

7. REGULATIONS AND ADVISORIES

The international, national, and state regulations and guidelines regarding total petroleum hydrocarbons (TPH) in air, water, and other media are summarized in Table 7-1. No health or environmental benchmarks have been developed for TPH as a general category, though many exist for individual petroleum chemicals or products, such as gasoline.

Benzene is on the list of chemicals in “The Emergency Planning and Community Right-to-Know Act of 1986” (EPA 1988c, 1989c, 1989d). 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.

OSHA requires employers of workers who are occupationally exposed to petroleum distillates to institute engineering controls and work practices to reduce and maintain employee exposure at or below permissible exposure limits (PEL). The PEL for petroleum distillates is 500 ppm (OSHA 1974).

TPH as oil is regulated by the Clean Water Act as stated in Title 40, Sections 109-114 and Section 112 of the Code of Federal Regulations. Sections 109-114 address oil pollution prevention and spill response. Section 112 pertains to stormwater discharge permitting under the National Pollutant Discharge Elimination System. Underground injection control is regulated according to 40 CFR Sections 144 and 146.

Under Subtitle C of the Resource Conservation and Recovery Act (RCRA), certain wastes containing designated TPH compounds and petroleum-related industrial wastes are listed as hazardous. However, RCRA excludes some TPH-related wastes from regulations (e.g., certain exploration, well development, and production wastes). The RCRA-listed wastes are also controlled under the Comprehensive Environmental, Response, Compensation, and Liability Act (CERCLA) for accidental releases to the environment.

The American Society for Testing and Materials (ASTM) developed a guide for the community of engineering firms, environmental and risk assessment scientists, and governmental agencies to deal with

petroleum contaminated sites. In 1995 ASTM published its *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites* partly in response to Subtitle I of the Resource Conservation and Recovery Act (RCRA) (ASTM 1995). RCRA directed the U.S. Environmental Protection Agency (EPA) establish programs to prevent, detect, and clean up releases from underground storage tank systems (UST). ASTM's risk-based corrective action (RBCA) is a widely used, decision-making process for the assessment and response to chemical releases, with particular emphasis on petroleum release, based on the protection of human health and the environment. RBCA integrates site assessment, remedial action selection, and monitoring with risk and exposure assessment practices suggested by the EPA. The RBCA process is implemented in a tiered approach that involves increasingly sophisticated levels of data collection and analysis. Site assessment is followed by site classification whereby sites are classified by the urgency of initial response action based on information collected during the site assessment. Section 5.3.3.3, Transport Models, in Chapter 5 presents a brief overview of the tiered RBCA approach and also provides the basic flow chart of the RBCA approach, Figure 5-2.

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Table 7-1. Regulations and Guidelines Applicable to Total Petroleum Hydrocarbons

| Agency | Description | Information ^a | References |
|--|---|--------------------------|--|
| <u>INTERNATIONAL</u> | | | |
| WHO | NA | | |
| International Convention for Prevention of Pollution from Ships (MARPOL) | 1978 Protocol: Annexes I-V-Oil, Noxious Liquids, etc | Yes | MARPOL 1978 |
| <u>NATIONAL</u> | | | |
| Regulations: | | | |
| a. Water: | | | |
| EPA OW | Oil Pollution Prevention (spill prevention control and counter-measure planning) | Yes | 40 CFR 112 EPA 1973a |
| | Criteria for State, Local and Regional Oil Removal Contingency Plans | Yes | 40 CFR 109 EPA 1971 |
| | Discharge of Oil | Yes | 40 CFR 110 EPA 1987 |
| | Liability Limits for Small Onshore Storage Facilities | Yes | 40 CFR 113 EPA 1973b |
| | Civil Penalties for Violation of Oil Pollution Prevention Regulations | Yes | 40 CFR 114 EPA 1974 |
| | National Pollutant Discharge Elimination Permit Application: General Permits Stormwater Discharges | Yes Yes | 40 CFR 122.28 EPA 1983a 40 CFR 122.26 EPA 1990a |
| | Procedures for [Permit] Decision-making: Fact sheet for Stormwater Discharge Associated with Industrial Activities (Notice: e.g., asphalt paving and roofing, oil and gas exaction, hazardous waste TSDFs, landfills/application sites) | Yes | 58 FR 61146 EPA 1993 |
| EPA-ODW | Underground Injection Control Criteria and Standards for Program: Criteria and Standards for Class II Wells (oil and gas-related) | | 40 CFR 144 EPA 1983b |
| | Underground Injection Control Criteria and Standards for Program: Criteria and Standards for Class II Wells (oil and gas-related) | Yes | 40 CFR 146, Subpart C EPA 1980a |
| Bureau of Land Mgt. | Onshore Oil and Gas Operations: Environment and Safety | | 43 CFR 3160 |

