REFERENCES

Amoore JE, Hautala E (1983) Odor as an aid to chemical safety: odor threshold compared with threshold limit values and volatilities for 214 industrial chemicals in air and water dilution. *Journal of applied toxicology*, 36(6):272-290.

Angerer J, Lichterbeck E, Begerow J, Jekel S, Lehnert G (1990) Occupational chronic exposure to organic solvents: XIII. Glycol ether exposure during the production of varnishes. *International archives of occupational and environmental health*, 62(2):123-126.

ATSDR (1996) *Toxicological profile for 2-butoxyethanol and 2-butoxyethanol acetate* (August 1996 draft). Atlanta, GA, US Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry.

Bartnik FG, Reddy AK, Klecak G, Zimmermann V, Hostynek JJ, Kunstler K (1987) Percutaneous absorption, metabolism, and hemolytic activity of *n*-butoxyethanol. *Fundamental and applied toxicology*, 8:59-70.

Bauer PH, Weber M, Mur JM, Protois JC, Bollaert PE, Condi A, Larcan A, Lambert H (1992) Transient noncarcinogenic pulmonary edema following massive ingestion of ethylene glycol butyl ether. *Intensive care medicine*, 18:250-251.

Bormett GA, Bartels MJ, Markham DA (1995) Determination of 2-butoxyethanol and butoxyacetic acid in rat and human blood by gas chromatography-mass spectrometry. *Journal of chromatography*, B665:315-325.

Bridie AL (1979) The acute toxicity of some petrochemicals to fish. *Water research*, 13:623-626.

Bringmann G, Kuhn R (1977) Results of the damaging effects of water

pollutants on *Daphnia magna. Zeitschrift fuer Wasser und Abwasser Forschung*, 10:161-166.

Bringmann G, Kuhn R (1980a) Comparison of the toxicity thresholds of water pollutants to bacteria, algae, and protozoa in the cell multiplication test. *Water research*, 14:231-241.

Bringmann G, Kuhn R (1980b) Determination of the toxicity of water pollutants to protozoa. II. Bacteriovorous ciliates. *Zeitschrift fuer Wasser und Abwasser Forschung*, 13:26-31.

Bringmann G, Kuhn R (1982) Results of the toxic action of water pollutants on *Daphnia magna* Straus tested by an improved standardized procedure. *Zeitschrift fuer Wasser und Abwasser Forschung*, 15:1-6.

Canadian Chemical Producers' Association (1996) *Reducing emissions. A Responsible Care initiative. 1994 emissions inventory and five year projections.* Ottawa, 36 pp.

Carpenter CP, Pozzani UC, Woil CS, Nair JH, Keck GA, Smyth HF Jr (1956) The toxicity of butyl cellosolve solvent. *American Medical Association Archives of industrial health*, 14:114-131.

CEFIC (1995) *CEFIC Document 486/95/7/stat/year, Oxygenated Solvents S.G. -- Statistical Investigation 1994* (23 February 1995). Brussels, European Chemical Industry Council [cited in OECD, 1997].

Chiewchanwit T, Au WW (1995) Mutagenicity and cytotoxicity of 2-butoxyethanol and its metabolite, 2-butoxyacetaldehyde, in Chinese hamster (CHO-AS52) cells. *Mutation research*, 334(13):341-346.

Ciccioli P, Brancaleoni E, Cecinato A, Sparapani R, Frattoni M (1993) Identification and determination of biogenic and anthropogenic volatile organic compounds in forest areas of northern and southern Europe and a remote site of the Himalaya region by high-resolution gas

chromatography-mass spectrometry. *Journal of chromatography*, 643:55-69.

Ciccioli P, Cecinato A, Brancaleoni E, Frattoni M, Bruner F, Maione M (1996) Occurrence of oxygenated volatile organic compounds (VOC) in Antarctica. *International journal of analytical chemistry*, 62:245-253.

CMA (1994) *HEDSET for ethylene glycol butyl ether*. Prepared for the European Union Existing Substances Programme. Washington, DC, Chemical Manufacturers Association.

