



United States Steel Corporation

Light Oil

Material Safety Data Sheet (MSDS)/Safety Data Sheet (SDS)

USS IHS Number: 4

(Replaces USS Code Number C1040; SRP 53)

Locations: Clairton, Gary, Granite City, Hamilton, Lake Erie

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Section 1 – Chemical Product and Company Identification

GHS Product Identifier: Light Oil

Other means of identification: Coal tar distillate, BTX, or BTXN

CAS Number: 65996-78-3

Supplier's Details: United States Steel Corporation, 600 Grant Street, Room 1662, Pittsburgh, PA 15219-2800

Phone Number (s): (412) 433-6840 (8:00 am to 5:00 pm); FAX: (412) 433-5019

Off-Hour Emergency Phone Number: 1-800-262-8200 (CHEMTREC)

Section 2 - Hazards Identification

Light Oil is hazardous according to the criteria specified in European Directives 67/548/EEC and 1999/45/EC, and OSHA 29 CFR 1910.1200 Hazard Communication Standard. The categories of Health Hazards as defined in "GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS (GHS), Third revised edition ST/SG/AC.10/30/Rev. 3" United Nations, New York and Geneva, 2009 have been evaluated and are listed below. Refer to Section 3, 8 and 11 for additional information.

Hazard Classification	Hazard Category	Hazard Symbols	Signal Word	Hazard Statement
Flammable Liquids (covers Categories 1-4)	1		Danger	R11 Highly flammable
Chronic Hazards to the Aquatic Environmental	1		Warning	Very toxic to aquatic life with long lasting effects R50 Very Toxic to aquatic organisms
Acute Toxicity Hazard (covers Categories 1-5)	4		Warning	R20 Harmful if inhaled
Skin Irritation (covers Categories 1-3)	2		Warning	Causes skin irritation R38 Irritating to the skin
Eye Damage/ Irritation (covers Categories 1, 2A and 2B)	2A		Warning	Causes serious eye irritation R41 Risk of serious damage to eyes
Germ Cell Mutagenicity (covers Categories 1A, 1B and 2)	2		Warning	Suspected of causing genetic defects
Carcinogenicity (covers Categories 1A, 1B and 2)	1A		Danger	R45 May cause cancer
Toxic to Reproduction (covers Categories 1A, 1B and 2)	2		Warning	Suspected of damaging fertility or the unborn child R63 Possible risk of harm to the unborn child R60 May impair fertility
Specific Target Organ Systemic Toxicity (STOST) Following Single Exposure (covers Categories 1-3)	3		Warning	May cause respiratory irritation drowsiness or dizziness
STOST Following Repeated Exposure (covers Categories 1 and 2)	1		Danger	Causes damage to blood forming tissues through prolonged or repeated exposure

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Section 2 - Hazards Identification (continued)

Safety Phrases/Emergency Overview:

S16 - Keep away from sources of ignition - No Smoking. **S33** - Take precautionary measures against static discharges. **S23** - Avoid breathing dust/fume/gas/mist/vapor/spray. **S36/37/39** - Wear suitable protective clothing, gloves and eye/face protection. **S45** - In case of accident or if you feel unwell, seek medical advice immediately. (show label where possible) **S53** - Avoid Exposure, obtain special instructions before use. **S60** - This material and its container must be disposed of as hazardous waste. **S61** - Avoid release to the environment. Refer to special instructions.

Section 3 – Composition/Information on Ingredients

Chemical identity of the substance: Light Oil CAS number 65996-78-3 is comprised of the following:

Ingredient Name	EC Number	CAS Number	% weight
Benzene	200-753-7	71-43-2	64.3-80.7
Toluene	203-625-9	108-88-3	6.3-11.2
Naphthalene	202-049-5	91-20-3	0.65-6.0
m-Xylene	203-576-3	108-38-3	0.72-1.84
Styrene, monomer	202-851-5	100-42-5	0.64-1.25
Indene	202-393-6	95-13-6	0.67-1.60
p-Xylene	203-396-5	106-42-3	0.72-1.84
Carbon Disulfide	200-843-6	75-15-0	0.47-1.18
o-Xylene	202-422-2	95-47-6	0.22-0.46
Various Aromatic Hydrocarbons (Each less than 1.0% and no known carcinogens)	Not Applicable (NA)	NA	Balance

