

ILLINOIS POLLUTION CONTROL BOARD
August 26, 1993

IN THE MATTER OF:)
TOXIC AIR CONTAMINANTS LIST,) R90-1(D)
STYRENE (35 Ill. ADM. CODE) (Rulemaking)
232.Appendix A))

Proposed Rule.

First Notice.

OPINION AND ORDER OF THE BOARD (by C. A. Manning):

On September 3, 1992, the Board added to its rules a list of 263 toxic air contaminants which may pose a significant risk to human health, as mandated by Section 9.5(c) of the Environmental Protection Act (Act). (415 ILCS 5/9.5(c) (1992)) (In Re: Air Toxic Contaminants List (September 3, 1992) R90-1(A) 135 PCB 583). The Air Toxics rulemaking was initiated by a proposal filed by the Illinois Environmental Protection Agency (Agency) on January 2, 1990.¹ Due to the nature of some of the questions arising during the public hearing and comment periods in docket R90-1(A) Toxic Air Contaminants List, the Board deferred action on some issues, to Dockets R90-1(B), (C), and (D). Today the Board is addressing only Docket R90-1(D), In Re: Toxic Air Contaminants List, Styrene.

On June 4, 1992, the Board authorized submittal of a revised set of rules to the Joint Committee on Administrative Rules (JCAR) for second notice review. These rules were considered by JCAR at its July 14 and August 11, 1992, meetings. JCAR issued an objection to the listing of one chemical, styrene. (16 Ill. Reg. 13372, August 28, 1992.) In response to the objection, by separate action in RES 92-1, the Board deleted styrene from the list, and opened R90-1, Docket D in order to further consider styrene. This is discussed in detail in the Board's resolution and order In Re: Toxic Air Contaminants List (September 3, 1991) RES 92-1, R90-1(A) and R90-1(D), 135 PCB 625.

On October 1, 1992, the Board issued an order requesting public comments in this matter. The Board received three

¹The Air Toxic rules were proposed for first notice by the Board's opinion and order of April 26, 1990, and were published in the Illinois Register on June 8, 1990. (14 Ill. Reg. 8905). A second first notice proposal was adopted on September 26, 1991, and published in the Illinois Register on October 18, 1991. (15 Ill. Reg. 14969). The Board proposed these rules for second notice in its opinion and order of June 4, 1992. On September 3, 1992, the Board adopted a final ~~notice~~ opinion and order in this matter. (16 Ill. Reg. 16592.)

comments (PC. #68, 69, and 70)² in response to this request. On November 19, 1992, the Board issued an order establishing a two week period in which interested parties could respond to the comments. On December 3, 1992, the Board extended the response period by two weeks until December 30, 1992. The Board received one response.

Discussion

The Board today has two options. It may either proceed with the listing of styrene by initiating a first notice publication of the proposed rule in the Illinois Register or not proceed with the listing of styrene and dismiss this docket. In order to determine the appropriate course of action in this matter, the Board must consider two issues:

1. Are the data on the mutagenicity of styrene submitted by the Styrene Information and Research Center (SIRC) persuasive enough to override the determination by the International Agency for Research on Cancer (IARC) that styrene should be considered a potential human health threat?
2. If SIRC's data are accepted, are the effects produced by styrene, as documented in the exhibits in the record, such that the statutory definition of a Toxic Air Contaminant (TAC) does not apply?³

The Board will consider these issues in light of the information contained in the docket (A) record and the public comments and responses received on the issue of styrene.

On July 14, 1992, SIRC filed comments to JCAR that assert that:

SIRC's numerous submissions to the Board include a review by SIRC of all the animal, human, mutagenic, and genotoxic studies

²The public comments were numbered consecutively with **following** those filed in the other subdockets.

³The statutory definition of TAC is found at Section 9.5(c) of the Act. Section 9.5(c) states, that the toxic air contaminant list published under this subsection shall include, "any air contaminant which 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." (See Also, 35 Ill. Adm. Code 232.200)

relied on by IARC. In addition SIRC submitted reviews of the animal, human, and mutagenic/genotoxic literature for styrene prepared by leading experts. These submissions, which we believe were never considered by the Board or IEPA, demonstrate that styrene does not merit classification as a carcinogen and does not, therefore, meet the statutory definition of a TAC. (7/14/92 Comments of SIRC before JCAR at 4.)

