The Federal Clean Air Act & Air Toxics

- 188 Chemicals listed in Section 112 (b)
- Congress looked at existing lists from states and federal programs to develop the list
- There is a process for adding and delisting chemicals - several chemicals have been delisted (e.g., caprolactam). Others are in the process (e.g., Methyl ethyl ketone)

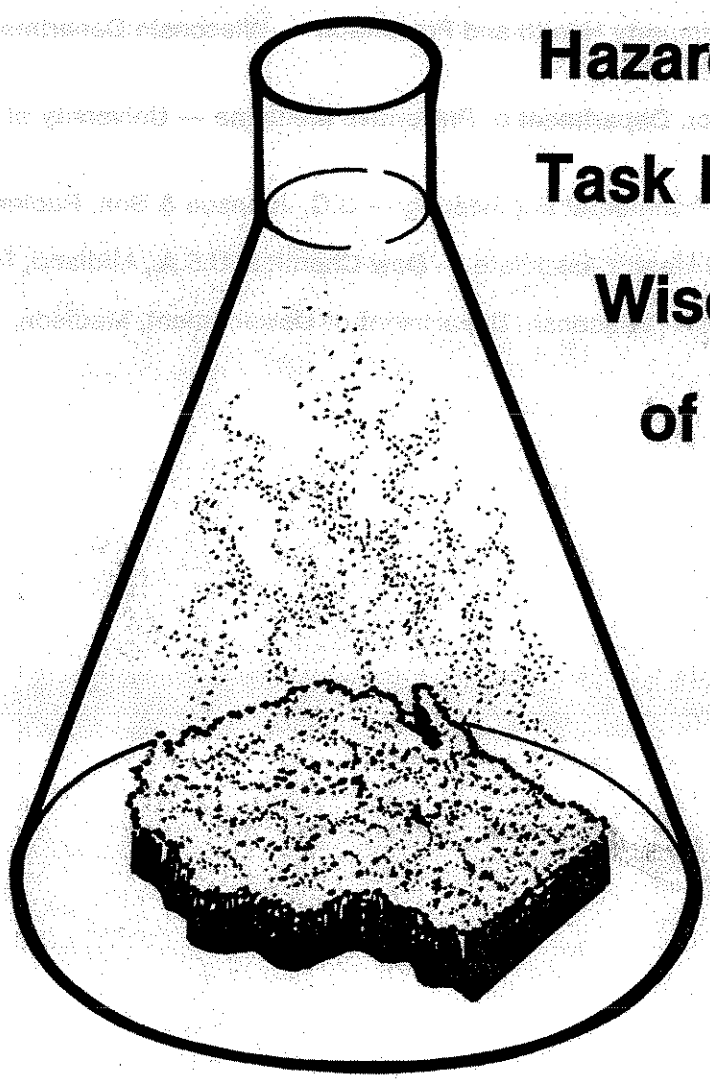
The Federal Clean Air Act & Air Toxics - Continued

- The threshold for major source is 10 tons of a single pollutant or 25 tons of a combination
- Standards are not based on ambient air concentrations, but the act established technology based standards for about 175 source categories (i.e. it is technology based, not risk based)

The Federal Clean Air Act & Air Toxics - Continued

- EPA revisits health impacts of technology based standards 8 yrs after MACT is promulgated (i.e. "residual risk")
- EPA then may revise standards for sources if residual risks are deemed to be too high
- EPA is developing methods for doing this - it has not been finalized
- Revised NR 445 risk provisions are consistent with current EPA guidance for inhalation exposures.

Report of Recommendations of the Hazardous Emissions Task Force to the Wisconsin Department of Natural Resources



July 1985

Hazardous Emissions Task Force

Robert Ginsburg, Director of Research — Citizens for a Better Environment, Chicago, IL.

Kevin Green, Research Associate — Citizens for a Better Environment, Chicago, IL.

Ivan Imm, Director, Bureau of Community Health and Prevention — Wisconsin Department of Health and Social Services, Madison, WI.

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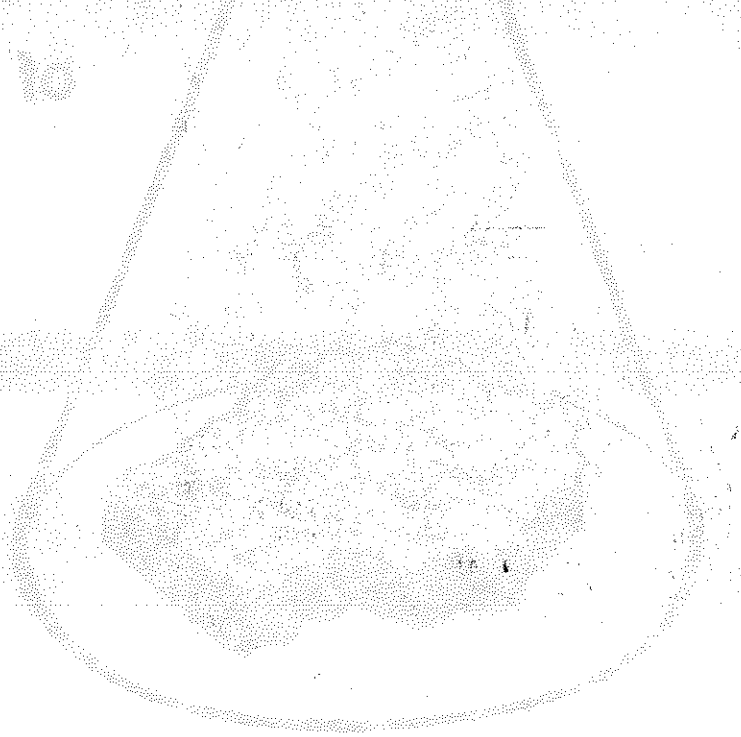
Thomas Stocksdale, Manager, Environmental Engineering — S.C. Johnson & Son, Racine, WI.

