Material Safety Data Sheet

WHMIS (Classification)
CLASS D-1A: Very toxic material causing immediate and serious effects
CLASS D-2A: Very toxic material causing other toxic effects

SECTION 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

<table>
<thead>
<tr>
<th>Trade Name</th>
<th>Mercury Residue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Code</td>
<td>None</td>
</tr>
<tr>
<td>Supplier</td>
<td>Noranda Income Limited Partnership, 860 Gérard Cadieux Boulevard, Salaberry-de-Valleyfield (Quebec) Canada J6T 6L4</td>
</tr>
<tr>
<td>Information Contact</td>
<td>Viviane DeQuoy, Industrial Hygienist</td>
</tr>
<tr>
<td>Phone Number (Business hours)</td>
<td>1 (450) 373-9144 Extension 2394</td>
</tr>
<tr>
<td>Phone Number (Emergency)</td>
<td>1 (450) 373-9144 Extension 2220</td>
</tr>
<tr>
<td>Synonym</td>
<td>Calcinated residue</td>
</tr>
<tr>
<td>DSL (Domestic Substance List)</td>
<td>Listed</td>
</tr>
<tr>
<td>Name / Chemical Formula</td>
<td>Sulfates, sulfides, selenides</td>
</tr>
<tr>
<td>Chemical Family</td>
<td>Raw material (Mercury and selenium recovery plants)</td>
</tr>
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</table>

SECTION 2. COMPOSITION AND INGREDIENTS

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS #</th>
<th>Percentage (%)</th>
<th>WHMIS: TWA (mg/m³)</th>
<th>TLV-TWA (mg/m³)</th>
<th>ACGIH (U.S.A.) 2009</th>
<th>Exposure Limits</th>
<th>OSHA - TWA (mg/m³)</th>
<th>PEL - TWA (mg/m³)</th>
<th>QUÉBEC (CA) TWAEV (mg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead (Sulfide)</td>
<td>1314-87-0</td>
<td>15-40</td>
<td>0.05 (Ph, inorganic compds)</td>
<td>0.05 (Ph, Pb compds)</td>
<td>0.05 (Pb, inorganic compds)</td>
<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
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<tr>
<td>Sulfur</td>
<td>7704-34-9</td>
<td>5-28</td>
<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
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<tr>
<td>Iron</td>
<td>7439-89-6</td>
<td>1-28</td>
<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
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<td>Not established</td>
</tr>
<tr>
<td>Selenium (Mercury)</td>
<td>-</td>
<td>1-22</td>
<td>0.2 (Se, compounds)</td>
<td>0.2 (Se, compounds)</td>
<td>0.2 (Se, compounds)</td>
<td>0.1 (Ceiling)</td>
<td>0.025 (vapour, inorganic compds, skin)</td>
<td>Not established</td>
<td>Not established</td>
</tr>
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<td>Mercury (Selenium)</td>
<td>20601-83-6</td>
<td>0.2-16</td>
<td>0.025 (Hg, skin)</td>
<td>0.1 (Ceiling)</td>
<td>0.025 (vapour, inorganic compds, skin)</td>
<td>Not established</td>
<td>Not established</td>
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<td>Not established</td>
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<td>Zinc</td>
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<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
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<tr>
<td>Copper</td>
<td>7440-50-8</td>
<td>0.7-6</td>
<td>1 (dust, mist, Cu)</td>
<td>1 (dust, mist, Cu)</td>
<td>1 (dust, mist, Cu)</td>
<td>0.1 (fumes)</td>
<td>0.2 (fumes Cu)</td>
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<td>Arsenic</td>
<td>7440-38-2</td>
<td>0.1-2</td>
<td>0.01 (As, inorganic compds As)</td>
<td>0.01 (As, inorganic compds, As)</td>
<td>0.1 (As, inorganic compds As)</td>
<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
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<td>Sulfuric Acid</td>
<td>7664-93-9</td>
<td>0.01-1.2</td>
<td>0.2 (thoracic fr.)</td>
<td>1</td>
<td></td>
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<td></td>
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<tr>
<td>Cadmium</td>
<td>1306-23-6</td>
<td>0-0.65</td>
<td>0.01 (Cd)</td>
<td>0.002 (respirable fraction)</td>
<td>0.005 (Cd)</td>
<td>0.2 (dust)</td>
<td>0.025 (Cd, dust, salt)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ACGIH: American Conference of Governmental Industrial Hygienists. OSHA: Occupational Safety and Health Administration.

