

## **APPENDIX A**

### **Chemical Descriptions**

## CHEMICAL DESCRIPTIONS

The following chemical descriptions are to be used for chemicals that may be present at the Site. Each chemical description includes physical and odor recognition characteristics, the health effects associated with exposure, and exposure limits expressed as an 8-hour time-weighted average (TWA). Provided are federal Occupational Safety and Health Administration (OSHA) permissible exposure limits (PELs; located in 29 CFR 1910.1000); California OSHA (Cal/OSHA) PELs (located in 8 CCR 5155); and the American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit values (TLVs). Short-term exposure limits (STELs) are short-term concentrations that must not be exceeded over a specified period of time (generally 15 minutes). Ceiling concentrations are limits that must not be exceeded during any part of the workday. These are expressed in parts per million (ppm), milligrams per cubic meter ( $\text{mg}/\text{m}^3$ ), or fibers per cubic centimeter (f/cc), as appropriate.

Odor thresholds can not be used as the primary indicator for changing gas and vapor cartridges as a result of the OSHA standard, 29 CFR 1910.134. The program administrator and designated representative(s), using objective data and information, must establish chemical cartridge change schedules if a gas or vapor cartridge does not have an end-of-service life indicator. Odor thresholds can be a useful secondary or backup indicator for cartridge change-out. The primary references for odor threshold information were VOCBASE and an American Industrial Hygiene publication. The method of defining and determining odor thresholds varies widely; therefore, caution must be used in relying upon odor threshold as a warning of potentially hazardous exposure.

For sites outside California, Cal/OSHA PELs are included as an additional reference.

### POLYCHLORINATED BIPHENYLS (PCBs)

PCBs are a series of technical mixtures consisting of many isomers and compounds that vary from mobile oil liquids to white crystalline solids and hard non-crystalline resins. Technical products vary in composition, in the degree of chlorination, and possibly according to batch. Generally, they are moderately toxic by ingestion, and some are poisons by other routes. Most are suspect human carcinogens and experimental tumorigens, and exhibit experimental reproductive effects. They have two distinct actions on the body: a skin effect (chloracne) and a toxic action on the liver. The higher the chlorine content, the more toxic the PCBs tend to be.

- The OSHA PEL is listed as  $0.5 \text{ mg}/\text{m}^3$  for 54% chlorine content (as a PCB) and  $1.0 \text{ mg}/\text{m}^3$  for 42% chlorine content (as a PCB).
- The Cal/OSHA PEL is listed as  $0.5 \text{ mg}/\text{m}^3$  for 54% chlorine content (as a PCB) and  $1.0 \text{ mg}/\text{m}^3$  for 42% chlorine content (as a PCB).

- The TLV is listed as 0.5 mg/m<sup>3</sup> for 54% chlorine content (as a PCB) and 1.0 mg/m<sup>3</sup> for 42% chlorine content (as a PCB).

Note: Published exposure limits designate a skin notation indicating that dermal contact can contribute to the overall exposure.

**WARNING: This chemical is known to the State of California to cause cancer.**

**WARNING: This chemical is known to the State of California to cause birth defects, developmental toxicity, and/or reproductive harm.**

## AROCOR

Aroclor (containing variable amounts of chlorine) is a polychlorinated biphenyl (PCB) used in heat transfer fluids, hydraulic fluids, lubricants, and insecticides. It is a confirmed carcinogen with experimental carcinogenic and neoplastigenic data. It is moderately toxic by ingestion and intraperitoneal routes. It also exhibits experimental teratogenic and reproductive effects. When heated to decomposition, it emits toxic fumes of chlorine.

- The OSHA PEL is listed as 0.5 mg/m<sup>3</sup> for 54% chlorine content (as a PCB) and 1.0 mg/m<sup>3</sup> for 42% chlorine content (as a PCB).
- The Cal/OSHA PEL is listed as 0.5 mg/m<sup>3</sup> for 54% chlorine content (as a PCB) and 1.0 mg/m<sup>3</sup> for 42% chlorine content (as a PCB).
- The TLV is listed as 0.5 mg/m<sup>3</sup> for 54% chlorine content (as a PCB) and 1.0 mg/m<sup>3</sup> for 42% chlorine content (as a PCB).

