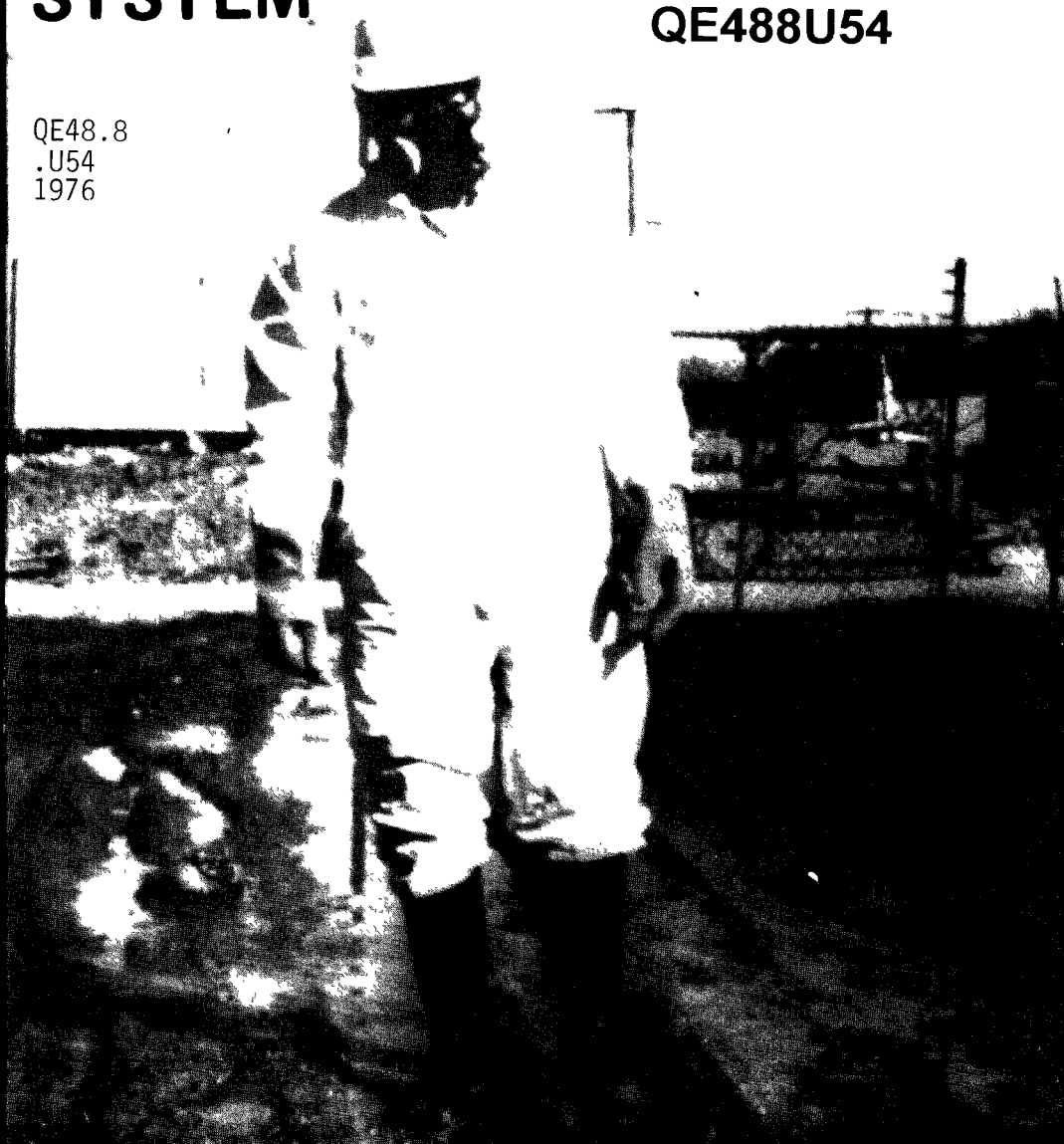


# **OIL and HAZARDOUS MATERIALS • TECHNICAL ASSISTANCE DATA SYSTEM**

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**U.S. ENVIRONMENTAL PROTECTION AGENCY**  
Oil and Special Materials Control Division  
Office of Water Program Operations  
Washington, D.C. 20460



**U.S. Environmental Protection Agency  
Region 5, Library (PL-12J)  
77 West Jackson Boulevard, 12th Floor  
Chicago, IL 60604-3590**

Chicago, Illinois 60604

# **EMERGENCY INFORMATION SYSTEMS AVAILABLE TO THE SPILL COORDINATOR**

The National Oil and Hazardous Materials Contingency Plan requires that accurate assessments be made of the potential or actual danger that a discharge of oil or hazardous substances may present. To aid competent water quality managers in time of emergency a data bank is a valuable tool. This data bank would permit the water quality manager to carefully evaluate the material relative to its environmental exposure. It is the purpose here to describe the Oil and Hazardous Materials—Technical Assistance Data System and its applications to emergency situations where an On-Scene Coordinator would need fast, accurate data on the degree of hazard involved, the countermeasures to be utilized and the personnel safety precautions to be taken.

The Oil and Hazardous Materials Technical Assistance Data System (OHM-TADS) is an automated information retrieval file designated to facilitate rapid-retrieval of information on 1,000 oil and hazardous substances. Data files were constructed in such a manner that a systematic query program could prove of great value, both for on-line response to spill incidents, and for summary evaluation relating to enforcement and research activities.

The prime function of the files is to provide immediate feedback of information on hazardous substances to spill response team personnel. Individual segments contain both numerical data and interpretive comments. These can serve as background for decision making and guidelines to initiate corrective action.

The completed files can also be used as a source of diverse information on hazardous substances as a whole, allowing research and enforcement authorities to assess areas where more work or stricter regulations are needed.

Although the files are meant to be a complete and accurate summary of all pertinent information concerning oil and hazardous substances, it must be realized that they immediately become incomplete as the result of an almost continuous outpouring of new data from a multitude of sources. It is evident that constant updating of the files is necessary.