Note:
- Lead (Sulfide): NIOSH REL-TWA (≤10 hours): 0.05 mg/m³; REL also applies to other lead compounds (as Pb); IDLH: 100 mg/m³ (Metal; Compounds). OSHA PEL-TWA: Not applicable. QUEBEC TWA: Lead, dust and fumes, ORAL acute (LD50): 1 330 mg/kg (Guinea pig). ORAL acute (LoLD): 155 mg/kg (Human). INHALATION acute (LoTC): 10 µg/m³ (Human). INTRAPERICOTONAL acute (LoLD): 1 g/kg (Rat). (RTECS).
- Sulfur: ORAL acute (LoLD): 175 mg/kg (Rabbit); (LD): 3 847 mg/kg (Rat). INHALATION acute (LC50): 1 660 mg/m³ (Mammals unspecified). (RTECS).
- Iron: ACGIH TLV TWA: 1 mg/m³ (Fe soluble salts). NIOSH REL-TWA (≤10 hours): 5 mg/m³ (Dust, fumes) (Fe); IDLH: 2 500 mg/m³ (Fumes; Fe dust oxides). LD50 and LC50: Not available. (RTECS).
- Selenium (Mercury complex) (as Se): NIOSH REL-TWA (≤10 hours): 0.2 mg/m³ (Except selenium hexafluoride); IDLH: 1 mg/m³ (Metal, compounds). OSHA PEL: Except selenium hexafluoride. ORAL acute (LD50): 6 700 mg/kg (Rat) ; INTRAPENVOSUS acute (LD50): 6 mg/kg (Rat). (RTECS).
- Mercury (Selenide) (as Hg): REL TWA (≤10 hours) (Vapour): 0.05 mg/m³ (Skin, Ceiling: 0.1 mg/m³ (Skin); IDLH: 10 mg/m³ (Hg), QUEBEC TLV-TWA: 0.1 mg/m³ (Aryl compunds, Skin); 0.01 mg/m³ (Alkyl compounds; Skin); TLV-STEL: 0.03 mg/m³ (Alkyl compounds; Skin); ORAL acute (LoTD): 43 mg/kg (Man). SUBCUITANEOUS acute (LoLD): 254 mg/kg (Man). INHALATION acute (LoTC): 150 µg/m³/46 days (Woman). INHALATION acute (LoLC): 30 mg/m³ (Rabbit). (RTECS).
- Zinc: LD50 and LC50: Not available. (RTECS).
- Copper: NIOSH REL-TWA (≤10 hours): 1 mg/m³ (Copper, copper compounds, as Cu, except fume); IDLH: 100 mg/m³ (Metal; Dust, mists; fumes, compounds Cu). SUBCUITANEOUS acute (LoLD): 375 mg/kg (Rabbit); INTRAPERICOTOPAL acute (LD 50): 0.7 mg/kg (Mouse). (RTECS).
- Arsenic: NIOSH REL-CEILING (15 minutes): 0.002 mg/m³ (Inorganic compounds, as As); IDLH: 5 mg/m³ (As). ORAL acute (LD50): 7 656 mg/kg (Rat); 144 mg/kg (Mouse). (RTECS). ORAL acute (LD50): Between 15-293 mg/kg (Rat); 11-150 mg/kg (Mice) (INERIS, 2006).
- Sulfuric Acid: Exposure limits may be different in other jurisdictions. NIOSH REL-TWA (≤10 hours): 1 mg/m³; IDLH: 15 mg/m³. ORAL acute (LD50): 2 140 mg/kg (Rat); INHALATION (LC50): 150 mg/m³ (Rat); 320 mg/m³ (Mouse). (RTECS).
Cadmium (Sulfide) : OSHA Ceiling : 0.3 mg/m³ (Cd fume). NIOSH IDLH : 9 mg Cd/m³ (Metal dust and compounds). ORAL acute (LD50) : 7 080 mg/kg (Rat); 1 166 mg/kg (Mouse). INHALATION acute (LC50) : 140 mg/m³/2 hours (Rat). (RTECS).

