

PLAINTIFF'S
EXHIBIT

DUP-455

DON'T SAY IT—WRITE IT

To: B.W. Culppepper Location Bldg. 1
From: J. M. KAYSER Location BLDG. 2 Phone No. 1397
Subject: CARCINOGEN LIST Date 1/21/80

Attached is the latest carcinogen list from Wilmington.
Please discard any previous lists.

G-88 REV. 10-62

SAFE LIVING IS A LIFETIME PROPOSITION

DUP 0810939

DUPONT USE ONLY

INDUSTRIAL CHEMICALS CLASSIFIED AS TO CARCINOGENICITY BY ACGIH, OSHA OR DU PONT

REVISED JANUARY 1980 Page 1

INDUSTRIAL CHEMICAL ¹	Airt	ATMOSPHERIC CONCENTRATION ²		OSHA LIMIT	CARCINOGEN CLASSIFICATION ³	
		TLV ²	TLV ²		ACGIH	OSHA
Acetylaminofluorene	[53-96-3]				Not currently listed. (AI in last document- faction of TLVs)	Cancer-suspect (>0.1% a.i.)
**Acrylonitrile	[107-13-1]	Lowest practical concentration, not to exceed 2 ppm (Nashell recommen- dation of 4/21/78)		2 ppm TWA, 10 ppm ceiling	AIb (Intended change)	Cancer hazard
4-Aminodiphenyl (para-xenylamine)	[92-67-1]	2 ug/m ³			AIb	Cancer-suspect (≥0.1% a.i.)
**3-Amino-1,2,4-triazole (3AT)	[61-02-5]				A2	
**ortho-Anisidine	[90-04-0]	0.1 ppm	0.1 ppm, 0.5 mg/m ³ (ortho, para isomers)	0.5 mg/m ³		
Antimony trioxide production			0.5 mg/m ³ as Sb		A2 (Intended change) ("cigarette smoking can enhance the incidence of respiratory cancers")	

¹ Classified by Du Pont as a suspected carcinogen
² Classified by Du Pont as an experimental carcinogen

DUPONT USE ONLY

INDUSTRIAL CHEMICALS CLASSIFIED AS TO CARCINOGENICITY BY ACSII, OSIIA OR DU PONT

REVISED JANUARY 1980 Page 2

INDUSTRIAL CHEMICAL ¹	ATMOSPHERIC CONCENTRATION ²		CARCINOGEN CLASSIFICATION ³	
	AEU	TLVE	OSIIA LIMIT	ACSII OSIIA
Arsenic, inorganic; refers to "copper aceto-arsenite and all inorganic compounds containing arsenic except arsine"			10 ug/m ³ , measured as arsenic, averaged over 8 hrs; for all occupational exposures other than in agriculture, in application of pesticides, in treatment of wood, and in utilization of arsenically preserved wood	Cancer hazard
Arsenic trioxide production				A2 (Intended change)
Asbestos				
		(Intended change)		
	Asbestos (Intended change)	OSIIA, limit of 2 fibers	A1a, all forms	"...may cause bodily harm"
	Amosite 0.5 fibers/cc	>5 um, per cc for TWA and 10 fibers, >5 um, per cc for ceiling concentration.	("cigarette smoking can enhance the incidence of respiratory cancers")	(chrysotile, amosite, crocidolite, tremolite, anthophyllite, actinolite) fibers >5 um, length according to specified measurements ⁴
	Chrysotile 2 fibers/cc			
	Crocidolite 0.2 fibers/cc			
	Tremolite 0.5 fibers/cc			
	Other forms 2 fibers/cc	OSIIA, 12/30/76).		

*Benzene (71-43-2) 10 ppm 10 ppm

OSIIA's proposed permanent standard of 1 ppm rejected by Appeals Court 10/5/78; U.S. Supreme Court agreed to review case (OSIIA 3/1/79).

