

| Chemicals        | Route of Exposure  | Effects in Humans   | Effects in Animals  |
|------------------|--|---|---|
| Acetic Anhydride | Inhalation<br>Ingestion<br>Eye/skin contact<br>Highly volatile | Severe irritation of eyes, upper respiratory mucous membranes and skin to very low concentrations<br>Permanent corneal scarring<br>Explosion related injuries   | Highly corrosive to eyes, upper respiratory mucous membranes and skin<br>Direct mortality   |
| Arsenic          | Oral – drinking contaminated water<br>Inhalation               | IARC Group 1 Carcinogen:<br>Adenocarcinoma of the lung<br>Cancers of skin, digestive tract, liver, urinary bladder, kidney, lymphatic and hematopoietic, meningioma<br>Noncancer chronic effects:<br>Severe peripheral vascular disease, “blackfoot disease”<br>Arsenicosis: arsenic poisoning  | Carcinogen:<br>Adenocarcinoma of lung<br>Lymphocytic leukemia<br>Lymphoma   |
| Benzene          | Inhalation<br>Oral –drinking contaminated water                | IARC Group 1 Carcinogen:<br>Leukemia (acute myelogenous)<br>Noncancer acute effects:<br>Neurological: drowsiness, headaches, unconsciousness, convulsions<br>Skin, eyes and upper respiratory tract Irritation<br>GI: Nausea, vomiting<br>Noncancer chronic effects:<br>Blood dyscrasias, aplastic anemia, excessive bleeding, leukopenia<br>Immunosuppression<br>Developmental: low birth weight, delayed bone formation | Carcinogen in experimental animals<br>In rodents:<br>Oral cavity<br>Malignant lymphoma<br>Lung Cancer<br>Mammary gland<br>Noncancer acute effects:<br>Neurologic, immunologic, hematologic<br>Low toxicity from inhalation<br>Moderate toxicity from ingestion<br>Noncancer chronic effects:<br>Similar to human findings |

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| Chlorine dioxide                                      | Inhalation  | Severe respiratory and eye irritant,<br><br>Congestion of lungs, chronic bronchitis<br><br>Mortality at 19 ppm  | Severe respiratory and eye irritant<br><br>Purulent bronchitis<br><br>Mortality at 150-200 ppm   |
| Ethylene glycol<br><br>(commonly known as antifreeze) | Ingestion of contaminated water                           | Acute:<br><br>Neurotoxicity<br>Cardiopulmonary effects<br>Renal<br><br>Low dose effects: eyes, nose and throat  | Hepatic and renal damage<br><br>Fetotoxicity in rodents  |
| Formaldehyde  | Inhalation<br><br>Ingestion in contaminated water or food | IARC Group 1 Carcinogen:<br><br>Nasopharyngeal and sinonasal cancer<br>Lymphohematopoietic cancer<br><br>Noncancer acute effects:<br>Respiratory<br>Eye, nose and throat irritation<br><br>Noncancer chronic effects:<br>Respiratory<br>Eye, nose, throat<br>Skin irritation; contact dermatitis<br>Menstrual disorders | Carcinogenic in experimental animals:<br><br>In rodents:<br>Nasal squamous cell carcinoma<br>Leiomyosarcoma of stomach, intestines<br>Lung cancer<br><br>Noncancer acute and chronic effects:<br>Lesions on nasal epithelium and lower respiratory system<br>Weight loss |
| Lead  | Inhalation<br><br>Ingestion<br><br>Dermal contact         | IARC Group 2B Carcinogen:<br><br>Associated with cancer of:<br>Lung<br>Stomach<br>Urinary bladder<br><br>Noncancer effects:<br>Neurotoxicity (especially fetal and childhood development)<br>Kidney damage  | Carcinogenic to experimental animals:<br><br>Adenocarcinoma of the kidney<br>Tumors of brain<br>Hematopoietic system<br>Lung<br><br>Noncancer effects:   |

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|         |  | Anemia<br>Immune system<br>Cardiovascular system<br>Male infertility (decreased sperm count)  | Birth defects   |
| Phenol  | Inhalation<br>Ingestion<br>Eye/skin contact<br>Absorption through skin | IARC Group 3 Carcinogen: (not classifiable in humans)<br><br>Non cancer acute effects:<br>Severe irritation to eyes, skin, mucous membranes<br>CNS impairment<br>Damage to liver and kidneys<br><br>Mortality following high dose exposure<br>( 1 gram oral ingestion=lethal, Death associated with respiratory failure)<br><br>Noncancer chronic effects:<br>Systemic disorders including Gastrointestinal, neurological, dermatological | Carcinogenic to experimental animals:<br>Leukemia and lymphoma<br><br>Non cancer acute effects:<br>Severe irritant of eyes (immediate corneal opacification in rabbits)<br>Irritant of upper respiratory mucous membranes;<br>Neurotoxic to motor centers in CNS (twitching, convulsions)<br>Tachy/bradycardia, hypotension<br>Dyspnea<br><br>Noncancer chronic effects:<br><br>Damage to lung, liver, kidneys, heart |
| Toluene | Inhalation<br>Ingestion  | IARC Group 3 Carcinogen<br><br>Noncancer acute effects:<br>Neurotoxic; fatigue, drowsiness, headaches, nausea, unconsciousness<br>Cardiac arrhythmia<br>Oral ingestion, high dose=lethal (associated with severe CNS depression, pulmonary hemorrhage, myocardial necrosis, and acute tubular renal necrosis)<br><br>Noncancer chronic effects:   | Acute:<br><br>Central nervous system depression<br><br>Immunosuppressed (increased risk of pulmonary infection)<br><br>Chronic:<br>Hepatic<br>Renal<br>Pulmonary  |

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|             |  | <p>CNS depression, ataxia, tremors, cerebral atrophy, impaired speech, hearing and vision<br/> Inflammation and degeneration of nasal epithelium,<br/> Pulmonary lesions</p> <p>Maternal Reproductive :<br/> increased spontaneous abortions</p> <p>Developmental: neurotoxicant, attention deficit, cranial-facial and limb anomalies</p> | <p>Impaired hearing<br/> Developmental toxicant</p>   |
| Uranium-238 | <p>Ingestion (food, water)</p> <p>Inhalation</p> | <p>No information on acute effects.</p> <p>Chronic effects:<br/> Renal toxicity</p>  | <p>No information on acute effects.</p> <p>Chronic effects:<br/> Inflammation of nasal mucosa<br/> Renal toxicity</p> |
| Radium-226  | <p>Ingestion (drinking water)</p>                | <p>IARC Group 1 Carcinogen</p> <p>No information on acute effects.</p> <p>Noncancer chronic effects:<br/> Anemia, necrosis of the jaw, brain abscess, bronchopneumonia and death (from oral ingestion)</p> <p>Acute leukopenia (from inhalation)</p>   |   |
| Radon-222   | <p>Inhalation</p>                                | <p>IARC Group 1 Carcinogen</p> <p>No information on acute effects.</p> <p>Non cancer chronic effects:<br/> Chronic lung disease, pneumonia,<br/> Pulmonary fibrosis</p>  | <p>Weight loss, hematologic disorders</p>   |