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Table 7-1. Regulations and Guidelines Applicable to Total Petroleum Hydrocarbons (continued)

| Agency | Description | Information ^a | References |
|-------------------------|---|--|------------------------------|
| <u>NATIONAL</u> (cont.) | | | |
| b. Other DOT | Table of Hazardous Materials and Special Provisions: Gasoline, Petroleum, Crude Oil, Petroleum Distillates, n.o.s., Petroleum Ether, Petroleum Gases, Petroleum Naphtha, Petroleum Oil, Petroleum Spirit, Hydro-carbon Gases | Yes | 49 CFR 172.101 DOT 1990 |
| EPA OPPT | PCB Manufacturing, Processing, Distribution in Commerce and Use Prohibition - Disposal Requirements: Incineration | ≥ 50 ppm | 40 CFR 761.60 EPA 1979b |
| EPA OSW | Criteria for Municipal Solid Waste Landfills | Yes | 40 CFR 258 EPA 1991a |
| | Definition of Used Oil | Yes | 40 CFR 260.10 EPA 1980b |
| | Definition of Solid Waste | Yes | 40 CFR 261.2 EPA 1985a |
| | Identification and Listing of Hazardous Waste: Definition of Hazardous Waste: Rebuttable Presumption of Used Oil Total Halogens Deeming Oil Hazardous | Yes | 40 CFR 261.3 EPA 1998c |
| | Exclusions Drilling Fluids, Produced Waters, Etc., Associated with Exploration, Development, or Production | Yes | 40 CFR 261.4(b) EPA 1980c |
| | Petroleum-contaminated Media and Debris Failing Toxicity Characteristic and Subject to Corrective Action | Yes | |
| | Non-terme plated Used Oil Filters | Yes | |
| | Requirements for Recyclable Materials - Exclusions (see 40 CFR 266) | Yes | 40 CFR 261.6 EPA 1985b |
| | Toxicity Characteristic Benzene Lead | 0.5 mg/L (0.5 ppm) 5.0 mg/L (5.0 ppm) | 40 CFR 261.6 EPA 1990b |

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Table 7-1. Regulations and Guidelines Applicable to Total Petroleum Hydrocarbons (continued)

| Agency | Description | Information ^a | References |
|-------------------------|--|----------------------------|-----------------------------|
| <u>NATIONAL</u> (cont.) | | | |
| | Hazardous Wastes from Non-specific Sources: Petroleum Refinery Primary and Secondary Oil/Water/Solids Separation Sludges (F037, F038) | Yes | 40 CFR 261.31 EPA 1981a |
| | Hazardous Wastes from Specific Sources: Petroleum Refining Wastes K048 - K052 | Yes | 40 CFR 261.32 EPA 1981b |
| | K170 - K172 (proposed) | Yes | 60 FR 57747 EPA 1995b |
| | Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities: Hazardous Waste Burned in Boilers and Industrial Furnaces Destruction and Removal Efficiency for All Organic Hazardous Constituents | 99.99% | 40 CFR 266.104 EPA 1991a |
| | Low Risk Waste Exemption | 50% of fuel is fossil fuel | 40 CFR 266.109 EPA 1991a |
| | Land Disposal Restrictions: Treatment Standards (numerous constituents) F037 - F038 | Yes | 40 CFR 268.40 EPA 1988c |
| | K048 - K052 | Yes | |
| | K170 - K172 (proposed) | Yes | 40 FR 57747 EPA 1995b |
| | Standards for the Management of Used Oil | Yes | 57 FR 41566 EPA 1992b |
| | Underground Storage Tank Standards | Yes | 40 CFR 280 EPA 1988b |
| | Release Response and Corrective Action for US Systems Containing Petroleum or Hazardous Substances | Yes | |
| EPA OSWER | Designation, Reportable Quantities and Notification F037 - F038 | 1 lb. each | 40 CFR 302.4 EPA 1985c |
| | K048 - K052 | 10 lb. each | |
| | K170 - K172 (proposed) | 100 lb. each | 60 FR 57747 EPA 1995b |