Consult local authorities for acceptable exposure limits.

SECTION 3. RISK IDENTIFICATION FOR HUMAN HEALTH

Routes of Entry
- Ingestion. Inhalation. Eye and skin contacts.

Carcinogenicity
- Arsenic : PROVEN (Group 1, IARC) (NTP, OSHA) ; CONFIRMED (Human, A1, ACGIH) ; POTENTIAL CARCINOGEN (Appendix A, NIOSH) ; CANCER HAZARD (OSHA).
- Cadmium (Sulfide) : PROVEN (Group 1, IARC) ; SUSPECTED (Human, A2, ACGIH) ; LISTED (NTP, OSHA).
- Lead (Sulfide) : POSSIBLE (Group 2B, IARC) (EPA) ; CARCINOGEN (Animal, A3, ACGIH).
- Mercury (Selenide) : NOT CLASSIFIABLE (Human, group 3, IARC) ; NOT CLASSIFIABLE (Human, Group A4, ACGIH).
- Selenium and Compounds : NOT CLASSIFIABLE (Human, Group 3, IARC) ; NOT LISTED (ACGIH) ; SUSPECTED (Human, selenium sulfide, NTP).
- Copper ; Zinc : NOT A CARCINOGEN (IARC, OSHA, NTP) ; NOT LISTED (ACGIH).
- Iron ; Sulfur : NOT LISTED (IARC, ACGIH).

Mutagenicity
- Not applicable.

Teratogenicity
- Lead : SUSPECTED (OSHA).

Acute Effects
- Contact with wet cake may cause skin and eyes irritation. The amount of tissue damage depends on length of contact. Possibility of corneal damage. Skin contact : Possibility of inflammation and blistering. Inadequate personal hygiene practices may cause the ingestion of heavy metal in the residue. Conditions and work practices which generate dusts or acid fumes should be avoided or controlled because they are irritants. The effects depend of the amount ingested or inhaled. Ingestion : Severe gastro-intestinal irritation (Arsenical cholera), nausea, vomiting, diarrhea, weakness, faintness, dizziness, excess sputum, drowsiness, pulmonary oedema, coma. Severe overexposure : Lung damage, choking, unconsciousness.
- Mercury : A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C. Zinc ; Copper : Essential for health. Vapour oxides inhalation, probably formed when heated to temperatures near or above the boiling point, may cause metal fume fever, a delayed, generally benign, transient, reversible flu-like condition.
- Sulfuric (Acid) : May be fatal if inhaled or ingested in large quantity. Liquids or acid mists : May produce tissue damage : Mucous membranes (Eyes, mouth, respiratory tract). Extremely dangerous by eyes and skin contact (Corrosive). Severe irritant for eyes : Inflammation (Redness, watering, itching). Very dangerous in case of inhalation (Mists) : May produce severe irritation of respiratory tract (Coughing, shortness of breath, choking).

SECTION 4. FIRST AID MEASURES

Eye Contact
- Check for and remove contact lenses. Immediately flush eyes with plenty of water, while holding eyelids open for at least 15 minutes. Consult a physician. Possibility of severe irritation.

Skin Contact
- Remove contaminated clothing and immediately flush skin with plenty of water for at least 15 minutes. Call a physician if irritation persists.

Inhalation
- Remove the person from exposure and bring to fresh air. If breathing is difficult, give oxygen. Get immediate medical attention.

Ingestion
- Induce vomiting. UNCONSCIOUS person : DO NOT induce vomiting or give any liquid. Get immediate medical attention.

SECTION 5. FIRE AND EXPLOSION DATA

Flash Point
- Not applicable

Flammable Limits
- Not applicable

Auto-Ignition Temperature
- Sulfur : 232°C (449.6°F)

Products of Combustion
- Metal oxides (Principally selenium). Heating to decomposition : Possibility of sulfur dioxide release (Corrosive gas), a strong respiratory irritant.

