when burned.

I. Spill, Leak and Disposal Procedures

Precautions Required if Material is Released or Spilled:
Wear protective equipment and/or garments described in Section C if exposure conditions warrant. Protect from ignition. Contain spill. Keep out of water sources and sewers. Promptly neutralize spill by adding dilute (5%) aqueous (water) solution of calcium hypochlorite (HTH) with stirring. Alternatively, household bleach (Clorox, Purex) in a dilute solution may be used. Concentrated or dry bleach must not be used. Absorb in dry inert material (sand, clay, sawdust, etc.).

Waste Disposal (Insure Conformity with all Applicable Disposal Regulations):
Incinerate or place in other permitted waste disposal facility.

J. DOT Transportation

Shipping Name:	Isopropyl Mercaptan
Hazard Class:	Flammable Liquid
ID Number:	UN 2703
Marking:	Isopropyl Mercaptan/UN 2703
Label:	Flammable Liquid
Placard:	Flammable/2703
Hazardous Substance/RQ:	Not Applicable
Shipping Description:	Isopropyl Mercaptan, Flammable Liquid, UN 2703
Packaging References:	47 CFR 173.141

NA - Not Applicable NE - Not Established

K. RCRA Classification - Unadulterated Product as a Waste

Ignitable

L. Protection Required for Work on Contaminated Equipment

Wear protective equipment and/or garments described in Section C if exposure conditions warrant. Contact immediate supervisor for specific instructions before work is initiated.

M. Hazard Classification

_X_ This product meets the following hazard definition(s) as defined by the Occupational Safety and Health Hazard Communication Standard (29 CFR Section 1910.1200):

___ Combustible Liquid	___ Flammable Aerosol	___ Oxidizer
___ Compressed Gas	___ Explosive	___ Pyrophoric
___ Flammable Gas	_X_ Health Hazard (Section F)	___ Unstable
_X_ Flammable Liquid	___ Organic Peroxide	___ Water Reactive
___ Flammable Solid		

___ Based on information presently available, this product does not meet any of the hazard definitions of 29 CFR Section 1910.1200.

N. Additional Comments

As of the preparation date, this product did not contain a chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

NA - Not Applicable NE - Not Established

industrial hygiene and toxicology

PHILLIPS PETROLEUM COMPANY HUMAN RESOURCES - MEDICAL DIVISION BARTLESVILLE, OK 74004 918 661-6600

TOXICITY STUDY SUMMARY

ISOPROPYL MERCAPTAN

Acute Inhalation Toxicity

Albino rats of the Sprague-Dawley strain weighing 200-350 g were selected as the experimental animals. Five male and five female animals were individually housed in stainless steel wire mesh cages which were placed in a glass and stainless steel exposure chamber. The animals were exposed to vaporized test material for 4 hours at a nominal concentration of 24.55 mg/L (actual concentration $\geq$ 3898.89 ppm**). The animals were then observed for 14 days. Pharmacotoxic signs and symptoms were observed as follows. Beginning 30 minutes after initiation of exposures, all animals exhibited hyperactivity and ataxia (for the first 3½ hours of exposure), labored respiration, prostration (last 30 minutes of exposure), and squinted eyes. One male and two females had bloody crusts around the eyes 30 minutes postexposure and all animals exhibited urine stains 30 minutes postexposure through Day 1 postexposure. All animals appeared normal throughout the rest of the study with the exception of one female exhibiting urine stains through Day 3 postexposure. The males exhibited reduced mean body weights through Day 4 postexposure and the females exhibited reduced mean body weights through Day 7 postexposure when compared to the respective pre-exposure mean body weights.

On Day 14 of the observation period all the animals were euthanized and submitted to thorough necropsy. Gross pathological signs included one male with an enlarged left cervical lymph node. All other animals appeared normal at the terminal sacrifice. Since no test animals died the acute inhalation LC50 for isopropyl mercaptan is considered to be greater than 3898.89 ppm.

Respiratory Tract Irritancy

Male mice of the outbred SPF (CD-1,COBS) strain weighing 20-25 g were selected as the experimental animals. A group of four animals was exposed head only to vaporized test material at a nominal concentration of 24.55 mg/L (actual concentration $\geq$ 4362.18 ppm**). Each animal was housed in an individual plethysmograph to permit monitoring of respiration. After the

animals became acclimatized they were exposed to vaporized test material for 1 minute and permitted to recover for 10 minutes while being exposed to room air only. Following this the animals were exposed to vaporized test material for 1 minute, then to room air for 5 minutes. During this time their respiratory patterns were continually monitored.

Based on these results, exposure to isopropyl mercaptan at a concentration of 4362.18 ppm via inhalation failed to produce upper airway irritancy in mice.

HR-210c

**Actual concentration calculated from total hydrocarbon analyzer response reported in methane equivalents.

11/10/83

December 18, 1988

PHILLIPS 66 WORLDWIDE (USA and Canada) PHILLIPS PETROLEUM 66 (Other Countries)

Material Safety Data Sheet

BUTYL MERCAPTAN

PHILLIPS 66 COMPANY
A Subsidiary of Phillips Petroleum Company
Bartlesville, Oklahoma 74004

PHONE NUMBERS
Emergency:
Business Hours (918) 661-3865
After Hours (918) 661-8118
General MSDS Information:
(918) 661-8327

A. Product Identification

Synonyms: Thiobutyl Alcohol
Chemical Name: 1-Butanethiol
Chemical Family: Mercaptan
Chemical Formula: C4H9SH
CAS Reg. No.: 109-79-5
Product No.: M08300

Product and/or Components Entered on EPA's TSCA Inventory: YES

B. Hazardous Components

Ingredients	CAS Number	% By Wt.	OSHA PEL	ACGIH TLV
Butyl Mercaptan	109-79-5	99.2	10 ppm	0.5 ppm
sec-Butyl Mercaptan	513-53-1	0.8	NE	NE

C. Personal Protection Information

Ventilation: Provide ventilation sufficient to control airborne concentration to below 10 ppm.

Respiratory Protection: Use supplied air respirators if an accidental release of gas or liquid may occur.

Eye Protection: Chemical safety goggles or face shield if splashes could occur.

Skin Protection: Rubber, neoprene or vinyl gloves. Remove contaminated clothing and launder before reuse.

NOTE: Personal protection information shown in Section C is based upon general information as to normal uses and conditions. Where special or unusual uses or conditions exist, it is suggested that the expert assistance of an industrial hygienist or other qualified professional be sought.

D. Handling and Storage Precautions

Avoid inhalation and skin or eye contact. Store in cool, dry, well-ventilated area. Protect from sources of ignition. Provide means of controlling leaks and spills. Bond and ground during liquid transfer. Use product in a closed system.

E. Reactivity Data

Stability: Stable
Conditions to Avoid: Not Applicable
Incompatibility (Materials to Avoid): Oxygen and strong oxidizing materials

Hazardous Polymerization: Will Not Occur
Conditions to Avoid: Not Applicable
Hazardous Decomposition Products: Sulfur oxides

F. Health Hazard Data

Recommended Exposure Limits:

See Section B.

Acute Effects of Overexposure:

Eye: Slight to moderate irritation.

Skin: Slight to moderate irritation, contact dermatitis, weakness, and lassitude.

Inhalation: Increased respiration, tremors, sedation, narcosis, incoordination, headache, nausea, vomiting, delayed pulmonary edema is possible.

Ingestion: Tremors, sedation, narcosis, incoordination, nausea, vomiting, liver and kidney effects may be seen with near lethal ingestions. May be aspirated into lungs if swallowed resulting in pulmonary edema and chemical pneumonitis.

Subchronic and Chronic Effects of Overexposure:

No statistically significant teratology was noted in a study exposing mice and rats up to 150 ppm in air. Some embryotoxicity and material toxicity was noted in the female mice but not in the rats.

In a 90 day subchronic inhalation study, no significant findings were noted in male and female rats exposed up to 150 ppm repeatedly.

Other Health Effects:

No dermal sensitization reactions were noted in guinea pigs. Negative results in the Ames Test and the Sister Chromatid Exchange Assay. Weakly positive in the Mouse Lymphoma Forward Mutational Assay.

Health Hazard Categories:

	Animal	Human		Animal	Human
Known Carcinogen	___	___	Toxic	___	___
Suspect Carcinogen	___	___	Corrosive	___	___
Mutagen	___	___	Irritant	___	___
Teratogen	___	___	Target Organ Toxin	_X_	_X_
Allergic Sensitizer	___	___	Specify -	Skin Hazard-Animal (Inflammation); Lung Hazard-Irritation; Nerve Toxin-Animal	
Highly Toxic	___	___			

First Aid and Emergency Procedures:

Eye: Flush eyes with running water for at least 15 minutes.

Skin: Wash with soap and water. If irritation or symptoms develop, seek medical attention.

Inhalation: Remove from exposure. If breathing becomes shallow, give oxygen. If breathing ceases, administer artificial respiration followed by oxygen. Seek medical attention.

Ingestion: Do not induce vomiting. Seek medical assistance.

Note to Physician: Gastric lavage using a cuffed endotracheal tube may be performed at your discretion.

G. Physical Data

Appearance:	Clear Liquid
Odor:	Repulsive
Boiling Point:	209F
Vapor Pressure:	83 mm Hg at 100F
Vapor Density (Air = 1):	3.1
Solubility in Water:	Negligible
Specific Gravity (H2O = 1):	0.845 at 60/60F
Percent Volatile by Volume:	100
Evaporation Rate (Ethyl Ether = 1):	1
Viscosity:	Not Established

H. Fire and Explosion Data

Flash Point (Method Used):	38F (TOC, ASTM D1310)
Flammable Limits (% by Volume in Air):	LEL - Not Established UEL - Not Established
Fire Extinguishing Media:	Dry chemical, foam, carbon dioxide (CO2)

Special Fire Fighting Procedures:	Shut off source. Self-contained breathing apparatus may be necessary. Use water fog or spray to cool exposed equipment and containers.
Fire and Explosion Hazards:	Sulfur oxides released when burned. Flammable liquid. Protect from sources of ignition.

I. Spill, Leak and Disposal Procedures

Precautions Required if Material is Released or Spilled:
Protect from ignition. Contain spill. Keep out of water sources and sewers. Promptly neutralize the spill by adding a dilute (5%) aqueous (water) solution of calcium hypochlorite (HTH). Alternatively, household bleach (Clorox, Purex) in a dilute solution is also suitable. Concentrated or dry bleach must not be used. Absorb in dry, inert material (sand, clay, sawdust, etc.). Refer to Personal Protection Information Section C and contact appropriate safety personnel for respirator requirements.

Waste Disposal (Insure Conformity with all Applicable Disposal Regulations):
Burn under controlled conditions or place in approved disposal facility.

J. DOT Transportation

Shipping Name:	Butyl Mercaptan
Hazard Class:	Flammable Liquid
ID Number:	UN 2347
Marking:	Butyl Mercaptan/UN 2347
Label:	Flammable Liquid
Placard:	Flammable/2347
Hazardous Substance/RQ:	Not Applicable
Shipping Description:	Butyl Mercaptan, Flammable Liquid, UN 2347
Packaging References:	49 CFR 173.141

K. RCRA Classification - Unadulterated Product as a Waste

Ignitable

L. Protective Measures During Repair and Maintenance of Contaminated Equipment

Provide adequate ventilation of repair area. Wear chemical safety goggles is splashes could occur. Use rubber, neoprene or vinyl gloves. If clothing is wetted with chemical, remove clothing, wash thoroughly and replace with clean dry clothing. Respirator protection is advised if liquid or pressurized gas is present in equipment to be repaired. Use supplied air full face respirator.

M. Hazard Classification

_X_ This product meets the following hazard definition(s) as defined by the Occupational Safety and Health Hazard Communication Standard (29 CFR Section 1910.1200):

___ Combustible Liquid	___ Flammable Aerosol	___ Oxidizer
___ Compressed Gas	___ Explosive	___ Pyrophoric
___ Flammable Gas	_X_ Health Hazard (Section F)	___ Unstable
_X_ Flammable Liquid	___ Organic Peroxide	___ Water Reactive
___ Flammable Solid		

___ Based on information presently available, this product does not meet any of the hazard definitions of 29 CFR Section 1910.1200.

N. Additional Comments

As of the preparation date, this product did not contain a chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

NA - Not Applicable NE - Not Established

PHILLIPS PETROLEUM COMPANY HUMAN RESOURCES - MEDICAL DIVISION BARTLESVILLE, OK 74004 918 661-6600

TOXICITY STUDY SUMMARY

N-BUTYL MERCAPTAN

Acute Oral Toxicity

Young, albino rats, Sprague-Dawley strain, were selected as the test animals. Two males and two females were dosed with a 50% (W/V) solution of the test material in corn oil, by gavage, at each dose level. The animals were observed for 14 days following intubation. The acute oral LD50 in albino rats is considered to be 1.8 g/kg of body weight (Standard Deviation ± 0.19 g/kg). Gross toxic signs of sedation, ataxia, occasional muscular tremors and labored respiration were noted. Recovery from these signs was complete within 24 hours after dosing except where lethargy persisted in all animals which died. Necropsy of the test animals did not reveal any gross pathologic signs which could be attributed to the test material.

