

1. PRODUCT IDENTIFICATION

| | |
|--|---|
| <u>TRADE NAME (AS LABELED):</u> | Thiourea |
| <u>CHEMICAL NAME/CLASS:</u> | Dangerous Goods |
| <u>PRODUCT NUMBER:</u> | Thiourea |
| <u>U.N. NUMBER:</u> | UN 2811 |
| <u>U.N. DANGEROUS GOODS CLASS/SUBSIDIARY RISK:</u> | Hazard Class 6.1 Packing group III |
| <u>MANUFACTURER'S NAME:</u> | NuGeneration Technologies, LLC |
| <u>ADDRESS:</u> | 100 Professional Center Drive, Rohnert Park, CA 94928 USA |
| <u>EMERGENCY PHONE:</u> | (800) 424-9300 (CHEMTREC) |
| <u>BUSINESS PHONE:</u> | (707) 820-4080 (Product Information) |
| <u>DATE OF PREPARATION:</u> | August 19, 2009 |
| <u>DATE OF LAST REVISION:</u> | New |

2. COMPOSITION and INFORMATION ON INGREDIENTS

| Hazardous Ingredients: | CAS # | EC # | ICSC # | WT % | Hazard Symbol; Risk Phrases |
|------------------------|---------|-----------|--------|------|---|
| Thiourea | 62-56-6 | 200-543-5 | 0680 | 100% | HAZARD CLASSIFICATION: XN, N RISK PHRASES: R22-40-51/53-63 |

NOTE: ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-2004 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR, EU Directives and the Japanese Industrial Standard *JIS Z 7250: 2000*.

See Section 3 for full text of Risk Phrases and Safety Phrases

3. HAZARD IDENTIFICATION

EU LABELING AND CLASSIFICATION: This product meets the definition of the following hazard class as defined by the European Economic Community Guidelines.

EU CLASSIFICATION: Harmful (Xn)
Environmentally Dangerous Substances (N)

EU RISK PHRASES: R 22 – Harmful if swallowed, R40 – Limited evidence of a carcinogenic effect, R51/53 – Toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment.

EU SAFETY PHRASES: S22 – Do not breath dust, S24 – Avoid contact with skin, S36 – Wear suitable protective clothing, S37 – Wear suitable gloves, S61 – Avoid release to the environment.



EMERGENCY OVERVIEW: Product Description: This product is in the form of white crystals and is odorless. **Health Hazards:** Harmful if swallowed or inhaled. Causes irritation to skin, eyes and respiratory tract. May cause allergic skin reaction. Possible cancer hazard. **Flammability Hazards:** This material has a slight flammability rating. **Environmental Hazards:** Release of this product to the environment is expected cause harm to plants and animals. If accidentally released, precautions must be taken to protect the environment. **Emergency Considerations:** In the event of fire or spill, adequate precautions must be taken for surrounding materials. Emergency responders must wear personal protective equipment suitable for the situation to which they are responding.

SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE: The most significant routes of overexposure for this product are by inhalation and by ingestion. The symptoms of overexposure are described in the following paragraphs.

INHALATION: Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath.

CONTACT WITH SKIN or EYES: Prolonged or repeated skin contact may cause irritation. Contact with eyes may cause inflammation and redness.

INGESTION: Harmful if swallowed. May effect bone marrow and consequently white blood cells, red blood cells, and platelet counts.

HEALTH EFFECTS OR RISKS FROM EXPOSURE:

ACUTE: Contact with skin or eyes may cause burning and irritation. Inhalation will cause respiratory irritation.

CHRONIC: Repeated or prolonged exposure to this product can produce target organs damage. Chronic exposure can cause liver damage and goiter (an enlarged thyroid gland). May effect bone marrow which could cause damage to blood. Material is a possible carcinogen.

TARGET ORGANS: Acute: Skin, eyes, respiratory system. **Chronic:** Skin, eyes and target organs.



HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

| | | |
|----------------------|--------|----------|
| HEALTH HAZARD | (BLUE) | 3 |
|----------------------|--------|----------|

| | | |
|----------------------------|-------|----------|
| FLAMMABILITY HAZARD | (RED) | 1 |
|----------------------------|-------|----------|

| | | |
|------------------------|----------|----------|
| PHYSICAL HAZARD | (YELLOW) | 1 |
|------------------------|----------|----------|

PROTECTIVE EQUIPMENT

| EYES | RESPIRATORY | HANDS | BODY |
|---|---------------|---|---------------|
|  | SEE SECTION 8 |  | SEE SECTION 8 |

For Routine Industrial Use and Handling Applications

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate
3 = Serious 4 = Severe * = Chronic hazard

4. FIRST-AID MEASURES

Contaminated individuals of chemical exposure must be taken for medical attention if any adverse effect occurs. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to health professional with contaminated individual.

SKIN EXPOSURE: If this product contaminates the skin, begin decontamination by flushing with soap and water. Minimum flushing is for 5 minutes. Remove exposed or contaminated clothing, taking care not to contaminate eyes. The contaminated individual must seek medical attention if any adverse effect occurs. Wash clothing before reuse.

EYE EXPOSURE: If dusts generated by this product enter the eyes, open contaminated individual's eyes while under gently running water. Use sufficient force to open eyelids. Have contaminated individual "roll" eyes. Minimum flushing is for 15 minutes. Seek medical attention immediately.

INHALATION: If dusts generated by this product are inhaled, remove contaminated individual to fresh air. If breathing is difficult, give oxygen. Seek medical attention.



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INGESTION: Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Skin and respiratory disorders, as well as conditions involving the "Target Organs" (see Section 3, Hazard Identification) may be aggravated by prolonged overexposures to this product.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate overexposure.

5. FIRE-FIGHTING MEASURES

FLASH POINT: As with most organic solids, fire is possible at elevated temperatures or by contact with ignition source.

NFPA RATING

AUTOIGNITION TEMPERATURE: Not Applicable

FLAMMABLE LIMITS (in air by volume, %): Not Applicable

FIRE EXTINGUISHING MATERIALS: Use fire extinguishing materials appropriate for surrounding fire.

Water Spray: Yes

Foam: Yes

Halon: Yes

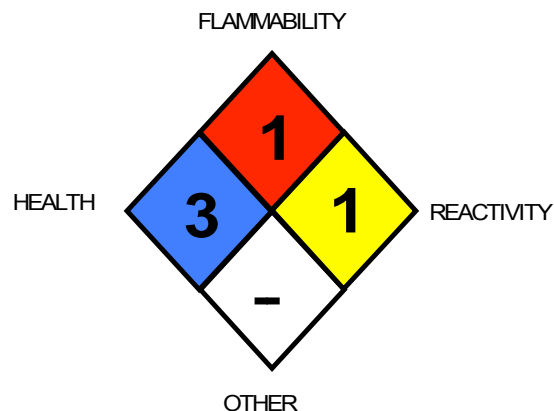
Carbon Dioxide: Yes

Dry Chemical: Yes

Other: Any "C" Class

UNUSUAL FIRE AND EXPLOSION HAZARDS: Fine dust dispensed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.

SPECIAL FIRE-FIGHTING PROCEDURES: Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Isolate materials not yet involved in the fire and protect personnel. Move containers from fire area if this can be done without risk; otherwise, cool with carefully applied water spray. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.



6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Uncontrolled releases should be responded to by appropriately trained personnel using pre-planned procedures. Proper protective equipment should be used.

Remove all sources of ignition. Ventilate area of leak or spill. Keep unnecessary and unprotected people away from area of spill. Wear appropriate protective equipment as specified in section 8.

Spills Pick up and place in suitable container for reclamation or disposal, using a method that does not generate dust. U.S. Regulations (CERCLA) requires reporting spills and releases of soil, water and air in excess of reportable quantities. Prevent entry into sewers, basements or confined areas, dike if needed. Dispose of in accordance with U.S. Federal, State, and local hazardous waste disposal regulations, those of Canada and its Provinces, those of Australia, Japan and EU Member States (see Section 13, Disposal Considerations).