Note: Published exposure limits designate a skin notation indicating that dermal contact can contribute to the overall exposure.

**WARNING: This chemical is known to the State of California to cause cancer.**

## ALDRIN

Aldrin is a light to dark brown crystal with a mild chemical odor. Short-term exposure to aldrin can cause hyperirritability, headaches, dizziness, nausea, vomiting, blood in the urine, tremors, convulsions, and coma.

- The OSHA PEL is listed as 0.25 mg/m<sup>3</sup>.
- The Cal/OSHA PEL is listed as 0.25 mg/m<sup>3</sup>.
- The TLV is listed as 0.05 mg/m<sup>3</sup> measured as inhalable fraction and vapor.

## AROCLOR

Aroclor (containing variable amounts of chlorine) is a polychlorinated biphenyl (PCB) used in heat transfer fluids, hydraulic fluids, lubricants, and insecticides. It is a confirmed carcinogen with experimental carcinogenic and neoplastigenic data. It is moderately toxic by ingestion and intraperitoneal routes. It also exhibits experimental teratogenic and reproductive effects. When heated to decomposition, it emits toxic fumes of chlorine.

- The OSHA PEL is listed as 0.5 mg/m<sup>3</sup> for 54% chlorine content (as a PCB) and 1.0 mg/m<sup>3</sup> for 42% chlorine content (as a PCB).
- The Cal/OSHA PEL is listed as 0.5 mg/m<sup>3</sup> for 54% chlorine content (as a PCB) and 1.0 mg/m<sup>3</sup> for 42% chlorine content (as a PCB).
- The TLV is listed as 0.5 mg/m<sup>3</sup> for 54% chlorine content (as a PCB) and 1.0 mg/m<sup>3</sup> for 42% chlorine content (as a PCB).

Note: Published exposure limits designate a skin notation indicating that dermal contact can contribute to the overall exposure.

**WARNING: This chemical is known to the State of California to cause cancer.**

## ARSENIC

Metallic arsenic is most commonly a gray, brittle, crystalline solid. It can also be in a black or yellow amorphous form. Arsenic is also commonly found in its volatile white trioxide form. Arsenic is used in several insecticides, herbicides, defoliants, desiccants, and rodenticides and appears in a variety of forms. It is also used in tanning, pigment production, glass manufacturing, wood preservation, and anti-fouling coatings. Arsenic is classified as a known carcinogen.

Short-term exposure to arsenic can cause marked irritation of the stomach and intestines with nausea, vomiting, and diarrhea. In severe cases the vomiting and stools are bloody and the exposed individual goes into collapse and shock with weak, rapid pulse, cold sweats, coma, and death. Inorganic arsenicals are more toxic than organic arsenicals, and the trivalent form is more toxic than the pentavalent form. Acute arsenic poisoning usually results from ingestion exposures. Blood cell changes, blood vessel damage, and impaired nerve function can also result from chronic arsenic ingestion. Other effects include skin changes, irritation of the throat, and increased risk of cancer of the liver, bladder, kidney, and lung.

- The OSHA PEL is listed as 0.01 mg/m<sup>3</sup> for inorganic forms of arsenic and 0.5 mg/m<sup>3</sup> for organic forms. Refer to 29 CFR 1910.1018 for additional information on inorganic forms of arsenic.

- The Cal/OSHA PEL is listed as 0.01 mg/m<sup>3</sup> for inorganic forms of arsenic and 0.2 mg/m<sup>3</sup> for organic forms. Refer to Section 5214 for additional information on inorganic forms of arsenic.
- The TLV is listed as 0.01 mg/m<sup>3</sup> for arsenic and inorganic arsenic compounds.

