7. REGULATIONS AND ADVISORIES

The international, national, and state regulations and guidelines regarding benzene in air, water, and other media are summarized in Table 7-l.

ATSDR has derived an acute inhalation MRL of 0.05 ppm for benzene based on a LOAEL for immunological effects in mice exposed to 10.2 ppm benzene for 6 hours a day for 6 consecutive days (Rozen et al. 1984).

ATSDR has derived an intermediate inhalation MRL of 0.004 ppm for benzene based on a LOAEL for neurological effects in mice exposed to 0.78 ppm benzene for 2 hours a day, 6 days a week for 30 days (Li et al. 1992).

The reference concentration (RfC) and reference dose (RfD) for benzene are undergoing review by an EPA Workgroup (IRIS 1996).

The International Agency for Cancer Research (IARC) classifies benzene as a Group 1 carcinogen (carcinogenic to humans) (IARC 1987). The U.S. EPA assigns Class A (human carcinogen) (IRIS 1996), and the National Toxicology Programs lists benzene as a “substance known to be carcinogenic,” that is, a substance for which the evidence from human studies indicates that there is a causal relationship between exposure to the substance and human cancer (NTP 1994).

Benzene is on the list of chemicals in “The Emergency Planning and Community Right-to-Know Act of 1986” (EPA 19888). Section 313 of Title III of the Superfund Amendments and Reauthorization Act (SARA) requires owners and operators of certain facilities that manufacture, import, process, or otherwise use the chemicals on this list to report annually any release of those chemicals to any environmental media over a specified threshold level (U.S. Congress 1986).

OSHA requires employers of workers who are occupationally exposed to benzene to institute engineering controls and work practices to reduce and maintain employee exposure at or below permissible exposure limits (PEL). If the employer can document that benzene is used in the workplace less than 30 days per year, the employer can use any combination of engineering controls, work practice controls, or respirators to reduce employee exposure to or below the (PEL) of 1 ppm.

However, the employer must use engineering and work practice controls, if feasible, to reduce exposure to or below an 8-hour TWA of 10 ppm. Respirators must be provided and used during the time period necessary to install or implement feasible engineering and work practice controls, or where controls are not yet sufficient. Respirators are also required when the employer determines that compliance with the TWA or PEL is not feasible with engineering or work practice controls, such as maintenance and repair activities, vessel cleaning, or other operations where exposures are intermittent and limited in duration, and in emergencies (OSHA 1987b).

Benzene is regulated by the Clean Water Effluent Guidelines in 40 CFR Part 401. For each point source category, benzene may be regulated as part of a group of chemicals controlled as total toxic organics, may have a specific regulatory limitation, or may have a zero discharge limitation. The point source categories for which benzene is controlled as a total toxic organic include electroplating (EPA 1981a), metal finishing (EPA 1983b), metal molding and casting (1985c), and copper forming (EPA 1983c). The point source categories for which benzene has a specific regulatory limitation include organic chemicals (EPA 1993a), and iron and steel manufacturing (EPA 1982a).

Under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), food tolerance restrictions are not required for benzene when it is used in accordance with good agricultural practices as an inert (or occasionally active) ingredient i formulations applied to growing crops only (EPA 1985h).
FDA has restricted benzene in food packaging for use only as a component of adhesives in packaging, transporting, or holding food. Adhesives are separated from the food by a functional barrier. The quantity of adhesive that contacts packaged dry food shall not exceed the limits of good manufacturing practices. The quantity of adhesive that contacts packaged fatty and aqueous foods and is found at seams and at the exposed edge between packaging laminates shall not exceed the limits of good manufacturing practices. Under normal conditions of use, the packaging seams or laminates will remain firmly bonded without visible separation. The label of the finished adhesive container must bear the statement “food-packaging adhesive” (FDA 1977a).

Table 7-1. Regulations and Guidelines Applicable to Benzene

Agency	Description	Information	References
INTERNATIONAL			
IARC	Carcinogenic Classification	Group 1[a]	IARC 1987
WHO	Drinking Water Guidelines	10 μg/L	WHO 1984
NATIONAL			
Regulations:			
a. Air:			
OSHA	PEL TWA	1 ppm	29 CFR 1910.1028 OSHA 1987a
	STEL (15-minute average)	5 ppm	
	Respirators and/or Engineering Controls Required if Compliance with TWA is Not Feasible	Yes	
	Limits for Industry Segments Excluded in 29 CFR 1910.1028		29 CFR 1910.1000 OSHA 1974
	PEL TWA (8 hr)	10 ppm[b]	
	Ceiling Limit	25 ppm	
	Maximum Peak Above the Acceptable Ceiling Concentration for an 8 hr Shift	50 ppm (10 min)[b]	
	Coke Oven Emissions[b]		
	8 hr PEL	<150 μg/m^3	29 CFR 1910.1029(c) OSHA 1976
	Types of Respiratory Protection (NPRM)	<150 to <7500 μg/m^3	59 CFR 58884 OSHA1994
	NRC Recommendations Concerning Chemical Hygiene in Labs (non-mandatory)	Yes	29 CFR 1910.1450, Appendix A OSHA 1990
EPA OAR	Listed as a Hazardous Air Pollutant Under Section 112 of the Clean Air Act	Yes	40 CFR 61.01 EPA 1977a
	Approval and Promulgation of Implementation Plans	No	40 CFR 52 EPA 1972
	New Source Performance Standards -		
	Subpart VV: SOCMI VOC Equipment Leaks - chemicals produced by affected facilities	Yes	40 CFR 60.489 EPA 1983a
	Subpart NNN: SOCMI Distillation Operation Volatile Organic Compound (VOC) Emissions - chemicals produced by affected facilities	Yes	40 CFR 60.667 EPA 1990a
	Subpart RRR: SOCMI Reactor Processes VOC Emissions - affected chemicals	Yes	40 CFR 60.707 EPA 1993a
	SOCMI Wastewater (proposed)	Yes	59 FR 46780 EPA 1994x

Table 7-1. Regulations and Guidelines Applicable to Benzene (continued)