Cancer hazard

¹ Classified by Du Pont as a suspected carcinogen
² Classified by Du Pont as an experimental carcinogen
³

DUPONT USE ONLY

INDUSTRIAL CHEMICALS CLASSIFIED AS TO CARCINOGENICITY BY ACGIH, OSHA OR DU PONT

REVISED JANUARY 1990 Page 3

INDUSTRIAL CHEMICAL ¹	AEL	ATMOSPHERIC CONCENTRATION ²		OSHA LIMIT	CARCINOGEN CLASSIFICATION ³	
		TLV [®]	(as benzidine production)		ACGIH	OSHA
benzidine (salts implied)		--	--		Alb (as benzidine production)	Cancer-suspect (>0.15 a.i.)
Benz(a)pyrene	[50-32-8]	--	--		A2	
Beryllium	[7440-41-7]	2 ug/m ³	2 ug/m ³		A2	
Cadmium oxide production		--	--		A2	
		(Intended change)	NIOSH, TWA ⁵ for Cd & Cd compounds = <0.04 mg/m			
**Carbon tetrachloride	[56-23-5]	10 ppm/12 hr. TWA	5 ppm (Intended change)		A2 (Intended change)	
			10 ppm			
**Chloroform	[67-66-3]	10 ppm	10 ppm		A2	
			50 ppm			
bis(chloromethyl)ether [542-88-1]			0.001 ppm		Ala	
Chloromethyl methyl ether -- See Methyl chloromethyl ether						
Chromite ore processing (chromate)			0.05 mg/m ³ , as Cr		Ala	

Cancer-suspect (>0.15 a.i.)

* Classified by Du Pont as a suspected carcinogen³
 ** Classified by Du Pont as an experimental carcinogen³

INDUSTRIAL CHEMICALS CLASSIFIED AS TO CARCINOGENICITY BY ACGIH, OSHA OR DU PONT

Paged

NOSII recommends chromium (VI) "be considered to be carcinogenic unless it can be demonstrated that only non-carcinogenic chromium (VI) compounds are present," also recommends emergency standard (OSHA 11/11/76):

35

DUPONT USE ONLY

INDUSTRIAL CHEMICAL ¹	INDUSTRIAL CHEMICALS CLASSIFIED AS TO CARCINOGENICITY BY ACGIH, OSHA OR DU PONT			CARCINOGEN CLASSIFICATION ³	
	ACGIH	ATMOSPHERIC CONCENTRATION ² TLV ²	OSHA LIMIT	ACGIH	OSHA
3,3'-Dichlorobenzidine (salts also specified by OSHA)		--			A2 Cancer-suspect (2) a.f., including salts
**1,4-Dichloro-2-butene (764-41-0)					
4-Dimethylaminobenzene (60-11-7)					
**Dimethylcarbamyl chloride (DMCC) (79-44-7)	0.5 ppb	--			A2 Not currently listed (A1 in last Documentation of TLV ²)
**1,1-Dimethyl hydrazine (57-14-7)	0.5 ppm		0.5 ppm		A2
**Dimethyl sulfate (77-78-1)	0.1 ppm (0.5 mg/m ³)		1 ppm		A2
**2,4-Dinitrotoluene (121-14-2)	1.5 mg/m ³	1.5 mg/m ³ (isomers not specified)	1.5 mg/m ³ (isomers not specified)		
**Dioxane (123-91-1)	25 ppm (1979 intended change)		100 ppm NIOSH recommends limit = 1 ppm (OSHA 12/1/77)		
**Epichlorohydrin (106-89-8)	2 ppm (10 mg/m ³) (intended change)		5 ppm NIOSH recommends TMA = 2 mg/m ³ (OSHA 12/9/76)		A2

¹ Classified by Du Pont as a suspected carcinogen
² Classified by Du Pont as an experimental carcinogen
³