**WARNING: This chemical is known to the State of California to cause cancer.**

**WARNING: This chemical is known to the State of California to cause birth defects, developmental toxicity, and/or reproductive harm.**

## BARIUM

Barium is a silvery-white metal found in nature. It occurs combined with other chemicals such as sulfur or carbon or oxygen. These combinations are called compounds. Barium compounds can also be produced by industry.

Barium compounds are used by the oil and gas industries to make drilling muds. They are also used to make paint, bricks, tiles, glass, and rubber.

Barium compounds that dissolve well in water may cause harmful health effects in people. Ingesting high levels of barium compounds that dissolve well in water over the short term has resulted in difficulties in breathing, increased blood pressure, changes in heart rhythm, stomach irritation, brain swelling, muscle weakness and damage to the liver, kidney, heart and spleen.

- The OSHA PEL is listed as 0.5 mg/m<sup>3</sup>.
- The Cal/OSHA PEL is listed as 0.5 mg/m<sup>3</sup> for barium and soluble compounds (as Ba).

The TLV is listed as 0.5 mg/m<sup>3</sup> for barium and soluble compounds (as Ba).

## BENZENE

Benzene is a clear, volatile liquid. It is colorless, highly flammable, and toxic, with a characteristic odor. It is a severe eye and moderate skin irritant. Human effects by inhalation and ingestion include euphoria, changes in sleep and motor activity, nausea and vomiting, other blood effects, dermatitis, and fever. In industry, inhalation is the primary route of chronic benzene poisoning. If the liquid is aspirated into the lung it may cause pulmonary edema. Poisoning by skin contact has also been reported. Exposure to high concentrations (3,000 ppm) may result in acute poisoning, which is characterized by the narcotic action of benzene on the central nervous system. Chronic poisoning occurs most commonly through inhalation and dermal absorption. Benzene is a known human carcinogen that can cause leukemia.

The odor threshold is 8.65 ppm to 61 ppm. Odor threshold CANNOT be used as a warning of potentially hazardous exposures.

- The OSHA PEL is listed as 1 ppm. Refer to 29 CFR 1910.1028 for additional information.
- The Cal/OSHA PEL is listed as 1 ppm. Refer to Section 5218 for additional information.
- The TLV is listed as 0.5 ppm.

Note: Published exposure limits designate a skin notation indicating that dermal contact can contribute to the overall exposure.

**WARNING: This chemical is known to the State of California to cause cancer.**

**WARNING: This chemical is known to the State of California to cause birth defects, developmental toxicity, and/or reproductive harm.**

## BENZOIC ACID

Benzoic acid is poison by the subcutaneous route and is moderately toxic by ingestion. Human systemic effects by inhalation include dyspnea and allergic dermatitis. It is a severe eye and human skin irritant.

No OSHA PEL, Cal/OSHA PEL, or TLV is listed for benzoic acid.

## BERYLLIUM

Beryllium is a confirmed carcinogen with experimental carcinogenic, neoplastigenic, and teratogenic data. Human systemic effects by inhalation include lung fibrosis, dyspnea, and weight loss.

- The OSHA PEL is listed as 0.002 mg/m<sup>3</sup>.
- The Cal/OSHA PEL is listed as 0.0002 mg/m<sup>3</sup>.
- The TLV is listed as 0.002 mg/m<sup>3</sup>. A value of 0.00005 mg/m<sup>3</sup> (as Inhalable Particulate Mass) is proposed.

**WARNING: This chemical is known to the State of California to cause cancer.**

---

## CADMIUM

Cadmium dust is an odorless gray powder. Short-term exposure to cadmium dust can cause irritation of the nose and throat, cough, chest pain, sweating, chills, shortness of breath, and weakness. Inhalation of cadmium compounds has been shown to cause lung cancer in humans. Fatal concentrations may be breathed without sufficient discomfort to warn a worker to leave the area. Ingestion of cadmium dust may cause nausea, vomiting, diarrhea, and abdominal cramps.

