

2-Hexanone  
(see Methyl butyl ketone)

Hexone  
(see Methyl isobutyl ketone)

|  |                         |  |   |
|--|-------------------------|--|---|
| sec-Hexyl acetate <sup>†</sup>   | 108-84-9<br>SA7525000   | 50 ppm (300 mg/m <sup>3</sup> ) TWA                      | Mild eye and upper respiratory irritation   |
| Hexylene glycol <sup>†</sup>   | 107-41-5<br>SA0810000   | 25 ppm (125 mg/m <sup>3</sup> ) ceiling                  | CNS depression; eye, skin, throat, and respiratory irritation; liver and kidney damage in animals                         |
| n-Hexylmercaptan<br>(see 1-Hexanethiol)  |                         |  |   |
| Hydrazines <sup>§</sup>  | 302-01-2<br>MU7175000   | Ca; 0.03 ppm (0.04 mg/m <sup>3</sup> ) ceiling (120-min) | Potential for cancer; blood, liver, and skin effects; tumors of the lung, liver, blood vessels, and intestines in animals |
| Hydrogen bromide <sup>†</sup>  | 10035-10-6<br>MW3850000 | 3 ppm (10 mg/m <sup>3</sup> ) ceiling                    | Eye, mucous membrane, and skin irritation   |
| Hydrogen chloride <sup>†,‡</sup>   | 7647-01-0<br>MW4025000  | 5 ppm (7 mg/m <sup>3</sup> ) ceiling                     | Eye, mucous membrane, and skin irritation   |
| Hydrogen cyanide <sup>**</sup><br><i>Class: Hydrogen cyanide<br/>and cyanide salts<sup>§</sup></i> | 74-90-8<br>MW6825000    | 4.7 ppm (5 mg/m <sup>3</sup> ) STEL (skin)               | Thyroid, blood, and respiratory effects   |

\*Consult primary sources in Section A for definitive information.

<sup>†</sup>REL adopted during OSHA hearings (Appendix II).

<sup>‡</sup>Also listed as a pesticide in Appendix V.

<sup>§</sup>Appendix I lists all members of the class indicated; refer to class name in Section A.

<sup>\*\*</sup>REL revised during OSHA hearings (Appendix IV).

<sup>††</sup>CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

| Hazardous agent                    | CAS No. and<br>RTECS No. | NIOSH REL  | Health effects*   |
|------------------------------------|--------------------------|--|---|
| Hydrogen fluoride**                | 7664-39-3<br>MW7875000   | 3 ppm (2.5 mg/m <sup>3</sup> ) TWA,<br>6 ppm (5.0 mg/m <sup>3</sup> ) STEL | Skin, eye, and airway irritation; bone effects  |
| Hydrogen peroxide†                 | 7722-84-1<br>MX0900000   | 1.0 ppm (1.4 mg/m <sup>3</sup> ) TWA                                       | Eye, mucous membrane, and skin irritation   |
| Hydrogen selenide†                 | 7783-07-5<br>MX1050000   | 0.05 ppm (0.2 mg/m <sup>3</sup> ) TWA                                      | Eye, nose, and throat irritation; pulmonary irritation in animals                             |
| Hydrogen sulfide                   | 7783-06-4<br>MX1225000   | 10 ppm (15 mg/m <sup>3</sup> ) ceiling<br>(10-min)                         | Irritation and severe acute effects on nervous and respiratory systems                        |
| Hydrogenated terphenyls†           | 61788-32-7<br>WZ6535000  | 0.5 ppm (5 mg/m <sup>3</sup> ) TWA   | Eye, skin, and lung damage; systemic toxicity to the liver, kidneys, and blood-forming organs |
| Hydroquinone<br>(dihydroxybenzene) | 123-31-9<br>MX3500000    | 2 mg/m <sup>3</sup> ceiling (15-min)                                       | Eye and skin effects  |
| 2-Hydroxypropyl acrylate†          | 999-61-1<br>AT1925000    | 0.5 ppm (3 mg/m <sup>3</sup> ) TWA<br>(skin)                               | Skin and eye irritation   |
| Indene†                            | 95-13-6<br>NK8225000     | 10 ppm (45 mg/m <sup>3</sup> ) TWA   | Mucous membrane and lung irritation; in animals, liver and renal necrosis, spleen injury      |
| Indium and compounds†<br>(as I)    | 7440-74-6<br>NL1050000   | 0.1 mg/m <sup>3</sup> TWA  | Highly toxic effects; eye and respiratory irritation  |

|  |                         |  |  |
|--|-------------------------|--|--|
| Iodine <sup>†,‡</sup>  | 7553-56-2<br>NN1575000  | 0.1 ppm (1 mg/m <sup>3</sup> ) ceiling   | Severe eye, respiratory, and skin irritation                       |
| Iodoform <sup>†</sup>  | 75-47-8<br>PB7000000    | 0.6 ppm (10 mg/m <sup>3</sup> ) TWA  | CNS depression; eye, heart, liver, and kidney damage               |
| Iron oxide, <sup>†</sup> dust and fume<br>(as Fe, total particulate) | 1309-37-1<br>NO7400000  | 5 mg/m <sup>3</sup> TWA  | Benign pneumoconiosis termed siderosis                             |
| Iron pentacarbonyl <sup>†</sup> (as Fe)                              | 13463-40-6<br>NO4900000 | 0.1 ppm (0.8 mg/m <sup>3</sup> ) TWA,<br>0.2 ppm (1.6 mg/m <sup>3</sup> ) STEL | Lung effects, degenerative changes in CNS                          |
| Iron salts <sup>†</sup> , soluble                                    | ††                      | 1.0 mg/m <sup>3</sup> TWA  | Skin and mucous membrane irritation                                |
| Isoamyl acetate <sup>†</sup>   | 123-92-2<br>NS9800000   | 100 ppm (525 mg/m <sup>3</sup> ) TWA   | Conjunctival and upper respiratory irritation,<br>narcosis         |
| Isoamyl alcohol <sup>†</sup><br>Primary                              | 123-51-3<br>EL5425000   | 100 ppm (360 mg/m <sup>3</sup> ) TWA,<br>125 ppm (450 mg/m <sup>3</sup> ) STEL | Mild irritation of the eyes, respiratory tract,<br>and skin        |
| Secondary  | 6032-29-7<br>SA4900000  |  |  |
| Isobutyl acetate <sup>†</sup>  | 110-19-0<br>AI4025000   | 150 ppm (700 mg/m <sup>3</sup> ) TWA   | Eye and nose irritation, narcosis                                  |
| Isobutyl alcohol <sup>†</sup>  | 78-83-1<br>NP9625000    | 50 ppm (150 mg/m <sup>3</sup> ) TWA  | Narcotic effects; mild irritation of the skin,<br>eyes, and throat |

\*Consult primary sources in Section A for definitive information.

<sup>†</sup>REL adopted during OSHA hearings (Appendix II).

<sup>‡</sup>Also listed as a pesticide in Appendix V.

\*\*REL revised during OSHA hearings (Appendix IV).

††CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

| Hazardous agent   | CAS No. and<br>RTECS No. | NIOSH REL   | Health effects*  |
|---|--------------------------|---|--|
| Isobutyronitrile<br><i>Class: Nitriles</i> <sup>§</sup>                           | 78-82-0<br>TZ4900000     | 8 ppm (22 mg/m <sup>3</sup> ) TWA   | Hepatic, renal, respiratory, cardiovascular, gastrointestinal, and nervous system effects                  |
| Isooctyl alcohol <sup>†</sup>   | 26952-21-6<br>NS7700000  | 50 ppm (270 mg/m <sup>3</sup> ) TWA<br>(skin)   | Conjunctival irritation in animals   |
| Isophorone <sup>‡</sup><br><i>Class: Ketones</i> <sup>§</sup>                     | 78-59-1<br>GW7700000     | 4 ppm (23 mg/m <sup>3</sup> ) TWA   | Irritation; liver, kidney, and nervous system effects  |
| Isophorone diisocyanate <sup>**</sup><br><i>Class: Diisocyanates</i> <sup>§</sup> | 4098-71-9<br>NQ9370000   | 0.005 ppm (0.045 mg/m <sup>3</sup> ) TWA<br>(skin), 0.02 ppm<br>(0.18 mg/m <sup>3</sup> ) STEL (skin) | Respiratory effects, sensitization, pulmonary irritation   |
| 2-Isopropoxyethanol<br>(see Appendix III)   | 109-59-1<br>KL5075000    |   |  |
| Isopropyl acetate<br>(see Appendix III)   | 108-21-4<br>AI4930000    |   |  |
| Isopropyl alcohol <sup>**</sup>   | 67-63-0<br>NT8050000     | 400 ppm (980 mg/m <sup>3</sup> ) TWA,<br>500 ppm (1,225 mg/m <sup>3</sup> ) STEL                      | Mucous membrane irritation, possible carcinogenic effects  |
| Isopropyl ether <sup>†</sup>  | 108-20-3<br>TZ5425000    | 500 ppm (2,100 mg/m <sup>3</sup> ) TWA  | Mild irritation of the eyes and mucous membranes, narcosis in animals                                      |
| Isopropyl glycidyl ether (IGE)<br><i>Class: Glycidyl ethers</i> <sup>§</sup>      | 4016-14-2<br>TZ3500000   | 50 ppm (240 mg/m <sup>3</sup> ) ceiling   | Skin and mucous membrane effects, sensitization potential, possible hematopoietic and reproductive effects |

|   |                        |  |  |
|---|------------------------|--|--|
| Isopropylamine<br>(see Appendix III)                              | 75-31-0<br>NT8400000   |  |  |
| N-Isopropylaniline <sup>†</sup>                                   | 768-52-5<br>BY4200000  | 2 ppm (10 mg/m <sup>3</sup> ) TWA (skin)   | Skin and eye irritation in animals                                   |
| Kaolin <sup>†</sup><br>Total dust<br>Respirable fraction          | 1332-58-7<br>††        | 10 mg/m <sup>3</sup> TWA<br>5 mg/m <sup>3</sup> TWA  | Skin and mucous membrane injury, respiratory effects                 |
| Kepon   | 143-50-0<br>PC8575000  | Ca; 0.001 mg/m <sup>3</sup> TWA  | Liver cancer, nervous system effects                                 |
| Kerosene<br><i>Class: Refined petroleum solvents</i> <sup>§</sup> | 8008-20-6<br>OA5500000 | 100 mg/m <sup>3</sup> TWA  | Eye, nose, and throat irritation; dermatitis; nervous system effects |
| Ketene <sup>†</sup>   | 463-51-4<br>OA7700000  | 0.5 ppm (0.9 mg/m <sup>3</sup> ) TWA,<br>1.5 ppm (3 mg/m <sup>3</sup> ) STEL   | Severe respiratory irritation; lung damage in animals                |
| Ketones <sup>§</sup>  | ††                     | See individual chemical  |  |
| Lead, inorganic <sup>§</sup> (as Pb)                              | 7439-92-1<br>OF7525000 | <0.1 mg Pb/m <sup>3</sup> TWA; Pb concentration in air to be maintained so that Pb concentration in worker's blood remains ≤ 0.060 mg/100 g of whole blood | Kidney, blood, and nervous system effects                            |

\*Consult primary sources in Section A for definitive information.

<sup>†</sup>REL adopted during OSHA hearings (Appendix II).

<sup>‡</sup>Also listed as a pesticide in Appendix V.

<sup>§</sup>Appendix I lists all members of the class indicated; refer to class name in Section A.

<sup>\*\*</sup>REL revised during OSHA hearings (Appendix IV).