Theodore Torkelson, Occupational Health Associate — Dow Chemical U.S.A., Midland, MI.

John Yingling, Executive Assistant — Wisconsin Department of Development, Madison, WI.



Acknowledgements

Special acknowledgement is due Dr. Henry Anderson, Mr. Duane Gunderson, Department of Health and Social Services; Mr. Richard Kotenbeutel, Department of Development; Mr. Michael Carlton, Ms. Shelley Moore, Citizens for a Better Environment for their contributions in task force deliberations as alternates or former members; and Mr. Paul Yeung, Mr. John Hillary, Ms. Judy Hill and Mrs. Sandi Farr for their contributions as staff to the task force. Special attention is due Penny Kanable for her diligent work in typing iterative draft task force lists and reports.

CORRESPONDENCE/MEMORANDUM

STATE OF WISCONSIN

Date: July 30, 1985 *File Ref:* 1430

To: C.D. Besadny - AD/5

From: James Rickun - AM/3

Subject: Recommendations of the Hazardous Emissions Task Force

Attached is a report which contains the final recommendations of the Hazardous Emissions Task Force. As I'm sure you recall, the Hazardous Emissions Task Force was formed in May 1983, responding to a request by the Air Pollution Control Council regarding concern over health risks prompted by a lack of direction in hazardous air pollution control at the federal level.

With the basic mission of advising the department in procedures which may be needed in working to adequately protect the health and welfare of the citizens of the state, the task force was given the specific four-fold charge of:

- Recommending a definition for a "toxic and/or hazardous air emission".
- Recommending a methodology (standard setting process) to be established in rulemaking for establishing emission limits to adequately protect public health and welfare.
- Examining potential health impacts surrounding the use of 1,1,1-trichloroethane and methylene chloride and making recommendations as to the adequacy of existing regulations applied to these compounds.
- Recommending which sources of hazardous emissions should be exempt from permit requirements because the potential emissions would not pose a significant threat to public health, safety or welfare.

The "Report of Recommendations - Hazardous Emissions Task Force" contains specific recommendations responsive to each of the above charges was approved by a vote of five to two at the task force meeting held on July 23, 1985. At present, the Bureau of Air Management is assessing the recommendations and anticipates proposing draft administrative rules at the October or November Natural Resources Board meeting.

With your concurrence, I will prepare letters for each of the task force members thanking them for their service. Additionally, with your approval, we would like to transmit copies of the report to district air personnel, Natural Resources Board members and other interested parties. If after reviewing the report you have any questions, let me know.

JSR:cjg
cc: Linda Bochert - AD/5
Lyman Wible - AD/5
Donald Theiler - AM/3

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LIST OF APPENDICES

I. INTRODUCTION

This report documents the final recommendations of the Hazardous Emissions Task Force. It includes a definition of a hazardous air contaminant as well as emission control recommendations for approximately 500 chemical substances. The task force believes it has forged a reasoned opinion as to the approach the Department of Natural Resources should pursue in establishing a hazardous air contaminant control program.

The Hazardous Emissions Task Force recognizes that the process of developing a viable hazardous emission control program cannot end with these recommendations and, therefore, a successor group should be established to monitor the development and publication of new data and make recommendations for modifications to the lists of chemicals contained in this report. In this fashion the Department of Natural Resources can ensure the adequacy of its hazardous air contaminant control program.

Lastly, in making these recommendations, the Hazardous Emissions Task Force has not presupposed the existance or absence of a hazardous air contaminant problem in Wisconsin. Rather, these recommendations are made with an eye toward the prevention of such problems.

History and Charge

In the late 1970's, as a result of the 1977 Amendments to the Clean Air Act, the Bureau of Air Management was aggressively pursuing the control of hydrocarbon precursors of ozone. Two compounds, 1,1,1-trichloroethane and methylene chloride, commonly used solvents in degreasing and dry cleaning operations, were initially believed to be precursors of ozone. After considerable study the U.S. Environmental Protection Agency on July 22, 1980, determined that the two compounds were in fact not photochemically reactive and, therefore, did not contribute to the formation of ozone.

The Department initially proposed to include 1,1,1-trichloroethane and methylene chloride in Reasonably Available Control Technology regulations for controlling precursors of ozone. This proposal resulted in considerable controversy. Industry contended that it would be at a competitive disadvantage, since other states had exempted the compounds from Reasonably Available Control Technology regulations. The environmental community argued the compounds were suspected carcinogens, and exempting them from Reasonably Available Control Technology regulations would encourage their use. As a compromise the Natural Resources Board in July, 1982, exempted the two compounds from Reasonably Available Control Technology regulations but required users which emit more than one-half ton per year of one or both compounds, to register their use of the solvents.

The controversy over regulation of 1,1,1-trichloroethane and

methylene chloride led the Air Pollution Control Council, an advisory committee to the Natural Resources Board, to suggest forming a special group to investigate the need for regulation of hazardous emissions. Acting on the Council's request, the Division of Environmental Standards in February 1983, began soliciting nominations for members of the Hazardous Emissions Task Force.

In addition to its basic mission of advising the department in procedures which may be needed in working to adequately protect the health and welfare of the citizens of the state, the Hazardous Emissions Task Force was given the specific four-fold charge of:

1. Recommending a definition for a "toxic and/or hazardous air emission".

2. Recommending a methodology (standard setting process) to be established in rulemaking for establishing emission limits to adequately protect public health and welfare.

3. Examining potential health impacts surrounding the use of 1,1,1-trichloroethane and methylene chloride and making recommendations as to the adequacy of existing regulations applied to these compounds.

4. Recommending which sources of hazardous emissions should be exempt from permit requirements because the potential emissions would not pose a significant threat to public

health, safety or welfare.