- The OSHA PEL is listed as 0.005 mg/m<sup>3</sup>. Refer to 29 CFR 1910.1027 for additional information.
- The Cal/OSHA PEL is listed as 0.005 mg/m<sup>3</sup>. Refer to Sections 1532 and 5207 for additional information.
- The TLV is listed as 0.01 mg/m<sup>3</sup> for dust (total) and 0.002 mg/m<sup>3</sup> for the respirable dust fraction.

**WARNING: This chemical is known to the State of California to cause cancer.**

**WARNING: This chemical is known to the State of California to cause birth defects, developmental toxicity, and/or reproductive harm.**

## CARBON TETRACHLORIDE

Carbon tetrachloride is a confirmed carcinogen with experimental carcinogenic, neoplastigenic, and tumorigenic data. It is a human poison by ingestion and is mildly toxic by inhalation. Human systemic effects by ingestion and inhalation include nausea or vomiting, pupillary constriction, coma, anti-psychotic effects, tremors, somnolence, anorexia, and respiratory and gastrointestinal system effects. It is an eye and skin irritant that also damages liver, kidneys, and lungs.

The odor threshold is 40.7 ppm. Odor threshold CANNOT be used as a warning of potentially hazardous exposures.

- The OSHA PEL is listed as 10 ppm.
- The Cal/OSHA PEL is listed as 2 ppm.
- The TLV is listed as 5 ppm.

Note: Published exposure limits designate a skin notation indicating that dermal contact can contribute to the overall exposure.

**WARNING: This chemical is known to the State of California to cause cancer.**

## CHLORDANE

Chlordane is a colorless to amber, odorless, viscous liquid. It is a confirmed carcinogen and is a poison to humans by ingestion and possibly other routes. It is moderately toxic by skin contact. Human systemic effects by ingestion or skin contact include tremors, convulsions, excitement, loss of muscle coordination, and gastritis. When heated to decomposition, chlordane emits toxic fumes of hydrogen chloride.

- The OSHA PEL is listed as 0.5 mg/m<sup>3</sup>.
- The Cal/OSHA PEL is listed as 0.5 mg/m<sup>3</sup>.
- The TLV is listed as 0.5 mg/m<sup>3</sup>.

Note: Published exposure limits designate a skin notation indicating that dermal contact can contribute to the overall exposure.

**WARNING: This chemical is known to the State of California to cause cancer.**

## CHLOROETHANE

Chloroethane (also known as ethyl chloride) is a flammable gas with an ether-like odor and a burning taste. The liquid form of chloroethane is mildly irritating to skin, eyes, and mucous membranes. Frostbite can occur because of rapid liquid evaporation. Exposure to chloroethane may produce headache, dizziness, incoordination, stomach cramps, and eventual loss of consciousness. In high concentrations, it is a respiratory tract irritant, and death from cardiac arrest has been recorded. Renal damage may also occur.

The odor threshold for chloroethane is 4.07 ppm. Caution should be used in relying on odor alone as a warning of potentially hazardous exposures.

- The OSHA PEL is listed as 1,000 ppm.
- The Cal/OSHA PEL is listed as 100 ppm.
- The TLV is listed as 100 ppm.

Note: Published exposure limits designate a skin notation indicating that dermal contact can contribute to the overall exposure.

**WARNING: This chemical is known to the State of California to cause cancer.**

system. The chemical is incompatible with chemically active metals such as sodium, potassium, calcium, powdered aluminum, zinc, and magnesium.

- The OSHA PEL is listed as 1,000 ppm.
- The Cal/OSHA PEL is listed as 1,000 ppm.
- The TLV is listed as 1,000 ppm.

## DICHLORODIPHENYLTRICHLOROETHANE (DDT)

DDT is a confirmed carcinogen with experimental carcinogenic, neoplastigenic, tumorigenic, and teratogenic data. It is an insecticide and is a human poison by ingestion. It is an experimental poison by skin contact and subcutaneous routes. Human systemic effects include anesthesia, convulsions, headache, cardiac arrhythmia, nausea, vomiting, sweating, and pulmonary changes. When heated to decomposition, it emits very toxic fumes of chlorine.