## **SCOPE**

The Oil and Hazardous Materials Technical Assistance Data System (OHM-TADS) is designed to include all information pertinent to spill response efforts related to any material designated as an oil or hazardous material. As such, it includes a wide variety of physical, chemical, biological, toxicological, and commercial data. However, the greatest emphasis is placed on the deleterious effects these materials may have on water quality.

The investigative effort required to compile the data files involved no original research. Consequently, the completed files comprise a compendium of information available in open literature. Further, the data gaps represent a fairly accurate listing of current research needs.

Sources of information include articles in journals, books, papers presented at various symposia, compendiums, governmental reports, and basic reference texts.

Data is entered in a form that requires some technical background for maximum benefit. It is assumed that the user is familiar with chemical symbols and common chemical-biological terms.

#### SEGMENT RATIONALE

The following lists segment numbers, mnemonics and segment title, as well as the basic considerations which were made in collecting data for the OHM-TADS file.

Segment		
No.	Mnemonic	Segment Title
1.	ACC	OHM-TADS Accession Number: A unique, computer assigned, identifier for the data file.
2.	CAS	Chemical Abstracts Service Registry Number: A unique, international, identifier for material of interest.
3.	SIC	Standard Industrial Code Industry-employed codes which can be used to identify manufacturers of material.
4.	MAT	Material Name: Generally, the common name for the materials.
5.	SYN	Synonyms: Alternate identifiers of similar isomers for which the data is valid.
6.	TRN	Company Trade Names: Lists commercial trade names and the associate manufacturer whenever possible.
7.	FML	Chemical Formula: Gives most common formula or describes nature of materials included in the general heading such as components of an industrial blend or mixture.
8.	SPC	Species in Mixture: Identifies typical product purity in cases of single constituent materials, or specific major components of heterogeneous mixtures.
9.	USS	Common Uses: Enumerates common uses of materials.
10.	RAL	Rail (%): Percentage shipped by rail (estimate).
11.	BRG	Barge (%): Percentage shipped by barge (estimate).
12.	TRK	Truck (%): Percentage shipped by truck (estimate).
13.	PIP	Pipeline (%): Percentage shipped by pipeline (estimate).

14.	CON	Containers: Lists type of shipping containers normally used or required by law. Typical shipment size when available.
15.	STO	General Storage Procedures: Relates to precautions to be taken when storing the material. Rationale for these measures varies from safety considerations to precautions designed to prevent degradation of the materials.
16.	HND	General Handling Procedures: States the precautions to be taken when handling the material. Information relates to both safety considerations and practices designed to prevent degradation of the material.
17.	PRD	Production Sites: Lists major producers and their plant locations.
18.	HYD	Hydrolysis Product of: Lists hazardous materials which decomposes to the material of reference when contacted with water.
19.	ADD	Additive (%): Lists typical stabilizers and inhibitors added to the base material.
20.	BIN	Binary Reactants: Lists materials known to react when put in contact with the material of reference.
21.	COR	Corrosiveness: General statement of observations on corrosive action to materials commonly used for packaging or equipment that might be required at a spill site.
22.	SGM	Synergistic Materials: Lists other materials and water quality parameters whose presence can increase the toxicity of the material of interest.
23.	ANT	Antagonistic Materials: Lists other materials and water quality parameters whose presence can reduce the toxicity of the material of interest.
24.	FDL	Field Detection Techniques, Limit (ppm), Ref: A three part segment listing potential field detection techniques, the lower sensitivity limit, and the literature reference where more data can be obtained. Field test generally refers to any gross identification method that can be used at the spill site without elaborate or non-portable equipment. It normally assumes that the material or the chemical class has been identified so that general tests for aldehydes or phenols, etc. are applicable. The two major types of tests listed are inorganic colorimetric reactions and organic spot tests.
25.	LDL	Laboratory Detection Techniques, Limit (ppm), Ref: Follows format of previous segment for specific tests that can be used for positive identification of material. These tests are generally reliant on sophisticated laboratory analysis equipment, such as atomic absorption units and gas

		chromatographs.
26.	STD	Standard Codes: Enumerates the National Fire Protection Association codes for materials as well as pertinent transportation codes.
27.	FLM	Flammability: Summarizes potential for fire at a spill site. Uses the NFPA ranking system described by one of the following modifiers: very quite moderate slight non-flammable
28.	LFL	Lower Flammability Limit (%): Listed value is % of material in air which is the lower limit of flammability.
29.	UFL	Upper Flammability Limit (%): Listed value is % of material in air which is the upper limit of flammability.
30.	TCP	Toxic Combustion Products: Occasionally lists specific materials or classes of materials released when compound of concern is burned or heated to decomposition.
31.	EXT	Extinguishing Methods: Notes fire fighting techniques and outlines unique precautions to be taken if any.
32.	FLP	Flash Point (°C): Listed open cup value when available, otherwise closed cup.
33.	AIP	Auto Ignition Point (°C): Listed value at which auto ignition occurs in the presence of adequate air.
34.	EXP	Explosiveness: Summarizes potential for violent rupture or vigorous reaction at a spill site.
35.	LEL	Lower Explosive Limit (%): Listed value is % of material in air which is the lower explosive limit.
36.	UEL	Upper Explosive Limit (%): Listed value is % of material in air which is the upper explosive limit.
37.	MLT	Melting Point (°C): Accepted value under standard conditions unless otherwise noted below in segment 38.
38.	MTC	Melting Characteristics: Decomposes, ignites, etc.
39.	BLP	Boiling Point (°C): Accepted value under standard conditions unless noted below in segment 40.
40.	BOC	Boiling Characteristics: Reduced pressure, etc.
41.	SOL	Solubility (ppm 25°C): Typically the listed value for standard reference conditions.
42.	SLC	Solubility Characteristics: Slightly and moderately are used when a specific value is not given.
43.	SPG	Specific Gravity: Listed value for material in the state it is most often shipped. For materials whose boiling point is near ambient temperatures, the liquid state was usually referenced.