Agency	Description	Information	References
NATIONAL (cont.)			
	National Emission Standards for Hazardous Air Pollutants (NESHAPs)		
	List of Pollutants and Applicability of Part 61	Yes	40 CFR 61.01 EPA 1985a
	Subpart J - Equipment Leaks (Fugitive Emission Sources) of Benzene	Yes	40 CFR 61.110-61.112 EPA 1984a
	Subpart L - Benzene Emissions From Coke By-product Recovery Plants	Yes	40 CFR 61.130-61.137 EPA 1989a
	- Process vessels, storage tanks and tar-intercepting sumps	>500 ppm benzene above background concentration	40 CFR 61.132 EPA 1989a
	- Light-oil sumps	>500 ppm above background concentration	40 CFR 61.133 EPA 1989a
	- Naphthalene processing, final coolers, and final cooler cooling towers	No ("zero") emission	40 CFR 61.134 EPA 1989a
	- Standards for equipment leaks	Yes	40 CFR 61.135 EPA 1989a
	- Compliance provisions and alternative means of emissions limitation	Yes	40 CFR 61.136 EPA 1989a
	- Test methods and procedures	Yes	40 CFR 61.137 EPA 1989a
	- Provisions for alternative means for process vessels, storage tanks, and tar-intercepting sumps	Yes	40 CFR 61.139 EPA 1991k
	Subpart V - Equipment Leaks (Fugitive Emission Sources)		40 CFR 61.240-61.242 EPA 1984b
	Pressure relief valve Closed-vent systems and control devices	Leak = ≥10,000 ppm Leak = ≥ 500 ppm	
	Subpart Y - Benezene Emissions From Benzene Storage Vessels	Yes	40 CFR 61.270-61.273 EPA 1989b
	Subpart BB - Benzene Emissions From Benzene Transfer Operations	Yes	40 CFR 61.300-61.304 EPA 1990b

Table 7-1. Regulations and Guidelines Applicable to Benzene (continued)

Agency	Description	Information	References
NATIONAL (cont.)			
	Subpart FF - Benzene Waste Operations		40 CFR 61.340-.353 EPA 1990c
	- Equipment standard	No detectable emissions <500 ppmv	40 CFR 61.340 EPA 1990c
	- Standards for tanks	<500 ppm above background	40 CFR 61.343 EPA 1990c
	- Surface impoundments	<500 ppm above background	40 CFR 61.344 EPA 1990c
	- Containers	<500 ppm above background	40 CFR 61.345 EPA 1990c
	- Individual drain systems	<500 ppm above background	40 CFR 61.346 EPA 1990c
	- Oil-water separator	<500 ppm above background	40 CFR 61.347 EPA 1990c
	- Closed-vent systems and control devices	Reduce organic emissions vented to it by ≥95 weight percent; achieve total organic compound concentration of 20 ppm (enclosed combustion devices) Recover or control organic emissions vented to it with an efficiency of ≥95 weight percent or the benzene emissions with an efficienty of ≥98 weight percent (vapor recovery system and other control devices except flares)	40 CFR 61.349 EPA 1990c
	- Performance standard	≥ 99% removal or destruction or removal to < 10 ppmw in waste	40 CFR 61.348 EPA 1990c
	- Alternative standards and emissions limitations	Yes	40 CFR 61.351-353 EPA 1990c
	NESHAPs for Source Categories		
	Subpart A - General Provisions	Yes	40 CFR 63.1 EPA 1994a
	Subpart B - Requirements for Control Technology Determinations for Major Sources in Accordance with Clean Air Act Sections 112(g) and 112(j)	Yes	40 CFR 63.51 EPA 1994b

Table 7-1. Regulations and Guidelines Applicable to Benzene (continued)

Agency	Description	Information	References
NATIONAL (cont.)			
	Subpart D - Regulations Governing Compliance Extensions for Early Reductions of Hazardous Air Pollutants — Demonstration of Early Reduction	Yes	40 CFR 63.74 EPA 1992a
	Subpart F - Synthetic Organic Chemical Manufacturing Industry (SOCMI)		
	Table 1 — SOCMI Chemicals	Yes	40 CFR 63.100 EPA 1994c
	Table 2 — Organic HAPs	Yes	40 CFR 63.100 EPA 1994d
	Subpart G - Synthetic Organic Chemical Manufacturing Industry for Process Vents, Storage Vessels, Transfer Operations, and Wastewater - Applicability		40 CFR 63.110 EPA 1994e
	Table 8 — Organic HAPs Subject to the Wastewater Provisions for Process Units at New Sources	Yes	40 CFR 63, Appendix EPA 1994f
	Table 9 — Organic HAPs Subject to Wastewater Provisions for Process Units at New and Existing Sources and Corresponding Fraction Removed (FR) Values	FR = 0.99	
	Subpart H - Equipment Leaks - Applicability	Yes	40 CFR 63.160 EPA 1994g
	Subpart L - Coke Oven Batteries		
	Alternative Standards for Coke Oven Doors Equipped with Sheds	Yes	40 CFR 63.305 EPA 1993b
	Subpart R - Gasoline Distribution	Yes	59 FR 64303 EPA 1994h
	Subpart CC — Petroleum Refineries	Yes	60 FR 43244 EPA 1995f
	NESHAPs		
	Constructed, Reconstructed, or Modified Major Sources (proposed)	No	59 FR 15504 EPA 1994k
	Off-Site Waste Operations (proposed)	Yes	59 FR 51913 EPA 1994m
	Subpart Y — Marine Tank Vessel Loading and Unloading Operations (proposed)	Yes	60 FR 48388 EPA 1995g
	Subpart X — Secondary Lead Smelters	Yes	40 CRF 63 60 FR 32587 EPA 1995d

Table 7-1. Regulations and Guidelines Applicable to Benzene (continued)

Agency	Description	Information	References
NATIONAL (cont.)			
	Regulation of Fuels and Fuel Additives		
	Subpart D - Reformulated Gasoline	Yes	40 CFR 80 EPA 1994i
	Standards for Reformulated and Conventional Gasoline - Revisions	Yes	40 CFR 80 59 FR 36944 EPA 1994j
	NPRM	Yes	60 FR 40009 EPA 1995e
	Standards for Reformulated Gasoline (Proposed)	Yes	58 FR 11722 EPA 1993k
	Renewable Oxygenate Requirement for Reformulated Gasoline (proposed)	Yes	58 FR 68343 EPA 1993c
	New and In-Use Motor Vehicles (proposed)	Yes	60 FR 52769 EPA 1995h
	New Gasoline Spark-Ignition and Diesel Compression-ignition Marine Engines (NPRM)	Yes	59 FR 55930 EPA 1994n
	Emission Standards for New Non-Road-Spark-Ignition Engines at or Below 19 KW (proposed)	Yes	59 FR 25399 EPA 1994y
b. Water			
EPA ODW	National Primary Drinking Water Standards		
	MCLs	0.005 mg/L	40 CFR 141.61 EPA 1991a
	BAT	Yes	40 CFR 141.61 EPA 1991b
	Guidelines Establishing Test Procedures for the Analysis of Pollutants: New Test Methods — Required Container, Preservation Technique and Holding (Proposed)	Yes	60 FR 53988 EPA 1995i
	National Primary Drinking Water Regulations Implementation - Variances and Exemptions from MCLs	Yes	40 CFR 142.62 EPA 1991c
	Hazardous Waste Injection Restrictions	Yes	40 CFR 148.10 EPA 1988a
EPA OW	Designation of Hazardous Substances	Yes	40 CFR 116.4 EPA 1978a
	Determination of Reportable Quantities for Hazardous Substances	Yes	40 CFR 117.3 EPA 1985b
	Form 2C - Application for Permit to Discharge Wastewater	Yes	40 CFR 125 EPA 1984c
	Guidelines Establishing Test Procedures		