EC - European Community

CAS - Chemical Abstract Service

Section 4 - First Aid Measures

Description of necessary first aid measures:

- **Inhalation:** If INHALED, Call a Poison Control Center /physician if you feel unwell. If INHALED, Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration; if breathing is difficult, administer oxygen. If exposed or concerned, Get medical attention.
- **Eye Contact:** IF IN EYES, Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. If exposed or concerned, Get medical attention. If eye irritation persists, Get medical attention.
- **Skin Contact:** IF ON SKIN (or hair) Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash with plenty of soap and water. Call a Poison Control Center /physician if you feel unwell. If exposed or concerned, Get medical attention. If skin irritation occurs, Get medical attention. Take off contaminated clothing and wash before reuse.
- **Ingestion:** Call a Poison Control Center /physician if you feel unwell. If exposed or concerned, Get medical attention. Not a probable route of industrial exposure, however possible aspiration hazard. Do not induce vomiting. Do not attempt to give anything by mouth to an unconscious person.

Most important acute and chronic symptoms/effects:**Acute Effects**

- **Inhalation:** May produce airway irritation. Systemic effects may include headache, dizziness, and loss of coordination, collapse and death. Systemic effects may include CNS excitation and cardiovascular depression. Inhalation of coal tar light oil may cause bronchial irritation, cough, hoarseness and/or pulmonary edema. Repeated or prolonged exposure may cause irritation of the respiratory tract, nausea, dizziness, headache, staggering, anorexia, and central nervous system problems. Inhalation of excessive concentrations of this product may cause confusion, convulsions, and abdominal pain. Kidney and/or liver functions may be disturbed.
- **Eye:** Direct contact may produce irritation. Vapors may be moderately irritating. Irritation and reversible corneal injury may occur.
- **Skin:** May cause moderate to severe irritation, with prolonged contact resulting in dryness and defatting, characterized by dermatitis, dryness, blistering and/or redness. Material can be absorbed through the skin producing systemic toxicity and possible death.
- **Ingestion:** Unlikely route of exposure. If ingested, may cause headache, drunkenness, nausea, vomiting, weakness, convulsions, unconsciousness and coma. Aspiration of this material into the lungs can cause chemical pneumonia.

Acute Effects by component

- **Benzene** - Excessive exposures may cause irritation to eyes, skin, nose, throat, lungs, and respiratory tract. Central nervous system effects may occur due to excessive exposures. Excessive exposures may result in headaches, nausea, sleep disturbances, excitability, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.
- **Toluene** - Excessive exposures may cause irritation to eyes, nose, throat, lungs, and respiratory tract. Central nervous system effects may occur. Excessive exposures may result in headaches, nausea dizziness, loss of balance and coordination, unconsciousness, and coma as well as respiratory failure and/or death.
- **Xylene** - Excessive exposures may cause irritation to eyes, nose, throat, lungs, and respiratory tract. Central nervous system effects may occur. May result in headaches, nausea, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure and death. Repeated excessive exposures may cause liver and/or kidney effects or damage.
- **Naphthalene** - Excessive exposures may cause irritation to eyes, nose, throat and lungs, and respiratory tract. Central nervous system effects may occur. Excessive exposures may also result in dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure and death.
- **Styrene, monomer** - Excessive inhalation may cause respiratory swelling and pneumonitis. Excessive exposures may cause narcotic effects including headache, dizziness, weakness, unconsciousness, and possible death.

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Section 4 - First Aid Measures (continued)

Acute Effects by component (continued):

- **Indene** - Data or studies as to human potential overexposure have not been reported in the literature. However, by analogy between chemical structure and toxicological effects of related monoaromatic hydrocarbons (not specified), excessive inhalation of indene vapors can be expected to cause irritation to the mucous membrane and lungs, skin irritation, pneumonitis, pulmonary edema and hemorrhage.
- **Carbon disulfide** - Excessive quantities of carbon disulfide may be fatal if ingested or inhaled. Serious health hazard, affecting the central nervous system. Carbon disulfide is readily absorbed through the skin. Sufficient material may be absorbed through the skin to be fatal. Excessive exposures may cause reproductive damage, including impairing fertility. Skin irritant.