Corley RA, Bormett GA, Ghanayem BI (1994) Physiologically-based pharmacokinetics of 2-butoxyethanol and its major metabolite, 2-butoxyacetic acid, in rats and humans. *Toxicology and applied pharmacology*, 129(1):61-79.

Corley RA, Markham DA, Banks C, Delorme P, Masterman A, Houle JM (1997) Physiologically-based pharmacokinetics and the dermal absorption of 2-butoxyethanol vapor by humans. *Fundamental and applied toxicology*, 39:120-130.

Dawson GW, Jennings AL, Drozdowski D, Rider E (1977) The acute toxicity of 47 industrial chemicals to fresh and saltwater fishes. *Journal of hazardous materials*, 1:303-318.

Dean BS, Krenzelok EP (1992) Clinical evaluation of pediatric ethylene glycol monobutyl ether poisonings. *Journal of toxicology and clinical toxicology*, 30(4):557-563.

Dill DC (1995) *Environmental summary for Dowanol EB and DB glycol ethers*. Unpublished report. Midland, MI, Dow Chemical Company.

Dodd DE, Snelling WM, Maronpot RR, Ballentyne B (1983) Ethylene glycol monobutyl ether: acute 9-day and 90-day vapor inhalation studies in Fischer 344 rats. *Toxicology and applied pharmacology*, 68:405-414.

Doe JE (1984) Further studies on the toxicology of the glycol ethers with emphasis on rapid screening and hazard assessment. *Environmental health perspectives*, 57:199-206.

Dow (1979) *Toxicity of Dowanol EB to freshwater organisms*. Unpublished report. Midland, MI, Dow Chemical Company (Report No. ES-330).

Dow (1988) *Dowanol EB glycol ether: evaluation of the toxicity to the green alga,* Selenastrum capricornutum. Unpublished report. Midland, MI, Dow Chemical Company.

ECETOC (1994) *Butoxyethanol criteria document. Including a supplement for 2-butoxyethyl acetate.* Brussels, European Chemical Industry, Ecology and Toxicology Centre (Special Report No. 7, April 1994).

Elias Z, Daniere MC, Marande AM, Poirot O, Terzelti F, Schneider O (1996) Genotoxic and/or epigenetic effects of some glycol ethers: results of different short-term tests. *Occupational hygiene,* 2:187-212.

Elliott BM, Ashby J (1997) Review of the genotoxicity of 2-butoxyethanol. *Mutation research*, 387:89-96.

Environment Canada (1997) *Canadian Environmental Protection Act. Priority Substances List Supporting Documentation -- 2-Butoxyethanol. Vol. 2* (draft). Ottawa, pp. 187-212.

Exon JH, Mather GG, Bussiere JL, Olson DP, Talcott PA (1991) Effects of subchronic exposure of rats to 2-methoxyethanol or 2-butoxyethanol: thymic atrophy and immunotoxicity. *Fundamental and applied toxicology*, 16(4):830-840.

Foster PMD, Lloyd SC, Blackburn DM (1987) Comparison of the *in vivo*

and *in vitro* testicular effects produced by methoxy-, ethoxy- and *n*-butoxy acetic acids in the rat. *Toxicology*, 43:17-30.

Ghanayem BI (1989) Metabolic and cellular basis of 2-butoxyethanol-induced hemolytic anemia in rats and assessment of human risk *in vitro*. *Biochemical pharmacology*, 38(10):1679-1684.

Ghanayem BI, Sullivan CA (1993) Assessment of the haemolytic activity of 2-butoxyethanol and its major metabolite, butoxyacetic acid, in various mammals including humans. *Human experimental toxicology*, 1214:305-311.

Ghanayem BI, Blair PC, Thompson MB, Maronpot RR, Matthews HB (1987a) Effect of age on the toxicity and metabolism of ethylene glycol monobutyl ether (2-butoxyethanol) in rats. *Toxicology and applied pharmacology*, 91:222-234.

Ghanayem BI, Burka LT, Sanders JM, Matthews H (1987b) Metabolism and disposition of ethylene glycol monobutyl ether (2-butoxyethanol) in rats. *Drug metabolism and disposition*, 15:478-484.