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Table 7-1. Regulations and Guidelines Applicable to Total Petroleum Hydrocarbons (continued)

| Agency | Description | Information ^a | References |
|-----------------------------|---|--|-------------------------------|
| <u>NATIONAL (cont.)</u> | | | |
| OSHA | Limits for Air Contaminants - Petroleum Distillates | 2,000 mg/m ³ (500 ppm) | 29 CFR 1910.1000 OSHA 1974 |
| Guidelines | | | ACGIH 1994 |
| a. Air: | | | |
| ACGIH | Threshold Limit Values Gasoline TWA | 890 mg/m ³ (300 ppm) 1,480 mg/m ³ (500 ppm) | |
| | STEL | | |
| NIOSH | Gasoline - LOQ CA | 15 ppm | NIOSH 1992 |
| b. Other: | | | |
| EPA | RfC (inhalation) Ethylbenzene Cumene Naphthalene <i>n</i> -Hexane Toluene | 1 mg/m ³ (0.2303 ppm) 0.4 mg/m ³ (0.1134 ppm) 0.003 mg/m ³ (0.00069 ppm) 0.2 mg/m ³ (0.0567 ppm) 0.4 mg/m ³ (0.1062 ppm) | IRIS 1998b |
| | RfD (oral) Cumene <i>n</i> -Hexane Naphthalene Ethylbenzene Anthracene Ancenaphthene Fluoranthene Fluorene Pyrene Toluene Xylene | 0.1 mg/kg/day 0.06 mg/kg/day 0.02 mg/kg/day 0.1 mg/kg/day 0.3 mg/kg/day 0.06 mg/kg/day 0.04 mg/kg/day 0.04 mg/kg/day 0.03 mg/kg/day 0.02 mg/kg/day 2 mg/kg/day | |
| <u>STATE</u> | | | |
| Regulations and Guidelines: | Average Acceptable Ambient Air Concentrations | | NATICH 1992 |
| a. Air: | | | |
| | Diesel Fuel Emissions | | |
| | 30 min. | 90 µg/m ³ | |
| TX | Annual | 9 µg/m ³ | |
| | Gasoline | | |
| CT | 8 hours | 1.8x10 ⁴ µg/m ³ | |
| FL-Ft Ldle | 8 hours | 9 mg/m ³ (9x10 ³ µg/m ³) | |
| FL-Pinella | 8 hours 24 hours | 9x10 ³ µg/m ³ 2.16x10 ³ µg/m ³ | |
| KS | 1 year | 1.33 µg/m ³ | |
| KS-KC | Annual | 1.33 µg/m ³ | |
| MI | Annual | 1.3 µg/m ³ | |
| ND | 8 hours 1 hour | 8.9 mg/m ³ (8.9x10 ³ µg/m ³) 14.8 mg/m ³ (14.8x10 ³ µg/m ³) | |

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Table 7-1. Regulations and Guidelines Applicable to Total Petroleum Hydrocarbons (continued)