<sup>††</sup>CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

| Hazardous agent                            | CAS No. and<br>RTECS No. | NIOSH REL                                | Health effects*   |
|--|--------------------------|--|---|
| Limestone <sup>†</sup>                     | 1317-65-3<br>EV9580000   |  | Eye and skin irritation   |
| Total dust                                 |                          | 10 mg/m <sup>3</sup> TWA                 |   |
| Respirable fraction                        |                          | 5 mg/m <sup>3</sup> TWA                  |   |
| Lindane <sup>†</sup>                       | 58-89-9<br>GV4900000     | 0.5 mg/m <sup>3</sup> 8-hr TWA (skin)    | Convulsions; liver and kidney damage in animals                           |
| Liquified petroleum gas <sup>†</sup>       | 68476-85-7<br>SE7545000  | 1,000 ppm (1,800 mg/m <sup>3</sup> ) TWA | Asphyxia, CNS depression  |
| Lithium hydride <sup>†</sup>               | 7580-67-8<br>OJ6300000   | 0.025 mg/m <sup>3</sup> TWA              | Severe irritation of the eyes, respiratory tract, and skin                |
| Magnesite <sup>†</sup>                     | 546-93-0<br>OM2470000    |  | Skin, mucous membrane, and other physical irritation                      |
| Total dust                                 |                          | 10 mg/m <sup>3</sup> TWA                 |   |
| Respirable fraction                        |                          | 5 mg/m <sup>3</sup> TWA                  |   |
| Magnesium oxide fume<br>(see Appendix III) |                          |  |   |
| Malathion <sup>‡**</sup>                   | 121-75-5<br>WM8400000    | 10 mg/m <sup>3</sup> TWA (skin)          | Nervous system effects  |
| Maleic anhydride <sup>†</sup>              | 108-31-6<br>ON3675000    | 0.25 ppm (1.0 mg/m <sup>3</sup> ) TWA    | Severe eye irritation, skin and respiratory irritation, and sensitization |

|   |                         |   |  |
|---|-------------------------|---|--|
| Malonaldehyde<br><i>Class: Aldehydes</i> <sup>§</sup>   | 542-78-9<br>TX6475000   | Ca; lowest feasible concentration                                 | Potential for cancer; thyroid gland tumors in animals; eye, skin, and respiratory irritation |
| Malononitrile<br><i>Class: Nitriles</i> <sup>§</sup>  | 109-77-3<br>OO3150000   | 3 ppm (8 mg/m <sup>3</sup> ) TWA                                  | Hepatic, renal, respiratory, cardiovascular, gastrointestinal, and nervous system effects    |
| Manganese compounds and fumes <sup>†</sup> (as Mn)  | 7439-96-5<br>OO9275000  | 1 mg/m <sup>3</sup> TWA,<br>3 mg/m <sup>3</sup> STEL              | CNS effects, manganese pneumonitis   |
| Manganese cyclopentadienyl tricarbonyl <sup>†</sup> (as Mn)                                       | 12079-65-1<br>OO9720000 | 0.1 mg/m <sup>3</sup> TWA (skin)                                  | Tissue irritation and strong toxic effects   |
| Manganese tetroxide<br>(see Appendix III)   | 1317-35-7<br>OP0895000  |   |  |
| Marble <sup>†</sup>   | 1317-65-3<br>EV9580000  |   | Physical irritation  |
| Total dust  |                         | 10 mg/m <sup>3</sup> TWA  |  |
| Respirable fraction   |                         | 5 mg/m <sup>3</sup> TWA   |  |
| Mercury, <sup>**</sup> aryl and inorganic (as Hg)<br><i>Class: Mercury compounds</i> <sup>§</sup> | ††                      | 0.1 mg/m <sup>3</sup> ceiling (skin)                              | CNS and mental effects   |
| Mercury (organo) alkyl compounds <sup>†,‡</sup> (as Hg)   | ††                      | 0.01 mg/m <sup>3</sup> TWA,<br>0.03 mg/m <sup>3</sup> STEL (skin) | CNS damage; eye, respiratory, and skin irritation  |
| Mercury <sup>**</sup> vapor (as Hg)   | 7439-97-6<br>OV4550000  | 0.05 mg/m <sup>3</sup> TWA (skin)                                 | CNS damage; eye, respiratory, and skin irritation  |

\*Consult primary sources in Section A for definitive information.

<sup>†</sup>REL adopted during OSHA hearings (Appendix II).

<sup>‡</sup>Also listed as a pesticide in Appendix V.

<sup>§</sup>Appendix I lists all members of the class indicated; refer to class name in Section A.

<sup>\*\*</sup>REL revised during OSHA hearings (Appendix IV).

<sup>††</sup>CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

| Hazardous agent  | CAS No. and<br>RTECS No. | NIOSH REL  | Health effects*   |
|--|--------------------------|--|---|
| Mesityl oxide<br><i>Class: Ketones</i> <sup>§</sup>                            | 141-79-7<br>SB4200000    | 10 ppm (40 mg/m <sup>3</sup> ) TWA                 | Irritation; liver, kidney, and nervous system effects   |
| Methacrylic acid <sup>†</sup>  | 79-41-4<br>OZ2975000     | 20 ppm (70 mg/m <sup>3</sup> ) TWA (skin)          | Severe eye and skin irritation  |
| Methanethiol<br>(methyl mercaptan)<br><i>Class: Thiols</i> <sup>§</sup>        | 74-93-1<br>PB4375000     | 0.5 ppm (1 mg/m <sup>3</sup> ) ceiling<br>(15-min) | Irritation; eye, skin, blood, and nervous system effects  |
| Methomyl <sup>†,‡</sup> (Lannate)  | 16752-77-5<br>AK2975000  | 2.5 mg/m <sup>3</sup> TWA                          | Reversible cholinesterase inhibition; eye irritation; kidney, liver, blood, spleen, and bone marrow effects |
| Methoxychlor <sup>†,‡</sup>  | 72-43-5<br>KJ3675000     | Ca (0.07 mg/m <sup>3</sup> LOQ)                    | Potential for cancer; liver and ovarian cancers in animals  |
| 2-Methoxyethanol<br>(see Ethylene glycol monomethyl ether)                     |                          |  |   |
| 2-Methoxyethyl acetate (see Ethylene glycol monomethyl ether acetate)          |                          |  |   |
| Methoxyflurane<br><i>Class: Waste anesthetic gases and vapors</i> <sup>§</sup> | 76-38-0<br>KN7820000     | 2 ppm (13.5 mg/m <sup>3</sup> ) ceiling            | Reproductive effects and decreased audiovisual performance  |



|  |                         |   |  |
|--|-------------------------|---|--|
| 4-Methoxyphenol <sup>†</sup>                             | 150-76-5<br>SL7700000   | 5 mg/m <sup>3</sup> TWA   | Eye and skin irritation, corneal damage, CNS depression                      |
| Methyl acetate <sup>†</sup>                              | 79-20-9<br>AI9100000    | 200 ppm (610 mg/m <sup>3</sup> ) TWA,<br>250 ppm (760 mg/m <sup>3</sup> ) STEL                  | Mild irritation to upper respiratory tract and eyes at higher concentrations |
| Methyl acetylene <sup>†</sup> (propyne)                  | 74-99-7<br>UK4920000    | 1,000 ppm (1,650 mg/m <sup>3</sup> ) TWA  | CNS effects  |
| Methyl acetylene-propadiene mixture <sup>†</sup> (MAPP)  | 59355-75-8<br>UK4920000 | 1,000 ppm (1,800 mg/m <sup>3</sup> ) TWA,<br>1,250 ppm<br>(2,250 mg/m <sup>3</sup> ) STEL       | Anesthetic effects at high concentrations                                    |
| Methyl acrylate <sup>†</sup>                             | 96-33-3<br>AT2800000    | 10 ppm (35 mg/m <sup>3</sup> ) TWA (skin)   | Conjunctival and upper respiratory irritation                                |
| Methyl alcohol <sup>**</sup>                             | 67-56-1<br>PC1400000    | 200 ppm (260 mg/m <sup>3</sup> ) TWA<br>(skin), 250 ppm<br>(325 mg/m <sup>3</sup> ) STEL (skin) | Blindness, metabolic acidosis  |
| Methylamine <sup>†</sup>                                 | 74-89-5<br>PF6300000    | 10 ppm (12 mg/m <sup>3</sup> ) TWA  | Severe eye and respiratory irritation  |
| Methyl amyl alcohol (see<br>Methyl isobutyl carbinol)    |                         |   |  |
| Methyl amyl ketone<br><i>Class: Ketones</i> <sup>‡</sup> | 110-43-0<br>MJ5075000   | 100 ppm (465 mg/m <sup>3</sup> ) TWA  | Irritation; liver, kidney, and nervous system effects                        |

<sup>\*</sup>Consult primary sources in Section A for definitive information.

<sup>†</sup>REL adopted during OSHA hearings (Appendix II).

<sup>‡</sup>Also listed as a pesticide in Appendix V.

<sup>§</sup>Appendix I lists all members of the class indicated; refer to class name in Section A.

<sup>\*\*</sup>REL revised during OSHA hearings (Appendix IV).

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

| Hazardous agent  | CAS No. and<br>RTECS No. | NIOSH REL  | Health effects*  |
|--|--------------------------|--|--|
| Methyl bromide <sup>‡</sup><br><i>Class: Monohalomethanes<sup>§</sup></i>                    | 74-83-9<br>PA49000000    | Ca; lowest feasible concentration<br>(4.7 ppm LOQ)                             | Potential for cancer; tumors of the kidney,<br>forestomach, and lung in animals                                  |
| Methyl butyl ketone<br>(2-hexanone)<br><i>Class: Ketones<sup>§</sup></i>                     | 591-78-6<br>MP1400000    | 1 ppm (4 mg/m <sup>3</sup> ) TWA   | Irritation; liver, kidney, and nervous system<br>effects   |
| Methyl chloride<br><i>Class: Monohalomethanes<sup>§</sup></i>                                | 74-87-3<br>PA6300000     | Ca; lowest feasible concentration<br>(1.6 ppm LOQ)                             | Potential for cancer, possible teratogenic<br>effects; tumors of the kidney, forestomach,<br>and lung in animals |
| Methyl chloroform<br>(see 1,1,1-Trichloroethane)   |                          |  |  |
| Methyl chloromethyl ether<br>(see Chloromethyl methyl<br>ether)                              |                          |  |  |
| Methyl 2-cyanoacrylate <sup>†</sup>  | 137-05-3<br>AS7000000    | 2 ppm (8 mg/m <sup>3</sup> ) TWA,<br>4 ppm (16 mg/m <sup>3</sup> ) STEL        | Nasal and eye irritation   |
| Methyl demeton <sup>†</sup>  | 8022-00-2<br>TG1760000   | 0.5 mg/m <sup>3</sup> TWA (skin)   | Cholinesterase inhibition, alteration of<br>intraocular pressure   |
| Methyl ethyl ketone <sup>**</sup> (MEK)<br>(2-butanone)<br><i>Class: Ketones<sup>§</sup></i> | 78-93-3<br>EL6475000     | 200 ppm (590 mg/m <sup>3</sup> ) TWA,<br>300 ppm (885 mg/m <sup>3</sup> ) STEL | Irritation; liver, kidney, and nervous system<br>effects   |

|  |                        |   |   |
|--|------------------------|---|---|
| Methyl ethyl ketone peroxide <sup>†</sup><br>(MEKP)                                    | 1338-23-4<br>EL9450000 | 0.2 ppm (1.5 mg/m <sup>3</sup> ) ceiling  | Eye and skin irritation; lung, liver, and kidney damage   |
| Methyl formate <sup>†</sup>  | 107-31-3<br>LQ8925000  | 100 ppm (250 mg/m <sup>3</sup> ) TWA,<br>150 ppm (375 mg/m <sup>3</sup> ) STEL                | Eye and respiratory irritation; narcosis in animals   |
| Methylhydrazine<br>(monomethylhydrazine)<br><i>Class: Hydrazines</i> <sup>‡</sup>      | 60-34-4<br>MV5600000   | Ca; 0.04 ppm (0.08 mg/m <sup>3</sup> )<br>ceiling (120-min)                                   | Potential for cancer; blood, liver, and skin effects; tumors of the lung, liver, blood vessels, and intestines in animals |
| Methyl iodide <sup>**</sup><br><i>Class: Monohalomethanes</i> <sup>§</sup>             | 74-88-4<br>PA9450000   | Ca; 2 ppm (10 mg/m <sup>3</sup> ) TWA<br>(skin) (1.7 ppm LOQ)                                 | Potential for cancer; tumors of the kidney, forestomach, and lung in animals  |
| Methyl isoamyl ketone<br><i>Class: Ketones</i> <sup>§</sup>                            | 110-12-3<br>MP3850000  | 50 ppm (240 mg/m <sup>3</sup> ) TWA   | Irritation; liver, kidney, and nervous system effects   |
| Methyl isobutyl carbinol <sup>†</sup><br>(methyl amyl alcohol)                         | 108-11-2<br>SA7350000  | 25 ppm (100 mg/m <sup>3</sup> ) TWA<br>(skin), 40 ppm<br>(165 mg/m <sup>3</sup> ) STEL (skin) | Narcosis; eye irritation  |
| Methyl isobutyl ketone <sup>**</sup><br>(hexone)<br><i>Class: Ketones</i> <sup>§</sup> | 108-10-1<br>SA9275000  | 50 ppm (205 mg/m <sup>3</sup> ) TWA,<br>75 ppm (300 mg/m <sup>3</sup> ) STEL                  | Irritation; liver, kidney, and nervous system effects   |
| Methyl isocyanate <sup>†</sup>   | 624-83-9<br>NQ9450000  | 0.02 ppm (0.05 mg/m <sup>3</sup> ) TWA<br>(skin)  | Lacrimation and irritation of the eyes, mucous membranes, and skin  |

\*Consult primary sources in Section A for definitive information.

<sup>†</sup>REL adopted during OSHA hearings (Appendix II).

<sup>‡</sup>Also listed as a pesticide in Appendix V.

<sup>§</sup>Appendix I lists all members of the class indicated; refer to class name in Section A.

<sup>\*\*</sup>REL revised during OSHA hearings (Appendix IV).