Acute Percutaneous Toxicity

Young, albino rabbits, New Zealand strain, were selected as the test animals. The test material was applied to the shaved backs of four rabbits at each dose level and covered with an occlusive wrapper. After 24 hours of contact the test material was washed off and the animals were observed for 14 days. The acute percutaneous LD50 in albino rabbits is considered to be greater than 34.6 g/kg of body weight. Skin reactions consisted of mild to moderate erythema which completely subsided 72 to 96 hours after skin exposures had ceased. A single death occurred at the 34.6 g/kg dose level. Gross toxic signs consisted of inactivity, weakness, lassitude and loss of appetite. All surviving animals appeared normal by 48 hours, with the exception of the skin reactions.

Acute Inhalation Toxicity

Young adult, Sprague-Dawley, albino rats having a body weight of approximately 275 g were selected as the test animals. A single group of five males and five females were continuously exposed for 4 hours to the test material as a saturated atmosphere. Exposures were conducted in a glass chamber with a volume of $0.038M^3$. Air flow in the chamber was established at 0.5 L/min. The concentration of test material in air was calculated to be 200 mg/L of air.

All animals died within 97 minutes. General restlessness, increased respiration, uncoordinated movements and muscular twitching were noted during the exposure period. These signs were followed by unconsciousness and death. Necropsy of the test animals did not reveal any gross pathologic observations which were considered to be the results of exposure to the test material.

Eye Irritation

Undiluted n-butyl mercaptan was instilled into the right eyes of five albino rabbits, New Zealand strain, at a volume of 0.1 ml. and observations were conducted according to the method of Draize*. No corneal irritation was noted. Iridial irritation was noted during the first 24 hours after instillation. Moderate to slight conjunctival irritancy was noted through 72 hours post instillation.

Skin Irritation

Undiluted n-butyl mercaptan was applied to the shaved backs of two albino rabbits, New Zealand strain, at a volume of 0.5 ml. This material was confined to a one inch square area on intact and abraded skin sites on each rabbit by an occlusive patch and left for 24 hours. Observations for skin irritation were conducted according to the method of Draize*. The primary irritation index for the test material is considered to be 1.25 in albino rabbits.

Ames Test

Five Salmonella typhimurium tester strains, TA1535, TA1537, TA1538, TA98 and TA100, were utilized as the experimental organisms. Each strain was exposed to a minimum of five test compound doses both with and without metabolic activation by an Aroclor-induced rat liver microsomal fraction. The test compound dose levels were determined by a preliminary multidose-ranging study with the optimal concentration allowing survival of about 50% of the cells. N-Butyl mercaptan solubilized at approximately 100 mg/ml in dimethylsulfoxide. The maximum dose selected for the mutagenicity test was approximately 10,000 ug/plate.

The mutagenicity assay was done directly by the plate incorporation method. Each of 2 ml of complete top agar, 0.1 ml of an overnight broth culture of each tester strain, 0.1 ml of the test compound or diluent and 0.5 ml of the S-9 mix, for the activated tests only, were combined, mixed thoroughly, and poured onto VBE minimal agar plates. Each concentration of the compound and the positive and negative controls were plated in triplicate. Plates were gently rotated and tilted to assure uniform distribution of the top agar, allowed to harden on an even surface for one hour, inverted and put in a dark 37$\pm$ 0.5°C incubator. After 2 days, the colonies on both test and control plates were counted using an electronic colony counter and the density of the background growth was noted.

Exposure to six graded doses of the test material in the presence of and in the absence of metabolic activation did not increase the reversion to histidine prototrophy of S. typhimurium strains TA1535, TA1537, TA1538, TA98 or TA100. Therefore n-butyl mercaptan is not considered to be mutagenic in this test system.

Mouse Lymphoma Forward Mutational Assay

This assay was performed with the TK+/- phenotype of L5178Y mouse lymphoma cells from subline 3.7.2C using a minimum of eight test compound doses with and without metabolic activation by an Aroclor-induced rat liver microsomal fraction. Appropriate negative, solvent, and positive controls were included with each assay. The test compound dose levels were determined by a preliminary multidose-ranging study with the highest dose tested being selected to give approximately 50-90% percent inhibition of suspension cell growth depending on the solubility of the compound. N-Butyl mercaptan solubilized at approximately 100 mg/ml in dimethylsulfoxide. The maximum dose selected for the mutagenicity test was 300 ug/ml because it exhibited approximately 60% growth inhibition in the absence of metabolic activation and 100% growth inhibition in the presence of metabolic activation.

Each test concentration was prepared to contain the test dose in 0.1 ml volumes. Six million precleansed TK+/- cells in 6 ml of $F_{10}P$ were added to centrifuge tubes. An additional 4 ml of the S-9 mix were added to half of the tubes. Immediately thereafter, 0.1 ml of the 100x concentrations of the test chemical dilutions or the positive controls, and 0.1 ml of the solvent were added to the appropriate tubes. Each tube was mixed, gassed with a mixture of CO_2 and air, and incubated at 37$\pm$ 0.5°C on a revolving roller drum for 4 hours. Following this incubation the tubes were centrifuged and the treatment solutions decanted. The cells were washed twice with $F_{10}P$ and resuspended in 20 ml $F_{10}P$ after the second wash. The tube cultures were then gassed and reincubated for a 2 day expression time. The cell cultures were readjusted to 3.0×10^5 cells/ml as necessary. At the end of the expression period, a sample of each of the cultures was centrifuged and the cells resuspended at 500,000 viable cells/ml in $F_{10}P$. The concentrated cells were serially diluted and appropriate dilutions were plated in triplicate in cloning medium with and without TFT. Approximately 500,000 cells were plated on each of 3 selective medium plates containing 2 ug/ml TFT, and 100 cells were cloned on each of 3 non-selective plates for each test concentration and a control tube. The plates were incubated for 12$\pm$ 2 days. The mutant colonies (TK-/-) were counted on the selective TFT containing plates and the survivors (TK+/- and TK-/-) were counted on the non-selective medium plates.

Exposure to eight graded doses of the test material in the presence of and in the absence of metabolic activation slightly increased the induction of forward mutations in L5178Y mouse lymphoma cells at the T/K locus. Therefore n-butyl mercaptan is considered to be weakly mutagenic in this test system.

In Vitro Sister Chromatid Exchange

This assay was performed using Chinese Hamster Ovary Cells and a minimum of five test compound doses with and without metabolic activation by an Aroclor-induced rat liver microsomal fraction. Appropriate negative, solvent and positive controls were included with each assay. The test compound dose levels were determined by a preliminary multidose-ranging study with the highest concentration of the chemical tested depending upon its solubility. N-Butyl mercaptan solubilized at approximately 100 mg/ml in dimethylsulfoxide. The maximum dose selected for the mutagenicity test was approximately 124 ug/ml because it exhibited growth inhibition.

Cells were treated in an exponential stage of growth by setting up cultures with 2 to 5 x 10^5 cells per 25 cm^2 flask, 24 hours prior to treatment. Cells were exposed to the chemical for 2 hours, washed twice and then 5-bromodeoxyuridine (Brd U) was added to each culture. All cultures were sampled a minimum of 24 hours after addition of Brd U to ensure completion of two full cell cycles. Duplicate cultures were set up for each dose level and all controls. Twenty-four hours after the above initiation of the cultures, the cells were treated with the test chemical in the presence of an S-9 rat liver activation system for 2 hours and washed twice in a balanced salt solution. The cells were then sampled and treated as described above. Two hours after, colcemid (0.2 ug/ml) was added to each tube and metaphases were collected by mitotic shake-off. The cells were swollen in a 0.075M KCL hypotonic, and washed three times in an acetic alcohol fixative. Slides were prepared and stained. Fifty cells in the metaphase stage of mitosis were scored at each dose level for the number of sister chromatid exchanges (SCE).

Exposure to five graded doses of the test material in the presence of and in the absence of metabolic activation did show statistically significant increases in the number of SCE's per chromosome at the second highest dose level, 41 ug/ml in the presence of metabolic activation; but no significant increase was seen in the remaining dose levels, and no dose level showed a two-fold increase in SCE's. Therefore n-butyl mercaptan did not fulfill the criteria necessary to be considered positive and is, therefore, not considered to be mutagenic in this test system.

Teratology

Pregnant Charles River COBS® CD® rats and Charles River CD® 1 mice were exposed to atmospheric concentrations of n-butyl mercaptan at levels of 10, 68 or 152 ppm, which were determined by analytical chemistry. Mice were exposed on gestation days 6 through 16 and rats were exposed on days 6 through 19. Both species were exposed 6 hours per day. No teratology was detected in either species. Mice did not survive the exposures as well as rats, which might be expected from species susceptibility data in the NIOSH Criteria Document (DHEW (NIOSH) Publication No. 78-213, September 1978). At 68 ppm and 152 ppm, 8 of 25 and 9 of 25 pregnant mice, respectively, succumbed to the exposure. Gross maternal toxicity in mice included thin appearance, unkept haircoat, reduced movement, red or brown material in vaginal area and decreased mean maternal body weight gain. Increased post-implantation loss was noted in mice at 68 and 152 ppm.

A slight decrease in mean maternal body weight gain at 68 and 152 ppm was noted in rats. A slight increase in hair loss at 152 ppm was recorded in rats.

There were no biologically meaningful or statistically significant differences in the total incidence of malformations in fetuses of either mice or rats exposed up to 152 ppm of n-butyl mercaptan.

90-Day Inhalation Toxicity

Albino Charles River CD® rats of both sexes were exposed to atmospheric concentrations of n-butyl mercaptan at levels of 9, 70 or 150 ppm, which were determined by analytical chemistry. Exposure lasted 6 hours per day, 5 days

per week for 13 weeks. No significant adverse findings were noted for body weight, urinalysis or behavior. One female from the 70 ppm group and one male from the 150 ppm group did not survive the total exposure period. The female succumbed during week 3 of unknown cause and the male died of blood collection trauma after the 6 week blood collection.

Blood samples for hematology and clinical chemistry were taken at weeks 0, 6 and 12. Female rats exhibited a statistically significant decrease in red blood cells when compared to controls at week 12 for the 70 ppm group and a similar decrease was noted for the 150 ppm group at weeks 6 and 12. A statistically significant elevation of neutrophils and a corresponding decrease of lymphocytes was noted for the 150 ppm group of females when compared to controls at week 12. None of these changes were considered to have shifted out of the normal range for rats and therefore, were not considered to be biologically significant.

Lung weights were statistically elevated for males in the 70 and 150 ppm groups when compared to controls. The only histopathological findings attributable to the test material was the presence of increased macrophages in the lungs of male and female rats in the 150 ppm group.

*Draize, J. H., "Appraisal of the Safety of Chemicals in Foods, Drugs, and Cosmetics", Assoc. Food and Drug Officials of the U.S., Texas State Department of Health, Austin, Texas, pp. 46, 1959.

HR:210b

11/15/83

December 18, 1988

USA and Canada WORLDWIDE Other Countries

Material Safety Data Sheet

sec-BUTYL MERCAPTAN

PHILLIPS 66 COMPANY
A Subsidiary of Phillips Petroleum Company
Bartlesville, Oklahoma 74004

PHONE NUMBERS
Emergency:
Business Hours (918) 661-3865
After Hours (918) 661-8118
General MSDS Information:
(918) 661-8327

A. Product Identification

Synonyms: 2-Butanethiol
Chemical Name: sec-Butyl Mercaptan
Chemical Family: Mercaptan
Chemical Formula: CH3CH(SH)CH2CH3
CAS Reg. No.: 513-53-1
Product No.: M07300

Product and/or Components Entered on EPA's TSCA Inventory: YES

B. Hazardous Components

Ingredients	CAS Number	% By Wt.	OSHA PEL	ACGIH TLV
sec-Butyl Mercaptan	513-53-1	99.6	NE	NE
n-Butyl Mercaptan	109-79-5	0.1	10 ppm	0.5 ppm
Isobutyl Mercaptan	513-44-0	0.2	NE	NE
Related Sulfur Compounds	NA	0.1	NE	NE

NA - Not Applicable NE - Not Established

C. Personal Protection Information

Ventilation: Provide adequate ventilation.

Respiratory Protection: Not generally required. In case of spill or accidental release, use NIOSH/MSHA approved air respirator.

Eye Protection: Use safety glasses with side shields. For splash protection, use chemical goggles and/or face shield.

Skin Protection: Rubber, neoprene or vinyl gloves if skin contact is possible. Use other protective garments, as needed, to prevent skin contact. Launder contaminated clothing before reuse.