| Agency | Description | Information ^a | References |
|----------------------------|--|--|------------------------|
| <u>STATE (cont.)</u> | | | |
| NV | 8 hours | 21.4 mg/m ³ (21.4x10 ³ µg/m ³) | |
| OK | 24 hours | 8.9x10 ⁴ µg/m ³ | |
| TX | 30 min. Annual | 8.9x10 ³ µg/m ³ 8.9x10 ² µg/m ³ | |
| VA | 24 hours | 1.5x10 ⁴ µg/m ³ | |
| Naphtha | | | |
| AZ | 24 hours | 2.6x10 ³ µg/m ³ | |
| CT | 8 hours 8 hours | 2.7x10 ⁴ µg/m ³ 60 µg/m ³ | |
| FL-Pinella | 8 hours 24 hours | 4x10 ³ µg/m ³ 9.6x10 ² µg/m ³ | |
| TX | 30 min. Annual | 4x10 ³ µg/m ³ 4x10 ² µg/m ³ | |
| VA | 24 hours | 2.25x10 ² µg/m ³ | |
| Petroleum Distillates | | | |
| FL-Ft Ldle | 6 hours | 9 mg/m ³ (9x10 ³ µg/m ³) | |
| NY | 1 year | 3x10 ⁻² µg/m ³ | |
| TX | 30 min. Annual 30 min. Annual | 8.9x10 ³ µg/m ³ 8.9x10 ² µg/m ³ 3.5x10 ³ µg/m ³ 3.5x10 ² µg/m ³ | |
| Petroleum Gases, Liquified | | | |
| ND | 8 hours | 18 mg/m ³ (18x10 ³ µg/m ³) | |
| TX | 30 min. Annual | 1.8x10 ⁴ µg/m ³ 1.8x10 ³ µg/m ³ | |
| VA | 24 hours | 3x10 ⁴ µg/m ³ | |
| WA-SWEST | 24 hours | 5.99x10 ³ µg/m ³ | |
| b. Water: | | | 40 CFR 147 EPA 1984 |
| | State Administered Underground Injection Control Programs | | |
| | Class II | | |
| | AL, AK, CO, FL, ID, IL, KS, KY, MD, MI, MS, MT, NE, NV, NM, NY, ND, OH, OK, PA, RI, SD, TN, TX, U, WA, WY | | |
| | Indian Lands | | |
| | AL, AR, CA, CO, CT, DE, FL, GA, ID, IL, KS, LA, ME, MD, MA, MN, NC, ND, OH, OK, OR, RI, SC, SD, TX, U, VT, WA, WV, WI, WY | | |

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| Agency | Description | Information ^a | References |
|--|--|--|-------------------|
| <u>STATE (cont.)</u> | | | |
| ME | Drinking Water (guideline) | 50 $\mu\text{g}/\text{m}^3$ | FSTRAC 1990 |
| MA | Upper Concentration Limits in Groundwater | 100,000 $\mu\text{g}/\text{L}$ (ppb) | BNA 1999 |
| MA | Upper Concentration Limits in Soil | 10,000 $\mu\text{g}/\text{g}$ (ppm) | BNA 1999 |
| CT | Groundwater Protection Criteria | 500 $\mu\text{g}/\text{L}$ (ppb) | BNA 1999 |
| AK, DE, HI, IN, MA, MD, ME, MN, MO, MS, MT, ND, NE, OK, SD, TN, UT, VA, WA, WI, WV, WY | Groundwater Cleanup Standards ^b | States with TPH Parameter ^c | Judge et al. 1998 |
| AK, AL, AZ, CA, DE, FL, HI, IN, IO, KS, MA, MD, ME, MN, MO, MS, MT, NC, ND, NE, NH, NM, NV, OH, OK, OR, RI, SC, SD, TN, UT, VA, VT, WA, WI, WY | Soil Cleanup Standards ^d | States with TPH Parameter ^c | Judge et al. 1997 |

^a "Yes" indicates that a specific value was not appropriate but that the referenced regulation or guideline is applicable.

^b There are many limitations to presenting these standards in a summary table. Each state should be contacted for complete information. See Judge et al. 1998.

^c Includes TRPH parameter (total recoverable petroleum hydrocarbons), TEH (total extractable hydrocarbons), gasoline range organics (GRO), and diesel range organics (DRO).

^d See note "b" above and Judge et al. 1997.

ACGIH = American Conference of Governmental Industrial Hygienists; BNA = The Bureau of National Affairs; CFR = Code of Federal Regulations; DOT = Department of Transportation; EPA = Environmental Protection Agency; LOQ = Limit of Quantitation; NA = not applicable; NATICH = National Air Toxics Information Clearinghouse; NIOSH = National Institute of Occupational Safety and Health; ODW = Office of Drinking Water; OSHA = Occupational Safety and Health Administration; OSW = Office of Solid Wastes; OW = Office of Water; STEL = Short-term Exposure Limit; TLV = Threshold Limit Value; TTO = Total Toxic Organic; TWA = Time-weighted Average; WHO = World Health Organization