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

| Hazardous agent  | CAS No. and<br>RTECS No. | NIOSH REL   | Health effects*  |
|--|--------------------------|---|--|
| Methyl isopropyl ketone <sup>†</sup>                                 | 563-80-4<br>EL9100000    | 200 ppm (705 mg/m <sup>3</sup> ) TWA  | Mild skin and eye irritation   |
| Methyl mercaptan<br>(see Methanethiol)                               |                          |   |  |
| Methyl methacrylate <sup>†</sup>                                     | 80-62-6<br>OZ5075000     | 100 ppm (410 mg/m <sup>3</sup> ) TWA  | Respiratory irritation   |
| Methyl parathion <sup>‡**</sup>                                      | 298-00-0<br>TG0175000    | 0.2 mg/m <sup>3</sup> TWA (skin)  | CNS effects  |
| Methyl propyl ketone<br>(2-pentanone)<br>Class: Ketones <sup>‡</sup> | 107-87-9<br>SA7875000    | 150 ppm (530 mg/m <sup>3</sup> ) TWA  | Irritation; liver, kidney, and nervous system effects                            |
| Methyl silicate <sup>†</sup>   | 681-84-5<br>VV9800000    | 1 ppm (6 mg/m <sup>3</sup> ) TWA  | Severe eye irritation  |
| Methylacrylonitrile <sup>†</sup>                                     | 126-98-7<br>UD1400000    | 1 ppm (3 mg/m <sup>3</sup> ) TWA (skin)                                       | CNS effects in animals   |
| Methylal <sup>†</sup><br>(dimethoxymethane)                          | 109-87-5<br>PA8750000    | 1,000 ppm (3,100 mg/m <sup>3</sup> ) TWA                                      | Mild respiratory irritation and anesthetic effects                               |
| $\alpha$ -Methyl styrene <sup>†</sup>                                | 98-83-9<br>WLS075300     | 50 ppm (240 mg/m <sup>3</sup> ) TWA,<br>100 ppm (485 mg/m <sup>3</sup> ) STEL | Slight irritation of the eyes, upper respiratory tract, and skin; CNS depression |

|   |                         |   |  |
|---|-------------------------|---|--|
| Methylcyclohexane <sup>†</sup>  | 108-87-2<br>GV6125000   | 400 ppm (1,600 mg/m <sup>3</sup> ) TWA  | Mild narcotic effects  |
| Methylcyclohexanol <sup>†</sup>   | 25639-42-3<br>GW0175000 | 50 ppm (235 mg/m <sup>3</sup> ) TWA   | Mild irritation of the eyes and mucous membranes in animals                              |
| o-Methylcyclohexanone <sup>†</sup>  | 583-60-8<br>GV1750000   | 50 ppm (230 mg/m <sup>3</sup> ) TWA (skin), 75 ppm (345 mg/m <sup>3</sup> ) STEL (skin)         | Eye and mucous membrane irritation in animals, narcosis at high concentrations           |
| Methylcyclopentadienyl manganese tricarbonyl <sup>†</sup>   | 12108-13-3<br>OP1450000 | 0.2 mg/m <sup>3</sup> TWA (skin)  | CNS effects, systemic damage   |
| 4,4'-Methylene bis (2-chloroaniline) <sup>**</sup> (MOCA)   | 101-14-4<br>CY1050000   | Ca; 0.003 mg/m <sup>3</sup> TWA (skin)  | Potential for cancer; liver and lung tumors in animals                                   |
| Methylene bis(4-cyclohexylisocyanate) (see Dicyclohexylmethane 4,4-diisocyanate)                                |                         |   |  |
| Methylene bisphenyl isocyanate (MDI) (diphenylmethane diisocyanate)<br><i>Class: Diisocyanates</i> <sup>§</sup> | 101-68-8<br>NQ9350000   | 0.005 ppm (0.050 mg/m <sup>3</sup> ) TWA, 0.020 ppm (0.200 mg/m <sup>3</sup> ) ceiling (10-min) | Respiratory effects, sensitization, pulmonary irritation                                 |
| Methylene chloride <sup>‡</sup> (dichloromethane)   | 75-09-2<br>PA8050000    | Ca; lowest feasible concentration   | Potential for cancer; tumors of the lung, liver, salivary, and mammary glands in animals |

<sup>\*</sup>Consult primary sources in Section A for definitive information.

<sup>†</sup>REL adopted during OSHA hearings (Appendix II).

<sup>‡</sup>Also listed as a pesticide in Appendix V.

<sup>§</sup>Appendix I lists all members of the class indicated; refer to class name in Section A.

<sup>\*\*</sup>REL revised during OSHA hearings (Appendix IV).

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

| Hazardous agent  | CAS No. and RTECS No.   | NIOSH REL   | Health effects*   |
|--|-------------------------|---|---|
| 4,4'-Methylenedianiline (MDA)  | 101-77-9<br>BY5425000   | Ca; lowest feasible concentration (0.03 mg/m <sup>3</sup> LOQ)  | Bladder cancer, skin and liver effects  |
| Metribuzin†  | 21087-64-9<br>XZ2990000 | 5 mg/m <sup>3</sup> TWA   | CNS depression; thyroid and liver enzyme effects in animals   |
| Mica (see Silicates)   |                         |   |   |
| Mineral wool<br><i>Class: Synthetic vitreous fibers</i> <sup>‡</sup>         | ††                      | 3 million fibers/m <sup>3</sup> (fibers ≤ 3.5 μm in diameter and ≥ 10 μm long), 5 mg/m <sup>3</sup> TWA (total mineral wool dust) | Eye, skin, and respiratory effects  |
| Molybdenum, soluble (see Appendix III)                                       | 7439-98-7<br>QA4680000  |   |   |
| Molybdenum, insoluble (see Appendix III)                                     | 7439-98-7<br>QA4680000  |   |   |
| Monochloroethane (ethyl chloride)<br><i>Class: Chloroethane</i> <sup>‡</sup> | 75-00-3<br>KH7525000    | Handle with caution in the workplace  | CNS effects, possible liver and kidney effects  |
| Monocrotophos <sup>†‡</sup> (Azodrin <sup>®</sup> )                          | 6923-22-4<br>TC4375000  | 0.25 mg/m <sup>3</sup> TWA  | Reversible cholinesterase inhibition; behavioral symptoms and pulmonary effects in animals; mutagenic and possible teratogenic effects in animals |

|  |                         |  |  |
|--|-------------------------|--|--|
| Monohalomethanes <sup>§</sup>  | ††                      | See individual chemical  |  |
| Monomethyl aniline <sup>†</sup>  | 100-61-8<br>BY4550000   | 0.5 ppm (2.0 mg/m <sup>3</sup> ) TWA<br>(skin)   | Anoxia resulting from the formation of<br>methemoglobin                  |
| Morpholine <sup>†</sup>  | 110-91-8<br>QD6475000   | 20 ppm (70 mg/m <sup>3</sup> ) TWA (skin),<br>30 ppm (105 mg/m <sup>3</sup> ) STEL<br>(skin) | Irritation to the skin, eyes, mucous<br>membranes, and respiratory tract |
| Naphtha <sup>†</sup><br>(coal tar)                                     | 8030-30-6<br>DE3030000  | 100 ppm (400 mg/m <sup>3</sup> ) TWA   | Narcosis; liver and kidney damage in animals                             |
| Naphthalene <sup>†,‡</sup>   | 91-20-3<br>QJ0525000    | 10 ppm (50 mg/m <sup>3</sup> ) TWA,<br>15 ppm (75 mg/m <sup>3</sup> ) STEL                   | Hemolysis and eye irritation that causes<br>cataracts                    |
| Naphthalene diisocyanate<br>(NDI)<br>Class: Diisocyanates <sup>§</sup> | 25551-28-4<br>NQ9600000 | 0.04 mg/m <sup>3</sup> TWA,<br>0.17 mg/m <sup>3</sup> ceiling (10-min)                       | Respiratory effects and sensitization,<br>pulmonary irritation           |
| α-Naphthylamine  | 134-32-7<br>QM1400000   | Ca; use 29 CFR 1910.1004   | Bladder cancer   |
| β-Naphthylamine <sup>§</sup>   | 91-59-8<br>QM2100000    | Ca; use 29 CFR 1910.1009   | Bladder cancer   |
| NIAX <sup>*</sup> catalyst ESN <sup>§</sup>                            | 62765-93-9<br>QR3900000 | Lowest feasible concentration  | Urological disorders, nervous system effects                             |

\*Consult primary sources in Section A for definitive information.

<sup>†</sup>REL adopted during OSHA hearings (Appendix II).

<sup>‡</sup>Also listed as a pesticide in Appendix V.

<sup>§</sup>Appendix I lists all members of the class indicated; refer to class name in Section A.

<sup>††</sup>CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

| Hazardous agent   | CAS No. and RTECS No.   | NIOSH REL   | Health effects*  |
|---|-------------------------|---|--|
| Nickel carbonyl   | 13463-39-3<br>QR6300000 | Ca; 0.001 ppm<br>(0.007 mg/m <sup>3</sup> ) TWA                         | Lung and nasal cancer  |
| Nickel, metal, soluble, insoluble, and inorganic<br><i>Class: Nickel, inorganic<sup>§</sup></i> | 7440-02-0<br>QR5950000  | Ca; 0.015 mg/m <sup>3</sup> TWA   | Lung and nasal cancer, skin effects  |
| Nickel sulfide roasting (as Ni)<br><i>Class: Nickel, inorganic<sup>§</sup></i>                  | ††                      | Ca; 0.015 mg/m <sup>3</sup> TWA   | Lung and nasal cancer, skin effects  |
| Nicotine <sup>†,‡</sup>   | 54-11-5<br>QS5250000    | 0.5 mg/m <sup>3</sup> TWA (skin)  | Transient stimulation, depression, or paralysis of the CNS, peripheral autonomic ganglia, and nerve endings in skeletal muscle; teratogenic effects in animals |
| Nitric acid <sup>**</sup>   | 7697-37-2<br>QU5775000  | 2 ppm (5 mg/m <sup>3</sup> ) TWA,<br>4 ppm (10 mg/m <sup>3</sup> ) STEL | Dental erosion, nasal and lung irritation  |
| Nitric oxide<br><i>Class: Oxides of nitrogen<sup>§</sup></i>                                    | 10102-43-9<br>QX0525000 | 25 ppm (30 mg/m <sup>3</sup> ) TWA                                      | Effects on blood and respiratory system  |
| Nitriles <sup>§</sup>   | ††                      | See individual chemical   |  |
| p-Nitroaniline <sup>†</sup>   | 100-01-6<br>BY7000000   | 3 mg/m <sup>3</sup> TWA (skin)  | Anoxia resulting from the formation of methemoglobin; jaundice and anemia  |
| Nitrobenzene <sup>†</sup>   | 98-95-3<br>DA6475000    | 1 ppm (5 mg/m <sup>3</sup> ) TWA (skin)                                 | Anoxia resulting from the formation of methemoglobin; anemia   |



|   |                         |   |  |
|---|-------------------------|---|--|
| 4-Nitrobiphenyl   | 92-93-3<br>DV5600000    | Ca; use 29 CFR 1910.1003  | Potential for cancer; bladder tumors in animals                                    |
| p-Nitrochlorobenzene <sup>†</sup>   | 100-00-5<br>CZ1050000   | Ca; lowest feasible concentration (skin) (0.25 mg/m <sup>3</sup> LOQ) | Potential for cancer; vascular and liver tumors in animals; anoxia                 |
| Nitroethane <sup>†</sup>  | 79-24-3<br>KI5600000    | 100 ppm (310 mg/m <sup>3</sup> ) TWA                                  | Mild skin irritation; narcosis, pulmonary irritation, and liver damage in animals  |
| Nitrogen dioxide <sup>**</sup><br><i>Class: Oxides of nitrogen</i> <sup>§</sup> | 10102-44-0<br>QW9800000 | 1 ppm (1.8 mg/m <sup>3</sup> ) STEL                                   | Respiratory and blood effects  |
| Nitrogen trifluoride <sup>†</sup>   | 7783-54-2<br>QX19250000 | 10 ppm (29 mg/m <sup>3</sup> ) TWA                                    | Anoxia resulting from the formation of methemoglobin in animals                    |
| Nitroglycerin <sup>**</sup>   | 55-63-0<br>QX2100000    | 0.1 mg/m <sup>3</sup> STEL (skin)                                     | Circulatory effects  |
| Nitromethane<br>(see Appendix III)  | 75-52-5<br>PA9800000    |   |  |
| 2-Nitronaphthalene<br><i>Class: β-Naphthylamine</i> <sup>§</sup>                | 581-89-5<br>QJ9760000   | Ca; lowest feasible concentration                                     | Bladder cancer   |
| 1-Nitropropane <sup>†</sup>   | 108-03-2<br>TZ5075000   | 25 ppm (90 mg/m <sup>3</sup> ) TWA                                    | Eye irritation and mild respiratory irritation; liver and kidney damage in animals |
| 2-Nitropropane <sup>‡</sup>   | 79-46-9<br>TZ5250000    | Ca; lowest feasible concentration (1.4 ppm LOQ)                       | Potential for cancer; liver tumors in rats   |

\*Consult primary sources in Section A for definitive information.

<sup>†</sup>REL adopted during OSHA hearings (Appendix II).

<sup>\*</sup>Also listed as a pesticide in Appendix V.

<sup>§</sup>Appendix I lists all members of the class indicated; refer to class name in Section A.

<sup>\*\*</sup>REL revised during OSHA hearings (Appendix IV).