NOTE: Personal protection information shown in Section C is based upon general information as to normal uses and conditions. Where special or unusual uses or conditions exist, it is suggested that the expert assistance of an industrial hygienist or other qualified professional be sought.

D. Handling and Storage Precautions

Avoid inhalation and skin or eye contact. Wear protective equipment and/or garments described in Section C if exposure conditions warrant. Wash hands after handling.

Store in cool, dry, well-ventilated area. Protect from sources of ignition. Provide means of controlling leaks and spills. Bond and ground during liquid transfer. Use product in a closed system.

E. Reactivity Data

Stability: Stable
Conditions to Avoid: Not Applicable
Incompatibility (Materials to Avoid): Oxygen and strong oxidizing materials

Hazardous Polymerization: Will Not Occur
Conditions to Avoid: Not Applicable
Hazardous Decomposition Products: Sulfur oxides

F. Health Hazard Data

Recommended Exposure Limits:

Not Established

NA - Not Applicable NE - Not Established

Acute Effects of Overexposure:

Eye: May cause slight irritation.

Skin: May cause slight irritation.

Inhalation: May cause headache, nausea, unconsciousness.

Ingestion: May cause labored breathing, sedation, muscle weakness. May be aspirated into lungs if swallowed resulting in pulmonary edema and chemical pneumonitis.

Subchronic and Chronic Effects of Overexposure:

No known applicable information.

Other Health Effects:

No known applicable information.

Health Hazard Categories:

	Animal	Human		Animal	Human
Known Carcinogen	___	___	Toxic	___	___
Suspect Carcinogen	___	___	Corrosive	___	___
Mutagen	___	___	Irritant	___	___
Teratogen	___	___	Target Organ Toxin	_X_	_X_
Allergic Sensitizer	___	___	Specify - Lung-Aspiration Hazard		
Highly Toxic	___	___			

First Aid and Emergency Procedures:

Eye: Flush eyes with running water for at least 15 minutes.

Skin: Wash with soap and water.

Inhalation: Remove from exposure. If breathing is difficult, give oxygen and seek medical attention.

Ingestion: Do not induce vomiting. Seek medical assistance.

Note to Physician: Gastric lavage using a cuffed endotracheal tube may be performed at your discretion.

NA - Not Applicable NE - Not Established

G. Physical Data

Appearance:	Clear Liquid
Odor:	Repulsive
Boiling Point:	185F (85C)
Vapor Pressure:	2.7 psia (140 mm Hg) at 100 F (38C)
Vapor Density (Air = 1):	3.1
Solubility in Water:	Slight
Specific Gravity (H2O = 1):	0.834 at 60/60F
Percent Volatile by Volume:	100
Evaporation Rate (Butyl Acetate = 1):	> 1
Viscosity:	Not Established

H. Fire and Explosion Data

Flash Point (Method Used):	-10F (-23C)(Estimated)
Flammable Limits (% by Volume in Air):	LEL - Not Established UEL - Not Established
Fire Extinguishing Media:	Dry chemical, foam, carbon dioxide (CO2)
Special Fire Fighting Procedures:	Use NIOSH/MSHA approved self-contained breathing apparatus and/or garments described in Section C if condtions warrant. Shut off source. Water fog or spray may be used to cool exposed equipment and containers.
Fire and Explosion Hazards:	Sulfur oxides released when burned.

I. Spill, Leak and Disposal Procedures

Precautions Required if Material is Released or Spilled:
Wear protectivwe equipment and/or garments described in Section C if exposure conditions warrant. Protect from ignition. Contain spill. Keep out of water sources and sewers. Promptly neutralize spill by adding dilute (5%) aqueous (water) solution of calcium hypochlorite (HTH) with stirring. Alternatively, houshold bleach (Clorox, Pures) in a dilute solution may be used. Concentrated or dry bleach must not be used. Absorb in dry inert material (sand, clay, sawdust, etc.)

Waste Disposal (Insure Conformity with all Applicable Disposal Regulations):
Incinerate or place in other permitted waste disposal facility.

NA - Not Applicable NE - Not Established

J. DOT Transportation

Shipping Name: Butyl Mercaptan
Hazard Class: Flammable Liquid
ID Number: UN 2347
Marking: Butyl Mercaptan/UN 2347
Label: Flammable Liquid
Placard: Flammable/2347
Hazardous Substance/RQ: Not Applicable
Shipping Description: Butyl Mercaptan, Flammable Liquid, UN 2347
Packaging References: 49 CFR 173.141

K. RCRA Classification - Unadulterated Product as a Waste

Ignitable

L. Protective Measures During Repair and Maintenance of Contaminated Equipment

Wear protective equipment and/or garments described in Section C if exposure conditions warrant. Contact immediate supervisor for specific instructions before work is inititated.

M. Hazard Classification

_X_ This product meets the following hazard definition(s) as defined by the Occupational Safety and Health Hazard Communication Standard (29 CFR Section 1910.1200):

___ Combustible Liquid	___ Flammable Aerosol	___ Oxidizer
___ Compressed Gas	___ Explosive	___ Pyrophoric
___ Flammable Gas	_X_ Health Hazard (Section F)	___ Unstable
_X_ Flammable Liquid	___ Organic Peroxide	___ Water Reactive
___ Flammable Solid		

___ Based on information presently available, this product does not meet any of the hazard definitions of 29 CFR Section 1910.1200.

N. Additional Comments

As of the preparation date, this product did not contain a chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

NA - Not Applicable NE - Not Established

December 18, 1988

USA and Canada WORLDWIDE Other Countries

Material Safety Data Sheet

tert-BUTYL MERCAPTAN

PHILLIPS 66 COMPANY
A Subsidiary of Phillips Petroleum Company
Bartlesville, Oklahoma 74004

PHONE NUMBERS
Emergency:
Business Hours (918) 661-3865
After Hours (918) 661-8118
General MSDS Information:
(918) 661-8327

A. Product Identification

Synonyms: 2-Methyl-2-Propanethiol
Chemical Name: tert-Butyl Mercaptan
Chemical Family: Mercaptan
Chemical Formula: (CH3)3CSH
CAS Reg. No.: 75-66-1
Product No.: M06390

Product and/or Components Entered on EPA's TSCA Inventory: YES

B. Hazardous Components

Ingredients	CAS Number	% By Wt.	OSHA PEL*	ACGIH TLV
tert-Butyl Mercaptan	75-66-1	99.5	NE	NE
Isopropyl Mercaptan	75-33-2	0.3	NE	NE
Propyl Mercaptan	107-03-9	0.2	NE	NE

* See Section F, Recommended Exposure Limits.

NA - Not Applicable NE - Not Established

C. Personal Protection Information

Ventilation: Provide ventilation sufficient to control airborne concentration to below 10 ppm.

Respiratory Protection: Use supplied air respirators if an accidental release of gas or liquid may occur.

Eye Protection: Face shield or safety glasses should be worn if splashes could occur.

Skin Protection: Rubber, neoprene or vinyl gloves. Long sleeves should be worn if splashes could occur. Immediately remove contaminated clothing and launder before reuse.

NOTE: Personal protection information shown in Section C is based upon general information as to normal uses and conditions. Where special or unusual uses or conditions exist, it is suggested that the expert assistance of an industrial hygienist or other qualified professional be sought.

D. Handling and Storage Precautions

Avoid inhalation and skin or eye contact.

Store in cool, dry, well-ventilated area. Protect from sources of ignition. Provide means of controlling leaks and spills. Bond and ground during liquid transfer. Use product in a closed system.

E. Reactivity Data

Stability: Stable
Conditions to Avoid: Not Applicable
Incompatibility (Materials to Avoid): Oxygen and strong oxidizing materials

Hazardous Polymerization: Will Not Occur
Conditions to Avoid: Not Applicable
Hazardous Decomposition Products: Sulfur oxides

F. Health Hazard Data

Recommended Exposure Limits:

Phillips recommended PEL is 1 ppm.

Acute Effects of Overexposure:

Eye: May produce mild irritation.

Skin: May produce mild irritation.

Inhalation: May cause dizziness, nausea and difficulty in breathing.

Ingestion: May produce sedative effects or result in gastric disturbances including nausea. May be aspirated into lungs if swallowed resulting in pulmonary edema and chemical pneumonitis.

Subchronic and Chronic Effects of Overexposure:

Has produced kidney disease in laboratory animals. No comparable health hazard for kidney disease is known to occur in humans.

Other Health Effects:

No known applicable information.

Health Hazard Categories:

	Animal	Human		Animal	Human
Known Carcinogen	___	___	Toxic	___	___
Suspect Carcinogen	___	___	Corrosive	___	___
Mutagen	___	___	Irritant	___	___
Teratogen	___	___	Target Organ Toxin	_X_	_X_
Allergic Sensitizer	___	___	Specify - Kidney Toxin-Animal; Lung-Aspiration Hazard		
Highly Toxic	___	___			

First Aid and Emergency Procedures:

Eye: Flush eyes with running water for at least 15 minutes. If irritancy develops obtain medical attention.

Skin: Wash with soap and water.

Inhalation: Remove from exposure. If breathing becomes shallow, give oxygen. If breathing ceases, administer artificial respiration followed by oxygen. Seek medical attention.

Ingestion: Do not induce vomiting. Seek medical assistance.

Note to Physician: Gastric lavage using a cuffed endotracheal tube may be performed at your discretion.

NA - Not Applicable NE - Not Established

G. Physical Data

Appearance:	Clear Liquid
Odor:	Repulsive
Boiling Point:	147F
Vapor Pressure:	5.9 psia (305 mm Hg) at 100F
Vapor Density (Air = 1):	3.1
Solubility in Water:	Negligible
Specific Gravity (H2O = 1):	0.806 at 60/60F
Percent Volatile by Volume:	100
Evaporation Rate (Butyl Acetate = 1):	> 1
Viscosity:	0.638 centipoises at 68F

H. Fire and Explosion Data

Flash Point (Method Used):	-15F (Estimated)
Flammable Limits (% by Volume in Air):	LEL - Not Established UEL - Not Established
Fire Extinguishing Media:	Dry chemical, foam, carbon dioxide (CO2)
Special Fire Fighting Procedures:	Shut off source. Self-contained breathing apparatus may be necessary. Use water fog or spray to cool exposed equipment and containers.
Fire and Explosion Hazards:	Sulfur oxides released when burned. Flammable liquid. Protect from sources of ignition.

I. Spill, Leak and Disposal Procedures

Precautions Required if Material is Released or Spilled:
Protect from ignition. Contain spill. Keep out of water sources and sewers. Refer to Section C and contact appropriate safety personnel for respirator requirements. Promptly neutralize the spill by adding a dilute (5%) aqueous (water) solution of calcium hypochlorite (HTH) to the spill with stirring. Alternatively, household bleach (Clorox, Purex) in dilute solution is also suitable. Concentrated or dry bleach must not be used. Absorb in dry, inert material (sand, clay, sawdust, etc.).

Waste Disposal (Insure Conformity with all Applicable Disposal Regulations):
Burn under controlled conditions or place in approved disposal facility.

J. DOT Transportation

Shipping Name: Butyl Mercaptan
Hazard Class: Flammable Liquid
ID Number: UN 2347
Marking: Butyl Mercaptan/UN 2347
Label: Flammable Liquid
Placard: Flammable/2347
Hazardous Substance/RQ: Not Applicable
Shipping Description: Butyl Mercaptan, Flammable Liquid, UN 2347
Packaging References: 49 CFR 173.141

K. RCRA Classification - Unadulterated Product as a Waste

Ignitable

L. Protective Measures During Repair and Maintenance of Contaminated Equipment

Wear protective equipment and/or garments described in Section C if exposure conditions warrant. Contact immediate supervisor for specific insturctions before work is initiated.

M. Hazard Classification

_X_ This product meets the following hazard definition(s) as defined by the Occupational Safety and Health Hazard Communication Standard (29 CFR Section 1910.1200):

___ Combustible Liquid	___ Flammable Aerosol	___ Oxidizer
___ Compressed Gas	___ Explosive	___ Pyrophoric
___ Flammable Gas	_X_ Health Hazard (Section F)	___ Unstable
_X_ Flammable Liquid	___ Organic Peroxide	___ Water Reactive
___ Flammable Solid		

___ Based on information presently available, this product does not meet any of the hazard definitions of 29 CFR Section 1910.1200.

N. Additional Comments

As of the preparation date, this product did not contain a chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

NA - Not Applicable NE - Not Established

PHILLIPS PETROLEUM COMPANY HUMAN RESOURCES - MEDICAL DIVISION BARTLESVILLE, OK 74004 918 661-6600

TOXICITY STUDY SUMMARY

TERTIARY BUTYL MERCAPTAN

Acute Oral Toxicity

Young, albino rats, Sprague-Dawley strain, were selected as the test animals. Two males and two females were dosed with a 50% (W/V) solution of the test material in corn oil, by gavage, at each dose level. The animals were observed for 14 days following intubation. The acute oral LD50 in albino rats is considered to be 8.4 grams per kilogram of body weight (Standard Deviation $\pm$ 0.45 g/kg). Gross toxic signs of general inactivity and sedation were noted. Prior to death the animals were noted to be either semi-conscious or unconscious. In all cases death occurred between 24 and 48 hours after intubation. Necropsy of all animals that died during the study did not reveal gross pathologic observations which could be attributed to the test material.