However, in PC. #68 the Agency urges the Board to proceed with the listing of styrene. The Agency asserts that styrene is a 2B carcinogen and should be listed. The Agency's comments explain that its determination is based at least in part on IARC's determination that styrene is carcinogenic. The Agency also states in PC. #68 that it does not feel that SIRC has rebutted IARC's determination.

The Agency in PC. #68 contends that:

SIRC has submitted information concerning styrene which the Agency believes represents a biased opinion of SIRC scientists. SIRC re-reviewed the same studies utilized by IARC when IARC concluded that styrene is carcinogenic. The resulting analysis presented by SIRC does not rebut the decision by IARC. The Agency has examined SIRC's submissions and has found nothing to clearly refute the IARC conclusion. SIRC has presented nothing new. Based on this, the Agency maintains that, since styrene falls within the accepted listing criteria, styrene should be listed. (PC. #68 at 4.)

The Agency also states that, "the Agency is not in a position to dispute the judgement of an internationally recognized carcinogen listing source such as IARC" (PC. #68 at 4) and notes that, "styrene is listed as a Hazardous Air Pollutant in the Clean Air Act at 42 U.S.C. §7412." (Id.), a fact also acknowledged by SIRC (7/14/92 SIRC before JCAR at 1).

In its most recent comment (PC. #69) SIRC states that it believes that it has submitted sufficient evidence to demonstrate that styrene is not a carcinogen. It is SIRC's position that the genotoxicity data about styrene does not provide a clear basis to conclude that styrene should be classified as a carcinogen. SIRC also comments that its purpose is to reiterate its position which it feels has been made clear in its previous comments. Specifically, SIRC refers to SIRC exhibit #1 attachments A-G, SIRC exhibits #2-5, PC. #29 and PC. #54. The Board notes that in

addition to SIRC's testimony and exhibits submitted at the Board's September 6, and 7, 1990, hearings, the Board has on file prefiled testimony from the following dates: August 24, 1990, March 11, 1991, and December 24, 1991, submitted by SIRC. Additionally, the Board notes that on December 31, 1991, SIRC submitted questions to the Board directed to the Agency.

The following is a list of SIRC exhibit #1 attachments A-G submitted as prefiled testimony in support of SIRC's position that styrene should not be listed:

- A. Bodner, KM, GG Bond, and RR Cook. 28 September 1987. *Review of Recent Epidemiology Studies Assessing the Association between Cancers of the Lymphatic and Hematopoietic Tissues and Occupational Exposures to Styrene*. Prepared by: Epidemiology Health and Environmental Sciences, The Dow Chemical Company. Sponsored by: The Styrene Information & Research Center.
- B. CanTox, Inc.. 21 July 1989. *A Review of Styrene Pharmacokinetics and Carcinogenicity*. Prepared for: Styrene Information & Research Center. Prepared by: CanTox, Inc. Oakville, Ontario.
- C. Preston, RJ. *Styrene (Vinyl Benzene) and its Metabolites: A Discussion of Results from Assays for Detecting Chromosomal Aberrations and Sister Chromatid Exchanges*. Biology Division Oakridge National Labrotory, Oakridge, Tennessee.
- D. Preston, RJ. April 1990. *The Potential Mutagenicity of Styrene and its Metabolites*. reprinted from The SIRC Review pp. 25-31.
- E. USEPA. March 1990. Re-evaluation of Issues Concerning the Health Effects of Ingested Styrene. Report of the Drinking Water Committee, Science Advisory Board. DRAFT Report.
- F. USEPA communication from Charles Ris, Deputy Director, Human Health Assessment Group to Ms. Suzanne Gardner, Louisiana Department of Environmental Quality dated September 18, 1989 (shows EPA cancer assessment for styrene to be pending).
- G. Alexander, M. April 1990. *The Environmental Fate of Styrene*. Reprinted from The SIRC Review pp. 33-42.