<sup>††</sup>CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

| Hazardous agent  | CAS No. and RTECS No.   | NIOSH REL   | Health effects*  |
|--|-------------------------|---|--|
| N-Nitrosodimethylamine   | 62-75-9<br>IQ0525000    | Ca; use 29 CFR 1910.1016  | Potential for cancer; tumors of the liver, kidney, lung, and nasal cavity in animals |
| m-Nitrotoluene <sup>†</sup>  | 99-08-1<br>XT2975000    | 2 ppm (11 mg/m <sup>3</sup> ) TWA (skin)                            | Hypoxia/anoxia resulting from formation of methemoglobin                             |
| o-Nitrotoluene <sup>†</sup>  | 88-72-2<br>XT3150000    | 2 ppm (11 mg/m <sup>3</sup> ) TWA (skin)                            | Anoxia resulting from formation of methemoglobin                                     |
| p-Nitrotoluene <sup>†</sup>  | 99-99-0<br>XT3325000    | 2 ppm (11 mg/m <sup>3</sup> ) TWA (skin)                            | Anoxia resulting from formation of methemoglobin                                     |
| Nitrotrichloromethane<br>(see Chloropicrin)                                  |                         |   |  |
| Nitrous oxide<br><i>Class: Waste anesthetic gases and vapors<sup>§</sup></i> | 10024-97-2<br>QX1350000 | 25 ppm (30 mg/m <sup>3</sup> ) TWA for the duration of the exposure | Reproductive system effects and decreases in audiovisual performance                 |
| Nonane <sup>†</sup>  | 111-84-2<br>RA6115000   | 200 ppm (1050 mg/m <sup>3</sup> ) TWA                               | Narcosis   |
| 1-Nonanethiol<br>(n-nonylmercaptan)<br><i>Class: Thiols<sup>§</sup></i>      | 1455-21-6<br>††         | 0.5 ppm (3.3 mg/m <sup>3</sup> ) ceiling (15-min)                   | Irritation; eye, skin, blood, and nervous system effects                             |
| Octachloronaphthalene <sup>†</sup>   | 2234-13-1<br>QK0250000  | 0.1 mg/m <sup>3</sup> TWA,<br>0.3 mg/m <sup>3</sup> STEL (skin)     | Liver and skin effects   |

|  |                          |  |  |
|--|--------------------------|--|--|
| 1-Octadecanethiol<br>(octadecylmercaptan)<br><i>Class: Thiols</i> <sup>§</sup> | 2885-00-9<br>††          | 0.5 ppm (5.9 mg/m <sup>3</sup> ) ceiling<br>(15-min)   | Irritation; eye, skin, blood, and nervous system effects |
| Octane<br><i>Class: Alkanes</i> <sup>§</sup>                                   | 111-65-9<br>RG8400000    | 75 ppm (350 mg/m <sup>3</sup> ) TWA,<br>385 ppm (1,800 mg/m <sup>3</sup> ) ceiling<br>(15-min) | Skin and nervous system effects                          |
| 1-Octanethiol<br>(n-octylmercaptan)<br><i>Class: Thiols</i> <sup>§</sup>       | 111-88-6<br>††           | 0.5 ppm (3.0 mg/m <sup>3</sup> ) ceiling<br>(15-min)   | Irritation; eye, skin, blood, and nervous system effects |
| n-Octylmercaptan<br>(see 1-Octanethiol)  |                          |  |  |
| Oil mist, <sup>†</sup> mineral   | 8012-95-1<br>PY8030000   | 5 mg/m <sup>3</sup> TWA,<br>10 mg/m <sup>3</sup> STEL  | Respiratory effects                                      |
| Organic solvents <sup>§</sup>  | ††                       | See individual chemical  |  |
| Organotin compounds <sup>§</sup>   | ††                       | See individual chemical  |  |
| Osmium tetroxide <sup>†</sup><br>(as Os)                                       | 20816-12-0<br>RN11400000 | 0.0002 ppm (0.002 mg/m <sup>3</sup> ) TWA,<br>0.0006 ppm<br>(0.006 mg/m <sup>3</sup> ) STEL    | Severe irritation of the eyes and respiratory tract      |
| Oxalic acid <sup>†,‡</sup>   | 144-62-7<br>RO2450000    | 1 mg/m <sup>3</sup> TWA, 2 mg/m <sup>3</sup> STEL  | Eye, mucous membrane, and skin irritation                |

\*Consult primary sources in Section A for definitive information.

†REL adopted during OSHA hearings (Appendix II).

‡Also listed as a pesticide in Appendix V.

§Appendix I lists all members of the class indicated; refer to class name in Section A.

††CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

| Hazardous agent  | CAS No. and<br>RTECS No. | NIOSH REL  | Health effects*   |
|--|--------------------------|--|---|
| Oxides of nitrogen <sup>§</sup>                              | ††                       | See individual chemical  |   |
| Oxygen difluoride <sup>†</sup>                               | 7783-41-7<br>RS2100000   | 0.05 ppm (0.1 mg/m <sup>3</sup> ) ceiling  | Severe respiratory irritation                                     |
| Ozone <sup>†</sup>   | 10028-15-6<br>RS8225000  | 0.1 ppm (0.2 mg/m <sup>3</sup> ) ceiling   | Upper and lower respiratory tract irritation                      |
| Paraffin wax fume <sup>†</sup>                               | 8002-74-2<br>RV0350000   | 2 mg/m <sup>3</sup> TWA  | Discomfort and nausea   |
| Paraquat <sup>†</sup><br>Respirable dust                     | 4685-14-7<br>DW1960000   | 0.1 mg/m <sup>3</sup> TWA (skin)   | Eye, mucous membrane, and skin irritation                         |
| Parathion <sup>†**</sup>                                     | 56-38-2<br>TF4550000     | 0.05 mg/m <sup>3</sup> TWA (skin)  | Nervous system effects  |
| Particulates not otherwise<br>regulated (see Appendix III)   | ††                       |  |   |
| Pentaborane <sup>†</sup>                                     | 19624-22-7<br>RY8925000  | 0.005 ppm (0.01 mg/m <sup>3</sup> ) TWA,<br>0.015 ppm (0.03 mg/m <sup>3</sup> ) STEL | Toxicity, nervous system effects, narcosis and<br>hyperexcitation |
| Pentachloroethane<br><i>Class: Chloroethanes<sup>§</sup></i> | 76-01-7<br>KI6300000     | Handle with caution in the<br>workplace  | CNS effects, possible liver and kidney effects                    |

|   |                        |   |   |
|---|------------------------|---|---|
| Pentachloronaphthalene <sup>†</sup>   | 1321-64-8<br>QK0300000 | 0.5 mg/m <sup>3</sup> TWA (skin)  | Liver and skin toxicity   |
| Pentachlorophenol <sup>†,‡</sup>  | 87-86-5<br>SM6300000   | 0.5 mg/m <sup>3</sup> TWA (skin)  | Eye and upper respiratory irritation, increased metabolic rate and hyperpyrexia |
| Pentaerythritol <sup>†</sup>  | 115-77-5<br>RZ2490000  |   | Physical irritation   |
| Total dust  |                        | 10 mg/m <sup>3</sup> TWA  |   |
| Respirable fraction   |                        | 5 mg/m <sup>3</sup> TWA   |   |
| Pentane <sup>‡</sup><br><i>Class: Alkane</i> <sup>§</sup>                             | 109-66-0<br>RZ9450000  | 120 ppm (350 mg/m <sup>3</sup> ) TWA,<br>610 ppm (1,800 mg/m <sup>3</sup> ) ceiling<br>(15-min) | Skin and nervous system effects   |
| 1-Pentanethiol <sup>‡</sup><br>(pentylmercaptan)<br><i>Class: Thiols</i> <sup>§</sup> | 110-66-7<br>SA3150000  | 0.5 ppm (2.1 mg/m <sup>3</sup> ) ceiling<br>(15-min)  | Eye and skin irritation, blood and nervous system effects                       |
| 2-Pentanone<br>(see Methyl propyl ketone)   |                        |   |   |
| Pentylmercaptan<br>(see 1-Pentanethiol)   |                        |   |   |
| Perchloroethylene<br>(see Tetrachloroethylene)  |                        |   |   |

\*Consult primary sources in Section A for definitive information.

<sup>†</sup>REL adopted during OSHA hearings (Appendix II).

<sup>‡</sup>Also listed as a pesticide in Appendix V.

<sup>§</sup>Appendix I lists all members of the class indicated; refer to class name in Section A.

<sup>\*\*</sup>REL revised during OSHA hearings (Appendix IV).

<sup>††</sup>CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

| Hazardous agent   | CAS No. and RTECS No.   | NIOSH REL   | Health effects*   |
|---|-------------------------|---|---|
| Perchloromethyl mercaptan <sup>†</sup>  | 594-42-3<br>PB0370000   | 0.1 ppm (0.8 mg/m <sup>3</sup> ) TWA  | Severe pulmonary irritation and lacrimation, liver and kidney damage            |
| Perchloryl fluoride <sup>†</sup>  | 7616-94-6<br>SD1925000  | 3 ppm (14 mg/m <sup>3</sup> ) TWA,<br>6 ppm (28 mg/m <sup>3</sup> ) STEL                              | Mucous membrane irritation;<br>methemoglobinemia and pulmonary edema in animals |
| Perlite <sup>†</sup>  | 93763-70-3<br>SD5254000 |   | Eye, skin, and other forms of physical irritation                               |
| Total dust  |                         | 10 mg/m <sup>3</sup> TWA  |   |
| Respirable fraction   |                         | 5 mg/m <sup>3</sup> TWA   |   |
| Pesticides <sup>§</sup>   | ††                      | See individual chemicals  |   |
| Petroleum distillates (naphtha)<br><i>Class: Refined petroleum products<sup>§</sup></i> | 8002-05-9<br>SE7449000  | 350 mg/m <sup>3</sup> TWA,<br>1,800 mg/m <sup>3</sup> ceiling (15-min)                                | Eye, nose, and throat irritation; dermatitis; nervous system effects            |
| Phenol <sup>‡**</sup>   | 108-95-2<br>SJ3325000   | 5 ppm (19 mg/m <sup>3</sup> ) TWA (skin),<br>15.6 ppm (60 mg/m <sup>3</sup> ) ceiling (15-min) (skin) | Skin, eye, CNS, liver, and kidney effects                                       |
| Phenothiazine <sup>†</sup>  | 92-84-2<br>SN5075000    | 5 mg/m <sup>3</sup> TWA (skin)  | Skin sensitization  |
| N-Phenyl-β-naphthylamine<br><i>Class: β-Naphthylamine<sup>§</sup></i>                   | 135-88-6<br>QM4550000   | Ca; lowest feasible concentration   | Bladder cancer  |

|  |                       |  |   |
|--|-----------------------|--|---|
| Phenyl ether, <sup>†</sup> vapor                                       | 101-84-8<br>KN8970000 | 1 ppm (7 mg/m <sup>3</sup> ) TWA                               | Mild toxicity; eye and nose irritation in animals   |
| Phenyl ether-biphenyl mixture <sup>†</sup> , vapor                     | ††                    | 1 ppm (7 mg/m <sup>3</sup> ) TWA                               | Eye, skin, and upper respiratory irritation   |
| Phenyl glycidyl ether<br><i>Class: Glycidyl ethers</i> <sup>§</sup>    | 122-60-1<br>TZ3675000 | Ca; 1 ppm (6 mg/m <sup>3</sup> ) ceiling (15-min)              | Skin and mucous membrane effects, potential for sensitization, possible hematopoietic and reproductive effects; epidermoid nasal carcinomas and squamous metaplasia of the nasal epithelium in rats |
| Phenyl mercaptan<br>(see Benzenethiol)                                 |                       |  |   |
| p-Phenylene diamine <sup>†</sup>                                       | 106-50-3<br>SS8050000 | 0.1 mg/m <sup>3</sup> TWA (skin)                               | Skin and respiratory sensitization, bronchial asthma  |
| Phenylethylene (see Styrene)   |                       |  |   |
| Phenylhydrazine <sup>**</sup><br><i>Class: Hydrazines</i> <sup>§</sup> | 100-63-0<br>MV8925000 | Ca; 0.14 ppm (0.6 mg/m <sup>3</sup> ) ceiling (120-min) (skin) | Potential for cancer; blood, liver, and skin effects; tumors of the lung, liver, blood vessels, and intestines in animals   |
| Phenylphosphine <sup>†</sup>   | 638-21-1<br>SZ2100000 | 0.05 ppm (0.25 mg/m <sup>3</sup> ) ceiling                     | CNS effects, irritation   |

\*Consult primary sources in Section A for definitive information.

<sup>†</sup>REL adopted during OSHA hearings (Appendix II).

<sup>‡</sup>Also listed as a pesticide in Appendix V.

<sup>§</sup>Appendix I lists all members of the class indicated; refer to class name in Section A.

<sup>\*\*</sup>REL revised during OSHA hearings (Appendix IV).