Chronic Effects: Prolonged skin or eye exposure can cause drying of the skin and eyes. Chronic excessive exposure can impact the blood forming systems. Workers with pre-existing heart, liver, kidney, nervous system disease, or blood disorders must be medically evaluated and approved prior to being assigned to work with this material. Overexposure to toluene, a primary component of this product, may also adversely affect fetal growth and development as well as pregnancy outcome.

Chronic Effects by component

- **Benzene** - IARC Group I- Human Cancer Hazard. Early signs and symptoms of chronic overexposure include effects on CNS and the GI tract (headache, loss of appetite, drowsiness, nervousness, and pallor) but the major manifestation of toxicity is aplastic anemia. Bone marrow depression may occur resulting in leucopenia, anemia, or thrombocytopenia (leukemogenic action). With continued overexposure the disease states may progress to pancytopenia resulting from bone marrow aplasia. Evidence has linked benzene in the etiology of leukemia.
- **Toluene** - Chronic overexposure has been associated with headache, lassitude, and nausea, loss of coordination, memory loss, and loss of appetite along with enlargement of the liver, a moderate decrease in red blood cells, and reduction in white blood cells, as well as palpitations, weakness, and impaired reaction time may occur. The neurological effects of chronic overexposure to high levels of toluene gradually progress to an irreversible state. Besides effects on behavior and intelligence, degeneration of the optic nerve and nerve deafness has also been reported. Dermatitis from repeated contact with the skin may also occur. Overexposure to toluene may cause risk of harm to the unborn child.
- **Xylene** - Chronic inhalation can cause headache, loss of appetite, nervousness and pale skin. Repeated or prolonged skin contact may cause a skin rash. Repeated exposure of the eyes to high concentrations of vapor may cause reversible eye damage. Repeated exposure can damage bone marrow, causing low blood cell count. May damage the liver and kidneys.
- **Styrene, monomer** - Chronic excessive exposures may cause significant reduction in color discrimination and/or color perception.
- **Indene** - The substance may be toxic to kidneys, liver, spleen, upper respiratory tract, skin and eyes. Repeated or prolonged overexposure to the substance can produce target organs damage.
- **Carbon disulfide** - Chronic overexposure to carbon disulfide has resulted primarily in neurological and cardiovascular effects, gastrointestinal and immune insufficiency problems as well as possible risk of impaired fertility and harm to the unborn child have also been reported.

Indication of immediate medical attention and special treatment: If quantity ingested is 1 ml/kg or greater, careful gastric lavage may be indicated, being careful to avoid aspiration.

Section 5 – Fire and Explosion Hazard Information

Suitable Extinguishing Media: In case of fire use foam, carbon dioxide, dry chemical for extinction. Water may be ineffective.

Specific Hazards arising from the chemical: Heat/fire conditions: vapors form flammable /explosive mixtures in air. Vapors heavy, may travel (ground, pit, sewer) to ignition source-flash. Open/closed containers may contain flammable/explosive vapors. Under fire conditions, may emit irritant/toxic gas and/or fumes. Closed containers may explode when exposed to extreme heat (fire). The hazardous combustion products that may be generated include: Carbon Dioxide, Carbon Monoxide, toxic organic acids, and fumes.

Explosion hazard: Light Oil is a nonconductive flammable liquid that can accumulate static electricity during transfer and storage. Static sparks generated can readily ignite flammable vapor-air mixtures inside storage tanks that can result in explosions. Normal bonding and grounding used during transfer and storage may not be enough protection. Additional precautions are warranted. These include but are not limited to; addition of inert gas to tank head space, addition of anti-static agents, reduced flow (pumping) velocity and modification or replacement of loose linkage tank level floats if present. For more information, contact the U.S. Steel Group. (*Reference: U.S. Chemical Safety and Hazard Investigation Board, Case Study No. 2007-06-I-KS*)

Special protective equipment and precautions for fire fighters: Self-contained MSHA/NIOSH approved respiratory protection and full protective clothing should be worn when fumes and/or smoke from fire are present. Heat and flames cause emittance of acrid smoke and fumes. Benzene is considered a severe explosion hazard. Do not release runoff from fire control methods to sewers or waterways. Firefighters should wear full face-piece self-contained breathing apparatus and chemical protective clothing with thermal protection. Direct water stream will scatter and spread flames and, therefore, should not be used.