Ghanayem BI, Ward SM, Blair PC, Matthews HB (1990) Comparison of the hematologic effects of 2-butoxyethanol using two types of hematology analyzers. *Toxicology and applied pharmacology*, 106(2):341-345.

Ghanayem BI, Sanchez IM, Matthews HB (1992) Development of tolerance to 2-butoxyethanol-induced hemolytic anemia and studies to elucidate the underlying mechanisms. *Toxicology and applied pharmacology*, 112(2):198-206.

Gijsenbergh FP, Jenco M, Veulemans H, Groesenken D, Verberckmoes R, Delooz HH (1989) Acute butyl-glycol intoxication: a case report. *Human toxicology*, 8:243-245.

Gingell R, Boatman RJ, Lewis S (1997) *Comparative acute toxicity of ethylene glycol mono-n-butyl ether in several species*. Arlington,

VA, Chemical Manufacturers Association.

Gollapudi BB, Barber ED, Lawlor TE, Lewis SA (1996) Re-examination of the mutagenicity of ethylene glycol monobutyl ether to *Salmonella* tester strain TA97a. *Mutation research*, 370:61-64.

Grant D, Slush S, Jones HB, Gangolli SD, Butler WH (1985) Acute toxicity and recovery in the hemopoietic system of rats after treatment with ethylene glycol monomethyl and monobutyl ethers. *Toxicology and applied pharmacology*, 77:187-200.

Greenspan AH, Reardon RC, Gingell R, Rosica KA (1995) Human repeated insult patch test of 2-butoxyethanol. *Contact dermatitis*, 33:59-60.

Groeseneken D, Van Vlem E, Veulemans H, Masschelein R (1986) Gas chromatographic determination of methoxyacetic and ethoxyacetic acid in urine. *British journal of industrial medicine*, 43:62-65.

Groeseneken D, Veulemans H, Masschelein R, Van Vlem E (1989) An improved method for the determination in urine of alkoxyacetic acids. *International archives of occupational and environmental health*, 61:249-254.

Gualtieri J, Harris C, Roy R, Corley R, Manderfield C (1995) Multiple 2-butoxyethanol intoxications in the same patient: clinical findings, pharmacokinetics, and therapy. *Journal of toxicology and clinical toxicology*, 33(5):550-551.

Hardin BD, Goad PT, Burg JR (1984) Developmental toxicity of four glycol ethers applied cutaneously to rats. *Environmental health perspectives*, 57:69-74.

Heindel JJ, Lamb JC IV, Chapin RE, Gulati DK, Hope E, George J, Jameson CW, Teague J, Schwetz BA (1989) *Reproductive toxicity testing by continuous breeding: Test protocol in Swiss (CD-1) mice.* Available from National Technical Information Service, Springfield, VA

(NTIS No. PB89152451AS).

Heindel JJ, Gulati DK, Russell VS, Reel JR, Lawton AD, Lamb JC IV (1990) Assessment of ethylene glycol monobutyl and monophenyl ether reproductive toxicity using a continuous breeding protocol in Swiss CD-1 mice. *Fundamental and applied toxicology*, 15(4):683-696.

Hoflack JC, Lambolez L, Elias Z, Vasseur P (1995) Mutagenicity of ethylene glycol ethers and of their metabolites in *Salmonella typhimurium* his-. *Mutation research*, 341(4):281-287.

Howard PH, Boethling RS, Jarvis WF, Meylan WM, Michalenko EM (1991) *Handbook of environmental degradation rates*. Chelsea, MI, Lewis Publishers Inc. [cited in ATSDR, 1996].

US NLM (1997) *Hazardous substances data bank*. Last revision on 7/11/96. Bethesda, MD, National Library of Medicine, National Toxicology Information Program.

IPCS (1993) *International Chemical Safety Card -- 2-Butoxyethanol.* Geneva, World Health Organization, International Programme on Chemical Safety (No. 0059).

Johanson G (1994) Inhalation toxicokinetics of butoxyethanol and its metabolite butoxyacetic acid in the male Sprague-Dawley rat. *Archives of toxicology*, 68(9):588-594.