<sup>††</sup>CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

| Hazardous agent                                  | CAS No. and<br>RTECS No. | NIOSH REL   | Health effects*   |
|--|--------------------------|---|---|
| Phorate <sup>†,‡</sup>                           | 298-02-2<br>TD9450000    | 0.05 mg/m <sup>3</sup> TWA,<br>0.2 mg/m <sup>3</sup> STEL (skin)                              | Organo-phosphorus cholinesterase inhibition   |
| Phosdrin <sup>†</sup> (Mevinphos <sup>®‡</sup> ) | 7786-34-7<br>GQ5250000   | 0.01 ppm (0.1 mg/m <sup>3</sup> ) TWA,<br>0.03 ppm<br>(0.3 mg/m <sup>3</sup> ) STEL (skin)    | Cholinesterase inhibition   |
| Phosgene (carbonyl chloride)                     | 75-44-5<br>SY5600000     | 0.1 ppm (0.4 mg/m <sup>3</sup> ) TWA,<br>0.2 ppm (0.8 mg/m <sup>3</sup> ) ceiling<br>(15-min) | Respiratory irritation and effects  |
| Phosphine <sup>†</sup>                           | 7803-51-2<br>SY7525000   | 0.3 ppm (0.4 mg/m <sup>3</sup> ) TWA,<br>1.0 ppm (1.0 mg/m <sup>3</sup> ) STEL                | Severe pulmonary irritation and acute systemic poisoning                                      |
| Phosphoric acid <sup>†,‡</sup>                   | 7664-38-2<br>TB6300000   | 1 mg/m <sup>3</sup> TWA, 3 mg/m <sup>3</sup> STEL   | Mild irritation of the eyes, upper respiratory tract, and skin                                |
| Phosphorus <sup>†,‡</sup> (yellow)               | 7723-14-0<br>TH3500000   | 0.1 mg/m <sup>3</sup> TWA   | Respiratory and eye irritation, skin burns  |
| Phosphorus oxychloride <sup>†</sup>              | 10025-87-3<br>TH4897000  | 0.1 ppm (0.6 mg/m <sup>3</sup> ) TWA,<br>0.5 ppm (3.0 mg/m <sup>3</sup> ) STEL                | Eye and respiratory irritation, gastric effects, narcotic effects, pulmonary edema, nephritis |
| Phosphorus pentachloride <sup>†</sup>            | 10026-13-8<br>TB6125000  | 1 mg/m <sup>3</sup> TWA   | Severe irritation of the eyes, mucous membranes, and respiratory tract; bronchitis            |
| Phosphorus pentasulfide <sup>†</sup>             | 1314-80-3<br>TH3675000   | 1 mg/m <sup>3</sup> TWA, 3 mg/m <sup>3</sup> STEL   | Eye and skin irritation   |



|  |                         |  |   |
|--|-------------------------|--|---|
| Phosphorus trichloride <sup>†</sup>                  | 7719-12-2<br>TH3675000  | 0.2 ppm (1.5 mg/m <sup>3</sup> ) TWA,<br>0.5 ppm (3.0 mg/m <sup>3</sup> ) STEL | Severe irritation of the eyes, mucous membranes, and skin; respiratory effects ranging from bronchial spasm to severe pulmonary edema |
| Phthalic anhydride <sup>†</sup>                      | 85-44-9<br>TI3150000    | 1 ppm (6 mg/m <sup>3</sup> ) TWA   | Skin and respiratory irritation and sensitization, eye irritation causing conjunctivitis  |
| m-Phthalodinitrile <sup>†</sup>                      | 626-17-5<br>CZ1900000   | 5 mg/m <sup>3</sup> TWA  | Skin irritation   |
| Picloram <sup>‡</sup> (see Appendix III)             | 1918-02-1<br>TJ7525000  |  |   |
| Picric acid <sup>†</sup><br>(2,4,6-trinitrophenyl)   | 88-89-1<br>TJ7875000    | 0.1 mg/m <sup>3</sup> TWA (skin),<br>0.3 mg/m <sup>3</sup> STEL (skin)         | Sensitization dermatitis  |
| Pindone <sup>†,‡</sup><br>(2-pivalyl-1,3-indandione) | 83-26-1<br>NK6300000    | 0.1 mg/m <sup>3</sup> TWA  | Vitamin K antagonist and inhibition of prothrombin  |
| Piperazine<br>dihydrochloride <sup>†,‡</sup>         | 142-64-3<br>TL4025000   | 5.0 mg/m <sup>3</sup> TWA  | Eye and skin irritation and sensitization   |
| Plaster of Paris <sup>†</sup>                        | 26499-65-0<br>TP0700000 |  | Skin, eye, and other forms of physical irritation   |
| Total dust   |                         | 10 mg/m <sup>3</sup> TWA   |   |
| Respirable fraction                                  |                         | 5 mg/m <sup>3</sup> TWA  |   |

\*Consult primary sources in Section A for definitive information.

<sup>†</sup>REL adopted during OSHA hearings (Appendix II).

<sup>‡</sup>Also listed as a pesticide in Appendix V.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

| Hazardous agent  | CAS No. and<br>RTECS No. | NIOSH REL  | Health effects*   |
|--|--------------------------|--|---|
| Platinum <sup>†</sup> (as Pt)  | 7440-06-4<br>TP2160000   |  | Asthma, skin sensitization, eye irritation  |
| Metal<br>Soluble salts   |                          | 1 mg/m <sup>3</sup> TWA<br>0.002 mg/m <sup>3</sup> TWA |   |
| Polychlorinated biphenyls <sup>§</sup><br>(PCBs)                     | ††                       | See individual chemical                                | Potential for cancer; skin, liver, and<br>reproductive effects; tumors of the liver and<br>pituitary gland and leukemias in animals |
| Portland cement <sup>†</sup>   | 65997-15-1<br>VV8770000  |  | Eye irritation, dermatitis  |
| Total dust   |                          | 10 mg/m <sup>3</sup> TWA                               |   |
| Respirable fraction  |                          | 5 mg/m <sup>3</sup> TWA                                |   |
| Potassium hydroxide <sup>†,‡</sup>                                   | 1310-58-3<br>TT2100000   | 2 mg/m <sup>3</sup> ceiling                            | Severe irritation of the eyes, mucous<br>membranes, and skin  |
| Propane <sup>†</sup>   | 74-98-6<br>TX2275000     | 1,000 ppm (1,800 mg/m <sup>3</sup> ) TWA               | Asphyxiation  |
| Propane sultone <sup>†</sup>   | 1120-71-4<br>RP5425000   | Ca; lowest feasible concentration                      | Skin tumors, leukemia, and gliomas in rats and<br>mice  |
| 1-Propanethiol<br>(n-propyl mercaptan)<br>Class: Thiols <sup>§</sup> | 107-03-9<br>TZ7300000    | 0.5 ppm (1.6 mg/m <sup>3</sup> ) ceiling<br>(15-min)   | Eye and skin irritation, blood and nervous<br>system effects  |

|  |                       |   |  |
|--|-----------------------|---|--|
| Propargyl alcohol <sup>†</sup>                               | 107-19-7<br>UK5075000 | 1 ppm (2 mg/m <sup>3</sup> ) TWA (skin)   | Skin and mucous membrane irritation, CNS depression, liver and kidney damage                     |
| β-Propiolactone  | 57-57-8<br>RQ7350000  | Ca; use CFR 29 1910.1013  | Potential for cancer; tumors of the liver, skin, and stomach in animals                          |
| Propionic acid <sup>†,‡</sup>                                | 79-09-4<br>UE5950000  | 10 ppm (30 mg/m <sup>3</sup> ) TWA,<br>15 ppm (45 mg/m <sup>3</sup> ) STEL                      | Mild irritation of the skin, eyes, and mucosal surfaces  |
| Propionitrile<br><i>Class: Nitriles</i> <sup>§</sup>         | 107-12-0<br>UF9625000 | 6 ppm (14 mg/m <sup>3</sup> ) TWA   | Hepatic, renal, respiratory, cardiovascular, gastrointestinal, and nervous system effects        |
| Propoxur <sup>†</sup> (Baygon)                               | 114-26-1<br>FC3150000 | 0.5 mg/m <sup>3</sup> TWA   | Cholinesterase inhibition  |
| n-Propyl acetate <sup>†</sup>                                | 109-60-4<br>AJ3675000 | 200 ppm (840 mg/m <sup>3</sup> ) TWA,<br>250 ppm (1,050 mg/m <sup>3</sup> ) STEL                | Conjunctival and upper respiratory irritation; narcosis in animals                               |
| n-Propyl alcohol <sup>†</sup>                                | 71-23-8<br>UH8225000  | 200 ppm (500 mg/m <sup>3</sup> ) TWA<br>(skin), 250 ppm<br>(625 mg/m <sup>3</sup> ) STEL (skin) | Mild narcosis, upper respiratory irritation  |
| n-Propyl nitrate <sup>†</sup>                                | 627-13-4<br>UK0350000 | 25 ppm (105 mg/m <sup>3</sup> ) TWA,<br>40 ppm (170 mg/m <sup>3</sup> ) STEL                    | Anoxia resulting from the formation of methemoglobin   |
| Propylene dichloride <sup>†,‡</sup><br>(1,2-dichloropropane) | 78-87-5<br>TX9625000  | Ca; lowest feasible concentration<br>(0.03 ppm LOQ)   | Potential for cancer; narcosis; eye irritation; mammary gland tumors and liver tumors in animals |

\*Consult primary sources in Section A for definitive information.

<sup>†</sup>REL adopted during OSHA hearings (Appendix II).

<sup>‡</sup>Also listed as a pesticide in Appendix V.

<sup>§</sup>Appendix I lists all members of the class indicated; refer to class name in Section A.

<sup>††</sup>CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

| Hazardous agent                                   | CAS No. and<br>RTECS No. | NIOSH REL  | Health effects*  |
|---|--------------------------|--|--|
| Propylene glycol dinitrate <sup>†</sup>           | 6423-43-4<br>TY6300000   | 0.05 ppm (0.3 mg/m <sup>3</sup> ) TWA<br>(skin)                                | Hepatotoxic, hematologic, and CNS effects  |
| Propylene glycol monomethyl<br>ether <sup>†</sup> | 107-98-2<br>UB7700000    | 100 ppm (360 mg/m <sup>3</sup> ) TWA,<br>150 ppm (540 mg/m <sup>3</sup> ) STEL | Eye, nose, and throat irritation; CNS<br>depression  |
| Propylene imine <sup>†</sup>                      | 75-55-8<br>CM8050000     | Ca; 2 ppm (5 mg/m <sup>3</sup> ) TWA<br>(skin)                                 | Potential for cancer; brain and mammary<br>tumors in animals                                     |
| Propylene oxide <sup>‡</sup>                      | 75-56-9<br>TZ2975000     | Ca; lowest feasible concentration<br>(8.4 ppm LOQ)                             | Potential for cancer; nasal tumors in animals  |
| n-Propylmercaptan<br>(see 1-Propanethiol)         |                          |  |  |
| Propyne<br>(see Methyl acetylene)                 |                          |  |  |
| Pyrethrum <sup>†</sup>                            | 8003-34-7<br>UR4200000   | 5 mg/m <sup>3</sup> TWA  | Dermatitis and sensitization; intoxication in<br>animals   |
| Pyridine <sup>†,‡</sup>                           | 110-86-1<br>UR8400000    | 5 ppm (15 mg/m <sup>3</sup> ) TWA  | Mild irritation to eyes and mucous<br>membranes, narcosis; kidney and liver<br>damage in animals |

|   |                        |   |   |
|---|------------------------|---|---|
| Quinone <sup>†*</sup>   | 106-51-4<br>DK2625000  | 0.1 ppm (0.4 mg/m <sup>3</sup> ) TWA  | Eye irritation, conjunctivitis, corneal edema, ulceration, scarring |
| Refined petroleum solvents <sup>‡</sup>                                 | ††                     | See individual chemical   |   |
| Resorcinal <sup>†</sup>   | 108-46-3<br>VG9625000  | 10 ppm (45 mg/m <sup>3</sup> ) TWA,<br>20 ppm (90 mg/m <sup>3</sup> ) STEL                          | Irritation, methemoglobinemia                                       |
| Rhodium <sup>†</sup> (as Rh),<br>metal fume and<br>insoluble compounds  | 7440-16-6<br>VI9069000 | 0.1 mg/m <sup>3</sup> TWA   | Possible respiratory sensitization                                  |
| Rhodium <sup>†</sup> (as Rh),<br>soluble compounds                      | 7440-16-6<br>VI9069000 | 0.001 mg/m <sup>3</sup> TWA   | Mild eye irritation in animals                                      |
| Ronnel <sup>†*</sup>  | 299-84-3<br>TG0525000  | 10 mg/m <sup>3</sup> TWA  | Weak cholinesterase inhibition                                      |
| Rosin core solder, pyrolysis<br>products <sup>†</sup> (as formaldehyde) | ††                     | 0.1 mg/m <sup>3</sup> TWA; Ca in the<br>presence of formaldehyde,<br>acetaldehyde, or malonaldehyde | Respiratory irritation  |
| Rotenone <sup>†*</sup>  | 83-79-4<br>DJ2800000   | 5 mg/m <sup>3</sup> TWA   | Nervous system effects and convulsions in<br>animals                |
| Rouge (see Appendix III)  | ††                     |   |   |

\*Consult primary sources in Section A for definitive information.

<sup>†</sup>REL adopted during OSHA hearings (Appendix II).

<sup>‡</sup>Also listed as a pesticide in Appendix V.

<sup>§</sup>Appendix I lists all members of the class indicated; refer to class name in Section A.