Table 7-1. Regulations and Guidelines Applicable to Benzene (continued)

Agency	Description	Information	References
NATIONAL (cont.)			
	Table 1C-List of Approved Test Procedures for Non-Pesticide Organic Compounds	Yes	40 CFR 136.3 EPA 1984f
	Method 601 - Purgeable Hydrocarbons	Yes	
	Method 602 - Purgeable Aromatics	Yes	
	Method 624 - Purgeables	Yes	
	Method 1624 Revision B - VOCs by Isotope Dilution GC/MS	Yes	
	Method 1625 Revision B - Semivolatile Organic Compounds by Isotope Dilution GC/MS	Yes	40 CFR 136, App. A EPA 1984d
	Effluent Guidelines and Standards Toxic Pollutants	Yes	40 CFR 401.15 EPA 1979b
	General Pretreatment Regulations for Existing and New Sources of Pollution		
	65 Toxic Pollutants	Yes	40 CFR 403, App. B EPA 1986a
	Standards for Use or Disposal of Sewage Sludge, Appendix G — Pollutants Eligible for a Removal Credit: Table II — Additional Pollutants Eligible (Proposed)	Land Application = 16 kg/g Surface Disposal Unlined = 140 mg/kg Unlined = 3,400 mg/kg	60 FR 54771 EPA 1995j
	Electroplating Point Source Category - General Definitions	Yes	40 CFR 413.02 EPA 1981a
	Organic Chemicals, Plastics and Synthetic Fibers		
	Subpart C - Other Fibers Maximum 1-day Maximum monthly average	 136 μg/L 37 μg/L	40 CFR 414.35 EPA 1993d
	Subpart D - Thermoplastic Resins Maximum 1-day Maximum monthly average	 136 μg/L 37 μg/L	40 CFR 414.45 EPA 1993e
	Subpart F - Commodity Organic Chemicals Maximum 1-day Maximum monthly average	 134 μg/L 37 μg/L	40 CFR 414.65 EPA 1993f
	Subpart I - Direct Discharge Point Sources That Use End-0f-Pipe Biological Treatment Maximum (1 day) Maximum (monthly average)	 136 μg/L 37 μg/L	40 CFR 414.91 EPA 1987a
	Subpart J - Direct Discharge Point Sources That Do Not Use End-Of-Pipe Biological Treatment Maximum (1 day) Maximum (monthly average)	 134 μg/L 57 μg/L	40 CFR 414.101 EPA 1993g

Table 7-1. Regulations and Guidelines Applicable to Benzene (continued)

Agency	Description	Information	References
NATIONAL (cont.)			
	Subpart K - Indirect Discharge Point Sources		40 CFR 414.111 EPA 1993h
	Maximum (1 day)	134 µg/L	
	Maximum (monthly average)	57 µg/L	
	Non-complexed Metal-Bearing Waste Streams and Cyanide-Bearing Waste Streams (Zinc)	Yes	40 CFR 414, App. A EPA 1987b
	Iron and Steel Manufacturing Point Source Category		
	General Definitions	Yes	40 CFR 420.02 EPA 1982a
	BAT Effluent Limits for By-Product Cokemaking		40 CFR 420.13 (b) EPA 1982b
	iron and steel	3.19×10^{-5} Kg/kkg of product	
	maximum (1 day) with physical chemical treatment system	2.15×10^{-5} Kg/kkg of product	
	merchant	3.55×10^{-5} Kg/kkg of product	
	maximum (1 day) with physical chemical	2.5×10^{-5} Kg/kkg of product	
	NSPS for By-product Cokemaking		40 CFR 420.14(a) EPA 1982c
	iron and steel		
	maximum (1 day)	3.19×10^{-5} Kg/kkg of product	
	merchant	3.55×10^{-5} kg/kkg of product	
	maximum (1 day)		
	Steam Electric Power Generating Point Source Category		
	126 Priority Pollutants	Yes	40 CFR 423, App. A EPA 1982d
	Centralized Waste Treatment Industry (Proposed)		
	Monthly Average	0.011-6.8 mg/L	60 FR 5464 EPA 1995a
	Maximum for One Day	0.014-9.0 mg/L	
	Pharmaceutical Manufacturing (Proposed)		60 FR 21592 EPA 1995c
	Definition of Minimal Level	10 µg/L	
	Subpart A — Fermentation		
	Monthly Average	212-268 µg/L	
	Maximum for One Day	573-796 µg/L	
	Subpart B — Extraction		
	Monthly Average	17-268 µg/L	
	Maximum for One Day	40-796 µg/L	
	Subpart C — Chemical Synthesis		
	Monthly Average	212-268 µg/L	
	Maximum for One Day	573-796 µg/L	

Table 7-1. Regulations and Guidelines Applicable to Benzene (continued)

Agency	Description	Information	References
NATIONAL (cont.)			
	Subpart D — Mixing, Compounding, and Formulation		
	Monthly Average	17-268 μg/L	
	Maximum for One Day	40-796 μg/L	
	Metal Finishing Point Source Category		
	Definition of Total Toxic Organics (TTO)	>0.01 mg/L	40 CFR 433.11 EPA 1983b
	Metal Molding and Casting Point Source Category		
	TTO Definition	>0.01 mg/L	40 CFR 464.11 EPA 1985c
	Copper Forming Point Source Category		
	TTO Definition	>0.01 mg/L	40 CFR 468.02 EPA 1983c
c. Food:			
FDA	Indirect Food Additive For Use Only as Component of Adhesives	Yes	21 CFR 175.105 FDA 1977a
d. Other:			
DOT	Hazardous Materials Table	Yes	49 CFR 172.101 DOT 1990
EPA OW	Ocean Dumping - Limits Established	Waste concentration < solubility Limit in sea water	40 CFR 227.7 EPA 1977b
EPA OSW	Solid Waste Disposal: Appendix I - MCLs	0.005 mg/L	40 CFR 257, App. I EPA 1991d
	Municipal Solid Waste Landfills		
	Design Criteria	0.005 mg/L	40 CFR 258.40 EPA 1991e
	App. I - Constituents for detection monitoring		40 CFR 258 EPA 1991f
	App. II - List of hazardous inorganic and organic constituents		40 CFR 258, App. II EPA 1991g
	Identification and Listing of Hazardous Waste		
	Toxicity Characteristic	0.5 mg/L	40 CFR 261.24 EPA 1990d
	Exemption for Petroleum — Contaminated Media and Debris	Yes	58 FR 8504 EPA 1993l
	Hazardous Wastes from Non-specific Sources	Yes	40 CFR 261.31 EPA 1981b
	Hazardous Wastes From Specific Sources	Yes	40 CFR 261.32 EPA 1981c
	Additional Petroleum Refining Wastes (Proposed)	Yes	60 FR 57747 EPA 1995k