Acute Percutaneous Toxicity

Young, adult, male, New Zealand strain, albino rabbits were selected as the test animals. The undiluted test material was applied to the shaved backs of four rabbits at each dose level and covered with an occlusive wrapper. After 24 hours of contact the test material was washed off and the animals were observed for 14 days. The acute percutaneous LD50 in albino rabbits is considered to be 20.8 grams per kilogram of body weight (Standard Deviation $\pm$ 2.1 g/kg). Skin reactions consisted of mild erythema and discoloration of the skin at the application site. These reactions completely subsided 48 to 72 hours after skin exposure had ceased. Moderate to severe inactivity and weakness were noted during the observation period during the first 72 hours after skin contact ceased. Those animals which died became semi-conscious approximately 3 to 4 hours prior to death. One surviving animal, receiving 23.07 g/kg, did not recover completely until six days after skin application. Necropsy of all animals that died during the study did not reveal gross pathologic observations which could be attributed to the test material.

Acute Inhalation Toxicity

Young, adult, Sprague-Dawley, albino rats having a body weight of approximately 275 grams were selected as the test animals. Three groups of five males and five

females each were continuously exposed for four hours to different concentrations of the test material in a glass chamber with a volume of $0.038M^3$. The acute inhalation LC50 was calculated to be 97.5 mg/liter (26432 ppm) of air (Confidence Limits 73.8 to 128.8 mg/l). Generalized inactivity and deep sedation were noted during the exposure period at all dose levels (14.7, 62.5, and 126.1 mg/l). Labored respiration and clonic-tonic convulsions were noted at the two highest dose groups during exposure prior to unconsciousness. All animals which survived appeared normal after 48 hours. Necropsy of the animals that died did not reveal gross pathologic changes which could be attributed to the test material.

Eye Irritation

Undiluted Tertiary Butyl Mercaptan was instilled into the right eye of five albino rabbits, New Zealand strain, at a volume of 0.1 ml and observations were conducted according to the method of Draize*. No corneal irritation was noted. One animal exhibited iridial irritancy one hour after instillation. Slight to mdoerate conjunctival irritancy completely subsided by the seventh day after instillation.

Skin Irritation

Undiluted Tertiary Butyl Mercaptan was applied to the shaved backs of two albino rabbits, New Zealand strain, at a volume of 0.5 ml. This material was confined to a one inch square area on intact and abraided skin sites on each rabbit by an occlusive patch and left for 24 hours. Observations for skin irritation were conducted according to the method of Draize*. The primary irritation index for the test material is considered to be 0.50 in albino rabbits.

Ames Test

Five Salmonella typhimurium tester strains, TA1535, TA1537, TA1538, TA98 and TA100, were utilized as the experimental organisms. Each strain was exposed to a minimum of five test compound doses both with and without metabolic activation by an Aroclor-induced rat liver microsomal fraction. The test compound dose levels were determined by a preliminary multidose-ranging study with the optimal concentration allowing survival of about 50% of the cells. T-Butyl mercaptan solubilized at approximately 100 mg/ml in dimethylsulfoxide. The maximum dose selected for the mutagenicity test was approximately 10,000 µg/plate because it represents the limits of solubility of the test material in this test system.

The mutagenicity assay was done directly by the plate incorporation method. Each of 2 ml of complete top agar, 0.1 ml of an overnight broth culture of each tester strain, 0.1 ml of the test compound or diluent and 0.5 ml of the S-9 mix, for the activated tests only, were combined, mixed thoroughly, and poured onto VBE minimal agar plates. Each concentration of the compound and the positive and negative controls were plated in triplicate. Plates were gently rotated and tilted to assure uniform distribution of the top agar, allowed to harden on an even surface for 1 hour, inverted and put in a dark 37± 0.5°C incubator. After 2 days, the colonies on both test and control plates were counted using an electronic colony counter and the density of the background growth was noted.

*J. Pharm. Exper. Ther., 82:377(1944).

Exposure to seven graded doses of the test material in the presence of and in the absence of metabolic activation did not increase the reversion to histidine prototrophy of S. typhimurium strains TA1535, TA1537, TA1538, TA98 or TA100. Therefore t-butyl mercaptan is not considered to be mutagenic in this test system.

Mouse Lymphoma Forward Mutational Assay

This assay was performed with the TK+/- phenotype of L5178Y mouse lymphoma cells from subline 3.7.2C using a minimum of eight test compound doses with and without metabolic activation by an Aroclor-induced rat liver microsomal fraction. Appropriate negative, solvent, and positive controls were included with each assay. The test compound dose levels were determined by a preliminary multidose-ranging study with the highest dose tested being selected to give approximately 50 - 90% inhibition of suspension cell growth depending on the solubility of the compound. T-Butyl mercaptan solubilized at approximately 100 mg/ml in dimethylsulfoxide. The maximum dose selected for the mutagenicity test was 1000 µg/ml because it represented the limits of solubility of the test material.

Each test concentration was prepared to contain the test dose in 0.1 ml volumes. Six million precleansed TK+/- cells in 6 ml of $F_{10}P$ were added to centrifuge tubes. An additional 4 ml of the S-9 mix were added to half of the tubes. Immediately thereafter, 0.1 ml of the 100x concentrations of the test chemical dilutions or the positive controls, and 0.1 ml of the solvent were added to the appropriate tubes. Each tube was mixed, gassed with a mixture of CO_2 and air, and incubated at 37± 0.5°C on a revolving roller drum for 4 hours. Following this incubation the tubes were centrifuged and the treatment solutions decanted. The cells were washed twice with $F_{10}P$ and resuspended in 20 ml $F_{10}P$ after the second wash. The tube cultures were then gassed and reincubated for a 2 day expression time. The cell cultures were readjusted to 3.0×10^5 cells/ml as necessary. At the end of the expression period, a sample of each of the cultures was centrifuged and the cells resuspended at 500,000 viable cells/ml in $F_{10}P$. The concentrated cells were serially diluted and appropriate dilutions were plated in triplicate in cloning medium with and without TFT. Approximately 500,000 cells were plated on each of 3 selective medium plates containing 2 µg/ml TFT, and 100 cells were cloned on each of 3 non-selective plates for each test concentration and a control tube. The plates were incubated for 12± 2 days. The mutant colonies (TK-/-) were counted on the selective TFT containing plates and the survivors (TK+/-and TK-/-) were counted on the non-selective medium plates.

Exposure to eight graded doses of the test material in the presence of metabolic activation did not increase the induction of forward mutations in L5178Y mouse lymphoma cells at the T/K locus. Exposure to the 202 and 1000 µg/ml dose levels of the test material in the absence of metabolic activation increased the induction of forward mutations in L5178Y mouse lymphoma cells at the T/K locus. Under these conditions, t-butyl mercaptan did exhibit a positive response and is, therefore, considered to be mutagenic in this test system.

In Vitro Sister Chromatid Exchange

This assay was performed using Chinese Hamster Ovary Cells and a minimum of five test compound doses with and without metabolic activation by an Aroclor-induced rat liver microsomal fraction. Appropriate negative, solvent and positive controls were included with each assay. The test compound dose levels were determined by a preliminary multidose-ranging study with the highest concentration of

the chemical tested depending upon its solubility. T-Butyl mercaptan solubilized at approximately 270 mg/ml in dimethylsulfoxide. The maximum dose selected for the mutagenicity test was approximately 1350 µg/ml because it exhibited growth inhibition.

Cells were treated in an exponential stage of growth by setting up cultures with 2 to 5 x 10^5 cells per 25 cm^2 flask, 24 hours prior to treatment. Cells were exposed to the chemical for 2 hours, washed twice and then 5-bromodeoxyuridine (Brd U) was added to each culture. All cultures were sampled a minimum of 24 hours after addition of Brd U to ensure completion of two full cell cycles. Duplicate cultures were set up for each dose level and all controls. Twenty-four hours after the above initiation of the cultures, the cells were treated with the test chemical in the presence of an S-9 rat liver activation system for 2 hours and washed twice in a balanced salt solution. The cells were then sampled and treated as described above. Two hours after, colcemid (0.2 µg/ml) was added to each tube and metaphases were collected by mitotic shake-off. The cells were swollen in a 0.075M KCL hypotonic, and washed three times in an acetic alcohol fixative. Slides were prepared and stained. Fifty cells in the metaphase stage of mitosis were scored at each dose level for the number of sister chromatid exchanges (SCE).

Following exposure to five graded doses of t-Butyl Mercaptan, a statistically significant increase in the number of SCE's per chromosome was seen at the 1350 µg/ml and the 450 µg/ml dose level in the presence of metabolic activation; but no significant increase was seen in the remaining dose levels, and no dose level showed a two-fold increase in SCE's. Therefore t-butyl mercaptan is not considered to be mutagenic in this test system.

Teratology

Pregnant Charles River COBS® CD® rats and Charles River CD® mice were exposed to atmospheric concentrations of t-butyl mercaptan levels of 11, 99 and 195 ppm, which were determined by analytical chemistry. Mice were exposed on gestation days 6 through 16 and rats were exposed on days 6 through 19. Both species were exposed 6 hours per day. No teratology was detected in either species. Pregnant mice exhibited an increase liver weight relative to controls at 99 and 195 ppm. Mice were comparable to controls in appearance, behavior and mean maternal body weight gain.

Other than an increased appearance of hair loss on the limbs of rats, no difference between treated and control animals for appearance, behavior, mean maternal body weight gain or mean liver weight was noted.

There were no biologically meaningful or statistically significant differences in the total incidence of malformations in fetuses of either mice or rats exposed up to 195 ppm of t-butyl mercaptan.

90-Day Inhalation Toxicity

Albino Charles River CD® rats of both sexes were exposed to atmospheric concentrations of t-butyl mercaptan at levels of 9, 97 and 196 ppm, which were determined by analytical chemistry. Exposure lasted 6 hours per day, 5 days per week for 13 weeks. No significant adverse findings were noted for body weight, urinalysis or behavior. All test animals survived the entire exposure period.

Blood samples for hematology and clinical chemistry were taken at weeks 0, 6 and 12. Male rats exhibited a statistically significant elevation in BUN at 6 weeks in the 97 ppm group. Female rats exhibited statistically significant depression of red blood cells at week 6 for the 97 ppm group and at week 12 for the 97 and 196 ppm groups. None of these changes were considered to have shifted out of the normal range for rats and therefore, were not considered to be biologically significant.

Kidney weights of males at the 97 and 196 ppm levels were found to be statistically elevated, compared to controls. Histopathologically, males at all dose levels were found to have nephrosis. The presence of increased macrophages was observed in the lungs of males and females at the 97 and 196 ppm levels.

HR:210c

01/22/84

(31)

LONG ISLAND LIGHTING COMPANY
SHOREHAM NUCLEAR POWER STATION
P.O. BOX 618, NORTH COUNTRY ROAD • WADING RIVER, N.Y. 11792

JOHN D. LEONARD, JR.
VICE PRESIDENT - NUCLEAR OPERATIONS

VPNO 89-054

MAR 31 1989

U.S. Nuclear Regulatory Commission
ATTN: Docketing and Service Branch
Washington, DC 20555

Response to Federal Register Notice
GE Stockholder's Alliance

Reference: Federal Register/Vol. 54, No. 20, dated February 1, 1989 - Petitions for Rulemaking, Title 10 CFR Part 20

Gentlemen:

This letter is in reference to the petition, filed by GE Stockholder's Alliance, which requests that the NRC amend its regulations to require that a detectable odor be injected into the emissions of nuclear power plants and other nuclear processes over which the NRC has jurisdiction.

LILCO has the following recommendations and/or questions on the subject for your consideration:

a) There is no demonstrated need for such a system. In fact, the malfunction of such a system would have an adverse effect on public health and safety. Members of the public would experience needless concern due to a malfunction of such a system. The current effluent technological systems and programs for normal and off-normal and/or accident conditions have demonstrated to be satisfactory and reliable due to the very physical nature of such effluents.

b) There is no indication of how such a system would be applied. The purpose of the odor in the gas industry is to identify a leak of any quantity. Nuclear reactors release radioactive materials during normal operations. Would it be applied to routine effluents? If so, would this not cause a problem in aesthetics for the neighbors? If it would be applied only to non-routine effluents, how would the threshold be determined?

It appears that more thought needs to be given to this proposal before it can be evaluated.

c) Due to considerations such as varying effluent flow rates and concentrations and varying meteorological conditions, the design of such a system could prove to be complicated, costly and completely ineffective. For example, if the majority of the members of the public are east of a nuclear plant and the prevailing wind is east to west, the system would be useless. It is suggested that an ALARA cost benefit analysis be performed to aid in evaluating the proposal.

d) Adding an odorant may create corrosive or biological problems. These problems must be evaluated and additional modifications to the existing plant systems may be necessary.