7. HANDLING and STORAGE



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WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing dusts generated by this product. Use in a well-ventilated location. Remove contaminated clothing immediately.

STORAGE AND HANDLING PRACTICES: All employees who handle this material should be trained to handle it safely. Avoid contact with eyes, skin, and clothing. Empty drums should be completely drained (triple rinsed), properly bunged, and promptly returned to a drum reconditioner, or disposed of properly. Open containers slowly on a stable surface. Containers of this product must be properly labeled. Storage areas of this product should be clearly identified, well-illuminated, clear of obstruction and accessible only to trained and authorized personnel. Store containers in a cool, dry location away from direct sunlight at temperatures between 39°F - 120°F. Keep product from freezing. Keep container tightly closed when not in use. Observe all warnings and precautions listed for this product.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided below. Use a chemical fume hood or local exhaust ventilation, and process enclosure if necessary, to control airborne dust. Ensure eyewash/safety shower stations are available near areas where this product is used.

EXPOSURE LIMITS/GUIDELINES:

| CHEMICAL NAME | CAS # | EXPOSURE LIMITS IN AIR | | | | | | | | | |
|---------------|---------|------------------------|-------------|------------|-------------|------------|-------------|-------------|------------|-------------|-----------|
| | | ACGIH-TLVs | | OSHA-PELs | | NIOSH-RELS | | NIOSH | AIHA WEELs | | OTHER |
| | | TWA ppm | STEL ppm | TWA ppm | STEL ppm | TWA ppm | STEL ppm | IDLH ppm | TWA ppm | STEL ppm | ppm |
| Thiourea | 62-56-6 | N.E | NE | NE | NE | N.E | NE | NE | N.E. | N.E | DFG MAKs: |

NE = Not Established. NIC = Notice of Intended Change See Section 16 for Definitions of Terms Used.

The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132) or equivalent standard of Canada, or standards of EU member states (including EN 149 for respiratory PPE, and EN 166 for face/eye protection), and those of Japan. Please reference applicable regulations and standards for relevant details.

RESPIRATORY PROTECTION: Maintain airborne contaminant concentrations below guidelines listed above, if applicable. If necessary, use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, Canadian CSA Standard Z94.4-93, the European Standard EN149, or EU member states. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under U.S. Federal OSHA's Respiratory Protection Standard (1910.134-1998) or the regulations of various U.S. States, Canada, EU Member States, or those of Japan. Air-purifying respirators with dust/mist/fume filters are recommended if operations may produce mists or sprays from this product.

EYE PROTECTION: Safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133, Canadian Standards, and the European Standard EN166, Australian Standards, or relevant Japanese Standards. Maintain eye wash fountain and quick drench facilities in the work area.

HAND PROTECTION: Use chemically-resistant gloves when handling this product. If necessary, refer to U.S. OSHA 29 CFR 1910.138, the European Standard DIN EN 374, the appropriate Standards of Canada, Australian Standards, or relevant Japanese Standards.

BODY PROTECTION: Use body protection appropriate for task (e.g. lab coat, overalls). If necessary, refer to appropriate Standards of Canada, or appropriate Standards of the EU, Australian Standards, or relevant Japanese Standards. If a



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hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136.

9. PHYSICAL and CHEMICAL PROPERTIES

BULK DENSITY: 8.50 (Air=10)
SPECIFIC GRAVITY @ 20°C: N/A (water=1)
SOLUBILITY IN WATER: Soluble in 11 parts water
VAPOR PRESSURE, mm Hg @ 20°C (68°F): No Data
ODOR: Odorless
APPEARANCE and COLOR: White crystals

EVAPORATION RATE (n-BuAc=1): No Data
MELTING POINT: 175°C – 177°C
BOILING POINT: 150° C– 160° C
pH: ~ No information found

10. STABILITY and REACTIVITY

STABILITY: Stable under normal conditions.