Fire Hazard
- Not flammable.

Explosion Hazard
- Not explosive (Mechanical impact ; Static discharge).

Fire Fighting (Instructions)
- ERG (Emergency Response Guidebook) : Guide 151
- Small fire : Dry chemical, CO₂ or water spray.
- Large fires : Water spray, fog or regular foam. Move containers from fire area if you can do it without risk. Dike fire control water for later disposal; do not scatter the material. Do not use straight streams.
- Fire involving tanks or car/trailer loads : Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Do not get water inside containers. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from the ends of tanks.
- Massive fire : Use unmanned hoses holders or monitor nozzles. If this is impossible withdraw from area and let fire burn.
SECTION 6. ACCIDENTAL RELEASE MEASURES

Spill

If without risk : Stop leak or spill. Prevent water run-off from entering sewers and water supplied. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Do not get water inside containers. See ERG no. 151.

Personal Protection

Large concentrations of fumes or dust : Use a self-contained breathing apparatus (SCBA) to avoid inhalation of material. Small concentrations : Use a NIOSH/OSHA approved full face cartridge respirator or the equivalent. Full protective clothing. Boots. Gloves.

SECTION 7. HANDLING AND STORAGE

Handling

DO NOT ingest or inhale dust. Wear adequate protective clothing. Wear approved respirators if adequate ventilation cannot be provided. Ingestion or inhalation : Seek medical advice immediately and provide medical personnel with a copy of this MSDS. Follow good personal hygiene practices.

Heat, contact with acids, acid vapours, contact with metals (Aluminum, zinc, iron, etc.) in acidic solution : MUST be avoided : Nascent hydrogen may form : Hydrogen selenide, hydrogen arsenide (Arsine), (Extremely toxic gases). If hydrides suspects in the area, the workplace must be immediately evacuated. Personnel entering this area MUST wear positive-pressure, self contained breathing apparatus (SCBA).

Storage

Cool and well ventilated area : Away from dust or metal pieces as zinc, copper, aluminum. Keep container tightly close. Avoid : Incompatible substances, moist, anti-acid. Floors : Acid-resistant and controlled drainage.

SECTION 8. ENGINEERING CONTROLS AND PERSONAL PROTECTION

Engineering Controls

If operations generate dust or fumes, use ventilation to keep exposure to airborne contaminants below the exposure limits.

Personal Protection

Splash goggles. Coveralls. Work gloves (PVC) and boots. Be sure to use a NIOSH approved respirator with HEPA filtration (For toxic dust, mists and vapours) or equivalent when concentrations exceed occupational exposure limits.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State and Appearance

Solid (Wet cake)

Molecular Weight

Not applicable

pH (1/10 soln/water)

3.7-5

Boiling Point

Not available

Melting Point

Iron : 1 535°C (2 979°F) ; Weighted average: 665.76°C (1 230.4°F)

Critical Temperature

Not available

Specific Gravity

1.5 (Water = 1)

Vapour Pressure

Not available

Vapour Density

Sulph (Highest known value) : 8.9 (Air = 1)

Solubility

No (Water, methanol, diethylene, n-octanol, acetone)

Odour

Not available

Taste

Acid

Colour

Brownish

Volatility

Not available

% Moisture

60-70 %

Odour Threshold

Not available

Water/Oil Dist. Coeff.

Not available

Ionicity (in Water)

Not available

Dispersion

No (Water)

SECTION 10. STABILITY AND REACTIVITY DATA

Stability

Yes

Conditions of Instability

Non applicable

Incompatibility

Lead (Sulfide) (as Pb) : Violent reaction on ignition with : Chlorine trifluoride, concentrated hydrogen peroxide, ammonium nitrate, sodium acetylide. Other incompatibilities : Sodium nitrate, zirconium, disodium acetylide, oxidants.

Sulfur : Possibility of violent reaction with : Oxidants, halogens, carbides, halogenates, halogenites, zinc, uranium, tin, sodium, lithium, nickel, palladium, phosphorus, potassium, indium, calcium, boron, aluminium, ammonia, ammonium nitrate, ammonium perchlorate, fluoride, silver nitrate.