If you require additional information, please contact this office.

Very truly yours,

John D. Leonard, Jr.
Vice President - Nuclear Operations

DS:ck

cc: S. Brown
W. T. Russell
F. Crescenzo

(30)

Eric Zickgraf, M.S.
A.B.R. Certified Radiological Physicist
5322 Davis Street
Skokie, IL 60077
(312) 492-6387 D, 470-9245 E

March 31, 1989

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Attn: Docketing and Service Branch

Dear Sirs:

I wish to comment on the recent Petition for Rulemaking: Docket No. PRM-20-19 which was published on Wednesday, February 1,1989 in Volume 54, No. 20 of the Federal Register.

I am opposed to the petition for rulemaking for the following reasons:

1. Whereas the concentration of a chemical can quickly reach the threshold of detection rapidly in an enclosed space, it is virtually impossible for such a chemical to reach the threshold of detection in an unenclosed space due to the emission rate and dilution volume of the unenclosed environment.

   A. With a threshold of detection of 1 ppb and a gas leak into an enclosed space of 20ft x 20ft x 10ft of 10 ppm at 2 l/min, the detection threshold will be achieved is just under 6 minutes

   B. With the same threshold of detection (1 ppb) and a response time of 60 minutes at a distance of 1 mile (radius) from a nuclear power plant the venting rate would have to be (limiting the vented plume to a height of 100 ft) over 4 million liters per minute with a concentration of 1 ppm.

A one mile radius with a 100 ft ceiling is a very small volume to consider with respect to the populated regions near facilities that use radioactive materials. A more realistic area of concern would have to be on the order of 10 miles in radius with a 1000 ft ceiling which would put the venting rate at 4 billion liters per minute with a concentration of 1 ppm (neglecting diffusion of the gas out of this volume, and neglecting all external weather).

2. There is the possibility of false alarms whenever industrial pollution becomes detectable, or even when a skunk is involved in a traffic accident in the neighborhood.

3. The odor would also have to match the half-life of the radioactive material being released otherwise the odor or the radioactivity would linger long after the other had decayed or dispersed. This means that each possible radioactive compound would have to have its own unique odor.

4. Here in Illinois, the Illinois Department of Nuclear Safety has a network of radiation detectors in and around all the nuclear power plants in the state with real-time readings reported and monitored around the clock. These radiation detectors are much more sensitive than the human nose.

5. The ability to label radioactive gasses that are known to partially vented to unrestricted areas (such as xenon studies in nuclear medicine) would not pose to great a problem in labeling, it is the labeling of radioactive materialsa that are not supposed to be vented to unrestricted areas--such as how one would label fission products.

I have discussed this petition with several of my colleagues in the Medical Physics and Health Physics fields and we all agree that the above referenced petition would not increase the safety of the populace in the vicinity of the licensee, would be economically catastrophic to the licensee, and is impractical to implement in the extreme.

Sincerely,

Eric Zickgraf, M.S.
A.B.R. Certified Radiological Physicist

DOCKET NUMBER
PETITION RULE PRM 20-19
(54 FR 5089)

DOCKETED
USNRC

(29)

'89 APR -5 P2:37

RALPH GRUNEWALD
438 TIMBERCREST CT
CEDARBURG, WI 53012

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

RAPID MEMO

TO: Docketing and Service Branch
Secretary of the Commission
US Nuclear Regulatory Commission
Washington, DC 20555

DATE: 30 MARCH 89

SUBJECT:
PRM-20-19

In consideration for PRM-20-19, regarding the addition of detectable odors to emissions from nuclear facilities, I submit this copy of an article that was published in USA TODAY very recently.

Thank you for your consideration

Ralph Grunewald

FORM 4151

MAY 25 1989

Acknowledged by card.

TMI at a glance . . .

The accident

What happened:

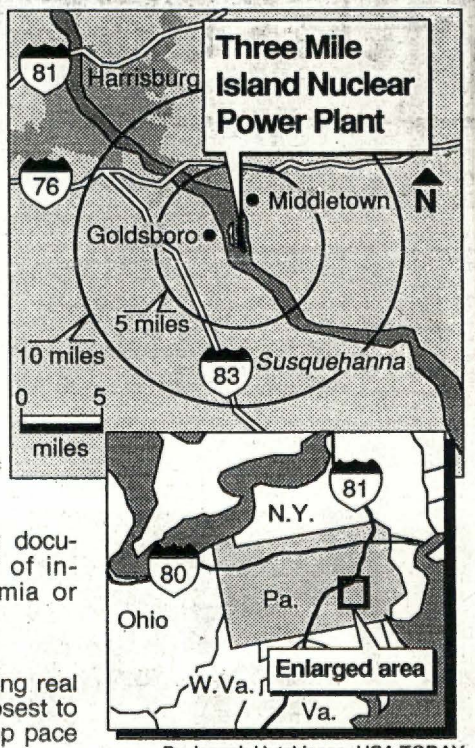
▶ At about 4 a.m. March 28, 1979, a relief valve at TMI-2 became stuck, releasing reactor cooling water as steam.

▶ Plant operators mistakenly shut cooling water to reactor.

▶ Overheated core begins partial meltdown, producing a potentially explosive hydrogen bubble in reactor.

▶ 144,000 people evacuated.

▶ Bubble dissipates after six days



By Joseph Hutchinson, USA TODAY

Medical impact

Extreme stress widely documented; no firm proof of increased cancer, leukemia or deaths.

Economic impact

Up to $1 billion, including real estate values in areas closest to plant, which failed to keep pace with appreciation.

Lawsuit status

At least 2,111 plaintiffs; approximately 300 settled, $25 million paid; highest settlement reportedly $1.1 million; other cases pending.

The plant now

Cleanup: $1 billion to be spent removing radioactive hardware; completion due mid-1990s.

Plant status: Shut, radioactive core to be sealed.

The area

Three Mile Island: 2.5 miles long, in the Susquehanna River, 12 miles south of Harrisburg.

Population: 168,000 within 10 miles of plant.

Industry: Small businesses, rural farms; TMI-1 a prime employer with 900 people working at the plant.

COVER STORY

TMI

Ten years later, still at center of nuclear debate.

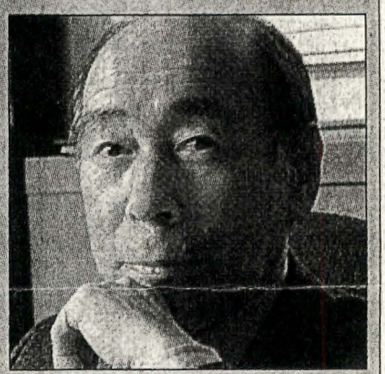
Photos by Stephen Lefkovits, USA TODAY

DEBORAH BAKER: Her son, Bradley, was born with Down's syndrome; she won $1.1 million out of court. 'If I can touch one person, that will be good. . . . Think, talk, voice your concerns.'

SPECIAL REPORT

TODAY

TUESDAY



DR. GEORGE TOKUHATA: 'We certainly do not expect a significant rise in cancer,' says researcher at Pennsylvania's health department.

Battles rage; El Salvador turnout low

By Juan J. Walte
USA TODAY

Heavy fighting marred El Salvador's presidential election Sunday — bringing more trouble to the struggling U.S.-backed democracy.

At least 32 people were killed as leftist rebels made good on vows to disrupt balloting. Clashes throughout the country kept voter turnout light in smaller towns, but there were long lines in the capital.

Challenger Alfredo Cristiani of the right-wing ARENA party claimed victory in his bid to succeed President Jose Napoleon Duarte. Returns aren't official, so it isn't certain he won the more than 50 percent needed to avoid an April runoff.

A Cristiani win "will greatly complicate" U.S. policy because of human rights concerns and would threaten aid, says Central American expert Richard Millett of Southern Illinois University.

▶ Test for Bush policy, 4A

COVER STORY

'Accident is nowhere near over'

TMI fallout: 2,200 suits over health problems, a hopeful industry

By Patrick O'Driscoll,
Rae Tyson and Brad Bumsted
USA TODAY

MIDDLETOWN, Pa. — Deborah Baker's question hangs in the air, like the familiar cloud of cooling-tower steam rising from her neighborhood nuclear power plant — Three Mile Island.

"How much radiation is not enough — or too much?" she asks one decade after a partial meltdown destroyed the plant's No. 2 nuclear reactor and terrified the nation.

Her son, Bradley, was born with Down's syndrome nine months after the March 28, 1979, accident. The Bakers claimed radiation from "TMI" — as locals call the plant just south of here — caused the birth defect, and they won a $1.1 million settlement. But the plant's owners admitted no blame and, today, more than 2,200 other claims of cancer, birth defects and other maladies await court judgment.

Ten years after TMI's near-disaster, nuclear experts and local residents still debate its effect on health — and debate

Please see COVER STORY next page ▶

COVER STORY

Nuclear revival is likely

Continued from 1A

nearly everything else surrounding nuclear power: plant safety, worker training, radioactive waste.

Despite all the heated talk, there may be a breath of potential new life for the dormant nuclear power industry, which hasn't ordered a new reactor since 1978.

Growing worry about global warming — the so-called "greenhouse effect," due to too much carbon dioxide in the atmosphere — could spur the construction of CO_2-free nuclear plants instead of CO_2-generating coal-power plants.

Even staunch anti-nuke groups such as the Environmental Defense Fund admit there may be a revival — or at least a re-examination. "It is an option that will be on the table," says EDF's Michael Oppenheimer.

A new USA TODAY poll shows most people are still unsettled about nuclear power — 82 percent are "very" or "somewhat" concerned about living near a nuclear plant. But we're split — 38 percent for, 51 against — on whether to go nuclear to help curb the greenhouse effect.

"I've had people in government say, 'If you're so concerned, why not move?' I say to them, 'Where to'?" says Joyce Corradi, who runs a child-care center here. "There's no place that's more than 200 miles from a nuclear plant."

Such worries don't surprise the Nuclear Regulatory Commission, which oversees the USA's 108 licensed, commercial reactors.

"The 'public climate,' if you will, was beginning to improve up to three years ago," says NRC's Joe Fouchard. "What happened? Chernobyl. You can understand public unease ... but TMI doesn't even compare."

Today, regulators say, most nuclear reactors are far safer and better run, and a disaster like Chernobyl — 30 dead, thousands exposed to lethal radiation — would be highly unlikely now in the wake of TMI.

"I'm sorry we had to pay the price, but it's worth it. A lot of good things came out of this," says Michael Ross, operations director at TMI No. 1, the undamaged reactor still in use.

But those who sued General Public Utilities Corp., which now operates TMI, couldn't disagree more.

They say the accident spewed unknown, harmful amounts of radiation over humans and livestock.

"The accident is nowhere near being over," says Elizabeth Chavey, one of several mothers who canvassed neighborhoods in the years after TMI and found alarming numbers of cancers.

Her brother fell violently ill the day of the accident and died of cancer in 1985. Her husband fights prostate cancer. She has a thyroid condition she blames on TMI. And like 100 others, she recalls an odd, metallic taste in the air that day — a familiar sign of radiation exposure.

But Pennsylvania's chief disease researcher, Dr. George Tokuhata, says studies of cancer rates, pregnancy outcomes and infant health haven't found medical problems among TMI-area residents: "We didn't see any evidence of increased cancer. In fact, the (rate of) leukemia was lower than usual."

Asked about the studies undertaken by residents, Tokuhata adds firmly: "Those studies don't hold water."

"It's difficult to equate emotions with scientific evidence," adds GPU spokeswoman Carol Clawson, who says only a tiny amount of radiation was released.

But University of Pittsburgh public health professor Gordon MacLeod, state health commissioner at the time of the accident, says it's irresponsible to dismiss possible links between TMI and cancer.

"We know that some 90 percent of cancers are environmentally induced. We just don't know if there is a connection here," says MacLeod, who argues that a comprehensive health study of those who lived within five miles of TMI is long overdue.

Judges and juries may have the last word — if they can ever untie complex legal knots. "This is like molasses in a wind chill of minus-4," says plaintiffs' lawyer Dusan Bratic.

Colon cancer victim James Webb, 56, a Leonardtown, Md., helicopter pilot who flew TV crews over TMI during the accident, has a simple strategy: "You can find all kinds of doctors that say radiation doesn't cause my kind of cancer. But you ain't going to find no doctor who's going to get on the stand and raise his hand and say, 'Radiation absolutely did *not* cause it.' "

Harold Denton, NRC's team leader during the accident's chaotic days, says the industry's previous view "that severe accidents couldn't happen" is gone — replaced by "a tremendous upgrading at all levels."