- The OSHA PEL is listed as 1 mg/m<sup>3</sup>.
- The Cal/OSHA PEL is listed as 1 mg/m<sup>3</sup>.
- The TLV is listed as 1 mg/m<sup>3</sup>.

Note: Published exposure limits designate a skin notation indicating that dermal contact can contribute to the overall exposure.

**WARNING: This chemical is known to the State of California to cause cancer.**

**WARNING: This chemical is known to the State of California to cause birth defects, developmental toxicity, and/or reproductive harm.**

## 1,1-DICHLOROETHENYLIDENE BIS 4-CHLOROBENZENE (4,4-DDE)

4,4-DDE (also known as dichlorodiphenyl-dichloroethylene) is a suspected carcinogen with experimental carcinogenic, reproductive, and neoplastigenic data. It is an insecticide and is a poison by ingestion. When heated to decomposition, it emits very toxic fumes of chlorine.

No OSHA PEL, Cal/OSHA PEL, or TLV is listed for 4,4-DDE.

**WARNING: This chemical is known to the State of California to cause cancer.**

- The OSHA PEL is listed as 0.5 mg/m<sup>3</sup>.
- The Cal/OSHA PEL is listed as 0.05 mg/m<sup>3</sup>.
- The TLV is listed as 0.05 mg/m<sup>3</sup>.

Note: Published exposure limits designate a skin notation indicating that dermal contact can contribute to the overall exposure.

**WARNING: This chemical is known to the State of California to cause cancer.**

**WARNING: This chemical is known to the State of California to cause birth defects, developmental toxicity, and/or reproductive harm.**

## HEXACHLOROBENZENE

Hexachlorobenzene (also known as benzene hexachloride isomers or HCB) is a toxic organochlorine pesticide that is persistent in the environment and accumulates in mammalian tissues. It is a confirmed carcinogen with experimental tumorigenic and neoplastigenic data by ingestion and skin contact. It is a poison by ingestion and inhalation. Human systemic effects by inhalation include headache, nausea, vomiting, and fever. Hexachlorobenzene is more toxic than DDT or dieldrin. When heated to decomposition, it emits very toxic fumes of chlorine, hydrogen chloride, and phosgene.

The odor threshold is 0.463 ppm. Odor threshold cannot be used as a warning of potentially hazardous exposures.

- No OSHA PEL or is listed for hexachlorobenzene.
- The Cal/OSHA PEL is listed as 0.002 mg/m<sup>3</sup>.
- The TLV is listed as 0.002 mg/m<sup>3</sup>.

Note: Published exposure limits designate a skin notation indicating that dermal contact can contribute to the overall exposure.

**WARNING: This chemical is known to the State of California to cause cancer.**

**WARNING: This chemical is known to the State of California to cause birth defects, developmental toxicity, and/or reproductive harm.**

## LEAD

Lead (inorganic) is a bluish-white, silver, or gray odorless solid. Short-term exposure to lead can cause decreased appetite, insomnia, headache, muscle and joint pain, colic, and constipation. Considerable data exist on the effects of lead exposure in humans. It

is a poison by ingestion and a suspected human carcinogen of the lungs and kidneys. There are data to suggest that lead is a mutagen and can cause reproductive effects. Human systemic effects by ingestion and inhalation (the two routes of absorption) include loss of appetite, anemia, malaise, insomnia, headache, irritability, muscle and joint pains, tremors, flaccid paralysis without anesthesia, hallucinations and distorted perceptions, muscle weakness, gastritis, and liver changes. Recent experimental evidence suggests that blood levels of lead below 10 micrograms per deciliter ( $\mu\text{g}/\text{dl}$ ) can have the effect of diminishing the IQ scores of children.