Johanson G, Boman A (1991) Percutaneous absorption of 2-butoxyethanol vapor in human subjects. *British journal of industrial medicine*, 48(11):788-792.

Johanson G, Kronborg H, Naslund PH, Nordqvist MB (1986) Toxicokinetics of inhaled 2-butoxyethanol (ethylene glycol monobutyl ether) in man. *Scandinavian journal of work and environmental health*,12:594-602.

Johanson G, Boman A, Dynesius B (1988) Percutaneous absorption of

2-butoxyethanol in man. *Scandinavian journal of work and environmental health*, 14:101-109.

Jonsson AK, Steen G (1978) *n*-Butoxyacetic acid, a urinary metabolite from inhaled *n*-butoxyethanol (butylcellosolve). *Acta Pharmacologica et Toxicologica*, 42:354-356.

Junke I, Ludemann D (1978) Results of the examination of the effects of 200 chemical compounds on fish toxicity using the golden orfe test. *Zeitschrift fuer Wasser und Abwasser Forschung*, 11:161-164.

Keith G, Coulais C, Edoœh A, Botlin MC, Rihn B (1996) Ethylene glycol monobutyl ether has neither epigenetic nor genotoxic effects in acute treated rats and in subchronic treated v-Ha-*ras* transgenic mice. *Occupational hygiene*, 2:237-249.

Kennah HE II, Hignet S, Laux PE, Dorko JD, Barrow CS (1989) An objective procedure for quantitating eye irritation based upon changes of corneal thickness. *Fundamental and applied toxicology*, 12(2):258-268.

Kennedy ER, O'Connor PF, Grote AA (1990) Application of multidimensional gas chromatography-mass spectrometry to the determination of glycol ethers in air. *Journal of chromatography*, 522:303-333.

Koenemann H (1981) Quantitative structure-activity relationships in fish toxicity studies. Part 1. Relationships for 50 industrial pollutants. *Toxicology*, 19:209-221.

Krasavage WJ (1986) Subchronic oral toxicity of ethylene glycol monobutyl ether in male rats. *Fundamental and applied toxicology*, 6:349-355.

Leaf DA (1985) *Glycol ethers: an overview*. Washington, DC, US Environmental Protection Agency, Office of Pesticides and Toxic

Substances.

McGregor DB (1984) The genotoxicity of glycol ethers. *Environmental health perspectives*, 57:97-103.

Medinsky MA, Singh G, Bechtold WE, Bond JA, Sabourin PJ, Birnbaum LS, Henderson RF (1990) Disposition of three glycol ethers administered in drinking water to male F344/N rats. *Toxicology and applied pharmacology*, 102(3):443-455.

Nagano K, Nakayama E, Koyano M, Oobayashi H, Adachi H, Yamada T (1979) Mouse testicular atrophy induced by ethylene glycol monoalkyl ethers. *Japanese journal of industrial health*, 21:29-35.

Nelson BR, Setzer JV, Brightwell WS, Mathinos PR, Kuczuk MH, Weaver TE, Goad PT (1984) Comparative inhalation teratogenicity of four glycol ether solvents and an amino derivative in rats. *Environmental health perspectives*, 57:261-271.

NIOSH (1983) *National Occupational Exposure Survey (NOES), 1981-83: estimated total and female employees, actual observation and trade-named exposure to EGEE, EGHE, EGBE, and their acetates*. Unpublished database. Cincinnati, OH, US Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health, Division of Surveillance, Hazard Evaluations, and Field Studies, Surveillance Branch.

NIOSH (1990) *Criteria for a recommended standard. Occupational exposure to ethylene glycol monobutyl ether and ethylene glycol monobutyl ether acetate*. Cincinnati, OH, US Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health, Division of Standards Development and Technology Transfer (DHHS [NIOSH] Publication No. 90-118).

NIOSH (1994) *Manual of analytical methods*, 4th ed. Cincinnati, OH, US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health (DHHS [NIOSH] Publication No. 94-113).