Whether that can offset the years and multibillion-dollar cost of building new nuclear plants is debatable. But recent reactions to the global warming problem may afford nuclear power another look:

▶ A "greenhouse" bill recently introduced by Sen. Tim Wirth, D-Colo., would fund research to improve reactor safety. He says safer reactors would help overcome public concern — what he calls "nuclear measles."

▶ President Bush is expected to push for more nuclear plants. "We've been reading about some of the needs to diversify our energy base (and) I have long been in favor of the safe use of nuclear power."

Adds Environmental Protection Agency chief William Reilly: "It isn't just a case of nuclear yes or no."

▶ The nuclear industry is expected to seize the chance to revive its sagging fortunes. "Groups that have opposed nuclear energy have to reconsider their opposition in light of this environmental problem," says Edward Davis, presdient of the American Nuclear Energy Council.

Some remain staunchly opposed:

"Nuclear power just doesn't cut it," says Rep. Claudine Schneider, R-R.I., sponsor of a greenhouse bill in the House. She'd rather conserve energy and add solar and wind power.

"Our argument is very simple. You don't trade one environmental calamity for another," adds Michael Mariotte of the Nuclear Information and Resource Service.

While the arguing goes on, TMI nears the end of a $1 billion cleanup effort. Working with exotic, long-handled tools from a platform 40 feet above the reactor's water-covered wreckage, round-the-clock shifts of workers cut up radioactive debris for shipment to a nuclear dump in Idaho. Awaiting NRC approval: a plan to boil off toxic water in the reactor.

Elizabeth Chavey and others don't believe the utility's claims that the boil-off process is safe — and remain skeptical about nuclear power.

"They plan to keep that plant open as a monument to the world that, yes, nuclear power is safe," says Chavey, who'll join an anniversary vigil at TMI next week. "But God forbid they have another accident. People will kill to get out of here."

Deborah Baker cautions people here and elsewhere not to believe any one side — government, industry, or anti-nuke — without weighing all. "Come to your own conclusions. Don't sit back; you got to care."

Nuclear Information and Resource Service

1424 16th Street, N.W., Suite 601, Washington, D.C. 20036 (202) 328-0002

March 30, 1989

Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Attn: Docketing and Service Branch

Dear Secretary:

The Nuclear Information and Resource Service is pleased to submit our comments on PRM-20-19, initiated by the GE Stockholders Alliance.

To begin, we acknowledge that we do not know if this rulemaking, which would require that a detectable odor be placed into nuclear power plant emissions in order to smell radiation releases, is technically feasible.

However, if it should prove possible to add such an odor, the Nuclear Information and Resource Service would strongly support a requirement that utilities do so. In addition, if the NRC does not know if adding an odor is technically feasible, we encourage the Commission to quickly conduct the necessary research to determine its feasibility.

We suggest that the natural gas analogy is a useful one. Natural gas, like radiation, is odorless and colorless, and thus impossible for average citizens to detect. By adding an odor to natural gas, this industry has demystified the substance, thus allowing its widespread use. Essentially, if citizens smell a large amount of gas, they know something is wrong and call on proper authorities to fix it. The result has been that natural gas is no longer a widely feared substance.

We believe the same would be true of adding an odor to radiation releases. While radiation is obviously dangerous, a portion of the public fear arises from the fact that it is not detectable by average citizens. Adding an odor would allow citizens to know--as is their right--when radiation is being released from a nuclear plant, and to take appropriate protective action. It might also reassure citizens when an odor is not present--presuming that there will be a time when an odor is not present.

To be honest, rather than demystifying radiation, adding an odor could well mean the end of nuclear power, since citizens would learn that reactors, waste dumps and other such facilities routinely release radiation. But that's a risk the industry and government should have to take. It is every citizen's right to know when s/he may be exposed to any hazardous substance. Democracy and justice demand no less.

Thank you for this opportunity to submit our comments.

Sincerely,

Michael Mariotte
Executive Director

Duke Power Company
P.O. Box 33189
Charlotte, NC 28242

(704)373-4011

DUKE POWER

March 29, 1989

The Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555
ATTENTION: Docketing and Service Branch

Subject: NRC Notice of Receipt of Petition
for Rulemaking by GE Stockholders Alliance
Duke Power Comments

Dear Sir:

In the Federal Register (54FR5089) dated February 1, 1989, the Nuclear Regulatory Commission published for comments a petition for rulemaking dated November 2, 1988, which was filed with the Commission by the GE Stockholders Alliance. The petitioner requests the Commission to amend its regulations to require that a detectable odor be injected into the emissions of nuclear power plants and other nuclear processes over which the NRC has jurisdiction.

Duke Power Company has reviewed the petition and feels that the addition of odor into emissions of nuclear power plants would not improve detection of radiation emissions, would not constitute an improvement of public safety and, therefore, the petition should be dismissed by the NRC.

Any radioactive releases at nuclear facilities are monitored by a variety of onsite and offsite detectors. These devices are accurate and based on physical principles most suitable for radiation detection. The addition of a chemical substance to radioactive releases, as proposed by the petitioner, would be of no value to radiation detection because of the dispersal factors at various distances from the plant. The intensity of odor could not be related to the amount of radiation, since odorant effects cannot match decay rates of a number of different isotopes found in radiation releases.

The addition of an odorant cannot change the physical reality that nuclear radiation is not and will not be detectable by human senses. An attempt to alter this fact would not only be futile but would, in our opinion, constitute a highly unreliable, inaccurate and potentially dangerous method of radiation detection. Therefore, the request by the GE Stockholder Alliance should be denied.

Very truly yours,

Hal B. Tucker

JSM/348/vm

(26)

PHILADELPHIA ELECTRIC COMPANY

2301 MARKET STREET

P.O. BOX 8699

PHILADELPHIA, PA 19101

(215) 841-5001

JOSEPH W. GALLAGHER
VICE PRESIDENT
NUCLEAR SERVICES

March 29, 1989

Mr. Samuel J. Chilk
Secretary of the Commission
U.S. Nuclear Regulatory Commission
Docketing and Service Branch
Washington, DC 20555

SUBJECT: Comments Concerning the Nuclear Regulatory Commission 10 CFR Part 20 Petition for Rulemaking by the GE Stockholders Alliance (54 FR 5089, dated February 1, 1989)

Dear Mr. Chilk:

This letter is being submitted in response to the Nuclear Regulatory Commission's (NRC's) request for comments regarding the 10 CFR Part 20 petition for rulemaking filed by the General Electric (GE) Stockholders Alliance on October 21, 1988, and published in the Federal Register (54 FR 5089, dated February 1, 1989).

The Philadelphia Electric Company (PECo) appreciates the opportunity to comment on this petition for rulemaking which requests that the NRC amend its regulations to require that a detectable odor be injected into the emissions of nuclear power plants and other nuclear processes over which the NRC has jurisdiction. PECo does not support this petition for rulemaking on the following basis. We consider that an injection of a detectable odor into the emissions from a nuclear plant would not increase the level of health or safety offered to the general public above that which is currently afforded. We consider that the current regulatory requirements provide substantial means for early public notification of the need to take health-protective measures in the event of radioactive material releases from nuclear power plants and other installations involved in nuclear processes which are regulated by the NRC. These requirements incorporate a series of integrated mechanisms which include sensitive airborne radioactive effluent monitoring instrumentation, procedural requirements for notification of unusual occurrences by the utility to federal, state, and local organizations, and a means for alerting the public (i.e., sirens, emergency broadcast system, etc.) if conditions so warrant. These mechanisms provide a more viable and orderly method than that of odor injection for alerting the public of a possible health risk associated with a radioactive material release.

Furthermore, these mechanisms have been designed and are required by regulations to be operated such that notification of the public is accomplished in sufficient time to allow appropriate protective measures to be taken.

If you have any questions, please do not hesitate to contact us.

Very truly yours,

J. W. Gallagher

25

PUBLIC CITIZEN

Buyers Up ☐ Congress Watch ☐ Critical Mass ☐ Health Research Group ☐ Litigation Group

April 3, 1989

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Attention: Docketing and Services Branch

Subject: Comments on the Petition of the General Electric Stockholders' Alliance to amend 10 CFR Part 20, Docket No. PRM-20-19

The above-referenced petition consists of one basic and very worthwhile proposal: attaching an odor to the radioactive effluents from a nuclear power plant. The idea follows from the current practice of odorizing otherwise odorless and invisible natural gas.

The Nuclear Regulatory Commission (NRC) has considered the odorization of radioactive effluents in the past as a means of tracking and assessing only unplanned releases in the event of an accident. However, this petition suggests that even routine emissions which are below the NRC's accepted limits also be odorized. Public Citizen strongly supports this proposal for the following reasons:

1) The public has both a right and a need to know when it is being exposed to radioactive emissions from nuclear power plants, regardless of the NRC's ruling as to the acceptability of the relative levels of that radioactivity.

2) There is not scientific proof that the NRC-allowed levels of radioactive effluents are indeed harmless to the public. In fact, a growing body of data on the effects of radiation on the populations surrounding Hiroshima indicate that much lower levels of radiation than previously believed can have severe health ramifications.

In light of the potential for damage to the public health from even routine radioactive reactor effluents, Public Citizen feels that odorization of radioactive emissions of all levels and from all releases would lead to a better public awareness of the radioactive content of the air and the water. The NRC's ruling that routine emissions are not harmful does not make them harmless, and thus the public should know when they are exposed to such emissions.

Health Research Group ☐ 2000 P St. NW ☐ Washington, DC 20036 ☐ (202) 872-0320

Based on this petition, the NRC should undertake a technical evaluation of the feasibility of odorizing all radioactive effluents from commercial nuclear power reactors. The petition does not undertake such an evaluation and should not be required to do so -- the NRC is better able to evaluate the feasibility of such a proposal.

This petition provides an excellent opportunity for the NRC to take conservative action with regard to the health and safety of the public. Not only will odorization, if technically feasible, help give early warning of radioactive releases in the event of an accident, but it will also improve NRC's own awareness of the public's exposure to routine emissions. Public Citizen strongly supports this petition and urges the NRC to develop a technical means for odorization and then to promulgate binding regulations implementing an odorization policy.

Sincerely,

Kenneth Bo[illegible]ey
Nuclear Safety Analyst
Critical Mass Energy Project
of Public Citizen

(24)

DOCKET NUMBER
PETITION RULE PRM 20-19
(54 FR 5089)

DOCKETED
APR - 3 1989
DOCKETING & SERVICE BRANCH
SECY-NRC

We feel the idea of a detectable odor injected into radioactive emissions is an excellent one. This should be a rule for all facilities which the NRC has jurisdiction over

Sincerely
Dan and Connie Emerton
9459 Morrish
Swartz Creek Mi 48473

FLINT, MI 484
PM
1 APR
1989

America the Beautiful USA 15

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C.
20555

MAY 25 1989
Acknowledged by card.

Attn: Docketing and Service Branch

DOCKET NUMBER
PETITION RULE PRM 20-19
(54 FR 5089)

(23)

JOHN J. HARRIS
4341 LOCUST STREET
KANSAS CITY, MISSOURI 64110

DOCKETED
USNRC

'89 APR -3 P2:38

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Docketing + Service Branch

Re: Docket No. PRM-20-19; to Amend 10CFR Part 20

Dear Sir:

Natural gas, propane, + butane are required to have an odorant that alerts people when a leak in lines occurs.

It should be mandatory that radioactive emissions from nuclear facilities be odorized so any dangerous leaks would be noticed + corrected immediately.

Will you please address this problem?

Sincerely
John J Harris

MAY 25 1989
Acknowledged by card.

DOCKET NUMBER
PETITION RULE PRM 20-19
(54FR5089)

(22)

DOCKETED
APR - 3 1989
DOCKETING & SERVICE BRANCH SECY-NRC

EMMA HARTZLER 1225 GREENCROFT DRIVE APARTMENT 29 GOSHEN IN 46526

3-28-89

Dear Sir:

May I urge the NRC to please take immediate and favorable action re: Docket No PRM 20-19 to amend 10 CFR Part 20.

We definitely need to be able to detect any and all nuclear emissions from weapons and power plants, waste sites, labs, whatever!

Over

The public needs protection from all cover-ups and lies and radioactivity now allowed.. And surely the workers deserve to Know the Truth, too.

Thanks for your considerations.

Respectfully
Emma Hartzler

MAY 25 1989
Acknowledged by card.

DOCKET NUMBER
PETITION RULE PRM 20-19
(54 FR 5089)

21

March 29, 1989

Dorothy & Don Elrod
128 Plum Creek Rd.
North East, Md 21901

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

RE: Docket No. PRM-20-19. to amend
10 CFR Part 20

Dear Secretary of the Commission

We support the idea of having a detectable odor injected into radioactive emissions of nuclear Power Plants and all other facilities over which the NRC has jurisdiction.