<sup>††</sup>CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

| Hazardous agent   | CAS No. and<br>RTECS No. | NIOSH REL                             | Health effects*  |
|---|--------------------------|---------------------------------------|--|
| Selenium compounds <sup>†</sup><br>(as Se)  | 7782-49-2<br>VS7700000   | 0.2 mg/m <sup>3</sup> TWA             | Eye, upper respiratory, and skin irritation;<br>damage to the liver, kidney, spleen, and heart<br>in animals |
| Selenium hexafluoride <sup>†</sup><br>(as Se)   | 7783-79-1<br>VS9450000   | 0.05 ppm (0.4 mg/m <sup>3</sup> ) TWA | Severe respiratory irritation in animals   |
| Silica, amorphous <sup>†</sup> ,<br>diatomaceous earth<br>containing less than 1%<br>crystalline silica | 61790-53-2<br>HL8600000  | 6 mg/m <sup>3</sup> TWA               | Pulmonary fibrosis   |
| Silica, amorphous, <sup>†,‡</sup><br>precipitated, and gel  | 7699-41-4<br>VV8850000   | 6 mg/m <sup>3</sup> TWA               | Pulmonary fibrosis   |
| Silica, crystalline cristobalite  | 14464-46-1<br>VV7325000  | Ca; 0.05 mg/m <sup>3</sup> TWA        | Chronic lung disease (silicosis)   |
| Silica, crystalline quartz  | 14808-60-7<br>VV7330000  | Ca; 0.05 mg/m <sup>3</sup> TWA        | Chronic lung disease (silicosis)   |
| Silica, crystalline tridymite   | 15468-32-3<br>VV7335000  | Ca; 0.05 mg/m <sup>3</sup> TWA        | Chronic lung disease (silicosis)   |
| Silica, crystalline tripoli   | 1317-95-9<br>VV7336000   | Ca; 0.05 mg/m <sup>3</sup> TWA        | Chronic lung disease (silicosis)   |

|  |                         |  |  |
|--|-------------------------|--|--|
| Silica, fused  | 60676-86-0<br>VV7328000 | Ca; 0.05 mg/m <sup>3</sup> TWA   | Chronic lung disease (silicosis)   |
| Silicates <sup>†</sup><br>(<1% crystalline silica):  |                         |  | Fibrotic pneumoconiosis  |
| Mica, respirable dust                                | 12001-26-2<br>VV8760000 | 3 mg/m <sup>3</sup> TWA  |  |
| Soapstone, total dust                                | ††                      | 6 mg/m <sup>3</sup> TWA  |  |
| Soapstone, respirable dust                           | VV8780000               | 3 mg/m <sup>3</sup> TWA  |  |
| Talc (containing asbestos)                           | 14807-96-6<br>WW2710000 | Ca; 100,000 fibers/m <sup>3</sup> (fibers<br>>5 μm long; in a 400-liter<br>sample) |  |
| Talc (containing no<br>asbestos) (see Talc)          |                         |  |  |
| Silicon <sup>†</sup>                                 | 7440-21-3<br>VW0400000  |  | Eye, skin, and mucous membrane irritation;<br>respiratory effects                                    |
| Total dust   |                         | 10 mg/m <sup>3</sup> TWA   |  |
| Respirable fraction                                  |                         | 5 mg/m <sup>3</sup> TWA  |  |
| Silicon carbide <sup>†</sup>                         | 409-21-2<br>VW0450000   |  | Physical irritation  |
| Total dust   |                         | 10 mg/m <sup>3</sup> TWA   |  |
| Respirable fraction                                  |                         | 5 mg/m <sup>3</sup> TWA  |  |
| Silicon tetrahydride <sup>†</sup>                    | 7803-62-5<br>VV1400000  | 5 ppm (7 mg/m <sup>3</sup> ) TWA   | Moderate irritation of the eyes, skin, and<br>mucous membranes                                       |
| Silver <sup>†,‡</sup> metal and soluble<br>compounds | 7440-22-4<br>VW3675000  | 0.01 mg/m <sup>3</sup> TWA   | Argyria; local or generalized impregnation of<br>the mucous membranes, skin, and eyes with<br>silver |

\*Consult primary sources in Section A for definitive information.

<sup>†</sup>REL adopted during OSHA hearings (Appendix II).

<sup>‡</sup>Also listed as a pesticide in Appendix V.

<sup>††</sup>CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

| Hazardous agent                     | CAS No. and<br>RTECS No. | NIOSH REL  | Health effects*   |
|-------------------------------------|--------------------------|--|---|
| Soapstone (see Silicates)           |                          |  |   |
| Sodium azide <sup>†</sup>           | 26628-22-8<br>VV8050000  | 0.1 ppm ceiling (skin) as HN <sub>3</sub> ,<br>0.3 mg/m <sup>3</sup> ceiling (skin)<br>as NaN <sub>3</sub> | Hypotension, cardiovascular effects, irritation               |
| Sodium bisulfite <sup>†,‡</sup>     | 7631-90-5<br>VZ2000000   | 5 mg/m <sup>3</sup> TWA  | Eye, skin, and mucous membrane irritation                     |
| Sodium fluoroacetate <sup>†,‡</sup> | 62-74-8<br>AH9100000     | 0.05 mg/m <sup>3</sup> TWA (skin),<br>0.15 mg/m <sup>3</sup> STEL (skin)                                   | Convulsions and ventricular fibrillation, kidney<br>damage    |
| Sodium hydroxide <sup>‡</sup>       | 1310-73-2<br>WB490000    | 2 mg/m <sup>3</sup> ceiling (15-min)   | Respiratory irritation  |
| Sodium metabisulfite <sup>†</sup>   | 7681-57-4<br>UX8225000   | 5 mg/m <sup>3</sup> TWA  | Skin, eye, lung, nose, and throat irritation                  |
| Starch <sup>†</sup>                 | 9005-25-8<br>GM5090000   |  | Eye, skin, and other physical irritation                      |
| Total dust                          |                          | 10 mg/m <sup>3</sup> TWA   |   |
| Respirable fraction                 |                          | 5 mg/m <sup>3</sup> TWA  |   |
| Stibine <sup>†</sup>                | 7803-52-3<br>WJ0700000   | 0.1 ppm (0.5 mg/m <sup>3</sup> ) TWA   | Toxic hemolysis, liver, and kidney damage;<br>lung irritation |



|  |                                      |   |  |
|--|--------------------------------------|---|--|
| Stoddard solvent <sup>‡</sup><br><i>Class: Refined petroleum solvents</i> <sup>§</sup> | 8052-41-3<br>WJ8925000               | 350 mg/m <sup>3</sup> TWA,<br>1,800 mg/m <sup>3</sup> ceiling<br>(15-min)     | Eye, nose, and throat irritation; dermatitis,<br>nervous system effects                      |
| Strychnine <sup>†,‡</sup>  | 57-24-9<br>WL2275000                 | 0.15 mg/m <sup>3</sup> TWA  | Convulsions  |
| Styrene <sup>**</sup><br>(vinyl benzene;<br>phenylethylene)                            | 100-42-5<br>WL3675000                | 50 ppm (215 mg/m <sup>3</sup> ) TWA,<br>100 ppm (425 mg/m <sup>3</sup> ) STEL | Nervous system effects, eye and respiratory<br>irritation, reproductive effects              |
| Subtilisins <sup>†</sup><br>(proteolytic enzymes)                                      | 9014-01-1<br>CO9450000,<br>CO9550000 | 0.00006 mg/m <sup>3</sup> STEL (60-min)                                       | Respiratory sensitization, skin irritation,<br>respiratory effects                           |
| Succinonitrile<br><i>Class: Nitriles</i> <sup>§</sup>                                  | 110-61-2<br>WN3850000                | 6 ppm (20 mg/m <sup>3</sup> ) TWA   | Hepatic, renal, respiratory, cardiovascular,<br>gastrointestinal, and nervous system effects |
| Sucrose <sup>†</sup>   | 57-50-1<br>WN6500000                 |   | Physical irritation  |
| Total dust   |                                      | 10 mg/m <sup>3</sup> TWA  |  |
| Respirable dust  |                                      | 5 mg/m <sup>3</sup> TWA   |  |
| Sulfotep (see TEDP)  |                                      |   |  |
| Sulfur dioxide <sup>‡,**</sup>   | 7446-09-5<br>WS4550000               | 2 ppm (5 mg/m <sup>3</sup> ) TWA,<br>5 ppm (10 mg/m <sup>3</sup> ) STEL       | Respiratory effects  |
| Sulfur hexafluoride <sup>†</sup>   | 2551-62-4<br>WS4900000               | 1,000 ppm (6,000 mg/m <sup>3</sup> ) TWA                                      | Mild effect on the nervous system  |

\*Consult primary sources in Section A for definitive information.

<sup>†</sup>REL adopted during OSHA hearings (Appendix II).

<sup>‡</sup>Also listed as a pesticide in Appendix V.

<sup>§</sup>Appendix I lists all members of the class indicated; refer to class name in Section A.

\*\*REL revised during OSHA hearings (Appendix IV).

Table 1 (Continued).--NIOSH recommended safety and health standards for hazardous agents in the workplace

| Hazardous agent                              | CAS No. and RTECS No.   | NIOSH REL   | Health effects*   |
|--|-------------------------|---|---|
| Sulfuric acid <sup>‡</sup>                   | 7664-93-9<br>WS5600000  | 1 mg/m <sup>3</sup> TWA   | Pulmonary irritation  |
| Sulfuric acid, fuming                        | 8014-95-7<br>WS5605000  | 1 mg/m <sup>3</sup> TWA   | Pulmonary irritation  |
| Sulfur monochloride <sup>†</sup>             | 10025-67-9<br>WS4300000 | 1 ppm (6 mg/m <sup>3</sup> ) ceiling                                      | Severe irritation of the eyes, mucous membranes, and skin; respiratory irritation |
| Sulfur pentafluoride <sup>†</sup>            | 5714-22-7<br>WS4480000  | 0.01 ppm (0.1 mg/m <sup>3</sup> ) ceiling                                 | Severe pulmonary irritation in animals  |
| Sulfur tetrafluoride <sup>†</sup>            | 7783-60-0<br>WT4800000  | 0.1 mg/m <sup>3</sup> (0.4 mg/m <sup>3</sup> ) ceiling                    | Severe pulmonary irritation in animals  |
| Sulfuryl fluoride <sup>†,‡</sup>             | 2699-79-8<br>WT5075000  | 5 ppm (20 mg/m <sup>3</sup> ) TWA,<br>10 ppm (40 mg/m <sup>3</sup> ) STEL | Respiratory irritation, CNS depression  |
| Sulprofos <sup>†</sup>                       | 35400-43-2<br>TE4165000 | 1 mg/m <sup>3</sup> TWA   | Mild organophosphate cholinesterase inhibition                                    |
| Systox <sup>®</sup> (see Demeton)            |                         |   |   |
| 2,4,5-T <sup>†,‡</sup>                       | 93-76-5<br>AJ8400000    | 10 mg/m <sup>3</sup> TWA  | Mild toxic effects; stiffness to ataxia in animals                                |
| Talc (containing asbestos)<br>(see Asbestos) |                         |   |   |

|   |                         |  |   |
|---|-------------------------|--|---|
| Talc <sup>†</sup> (containing no asbestos)              | 14807-96-6<br>WW2700000 | 2 mg/m <sup>3</sup> TWA                            | Nonmalignant respiratory effects, talc pneumoconiosis               |
| Tantalum, <sup>†</sup><br>metal and oxide dust          | 7440-25-7<br>WW5505000  | 5 mg/m <sup>3</sup> TWA, 10 mg/m <sup>3</sup> STEL | Respiratory effects   |
| TEDP <sup>†,‡</sup> (sulfotep)                          | 3689-24-5<br>XN4375000  | 0.2 mg/m <sup>3</sup> TWA (skin)                   | Cholinesterase inhibition   |
| Tellurium <sup>†</sup> and compounds                    | 13494-80-9<br>WY2625000 | 0.1 mg/m <sup>3</sup> TWA                          | Malaise; CNS and red blood cell effects in animals                  |
| Tellurium hexafluoride <sup>†</sup>                     | 7783-80-4<br>WY2800000  | 0.02 ppm (0.2 mg/m <sup>3</sup> ) TWA              | Severe respiratory irritation                                       |
| Temephos <sup>†,‡</sup>                                 | 3383-96-8<br>TF6890000  |  | Cholinesterase inhibition; reduced carboxylesterase activity        |
| Total dust  |                         | 10 mg/m <sup>3</sup> TWA                           |   |
| Respirable fraction                                     |                         | 5 mg/m <sup>3</sup> TWA                            |   |
| TEPP <sup>†,‡</sup><br>(tetraethyl pyrophosphate)       | 107-49-3<br>UX6825000   | 0.05 mg/m <sup>3</sup> TWA (skin)                  | Cholinesterase inhibition   |
| Terphenyls <sup>†</sup>                                 | 26140-60-3<br>WZ6450000 | 0.5 ppm (5 mg/m <sup>3</sup> ) ceiling             | Skin and respiratory irritation; conjunctival irritation in animals |
| 1,1,1,2-Tetrachloro-<br>2,2-difluoroethane <sup>†</sup> | 76-11-9<br>KI1425000    | 500 ppm (4,170 mg/m <sup>3</sup> ) TWA             | Narcosis, skin, and eye irritation; difficulty in breathing         |
| 1,1,2,2-Tetrachloro-<br>1,2-difluoroethane <sup>†</sup> | 76-12-0<br>KI1420000    | 500 ppm (4,170 mg/m <sup>3</sup> ) TWA             | Narcosis, skin, and eye irritation; difficulty in breathing         |

\*Consult primary sources in Section A for definitive information.