Section 6 - Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures: Remove ignition sources and ventilate enclosed places. Clean-up personnel should wear a respirator and appropriate chemical/thermal protective clothing dictated by the magnitude of the spill or leak.

Environmental precautions: If necessary (for larger quantities), contain spill with sand or earth to prevent entry into sewers and waterways. This product is a US EPA defined ignitable hazardous waste. Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations

Methods and materials for containment and clean up: Absorb as much of the spill as possible with dry sand, earth, or other suitable material. Remaining benzene must be flushed with large amounts of water. Do not flush into sewer or other confined space due to explosion hazards. Reportable spills must be reported to the National Response Center (1-800-424-8802). Follow applicable OSHA regulations (29 CFR 1910.120) and all other pertinent state and federal requirements.

Section 7 - Handling and Storage

Precautions for safe handling: Wash thoroughly after handling. Do not handle until all safety precautions have been read and understood. Avoid directly breathing vapors or mists. Avoid direct contact on skin, eyes or on clothing. Handle and use in accordance with OSHA 29CFR 1910.106/local codes. Observe proper industrial hygiene practices. Comply with the OSHA Benzene Standard, 29CFR 1910.1028, and all other applicable regulatory standards. Emergency safety showers and eye wash stations should be present.

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Section 7 - Handling and Storage (continued)

Conditions for safe storage, including any incompatibilities: Use only outdoors or in a well ventilated area. Store in a well-ventilated place. Keep cool. Whenever feasible store locked up. Control all ignition sources (including smoking). Store and handle as OSHA 1B liquid. When transporting, use electrically ground storage and transport piping. Store in areas/buildings designed to comply with OSHA 1910.106. Protect from physical damage. Keep containers closed when material is not in use. Maintain good housekeeping.

Section 8 - Exposure Controls / Personal Protection

Occupational Exposure Limits (OELs):

Ingredients	OSHA PEL ¹	ACGIH TLV ²	NIOSH REL ³	IDLH ⁴
Benzene	1.0 ppm "STEL" 5.0 ppm	0.5 ppm (1.6 mg/m ³), skin "STEL" 2.5 ppm (188 mg/m ³)	0.1 ppm (0.32 mg/m ³) "STEL" 1.0 ppm (3.2 mg/m ³)	500 ppm
Toluene	200 ppm "C" 300 ppm	50 ppm, skin	100 ppm (375 mg/m ³) "STEL" 150 ppm (560 mg/m ³)	500 ppm
Naphthalene	10 ppm (50 mg/m ³)	10 ppm (52 mg/m ³), skin "STEL" 15 ppm (79 mg/m ³)	10 ppm (50 mg/m ³) "STEL" 15 ppm (75 mg/m ³)	250 ppm
m-,o-, p-Xylene	100 ppm (435 mg/m ³)	100 ppm (434 mg/m ³) "STEL" 150 ppm (651 mg/m ³)	100 ppm (435 mg/m ³) "STEL" 150 ppm (655 mg/m ³)	900 ppm
Styrene, monomer	100 ppm "C" 200 ppm	20 ppm (85 mg/m ³) "STEL" 40 ppm (170 mg/m ³)	50 ppm (215 mg/m ³) "STEL" 100 ppm (425 mg/m ³)	700 ppm
Indene	NE	10 ppm (48 mg/m ³)	10 ppm (45 mg/m ³)	NE
Carbon Disulfide	20 ppm-TWA "C" 30 ppm	10 ppm (31 mg/m ³), skin	1.0 ppm (3 mg/m ³) "STEL" 5 ppm (30 mg/m ³)	500 ppm

NE - None Established

Notes:

- OSHA PEL (Permissible Exposure Limits) are 8-hour TWA (time-weighted average) concentrations unless otherwise noted. A ("C") designation denotes a ceiling limit, which should not be exceeded during any part of the working exposure unless otherwise noted. A Short Term Exposure Limit (STEL) is defined as a 15-minute exposure, which should not be exceeded at any time during a workday.
- Threshold Limit Values (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH) are 8-hour TWA concentrations unless otherwise noted. ACGIH TLVs are for guideline purposes only and as such are not legal, regulatory limits for compliance purposes.
- The National Institute for Occupational Safety and Health Recommended Exposure Limits (NIOSH-REL)- Compendium of Policy and Statements. NIOSH, Cincinnati, OH (1992). NIOSH is the federal agency designated to conduct research relative to occupational safety and health. As is the case with ACGIH TLVs, NIOSH RELs are for guideline purposes only and as such are not legal, regulatory limits for compliance purposes.
- The "immediately dangerous to life or health air concentration values (IDLHs)" are used by NIOSH as part of the respirator selection criteria and were first developed in the mid-1970's by NIOSH. The Documentation for Immediately Dangerous to Life or Health Concentrations (IDLHs) is a compilation of the rationale and sources of information used by NIOSH during the original determination of 387 IDLHs and their subsequent review and revision in 1994.

Appropriate Engineering Controls: Use controls as appropriate to minimize fire risk and inhalation of vapors or mists as well as any by products of combustion. Provide general or local exhaust ventilation systems to minimize airborne concentrations. Local exhaust is necessary for use in enclosed or confined spaces. Provide sufficient general/local exhaust ventilation in pattern/volume to control inhalation exposures below current exposure limits and areas below flammable vapor concentrations.

Personal Protective Equipment (PPE)

- Respiratory Protection:** Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, use only a NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. Concentration in air of the various contaminants determines the extent of respiratory protection needed. Half-mask negative-pressure, air-purifying respirator equipped with organic vapor cartridge is acceptable for concentrations up to 10 times the exposure limit. Full-face negative-pressure air purifying respirator equipped with organic vapor cartridges is acceptable for concentrations up to 50 times the exposure limit. Protection by air purifying both negative-pressure and powered air respirators is limited. Use a positive-pressure-demand, full-face, supplied air respirator or self contained breathing apparatus (SCBA) for concentrations above 50 times the exposure limit. If exposure is above the IDLH (Immediately dangerous to life or health) for any of the constituents, or there is a possibility of an uncontrolled release or exposure levels are unknown, then use a positive-demand, full-face, supplied air respirator with escape bottle or SCBA.

Warning! Air-purifying respirators both negative-pressure, and powered-air do not protect workers in oxygen-deficient atmospheres.

Protective Clothing/Equipment:

- Eyes:** Wear appropriate eye protection to prevent eye contact. Use safety glasses with side shields or chemical goggles.
- Skin:** Wear appropriate personal; protective clothing to prevent skin contact. Chemical resistance data for barrier metals used should be determined based on use. Polyvinyl alcohol and viton protective garments have been suggested by the American Conference of Governmental Industrial Hygienist (ACGIH) Guidelines for the Selection of Chemical Protective Clothing for protection against materials of this chemical class. As required, industrial resistant flexible-type gloves (viton, neoprene, silver shield or equal). Wear industrial-type work clothing and safety footwear. A face-shield should be used, when appropriate, to prevent contact of eyes and face. Full body covering should be used to prevent skin contact depending on work conditions.
- Other protective equipment:** An eyewash fountain and deluge shower should be readily available in the work area.

Section 9 - Physical and Chemical Properties

Appearance and Odor: Yellow liquid with sweet odor
Odor Threshold: ND
Vapor Pressure: 0.75 mm Hg (Benzene)
Vapor Density (Air=1): 2.7 (Benzene)
Formula Weight: NA

Viscosity: ND
Fat Solubility: ND
Water Solubility: 0.01%
Other Solubilities: NA
Boiling Point: 175.3 °F/ 79.6 °C

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Section 9 - Physical and Chemical Properties (continued)

Density: ND**Specific Gravity (H₂O=1, at 60 /60°F):** 0.87**pH:** NA**Flash Point (closed cup):** 12°F (-11°C) (as Benzene)* (Category 1)**Auto Ignition Temperature:** ND**Decomposition Temperature:** ND**Flammability (solid, gas):** ND**UEL:** ND**LEL:** ND

NA - Not Applicable

ND - Not determined for product as a whole

* The Flash Point listed is for 100% Benzene. The flash point of Light Oil as a mixture has been tested at various times and found to be in ranges between 60°F and 80°F dependent of actual composition

Refractive Index: ND**Partition Coefficient n-octanol/water:** ND**Surface Tension:** ND**% Volatile by volume:** 99**Evaporation Rate:** ND**Freezing Point:** NA**Melting Point:** ND**Oxidizing Properties:** ND**Explosive Properties:** ND