44.	VPN	Vapor Pressure (mm Hg): The pressure characteristic (at any given temperature) of a vapor in equilibrium with its liquid or solid form.
45.	VPT	Vapor Pressure Text: Indicates conditions under which measurement is made.
46.	VDN	Vapor Density: A value derived by dividing the mass of the vapor by its volume and measuring at a specific temperature. A value <1 indicates that the vapor is lighter than air, >1 is heavier than air and will give the appearance of a fog, hugging the ground.
47.	VDT	Vapor Density Text: Indicates temperature and any other conditions under which measurement is made.
48.	BOX	Biochemical Oxygen Demand (BOD lb/lb): Describes relative oxygen requirements of wastewaters, effluents, and polluted waters. Lists biochemical oxygen demand of pure substance on a lb/lb, or % of theoretical demand basis.
49.	BOD	Biochemical Oxygen Demand Text: Displays same information listed in segment 48 and includes duration of the test and source of information.
50.	PER	Persistency: Interprets BOD and chemical data to estimate material life span in a free aquatic system. When possible degradation products are specified.
51.	PFA	Potential for Accumulation: Recounts data on ability of various organisms to accumulate a material and the specific organs in which concentration is most pronounced.
52.	FOO	Food Chain Concentration Potential: Indicates potential for material to be concentrated to toxic levels while it is passed up the food chain. Where possible, data is given on findings in predator species.
53.	EDF	Etiological Potential: Enumerates diseases and ailments initiated or accelerated by exposure to the material of interest.
54.	CAG	Carcinogenicity: Relates results of work directed to isolating carcinoma in test animals. Human data is used when available.
55.	MUT	Mutagenicity: Cites finding of tests for metagenicity.
56.	TER	Teratogenicity: Cites finding of tests for teratogenicity.
57.	FTX	Freshwater Toxicity Number (ppm): This segment indicates the concentration in parts per million at which test results were reported.

58	FTB	<p>Freshwater Toxicity Text:</p> <p>Column 1—Concentration in ppm at which test results were reported.</p> <p>Column 2—Time of exposure expressed in hours.</p> <p>Column 3—Species tested, usually a common name.</p> <p>Column 4—Effect on organism tested often given as TLm or LD 50.</p> <p>Column 5—Test environment, includes data on water quality and other controlled conditions.</p> <p>Column 6—Source of information.</p>
59.	CAT	Chronic Aquatic Toxicity Limits (ppm): Maximum level in ppm found to be safe for extended exposure of fish to the material of interest
60.	CAR	Reference for Chronic Aquatic Toxicity: Source of information.
61	STX	Salt Water Toxicity: Indicates toxicity to estuarine or marine animals in parts per million.
62	STB	Salt Water Toxicity Text Follows same general format as segment 58.
63	ATX	Animal Toxicity: Displays doses reported in milligrams of material per milligram of body weight of the test animal (unless otherwise noted).
64.	ATB	<p>Animal Toxicity Text:</p> <p>Column 1—Doses in mg of Material per mg body weight of test animal.</p> <p>Column 2—Time of exposure.</p> <p>Column 3—Species, lists animal of reference—typically lab animals—rats, guinea pigs, mice, pigs, dogs, and monkeys.</p> <p>Column 4—Parameter, description of exposure. Terms indicate whether dose caused death or other toxic effects, and whether it was administered as a lethal concentration, or toxic concentration in the inhaled air. Refer to Appendix for abbreviations.</p> <p>Column 5—Route, lists mode of application. Refer to Appendix for abbreviations.</p> <p>Column 6—Reference, source of data.</p>
65	ATL	Chronic Animal Toxicity Limits (ppm): Maximum level reported in ppm thought to be the threshold for extended use on livestock
66	ATR	Reference for Chronic Animal Toxicity Limits: Source of information
67.	LVN	Livestock Toxicity (ppm): Lists recommended or safe levels of concentration in ppm for use on livestock.
68.	LVR	Reference for Livestock: Source of information.



69	WAN	Acute Waterfowl Toxicity (ppm): Concentration in ppm considered to be hazardous to waterfowl upon acute exposure.
70.	WAR	Reference for Acute Waterfowl Toxicity: Source of information.
71.	CWF	Chronic Waterfowl Toxicity Limits (ppm): Concentration in ppm considered to be maximum permissible in water inhabited by waterfowl.
72.	CWR	Reference for Chronic Waterfowl Toxicity: Source of information
73.	AQN	Aquatic Plants (ppm): Concentration in ppm found to be injurious to aquatic flora listed
74.	AQR	Reference for Aquatic Plants: Source of information
75.	IRN	Irrigable Plants (ppm): Concentration expressed in ppm found to be injurious to crop listed.
76.	IRR	Reference for Irrigable Plants. Source of information.
77.	CPT	Chronic Plant Toxicity Limits (ppm): Threshold level expressed in ppm for extended use as irrigation water.
78	CPN	Reference for Chronic Plant Toxicity Limits: Source of information.
79	TRT	Major Species Threatened This segment was originally designed to spotlight individual species especially susceptible to the material of interest. Data such as this is very rare. Consequently, the segment includes specific data on tests run with different species.
80	TIC	Taste Imparting Characteristics (ppm): Level in ppm at which material will impart a taste to the flesh of fish living in the affected waters.
81	TIR	Reference for Taste Imparting Characteristics: Source of information.
82.	INH	Inhalation Limit (Value) Generally the accepted threshold limit value (TLV) which is that level acceptable for industrial exposure over an eight hour period May sometimes be the LC50 for inhalation
83	INT	Inhalation Limit (Text). Units and source of information for the above segment.
84.	IRL	Irritation Levels (Value): Level at which skin and mucous membrane irritation occurs.
85.	IRT	Irritation Levels (Text): Reference and explanatory comments for above segment.
86	DRC	Direct Contact: Summary statement indicating corrosiveness or irritation value of material in direct contact with skin, mucous membranes, or eyes.