The task force is composed of seven members; nominated by industrial associations, environmental groups and state government agencies. The task force members and their affiliations are:

Robert Ginsburg, Director of Research - Citizens for a Better Environment, Chicago, IL/Milwaukee, WI

Kevin Green, Research Associate - Citizens for a Better Environment, Chicago, IL/Milwaukee, WI

Ivan Imm, Director, Bureau of Community Health and Prevention - Department of Health and Social Services, Madison, WI

Marty Kanarek, Associate Professor, Department of Preventive Medicine - University of Wisconsin, Madison, WI

Thomas Stocksdale, Manager, Environmental Engineering - S.C. Johnson & Son, Racine, WI

Theodore Torkelson, Occupational Health Associate - Dow Chemical U.S.A, Midland, MI

John Yingling, Executive Assistant - Department of

Development, Madison, WI

James Rickun, Chief, Air Impact Analysis and Planning Section, Bureau of Air Management - Department of Natural Resources, Madison, Wisconsin served as ex officio Task Force chairman.

II. DEFINITION OF A HAZARDOUS AIR CONTAMINANT

The task force recommends the following definition of a hazardous air contaminant:

> "Hazardous air contaminant" means any air contaminant for which no ambient air quality standard is set in ch. NR 155, Wis. Adm. Code, and which the department determines may cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness, or may pose a significant threat to human health or the environment. Hazardous air contaminants include but are not limited to the air contaminants listed in Appendices 1, 2, 3, or 4."

This definition of a hazardous air contaminant parallels the definition of a hazardous air pollutant contained in Section 112 of the Clean Air Act as amended, but has been expanded to include those contaminants which pose a threat to human health or the environment.

In response to concerns voiced by the industrial community

regarding a clear understanding of substances to be regulated within the hazardous emissions permitting process, as well as an interest expressed by environmental groups in securing information on emissions of hazardous substances from Wisconsin industries, the task force agreed on a list of substances which it concluded would be of initial regulatory concern. As an aid in the list formulation effort the task force relied upon the work of the American Conference of Governmental Industrial Hygienists, an organization recognized worldwide for its expertise in establishing acceptable exposure concentrations for workers in industrial settings. Borrowing on years of American Conference of Governmental Industrial Hygienists experience, the task force critically reviewed the 1983/1984 list of substances for which the American Conference of Governmental Industrial Hygienists has ascribed workplace exposure guidelines.

Early in this review process the task force recognized that many substances, though listed by American Conference of Governmental Industrial Hygienists for control in potentially concentrated workplace conditions, would not be of concern in dilute ambient concentrations and, therefore, should not be the subject of initial regulatory development efforts. The task force also decided to separate substances of recognized or suspected carcinogenic potential into a separate class of substances for consideration at a later date. These early decisions led to the development of eight criteria for deletion and classification of substances from the American Conference of Governmental Industrial

Hygienists list. Although agreed on the eight criteria for classification and deletion, the task force concluded that these criteria should not preclude the department from regulating any air contaminant, if the department finds such regulation necessary to provide adequate protection for public health and welfare. The criteria applied by the task force for deletion and classification of substances were:

1. Substances which the Hazardous Emissions Task Force believes the only use within Wisconsin are in such small quantities as not to pose a threat to public health and welfare.

2. Inert gases or vapors which when present in high concentrations act primarily as simple asphyxiants without other significant physiologic effects.

3. Inert dusts which, unlike fibrogenic dusts, have a long history of little adverse effect on the lung and do not produce significant organic disease or toxic effect when workplace exposures are kept under reasonable control.

4. Substances, in vapor or gaseous form, for which the American Conference of Governmental Industrial Hygienists has ascribed a threshold limit value - time weighted average greater than 99 parts per million (ppm) (with a few minor exceptions).

5. Criteria pollutants or hazardous pollutants for which national emission standards have been established.

6. Substances, in particulate form, for which the American Conference of Governmental Industrial Hygienists has ascribed a threshold limit value - time weighted average equal to or greater than 10 milligrams per cubic meter.

7. Substances possessing an explosive nature which require safety procedures precluding ambient concentrations which would present hazardous concerns.

8. Substances which are recognized or suspected to have carcinogenic or cocarcinogenic potential by the American Conference of Governmental Industrial Hygienists.

The task force reviewed each of the 653 substances included in the 1983/1984 American Conference of Governmental Industrial Hygienists lists, applying the eight criteria listed above. The result of this effort was later updated to reflect the 1984/1985 American Conference of Governmental Industrial Hygienists list. Substances which were not deleted, or identified by the American Conference of Governmental Industrial Hygienists as carcinogens are specified in Appendix 1, Hazardous Air Contaminants That Have Acceptable Ambient Concentrations With Their Minimum Emission Rate for Requiring a Hazardous Air Contaminant Control Permit.

The Hazardous Emissions Task Force next turned its attention to substances which had been classified by the International Agency for Research on Cancer and/or the National Toxicology Program. Each of these bodies base their hazard classifications on the presence-of-evidence provided by studies.

Established in 1965, the goal of the International Agency for Research on Cancer is to promote international collaboration on cancer research and to provide expert independent scientific opinion on environmental carcinogens to, among others, governmental authorities. To achieve this goal the agency publishes a balanced evaluation of data through the deliberations of an international group of experts in chemical carcinogenesis. These publications attempt to place into perspective the present state of knowledge with the final aim of evaluating available data in terms of possible human risk. No recommendations are given concerning preventive measures or legislation, since such matters depend on risk/benefit evaluation which seems best made by individual governments.

The National Toxicology Program was established in 1978, as a cooperative effort within the Department of Health and Human Services to develop scientific information needed to better protect the American people from exposure to toxic chemicals. Composed of resources provided by the National Cancer Institute, the National Institute of Environmental Health Sciences, the

National Center for Toxicological Research and the National Institute for Occupational Safety and Health, the National Toxicology Program has two roles: to determine the toxic effects of chemicals and to develop better, faster, and less expensive test methods. One of the Program's many goals is to communicate the results of the it's testing and methods development programs to government research and regulatory agencies.