DUPONT USE ONLY

INDUSTRIAL CHEMICALS CLASSIFIED AS TO CARCINOGENICITY BY ACGIH, OSHA OR DU PONT

REVISED JANUARY 1980 Page 6

INDUSTRIAL CHEMICAL ¹	ATMOSPHERIC CONCENTRATION ²		CARCINOGEN CLASSIFICATION ³	
	ATL	TLV [•]	OSHA LIMIT	ACGIH OSHA
*Ethylene dibromide (EDB) (106-93-4)		-- (Intended change)	NIOSH recommends atmospheric limit = 1 mg/m ³ (0.13 ppm) as ceiling limit determined by sampling period of 15 min. (OSHA 11/24/77); OSHA recommends limiting exposure to "lowest possible concen- tration" (OSHA 12/15/77)	Alb
**Ethylene thiourea (96-45-71)		0.5 ppm	0.5 ppm	Cancer-suspect (219 a.1.)
Ethyleneimine (ethylene aziridine) (151-56-4)		0.5 ppm		A2 (Intended change)
Hexachlorobutadiene (87-60-3)		--		A2
**Hexamethylphosphoramide (HMPA) (680-31-9)		0.5 ppb		A2
**Hydrazine (302-01-2)	0.5 ppm/12 hr. TWA	0.1 ppm (0.1 mg/m ³)	1 ppm	A2
**N-(2-hydroxyethyl)ethylenediamine (1-aziridine ethanol) (1072-52-2)				A2
*Lead chromate (11119-70-3)		0.05 mg/m ³ as Cr		A2
Methyl-chloromethyl-ether (107-30-2)		--		Alb (Intended change) Cancer-suspect (20.18 a.1.)

¹ Classified by Du Pont as a suspected carcinogen
² Classified by Du Pont as an experimental carcinogen

DUPONT USE ONLY

INDUSTRIAL CHEMICALS CLASSIFIED AS TO CARCINOGENICITY BY ACGIH, OSHA OR DU PONT

REVISED JANUARY 1980 Page 7

INDUSTRIAL CHEMICAL ¹	ATMOSPHERIC CONCENTRATION ²		CARCINOGEN CLASSIFICATION ³	
	ASL	TLV [®]	OSHA LIMIT	ACGIH OSHA
••4,4'-Methylene bis(2-chloroaniline) (101-14-4)		0.02 ppm		A2 Grouped by OSHA (FR 8/20/76) but NIOSH recom- mends emerg- cy standard (OSHA 11/11/76)
Monomethyl hydrazine (60-34-4)		C 0.2 ppm (C = ceiling)	C 0.2 ppm (C = ceiling)	A2
Methyl iodide (74-80-4)		2 ppm (1979 change)		A2 (1979 Intended change)
alpha-Naphthylamine (134-32-7)				Cancer-suspect (2) a.e.l.)
beta-Naphthylamine (91-59-8)				Cancer-suspect (20-15 a.e.l.)
Nickel sulfide roasting, fume & dust		1.0 mg/m ³ as Ni	NIOSH recommends for inorganic nickel TWA <15 ug/m ³ (OSHA 7/21/77)	A1a
4-Nitrophenyl (4-nitrodiphenyl) (92-93-3)		--		A1b
••2-Nitronaphthalene (501-89-5)				Cancer-suspect (20-15 a.e.l.)
2-Nitropropene (79-46-9)		C 25 ppm (C = ceiling)	25 ppm	A2
Nitrosamines		--		A2

* Classified by Du Pont as a suspected carcinogen³
 ** Classified by Du Pont as an experimental carcinogen³