Sincerely yours,

Mr. & Mrs. Donald Elrod

Charity In Action

Dominican Sisters of the Sick Poor

MARIANDALE, BOX 1200, OSSINING, NEW YORK 10562

(914) 941-4455

(20)

March 27, 1989

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Docketing and Service Branch

Re: Docket No. PRM-20-19; to amend 10 CFR Part 20

Dear Secretary:

On behalf of the Dominican Sisters of the Sick Poor, I urge NRC to require a detectable odor to be injected into radioactive emissions of nuclear power plants and all other facilities over which the NRC has jurisdiction.

The odor added to normally odorless has undoubtedly saved thousands of lives as well as prevented millions of dollars in property loss or damage. Surely in this age of increasing concern for our environment, the warning odor from the nuclear power plants would do as well.

Further, this is a measure that would help promote public confidence in the nuclear power plant system. If there are no emissions, this is certainly a way to prove the safety and reliability of the nuclear plants.

Thank you for your attention.

Yours truly,

Valerie Heinonen

Valerie Heinonen
Corporate Responsibility Representative

(19)

DOCKET NUMBER
PETITION RULE PRM 20-19
(54 FR 5089)

DOCKETED
USNRC

'89 MAR 31 P2:34

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

March 27, 1989

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Docketing and Service Branch

Re: Docket No. PRM-20-19; to amend 10 CFR Part 20

Dear Secretary:

The NRC should require a detectable odor to be injected into radioactive emissions of nuclear power plants and all other facilities over which the NRC has jurisdiction.

The odor added to normally odorless has undoubtedly saved thousands of lives as well as prevented millions of dollars in property loss or damage. Surely in this age of increasing concern for our environment, the warning odor from the nuclear power plants would do as well.

Further, this is a measure that would help promote public confidence in the nuclear power plant system. If there are no emissions, this is certainly a way to prove the safety and reliability of the nuclear plants.

Thank you for your attention.

Yours truly,

Valerie Heinonen

Valerie Heinonen
635 E 12 Street #6K
NY NY 10009

MAY 25 1989

Acknowledged by card.

(18)

DOCKET NUMBER
PETITION RULE PRM 20-19
(54 FR 5089)

March 14, 1989

DOCKETED
USNRC

'89 MAR 31 P2:32

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Docketing and Service Branch

Gentlemen:

I support a rule change to the NRC urging the NRC to require a detectable odor to be injected into radioactive emissions of nuclear power plants and all other facilities over which the NRC has jurisdiction.

Sincerely,

Wilbur L Angell
1196 Bellmer Rd
Petoskey, Mi. 49770

MAY 25 1989

Acknowledged by card.

CUYAHOGA • COUNTY • CONCERNED • CITIZENS
P.O. BOX 79052 CLEVELAND, OHIO 44107 216-843-7272
STOP PERRY DAVIS BESSE NOW

(17)

March 17, 1989

U.S. Nuclear Regulatory Commission
Docketing and Service Branch
Washington, D.C. 20555

RE: Docket #PRM-20-19;
To amend CFR Part 20

Dear Secretary of the Commission,

Concerned Citizens, safe energy advocates representing thousands of northeast Ohio residents, is urging you to require a detectable odor to be injected into any and all radioactive emissions from nuclear power plants and all other facilities over which the NRC has jurisdiction.

We also feel that the addition of a detectable "color" would be extreemly valuable in detecting the pathway of radioactive emissions in case of an accident.

The detectable odor should be strong enough and distinct enough to be considered an early warning sign much like the odor which is added to natural gas.

Cuyahoga County Concerned Citizens believes that the addition of a detectable odor would be a valuable addition to the monitoring systems that are in place around Perry and Davis Besse. Rather than depend on mechanical instrumentation, every person who is downwind could easily tell if there is an unusual release. This is an idea whose time has come.

We urge you require the odor addition as quickly as possible to protect the public health and safety. Thank you for your consideration.

Cordially,

Chris Trepal, Director
P.O. Box 770743 (New Address)
Cleveland, OH 44107-0035

(16)

DOCKET NUMBER
PETITION RULE PRM 20-19
(54FR 5089)

DOCKETED
USNRC

March 14, 1989

'89 MAR 28 P4:21

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Docketing and Service Branch

Gentlemen:

I support a rule change to the NRC urging the NRC to require a detectable odor to be injected into radioactive emissions of nuclear power plants and all other facilities over which the NRC has jurisdiction.

Sincerely,

Shirley M. Burgess

Mr. & Mrs.
Leonard L. Burgess
575 Hillcrest Avenue
Petoskey, MI 49770

Acknowledged by card MAY 25 1989

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DOCKET NUMBER
PETITION RULE PRM 20-19
(54 FR 5089)

(15)

Concerned Citizens of Tennessee
at the Hartsville Nuclear Plant Site
Dixon Springs, Tn. 37057 (615-735-1862)

Re: Docket # PRM-20-19

Gentlemen:

Our organization supports the emergency rule change to Amend 10 CFR, part 20 to require a detectable odor to radioactivity of nuclear plants.

This would have wide public health implications and should be implemented at once.

Please keep us advised.

Sincerely,
CCT
by: Faith Young
secretary

3-25-89

DOCKET NUMBER
PETITION RULE PRM 20-19
(54 FR 5089)

(14)

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USNRC

'89 MAR 27 P3:45

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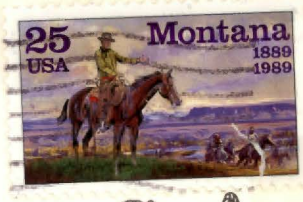
The beautiful Atlantic Ocean.



NRC,

I am concerned about radioactive emissions from Nuclear power plants. I would like to see the NRC require a detectable odor injected into these emissions from nuclear power plants and weapons production plants!!

Sincerely,
R. Jane Harrington
Rt. 4 Box 23
Berlin, Md 21811

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L-93303-D Photo by Kevin N. Moore

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Post Card

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington DC.
20555
Att: Docketing & Service Branch

APR 01 1989

Acknowledged by card.....

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Lesar

Mr. & Mrs. C. Howard Jones
3645 Sardis Road
Murrysville, PA 15668

(13)

March 21, 1989

Docketing & Service Branch of the
U.S. Nuclear Regulatory Commission
Washington DC 20555

Subject: Docket No. PRM 20-19
To amend 10 CFR Part 20

Gentlemen,

I would like to urge you to determine the feasibility of adding an odor to any radioactive emissions from nuclear plants. I am an electrical engineer with 42 years of experience at Westinghouse Electric Corporation.

Sincerely,

C. Howard Jones

VANCE L. SAILOR
100 Durkee Lane
East Patchogue, NY 11772

March 19, 1989

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Attn: Docketing and Service Branch

Subject: Reservations Concerning Actions Proposed in Docket No. PRM-20-19

Dear Mr. Secretary:

Although it seems obvious that the action requested by the Petitioner would, when implemented, have a salutary effect on the public health and safety, I question whether emergency rulemaking by the Commission is appropriate. There are several ramifications to the proposed rules ("to require that a delectable odor be injected into the emissions of nuclear power plants....") that deserve sagacious exploration.

Admittedly, the substitution of human olfactory organs for radiation dosimeters would be cost effective, saving society millions of dollars each year. But there are complications that should be judiciously weighed, as outlined below.

1. Not all members of the public would receive equal protection under the rules. Those with congested nasal passages would not know when to evacuate! In order to circumvent this problem it would be necessary to require each licensee to maintain a kennel of expertly trained "smelling-nose dogs" to loan to individuals in the population during those times when their nasal senses were impaired.

2. There will be difficulty in achieving a consensus on what constitutes a "delectable" odor. Possibly a national referendum will be necessary. What is delectable to one person might be noxious to another. The delicate scent of a rose brings delight to one observer but is an allergen to others.

3. Unless great care is taken in the selection of the required odor, there will be great risk of unnecessary initiation of protective actions due to false alarms. Assume, for example, that the Commission selected the scent of spring lilacs. A stylish lady promonading on 5th Avenue, wearing Schmell #6, might inadvertently initiate a precipitous evacuation of Manhattan. Obviously, the NRC must obtain exclusive rights to whatever "delectable odor" it indentifies in the rules.

4. The process of injecting the odor needs further research and development. Large isotopes such as cesium-137 might have a large enough volume to be

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rescind staff member said it should be
a comment since author is satisfied with extension
I said I gave preference to extension

able to retain a reasonable quantity of injected odor, but the injecting device would be hard pressed to get much scent into a tritium atom, or for that matter, even to hit it. Also, gamma-rays, because of their ephemeral structure and small surface area present a uniquely difficult technical challenge.

Possibly, with adequately funded NRC research programs most of the outstanding problems could be solved in a timely manner. E.g., it might not be absolutely necessary to scent-tag a gamma-ray. One alternative that comes immediately to mind would be a "co-scent", i.e., a scent not actually attached to the gamma-ray but emitted from the radioactive atom at the same time. The two main difficulties to be overcome with this idea is how to make sure that the co-scent goes in the same direction as the gamma-ray and also, in order to give timely warning the co-scent would have to travel at a higher speed than the gamma.

For these and other reasons, I respectfully urge the Commission to avoid emergency rulemaking in this case. I am confident that the Commission can count the solid backing of the research community in the form of the submission of numerous proposals to address the outstanding issues.

Finally, I respectfully request that the deadline for comment be extended for at least a year. I have a few additional thoughts that are still in the formative stage and cannot predict how quickly they will solidify. Also, several of my colleagues are preparing comments, but will not be able to meet the April 3, 1989 deadline. The Commission would thus be denied valuable insights into this issue.

Respectfully yours,

Vance L. Sailor

Vance L. Sailor

P.S. Upon re-reading the Federal Register notice, I am slightly embarrassed to discover that I had mis-read the word "detectable" to be "delectable". This error can be attributed to a combination of the poor print quality of my copy and my failing eyesight. However, the correct version vastly simplifies the Commission's task -- the need for a national referendum described in paragraph 2 above is eliminated.

(12)

DOCKET NUMBER
PETITION RULE PRM 2019

(54 FR 5089)

Jayna Pike
P.O. Box 60876
Palo Alto, CA 94306

DOCKETED
USNRC

'89 MAR 22 P6:42

March 16, 1989

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Secretary,

I've recently learned about the proposal by Betty Schroeder, of the GE Stockholders' Aliance, proposing that a detectable odor be mandatorily injected into radioactive emissions of nuclear power plants and all other facilities over which the Nuclear Regulatory Commission has jurisdiction.

Let me just say that this is one of the finest and most intelligent proposals I've heard of in quite some time. In fact I cannot imagine why this practice has not been implemented sooner. Analogously, the naturally odorless "natural gas" which we use in our homes has for years and years been injected with the odor that we have come to know so well. Many many lives, specifically by virtue of this practice, have been saved.

I do hope you will see this as a critical step for the N.R.C. to take, not only for the health and safety of the American people, but also for our mental and emotional solace.

Respectfully,

Jayna L. Pike

Jayna Pike

cc: Betty Schroeder

APR 0 1 1989
Acknowledged by card.

March 18, 1989

Docketing and Service Branch
Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

To whom it may concern:

I urge the Nuclear Regulatory Commission (NRC) to require a detectable odor to be injected into radioactive emissions of nuclear power plants and all other facilities over which the NRC has jurisdiction. I believe that the good of the public's health is at risk without the added detectable odor.

Sincerely,

Theresa M. Burling

Theresa M. Burling
Concerned Citizens of Geauga County
11701 Colburn Road
Chardon, Ohio 44024

RE Docket # PRM-20-19; to amend 10 CFR Part 20.

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(10)

LAKE CTY CONCERNED CITIZENS

P.O. Box 522 Painesville, Ohio 44077

March 17, 1989

Secretary of the Commission
U.S. Nuclear Regulatroy Commission
Washington, D.C. 20555

ATTENTION: Docketing and Service Branch

RE: Docket No. PRM-20-19; to amend 10 CFR Part 20

To Whom It May Concern:

Lake County Concerned Citizens, a safe energy advocacy group representating thousands of customers of Cleveland Electric Illuminating Co. who live in the shadow of the Perry Nuclear Power Plant, fully support the request for an emergency rule change to require a detectable odor to be injected into radioactive emissions of nuclear power plants and all other facilities over which the NRC has jurisdiction.

As a matter of fact, Lake County Concerned Citizens would like to see a safe, nontoxic visible colorant added to radioactive emissions.

Thank you for your time and consideration.

Sincerely yours,

Connie Kline

Connie Kline
Director

U.S. NUCLEAR REGULATORY COMMISSION
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(9)

Will Doherty
22400 Skyline, Box 7
La Honda, CA 94020
(415) 948-3476

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555
Attention: Docketing and Service Branch
RE: Docket No. PRM-20-19; to amend 10 CFR Part 20

March 16, 1989

Dear Secretary,

Please approve the requested emergency rule change to require that a detectable odor be injected into radioactive emissions of nuclear power plants and all other facilities over which the NRC has jurisdiction.