Based on the presence-of-evidence classification of a chemical, its own judgement, and whether it believed the chemical was currently being used in Wisconsin, the task force recommended 133 chemicals for inclusion on three separate lists. The task force used existing lists constructed by the International Agency for Research on Cancer, the National Toxicology Program and the American Conference of Governmental Industrial Hygienists but did not review the original toxicological data for these substances.

The task force constructed Appendix 2, Hazardous Air Contaminants Without an Accepted Ambient Concentration Requiring Application of Best Commercially Available Control Technology (without regard to economics), from lists of substances which the International Agency for Research on Cancer or the National Toxicology Program have classified as having sufficient evidence of carcinogenicity from studies of humans which indicate a causal relationship between the agent and human cancer.

Appendix 3, Hazardous Air Contaminants Without an Accepted Ambient

Concentration Requiring Application of Best Commerically Available Control Technology, was constructed from lists of substances which the International Agency for Research on Cancer or the National Toxicology Program have classified as (1) having limited evidence of carcinogenicity from studies of humans which indicate that causal interpretation is credible but that alternative explanations, such as chance, bias or confounding, could not be adequately excluded or (2) having sufficient evidence of carcinogencity from studies of experimental animals which indicate that there is an increased incidence of malignant or benign tumors: (a) in multiple species or strains, (b) on multiple experiments (preferably with different routes of administration or using different dose levels), or (c) to an unusual degree with regard to incidence, site, or type of tumor or age at onset.

Appendix 4, Hazardous Air Contaminants Without an Accpeted Ambient Concentration Requiring Application of Reasonably Available Control Technology, is composed of one class of compounds (nitrosoamines) which have been classified by the National Toxicology Program. In composing the lists of substances contained in Appendices 1 through 4, the task force has assumed that the lists would be promulgated in Wisconsin Administrative Code and that any modifications to the lists, once established in code, would be accomplished through the administrative rulemaking process.

III. HAZARDOUS AIR CONTAMINANT EMISSION LIMITATIONS

The Hazardous Emissions Task Force recommends the following limitations for hazardous air contaminants:

"1. No person may cause, allow or permit emissions of substances listed in Appendix 1 in such quantities and durations to cause ambient concentrations such that the following would be exceeded:

A. One percent (1%) of the Threshold Limit Value - Time Weighted Average established by the American Conference of Governmental Industrial Hygienists for any consecutive twenty-four hour (24-hour) averaging period.

B. One percent (1%) of the Threshold Limit Value - Ceiling established by the American Conference of Governmental Industrial Hygienists for any one-hour (1-hour) averaging period."

"2. Any source not exempted under the de-minimus provisions specified in Chapter 5 shall control emissions of hazardous air contaminants listed in Appendix 2, 3, or 4 in the following manner:

A1. For hazardous air contaminants in Appendix 2, a level of

control which is Best Commercially Available Control Technology, without consideration of cost.

A2. The Department may grant a variance from the control provisions of paragraph A1. if a source can adequately demonstrate that compliance with the provisions of paragraph A1. would be economically infeasible when consideration is given to:

i. The impact on public health and the environment.
ii. The societal welfare of the source's existence.

A risk of more than one in one million to exposed populations shall not be allowed under any variance granted by the Department.

B. For hazardous air contaminants in Appendix 3, a level of control which is Best Commercially Available Control Technology. Best Commercially Available Control Technology is the maximum level of control taking into account cost, energy requirements, and relative benefits of differing control technologies.*

* The term "relative benefits of differing control technologies" is exemplified by the case where a source proposes carbon adsorption controls which will achieve a 99.2% control efficiency and cost $400,000; as opposed to incineration control which would also cost $400,000 for 99.7% efficiency, but the operating cost would require large additional expenditures. The task force believes this approach would provide both the regulated community and the Department the flexibility each needs for effective, efficient control.

C. For hazardous air contaminants in Appendix 4, a level of control which is Reasonably Available Control Technology as defined in NR 154.01 (162), Wis. Adm. Code."

"3. Notwithstanding 1 and 2 above, any source subject to the requirements in s. NR 154.19(3), (4), (5), or (6), Wis. Adm. Code, shall not be subject to the requirements for that hazardous air contaminant under this section."

The Threshold Limit Value - Time Weighted Average established by the American Conference of Governmental Industrial Hygienists refers to the time-weighted average airborne concentration for a normal 8-hour workday and a 40-hour workweek under which it is believed nearly all workers may be repeatedly exposed without adverse effect. The Threshold Limit Value - Ceiling refers to maximum limits that should not be exceeded since substances with ceiling limits are predominately fast-acting irritants.

Although the American Conference of Governmental Industrial Hygienists has unequivocally stated that the Threshold Limit Values are not intended for use in the evaluation or control of community air pollution nuisances, or in estimating the toxic potential of continuous uninterrupted exposures, the task force believes the Threshold Limit Values represent the reasoned opinion of a group of experienced, objective professionals in the fields of industrial hygiene and toxicology, and represents a good source of guidance with regard to inhaled materials. In order to overcome

several recognized deficiences associated with the use of Threshold Limit Values in ambient situations; such as individual human variation and susceptibility, and intermittent workplace exposure vis-a-vis continuous ambient exposure, the task force agreed to applying a one-hundred fold safety factor to the Threshold Limit Value - Time Weighted Average. This one-hundred fold safety factor for acceptable ambient concentrations is in addition to the safety factor already included in the Threshold Limit Value - Time Weighted Average for protection in the workplace. The task force agrees that the recommended value of 1% of the Threshold Limit Value - Time Weighted Average as an acceptable ambient concentration be applied at the point of maximum ambient air concentration external to the source.