87.	JNS	General Sensation. Designed to identify some of the reactions people might have (symptoms and effect on body) when exposed to the designated material, sensation upon breathing the vapors, vapor concentration levels at which noticeable reactions occur, warning properties, and miscellaneous toxicological observations
88.	LOT	Lower Odor Threshold (ppm): Listed value in ppm
89.	LOR	Lower Odor Threshold Reference: Source of information.
90.	MOT	Medium Odor Threshold (ppm): Listed value in ppm.
91.	MOR	Medium Odor Threshold Reference: Source of information.
92.	UOT	Upper Odor Threshold (ppm): Listed value in ppm.
93.	UOR	Upper Odor Threshold Reference: Source of information.
94.	LTT	Lower Taste Threshold (ppm): Listed value in ppm.
95.	LTR	Lower Taste Threshold Reference: Source of information
96.	MTT	Medium Taste Threshold (ppm): Listed value in ppm.
97.	MTR	Medium Taste Threshold Reference: Source of information.
98.	UTT	Upper Taste Threshold (ppm): Listed value in ppm.
99.	UTR	Upper Taste Threshold Reference: Source of information.
100.	DHI	Direct Human Ingestion (mg/kgwt): Note toxic dose levels via human consumption in milligrams toxicant per kilogram body weight.
101.	DHR	Reference for Direct Human Ingestion: Source of information.
102.	DRK	Recommended Drinking Water Limits (ppm): Cites Public Health Service Drinking Water Standards whenever available.
103.	DRR	Reference for Recommended Drinking Water Limits: Source of information.
104.	BCE	Body Contact Exposure (ppm). States acute contact threshold limits in water where available.
105.	BCR	Reference for Body Contact Exposure: Source of information.
106.	PHC	Prolonged Human Contact (ppm): States safe level for bathing and swimming (prolonged) in parts per million
107.	PHR	Reference for Prolonged Human Contact. Source of information.

108.	SAF	Personal Safety Precautions: Lists equipment to be employed when working in a spill area. Refers to disaster conditions and as such often presupposes fire or intense heat. Response teams should use their own judgment in deciding when stated precautions are no longer necessary. For most circumstances, eye protection, hard hats, and gloves are recommended.
109.	AHL	Acute Hazard Level: Attempts to indicate level of hazard resulting from a spill. Relates to inhalation, ingestion and contact with material. Also lists specific water use hazard level such as fish toxicity and irrigation water toxicity.
110.	CHL	Chronic Hazard Level: Interprets chronic toxicological-biological hazard to life forms subjected to material of interest for extended periods of time.
111.	HEL	Degree of Hazard to Public Health: Interpretive summary of data from previous segments. This segment focuses on those toxicological chemical hazards directly affecting public health.
112.	AIR	Air Pollution: Summarizes degree of hazard to people in the vicinity of a spill. May refer to fumes, vapors, mists, or dusts of the material spilled or its combustion and/or decomposition products.
113.	ACT	Action Levels. An interpretive segment designed to aid in initiating response activities. Suggests notification of fire and air authority if material poses flammability or air hazard. Recommends alerting Civil Defense if explosion hazard exists. When explosion or severe air pollution exists, evacuation is indicated. If the material in question is highly corrosive or can be absorbed through the skin at toxic levels, affected waterways should be restricted from public access. When flammable materials are involved, ignition sources should be removed. Air contaminants require entry from upwind. If the spill involves solids, attempts should be made to prevent suspension of dusts in the air. If the material is one that will form a slick on water before dissolving, early attempts at containment will be quite beneficial.

It is assumed that these actions will be complemented by general defensive responses. These include, notifying downstream water users of the spill, stopping all leaks or diverting their flow from reaching surface waters, and removing all bags, barrels and or other containers that may still be leaking to the water body.

114.	AML	In Situ Amelioration: Lists potentially effective treatment methods which could be applied to the body of water for removal of the spilled material. Methods deemed to include hazards equal to or greater than that of the contaminant were systematically excluded. The term carbon refers to activated carbon in granular or powdered form.
115.	SHR	Beach and Shore Restoration: This segment is used mainly to indicate if material can be safely burned off beaches. Occasionally, a recommendation is made to wash affected area with a neutralizing solution.
116.	AVL	Availability of Countermeasures Material: Lists major materials required for countermeasures recommended in segment 114 (in situ amelioration) and possible local sources for those materials.
117.	DIS	Disposal Methods: Describes recommended techniques for disposing of spilled materials.
118.	DSN	Disposal Notification: Lists local authorities who should be notified before disposal methods in segment 117 are initiated.
119.	IFP	Industrial Fouling Potential: Relates potential problems from use of water contaminated by the material of interest. Generally refers to use in boiler feed and cooling water. Materials with flash points below 50° C are listed as potential rupture hazards when included in boiler feed or cooling water.
120.	WTP	Effect on Water Treatment Process: Describes potential interaction with typical water and wastewater treatment facilities. Most frequent entries concern effect of chlorination on the aesthetic properties of contaminated water, and the effect of high concentration on sewage organisms.
121.	WAT	Major Water Uses Threatened: Lists water uses imperiled by a spill and consequently indicates what type of downstream water users should be notified of the spill.
122.	LOC	Probable Location and State of the Material: This is an interpretive segment of physical data designed to assist personnel in identifying the material spilled and its whereabouts. The data attempts to describe the physical appearance of the material as shipped (i.e., a dark red powder, etc.) and its probable location if the spill occurs in or near surface water.
123.	DRT	Soil Chemistry: A general description of the behavior and exchange capacity of various cations and ions in soil.

124.	HOH	Water Chemistry. A general description of the behavior of the material of interest in aqueous solution.
125.	COL	Color in Water Identifies the color or appearance of concentrated solutions of the material of interest. In many cases, dilution and material coloring will minimize the visibility of the color listed here
126.	DAT	Adequacy of Data A simple classification was used to indicate the availability of data. Poor—indicates toxicological data is sparse if it exists at all. Fair—indicates toxicological data was found but no aquatic toxicities are listed Moderate—indicates toxicological data was found along with some information on toxicity towards fish Good—indicates both toxicological and aquatic toxicity data was found Limited References—identifies those materials for which a complete literature survey was not run

The Oil and Hazardous Materials-Technical Assistance Data System is an on-line interactive information retrieval system. The system is capable of processing structured and unstructured data in an on-line conversational mode, whereby the user can interact with the system in natural language or abbreviated expressions. Data in the system are condensed to obviate the need for extensive study by the user. The random access provision permits the user to solve problems involving unidentified pollutants by searching for color, odor or other physical/chemical characteristics as observed on-scene.