Table 7-1. Regulations and Guidelines Applicable to Benzene (continued)

Agency	Description	Information	References
NATIONAL (cont.)			
	Discarded Commercial Chemical Products, Off-specification Species, Container Residues, and Spill Residues Thereof	Yes	40 CFR 261.33(f) EPA 1980c
	Basis for Listing Hazardous Wastes (F024, F025, K085, K104, K105, K141, K142, K143, K144, K145, K147, K151 (Final); K170, K171, K172 [Proposed])	Yes	40 CFR 261, Appendix VII EPA 1981d
	Hazardous Constituents	Yes	40 CFR 261, Appendix VIII EPA 1988b
	Wastes Excluded Under 260.20 and 260.22	Yes	40 CFR 261, Appendix IX EPA 1984e
	Risk-Based Exit Levels (Proposed)		60 FR 66344, Appendix X EPA 1995l
	MCL Benchmark Option		
	Wastewater — Totals	0.021 mg/L	
	Nonwastewater		
	Totals	110 mg/kg	
	Leach	0.009 mg/L	
	Toxicity Benchmark Option		
	Wastewater — Totals	0.018 mg/L	
	Nonwastewater		
	Totals	110 mg/kg	
	Leach	0.0054.mg/L	
	Risk-Based Conditional Exit Levels (Proposed)		60 FR 66344, Appendix XI EPA 1995l
	MCL Benchmark Option		
	Wastewater — Totals		
	Nonwastewater	0.02 mg/L	
	Totals		
	Leach	250 mg/kg 0.039 mg/L	
	Toxicity Benchmark Option		
	Wastewater — Totals	0.018 mg/L	
	Nonwastewater		
	Totals	250 mg/kg	
	Leach	0.023 mg/L	
	Standards for Owners and Operators of Hazardous Wate TSDF		
	Subpart AA - Air Emission Standards for Process Vents	Yes	40 CFR 264.1030 EPA 1990e
	Subpart BB - Air Emission Standards for Equipment Leaks	Yes	40 CFR 264.1050 EPA 1990f
	Subpart CC - Organic Air Emission Standards for Tanks, Surface Impoundments, and Containers	Yes	40 CFR 264 59 FR 62896 EPA 1994p

Table 7-1. Regulations and Guidelines Applicable to Benzene (continued)

Agency	Description	Information		References
NATIONAL (cont.)				
	Groundwater Monitoring List	PQL = 2μg/L		40 CFR 264, Appendix IX EPA 1987c
	Interim Status Standards for Owners and Operators of Hazardous Waste TSDF	Yes		
	Subpart AA - Air Emission Standards for Process Vents	Yes		40 CFR 265.1030 EPA 1990e
	Subpart BB - Air Emission Standards for Equipment Leaks	Yes		40 CFR 265.1050 EPA 1990f
	Subpart CC - Organic Air Emission Standards for Tanks, Surface Impoundments, and Containers	Yes		40 CFR 265 59 FR 62896 EPA 1994o
	Health-Based Limits for Exclusion of Waste - Derived Residues	Yes		40 CFR 266, Appendix VII EPA 1991h
	Appendix VIII - Potential PICs for Determination of Exclusion of Waste - Derived Residues	Yes		40 CFR 266, Appendix VIII EPA 1991i
	Land Disposal Restrictions			
	Identification of Wastes to be Evaluated by August 8, 1988	Yes		40 CFR 268.10 EPA 1986b
	Waste Specific Prohibitions - Third Wastes	Yes		40 CFR 268.35 EPA 1990g
	Treatment Standards for Hazardous Wastes			40 CFR 268.40 59 FR 47982 EPA 1994q
		ww	non ww	
	F001 - F005 (spent solvents)	0.14 mg/L	10 mg/kg	
	F037, F038, K048, K049, K051, K052	0.14 mg/L	10 mg/kg	
	F039	0.14 mg/L	10 mg/kg	
	K011, K013	0.14 mg/L	10 mg/kg	
	K060	0.14 mg/L	10 mg/kg	
	K083	0.14 mg/L	10 mg/kg	
	K085, K105	0.14 mg/L	10 mg/kg	
	K087	0.14 mg/L	10 mg/kg	
	K104	0.14 mg/L	10 mg/kg	
	K141, K142, K143, K144, K145, K147, K151	0.14 mg/L	10 mg/kg	
	K171, K172 (Proposed)	0.14 mg/L	10 mg/kg	40 CFR 261 60 FR 57747 EPA 1995k

Table 7-1. Regulations and Guidelines Applicable to Benzene (continued)

Agency	Description	Information		References
NATIONAL (cont.)				
	D018, K156, K158, K159 (Proposed)	0.14 mg/L	10 mg/kg	60 FR 11702 EPA 1995b
	Treatment Standards Expressed as Specified Technologies	Yes		40 CFR 268.42 59 FR 47982 EPA 1994r
	Treatment Standards Expressed as Waste Concentrations	Yes		40 CFR 268.43 59 FR 47982 EPA 1994s
		ww	non ww	
	F001 - F005 (spent solvents)	0.070 mg/L	3.7 mg/kg	
	F037, F038, K048, K049, K051	0.14 mg/L	14 mg/kg	
	F039, U019	0.14 mg/L	36 mg/kg	
	K011, K014	0.02 mg/L	0.03 mg/kg	
	K060	0.17 mg/L	0.071 mg/kg 6.6 - mg/kg	
	K083	0.14 mg/L	4.4 mg/kg	
	K085, K105	0.14 mg/L	6.0 mg/kg	
	K103, K104	0.15 mg/L		
	Universal Treatment Standards	0.14 mg/L	10 mg/kg	40 CFR 268.48 59 FR 47982 EPA 1994t
	Minimize Threat Levels Without Management Requirements (Proposed) — Non Wastewater Standard	110 mg/kg 0.0054 mg/L		60 FR 66344 EPA 1995l
	Effective Dates of Surface Disposed Wastes (Non-soil and Debris) Regulated in the LDRs - Comprehensive List	Yes		40 CFR 268, Appendix VII EPA 1991j
	Basis for Listing Hazardous Waste (proposed)	Yes		59 FR 9808 EPA 1994u
EPA OERR	Toxic Chemical Release Reporting			
	List of Hazardous Substances and Reportable Quantities			
	Benzene and Benzene-containing Wastes (K085, K104, K105, K151)	10 lb		40 CFR 302.4 EPA 1989c
	Benzene-containing Wastes (F024, F025, K141, K142, K143, K144, K145, K147, K170, K171, K172) (Proposed)	1 lb		60 FR 57747 EPA 1995k
	TRI Reporting Thresholds	10,000 lb		40 CFR 372.25 EPA 1988g
	Specific Toxic Chemical Listings	Yes		40 CFR 372.65 EPA 1988c
EPA OPTS	Chemical Fate Testing Guidelines			
	Boiling point/boiling range	80.1°C		40 CFR 796.1220 EPA 1985d
	Partition Coefficient (n-Octanol-water) (log k_{ow})	Yes		40 CFR 796.1570 EPA 1985e