If, however, the department determines that, due to the effects of background and multiple sources, ambient levels of hazardous air contaminants in Appendix 1 exceed 1% of the Threshold Limit Value - Time Weighted Average the Department of Natural Resources shall evaluate the potential threat to public health; and if it determines such risk to be significant shall develop a control plan to protect public health, welfare and the environment.

For substances contained in Appendices 2, 3, or 4, rather than attempting to specify an acceptable ambient concentration, the task force recommended emission control technology requirements it believed appropriate to the International Agency for Research on Cancer and/or National Toxicology Program classification of the contaminant.

In determining ambient concentrations of hazardous air contaminants through dispersion modelling of sources of these contaminants, the task force also recommends dilution credit up to "good engineering practice" stack height, as defined by the U.S. Environmental Protection Agency, and that compliance determinations are to be based on stack emission tests.

IV. ADEQUACY OF EXISTING REGULATION OF 1,1,1-TRICHLOROETHANE AND METHYLENE CHLORIDE

The Hazardous Emissions Task Force recommends that existing regulations for 1,1,1-trichloroethane (methyl chloroform) are adequate, but recommends that current regulations for methylene chloride (dichloromethane) are inadequate to ensure protection of public health and, therefore, have included methylene chloride in Appendix 1.

The Hazardous Emissions Task Force decision that current regulations on 1,1,1,-trichloroethane (reporting the amount used) was adequate, is based primarily on a February 1984, U.S. Environmental Protection Agency Health Assessment Document. This assessment concluded that, "On the basis of animal bioassays performed to date and in the absence of epidemiological information, it is not possible to classify methyl chloroform as to its carcinogenic potential in humans. The weight of available evidence obtained from both human and animal data suggest that long-term exposure to environmental levels of methyl chloroform

poses no serious health concern to the general population. One must recognize, however, that as new information becomes available, further re-evaluation of the health consequences of exposure may become necessary."*

Regarding methylene chloride, the Hazardous Emissions Task Force concluded that this substance has a Threshold Limit Value - Time Weighted Average of 100 parts per million and a carboxyhemoglobin potential concurrent with its use, as well as mutagenic potential, and therefore, the task force decided it warranted a level of control beyond simple reporting of quantity used. For these reasons, the task force recommended that emissions of methylene chloride be controlled to acceptable ambient concentrations of 1% of the Threshold Limit Value - Time Weighted Average.

*United States Environmental Protection Agency, Health Assesement 1,1,1-Trichloroethane (methyl chloroform). (Washington D.C.: EPA-600/8-82-003F 1984), p. 1-3.

V. EXEMPTIONS FROM HAZARDOUS AIR CONTAMINANT PERMITTING REQUIREMENTS

The Hazardous Emissions Task Force recommends the following sources be exempted from hazardous air contaminant permit requirements:

"1. Except as provided in subparagraph 2 or 3, a direct source otherwise exempt from permit requirements under s. NR 154.04(2) or Chapter NR 407, Wis. Adm. Code, is exempt from the requirement to obtain a permit under the toxic air contaminant criteria if it meets the following:

A. The source's potential emission of any hazardous air contaminant listed in Appendix 1 is less than the listed emission rate for the respective hazardous air contaminant in Appendix 1, and;

B. For individual categories of emission units using materials containing substances listed in Appendix 2, the materials used must contain less than 500 parts per million (0.05 percent) of each of the substances in Appendix 2; or the annual aggregate use of any substance listed in Appendix 2 must be less than 25 pounds, and;

C. For individual categories of emission units using materials containing substances listed in Appendix 3 or 4, the materials used must contain less than 1000 parts per million (0.1 percent) of each of the substances in Appendix 3 or 4; or the annual aggregate use of any substance listed in Appendix 3 or 4 must be less than 1000 pounds, and;

D. If the source includes combustion processes the annual aggregate emissions of the following hazardous air contaminants must be less than:

1. For vinyl chloride, 2 pounds
2. For polychlorinated biphenyls, 25 pounds
3. For coke oven emissions, 300 pounds
4. For polycyclic organic matter, 300 pounds

2. The exemption in paragraph 1 does not apply if total facility emissions exceed 10 pounds per year for chromium, nickel or cadmium or 100 pounds per year for any other substance listed in Appendix 2 or 500 pounds per year for any other substance listed in Appendix 3.

3. Notwithstanding 1 above, sources combusting chlorinated solvents together with aromatic solvents or any municipal incinerator or hazardous waste incinerator shall not be exempt from the requirement to obtain a permit under the hazardous air

contaminant criteria."

The Hazardous Emissions Task Force recommendation for the permit exemption of sources of hazardous air contaminants contained in Appendix 1, is based on a limited air dispersion scenario employing conservative source emission characteristics which were then compared to the Acceptable Ambient Concentration of 1 percent of the Threshold Limit Value - Time Weighted Average discussed previously in Chapter III. Basically, the task force believed that if a maximum emission rate, which would not result in an ambient concentration exceeding the prescribed acceptable ambient concentration, could be ascertained, then a source with a maximum potential emission rate below such a level, could not, by itself, cause an exceedance of the acceptable ambient concentration. Based on a source simulation procedure performed by staff of the Bureau of Air Management and detailed in Appendix 5, the Bureau of Air Management has calculated and the Hazardous Emissions Task Force has recommended a maximum emission rate in pounds per hour for each hazardous air contaminant contained in Appendix 1 as the source's maximum potential emission rate below which the source would not be required to obtain a hazardous air contaminant control permit.

For sources of hazardous air contaminants contained in Appendix 2, 3, or 4, such an approach was not possible since these contaminants do not have an accepted ambient concentration. For such sources the task force decided to specify maximum use levels of these

contaminants, believing that use could be readily ascertained by the source and that in all likelihood no more than 10 percent of the contaminant used in process sources would escape during the production process. The task force furthered this concept by not only recommending minimum hazardous air contaminant use requiring a hazardous air contaminant permit, but included an additional determinant based on the degree of hazardous contaminant concentration present in other materials used by a source in the production process.