The Board has examined the data provided by SIRC and has not found it to be persuasive. Three of the five referenced publications sponsored by SIRC lack external verification or peer

review. Of the remaining two, there is no indication when and where one was published and the other is a draft document of the USEPA's Science Advisory Board Drinking Water Committee. There is also no indication that any of these latter documents have been subject to verification or an external peer review. Although this "grey literature" arguably contains valid scientific conclusions, the Board asserts that it has not been subject to a rigorous enough review to overturn the conclusions of an international agency that specializes in reviewing studies on carcinogenicity, mutagenicity, and genotoxicity. The Board also notes that although SIRC states that these reports were prepared by "leading experts", there is little in the record to apprise the Board of these experts' qualifications.

In addition to the comments discussed above, the Board received two other filings regarding styrene. Both filings support the Board's conclusion that styrene should be listed.

The first comment received was a collective comment from the Sierra Club along with the Coalition for Consumer Rights and the Chicago Lung Association (Sierra Club et al.) (PC. #70). Sierra Club et al. commented that it is their belief that the literature demonstrates the serious chronic toxicity effects of styrene exposure. Thus, they argue, regardless of styrene's carcinogenicity effects, it should be listed because of its chronic toxicity. (PC. #70 at 3.)

On December 18, 1992, the Agency filed a response to the comments of Sierra Club et al..⁴ In the response, the Agency states that it "maintains its position that styrene be listed based on the classification of the International Agency for Research on Cancer". (Id. at 1.) The Agency also states that it has not performed an independent analysis of the toxicity of styrene because there is sufficient evidence supporting the listing of styrene as a carcinogen. (Id. at 2.)

CONCLUSION

The Board has reviewed the data and testimony in the record, the public comments, and the responses to the public comments. Based on its review, the Board today proposes for first notice publication an order that would add the chemical styrene to the list of toxic air contaminants at 35 Ill. Adm. Code 232. Appendix A. The Board notes that once this notice is published in the Illinois Register, interested parties will have forty-five days to file comments on the proposed amendment. The Board does not intend to conduct another hearing in this matter unless a hearing is requested pursuant to Section 5-40 of the Illinois

⁴No public comment number was given to this document.

Administrative Procedure Act. (5 ILCS 100/5-40.)

ORDER

The Board hereby proposes for first notice publication the addition of the chemical styrene to the list of toxic air contaminants at 35 Ill. Adm. Code 232.Appendix A. The Clerk of the Board is directed to file the proposed amendment with the Secretary of State for publication in the Illinois Register.

TITLE 35: ENVIRONMENTAL PROTECTION
 SUBTITLE B: AIR POLLUTION
 CHAPTER I: POLLUTION CONTROL BOARD
 SUBCHAPTER f: TOXIC AIR CONTAMINANTS

PART 232

TOXIC AIR CONTAMINANTS

SUBPART A: GENERAL PROVISIONS

Section
 232.100 Introduction
 232.110 Incorporations by Reference
 232.120 Definitions
 232.130 Applicability

SUBPART B: DETERMINATION OF A TOXIC AIR CONTAMINANT

Section
 232.200 Characteristics for Determining a Toxic Air Contaminant

SUBPART C: PROCEDURES FOR EVALUATING CHARACTERISTICS
 OF A TOXIC AIR CONTAMINANT

Section
 232.300 Purpose
 232.310 Procedures for Determining the Toxicity Score
 232.320 Carcinogen Classification

SUBPART E: LISTING AND DELISTING

Section
 232.500 Procedures for Listing and Delisting Toxic Air
 Contaminants

- 232.Appendix A List of Toxic Air Contaminants
 232.Appendix B Additional Procedures for Calculating the Chronic Toxicity score
- 232.Appendix C Carcinogens (Categories A, B1, and B2) listed on the Integrated Risk Information System' (IRIS) as of December 31, 1989 (Unites States Environmental Protection Agency, Office of Health and Environmental Assessment)

AUTHORITY: Implementing Section 9.5 and authorized by Section 27 of the Environmental Protection Act (Ill. Rev. Stat. 1991, ch. 111 1/2, pars. 1009.5 and 1027.

SOURCE: Adopted in R90-1 at 16 Ill. Reg. 16592 effective October 18, 1992.