Table 7-1. Regulations and Guidelines Applicable to Benzene (continued)

Agency	Description	Information	References
NATIONAL (cont.)			
DOT Coast Guard	Facilities Transferring Oil or Hazardous Materials in Bulk	Yes	33 CFR 154 CG 1990
	Natural Resource Damage Assessments (proposed)	Yes	59 FR 1062 NOAA 1994
Guidelines:			
a. Air:			
EPA	RfC (8-hr inhalation)	Pending[e]	IRIS 1996
ACGIH	TLV TWA	10 ppm, 32 mg/m^3[c]	ACGIH 1996
	Carcinogen classification	A2 = Suspected human carcinogen	
	Biological Exposure Indices		
	Total phenol in urine at end of shift	50 mg/g creatinine[d]	
	In exhaled air prior to next shift		
	Mixed-exhaled	0.8 ppm	
	End-exhaled	0.12 ppm	
NIOSH	REL (8-hr TWA)	0.1 ppm	NIOSH 1992
	Ceiling (15 minutes)	1 ppm	
b. Water:			
EPA OWRS	Health Advisories		EPA 1995m
	1-day (recommended) (child)	0.2 mg/L	
	10-day (child)	0.2 mg/L	
	Long-term (child & adult)	None[f]	
	Lifetime (child & adult)	None[f]	
	DWEL	None[f]	
	Ambient Water Quality Criteria For Protection of Human Health[g]		45 FR 79318 EPA 1980b
	Ingesting water and organisms		
	10^{-5}	6.6 µg/L	
	10^{-6}	0.66 µg/L	
	10^{-7}	0.066 µg/L	
	Ingesting organisms only		
	10^{-5}	400 µg/L	
	10^{-6}	40.0 µg/L	
	10^{-7}	4.0 µg/L	
	Drinking water		
	10^{-4}	70 µg/L	
	10^{-5}	7.0 µg/L	
	10^{-6}	0.7 µg/L	
	Public Notification	Yes	40 CFR 141.32(e)(5) EPA 1987d
	MCLGs	0 mg/L	40 CFR 141.50 EPA 1985f
	Water Quality Guidance for Great Lakes System (proposed)	Yes	59 FR 44678 EPA 1994z
c. Other			
EPA	EEGL (1-hr) (preliminary)	50 ppm	NAS/NRC 1993
	EEGL (24-hr) (preliminary)	2 ppm	
	Cancer Classification	A	IRIS 1996

Table 7-1. Regulations and Guidelines Applicable to Benzene (continued)

Agency	Description	Information	References
NATIONAL (cont.)			
NTP	Weight of Evidence	Clear evidence	NTP 1995
EPA	Unit Risk (air)	$8.3x10^{-6}$ per μg/m^3	IRIS 1996
	Unit Risk (water)	$8.3x10^{-7}$ per μg/L	IRIS 1996
	q_1*cancer slope factor	$2.9x10^{-2}$ per mg/kg-day	IRIS 1996
NIOSH	Carcinogen Classification	Ca[h]	NIOSH 1992
STATE			
Regulations and Guidelines:			
a. Air:	Acceptable ambient air concentrations (average time)		NATICH 1990
AZ	1 hour	$6.30x10^{+2}$ μg/m^3	
	24 hour	$5.10x10^{+1}$ μg/m^3	
	Annual	$1.40x10^{-1}$ μg/m^3	
CT	8 hour	$1.50x10^{+2}$ μg/m^3	
FL-FTLDLF	8 hour	$3.00x10^{-1}$ mg/m^3	
FL-Pinella	8 hour	$3.00x10^{+1}$ μg/m^3	
	24 hour	7.20 μg/m^3	
	Annual	$1.20x10^{-1}$ μg/m^3	
IN	Annual	$1.20x10^{-1}$ μg/m^3	
	8 hour	$1.60x10^{+2}$ μg/m^3	
IN-Innap.	Annual	$1.45x10^{-1}$ μg/m^3	
KS	Annual	$1.20x10^{-1}$ μg/m^3	
KS-KC	Annual	$1.20x10^{-1}$ μg/m^3	
LA	Annual	$1.20x10^{+1}$ μg/m^3	
MA	24 hour	1.74 μg/m^3	
	Annual	$1.20x10^{-1}$ μg/m^3	
ME	Year	$1.20x10^{-1}$ μg/m^3	
MI	Annual	$1.40x10^{-1}$ μg/m^3	
ND	NA	0.00 LAER	
NV	8 hour	$7.14x10^{-1}$ mg/m^3	
NY	1 year	$1.00x10^{+2}$ μg/m^3	
OK	24 hour	3.20 μg/m^3	
PA - Phil.	1 year	$7.20x10^{+1}$ μg/m^3	
	Annual	$2.40x10^{+1}$ ppb	
RI	Annual	$1x10^{-1}$ μg/m^3	
SC	24 hour	$1.50x10^{+2}$ μg/m^3	
TX	30 minutes	$3.00x10^{+1}$ μg/m^3	
	Annual	3.00 μg/m^3	
VA	24 hour	$3.20x10^{+2}$ μg/m^3	
VT	Annual	$1.20x10^{-1}$ μg/m^3	
WA-SWEST	Annual	$1.20x10^{-1}$ μg/m^3	
KY	Significant Emission Levels of Toxic Air Pollutants	$7.654x10^{-3}$ lb/hour	401 KAR 63:021 KAR 1991a

Table 7-1. Regulations and Guidelines Applicable to Benzene (continued)