Iron : Possibility of violent reaction or explosion with : Ammonium nitrate+heat, chloric acid, chlorine trifluoride, sodium acetylide ; Dust with : Bromine pentafluoride+heat, air+oil. Reduced iron with water produce hydrogen (Flammable and explosive gas).

Selenium : Violent reaction with : Fluorine, chloride, bromine ; Chromium trioxide, metal chlorates, potassium and silver bromates, cadmium. Heated or contact with acids or acid fumes, metals releasing hydrogen with acids : Release of hydrogen selenide (Extremely toxic gas).

Mercury (Selenide) : Possible explosion with ammonia (as Hg). Violent reaction with : Acetylenic compounds (Acetylene, sodium acetylide, 3-bromopropyne, 2-butyn-1,4-diol+acid) ; Metals (Aluminum, calcium, potassium,
sodium, rubidium, exothermic formation of amalgams) ; Cl₂ ; ClO₃ ; CH₂N₃ ; Na₂C₂ ; Nitromethane. Reaction with : Boron diiodophosphide, ethylene oxide, lithium, methylsilane, tetracarboxynickel, oxygen.

**Zinc** : Ammonium nitrate, barium dioxide, barium dinitrate, chlorates, chlorides, fluorides, chlorine trifluoride, chromic trioxide, hydrazine mononitrate, hydroxylamine, performic acid, potassium nitrate, dipotassium peroxide, selenium, sodium peroxide, tellurium, sulfur, sodium hydroxide, nitrobenzene, oxidants ; Dusts or very fine powder with water.

**Copper** : Violent reaction with : Bromates, chlorates, hydrogen peroxide, sulfuric acid, sodium peroxide, dipotassium peroxyde, hydrazodic acid, combination of hydrogen sulfur and air.

**Arsenic** : Possibility of vigorous reaction when in contact with oxidizing materials. Incompatible with : Bromine azide, dirubidium acetylde, halogen, palladium, zinc, platinum, silver nitrate, chromic oxide, sodium peroxyde and hexfluoro-isopropylideneamino lithium. Heated and contact with acids or acid fumes, metals releasing hydrogen with acids : Release of hydrogen arsenide (Arsine) (Extremely toxic gas).

**Sulfuric (Acid)** : Possibility of violent reaction with : Reducing agents, combustible and organic materials, metals and alkalis. Type of reactions generally produced : Generation of heat or gas that may cause fire or explosions. Sulfuric acid may ignite certain combustible materials. Sulfuric acid reacts with metal to produce hydrogen, a flammable and potentially explosive gas. Hydrogen reacts with sulfides and generates hydrogen sulfide (Highly toxic gas). NEVER add water directly to sulfuric acid because a violent exothermic reaction may occur.

**Cadmium (Sulfide)** : Reaction with strong oxidants. Reaction with acids : Formation of toxic gas (Hydrogen sulfur).

**Corrosivity**

**Selenium** : Some other compounds corrosive (Selenium dioxide ; Selenious acid). Highly toxic and corrosive selenium dioxides vapours with water forms selenious acid (Extremely corrosive).

### Section 11. Toxicological Information

#### Chronic Effects

Possibility of toxic effects to blood : Blood, eyes, heart, kidneys, liver, lung, mucous, skin ; Digestive, nervous and reproductive systems. Repeated exposure to dust : Possibility of eye irritation, skin and varying degree of respiratory irritation, lung damages, dermatitis.

**Lead (Sulfide)** : Metal lead NOT CLASSIFIED as carcinogen but listed as teratogen and reproductive toxic (European Economic Community Expert Committee on Metal). Lead is a regulated substance in many jurisdictions. Target organs for acute and chronic overexposure (NIOSH 90-117) : Blood, gingival tissues ; gastro-intestinal, central nervous, renal systems. Symptoms of acute overexposure often develop abruptly and resemble those of chronic overexposure : Anaemia, lassitude, weakness, nausea, vomiting, abdominal cramps, constipation, confusion, convulsions, muscular weakness, muscular and joint pains. Target organs (Chronic overexposure) : Blood, kidneys, digestive, nervous and reproductive systems.