Sincerely,

(8)

DOCKET NUMBER
PETITION RULE PRM 20-19
(54FR5089)

March 14, 1989

DOCKETED
USNRC

Prof. C.M.E.R. Rigg
2960-58 Ave. So.
St. Pete, FL 33712

'89 MAR 20 P3:11

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555
Attention: Docketing & Service Branch

RE: Docket No. PRM-20-19; to amend 10CFR Part 20.

Mr. Secretary,

I support the idea of making mandatory some strong Odor (to be ~~used~~ infused) INTO any/all radioactive emissions of all nuclear power plants & other nuclear facilities over which NRC has any jurisdiction.

(SEE: Feb. 1, 1989 Federal Register - RE: Docket No. PRM-20-19; to amend 10 CFR Part 20.

NEED: It is already apparent. Let us do all to safe-guard the future. You have a unique position in our, as yet weak, informed safeguarding for the Future. We all can work on this together. People, healthy humans, will be our future.

May I hear from you, soon?

Regards, in hope of hearing your affirmative in this important matter,

APR 01 1989
Acknowledged by card.

Prof. C.M.E.R. Rigg
Eckerd College, St. Petersburg, FL.

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(54 FR 5089)

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USNRC

'89 MAR 20 P3:12

March 14, 1989

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

Dear Secretary,

This letter is in support of a requirement by the NRC to inject a detectable odor into radioactive emissions of nuclear power plants and all other facilities which the NRC has jurisdiction.

As radioactivity is not perceptable, this seems like a very good idea. Please enact on this requirement with haste as it is a great concern for myself and my family and friends.

Sincerely,

Ted Fishman

Re: Docket No.: PRM-20-19
to amend 10CFR Part 20.

APR 01 1989

Acknowledged by card.

Ted Fishman
1017 Davis Ave.
Woodstock, Md.
21163

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(54 FR 5089)

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DOCKETED
USNRC

March 14, 1989

'89 MAR 20 A11 :49

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Docketing and Service Branch

Gentlemen:

I support a rule change to the NRC urging the NRC to require a detectable odor to be injected into radioactive emissions of nuclear power plants and all other facilities over which the NRC has jurisdiction.

Sincerely,

Lloyd Branch
913 Harvey St
Petoskey MI. 49770

Acknowledged by card. APR 0 1 1989

(5)

DOCKET NUMBER
PETITION RULE PRM 20-19
(54FR05089)

March 14, 1989

DOCKETED
USNRC

'89 MAR 17 P2:01

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Docketing and Service Branch

Gentlemen:

I support a rule change to the NRC urging the NRC to require a detectable odor to be injected into radioactive emissions of nuclear power plants and all other facilities over which the NRR has jurisdiction.

Sincerely,

Doris Schaller

Doris Schaller
Box 528
Petoskey, Mi. 49770

APR 01 1989

Acknowledged by card.

(4)

The Self-Government Center

301 G Street S.W. Suite 404 Washington, DC 20024

RE: Docket No. PRM-20-19; to amend
10 CFR Part 20

March 13, 1989

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington DC 20555

To the Secretary:

We support the proposal to require injection of an odor into emissions (54 FR 5089). The measure will enhance the public's ability to take self-protective actions.

Sincerely,

Neil Steyskal

Neil Steyskal
Director

DOCKET NUMBER
PETITION RULE PRM 20-19

(3)

(54 FR 05089)

DOCKETED
USNRC

'89 MAR -6 P12:26

OFFICE OF SEC
DOCKETING &
BRANCH

Sheila Q. Brown
924 West End Avenue, No. 33
New York City, New York 10025

Mar. 1, 1989

Sec. of the Commission
US Nuclear Regulatory Com.
Wash DC 20555

Re. Docket No PRM-20-19
to amend 10 CFR Part 20

I am writing to request that a detectable odor be interjected into radioactive emissions as it is into odorless natural gas. This would have great results and would be of much assistance to you in detecting leaks and to our children and grandchildren in their effort to attain good health and long life.

A favor of a reply please.

Sincerely,
Sheila Brown

APR

Acknowledged by card.

ECOLOGY/ALERT
BOX 621
BLOOMSBURG 17815

(2)

Feb 22 -89

E Nemethy, Sec'y

Re: Docket PRM-20-19
GE Stockholders Alliance
Petition for Rulemaking
Fed Reg - Feb 1-89, p 5089

Sec'y - NRC
ATT: DOCKETING & SERVICE BRANCH

Gentlemen -

We salute the GE Stockholders Alliance for an ingenious idea. Putting a detectable odor in the emissions of reactors and other atomic processes could provide advance warning to the captive citizens living near such plants.

It could also effectively spike the standard disclaimer -whenever there's an "unscheduled" release - that "there was no danger to the public."

BUT -

Unfortunately, there's such a thing as "permitted" gaseous emissions from reactors.

In June -81, the NRC published NUREG 0564 - the Final Environmental Statement for PA Power & Light's twin reactors at Berwick PA. It gives the calculated releases of some 33 gaseous effluents as 16,454 curies/year from each reactor.

QUESTION -

How do you distinguish between "permitted" and "inadvertent" releases?

If there is such a technique, we urge that mercaptan not be used - that stuff commonly added to liquefied propane which smells like open sewers.

If the stuff isn't toxic, it can certainly cause distress and nausea over a large area.

We'd suggest something like peppermint - or if the utility is really anxious to promote good relations with its public - the fragrance "Joy" by Jean Patou...

E Nemethy

(1)

Marvin I. Lewis
7801 Roosevelt Blvd. #62
Phila., PA 19152
(215) 624 1574

Secretary of the Commission
USNRC
Washington, D. C. 20555

Dear Secretary;

I am very much in favor of the idea in the Proposed Rule 10CFR Part 20 Docket No. PRM 20-19. Adding an odor to radioactive emissions would assuage so many of the worries of the general public about nuclear power and radioactive emissions. If so generally accepted a danger as natural cooking gas can add an odor without being blasted off the market, surely radioactive emissions can do the same.

The addition of odor to natural gas has aided public acceptance. Not going along with this petition would brand nuclear power as to dangerous to take even the mild warnings which are required of illuminating gas. Going along with this petition would make radiation an understandable and acceptable addition to modern life. The petition may have been proffered by a group which is essentially anti-nuclear but the suggestion is a [illegible]on to public acceptance of the nuclear option.

Conversely, ignoring this suggestion of adding odor to radiation would suggest to many that the NRC is attempting to hide the obvious danger of nuclear power.

Respectfully submitted,

2-19-89 Marvin I. Lewis

GE Stockholders' Alliance
P.O. Box 966 • Columbia, MD 21044 • (301) 381-2714

(54 FR 05089)

February 12, 1989

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

RE: Docket No. PRM-20-19

Dear Mr. Chilk:

Thank you for considering my petition for rulemaking which is published in the February 1, 1989 Federal Register, requesting that the NRC require a detectable odor be injected in radioactive emissions.

The assigned 60 day comment period is extremely inadequate for the public to become aware of, and comment upon this important proposal. The odor-injection, if implemented, could result in a significant impact on public health. Therefore an extension of the comment period is very important.

I, therefore, request that a 90 day extension be granted for receiving comment on this proposal.

Thank you for your consideration.

Sincerely,
Betty Schroeder

Betty Schroeder,
Secretary

February 12, 1989

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

RE: Docket No. PRM-20-19

Dear Mr. Chilk:

Thank you for considering my petition for rulemaking which is published in the February 1, 1989 Federal Register, requesting that the NRC require a detectable odor be injected in radioactive emissions.

The assigned 60 day comment period is extremely inadequate for the public to become aware of, and comment upon this important proposal. The odor-injection, if implemented, could result in a significant impact on public health. Therefore an extension of the comment period is very important.

I, therefore, request that a 90 day extension be granted for receiving comment on this proposal.

Thank you for your consideration.

Sincerely,

Betty Sourgeder
Secretary

DOC

7590-01

NUCLEAR REGULATORY COMMISSION

10 CFR PART 20

[Docket No. PRM-20-19]

GE Stockholders Alliance; Receipt of Petition for Rulemaking

AGENCY: Nuclear Regulatory Commission.

ACTION: Petition for rulemaking: Notice of receipt.

SUMMARY: The Commission is publishing for public comment a notice of receipt of a petition for rulemaking dated October 31, 1988, which was filed with the Commission by the GE Stockholders Alliance. The petition was docketed by the Commission on November 2, 1988, and has been assigned Docket No. PRM-20-19. The petitioner requests that the Commission amend its regulations to require that a detectable odor be injected into the emissions of nuclear power plants and other nuclear processes over which the NRC has jurisdiction.

DATE: Submit comments by April 3, 1989.

Comments received after this date will be considered if it is practical to do so but the Commission is able to assure consideration only for comments received on or before this date.

ADDRESSES: Submit written comments to the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, DC 20555, Attention: Docketing and Service Branch.

Published in FR 2-1-89

For a copy of the petition, write the Regulatory Publications Branch, Division of Freedom of Information and Publications Services, Office of Administration and Resources Management, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

The petition and copies of comments received may be inspected and copied for a fee at the NRC Public Document Room, 2120 L Street, NW., Lower Level, Washington, DC.

FOR FURTHER INFORMATION CONTACT: Michael T. Lesar, Acting Chief, Rules Review Section, Regulatory Publications Branch, Division of Freedom of Information and Publications Services, Office of Administration and Resources Management, U.S. Nuclear Regulatory Commission, Washington, DC 20555, Telephone: 301-492-8926 or Toll Free: 800-368-5642.

SUPPLEMENTARY INFORMATION:

The petitioner requests that the NRC issue a regulation to require that a detectable odor be injected into the emissions of nuclear power plants and other nuclear processes over which the NRC has jurisdiction. The petitioner requests that the suggested requirement be imposed through an emergency rulemaking. The petition would require an amendment to the regulations contained in 10 CFR Part 20. Part 20 contains the Commission's Standards for Protection Against Radiation. A requirement of the type requested by the petitioner would result in the addition of the provision to §20.106, "Radioactivity in Effluents to Unrestricted Areas."

The petitioner believes that compliance with the suggested requirement by Commission licensees would immeasurably improve the health and safety of the public by providing for early detection of radiation leaks. The petitioner states that a detectable odor would give the public notice of the need to take health-protective measures.

The petitioner states that scientific studies prove that even the smallest amount of ionizing radiation may cause harmful health effects. The petitioner states that there is ample evidence that radiation causes increased infant mortality, genetic abnormalities, cancer, and a lowering of the immune system which makes the body more susceptible to disease. The petitioner states that records demonstrate that radiation plumes are erratic and unpredictable in their dispersion upon release because of varying weather and geo-physical characteristics of the terrain.

The petitioner also states that the natural gas industry observed the danger of odorless, colorless gas in its original state, and now requires inexpensive, non-toxic, recognizable odors to be injected into gas for commercial and domestic use. The purpose of the odor-additive is to help people detect gas leaks, and thereby provide confidence that the use of gas is safe.

Dated at Rockville, Maryland, this 27th day of January, 1989.

For the Nuclear Regulatory Commission.

Samuel J. Chilk,
Secretary of the Commission.

GE Stockholders' Alliance

P.O. Box 966 • Columbia, MD 21044 • (301) 381-2714

October 28, 1988

Secretary
Docketing & Service Branch
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Sir:

I respectfully submit a petition for emergency rulemaking to request that the Nuclear Regulatory Commission require a detectable odor to be injected into the emissions of nuclear power plants and other nuclear processess over which the NRC has jurisdiction. The compliance with this requirement would immeasurably improve health and safety of the public by providing for early detection of radiation leaks, giving the public notice of the need to take health-protective measures.

Background

Scientific studies prove that even the smallest amounts of ionizing radiation cause harmful health effects. There is ample evidence that radiation causes increased infant mortality, genetic abnormalities, cancer and leukemia, and a lowering of the immune system which makes the body more susceptible to disease.

Even though nuclear facilities are required to maintain monitoring stations, the accident at Three Mile Island demonstrates their deficiencies in being able to alert the population of dangerous releases.

Records also demonstrate that radiation plumes are erratic and unpredictable in their dispersion upon release, because of varying weather and geo-physical characteristics of the terrain.

The natural gas industry observed the danger of the odorless, colorless gas in its original state, and requires inexpensive, non-toxic mercaptains (recognizable odors) to be injected into gas for commercial and domestic use. The purpose of the odor-additive is to help people detect gas leaks, and thereby provide confidence that the use of gas is safe.

On behalf of myself, the General Electric Stockholders' Alliance which I represent, all people in this country, and all future generations, I implore you to expedite an emergency rule to require the injection of a detectable odor (similar to, but recognizably different from the mercaptains used in natural gas), into the emissions of nuclear power plants and other nuclear processes over which the NRC has licensing jurisdiction.

Respectfully Submitted,

Betty Schroeder

Betty Schroeder, Secretary

U.S. NUCLEAR REGULATORY COMMISSION
DOCKETING & SERVICE SECTION
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OF THE COMMISSION

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