Section 232.Appendix A List of Toxic Air Contaminants

Chemical Name	Chemical Abstract Service Number
Acetaldehyde	75-07-0
Acetamide	60-35-5
Acetonitrile	75-05-8
Acetophenone	98-86-2
Acrolein	107-02-8
Acrylamide	79-06-1
Acrylic acid	79-10-7
Acrylonitrile	107-13-1
Aldrin	309-00-2
Allyl chloride	107-05-1
2-Aminoanthraquinone	117-79-3
4-Aminoazobenzene	60-09-3
o-Aminoazotoluene	93-56-3
4-Aminobiphenyl	92-67-1
1-Amino-2-methylanthraquinone	82-28-0
Amitrole	61-82-5
Aniline	62-53-3
o-Anisidine	90-04-0
o-Anisidine hydrochloride	134-29-2
Antimony	7440-36-0
Arsenic	7440-38-2
Asbestos (friable)	1332-21-4
Azobenzene	103-33-3
Benz (a) anthracene	56-55-3
Benzene	71-43-2
Benzidine	92-87-5
Benzo (a) pyrene	50-32-8
Benzo (b) fluotanthene	205-99-2
Benzo (j) fluoranthene	205-82-3

Benzo(k)fluoranthene	207-08-9
Benzotrichloride	98-07-7
Benzyl chloride	100-44-7
Benzyl violet	1694-09-3
Beryllium	7440-41-7
Beryllium oxide	1304-56-9
Biphenyl	92-52-4
Boron trifluoride	7637-07-2
Bromoform	75-25-2
1,3-Butadiene	106-99-0
Butyl benzyl phthalate	85-68-7
beta-Butyrolactone	3068-88-0
C.I. Basic Red 9 monohydrochloride	569-61-9
Cadmium	7440-43-9
Cadmium oxide	1306-19-0
Caprolactam	105-60-2
Carbaryl	63-25-2
Carbofuran	1563-66-2
Carbon black	1333-86-4
Carbon disulfide	75-15-0
Carbon tetrachloride	56-23-5
Carbosulfan	55285-14-8
Chloramben	133-90-4
Chlordane	57-74-9
Chlorinated dibenzodioxins	--
Chlorinated dibenzofurans	--
Chlorendic acid	115-28-6
Alpha-Chlorinated toluenes	--
Chlorinated paraffins (Cl ₂ , 60% chlorine)	108171-26-2
Chlorine	7782-50-5
Chloroacetic acid	79-11-8
Chlorobenzene	108-90-7
Chloroform	67-66-3
Chloromethyl methyl ether	107-30-2
4-Chloro-2-methylpropene	563-47-3
4-Chloro-o-phenylenediamine	95-83-0
p-Chloro-o-toluidine	95-69-2
Chloroprene	126-99-8
Chromium	7440-47-3
Chromium VI	18540-29-9
Chrysene	218-01-9
Coal tar(pitch) volatiles	65996-93-2
Cobalt	7440-48-4
Coke Oven Emissions	--
Copper	7440-50-8
p-Cresidine	120-71-8
Creosote (Coal)	8001-58-9
Cresol (mixed isomers)	1319-77-3
cyanazine	21725-46-2
Cyclohexanone	108-94-1
DDD	72-54-8
DDE	72-55-9