<sup>†</sup>REL adopted during OSHA hearings (Appendix II).

<sup>‡</sup>Also listed as a pesticide in Appendix V.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

| Hazardous agent   | CAS No. and RTECS No.  | NIOSH REL   | Health effects*   |
|---|------------------------|---|---|
| 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) (dioxin)                   | 1746-01-6<br>HP3500000 | Ca; lowest feasible concentration   | Potential for cancer; chloracne; tumors at many sites in animals  |
| 1,1,1,2-Tetrachloroethane<br><i>Class: Chloroethanes</i> <sup>†</sup> | 630-20-6<br>KI8450000  | Handle with caution in the workplace  | CNS effects, possible liver and kidney effects  |
| 1,1,2,2-Tetrachloroethane <sup>**</sup>                               | 79-34-5<br>KI8575000   | Ca; 1 ppm (7 mg/m <sup>3</sup> ) TWA (0.7 ppm LOQ) (skin)                   | Potential for cancer, liver, gastrointestinal, and nervous system effects; tumors of the liver in animals |
| Tetrachloroethylene <sup>‡</sup><br>(perchloroethylene)               | 127-18-4<br>KX3850000  | Ca; lowest feasible concentration (0.4 ppm LOQ)                             | Potential for cancer; tumors of the liver in animals  |
| Tetrachloromethane<br>(see Carbon tetrachloride)                      |                        |   |   |
| Tetrachloronaphthalene <sup>†</sup>                                   | 1335-88-2<br>QK3700000 | 2 mg/m <sup>3</sup> TWA (skin)  | Liver and skin toxicity   |
| Tetraethyl lead <sup>†</sup> (as Pb)                                  | 78-00-2<br>TP4550000   | 0.075 mg/m <sup>3</sup> TWA (skin)  | Nervous system effects, mental aberrations, psychosis, mania, convulsions                                 |
| Tetrahydrofuran <sup>†</sup>  | 109-99-9<br>LU5950000  | 200 ppm (590 mg/m <sup>3</sup> ) TWA, 250 ppm (735 mg/m <sup>3</sup> ) STEL | Anesthetic effects, mild upper respiratory tract irritation   |
| Tetramethyl lead <sup>†</sup>   | 75-74-1<br>TP4725000   | 0.075 mg/m <sup>3</sup> TWA (skin)  | Irritability; CNS effects in animals  |

|   |                        |   |  |
|---|------------------------|---|--|
| Tetramethyl succinonitrile**<br>Class: Nitriles <sup>§</sup>                              | 3333-52-6<br>WN4025000 | 0.5 ppm (3 mg/m <sup>3</sup> ) TWA (skin)           | Hepatic, renal, respiratory, cardiovascular,<br>gastrointestinal, and nervous system effects |
| Tetranitromethane <sup>†</sup>  | 509-14-8<br>PB4025000  | 1 ppm (8 mg/m <sup>3</sup> ) TWA                    | Severe irritation of the eyes and respiratory<br>tract                                       |
| Tetrasodium<br>pyrophosphate <sup>†,‡</sup>   | 7722-88-5<br>UX7350000 | 5 mg/m <sup>3</sup> TWA                             | Eye and respiratory irritation   |
| Tetryl <sup>†</sup> (2,4,6-trinitro-<br>phenylmethylnitramine)                            | 479-45-8<br>BY6300000  | 1.5 mg/m <sup>3</sup> TWA (skin)                    | Severe sensitization dermatitis, upper<br>respiratory tract irritation                       |
| Thallium, <sup>†</sup> soluble compounds  | 7440-28-0<br>XG3425000 | 0.1 mg/m <sup>3</sup> TWA (skin)                    | Extreme toxic effects, effects on nervous<br>system and body hair, kidney damage             |
| 4,4'-Thiobis-<br>(6-tertbutyl-m-cresol) <sup>†</sup><br>Total dust<br>Respirable fraction | 96-69-5<br>GP3150000   | 10 mg/m <sup>3</sup> TWA<br>5 mg/m <sup>3</sup> TWA | Eye, skin, and other physical irritation   |
| Thioglycolic acid <sup>†</sup>  | 68-11-1<br>AI5950000   | 1 ppm (4 mg/m <sup>3</sup> ) TWA (skin)             | Eye and skin irritation, systemic effects  |
| Thiols <sup>§</sup>   | ††                     | See individual chemical                             |  |
| Thionyl chloride <sup>†</sup>   | 7719-09-7<br>XM5150000 | 1 ppm (5 mg/m <sup>3</sup> ) ceiling                | Eye, skin, and mucous membrane irritation  |

\*Consult primary sources in Section A for definitive information.

<sup>†</sup>REL adopted during OSHA hearings (Appendix II).

<sup>‡</sup>Also listed as a pesticide in Appendix V.

<sup>§</sup>Appendix I lists all members of the class indicated; refer to class name in Section A.

\*\*REL revised during OSHA hearings (Appendix IV).

††CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

| Hazardous agent  | CAS No. and RTECS No.   | NIOSH REL  | Health effects*   |
|--|-------------------------|--|---|
| Thiram <sup>†,‡</sup>  | 137-26-8<br>JO1400000   | 5 mg/m <sup>3</sup> TWA  | Respiratory, eye, and skin irritation; sensitization dermatitis; teratogenic effects in animals |
| Tin <sup>†</sup> , inorganic compounds (as Sn)   | 7440-31-5<br>XP7320000  | 2 mg/m <sup>3</sup> TWA  | Eye and skin irritation   |
| Tin <sup>**</sup> , organic compounds<br><i>Class: Organotin compounds<sup>§</sup></i> | ††                      | 0.1 mg/m <sup>3</sup> TWA (skin)   | Eye, skin, liver, nervous system, and heart effects   |
| Tin oxide <sup>†</sup><br>(as Sn)  | 1332-29-2<br>XQ3980000  | 2 mg/m <sup>3</sup> TWA  | Reduced pulmonary capacity, stannosis   |
| Titanium dioxide <sup>†</sup>  | 13463-67-7<br>XR2275000 | Ca; lowest feasible concentration<br>(0.2 mg/m <sup>3</sup> LOQ)               | Potential for cancer; lung tumors in animals  |
| o-Tolidine-based dyes  | ††                      | Ca; lowest feasible concentration  | Bladder cancer  |
| o-Tolidine   | 119-93-7<br>DD1225000   | Ca; 0.02 mg/m <sup>3</sup> ceiling (60-min)                                    | Potential for cancer; tumors of the liver, urinary bladder, and mammary glands in animals       |
| Toluene <sup>**</sup>  | 108-88-3<br>XS5250000   | 100 ppm (375 mg/m <sup>3</sup> ) TWA,<br>150 ppm (560 mg/m <sup>3</sup> ) STEL | CNS depression  |

|  |                         |  |  |
|--|-------------------------|--|--|
| Toluene diisocyanate (TDI)                           | 26471-62-5<br>NQ9490000 | Ca; lowest feasible concentration                          | Potential for cancer; tumors of the pancreas, liver, skin, mammary glands, and circulatory system in animals |
| Toluenediamine (TDA)                                 | 95-80-7<br>XS9625000    | Ca; lowest feasible concentration                          | Potential for cancer; tumors of the liver, skin, and mammary glands in animals                               |
| m-Toluidine<br>(see Appendix III)                    | 108-44-1<br>XU2800000   |  |  |
| o-Toluidine  | 95-53-4<br>XU2975000    | Ca; lowest feasible concentration<br>(skin)                | Potential for cancer; tumors of the liver, bladder, and mammary glands in animals                            |
| p-Toluidine <sup>†</sup>                             | 106-49-0<br>XU3150000   | Ca; lowest feasible concentration<br>(0.15 ppm LOQ) (skin) | Potential for cancer; tumors of the liver in animals   |
| Toxaphene <sup>‡</sup><br>(see Chlorinated camphene) |                         |  |  |
| Tremolite<br><i>Class: Asbestos</i> <sup>§</sup>     | 77536-68-6<br>CI6560000 | Ca; 0.1 fibers/cc<br>(see 29 CFR 1910.1101)                | Lung cancer, mesothelioma, asbestosis  |
| Tributyl phosphate <sup>†</sup>                      | 126-73-8<br>TC7700000   | 0.2 ppm (2.5 mg/m <sup>3</sup> ) TWA                       | Pulmonary irritation; moderate excitation of nervous system in animals                                       |
| Trichloroacetic acid <sup>†,‡</sup>                  | 76-03-9<br>AJ7875000    | 1 ppm (7 mg/m <sup>3</sup> ) TWA                           | Skin and eye irritation  |

\*Consult primary sources in Section A for definitive information.

<sup>†</sup>REL adopted during OSHA hearings (Appendix II).

<sup>‡</sup>Listed as a pesticide in Appendix V.

<sup>§</sup>Appendix I lists all members of the class indicated; refer to class name in Section A.

\*\*REL revised during OSHA hearings (Appendix IV).

<sup>††</sup>CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

| Hazardous agent   | CAS No. and RTECS No.  | NIOSH REL   | Health effects*   |
|---|------------------------|---|---|
| 1,2,4-Trichlorobenzene <sup>†,‡</sup>   | 120-82-1<br>DC2100000  | 5 ppm (40 mg/m <sup>3</sup> ) ceiling   | Eye, throat, and dermal irritation  |
| 1,1,1-Trichloroethane <sup>‡</sup><br>(methyl chloroform)<br><i>Class: Chloroethanes</i> <sup>§</sup> | 71-55-6<br>KJ2975000   | 350 ppm (1,910 mg/m <sup>3</sup> ) ceiling<br>(15-min)                                    | CNS, liver, and cardiovascular effects  |
| 1,1,2-Trichloroethane <sup>‡,¶</sup><br><i>Class: Chloroethanes</i> <sup>§</sup>                      | 79-00-5<br>KJ3150000   | Ca; 10 ppm (45 mg/m <sup>3</sup> ) TWA<br>(skin)  | Potential for cancer, CNS effects; liver tumors<br>in animals   |
| Trichloroethylene <sup>‡,§</sup>  | 79-01-6<br>KX4550000   | Ca; 25 ppm TWA; 2 ppm ceiling<br>(1-hr) as a Waste anesthetic gas                         | Potential for cancer, CNS effects; liver tumors<br>in animals   |
| Trichloromethane<br>(see Chloroform)  |                        |   |   |
| Trichloronaphthalene <sup>†</sup>   | 1321-65-9<br>QK4025000 | 5 mg/m <sup>3</sup> TWA (skin)  | Toxic effects on the liver and skin   |
| 1,2,3-Trichloropropane <sup>†</sup>   | 96-18-4<br>TZ9275000   | Ca; 10 ppm (60 mg/m <sup>3</sup> ) TWA<br>(skin)  | Eye and mucous membrane irritation;<br>potential for cancer, liver and kidney effects,<br>narcosis in animals |
| 1,1,2-Trichloro-1,2,2-tri-<br>fluoroethane <sup>†</sup>   | 76-13-1<br>KJ4000000   | 1,000 ppm (7,600 mg/m <sup>3</sup> ) TWA,<br>1,250 ppm<br>(9,500 mg/m <sup>3</sup> ) STEL | CNS depression, cardiac sensitization, mild<br>mucous membrane irritation                                     |
| Triethylamine<br>(see Appendix III)   | 121-44-8<br>YE0175000  |   |   |



|  |                         |  |  |
|--|-------------------------|--|--|
| Trifluorobromomethane <sup>†</sup>                   | 75-63-8<br>PA5425000    | 1,000 ppm (6,100 mg/m <sup>3</sup> ) TWA   | Narcotic effects; CNS effects in animals   |
| Trimellitic anhydride <sup>**</sup>                  | 552-30-7<br>DC2050000   | 0.005 ppm (0.04 mg/m <sup>3</sup> ) TWA;<br>handle in the workplace as an<br>extremely toxic substance | Pulmonary edema; immunologic sensitization;<br>pulmonary, eye, nose, and skin irritation                                   |
| Trimethylamine <sup>†</sup>                          | 75-50-3<br>PA0350000    | 10 ppm (24 mg/m <sup>3</sup> ) TWA,<br>15 ppm (36 mg/m <sup>3</sup> ) STEL                             | Eye, respiratory, and skin irritation  |
| Trimethyl benzene <sup>†</sup>                       | 25551-13-7<br>DC3220000 | 25 ppm (125 mg/m <sup>3</sup> ) TWA  | Skin irritation, CNS depression, respiratory<br>failure  |
| Trimethyl phosphite <sup>†</sup>                     | 121-45-9<br>TH1400000   | 2 ppm (10 mg/m <sup>3</sup> ) TWA  | Eye, skin, and upper respiratory irritation;<br>teratogenic and reproductive effects in<br>animals                         |
| 2,4,6-Trinitrophenyl<br>(see Picric acid)            |                         |  |  |
| 2,4,6-Trinitrophenylmethyl<br>nitramine (see Tetryl) |                         |  |  |
| 2,4,6-Trinitrotoluene <sup>†</sup><br>(TNT)          | 118-96-7<br>XU0175000   | 0.5 mg/m <sup>3</sup> TWA (skin)   | Kidney and liver damage, aplastic anemia,<br>cyanosis, dermatitis  |
| Triorthocresyl phosphate <sup>†</sup>                | 78-30-8<br>TD0350000    | 0.1 mg/m <sup>3</sup> TWA (skin)   | Peripheral neuropathy, flaccid paralysis of the<br>distal muscles of the upper and lower<br>extremities, spastic paralysis |

<sup>o</sup>Consult primary sources in Section A for definitive information.