Lastly, the task force believed that certain hazardous air contaminants associated with combustion sources warranted individual emission rate permit exemptions. A singular exception to this structure was tetrachlorodibenzo-para-dioxin generated from combustion of chlorinated and aromatic solvents or from municipal or hazardous waste incinerators. The task force believes these emissions to be dangerous enough to warrant no permit exemptions for such sources.

In this manner the task force believes it has recommended a structure for specifying which sources of hazardous air contaminants should be required to obtain a hazardous air contaminant control permit, which not only protects public health and welfare but also minimizes requirements for very small users of hazardous substances who do not pose a threat to human health or the environment.

APPENDIX 1

APPENDIX 1

Hazardous Air Contaminants That Have Acceptable Ambient Concentrations With Their Minimum Emission Rate for Requiring a Hazardous Air Contaminant Control Permit.

(The notation (c) indicates those contaminants with ceiling limits which are minimum emission rates averaged over a one-hour period. Those contaminants without such a notation are minimum emission rates per hour averaged over a twenty-four hour period.)

Contaminant - Emission Rate in Pounds per Hour

Acetaldehyde - 6.246

Acetic acid - 0.868

Acetic anhydride - 0.422 (c)

Acetonitrile - 2.429

Acrolein - 0.0087

Acrylamide - 0.010

Acrylic acid - 1.041

Aldrin - 0.0087

Allyl alcohol - 0.174

Allyl chloride - 0.104

Allyl propyl disulfide - 0.416

Aluminum

- Pyro powders - 0.174
- Welding fumes - 0.174
- Soluble salts - 0.069
- Alkyls - 0.069

2-Aminopyridine - 0.069

Amitrole - 0.0069

Ammonia - 0.625

Ammonium persulfate - 0.174

Aniline - 0.347

Anisidine - 0.017

Antimony & compounds, as Sb - 0.017

ANTU - 0.010

Arsine - 0.0069

Asphalt (petroleum) fumes - 0.174

Atrazine - 0.174

Azinphos-methyl - 0.0069

Barium

Soluble compounds, as Ba - 0.017

Benomyl - 0.347

Benzoyl peroxide - 0.174

Benzyl chloride - 0.174

Biphenyl - 0.052

Borates, tetra, sodium salts

Anhydrous - 0.035

Decahydrate - 0.174

Pentahydrate - 0.035

Boron tribromide - 0.211 (c)

Boron trifluoride - 0.063 (c)

Bromacil - 0.347

Bromine - 0.024

Bromine pentafluoride - 0.024

2-Butoxyethanol - 4.164

Butyl acrylate - 1.909

n-Butyl alcohol - 3.165 (c)

Butylamine - 0.317 (c)

tert-Butyl chromate, as CrO3 - 0.0021 (c)

n-Butyl glycidyl ether (BGE) - 4.685

n-Butyl lactate - 0.868

o-sec-Butylphenol - 1.041

p-tert-Butyltoluene - 2.082

Calcium cyanamide - 0.017

Calcium hydroxide - 0.174

Calcium oxide - 0.069

Camphor (Synthetic) - 0.416

Caprolactam

Dust - 0.035

Vapor - 0.694

Captafol - 0.0035

Captan - 0.174

Carbon black - 0.121

Carbaryl - 0.174

Carbofuran - 0.0035

Carbon disulfide - 1.041

Carbon tetrabromide - 0.049

Carbonyl fluoride - 0.174

Catechol (Pyrocatechol) - 0.694

Cesium hydroxide - 0.069

Chlordane - 0.017

Chlorinated camphene - 0.017

Chlorinated diphenyl oxide - 0.017

Chlorinated naphthalenes

tri - 0.174

tetra - 0.069

penta - 0.017

hexa - 0.0069

octa - 0.0035

Chlorine - 0.104

Chlorine dioxide - 0.010

Chlorine trifluoride - 0.0084 (c)

Chloroacetaldehyde - 0.063 (c)

a-Chloroacetophenone

(Phenacyl chloride) - 0.010

Chloroacetyl chloride - 0.0069

Chlorobenzene

(monochlorobenzene) - 12.145

1-Chloro-1-nitropropane - 0.347

Chloropicrin - 0.024

B-Chloroprene - 1.562

O-Chlorostyrene - 9.890

O-Chlorotoluene - 8.675

Chlorpyrifos - 0.0069

Chromium

Metal - 0.017

Chromium (II) compounds as Cr - 0.017

Chromium (III) compounds, as Cr - 0.017

Chromium (VI) compounds as Cr

Water soluble - 0.0017

Chromyl chloride - 0.0052

Cobalt, as Co

Metal, dust & fume - 0.0017

Cobalt carbonyl, as Co - 0.0035

Cobalt hydrocarbonyl, as Co - 0.0035

Copper

Fume - 0.0069

Dusts & mists, as Cu - 0.035

Cresol, all isomers - 0.763

Crotonaldehyde - 0.208

Crufomate - 0.174

Cumene - 8.502

Cyanamide - 0.069

Cyanides, (inorganics) as CN - 0.174

Cyanogen - 0.694

Cyanogen chloride - 0.013 (c)

Cyclohexanol - 6.940

Cyclohexanone - 3.470

Cyclohexylamine - 1.388

Cyclopentadiene - 6.940

Cyhexatin - 0.174

Demeton - 0.0035

Diacetone alcohol - 8.328

Diazinon - 0.0035

Diazomethane - 0.014

Diborane - 0.0035

2-N-Dibutylaminoethanol - 0.486

Dibutyl phosphate - 0.174

Dibutyl phthalate - 0.174

O-Dichlorobenzene - 6.330 (c)