DDT	50-29-3
2,4-Diaminoanisole	615-05-4
2,4-Diaminoanisole sulfate	39156-41-7
4,4'-Diaminodiphenyl ether	101-80-4
2,4-Diaminotoluene	95-80-7
Dibenzo(a,h)acridine	226-36-8
Dibenzo(a,j)acridine	224-42-0
Dibenzo(a,h)anthracene	53-70-3
Dibenzo(a,e)pyrene	192-65-4
Dibenzo(a,h)pyrene	189-64-0
Dibenzo(a,i)pyrene	189-55-9
Dibenzo(a,l)pyrene	191-30-0
Dibutyl phthalate	84-74-2
1,2-Dibromo-3-chloropropane	96-12-8
1,2-Dibromoethane (Ethylene dibromide]	106-93-4
3,31-Dichlorobenzidine	91-94-1
3,31-Dichlorobenzidine dihydrochloride	612-83-9
Dichloroethyl ether	111-44-4
2,4-Dichlorophenoxyacetic acid (2,4-D]	94-75-7
1,2-Dichloropropane	78-87-5
1,3-Dichloropropylene	542-75-6
Dichlorvos	62-73-7
Dieldrin	60-57-1
Diepoxybutane	1464-53-5
1,2-Diethylhydrazine	1615-80-1
Di(2-ethylhexyl) phthalate	117-81-7
Diethyl sulfate	64-67-5
Diglycidyl resorcinol ether	101-90-6
3,31-Dimethoxybenzidine	119-90-4
Dimethyl acetamide	127-19-5
4-Dimethylaminoazobenzene	60-11-7
3,31-Dimethylbenzidine [o-Tolidine]	119-93-7
Dimethylcarbamoyl chloride	79-44-7
Dimethyl formamide	68-12-2
1,1-Dimethylhydrazine	57-14-7
1,2-Dimethylhydrazine	540-73-8
Dimethyl sulfate	77-78-1
Dinitrocresol	534-52-1
2,4-Dinitrophenol	51-28-5
2,4-Dinitrotoluene	121-14-2
1,4-Dioxane	123-91-1
1,2-Diphenylhydrazine	122-66-7
Disulfoton	298-04-4
Endothall	145-73-3
Epichlorohydrin	106-89-8
2-Ethoxyethanol	110-80-5
Ethyl acrylate	140-88-5
Ethylene dichloride	107-06-2
Ethylene oxide	75-21-8
Ethylene thiourea	96-45-7
Etridiazole	2593-15-9
FMC-67825	95465-99-9

Fluorine	7782-41-4
Folpet	133-07-3
Formaldehyde	50-00-0
Furmecyclox	60568-05-0
Heptachlor	76-44-8
Heptachlor epoxide	1024-57-3
Hexachlorobenzene	118-74-1
Hexachloro-1,3-butadiene	87-68-3
Hexachlorocyclopentadiene	77-47-4
Hexachlorodibenzo-p-dioxin	19408-74-3
Hexachloroethane	67-72-1
Hexamethylphosphoramide	680-31-9
Hydrazine	302-01-2
Hydrazine sulfate	10034-93-2
Hydrogen cyanide	74-90-8
Indeno(1,2,3-cd)pyrene	193-39-5
Isophorone diisocyanate	4098-71-9
Lead	7439-92-1
Lindane (alpha)	319-84-6
Lindane (beta)	319-85-7-
Lindane (gamma)	58-89-9
Lindane (mixed isomers)	608-73-1
Linuron	330-55-2
Malathion	121-75-5
Manganese	7439-96-5
Mercury	7439-97-6
2-Methoxyethanol	109-86-4
2-Methoxyethanol acetate	110-49-6
5-Methylchrysene	3697-24-3
4,41-Methylenebis(2-chloroaniline)	101-14-4
Methylenebis(phenylisocyanate)	101-68-8
4,41-Methylenebis(N,Nt-dimethyl) benzenamine	101-61-1
Methylene chloride	75-09-2
4,41-Methylenedianiline	101-77-9
4,41-Methylenedianiline dihydrochloride	13552-44-8
Methyl hydrazine	60-34-4
Methyl iodide	74-88-4
Methyl mercaptan	74-93-1
N-Methyl-NI-nitro-N-nitrosoguanidine	70-25-7
Metolachlor	51218-45-2
Michler's Ketone	90-94-8
Mirex	2385-85-5
Monoethanolamine	141-43-5
beta-Naphthylamide	91-59-8
Nickel	7440-02-0
Nitric acid	7697-37-2
Nitrilotriacetic acid	139-13-9
Nitrobenzene	98-95-3
5-Nitro-o-anisidine	99-59-2
2-Nitropropane	79-46-9
N-Nitroso-n-butyl-N-(3-carboxypropyl) amine	38252-74-3
N-Nitroso-n-butyl-N-(4-hydroxybutyl) amine	3817-11-6