The main characteristic of this system is that it automatically takes each word and processes it into an inverted index file, making each word a search component of the data base. The data themselves are in two files. A serial file consisting of variable block length character strings plus additional information, and an inverted file consisting of the index expression followed by the associated information strings.

Searches are formulated in an English-like language using Boolean logic. The system responds with the number of documents meeting the request and the researcher is then able to refine or restructure the query if necessary. The resulting pertinent information can then be displayed at the user's terminal, listed at a remote medium speed terminal, or at the central site.

This system is oriented towards the informational retrieval problem that is characterized by difficult and vague subject definition, extensive variance in term selection, changing scientific and technical terminology, and imprecise search definition. The system greatly facilitates file browsing.

# ABBREVIATIONS

brd—bird (domestic or lab)  
ckn—chicken  
ctl—cattle  
dck—duck  
frg—frog  
gm—gram  
gpg—guinea pig  
grb—gerbil  
ham—hamster  
hmn—human  
idr—intradermal  
IL50—inhibition limit (50% reduction in cell count, biomass, or photo-synthetic ability)  
imp—implant  
ims—intramuscular  
inh—inhalation  
ipr—intraperitoneal  
inv—intravenous  
kg—kilogram (one thousand grams)  
LC50—lethal concentration 50 percent kill  
LCLo—lowest published lethal concentration  
LD50—lethal dose 50 percent kill  
LDLo—lowest published lethal dose  
mg—milligram (one thousandth of a gram)  
mky—monkey  
mus—mouse  
orl—oral  
pgn—pigeon  
ppb—parts per billion  
pph—parts per hundred  
ppm—parts per million  
ppt—parts per trillion  
qal—quail  
rbt—rabbit  
scu—subcutaneous  
skn—skin  
sql—squirrel  
TCLo—lowest published toxic concentration  
TDLo—lowest published toxic dose  
TLm—threshold limit median  
TLv—threshold limit value

# INDEX OF MATERIAL NAMES

A-Maltose	Ammonium Ferrocyanide
Abietic Acid	Ammonium Hydroxide
Acetaldehyde	Ammonium Nitrate
Acetamide	Ammonium Oxalate
Acetanilide	Ammonium Perchlorate
Acetemul-Uc	Ammonium Peroxydisulfate
Acetic Acid	Ammonium Phosphate, Dibasic
Acetic Anhydride	Ammonium Picrate
Acetone	Ammonium Stearate
Acetone Cyanohydrin	Ammonium Sulfamate
Acetonitrile	Ammonium Sulfate
Acetophenone	Ammonium Sulfide
Acetyl Bromide	Ammonium Thiocyanate
Acetyl Chloride	Amyl Alcohol
Acetylacetone	Aniline
Acetylene	Antimony
Acridine	Antimony Potassium Tartrate
Acrolein	Antimony Trichloride
Acrylic Acid	Antimony Trifluoride
Acrylonitrile	Antimony Trioxide
Actusol	Antimony 122
Actusol-T-776	Antimony 124
Adipic Acid	Antimony 125
Adiponitrile	AP-10
Aldrin	Aquanex-MC
Alken O.S.D.	Argon 37
Alkyldimethyl 3,4-Dichlorobenzylammonium Chloride	
Alkyldimethylbenzylammonium Chloride	Arsenic
Allyl Alcohol	Arsenic Acid
Allyl Chloride	Arsenic Pentoxide
Aluminum Fluoride	Arsenic Tribromide
Aluminum Hydroxide	Arsenic 74
Aluminum Sulfate	Arsenic 76
Americium 241	Arsenic 77
Ameroid	Asphalt
Ameroid-Drewclean-522	Atlas-1901
Aminoethylethanolamine	B-and-B-2021-S
Ammonia	B-and-B-2023
Ammonium Acetate	B-Propiolactone
Ammonium Carbamate	Bacto-Zyme
Ammonium Carbonate	Barium
Ammonium Chloride	Barium Carbonate
Ammonium Chromate	Barium Chloride
Ammonium Dichromate	Barium Cyanide
Ammonium Ferricyanide	

Barium Hydroxide	Cadmium Nitrate
Barium Nitrate	Cadmium Sulfate
Barium 131	Cadmium 109
Barium 133	Cadmium 115
Barium 137	Calcium Arsenate
Barium 140	Calcium Carbide
Basic-H	Calcium Chloride
Benzaldehyde	Calcium Cyanide
Benzene	Calcium Dodecylbenzene Sulfonate
Benzoic Acid	Calcium Fluoride
Benzonitrile	Calcium Gluconate
Benzophenone	Calcium Hydroxide
Benzoyl Chloride	Calcium Hypochlorite
Benzoyl Peroxide	Calcium Nitrate
Benzyl Alcohol	Calcium Oxide
Benzyl Benzoate	Calcium Phosphate
Benzyl Bromide	Calcium Phosphide
Benzyl Chloride	Calcium 45
Benzyl Mercaptan	Calcium 47
Benzylamine	Calidria-Asbestos-Grade-R-G444
Beryllium	Camphor
Beryllium Chloride	Capillardiamin
Beryllium Nitrate	Captan
Beryllium Sulfate	Carbon Disulfide
Beryllium 7	Carbon Monoxide
Besco-B-51-DT	Carbon Tetrachloride
Besco-D-Emulsion-No.-100	Carbon 14
Besco-Slick-440	Casol
Bismuth	Cerium 141
Bismuth 207	Cerium 144
Bismuth 210	Cesium 131
Black Phosphorus	Cesium 134
Blitz	Cesium 137
Boric Acid	Cetyldimethylammonium Bromide
Boron	Cetyldimethylbenzylammonium Chloride
BP-1002	Cetylpyridinium Chloride
BP-1100	Cetyltrimethylammonium Bromide
Bromacetone	Cetyltrimethylethylammonium Bromide
Brombenzylcyanide	Chemical-Sludge
Bromine	Chevron-N1-0
Bromine 82	Chloracetophenone
Brucine	Chloramine-T
Butyl Benzyl Phthalate	Chloramines
Butyl Mercaptan	Chlordane
Butyl Stearate	Chloric Acid
Butylamine	Chlorine
Butyric Acid	Chlorine 36
CAB-O-SIL-ST-2-0	Chloroacetic Acid
Cadmium	Chlorobenzene
Cadmium Chloride	Chlorobutadiene
Cadmium Fluoborate	Chloroform