Section 10 - Stability and Reactivity

Reactivity: ND**Stability:** Light Oil is stable under normal storage and handling conditions.**Polymerization:** Hazardous polymerization cannot occur.**Chemical Incompatibilities:** Strong oxidizing agents, many Fluorides, Chlorides, and Perchlorates, Nitric Acid, and Chromic Anhydride.**Conditions to Avoid:** Exposure to heat, sparks or flames.**Hazardous Decomposition/Combustion Products:** Carbon Monoxide and Carbon Dioxide.**Sensitivity to Mechanical Impact:** ND**Sensitivity to Static Discharge:** ND

ND - Not Determined for product as a whole

Section 11 - Toxicological Information

The following toxicity data has been determined for **Light Oil** by using the information available for its components applied to the guidance on the preparation of an SDS under the requirements of the GHS:**Notes:**a. No LC50 or LD50 has been established for **Light Oil** as a mixture. The following data has been determined for the components:

- **Benzene:** LC₅₀= 30,000 mg/m³ (Inhalation/ Rat/7hr); LC₅₀= 10,000 ppm (Inhalation/Rat/7hr); LD₅₀= 3.8 g/kg (Oral/Rat)
- **Toluene:** LC₅₀= 49,000 mg/m³ (Inhalation/Rat/1hr); LD₅₀= 0.636 g/kg (Oral/Rat)
- **Xylene:** LC₅₀= 5,000 ppm (Inhalation/Rat/1hr); LD₅₀= 4.3 g/kg (Oral/Rat)
- **Styrene:** LC₅₀= 9,500 mg/m³ (Inhalation/Rat/4hr); LD₅₀= 2,650 mg/mg (Oral/Rat)
- **Naphthalene:** LC₅₀= 340,000 ppm (Inhalation/Rat/1hr); LD₅₀= 2.6 g/kg (Oral/Rat)
- **Indene:** LC₅₀= 14,000 mg/m³ (Inhalation/Rat); LD₅₀= 2300 mg/kg (Unreported/Rat)
- **Carbon Disulfide:** LC₅₀= 10,000 mg/m³ (Inhalation/Mouse); LD₅₀= 3188 mg/kg (Oral/Rat); LD₅₀= 2550 mg/kg (Oral/Rabbit)

b. Skin Irritation data: **Light Oil** may cause moderate to severe skin irritation, with prolonged contact resulting in dryness and defatting, characterized by dermatitis, dryness, blistering and/or redness. Material can be absorbed through the skin producing systemic toxicity and possible death.c. No Eye Irritation data: Direct eye contact with **Light Oil** may produce irritation. Vapors may be moderately irritating. Irritation and reversible corneal injury may occur.d. **Light Oil** is classified as a potential germ cell mutagen. The following mutagenicity and genotoxicity information was found for the components:

- **Benzene**- Chronic overexposure can cause chromosomal aberrations in animals and humans. Also, may induce sister-chromatid exchange (SCE), and micronuclei both *in vivo* and *in vitro*. Benzene overexposure has been shown to induce aneuploidy in dividing cells. Classified as a potential germ cell mutagen.

e. **Light Oil** is classified as a material that may cause cancer. The following carcinogenicity information was found for the components:

- **Benzene** - ACGIH, OSHA, the International Agency for Research on Cancer (IARC), and the National Toxicology Program (NTP) consider the Benzene (the major component of Light oil to be known carcinogen. Case reports and cohort studies have suggested a relationship between overexposures to Benzene and the occurrence of various types of leukemia.
- **Naphthalene** – Limited evidence of carcinogenicity.

f. No toxic reproduction data available for **Light Oil** as a mixture. The following toxic reproductive data was found for its components:

- **Toluene and Carbon Disulfide** – Regarded as suspected reproductive toxins.

g. No Specific Target Organ Systemic Toxicity (STOST) following a single exposure data available for **Light Oil** as a mixture. The following STOST data was found for its components:

- **Benzene** – Mild to moderate respiratory tract irritation expected with breathing vapors

h. No Specific Target Organ Systemic Toxicity (STOST) following repeated exposure data was available for **Light Oil** as a mixture. The following STOST data was found for its components:

- **Benzene**-induced blood dyscrasias in humans were characterized by erythrocytic anisocytosis and poikilocytosis, anemia, decreased hemoglobin, and reduced hematocrit. In addition, benzene is a human carcinogen.