Agency	Description	Information	References
STATE (cont.)			
WI	Hazardous Air Contaminants Without Acceptable Ambient Concentrations Requiring Application of Lowest Achievable Emission Rates	300 lb/year	DNR 445.04 WAC 1988
b. Water:			
	State Water Quality Standards Summaries		EPA 1988d
IA	Class B - Upper value - 2° upper limit Class C - Upper Value	0.01 mg/L 0.0012 mg/L 0.01 mg/L	
ID	Domestic Upper Value	0.01 mg/L	
IL	General Use Water - Upper value Public Food - *Upper value 2° Upper Value	 0.15 mg/L	
IN	Yes-. site-specific		
KS	Agri. Upper Value Agri. Upper Value	0.1 mg/L 0.2 mg/L	
KY	Warm Water Aquatic - upper value - 2° upper limit	4.0 µg/L 12 µg/L	
MN	Domestic Consumption - Upper value	0.01 mg/L	
MO	Irrigation - upper value Protxn of w. - upper value Coldwater Sport - upper value Drinking - upper value	10 µg/L 12µg/L 1.2 µg/L 10 µg/L	
MS	Public Water Supply - upper value	0.01 mg/L	
MT	Yes-.-site specific		
NC	Fresh Sfc. w. (WS-I) - upper value - 2° upper limit Fresh Sfc. Water (WS-II) - upper value - 2° upper limit Fresh Sfc. Water (WS-III) - upper value - 2° upper limit Fresh Sfc. Water (Class B) - upper value - 2° upper limit Fresh Sfc. Water (Class C) - upper value - 2° upper limit Tidal Salt Water (Class SA) - upper value Tital Salt Water (Class SB) - upper value Tidal Salt Water (Class SC) - upper value)	0.4 µg/L 2.0 µg/L 0.4 µg/L 0.2 µg/L 0.4 µg/L 2.0 µg/L 0.4 µg/L 0.2 µg/L 0.4 µg/L 0.2 µg/L 5 µg/L 5 µg/L 5 µg/L	
ND	Class I Streams - upper value Class IA Streams - upper value Class II Streams - upper value Class III Streams - upper value	0.01 mg/L 0.01 mg/L 0.01 mg/L 0.01 mg/L	
NE	Water Supply - upper value	0.01 mg/L	
NJ	Fresh water FW2 - upper value	10 µg/L	

Table 7-1. Regulations and Guidelines Applicable to Benzene (continued)

Agency	Description	Information	References
STATE (cont.)			
NV	All Classes - upper value	0.0004 mg/L	
NY	Class A - upper value	10 µg/L	
	2° upper limit	Yes	
	Class B-D funct.	NA	
	Class AA Special Class I - upper value	10 µg/L	
	- 2° upper limit	Yes	
	Class A Special Class II - upper value	10 µg/L	
	- 2° upper limit	Yes	
	Class A Special - upper value	10 µg/L	
	Class A Special - upper limit	Yes	
OH	Warm water Habit - upper value	Yes- site specific	
	Limited Warm Water - upper value	Yes-site specific	
	Exceptional Warm Water - upper value	Yes- site specific	
	Seasonal Salmon - upper value	Yes -site specific	
	Cold water - upper value	Yes- site specific	
	Public Water Supply - upper value	10 µg/L max.	
	Agricultural - upper value	50 µg/L	
OK	Public and Private - upper value	0.020 mg/L	
	Fish and Wildlife - upper value	Yes- site specific	
OR	All Classes - upper value	Yes- site specific	
PR	Class SA - upper value	Yes- site specific	
	Class SB - upper value	5.0 µg/L	
	Class SC - upper value	5.0 µg/L	
	Class SD - upper value	5.0 µg/L	
	Class SE - upper value	5.0 µg/L	
RI	Fresh water Class SB 2° upper limit	Yes	
	Fresh water Class C	Yes	
	Fresh water Class D	Yes	
	Sea Water Class SA upper value	59 µg/L	
	Sea Water Class SA 2° upper limit	4.5 µg/L	
	Sea Water Class SB upper value	59 µg/L	
	Sea Water Class SB 2° upper limit	4.5 µg/L	
	Sea Water Class SC upper value	59 µg/L	
	Sea Water Class SC 2° upper limit	4.5 µg/L	
SD	Domestic water - upper value	0.01 mg/L	
TN	Domestic water - upper value	10 µg/L	
UT	Domestic Purpose - Class IA - upper value	0.01 mg/L	
	Domestic Purpose - Class IB	0.01 mg/L	
	Domestic Purpose - Class IC	0.01 mg/L	
	Recreation and Class 2A - upper value	Yes	
	Recreation and Class 2B - upper value	Yes	
	Aquatic Class 3A - upper value	0.004 mg/L	
	Aquatic Class 3B - upper value	0.04 mg/L	
	Aquatic Class 3C - upper value	Yes	
	Aquatic Class 3D - upper value	Yes	
	Agricultural Use Class 4 - upper value	0.01 mg/L	
	Agricultural Use Class 5 - upper value	Yes	
VA	Surface Public - upper value	0.01 mg/L	
	Protection of Surface Public	9.3 µg/L	

Table 7-1. Regulations and Guidelines Applicable to Benzene (continued)

Agency	Description	Information	References
STATE (cont.)			
WV	Public Water Su. Category A - upper value	Yes (10 mg/L)	
AZ	Drinking Water	1.3 µg/L	FSTRAC 1990
CT	Drinking Water	1 µg/L	
ME	Drinking Water	5 µg/L	
MN	Drinking Water	7 µg/L	
RI	Drinking Water	0.7 µg/L	
	Water Quality Criteria: Human Health		
AZ	Concentration Domestic/Drinking	0.005 mg/L 1.2 µg/L	CELDs 1994 Sittig 1994b
AL	Concentration	0.005 mg/L	CELDs 1994
AZ	Domestic Water Source	5 µg/L	
AZ	Fish Consumption	120 µg/L	
AZ	Partial Body Contact	470 µg/L	
CO	Maximum Contaminant Level	0.005 mg/L	
CT	Quantification Limit (Organic Chemical Parameters) Domestic/Drinking	1 mg/L 1 µg/L	 Sittig 1994b
CA	Maximum Contaminant Level	0.005 mg/L	CELDS 1994
DE	Organic Chemical Conc. Level	0.005 mg/L	
DC	Numeric Stds for Water Quality	0.8 µg/L	
FL	Maximum Contaminant Level Detection Limit	0.001 mg/L 0.5 µg/L	 Sittig 1994b
GA	Maximum Contaminant Level	0.005 mg/L	CELDs 1994
IA	Maximum Contaminant Level	0.005 mg/L	
ID	Maximum Contaminant Level Goal	zero	
ID	Maximum Contaminant Level	0.005 mg/L	
IN	Continuous Criterion Conc. (Avg. 4 days) Outside Mixing Zone	400 µg/L	
IN	Continuous Criterion Conc. (Avg. 4 days) Point of Water Intake	6.6 µg/L	
IL	Maximum Contaminant Level	0.005 mg/L	
KY	Water Quality Conc. from Consumption of Fish Tissue	.40 µg/L	
KY	Domestic Water Supply (MCL)	.66 µg/L	
LA	Drinking Water Supply	1.10 µg/L	
LA	Drinking Water Supply	12.50 µg/L	

Table 7-1. Regulations and Guidelines Applicable to Benzene (continued)