DECOMPOSITION PRODUCTS: May emit oxides of carbon, sulfur and nitrogen when heated to decomposition.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Acrolein, acrylaldehyde, hydrogen peroxide, nitric acid and oxidizing agents.

HAZARDOUS POLYMERIZATION: May occur when in contact with acrylaldehyde.

CONDITIONS TO AVOID: Incompatibles.

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: The specific toxicology data available for components greater than 1% in concentration are as follows.

Toxic. Known animal carcinogen and probable human carcinogen. May cause irreversible effects. May effect fertility. May be fatal if swallowed. May cause allergic skin reaction. May cause skin ulcers, liver damage.

UNR-MAN LDLO 147 g/kg
ORL-RAT LD50 125 mg/kg
IPR-RAT LD50 436 g/kg
IPR-MUS LD50 100 mg/kg
ORL-MUS LD50 8500 mg/k

SUSPECTED CANCER AGENT: The components of this product are found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, or CAL/OSHA and therefore are considered to be, or suspected to be, cancer-causing agents by these agencies.

IRRITANCY OF PRODUCT: This product is irritating to skin, eyes and respiratory tract.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this product and its components on the human reproductive system.

Mutagenicity: The components of this product are not reported to produce mutagenic effects in humans.

Embryotoxicity: The components of this product are reported to produce embryotoxic effects in humans.

Teratogenicity: The components of this product are reported to cause teratogenic effects in humans.

Reproductive Toxicity: The components of this product are reported to cause reproductive effects in humans.



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A mutagen is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An embryotoxin is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance which interferes in any way with the reproductive process.

BIOLOGICAL EXPOSURE INDICES: Currently, Biological Exposure Indices (BEIs) have not been determined for the components of this product.

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ENVIRONMENTAL FATE: When released into the soil, this material may biodegrade to a moderate extent. When released into the soil this material may leach into ground water. When released into water, this material is not expected to biodegrade. This material has an experimentally-determined bioconcentrate factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material may be degraded by reaction with photochemistry produced hydroxyl radical. When released into the air this material may be removed from the atmosphere to a moderate extent by wet deposition. When released into the air this material may be removed from the atmosphere to a moderate extent by dry deposition.

ECOLOGICAL DATA:

Fish: No Data

Algae: No data available

Daphnia: 48 Hr EC 50 – 35 mg/L

Dangerous to the environment. Toxic to aquatic organisms; may cause long term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate U.S. Federal, State, and local regulations, those of Canada, Australia, EU Member States and Japan.

14. TRANSPORTATION INFORMATION

US DOT, IATA, IMO, ADR:

PROPER SHIPPING NAME: RQ, TOXIC SOLID, ORGANIC, N.O.S (THOUREA)

HAZARD CLASS NUMBER: 6.1

UN IDENTIFICATION NUMBER: UN2811

PACKING GROUP: III

DOT LABEL(S) REQUIRED: Dangerous Goods

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER, 2004: 154





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MARINE POLLUTANT: This product is designated as a marine pollutant by the Department of Transportation (49 CFR 172.101, Appendix B).

INTERNATIONAL AIR TRANSPORT ASSOCIATION SHIPPING INFORMATION (IATA): This product is considered as dangerous goods.

INTERNATIONAL MARITIME ORGANIZATION SHIPPING INFORMATION (IMO): This product is considered as dangerous goods.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR): This product is considered by the United Nations Economic Commission for Europe to be dangerous goods.

15. REGULATORY INFORMATION

ADDITIONAL UNITED STATES REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: The components of this product are subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act, and are listed as follows:

| CHEMICAL NAME | SARA 302 (40 CFR 355, Appendix A) | SARA 304 (40 CFR Table 302.4) | SARA 313 (40 CFR 372.65) |
|---------------|--------------------------------------|----------------------------------|-----------------------------|
| Thiourea | NO | YES | YES |

ADDITIONAL UNITED STATES REGULATIONS (continued):

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for the components of this product. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lbs (4,540 kg) therefore applies, per 40 CFR 370.20.