N-Nitrosodi-n-butylamine	924-16-3
N-Nitrosodiethanolamine	1116-54-7
N-Nitrosodiethylamine	55-18-5
N-Nitrosodimethylamine	62-75-9
N-Nitrosodiphenylamine	86-30-6
N-Nitrosodi-n-propylamine	621-64-7
N-Nitroso-N-ethylurea	759-73-9
3-(N-Nitrosomethylamino) propionitrile	60153-49-3
N-Nitrosomethylethylamine	10595-95-6
N-Nitroso-N-methylurea	684-93-5
N-Nitrosomethylvinylamine	4549-40-0
N-Nitrosomorpholine	59-89-2
N-Nitrosornicotine	16543-55-8
N-Nitrosopiperidine	100-75-4
N-Nitrosopyrrolidine	930-55-2
N-Nitrososarcosine	13256-22-9
Nitrofen	1836-75-5
Pentachloronitrobehzene	82-68-8
Pentachlorophenol	87-86-5
Peracetic acid	79-21-0
Phenol	108-95-2
Phenylhydrazine	100-63-0
Phorate	298-02-2
Phosphorus	7723-14-0
Phosphorus oxychloride	10025-87-3
Phosphorus pentachloride	10026-13-8
Polybrominated biphenyls	--
Polychlorinated biphenyls	1336-36-3
Potassium bromate	7758-01-2
Propane sultone	1120-71-4
beta-Propiolactone	57-57-8
Propyleneimine	75-55-8
Propylene oxide	75-56-9
Pyrene	129-00-0
Quinoline	92-22-5
Selenium	7782-49-2
Sodium borate	1303-96-4
<u>Styrene</u>	<u>100-42-5</u>
Styrene oxide	96-09-3
Sulfallate	95-06-7
Sulfuric acid	7664-93-9
Terbufos	13071-79-9
1,1,2,2-Tetrachloroethane	79-34-3
Tetrachloroethylene	127-18-4
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6
4,41-Thiodianiline	139-65-1
Thiophenol	108-98-5
Thiourea	62-56-6
Thorium dioxide	1314-20-1
Toluene	108-88-3
Toluene-2,4-diisocyanate	584-84-9
Toluene-2,6-diisocyanate	91-08-7

o-Toluidine	95-53-4
o-Toluidine hydrochloride	636-21-5
p-Toluidine	106-49-0
Toxaphene	8001-35-2
1,2,4-Trichlorobenzene	120-82-1
Trichloroethylene	79-01-6
2,4,6-Trichlorophenol	88-06-2
Trimethyl benzene	25551-13-7
1,2,4-Trimethyl benzene	95-63-6
2,4,6-Trinitrotoluene	118-96-7
Tris(2,3-dibromopropyl)phosphate	126-72-7
Trypan blue	72-57-1
Urethane (Ethyl carbamate]	51-79-6
Vinyl bromide	593-60-2
Vinyl chloride	75-01-4
Vinylidene chloride	75-35-4
Antimony compounds	--
Includes any unique chemical substance that contains antimony as part of that chemical's infrastructure	
Arsenic compounds	--
Includes any unique chemical substance that contains arsenic as part of that chemical's infrastructure	
Beryllium compounds	--
Includes any unique chemical substance that contains beryllium as part of that chemicals infrastructure	
Cadmium compounds	--
Includes any unique chemical substance that contains cadmium as part of that chemical's infrastructure	
Chromium compounds	--
Includes any unique chemical substance that contains chromium as part of that chemical's infrastructure	
Cobalt compounds	--
Includes any unique chemical substance that contains cobalt as part of that chemical's infrastructure	
Cyanide compounds	--
x(pos) CN(neg) where X = H(pos) or any other group where a formal-dissociation	

can be made. For example, KCN or Ca(CN)2

Lead compounds

Includes any unique chemical substance that contains lead as part of that chemical's infrastructure

Manganese compounds

Includes any unique chemical substance that contains manganese as part of that chemical's infrastructure

--

Mercury compounds

Includes any unique chemical substance that contains mercury as part of that chemical's infrastructure

--

Nickel compounds

Includes any unique chemical substance that contains nickel as part of that chemical's infrastructure

IT IS SO ORDERED.

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, hereby certify that the above opinion and order was adopted on the 26th day of August, 1993, by a vote of 6-0.

Dorothy M. Gunn
Dorothy M. Gunn, Clerk
Illinois Pollution Control Board