Chloromethane	Dart
Chloropicrin	Dasic
Chloroquine	DBC-Plus
Chlorosulfonic Acid	DDD
Chlorothiazide	DDT
Chloroplatinic Acid	Decaborane
Chlorthion	Decanal
Choline Chloride	Deck-Glo
Chromic Acetate	Dermol
Chromic Acid	DI-CHEM-320
Chromium	Diacetone Alcohol
Chromium 51	Diamylamine
Citric Acid	Diazinon
Cleansol	Diborane
CMU	Dibromochloropropane
Cobalt Chloride	Dibutyl Phthalate
Cobalt Nitrate	Dicapthon
Cobalt Sulfate	Dichlorobenzene
Cobalt 57	Dichlorodifluoromethane
Cobalt 58	Dichloroethyl Ether
Cobalt 60	Dichloromethane
Coconut Oil	Dichloronaphthoquinone
Cold-Clean	Dichloropropane
Colloid-88	Dichloropropene
Copper	Dicyclopentadiene
Copper Naphthenate	Dieldrin
Copper Nitrate	Diesel Fuel No. 1-D
Copper Sulfate	Diesel Fuel No. 2-D
Copper 64	Diesel Fuel No. 4-D
Copper Chloride	Diethanolamine
Corexit-7664	Diethylamine
Corexit-8666	Diethylbenzene
Cresyldiphenyl Phosphate	Diethylene Glycol Monobutyl Ether
Crotonaldehyde	Diethylene Glycol Monoethyl Ether
Crude-Heavy	Diethylene Glycol Monomethyl Ether
Crude-Light	Diethylene Glycol
Crude-Medium	Diethylenetriamine
Cumene	Digested-Sewage-Sludge
Cutting-Oil	Diisobutyl Carbinol
CW-Solvent	Diisobutyl Ketone
Cyanamide	Diisobutylcresoxyethoxyethyl
Cyanoacetic Acid	dimethylbenzylammonium Chloride
Cyanobutadiene	Diisobutylene
Cyanogen	Diisobutylphenoxyethoxyethyl
Cyanogen Bromide	dimethylbenzylammonium Chloride
Cyanogen Chloride	Diisopropanolamine
Cyclohexane	Diisopropylamine
Cyclohexanol	Dimethyl Sulfate
Cyclohexanone	Dimethyl Sulfoxide
Cyclohexylamine	Dimethylamine
Dalapon	Dinitrochlorobenzol

Diocetyl Phthalate	Ethylenediaminetetraacetic Acid
Dioxane (P-Dioxane)	Ethyleneimine
Dipentene	Europium 152
Diphosgene	Europium 154
Dipropylene Glycol	Europium 155
Dipterex	Fenuron
Disodiumdibutylphenylphenoldisulfonate	Ferbam
Disperse-Oil	Ferric Chloride
Dispersol-OS	Ferric Hydroxide
Diuron	Ferric Sulfate
Divinylbenzene	Ferrous Hydroxide
DNBP	Ferrous Sulfate
DNBP-NH4-SALT	Ferrous Sulfite
Dodecanol (1-Dodecanol)	Fish-Oil
Dodecyl Mercaptan	Fluorine
Dodecylbenzene	FO-300-B
Dodecylbenzenesulfonic Acid	Foilzoi
Dysprosium 159	Formaldehyde
E-314	Formic Acid
Ekoperl	Fuel Oil No. 1
EMERY-15298	Fuel Oil No. 2
EMTAL-42	Fuel Oil No. 4
Endothal	Fuel Oil No. 5
Endrin	Fuel Oil No. 6
Epichlorohydrin	Fumaric Acid
Erbium 169	Furfuryl Alcohol
Essolvene	Gadolinium 153
Ethanolamine	Gallic Acid
Ethoxytriglycol	Gallium 68
Ethyl Acrylate	Gallium 72
Ethyl Alcohol	Gamlen-D-Solvent
Ethyl Benzene	Gamosol
Ethyl Chloride	Gas Oils
Ethyl Ether	Gasoline
Ethyl Acetate	Germanium 71
Ethyl Phymalate	Gluconic Acid
Ethylamine	Glucose
Ethylbutanol	Glycerol
Ethylene	Glycol Diacetate
Ethylene Cyanohydrin	Glyoxal
Ethylene Dibromide	Gold 195
Ethylene Dichloride	
Ethylene Glycol Monobutyl Ether	
Ethylene Glycol Monomethyl Ether	
Ethylene Glycol Monoethyl Ether Acetate	
Ethylene Glycol Monoethyl Ether	
Ethylene Glycol	Gold 198
Ethylene Glycol, Diacetate	Gold 199
Ethylene Oxide	Gold-Crew
Ethylenediamine	Guthion