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Section 11 - Toxicological Information (continued)

The above toxicity information was determined from available scientific sources to illustrate the prevailing posture of the scientific community. The scientific resources includes: The American Conference of Governmental Industrial Hygienist (ACGIH) Documentation of the Threshold Limit Values (TLVs) and Biological Exposure indices (BEIs) with Other Worldwide Occupational Exposure Values 2009, The International Agency for Research on Cancer (IARC), The National Toxicology Program (NTP) updated documentation, the World Health Organization (WHO) and other available resources, the International Uniform Chemical Information Database (IUCLID), European Union Risk Assessment Report (EU-RAR), Concise International Chemical Assessment Documents (CICAD), European Union Scientific Committee for Occupational Exposure Limits (EU-SCOEL), Agency for Toxic Substances and Disease Registry (ATSDR), Hazardous Substance Data Bank (HSDB), and International Programme on Chemical Safety (IPCS).

Section 12 - Ecological Information

Hazard Category: 3

Hazard Symbol: No Symbol

Signal Word: No Signal Word

Hazard Statement: Harmful to aquatic life

Ecotoxicity: No Data Available for **Light Oil** as a whole. However, individual components have been found to be toxic to the environment:

- **Benzene:** LC50 Lepomis macrochirus (bluegill sunfish) 20 mg/l/24 to 48 hr /Conditions of bioassay not specified/; LC50 Salmo trutta (brown trout yearlings) 12 mg/l/1 hr (static bioassay)
- **Toluene:** LC50 Pimephales promelas (fathead minnow) 34.27 mg/l 96 hr (95% Confidence Limits= 22.83-45.86 mg/l) /Conditions of bioassay not specified/ LC50 Daphnia magna, (water flea) 313 mg/l 48 hr /Conditions of bioassay not specified
- **Naphthalene:** LC50 Pimephales promelas (fathead minnow) 6.08 (5.74-6.44) mg/l 72 & 96 hr, /flow-through bioassay; LC50 Oncorhynchus gorbuscha (pink salmon) 1.4 mg/L/96 hr Conditions of bioassay not specified
- **Xylene:** LC₅₀: 75,000 µg/L/24H; Fish-*Goldfish*
- **Carbon disulfide:** LC₅₀: 135,000/96H; Fish-*Western mosquitofish*

Mobility: No Data Available for **Light Oil** as a whole. However, benzene and toluene are have been estimated to be moderately to highly mobile in soil. Evaporation is expected to be the primary loss mechanism from water. Benzene and toluene are not expected to adsorb to sediment and suspended solids in water. Volatilization half-lives for a model river and model lake have been estimated to be 1 hr and 3.5 days, respectively for benzene and 1 hour and 4 days. Respectively for toluene.

Persistence & Degradability: Vapor-phase benzene and toluene are degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 13 days and 3 days for benzene and toluene respectively.

Bioaccumulative Potential: Not Determined

Note: The listing of regulations relating to a U. S. Steel product may not be complete and should not be solely relied upon for all regulatory compliance responsibilities.

Section 13 - Disposal Considerations

Disposal Methods: Dispose of contents/container in accordance with local/regional/international regulations. Upon disposal Coal Tar Light Oil may become an EPA hazardous waste due to Ignitability (D001). Also, it may be a characteristic waste due to leachable benzene content of greater than 0.5 ppm (D018) as determined by the TCLP test. Benzene has a RCRA waste number of D018 and a CERCLA reportable quantity of 10 lbs. Recycle or dispose of in accordance with federal, state and local regulations. Empty containers may retain product residue including flammable or explosive vapors. Do not cut, drill, grind or weld on or near full, partially full or empty product containers.

European Waste Catalogue (EWC): 05-06-99 (waste form pyrolytic treatment of coal-waste not otherwise specified)

Please note this information is for Coal Tar Light Oil in its original form. Any alterations can void this information.

Section 14 - Transport Information

DOT Transportation Data (49 CFR 172.101):

US Department of Transportation (DOT) under 49 CFR 172 regulates **Light Oil** a Class 3 Hazardous Material (Flammable Liquid). All federal, state, and local laws and regulations that apply to the transport of this type of material must be adhered to.