D U P O N T U S E O N L Y

INDUSTRIAL CHEMICALS CLASSIFIED AS TO CARCINOGENICITY BY ACGIH, OSHA OR DU PONT

REVISED JANUARY 1980 Page 8

INDUSTRIAL CHEMICAL ¹	AEL	ATMOSPHERIC CONCENTRATION ²		OSHA LIMIT	CARCINOGEN CLASSIFICATION ³	
		TLV®			ACGIH	OSHA
N-nitrosodimethylamine (or dimethyl-nitrosamine) (62-75-9)	--	--			A2	Cancer-suspect (218 A.1.1.)
**Oxydianiline (101-00-4)	0.1 mg/m ³					
Particulate polycyclic aromatic hydrocarbons (PAH)		0.2 mg/m ³ , as benzene solubles			A1a	Seal Coke oven emissions
**Phenyl glycidyl ether (122-60-1)	0.75 ppm	10 ppm		10ppm		
n-Phenyl-beta-naphthylamine (135-08-6)	--	--			A2 (Intended change)	
Propene sulfone (1120-71-4)	--	--			A2	
**beta-Propiolactone (57-57-8)		0.5 ppm (1979 Intended change)			A2	Cancer-suspect (218 A.1.1.)
**Propyleneimine (2-methyl aziridine) (75-55-8)		2 ppm				
*Tetrachloroethylene (127-18-4)		100 ppm		100 ppm		
**Tetramethyl thiourea (2782-91-4)						
**Thiourea (62-56-6)						
**Toluene-2,4-diamine (m-tolylene-diamine) (TRD) Pontamine Developer Tri 2,4-diaminotoluene) (59-80-7)	0.25 mg/m ³					
*o-Toluidine (95-53-4)	5 ppm			5 ppm		

* Classified by Du Pont as a suspected carcinogen³
 ** Classified by Du Pont as an experimental carcinogen³

DUPONT USE ONLY

INDUSTRIAL CHEMICALS CLASSIFIED AS TO CARCINOGENICITY BY ACGIH, OSHA OR DU PONT

REVISED JANUARY 1980 Page 9

INDUSTRIAL CHEMICAL ¹	ATMOSPHERIC CONCENTRATION ²		CARCINOGEN CLASSIFICATION ³	
	REL.	TIY ⁴	OSHA LIMIT	ACGIH OSHA
**2,3,4-Trichloro-1-butene (2431-50-71)	0.2 ppm			
*Trichloroethylene	(79-01-6)	100 ppm	100 ppm	
Vinyl bromide	(593-60-2)	5 ppm (intended change)		A2 (1978 Intended change)
Vinyl chloride	(75-01-4)	5 ppm (intended change)	OSHA has defined permissible exposure as <1 ppm average in any 8-hr period, <5 ppm average in any 15 min period, no direct liquid contact.	A1a (1978 Intended change) Cancer-suspect
Vinyl cyclohexene dioxide	(4223-10-3)	10 ppm		A2
*Zinc chromate	(1328-67-2)	0.05 mg/m ³ as Cr		A2

¹ Classified by Du Pont as a suspected carcinogen³
² Classified by Du Pont as an experimental carcinogen³

D U P O N T U S E O N L YINDUSTRIAL CHEMICALS CLASSIFIED AS TO CARCINOGENICITY BY ACGIH, OSHA OR DU PONT

REVISED JANUARY 1980 Page 10

1 INDUSTRIAL CHEMICAL:

Underlining of chemical denotes addition or change in listing. The bracket number shown in the form [xxxx-xx-x] for specific chemicals is the unique Chemical Abstracts registry number for that substance according to Chemical Abstracts indexing practices. To cite ortho-anisidine as an example, note that the ninth collective index gives five registry numbers for different isomers, many more for various complexes, and indexes studies of "anisidine" under the para isomer.

2 ATMOSPHERIC CONCENTRATION:

Values, here given as eight-hour time-weighted average (TWA) concentrations unless otherwise stated, are:

- Acceptable Exposure Limits (AEL) values recommended by Haskell Laboratory's AEL Committee as analogous to the TLVs (see directly below). The AEL recommendations may be interim and are designed for Du Pont operations.
- Threshold Limit Values (TLVs) "refer to airborne concentrations of substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse effect ... [The] Threshold Limit Value - Time-Weighted Average (TLV-TWA) [is] the time-weighted average concentration for a normal 8-hour workday or 40-hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect ... The TLV-TWA should be used as guides in the control of health hazards and should not be used as fine lines between safe and dangerous concentrations ... [The] Threshold Limit Value-Ceiling (TLV-C) [is] the concentration that should not be exceeded even instantaneously."