NTP (1993) *NTP technical report on toxicity studies of ethylene glycol ethers 2-methoxyethanol, 2-ethoxyethanol, 2-butoxyethanol administered in drinking water to F344/N rats and B6C3F$_1$ mice*. Research Triangle Park, NC, US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Toxicology Program (NIH Publication No. 93-3349).

OECD (1997) *Screening Information Dataset (SIDS) initial assessment report on 2-butoxyethanol*. 6th SIDS Initial Assessment Meeting. Paris, Organisation for Economic Co-operation and Development.

OSHA (1990) *2-Butoxyethanol (butyl cellosolve) and 2-butoxyethyl acetate (butyl cellosolve acetate)*. Salt Lake City, UT, US Department of Labor, Occupational Safety and Health Administration, Organic Methods Evaluation Branch, OSHA Analytical Laboratory.

Price KS, Waggy GT, Conway RA (1974) Brine shrimp bioassay and seawater BOD of petrochemicals. *Journal of the Water Pollution Control Federation*, 46:63-77.

Rambourg-Schepens MD, Buffet M, Bertault R, Jaussaud M, Journe B, Fay R, Lamiable D (1988) Severe ethylene glycol butyl ether poisoning. Kinetics and metabolic pattern. *Human toxicology*, 7:187-189.

Rettenmeier AW, Hennigs R, Wodarz R (1993) Determination of butoxyacetic acid and *n*-butoxyacetylglutamine in urine of lacquerers exposed to 2-butoxyethanol. *International archives of occupational and environmental health*, 65(1) (Suppl.):S151-S153.

Rowe VK, Wolf MA (1982) Derivatives of glycols. In: Clayton GD, Clayton EF, eds. *Patty's industrial hygiene and toxicology*, 3rd rev.

ed. *Vol. 2.* New York, NY, John Wiley and Sons, pp. 3909-4052.

Sakai T, Araki T, Masuyama Y (1993) Determination of urinary alkoxyacetic acid by rapid and simple method for biological monitoring of workers exposed to glycol ethers and their acetates. *International archives of occupational and environmental health*, 64:495-498.

Sakai T, Araki T, Morita Y, Masuyama Y (1994) Gas chromatographic determination of butoxyacetic acid after hydrolysis of conjugated metabolites in urine from workers exposed to 2-butoxyethanol. *International archives of occupational and environmental health*, 66:249-254.

Sax NI, Lewis RJ (1987) *Hawley's condensed chemical dictionary*, 11th ed. New York, NY, Van Nostrand Reinhold Company, pp. 488-489.

Schuler RL, Hardin BD, Niemeier RW, Booth G, Hazelden K, Piccirillo V (1984) Results of testing 15 glycol ethers in a short-term *in vivo* reproductive toxicity assay. *Environmental health perspectives*, 57:141-146.

Shyr LJ, Sabourin PJ, Medinsky MA, Birnbaum LS, Henderson RF (1993) Physiologically-based modeling of 2-butoxyethanol disposition in rats following different routes of exposure. *Environmental research*, 63(2):202-218.

Smallwood AW, DeBord KE, Lowry LK (1984) Analyses of ethylene glycol monoalkyl ethers, and their proposed metabolites in blood and urine. *Environmental health perspectives*, 57:249-253.

Smallwood AW, DeBord KE, Burg J, Moseley C, Lowry LK (1988) Determination of urinary 2-ethoxyacetic acid as an indicator of occupational exposure to 2-ethoxyethanol. *Applied industrial hygiene*, 3(2):47-50.

Smialowicz RJ, Williams WC, Riddle HH, Andres DL, Luebke RW, Copeland CB (1992) Comparative immunosuppression of various glycol ethers orally administered to Fischer 344 rats. *Fundamental and applied toxicology*, 18(4):621-627.

Sohnlein B, Letzel S, Weltle D, Rüdiger HW, Angerer J (1993) XIV. Examinations concerning the evaluation of a limit value for 2-ethoxyethanol and 2-ethoxyethylacetate and the genotoxic effects of these glycol ethers. *International archives of occupational and environmental health*, 64(7):479-484.