<p>Shipping Name: Coal tar distillates, flammable (contains benzene, toluene, xylene) Shipping Symbols: Not applicable Hazard Class: 3, Flammable UN No.: UN 1136 Packing Group: II / III DOT/IMO Label: 3 / Flammable Liquid Special Provisions (172.102): IB2, T4, TP1 / B1, IB3, T4, TP1, TP29</p>	<p>Packaging Authorizations (173.***) a) Exceptions: 150 / 150 b) Non-bulk: 202 / 203 c) Bulk: 242 / 242</p>	<p>Quantity Limitations (173.27 & 175.75) a) Passenger Aircraft or Rail: 5 Liters / 60 Liters b) Cargo Aircraft Only: 60 Liters / 220 Liters Vessel Stowage Location: B / A DOT Reportable Quantities: Refer to Section 6</p>
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The International Maritime Dangerous Goods (IMDG) and the Regulations Concerning the International Carriage of Dangerous Goods by Rail (RID) classification, packaging and shipping requirements follow the US DOT Hazardous Materials Regulation.

ADR – Regulations Concerning the International Carriage of Dangerous Goods by Road regulates Light Oil a Class 3 Flammable Liquid.

<p>Shipping Name: Coal tar distillates, flammable Class: 3 Classification Code: F1 UN No.: UN 1136 Packing Group: II ADR Label: 3 Special Provisions: Not Applicable Limited Quantities: LQ7</p>	<p>Packaging a) Packing Instructions: P001, IBC03, LP01, R001 b) Special Packing Provisions: Not Applicable c) Mixed Packing Provisions: MP19</p>	<p>Portable Tanks & Bulk Containers a) Instructions: T4 b) Special Provisions: TP1, TP29</p>
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Light Oil

Section 15 - Regulatory Information (continued)

State Regulations: The product, **Light Oil** as a whole is not listed in any state regulations. However, individual components of the product are listed in various state regulations:

Pennsylvania Right to Know: Contains regulated material in the following categories:

- Hazardous Substances: Indene
- Environmental Hazards: Benzene, Toluene, Naphthalene, m-, p-, o-Xylene, Carbon Disulfide
- Special Hazardous Substance: Benzene

California Prop. 65: This product contains materials known to the State of California to cause cancer.

New Jersey: Benzene, Toluene, Naphthalene, Styrene, Indene, , m-, o-, p-Xylene, Carbon Disulfide

Minnesota: Benzene, Toluene, Naphthalene, Styrene, Indene, m-, o-, p-Xylene, Carbon Disulfide

Massachusetts: Benzene, Toluene, Naphthalene, Styrene, Indene, m-, o-, p-Xylene, Carbon Disulfide

Other Regulations:

WHMIS Classification (Canadian): **Light Oil** is not listed as a whole. However individual components are listed.

Ingredients	WHMIS Classification
Benzene	D-2A, D-2B, B-2
Toluene	D-2A, D-2B, B-2
Naphthalene	B4, D2A
m-Xylene	D2B, B2
Styrene, monomer	D2B, D-2A, B-2
Indene	B-3
p-Xylene	B-2, D2B
Carbon Disulphide	B-2, D-1B, D-2A, D-2B
o-Xylene	B-2, D2B

WHMIS - Workplace Hazardous Materials Information System

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Section 16 - Other Information

Prepared By: United States Steel Corporation

Revision History:

- 5/10/2011 – Update format
- 7/31/10 – Update of content and format to comply with GHS
- 9/22/08 – Updated section 13 to eliminate incorrect RCRA code

Hazardous Material Identification System (HMIS) Classification

Health Hazard	2
Fire Hazard	3
Reactivity	1

HEALTH = 2, Moderate
 FIRE = 3, HIGH
 REACTIVITY = 1, Slight (Normally Stable)

National Fire Protection Association (NFPA)



HEALTH = 2, Moderate
 FIRE = 3, HIGH
 REACTIVITY = 1, Slight (Normally Stable)

Disclaimer: This information is taken from sources or based upon data believed to be reliable. However, United States Steel Corporation makes no warranty as to the absolute correctness or sufficiency of any of the foregoing or that additional or other measures may not be required under particular conditions.