**Sulfur** : Sulfur dioxide formation when sulfides melting. Sulfur dioxide : Irritant of the upper respiratory tract. Exposure to high concentrations : Lung damage, even death. Target organs for acute and chronic overexposure (NIOSH 90-117) : Respiratory system, skin, eyes.

**Iron** : May cause a benign pneumoconiosis (Siderosis). Target organ for acute and chronic overexposure (NIOSH 90-117) : Respiratory system, skin, eyes.

**Selenium (Mercury complex) (as Se)** : Possibility of dermatitis ; Irritation : Nose, throat, lungs ; headache, nausea, vomiting, abdominal pain, pailor and fatigue. Repeated exposure can cause garlic odour of the breath, metallic taste, increased dental cavities, and loss of hair and nails. Target organs for acute and chronic overexposure (NIOSH 90-117) : Blood, eyes, kidneys, liver, skin, upper respiratory system.

**Mercury (Selenide) (as Hg)** : Inhalation : Abdominal pain, cough, diarrhea, shortness of breath, vomiting, fever or elevated body temperature. Skin : May be absorbed, redness. Short-term : Skin irritation, possible pneumonia (Vapours). Target organs for acute and chronic overexposure (NIOSH 90-117) : Eyes, kidneys, central nervous and respiratory system, skin. Signs and symptoms of chronic overexposure : Irritability, personality change, tremor, confusion, numbness, incoordination, fatigue, muscle weakness, excessive salivation. Danger of cumulative effects. The effects may be delayed. Medical observation is indicated.

**Copper** : Target organs for acute and chronic overexposure (NIOSH 90-117) : Respiratory system, skin, liver and kidneys.

**Arsenic** : Carcinogen : This evaluation applies to the whole chemical group and not necessarily to all individual chemicals. Certain process conditions may generated arsine (Highly toxic gas). Target organs for acute and chronic overexposure (NIOSH 90-117) : Liver, kidneys, skin, lungs ; Lymphatic system. Chronic overexposure symptoms : Loss of appetite, tingling, numbness, anaemia, muscular weakness, gingival irritation, hoarseness and skin lesions (Palmo-plantar hyperkeratosis).

**Sulfuric (Acid)** : Overexposure to strong inorganic mists containing sulfuric acid ; Possibility of laryngeal cancer (HSDB, IARC). Target organs for acute and chronic overexposure (NIOSH 90-117) : Respiratory system, eyes, skin, teeth.
**Cadmium (Sulfide)**: Repeated or prolonged exposure: Risk of pulmonary diseases. Possibility of effects on kidney (Renal failure), on bones (Bone weakness).

**Toxicity**

Persons with the following pre-existing conditions warrant particular attention:

**Lead (Sulfide)**: Anaemia, pregnant or breast feeding women and women of child bearing age. Preferred method for biological monitoring: Blood lead levels (Pb blood) measurement.

**Sulfur**: Chronic pulmonary diseases.

**Iron**: Eyes and respiratory sensitivities.

**Selenium**: Asthma, recurrent dermatitis, allergies, known sensitisation to selenium, with a history of other chronic respiratory diseases, gastrointestinal disturbances, liver or kidney disorders. Preferred method for biological monitoring: Urinary selenium. Half-life in the human body is estimated at 11 days.

**Mercury (Selenide)**: Gingivitis and nervous diseases; Pregnant women. Urinary mercury is the preferred means of biological monitoring.

**Copper**: Wilson's disease.

**Arsenic**: Cancer and skin lesions. Preferred method for biological monitoring: urinary inorganic arsenic measurement.

**Sulfuric (Acid)**: Laryngeal irritation.

**Cadmium (Sulfide)**: Osteoporosis, chronic renal diseases, emphysema. Preferred method for biological monitoring: Urinary and blood levels measurement. Proteinuric detection: Beta-2 microglobulines or protein-retinol linked dosages.

Eating, drinking and smoking must be prohibited in areas where this material is handled and processed. Wash hands and face before eating, drinking and smoking.