Agency	Description	Information	References
STATE (cont.)			
MA	Maximum Contaminant Levels	0.005 mg/L	
ME	Domestic/Drinking	5 µg/L	Sittig 1994b
MI	Domestic/Drinking Detection Limit	1.2 µg/L 1 µg/L	
MD	Toxic Sub. Criteria-Drinking Water	5 µg/L	CELDs 1994
MD	Toxic Sub. Criteria-Fish Consumption	400 µg/L	
MT	Maximum Volatile Organic Chemical Contaminant Level	0.005 mg/L	
MO	Maximum Contaminant Level for VOs	0.005 mg/L	
MN	Maximum Contaminant Level for VOs	0.005 mg/L	
MO	Toxic Sub.Criteria - Human Health Fish Consumption	71 µg/L	
MO	Toxic Sub. Criteria - Drinking Water	5 µg/L	
NE	Maximum Contaminant Levels	0.005 mg/L	
MN	Maximum Contaminant Levels	0.002 mg/L	
ND	Maximum Contaminant Levels	0.005 mg/L	
NJ	Domestic/Drinking	1 µg/L	Sittig 1994b
NY	Water Quality Stds. Health	.7 µg/L	CELDS 1994
NC	Maximum Contaminant Levels	0.005 mg/L	
NC	Water Quality Stds. for Class GS Waters	0.001 mg/L	
OH	Maximum Contaminant Levels	0.005 mg/L	
OK	Maximum Allowable Levels	0.005 mg/L	
OR	Domestic/Drinking	3 µg/L	Sittig 1994b
PR	Maximum Allowable Conc. (Class SB & SC)	400 µg/L	CELDs 1994
PR	Maximum Allowable Conc. (Class SD)	5 µg/L	
PR	Maximum Allowable Conc. (Class SBI)	5 µg/L	
PR	MCL Goals	0.005 mg/L	
RI	Maximum Contaminant Levels	0.005 mg/L	
SC	Maximum Contaminant Levels	0.005 mg/L	
SD	Volatile Organic Chemical Level	0.005 mg/L	

Table 7-1. Regulations and Guidelines Applicable to Benzene (continued)

Agency	Description	Information	References
STATE (cont.)			
TN	Maximum Contaminant Levels	0.005 mg/L	
TX	Maximum Contaminant Levels	0.005 mg/L	
VA	Maximum Contaminant Levels	0.005 mg/L	
VT	Class A or B Criteria	0.66 µg/L	
VT	Class C Waters Criteria	40 mg/L	
UT	Volatile Organic Contaminants	0.005 mg/L	
WA	Domestic/Drinking	5 µg/L	Sittig 1994b
WV	Maximum Synthetic Organic Contaminant	0.005 mg/L	CELDS 1994
WI	Maximum Contaminant Levels for VOs	0.005 mg/L	
WI	Human Cancer Criteria in Warm Water Sport Fish Commun.	5 mg/L	
WI	Human Cancer Criteria in Coldwater Commun.	5 mg/L	
WI	Human Cancer Criteria in Great Lakes Commun.	5 mg/L	
WI	Human Cancer Criteria in Warm Water Sport Fish Commun. (non-public WS)ublic WS)	140 mg/L	
WI	Human Cancer Criteria in Cold Water Commun. (non-public WS)	45 mg/L	
WI	Human Cancer Criteria in Warm Water Forage & Limited Forage (non-public WS)	1,300 mg/L	
WI	Interim Std. for those landfill and impoundments that accepted waste between 11-19-80 -- 7-26-82	0.005 mg/L	
WV	All water stds. criteria (B1, B2, B3)	40 mg/L	
WV	All water stds. criteria (A1)	0.66 mg/L	
WI	Maximum Contaminant Levels Goals Less than Maximum Contaminant Levels	0.001 mg/L	
WI	Human Cancer Criteria		DNR 105.09
	Public water supply	5 µg/L	WAC1989a
	Warm water sport fish communities	5 µg/L	
	Cold water communities	5 µg/L	
	Water Quality Criteria: Aquatic Life		CELDS 1994
AZ	(Acute) Cold Water Fishery	2,700 µg/L	
AZ	(Acute) Warm Water Fishery	2,700 µg/L	

Table 7-1. Regulations and Guidelines Applicable to Benzene (continued)

Agency	Description	Information	References
STATE (cont.)			
AZ	(Acute) Effluent Dominated Water	11,000 µg/L	
AZ	(Acute) Ephemeral	NS	
AZ	(Chronic) Cold Water Fishery	180 µg/L	
AZ	(Chronic) Warm Water Fishery	180 µg/L	
AZ	(Chronic) Effluent Dominated Water	700 µg/L	
AZ	(Chronic) Ephemeral	NS	
CO	(Acute) Organic Compounds to Second Power Std.	5,300 µg/L	
DC	Numeric Standards for Water Quality	1,000 µg/L	
FL	For Mixing Zone Pollutants (Maximum Conc. Levels)	4 mg/L	
HI	(Acute) Freshwater	1,800 µg/L	
HI	(Chronic) Freshwater	NS	
HI	(Acute) Saltwater	1,700 µg/L	
HI	(Chronic) Saltwater	NS	
HI	Fish Consumption	13 µg/L	
LA	Acute Freshwater	2,249 µg/L	
LA	Acute Marinewater	2700	
LA	Chronic Freshwater	1,125 µg/L	
LA	Chronic Marinewater	1,350 µg/L	
NC	Chronic - Stds. for Carcinogens in Fish and Shellfish	71.4 µg/L	
NY	Domestic/Drinking	6 µg/L	Sittig 1994b
OH	(Outside Mixing Zone) Maximum Concentration	1,100 µg/L	CELDS 1994
OH	30 Day Average - Coldwater	560 µg/L	
OH	(Inside Mixing Zone) Maximum Concentration Aquatic Habitat	2,100 µg/L	
OH	(Outside Mixing Zone) Aquatic Habitat Avg. 30 days Human Health	710 µg/L	
WI	Nonpublic water supply		DNR 105.09
	Warm water sport fish communities	140 µg/L	WAC 1989b
	Cold water forage and limited forage fish	45 µg/L	
	communities and limited aquatic life	1,300 µg/L	
	Groundwater Quality Standards		CELDS 1994
CO	Carcinogenic Chemical Standard	5 µg/L	

Table 7-1. Regulations and Guidelines Applicable to Benzene (continued)