Hafnium 181	Isooctylaldehyde
Hemco-NO-2	Isopentaldehyde
Heptachlor	Isophorone
Heptane	Isophthaloyl Chloride
Heptanol	Isoprene
Hetp	Isopropyl Acetate
Hexaborane	Isopropyl Acetone
Hexamethylenediamine	Isopropyl Alcohol
Hexane	Isopropyl Ether
Hexanol	Isopropylamine
Hexylene Glycol	Jansolv-60
Holl-Chem-#622	JP-4
Holmium 166	JP-5
Hydrazine	Kelthane
Hydrochloric Acid	Klearfac-AA040
Hydrocyanic Acid	Krypton 85
Hydrofluoric Acid	Kuwait-Crude
Hydrogen Peroxide	Lactic Acid
Hydrogen Sulfide	Lanthanum 140
Hydrogen 3	Lanthanum Acetate
Hydroquinone	Lauroyl Peroxide
Hydroxylamine	Lauryldimethylbenzylammonium Chloride
Hypochlorous Acid	LCP-12
IGEPAL-CO-430	Lead
IGEPAL-CO-530	Lead Acetate
Indium 113	Lead Arsenate
Indium 114	Lead Chloride
Indole	Lead Fluoborate
Iodine 125	Lead Nitrate
Iodine 129	Lead Sulfate
Iodine 130	Lead Thiocyanate
Iodine 131	Lead 210
IPC	Lindane
Iridium 192	Linoleic Acid
Iridium 194	Lithium Chloride
Iron	Lithium Sulfate
Iron 55	LIX-336
Iron 59	Lutetium 177
Isoamyl Acetate	M-Cresol
Isobutyl Acetate	M-Nitrocresol
Isobutyl Acrylate	M-Nitrophenol
Isobutyl Alcohol	M-Nitroxylol
Isobutyl Mercaptan	M-Xylene
Isobutyraldehyde	M-Xylylbromide
Isodecaldehyde	Magic-Power-OD-#1
Isodecyl Alcohol	Magnesium
Isodecyldiphenyl Chloride	Magnesium Sulfate
Isodrin	Magnesium 28
Isomal-265	Magnesium Acetate
Isooctyl Alcohol	Magnesium Dodecyl Sulfate

Magnus	Mustard-Gas
Magnus-Marine-Disperser	N-Nitrosodimethylamine
Malathion	N-Amyl Acetate
Maleic Acid	N-Butyl Acetate
Maleic Anhydride	N-Butyl Acrylate
Manganese 54	N-Butyl Alcohol
Marine-Cleaner-8551	N-Butyraldehyde
Maritec-Oil-Spill-Remover	N-Decyl Alcohol
MCP	N-Propyl Alcohol
Megsite	N-Valeraldehyde
Mercuric Nitrate	Nabam
Mercuric Oxide	Naphthalene
Mercury	Naphthalic Acid
Mercury 197	Naphthenic Acid
Mercury 203	NAVEE-42
Mercury-Fungicides	Neodymium 147
Mesityl Oxide	Neptunium 237
Met-Aquaclene-100	Nickel
Meta-Nitrochlorobenzene	Nickel Ammonium Sulfate
Metasystox	Nickel Chloride
Methacrylonitrile	Nickel Nitrate
Methanesulfonyl Chloride	Nickel Sulfate
Methanethiol	Nickel 63
Methanol	Nicotine
Methoxy Triglycol	Nicotine Hydrochloride
Methoxychlor	Nicotine Salicylate
Methyl Acetate	Nicotine Sulfate
Methyl Acrylate	Nicotine Tartrate
Methyl Amyl Acetate	Niobium 95
Methyl Amyl Alcohol	Nitric Acid
Methyl Bromide	Nitric Oxide
Methyl Chloride	Nitrilotriacetic Acid
Methyl Ethyl Ketone	Nitrobenzol
Methyl Isobutyl Ketone	Nitrogen Dioxide
Methyl Methacrylate	Nitrous Acid
Methyl Parathion	Nitrous Oxide
Methyl Azide	Nitroxylenes
Methylal	Nonane
Methylamine	Nonanol
Methylene Chloride	Nonyl Phenol
Mistron-Vapor	Norsemen-67
Molasses	O-Cresol
Molybdenum	O-Dinitrobenzol
Molybdenum 99	O-Nitroxylol
Molybdic Trioxide	O-Xylene
Monochloroacetone	Octadecenyldimethylethylammonium
Monochlorodifluoromethane	Bromide
Monoethanolamine	OD-2
Monoisopropanolamine	Oil-and-Spill-Eradicator
Morpholine	Oil-Spill-Eradicator-X-1-11

Oleic Acid	Polychlorinated Biphenyls
Omazene	Polyclens-(Moltoklar)
Omya-Nautex-H	Polycomplex-A-11
Ortho-Nitroaniline	Polyglycol Ether
Ortho-Nitrochlorobenzene	Polypropylene Glycol
Osmium 191	Polypropylene Glycol Methyl Ether
Ovotran	Potassium Chromate
Oxalic Acid	Potassium Cyanide
Oxydipropionitrile	Potassium Dichromate
P-Chlorothymol	Potassium Hydroxide
P-Cresol	Potassium Iodide
P-Cymene	Potassium Permanganate
P-Nitroxylol	Potassium Pyrophosphate
P-Xylene	Potassium Sulfate
Palladium 103	Potassium 42
Pallidium 109	Praseodymium 142
Para-Nitroaniline	Praseodymium 143
Para-Nitrochlorobenzene	Praseodymium 144
Paraformaldehyde	Promethium 147
Parathion	Propane
Pentaborane	Propanolamine
Pentachlorophenol	Propionaldehyde
Pentadecanol	Propionic Acid
Pentanal	Propionic Anhydride
Pentane	Propyl Acetate
Perchloric Acid	Propylamine
Perchloroethylene	Propylene
Perchloromethyl Mercaptan	Propylene Dichloride
Pero-Klean-No-818	Propylene Glycol
Perthane	Propylene Oxide
Petro-Ban	Protactinium 233
Petrolite-W-1439	Protactinium 234
Petrolite-WF-30	Pyraxon
Phenobarbital	Pyrethrum
Phenol	Pyridine
Phenylcarbylamine Chloride	Pyrocatechol
Phenylmercuric Acetate	Pyrogallol
Phosdrin	Quinacrine Hydrochloride
Phosgene	Quinhydrone
Phosphoric Acid	Quinine
Phosphorous 32	Quinoline
Phosphorous White	Quinone
Phosphorus Oxychloride	Radium 226
Phosphorus Pentasulfide	Raw-Sewage-Sludge
Phosphorus Trichloride	Red Phosphorous
Phthalic Anhydride	Resorcinol
Picric Acid	Rhenium 186
Plutonium 238	Rhodium 106
Plutonium 239	Ridzlik
Polonium	Rotenone