3 CARCINOGEN CLASSIFICATION:

- OSHA values are regulatory if formally adopted by the Occupational Safety and Health Administration (OSHA). Advisory values from the National Institute of Occupational Safety and Health are listed for additional information.
- Du Pont definitions (classified items are marked with asterisks):
 - Human carcinogen as: "a substance which has been shown by valid, statistically significant epidemiological evidence to be a carcinogen to man."
 - Experimental carcinogen as: "a substance shown by valid, statistically significant experimental evidence to induce cancer in mammals."
 - Suspected carcinogen as: "a substance for which there exists moderate, but inconclusive, evidence that it is a human or experimental carcinogen." (letter, E. A. Go to Heads of Departments, 2/17/75)

D U P O N T U S E O N L YINDUSTRIAL CHEMICALS CLASSIFIED AS TO CARCINOGENICITY BY ACGIH, OSHA OR DU PONT

REVISED JANUARY 1980 Page 11

- American Conference of Governmental Industrial Hygienists (ACGIH), 1979 TLV® Booklet has categorized certain carcinogens:
 - A1a. "Substances ... recognized to have carcinogenic or cocarcinogenic potential, with an assigned TLV."
 - A1b. "Substances ... recognized to have carcinogenic potential without an assigned TLV ... For the substance in 1b, no exposure or contact by any route - respiratory, skin or oral, as detected by the most sensitive methods - shall be permitted. The worker should be properly equipped to insure virtually no contact with the carcinogen."
 - A2. "Chemical substances or substances associated with industrial processes, which are suspect of inducing cancer, based on either (1) limited epidemiologic evidence, exclusive of clinical reports of single cases, or (2) demonstration of carcinogenesis in one or more animal species by appropriate methods ... Worker exposure by all routes should be carefully controlled to levels consistent with the animal and human experience data (see Documentation), including those substances with a listed TLV."
- ACGIH lists The Committee Guidelines for the Classification of Experimental Animal Carcinogens on pp. 41-44 of the 1979 TLV® booklet.
- Occupational Safety and Health Administration (OSHA) has issued standards for "Toxic and Hazardous Substances" that categorize certain materials as "cancer-suspect" or "cancer hazard." See 29CFR 1910.100-1910.1500 and subsequent revisions in FR, also "Occupational Safety and Health Reporter," (Bureau of National Affairs, Washington, DC, Reference File 31.6301 and pertinent pages in this section).
- 4. Asbestos fibers, "method of measurement. All determinations of airborne concentrations of asbestos fibers shall be made by the membrane filter method at 400-450 x (magnification) (4 millimeter objective) with phase contrast illumination." 29CFR 1910.1001, 7/1/75.
- 5. Maximum time-weighted average exposure (TWA) for up to a 10-hour workday, 40-hour workweek, as recommended to OSHA by NIOSH in their Criteria Document or other communications. (Sampling limits individually specified, as two hour and one hour for carbon tetrachloride and chloroform.)
- 6. This limit for coke oven emissions defined in terms of benzene-soluble fraction of total particulate matter (BSPTM). See Part V, Section C, in standard (which contains 14 definitions "in order to establish a working vocabulary").

DUP 0810951

D U P O N T U S E O N L Y

INDUSTRIAL CHEMICALS CLASSIFIED AS TO CARCINOGENICITY BY ACGIH, OSHA OR DU PONT

Abbreviations

a.i. - Active Ingredient
CFR - Code of Federal Regulations (U.S.)
FR - Federal Register (U.S.)
NIOSH - National Institute of Occupational Safety and Health
OSHA - Occupational Safety & Health Reporter (Bureau of National Affairs)

REVISED JANUARY 1980

Page 12

R. R. Montgomery/vjm
Haskell Laboratory