1,3-Dichloro-5,5-dimethyl hydantoin - 0,0069

1,1-Dichloroethane - 28,107

1,2-Dichloroethylene - 27.413

Dichloroethyl ether - 1.041

1,1-Dichloro-1-nitroethane - 0,347

Dichloropropene - 0.174

2,2-Dichloropropionic acid - 0,208

Dichlorvos - 0.035

Dicrotophos - 0.0087

Dicyclopentadiene - 1.041

Dieldrin - 0.0087

Diethanolamine - 0.521

Diethylamine - 1.041

Diethylaminoethanol - 1.735

Diethylene triamine - 0.139

Diethyl phthalate - 0.174

Diglycidyl ether (DGE) - 0.017

Diisobutyl ketone - 5.205

Diisopropylamine - 0.694

Dimethyl acetamide - 1.215

Dimethylamine - 0.625

Dimethylaniline

(N,N-Dimethylaniline) - 0.868

Dimethylformamide - 1.041

Dimethylphthalate - 0.174

Dinitrobenzene - 0.035

Dinitro-o-cresol - 0.0069

Dinitrotoluene - 0.052

Dioxathion - 0.0069

Dipropyl ketone - 8.155

Diquat - 0.017

Disulfiram - 0.069

Disulfoton - 0.0035

Divinyl benzene - 1.735

Endosulfan - 0.0035

Endrin - 0.0035

EPN - 0.017

Ethanolamine - 0.278

Ethion - 0.014

2-Ethoxyethanol - 0.312

2-Ethoxyethyl acetate - 0.937

Ethyl acrylate - 0.694

Ethylamine - 0.625

Ethyl amyl ketone - 4.511

Ethyl benzene - 15.095

Ethyl butyl ketone - 7.981

Ethylene chlorohydrin - 0.063 (c)

Ethylenediamine - 0.868

Ethylene dichloride - 1.388

Ethylene glycol vapor - 2.638 (c)

Ethylenimine - 0.035

Ethyl formate - 10.410

Ethylidene norbornene - 0.528 (c)

N-Ethylmorpholine - 0.798

Ethyl silicate - 2.950

Fensulfothion - 0.0035

Fenthion - 0.0069

Ferrovanadium dust - 0.035

Fluorides, (inorganics) as F - 0.087

Fluorine - 0.069

Fonofos - 0.0035

Formaldehyde - 0.052

Formamide - 1.041

Furfural - 0.278

Furfuryl alcohol - 1.388

Germanium tetrahydride - 0.021

Glycidol - 2.603

Heptachlor - 0.017

Hexachlorocyclopentadiene - 0,0035

Hexachloroethane - 3.470

Hexane (n-Hexane) - 6.246

sec-Hexyl acetate - 10.410

Hexylene glycol - 2.638 (c)

Hydrogenated terphenyls - 0.174

Hydrogen bromide - 0.211 (c)

Hydrogen chloride - 0.148 (c)

Hydrogen cyanide - 0.211 (c)

Hydrogen fluoride - 0.053 (c)

Hydrogen peroxide - 0.052

Hydrogen sulfide - 0.486

Hydroquinone - 0.069

2-Hydroxypropyl acrylate - 0.104

Indium - 0.0035

Iodine - 0.021 (c)

Iron oxide fume (Fe203) as Fe - 0.174

Iron pentacarbonyl, as Fe - 0.028

Iron salts, soluble as Fe - 0.035

Isobutyl alcohol - 5.205

Isooctyl alcohol - 9.369

Isophorone - 0.528 (c)

Isophorone diisocyanate - 0.0031

Isopropoxyethanol - 3.644

Isopropylamine - 0.416

N-isopropylaniline - 0.347

Isopropyl glycidyl ether - 8.328

Ketene - 0.031

Lithium hydride - 0.00087

Maleic anhydride - 0.035

Manganese, as Mn

Dust and compounds - 0.106 (c)

Fume - 0.035

Manganese cyclopentadienyl tricarbonyl, as Mn - 0.0035

Manganese tetroxide - 0.035

Mercury

Alkyl compounds - 0.00035

All forms except alkyl

Vapor - 0.0017

Aryl and inorganic compounds - 0.0035

Mesityl oxide - 2.082

Methacrylic acid - 2.429

Methomyl - 0.087

2-Methoxyethanol - 0.555

2-Methoxyethyl acetate - 0.833

4-Methoxyphenol - 0.174

Methyl acrylate - 1.215

Methylacrylonitrile - 0.104

Methylamine - 0.416

Methyl n-amyl ketone - 8.155

N-Methyl aniline - 0.069

Methyl bromide - 0.694

Methyl n-butyl ketone - 0.694

Methyl chloride - 3.644

Methyl 2-cyanoacrylate - 0.278

Methylcyclohexanol - 8.155

o-Methylcyclohexanone - 7.981

Methylcyclopentadienyl manganese tricarbonyl, as Mn - 0.0069

Methylene bisphenyl isocyanate - 0.0042 (c)

Methylene bis (4-cyclohexylisocyanate) - 0.0023 (c)

Methylene chloride - 12.145

Methyl demeton - 0.017

4,4-Methylene dianiline - 0.028

Methyl ethyl ketone peroxide - 0.032 (c)

Methyl formate - 8.675

Methyl isoamyl ketone - 8,328

Methyl isobutyl carbinol - 3,470

Methyl isobutyl ketone - 7,114

Methyl isocyanate - 0.0017

Methyl mercaptan - 0.035

Methyl methacrylate - 14.227

Methyl parathion - 0.0069

Methyl silicate - 0.208

a-Methyl styrene - 8.328

Mevinphos - 0.0035

Molybdenum, as Mo

Soluble compounds - 0.174

Monocrotophos - 0.0087

Morpholine - 2.429

Naled - 0.104

Naphthalene - 1.735

Nitric acid - 0.174

P-Nitroaniline - 0.104

Nitrobenzene - 0.174

P-Nitrochlorobenzene - 0.104

Nitroethane - 10.757

Nitrogen trifluoride - 1.041

Nitromethane - 8.675

1-Nitropropane - 3.123

Nitrotoluene - 0.382

Oxalic acid - 0.035

Oxygen difluoride - 0.0021 (c)