U.S. CERCLA REPORTABLE QUANTITY (RQ): 10

U.S. TSCA INVENTORY STATUS: The components of this product are listed on the TSCA Inventory.

OTHER U.S. FEDERAL REGULATIONS: Not applicable.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): This product is on the Proposition 65 Lists.

ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL/NDSL INVENTORY STATUS: The components of this product are on the DSL or NDSL Inventories

CANADIAN WHMIS CLASSIFICATION and SYMBOLS: D1, D1B, D2A



EUROPEAN ECONOMIC COMMUNITY INFORMATION:

EU CLASSIFICATION: Harmful (Xn)
Environmentally Dangerous Substances (N)

EU RISK PHRASES: R 22 – Harmful if swallowed, R40 – Limited evidence of a carcinogenic effect, R51/53 – Toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment.

EU SAFETY PHRASES: S26 – In case of contact with eyes, rinse immediately with plenty of water and seek medical advice, S36 – Wear suitable protective clothing, S39 – Wear eye/face protection,



EUROPEAN ECONOMIC COMMUNITY INFORMATION FOR CONSTITUENTS: The following information is available for the components of this product.

Thiourea:

EU EINECS/ELINCS NUMBER: 200-543-5

AUSTRALIAN INFORMATION FOR PRODUCT:

AUSTRALIAN INVENTORY OF CHEMICAL SUBSTANCES (AICS) STATUS: The components of this product are listed on the AICS.

HAZARDOUS SUBSTANCES INFORMATION SYSTEM: Thiourea is listed by the Hazardous Substances Information System as a Hazardous Substance.

STANDARD FOR THE UNIFORM SCHEDULING OF DRUGS AND POISONS: Not applicable.

LABELING AND CLASSIFICATION: The product is regulated, based a review of the regulation [NOHSC: 10005 (1994-Current)]:

CLASSIFICATION: Harmful (Xn)
Environmentally Dangerous Substances (N)

RISK PHRASES: R 22 – Harmful if swallowed, R40 – Limited evidence of a carcinogenic effect, R51/53 – Toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment.

SAFETY PHRASES: S26 – In case of contact with eyes, rinse immediately with plenty of water and seek medical advice, S36 – Wear suitable protective clothing, S39 – Wear eye/face protection,

HAZARD SYMBOLS:



JAPANESE INFORMATION FOR PRODUCT:

JAPANESE MINISTER OF INTERNATIONAL TRADE AND INDUSTRY (MITI) STATUS: The components of this product are not listed as Class I Specified Chemical Substances, Class II Specified Chemical Substances, or Designated Chemical Substances by the Japanese MITI.

JAPANESE ENCS INVENTORY: The components of this product are on the ENCS Inventory as indicated in the section on International Chemical Inventories, below.

POISONOUS AND DELETERIOUS SUBSTANCES CONTROL LAW: No component of this product is a listed Specified Poisonous Substance under the Poisonous and Deleterious Substances Control Law.

INTERNATIONAL CHEMICAL INVENTORIES:

Listing of the components on individual country Chemical Inventories is as follows:

Thiourea is listed on the following inventories:

Asia-Pac: Listed

Australian Inventory of Chemical Substances (AICS): Listed

Korean Existing Chemicals List (ECL): Listed

Japanese Existing National Inventory of Chemical Substances (ENCS): Listed

Philippines Inventory of Chemicals and Chemical Substances (PICCS): Listed

Swiss Giftlist List of Toxic Substances: Listed

U.S. TSCA: Listed



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16. OTHER INFORMATION

PREPARED BY: Paul Eigbrett

MSDS Authoring Services

DATE: August 19, 2009

This information is furnished without warranty, expressed or implied, except that it is accurate to the best knowledge of NuGeneration Technologies, LLC. The data on this sheet are related only to the specific material designated herein. NuGeneration Technologies, LLC assumes no legal responsibility for use or reliance upon this data.

End of MSDS