**SECTION 12. ECOTOXICOLOGICAL INFORMATION**

**Ecotoxicity**

<table>
<thead>
<tr>
<th>Heavy metals</th>
<th>Mercury</th>
<th>Zinc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainbow trout (LC50, 96 h): 0.16-0.90 mg/L; Bluegill sunfish (LC50, 96 h): 0.16-0.90 mg/L; Catfish (LC50, 96 h): 0.35 mg/L; Water Flea (EC50, 48h): 0.01 mg/L.</td>
<td>Rainbow trout (LC50, 96h): 1.2 ppm; (LC50, 48 h): 4.76 ppm; Zebra fish (LC50, 48 h): 136 ppm.</td>
<td></td>
</tr>
</tbody>
</table>

**Toxicity to Animals**

<table>
<thead>
<tr>
<th>Lead (Sulfide)</th>
<th>Mercury (Selenide)</th>
<th>Sulfuric (Acid)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORAL acute (LD50): 1 330 mg/kg (Guinea pig). ORAL acute (LoLD): 155 mg/kg (Human). INHALATION acute (LoTC): 10 μg/m³ (Human). INTRAPERITONEAL acute (LoLD): 1 g/kg (Rat). (RTECS).</td>
<td>ORAL acute (LoTD): 43 mg/kg (Man). SUBCUTANEOUS acute (LoTD): 254 mg/kg (Man). INHALATION acute (LoTC): 150 μg/m³/46 days (Woman). INHALATION acute (LoLC): 30 mg/m³ (Rabbit). (RTECS).</td>
<td>ORAL acute (LD50): 763 mg/kg (Rat); 144 mg/kg (Mouse). (RTECS). ORAL acute (LD50): Between 15-293 mg/kg (Rat); 11-150 mg/kg (Mice) (INERIS, 2006).</td>
</tr>
</tbody>
</table>

**Biodegradation Products**

Not biodegradable

**Biodegradation Products (Toxicity)**

Not applicable

**Remarks on Environment**

Due to the product's composition, particular attention must be taken for transportation and storage. Protect from rain because run-off water may become acidic and may be harmful to flora and fauna.

**Selenium**: Can persist in naturel waters as a free anion.

**Zinc**: May be toxic to aquatic life. Low levels of zinc will affect taste of water.

**Cadmium (Sulfide)**: Bioaccumulation, particularly in shellfish, in flora. Persistent in the environment, do not let this product contaminate the environment.

**BOD5 and COD**

Not available

**SECTION 13. DISPOSAL ARRANGEMENTS**

Waste Disposal

Discard in full compliance with regulations; In a authorized site.

**SECTION 14. TRANSPORT INFORMATION**

**TDG (Pictograms)**

CLASS 6.1 Toxic substances

**PIN**

UN2025 MERCURY COMPOUNDS, SOLID PG: III

**Special Provisions (Transport)**

None

**SECTION 15. OTHER REGULATIONS**

**Labeling (EEC)**


**Selenium**: T Toxic (Pictogram)

Annex I Index number: 034-001-00-2; EU Consolidated Inventories: EC Number 231-957-4 R: 23/25, 33, 53; S: 20/21, 28, 45, 61.
Mercy Residue

Arsenic: T+ Very toxic; N Dangerous for the environment (Pictograms)

Annex I Index number: 033-001-00-X; EU Consolidated Inventories: EC Number 231-148-6
R: 23/25, 50/53; S: 20/21, 28, 45, 60, 61

Cadmium: T+ Toxique; N Dangerous for the environment (Pictograms)
Annex I Index number: 048-010-00-4; EU Consolidated Inventories: EC Number 215-147-8
R: 45, 22, 48/23/25, 62, 63, 68, 53; S: 53, 45, 61; Cancerogen C2; Mutagen Car.3; Repro. Cat 3
0.1% ≤ C < 1% T R45-48/20/22

EU: Consolidated Inventories: Listed.