Agency	Description	Information	References
STATE (cont.)			
KY	Maximum Contaminant Levels for Underground Drinking Water	0.005 mg/L	
MO	Toxic Criteria-Groundwater Quality	5 µg/L	
MN	Groundwater Standards	0.01 mg/L	
NY	Groundwater Effluent Standards	0.7 µg/L	
OK	Numerical Water Quality Criteria for Groundwater	0.2 µg/L	
OK	Numerical Groundwater Quality Ref.	0.005 mg/L	
UT	Groundwater Quality Stds.	0.005 mg/L	
WI	Groundwater Quality Enforced Std.	5 mg/L	
WI	Groundwater Quality Preventative Action Limit	0.5 mg/L	
WI	Maximum Conc. of Constituents for Groundwater Prot.	0.005 mg/L	
WI	Public Health Groundwater Quality Standards		DNR 140.10
	Enforcement standard	5 µg/L	WAC 1994a
	Preventive action limit	0.05 µg/L	DNR 140.10 WAC 1994b
	Groundwater Quality Monitoring Parameters		CELDS 1994
AL	Suggested Methods	8020, 8240	
CO	Suggested Methods	8020, 8240	
CA	Suggested Methods	8020, 8240	
IL	Suggested Methods	8020, 8240	
LA	Suggested Methods	8020, 8240	
KY	Suggested Methods	8020, 8240	
MT	Suggested Methods	8020, 8240	
NY	Suggested Methods	8020, 8240	
OH	Suggested Methods	8020, 8240	
SC	Suggested Methods	8020, 8240	
VA	Suggested Methods	8020, 8240	
WI	Suggested Methods	8020, 8240	
	Hazardous Waste Constituents		CELDS 1994
AL	Maximum Concentration	0.5 mg/L	
CA	Hazardous Waste Max. Conc. of Tox. Characteristics	0.5 mg/L	
CA	Recyclable Hazardous Waste Type	NA	

Table 7-1. Regulations and Guidelines Applicable to Benzene (continued)

Agency	Description	Information	References
STATE (cont.)			
CO	Maximum Concentration	0.5 mg/L	
IL	Maximum Concentration of Tox. Characteristics	0.5 mg/L	
KY	Maximum Concentration of Cont. for Tox. Characteristics	0.5 mg/L	
LA	Reportable Quantities for Selected Air Cont.	100 lbs.	
LA	Effluent Limitations for Produced Water Discharge	0.0125 mg/L	
LA	Maximum Conc. of Cont. for Tox. Characteristics	0.5 mg/L	
ME	Minimum Detection Unit	≤5 mg/kg	
MA	Maximum Conc. of Cont. for Tox. Characteristics	0.5 mg/L	
MD	Maximum Conc. of Cont. for Tox. Characteristics	0.5 mg/L	
MN	Maximum Conc. of Cont. for Tox. Characteristics	0.5 mg/L	
NJ	Maximum Conc. of Cont. for Tox. Characteristics	0.5 mg/L	
NE	Maximum Conc. of Cont. for Tox. Characteristics	0.5 mg/L	
ND	Maximum Conc. of Cont. for Tox. Characteristics	0.5 mg/L	
PA	Maximum Conc. of Cont. for Tox. Characteristics	0.5 mg/L	
OH	Maximum Conc. of Cont. for Tox. Characteristics	0.5 mg/L	
SC	Maximum Conc. of Cont. for Tox. Characteristics	0.5 mg/L	
VA	Maximum Conc. of Cont. for Tox. Characteristics	0.5 mg/L	
VT	Maximum Conc. of Cont. for Tox. Characteristics	0.5 mg/L	
WI	Maximum Conc. of Cont. for Tox. Characteristics	0.5 mg/L	
WY	Maximum Conc. of Cont. for Tox. Characteristics	0.5 mg/L	
	Maximum Leachable Concentrations		CELDS 1994
TX	Maximum Leachable Conc.	0.50 mg/L	
TX	MCL	0.005 mg/L	

Table 7-1. Regulations and Guidelines Applicable to Benzene (continued)

Agency	Description	Information	References
STATE (cont.)			
c. Other			
CA	Hazardous Substance Subject to Minimum Standard of Management of Hazardous and Extremely Hazardous Wastes	Yes	66260.24 CA 1993a
CA	Regulatory Level	0.50 µg/day	66260.24 CA 1993b
KY	Defined as Hazardous Waste	Yes	401 KAR 31:170 KAR 1991b

[a] Group 1=Carcinogenic to humans.
[b] Coke oven emissions have been demonstrated to contain benzene.
[c] Notice of intended change for benzene would lower the TWA to 0.l ppm and STEL to 0.3 mg/m^3; the carcinogen classification would be changed to Category A1 (confirmed Human Carcinogen).
[d] The Biological Exposure Indices for benzene are under study for possible change.
[e] Under review by an EPA work group.
[f] "None" indicates that these values have not been calculated for benzene because of its potent carcinogenicity.
[g] Because of its carcinogenic potential, the EPA-recommended concentration for benzene in ambient water is zero. However, because attainment of this level may not be possible, levels that correspond to upper-bound incremental lifetime cancer risks of 10^{-5}, 10^{-6}, and 10^{-7} are estimates.
[h] Ca = Carcinogenic

ACGIH = American Conference of Governmental Industrial Hygienists; BAT = Best Available Technology; CELDS = Computer-assisted Environmental Legislative Database; CFR = Code of Federal Regulations; DWEL = Drinking Water Equivalent Level; EEGL = Emergency Exposure Guidance Level; EPA = Environmental Protection Agency; FDA = Food and Drug Administration; FSTRAC = Federal State Toxicology and Regulatory Alliance Committee; GA = ground water best used as sources of drinking water; IARC = International Agency for Research on Cancer; IRIS = Integrated Risk Information System; KAR = Kentucky Administrative Regulations; LAER = Lowest Achievable Emission Rate; LDR = Land Disposal Restrictions; MCL = Maximum Contaminant Level; MCLG = Maximum Contaminant Level Goal; NA = Not applicable; NAS = National Academy of Sciences; NATICH = National Air Toxics Information Clearinghouse; NESHAP = National Emission Standard for Hazardous Air Pollutants; NIOSH = National Institute for Occupational Safety and Health; NPRM = Notice of Proposed Rulemaking; NR = Natural Resources; NRC = National Research Council; NS = not specified; NSPS = New Source Performance Standards; NTP = National Toxicology Program; OAR = Office of Air and Radiation; ODW = Office of Drinking Water; OERR = Office of Emergency and Remedial Response; OPTS = Office of Pesticides and Toxic Substances; OSHA = Occupational Safety and Health Administration; OSW = Office of Solid Waste; OWRS = Office of Water Regulations and Standards; PEL = Permissible Exposure Limit; PICs = Products of Incomplete Combustion; PQL = Principal Quantitation Limit; PSES = Pretreatment Standards for Existing Sources; PSNS - Pretreatment Standards for New Sources; REL = Recommended Exposure Limit; RfC = Reference Concentrations; RfD = Reference Dose; SDWA = Safe Drinking Water Act; SNARL = Suggested-No-Adverse-Response Level; STEL = Short Term Exposure Limit; TLV = Threshold Limit Value; TRI = Toxics Release Inventory; TTO = Total Toxic Organic; TWA = Time-Weighted Average; VHAP = Volatile Hazardous Air Pollutant; WAC = Wisconsin Administrative Code; WHO = World Health Organization; ww = wastewater