- The OSHA PEL is listed as  $0.05 \text{ mg}/\text{m}^3$ . Refer to 29 CFR 1910.1025 for additional information.
- The Cal/OSHA PEL is listed as  $0.05 \text{ mg}/\text{m}^3$ . Refer to Section 5198 for additional information.
- The TLV is listed as  $0.05 \text{ mg}/\text{m}^3$ .

**WARNING: This chemical is known to the State of California to cause cancer.**

**WARNING: This chemical is known to the State of California to cause birth defects, developmental toxicity, and/or reproductive harm.**

## LINDANE (BENZENE HEXACHLORIDE - GAMMA ISOMER)

Lindane is a colorless solid with a musty odor (pure material is odorless). Exposure to lindane may cause vomiting, restlessness, muscle spasms, convulsions, respiratory failure, severe breathing difficulties that may be delayed in onset, headaches, irritation of the eyes, nose, and throat, and skin rash. Lindane is moderately toxic by dermal absorption.

- The OSHA PEL is listed as  $0.5 \text{ mg}/\text{m}^3$ .
- The Cal/OSHA PEL is listed as  $0.5 \text{ mg}/\text{m}^3$ .
- The TLV is listed as  $0.5 \text{ mg}/\text{m}^3$ .

Note: Published exposure limits designate a skin notation indicating that dermal contact can contribute to the overall exposure.

**WARNING: This chemical is known to the State of California to cause cancer.**

## MANGANESE

Manganese (Mn) is a lustrous, brittle, silvery solid. Exposure routes include inhalation and ingestion. Symptoms of exposure include Manganism; asthenia, insomnia, mental confusion; metal fume fever: dry throat, cough, chest tightness, dyspnea (breathing difficulty), rales, flu-like fever; low-back pain; vomiting; malaise (vague feeling of

## TOLUENE

Toluene is a colorless liquid with a benzol-like odor. Toluene can affect humans when breathed in and by passing through the skin. Toluene should be handled as a **TERATOGEN—WITH EXTREME CAUTION**. It may damage the developing fetus. Contact can irritate the skin and eyes. Breathing toluene can irritate the nose and throat causing coughing and wheezing. Exposure to toluene can affect the nervous system, causing trouble concentrating, headaches, and slowed reflexes. Higher levels can cause humans to feel dizzy, lightheaded, and to lose consciousness. Death may occur. Prolonged contact can cause drying of the skin and a skin rash. Repeated toluene exposure may cause liver, kidney, and brain damage. Toluene is a **FLAMMABLE LIQUID** and a **FIRE HAZARD**.

The odor threshold is 0.16 ppm. Caution should be used in relying on odor alone as a warning of potentially hazardous exposures.

- The OSHA PEL is listed as 200 ppm.
- The Cal/OSHA PEL is listed as 50 ppm.
- The TLV is listed as 20 ppm.

Note: Published exposure limits designate a skin notation indicating that dermal contact can contribute to the overall exposure.

**WARNING: This chemical is known to the State of California to cause birth defects, developmental toxicity, and/or reproductive harm.**

**WARNING: This chemical is known to the State of California to cause cancer.**

## TOXAPHENE (CHLORINATED CAMPHENE)

Toxaphene, also called chlorinated camphene, is a waxy, amber-colored solid with a mild, turpentine-like odor. Toxaphene can affect humans when breathed in and by passing through the skin. Toxaphene should be handled as a **CARCINOGEN** and a **TERATOGEN--WITH EXTREME CAUTION**. Contact can irritate the skin and eyes. Breathing toxaphene can irritate the nose and throat. Breathing toxaphene can irritate the lungs, causing coughing and/or shortness of breath. Higher exposures can cause a buildup of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath. High exposure can affect the nervous system, causing tremors, weakness, dizziness, increased saliva, nausea, vomiting, and convulsions. High or repeated exposures may cause kidney and liver damage. Low blood count (aplastic anemia) is an uncommon but serious reaction to toxaphene. Skin irritation may result from skin contact; moderately toxic through dermal absorption.

- The OSHA PEL is listed as 0.5 mg/m<sup>3</sup>.