Lead: EU Consolidated Inventories: EC Number 234-367-5
Sulfur: EU Consolidated Inventories: EC Number 231-722-6
Iron: EU Consolidated Inventories: EC Number 231-096-4

Mercury (Selenide): EU Consolidated Inventories: EC Number 243-910-5
Zinc: EU Consolidated Inventories: EC Number 231-175-3
Copper: EU Consolidated Inventories: EC Number 231-159-6
Sulfuric (Acid): EU Consolidated Inventories: EC Number 231-639-5
Not listed in the Annex I of Council Regulation No (EC) 304/2003
Not listed in a priority list (as foreseen under Council Regulation (EEC) No 793/93

Risk Phrases (EEC)
R23/25: Toxic by inhalation and if swallowed
R33: Danger of cumulative effects
R45: May cause cancer
R48/20/22: Toxic: danger of serious damage to health by prolonged exposure through inhalation and if swallowed
R50/53: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases (EEC)
S20/21: When using do not eat, drink or smoke
S28: In case of contact with skin, rinse immediately with plenty of water
S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S53: Avoid exposure -- obtain special instructions before use.
S60: This material and/or its container must be disposed of as hazardous waste.
S61: Avoid release to the environment. Refer to special instructions/Safety data sheets.

CEPA DSL (Canada)
Canadian Environmental Protection Act (CEPA): On the Domestic Substances List (DSL): Acceptable for use under the provisions of CEPA.
Sulfuric (Acid) is a Class B Drug Precursor under Health Canada’s Controlled Drugs and Substances Act and Precursor Control Regulations.

Regulation (U.S.A.)
CERCLA Section 103 Hazardous substances (40 CFR 302.4): Listed.
Zinc: RQ: *1 000 pounds (454 kg)
Lead (Sulfide): RQ: *10 pounds (4.54 kg)
Copper: RQ: *5 000 pounds (2 250 kg)
Sulfuric (Acid) (RQ): 1 000 pounds (454 kg)
CERCLA Section 103 Hazardous substances (40 CFR 302.4): SARA Section 313, Toxic Chemicals (40 CFR 372.65):
Arsenic (Final RQ): *1 pounds (0.454 kg)
Compounds (Mercury, Selenium, Cadmium): no RQ is assigned to this generic or broad class, although the class is a CERCLA hazardous substance. See 50 Federal Register 13456 (April 4, 1985).
Lead (Sulfide); Sulfur; Iron; Selenium (Compounds); Mercury (Selenide); Zinc; Copper; Arsenic; Sulfuric (Acid); Cadmium (Sulfide).
* No declaration required if the diameter of the piece of solid metal released is equal to or exceeds 100 micrometers (0.004 inches).

Classifications HCS (U.S.A.)
Highly toxic

NFPA (National Fire Protection Association) (U.S.A.)
Fire Hazard 0
Reactivity 1
Health 2
Special Hazard

DOT (U.S.A.) (Pictograms)
No additional remarks

DSCL (Europe) (Pictograms)
No additional remarks

ADR (Europe) (Pictograms)
No additional remarks
**SECTION 16. OTHER INFORMATION**

**References**
- ESI$: C&L (Classification and Labelling), substances or preparations in accordance with Directive 67/548/EEC (substances) and 1999/45/EC (preparations),
- ESI$: EINECS (European Inventory of Existing Commercial chemical Substances) O.J. C 146A, 15.6.1990
- Patty's Industrial Hygiene and Toxicology, 3rd Revised Edition
- Réglement sur les produits contrôlés (Canada)
- RTECS (2008). Registry of Toxic Effects of Chemical Substances, NIOSH, CDC
- Toxicologie industrielle & intoxication professionnelle, 3e édition, Lauwerys
- HSDB : Hazardous Substances Data Bank.
- NTP : U.S. National Toxicology Program.
- RTECS : Registry of Toxic Effects of Chemical Substances

**Glossaire**
- CSST : Commission de la Santé et de la Sécurité du Travail (Québec).
- HSDB : Hazardous Substances Data Bank.
- NTP : U.S. National Toxicology Program.
- RTECS : Registry of Toxic Effects of Chemical Substances

**Note**
No specific studies have been performed on this mixture. For your protection, we suggest that you test it before using in your process.

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