<sup>†</sup>REL adopted during OSHA hearings (Appendix II).

<sup>‡</sup>Listed as a pesticide in Appendix V.

<sup>§</sup>Appendix I lists all members of the class indicated; refer to class name in Section A.

<sup>\*\*</sup>REL revised during OSHA hearings (Appendix IV).

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

| Hazardous agent   | CAS No. and<br>RTECS No. | NIOSH REL   | Health effects*  |
|---|--------------------------|---|--|
| Triphenyl amine†  | 603-34-9<br>YK2680000    | 5 mg/m <sup>3</sup> TWA   | Skin irritation  |
| Triphenyl phosphate†  | 115-86-6<br>TC8400000    | 3 mg/m <sup>3</sup> TWA   | Neurotoxicity in animals   |
| Tungsten <sup>‡</sup> and cemented<br>tungsten carbide:<br>Tungsten<br>Containing >2%<br>cobalt<br>Containing >0.3%<br>nickel | 12070-12-1<br>Y07250000  | 0.05 (Co) mg/m <sup>3</sup> TWA<br>0.015 (Ni) mg/m <sup>3</sup> TWA   | Lung and skin effects  |
| Tungsten**<br>Insoluble<br>compounds <sup>§</sup><br>Soluble<br>compounds   | 7440-33-7<br>Y07175000   | 5 mg/m <sup>3</sup> TWA,<br>10 mg/m <sup>3</sup> STEL<br>1 mg/m <sup>3</sup> TWA,<br>3 mg/m <sup>3</sup> STEL | Lung and skin effects  |
| Turpentine†   | 8006-64-2<br>YO8400000   | 100 ppm (560 mg/m <sup>3</sup> ) TWA  | Mucous membrane irritation, convulsions,<br>albuminuria, hematuria |
| 1-Undecanethiol<br>Class: Thiols <sup>§</sup>   | 5332-52-5<br>††          | 0.5 ppm (3.9 mg/m <sup>3</sup> ) ceiling<br>(15-min)  | Eye, skin, and blood irritation, nervous system<br>effects         |

|   |                         |  |  |
|---|-------------------------|--|--|
| Uranium <sup>†</sup>                                      |                         |  |  |
| Soluble compounds   | 7440-61-1               |  | Potential for hepatocellular cancers as a result of its alpha-emitting properties and radioactive decay products (e.g., radon, etc.) |
| Insoluble compounds                                       | YR3490000               | Ca; 0.05 mg/m <sup>3</sup> TWA<br>Ca; 0.2 mg/m <sup>3</sup> TWA,<br>0.6 mg/m <sup>3</sup> STEL |  |
| n-Valeraldehyde <sup>†</sup>                              | 110-62-3                | 50 ppm (175 mg/m <sup>3</sup> ) TWA  | Severe eye and skin irritation   |
| Class: Aldehydes <sup>‡</sup>                             | YV3600000               |  |  |
| Vanadium <sup>§</sup> (as V),<br>Respirable dust and fume | 1314-62-1<br>YW2450000  | 0.05 mg/m <sup>3</sup> ceiling (15-min)  | Eye, skin, and lung effects  |
| Vegetable oil mist <sup>†</sup>                           | 68956-68-3<br>YX1850000 |  | Physical irritation  |
| Total dust  |                         | 10 mg/m <sup>3</sup> TWA   |  |
| Respirable fraction                                       |                         | 5 mg/m <sup>3</sup> TWA  |  |
| Vinyl acetate   | 108-05-4<br>AK0875000   | 4 ppm (15 mg/m <sup>3</sup> ) ceiling<br>(15-min)  | Eye, nose, and throat irritation   |
| Vinyl benzene (see Styrene)                               |                         |  |  |
| Vinyl bromide   | 593-60-2                | Ca; lowest feasible concentration<br>(0.2 ppm LOQ)   | Potential for cancer; liver and kidney tumors<br>in animals  |
| Class: Vinyl halides <sup>‡</sup>                         | KU8400000               |  |  |
| Vinyl chloride  | 75-01-4<br>KU9625000    | Ca; lowest feasible concentration  | Liver cancer   |
| Vinylcyanide<br>(see Acrylonitrile)                       |                         |  |  |

\*Consult primary sources in Section A for definitive information.

<sup>†</sup>REL adopted during OSHA hearings (Appendix II).

<sup>‡</sup>Appendix I lists all members of the class indicated; refer to class name in Section A.

<sup>§</sup>REL revised during OSHA hearings (Appendix IV).

<sup>\*\*</sup>CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

| Hazardous agent   | CAS No. and<br>RTECS No. | NIOSH REL  | Health effects*  |
|---|--------------------------|--|--|
| Vinyl cyclohexene dioxide <sup>†</sup>  | 106-87-6<br>RN8640000    | Ca; 10 ppm (60 mg/m <sup>3</sup> )<br>TWA (skin)                       | Potential for cancer; skin tumors in animals                             |
| Vinyl fluoride<br><i>Class: Vinyl halides</i> <sup>§</sup>                                | 75-02-5<br>YZ7351000     | 1 ppm TWA, 5 ppm ceiling<br>(15-min); use 29 CFR 1910.1017             | CNS effects; mutagenic effects in bacterial systems                      |
| Vinyl halides <sup>§</sup>  | ††                       | See individual chemical  |  |
| Vinyl toluene <sup>†</sup>  | 25013-15-4<br>WL5075000  | 100 ppm (480 mg/m <sup>3</sup> ) TWA                                   | Eye, upper respiratory, and skin irritation                              |
| Vinylidene chloride<br>(1,1-dichloroethylene)<br><i>Class: Vinyl halides</i> <sup>§</sup> | 75-35-4<br>KV9275000     | Ca; lowest feasible concentration<br>(0.4 ppm LOQ)                     | Potential for cancer; liver and kidney tumors in animals                 |
| Vinylidene fluoride<br><i>Class: Vinyl halides</i> <sup>§</sup>                           | 75-38-7<br>KW0560000     | 1 ppm TWA, 5 ppm ceiling<br>(15-min); use 29 CFR 1910.1017             | CNS effects; mutagenic effects in bacterial systems                      |
| VM&P naphtha<br><i>Class: Refined petroleum solvents</i> <sup>§</sup>                     | 8032-32-4<br>OI6180000   | 350 mg/m <sup>3</sup> TWA, 1,800 mg/m <sup>3</sup><br>ceiling (15-min) | Eye, nose, and throat irritation; dermatitis; nervous system effects     |
| Warfarin <sup>†,‡</sup>   | 81-81-2<br>GN4550000     | 0.1 mg/m <sup>3</sup> TWA  | Hypoprothrombinemia and vascular injury resulting in internal hemorrhage |
| Waste anesthetic gases and vapors <sup>§</sup>  | ††                       | See individual chemical  |  |

|                                       |                        |  |  |
|---------------------------------------|------------------------|--|--|
| Welding, fumes and total particulates | **                     | Ca; lowest feasible concentration  | Cancer, respiratory disease  |
| Wood dust, all soft and hard woods    | **                     | Ca; 1 mg/m <sup>3</sup> TWA  | Pulmonary dysfunction, respiratory effects   |
| Xylene, isomers <sup>*†</sup>         | 1330-20-7<br>ZE2100000 | 100 ppm (435 mg/m <sup>3</sup> ) TWA,<br>150 ppm (655 mg/m <sup>3</sup> ) STEL | CNS depression, respiratory and eye irritation   |
| m-Xylene                              | 108-38-3<br>ZE2275000  |  |  |
| o-Xylene                              | 95-47-6<br>ZE2450000   |  |  |
| p-Xylene                              | 106-42-3<br>ZE2625000  |  |  |
| m-Xylene α,α'-diamine <sup>†</sup>    | 1477-55-0<br>PF8970000 | 0.1 mg/m <sup>3</sup> ceiling (skin)   | Skin irritation, systemic effects  |
| Xylidine <sup>†</sup>                 | 1300-73-8<br>ZE8575000 | 2 ppm (10 mg/m <sup>3</sup> ) TWA (skin)                                       | Anoxia resulting from formation of methemoglobin in humans; lung, liver and kidney damage in animals |
| Yttrium <sup>†</sup>                  | 7440-65-5<br>ZG2980000 | 1 mg/m <sup>3</sup> TWA  | Pulmonary irritation in animals  |
| Zinc chloride fume <sup>†</sup>       | 7646-85-7<br>ZH1400000 | 1 mg/m <sup>3</sup> TWA, 2 mg/m <sup>3</sup> STEL                              | Eye, mucous membrane, and skin irritation; pulmonary edema   |

\*Consult primary sources in Section A for definitive information.

<sup>†</sup>REL adopted during OSHA hearings (Appendix II).

<sup>‡</sup>Also listed as a pesticide in Appendix V.

<sup>§</sup>Appendix I lists all members of the class indicated; refer to class name in Section A.

<sup>¶</sup>REL revised during OSHA hearings (Appendix IV).

<sup>\*\*</sup>CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

| Hazardous agent   | CAS No. and<br>RTECS No.             | NIOSH REL   | Health effects*                           |
|---|--------------------------------------|---|---|
| Zinc chromate<br><i>Class: Chromium<sup>‡</sup></i>                     | 13530-65-9<br>GB3290000<br>GB3300000 | Ca; 0.001 mg/m <sup>3</sup> TWA                                       | Lung cancer, skin ulcers, lung irritation |
| Zinc oxide, fume <sup>**</sup>  | 1314-13-2<br>ZH4810000               | 5 mg/m <sup>3</sup> TWA,<br>10 mg/m <sup>3</sup> STEL                 | Metal fume fever                          |
| Zinc oxide, <sup>‡</sup><br>total dust                                  | 1314-13-2<br>ZH4810000               | 5 mg/m <sup>3</sup> TWA,<br>15 mg/m <sup>3</sup> TWA ceiling (15-min) | Metal fume fever                          |
| Zinc stearate <sup>†</sup>  | 557-05-1<br>ZH5200000                |   | Pulmonary effects                         |
| Total dust  |                                      | 10 mg/m <sup>3</sup> TWA  |   |
| Respirable fraction   |                                      | 5 mg/m <sup>3</sup> TWA   |   |
| Zirconium compounds <sup>†</sup><br>(except zirconium<br>tetrachloride) | 7440-67-7<br>ZH7070000               | 5 mg/m <sup>3</sup> TWA,<br>10 mg/m <sup>3</sup> STEL                 | Granulomas of the skin                    |
| Zirconium tetrachloride<br>(see Appendix III)                           |                                      |   |   |

\*Consult primary sources in Section A for definitive information.

<sup>†</sup>REL adopted during OSHA hearings (Appendix II).

<sup>‡</sup>Also listed as a pesticide in Appendix V.

<sup>§</sup>Appendix I lists all members of the class indicated; refer to class name in Section A.

<sup>\*\*</sup>REL revised during OSHA hearings (Appendix IV).

Table 2.—NIOSH recommended safety and health standards for physical hazards in the workplace

| Physical hazard  | NIOSH recommendation  | Health effects*  |
|--|---|--|
| Electrical energy and electrocutions                               | Numerous work practice and control recommendations for reducing the risk of electrocutions and related injuries   | Injury and death   |
| Hand-arm vibration   | Redesign tools and jobs; use protective clothing and equipment; implement worker training programs, administrative controls, and medical monitoring   | Raynaud's phenomenon of occupational origin, or vibration white finger disease |
| Hot environments   | Sliding scale limits based on environmental and metabolic heat loads  | Heat-induced illnesses   |
| Noise  | 85 dBA <sup>†</sup> TWA; 115 dBA ceiling  | Hearing damage   |
| Radon progeny in underground mines<br>(See Radiation in Section A) | Ca; 1.0 WLM/year with average workshift concentration $\leq 1/12$ of 1.0 WL (or 0.083 WL)   | Lung cancer  |
| Radiofrequency (RF) sealers and heaters                            | Various recommendations for safe work practices and technologic improvements to reduce adverse health effects from unwarranted exposure to RF energy  | Adverse thermal and nonthermal effects on tissue cells                         |
| Ultraviolet radiation  | For spectral region of 315-400 nm: for periods >1,000 sec, 1.0 mW/cm <sup>2</sup> ; for periods $\leq 1,000$ sec, 1,000 mW.sec/cm <sup>2</sup> (1.0 J/cm <sup>2</sup> ). For spectral region of 200-315 nm: consult criteria document | Skin and eye effects   |

\*Consult primary sources in Section A for definitive information.

<sup>†</sup>Abbreviations: dBA=decibels measured on the A scale; RF=radiofrequency; TWA=time-weighted average; WL=working level; WLM=working level month.