Staples CA, Boatman RJ, Cano ML (1998) Ethylene glycol ethers: An environmental risk assessment. *Chemosphere*, 36:1585-1613.

Tyl RW, Millicovsky G, Dodd DE, Pritts IM, France KA, Fisher LC (1984) Teratologic evaluation of ethylene glycol monobutyl ether in Fischer 344 rats and New Zealand white rabbits following inhalation exposure. *Environmental health perspectives*, 57:47-68.

Tyler TR (1984) Acute and subchronic toxicity of ethylene glycol monobutyl ether. *Environmental health perspectives*, 57:85-191.

Udden MM (1994) Hemolysis and deformability of erythrocytes exposed to butoxyacetic acid, a metabolite of 2-butoxyethanol: II. Resistance in red blood cells from humans with potential susceptibility. *Journal of applied toxicology*, 14(2):97-102.

Udden MM (1996) Effects of butoxyacetic acid on human red cells. *Occupational hygiene*, 2:283-290.

Udden MM, Patton CS (1994) Hemolysis and deformability of erythrocytes exposed to butoxyacetic acid, a metabolite of 2-butoxyethanol: I. Sensitivity in rats and resistance in normal humans. *Journal of applied toxicology*, 412:91-96.

Union Carbide (1989) *Ecological fate and effects data on four*

selected glycol ether products. Unpublished report. South Charleston, WV, Union Carbide Chemicals and Plastic Co. Inc.

US EPA (1984) *Acute toxicity studies on Wellaid 31.* Study submitted to the US Environmental Protection Agency by Amoco Corporation [cited in OECD, 1997].

US ITC (1996) *Preliminary report on U.S. production of selected synthetic organic chemicals (including synthetic plastics and resin materials).* Fourth Quarter and Preliminary International Trade Commission, Series C/P-96-2; No. 26, pp. 2-12. Totals, 1995. Washington, DC, US International Trade Commission.

Verschueren K (1983) *Handbook of environmental data on organic chemicals*, 2nd ed. New York, NY, Van Nostrand Reinhold Company, 1310 pp.

Veulemans H, Groeseneken D, Masschelein R, Van Vlem E (1987) Survey of ethylene glycol ether exposures in Belgian industries and workshops. *American Industrial Hygiene Association journal*, 48(8):671-676.

Vincent R, Cicolella A, Subra I, Rieger B, Parrot P, Pierre F (1993) Occupational exposure to 2-butoxyethanol for workers using window cleaning agents. *Applied occupational and environmental hygiene,* 8(6):580-586.

von Oettingen WF, Jirouche EA (1931) The pharmacology of ethylene glycol and some of its derivatives in relation to their chemical constitution and physical chemical properties. *Journal of pharmacology and experimental therapeutics*, 42(3):355-372.

Werner HW, Mitchell JL, Miller JW, von Oettingen WF (1943a) The acute toxicity of vapors of several monoalkyl ethers of ethylene glycol. *Journal of industrial hygiene and toxicology*, 25:157-163.

Werner HW, Nawrocki CZ, Mitchell JL, Miller JW, von Oettingen WF

(1943b) Effects of repeated exposure of rats to monoalkyl ethylene glycol ether vapors. *Journal of industrial hygiene and toxicology*, 25:374-379.

Werner HW, Mitchell JL, Miller JW, von Oettingen WF (1943c) Effects of repeated exposure of dogs to monoalkyl ethylene glycol ether vapors. *Journal of industrial hygiene and toxicology*, 25:409-414.

Yasuhara A, Shiraisi H, Tsuji M, Okuno T (1981) Analysis of organic substances in highly polluted river water by mass spectrometry. *Environmental science and technology*, 15:570-573.

Zeiger E, Anderson B, Haworth S, Lawlor T, Mortelmans K (1992) *Salmonella* mutagenicity tests: V. Results from the testing of 311 chemicals. *Environmental and molecular mutagenesis*, 19 (Suppl. 21):2-141.

Zissu D (1995) Experimental study of cutaneous tolerance to glycol ethers. *Contact dermatitis*, 32(2):74-77.