Rubidium 86	Sodium Dodecylbenzene Sulfonate
Ruthenium 103	Sodium Ferricyanide
Ruthenium 106	Sodium Ferrocyanide
Salicylaldehyde	Sodium Fluoborate
Salicylic Acid	Sodium Fluoride
Samarium 151	Sodium Fluosilicate
Samarium 153	Sodium Hydrosulfite
Scandium 46	Sodium Hydroxide
Schrader	Sodium Lauryl Sulfate
Sea-Sweep	Sodium Methyrate
Seabead	Sodium Naphthalene Sulfate
Seamulso-E	Sodium Nitrite
Sec-Butyl Acetate	Sodium Nitrochlorobenzene Sulfonate
Selenium	Sodium Octyl Sulfate
Selenium 75	Sodium Oleate
Sesone	Sodium Palmitate
Sevin	Sodium Phosphate
Shell-Herder	Sodium Selenite
Silver	Sodium Silicate
Silver Cyanide	Sodium Stearate
Silver Nitrate	Sodium Sulfide
Silver 110	Sodium Sulfite
Silver 111	Sodium Sulphate
Silvex	Sodium Thiocyanate
Simazine	Sodium Wolframate
Skanex-S-102	Sodium 22
Skatole	Sodium 24
Slickgone-1	Sol-Speed1-Dri
Slickgone-2	Sorbitol
Slip-Clean	Spill-Away
Slix	Spill-X
Sodium	Stannous Chloride
Sodium Acetate	Stearic Acid
Sodium Anthraquinone Sulfonate	
Sodium Arsenate	Strickite
Sodium Azide	Strontium Chloride
Sodium Bisulfite	Strontium Nitrate
Sodium Borate	Strontium 85
Sodium Bromobenzene Sulfonate	
Sodium Butyldiphenyl Sulfonate	
Sodium Butylphenylphenol Sulfonate	
Sodium Carbonate	Strontium 87
Sodium Chlorate	Strontium 89
Sodium Chromate	Strontium 90
Sodium Cyanate	Strychnine
Sodium Cyanide	Styrene
Sodium Decylbenzene Sulfonate	
Sodium Dichlorobenzene Sulfonate	
Sodium Dichromate	Sulfur

Sulfolane	Toluene
Sulfoxide	Toluene Diisocyanate
Sulfur Chloride	Toluidine (Ortho)
Sulfur Dioxide	Toxaphene
Sulfur 35	Tricresyl Phosphate
Sulfuric Acid	Trichlorobenzene
Sulfurous Acid	Trichloroethane
Superphosphate	Trichloroethylene
SURFLO-RD-282	Trichlorofluoromethane
Systox	Trichlorophenol
T-Butylhydroperoxide	Tridecanol
Talent	Triethanolamine
Tallow	Triethylaluminum
Tannic Acid	Triethylamine
Tantalum 182	Triethylbenzene
TBA	Triethylene Glycol
TCA	Triethylenetetramine
Technetium 99	Trinitrotoluene
Tedion	Tungsten 185
Tellurium 132	Tungsten 187
TEOC-444	Turpentine
TEOC-777	Tyfosol-80
Terbium 160	Uranium 235
Tert-Butyl-Mercaptan	Uranium 238
Tetraborane	Uranyl Acetate
Tetradecanol	Urea
Tetraethyl Dithiopyrophosphate	Vanadium Oxytrichloride
Tetraethylene Glycol	Vanadium Pentoxide
Tetraethylene Pentamine	Vanadyl Sulfate
Tetraethyllead	Vapam
Tetrahydronaphthalene	Vinyl Acetate
Tetramethyl Lead	Vinyl Bromide
Thallic Oxide	Vinyl Chloride
Thallium	Vinyl Ether
Thallium Acetate	Vinyltoluene
Thallium 204	Vinylidene Chloride
Thallos Nitrate	Wyandotte-Spill-Remover
Thiodan	Xenon 133
Thioglycolic Acid	Ytterbium 169
Thiophosgene	Yttrium 90
Thiram	Yttrium 91
Thorium Chloride	Zinc
Thulium 170	Zinc Acetate
Tin 113	Zinc Chloride
Tin 119	Zinc Chromate
Titanium Chloride	Zinc Fluoborate
Titanium Nitrate	Zinc Nitrate
Titanium Sulfate	Zinc Sulfate
Titanium 44	Zinc 65

Zinc 69  
Zirconium Sulfate  
Zirconium 95  
Zorb-All  
1-Decene  
1-Dodecene  
1-Hexene  
1-Nonene  
1-Octanol  
1-Octene  
1-Pentene  
1-Tetradecene  
1-Tridecene  
1-Undecene  
1,3-Butylene Glycol  
12-N-Degreaser  
2-Ethyl Hexaldehyde  
2-Ethyl-3-Propylacrolein  
2-Ethylbutyraldehyde  
2-Ethylhexyl Acrylate  
2-Methyl-5-Ethyl Pyridine  
2-Naphthol  
2-Naphthylamine  
2-Nitropropane  
2-Octanol  
2-Undecanol  
2-4-D-Esters  
2,4-Dinitrophenol  
2,4,5-T  
2,4-D Cid  
2,4-Dichlorophenol  
3-Heptene  
3,5-Xylenol  
4-Chlorotoluidene Hydrochloride



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For more detailed information on the Oil and Hazardous Materials-  
Technical Assistance Data System (OHM-TADS), please contact:

Ms. Jean Wright, Environmental Protection Specialist  
OHM-TADS Project Officer  
Division of Oil and Special Materials Control  
Environmental Protection Agency (WH-548)  
Washington, D. C. 20460  
Office (202) 245-3057

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