Paraffin wax fume - 0.069

Paraquat

Respirable sizes - 0.0035

Parathion - 0.0035

Pentaborane - 0.00035

Pentachlorophenol - 0.017

Perchloroethylene - 11.625

Perchloromethyl mercaptan - 0,028

Perchloryl fluoride - 0.486

Phenol - 0.659

Phenothiazine - 0.174

P-Phenylene diamine - 0.0035

Phenyl ether vapor - 0.243

Phenyl glycidyl ether (PGE) - 0.208

Phenyl mercaptan - 0.069

Persulfates, alkali metal - 0.174

Phorate - 0.0017

Phosgene - 0.014

Phosphine - 0.014

Phosphoric acid - 0.035

Phosphorus (yellow) - 0.0035

Phosphorus oxychloride - 0,021

Phosphorus pentachloride - 0.035

Phosphorus pentasulfide - 0.035

Phosphorus trichloride - 0.052

Phthalic anhydride - 0.208

m-Phthalodinitrile - 0.174

Pindone - 0.0035

Piperazine dihydrochloride - 0.174

Platinum

Metal - 0.035

Soluble salts, as Pt - 0.000069

Potassium hydroxide - 0.042 (c)

Potassium persulfate - 0.174

Propargyl alcohol - 0.069

Propionic acid - 1.041

Propoxur - 0.017

n-Propyl nitrate - 3.644

Propylene dichloride - 12.145

Propylene oxide - 1.735

Pyrethrum - 0.174

Pyridine - 0.521

Quinone - 0.014

Resorcinol - 1.562

Rhodium

Metal - 0.035

Soluble compounds, as Rh - 0.00035

Rosin core solder pyrolysis products, as formaldehyde - 0.0035

Rotenone (commercial) - 0.174

Selenium compounds - 0.0069

Silicon tetrahydride (Silane) - 0.243

Sodium bisulfite - 0.174

Sodium fluoroacetate - 0.0017

Sodium hydroxide - 0.042 (c)

Sodium metabisulfite - 0.174

Sodium persulfate - 0.174

Stibine - 0.017

Stoddard solvent (mineral spirits) - 18.218

Strychnine - 0.0052

Styrene, monomer - 7.461

Sulfotep - 0.0069

Sulfur monochloride - 0.127 (c)

Sulfur pentafluoride - 0.0021 (c)

Sulfur tetrafluoride - 0.0084 (c)

Sulfuryl fluoride - 0.694

Tellurium and compounds, as Te - 0.0035

TEPP - 0.0017

Terphenyls - 0.106 (c)

1,1,2,2,-Tetrachloroethane - 0.243

Tetrahydrofuran - 20.473

Tetramethyl succinonitrile - 0.104

Tetrasodium pyrophosphate - 0.174

Thallium

Soluble compounds, as TI - 0.0035

Thioglycolic acid - 0.174

Thionyl chloride - 0.106 (c)

Thiram - 0.174

Tin

Metal - 0.069

Oxide & inorganic compounds, except SnO4, as Sn - 0.069

Organic compounds, as Sn - 0.0035

Toluene (toluol) - 13.013

Toluene-2,4-diisocyanate (TDI) - 0.0014

m-Toluidine - 0.312

Tributyl phosphate - 0.087

Trichloroacetic acid - 0.174

1,2,4-Trichlorobenzene - 0.844 (c)

1,1,2-Trichloroethane - 1.562

Trichloroethylene - 9.369

1,2,3-Trichloropropane - 10.410

Triethylamine - 1.388

Trimellitic anhydride - 0.0014

Trimethylamine - 0.833

Trimethyl benzene - 4.338

Trimethyl phosphite - 0.347

Triorthocresyl phosphate - 0.0035

Triphenyl phosphate - 0.104

Tungsten, as W

Insoluble compounds - 0.174

Soluble compounds - 0.035

Uranium (natural)

Soluble & Insoluble, as U - 0.0069

Valeraldehyde - 6.073

Vanadium, as V205

Respirable dust and fume - 0.0017

Vinyl acetate - 1.041

Vinylidene chloride - 0.694

Vinyl toluene - 8.328

Warfarin - 0.0035

Xylene - 15.095

m-Xylene a,a'-diamine - 0.0021 (c)

Xylidine - 0.347

Zinc chloride fume - 0.035

Zinc oxide

Fume - 0.174

Zirconium compounds, as Zr - 0.174

APPENDIX 2

APPENDIX 2

Hazardous Air Contaminants Without an Accepted Ambient Concentration Requiring Application of Best Commercially Available Control Technology (without regard to economics)

Acrylonitrile

Aflatoxins

4-Aminobiphenyl

Arsenic and inorganic compounds

Asbestos

Auramine (technical grade)

Benzene

Benzidine

Beryllium and beryllium compounds

Bis (chloromethyl) ether (BCME) and technical grade chloromethyl methyl ether (CMME)

Chromium (VI), water insoluble compounds

Coke oven emissions

Diethyl sulphate

Dimethyl sulfate

2-Naphthylamine

Nickel and inorganic nickel compounds (including nickel carbonyl)

Polybrominated biphenyls (PBB)

Polychlorinated biphenyls (PCB)

Thorium dioxide

2,3,7,8 - Tetrachloro-dibenzo-p-dioxin

O-Toliudine

Vinyl bromide

Vinyl chloride

Manufacture of:

(Azathioprine, N,N-Bis (2-chloroethyl) 2-naphthylamine (chloronaphazine), 1,4-Butanediol dimethanesulphonate (myleran),Chlorambucil, Cyclophosphamide, Diethylstilbestrol (DES), Melphalan, Mustard Gas, Nitrogen Mustards, Oxymetholone, Phenacetin, Procarbazine and procarbazine hydrochloride, Treosulphan)