URANIUM PEROXIDE

CAUTIONARY RESPONSE INFORMATION

Keep people away. Avoid contact with solid. Wear goggles, self-contained breathing apparatus, and heavy leather gloves. Notify local health and pollution control agencies.

Fire
Not flammable.

Exposure
CALL FOR MEDICAL AID.
DIE.
POISONOUS IF INHALED.
Move to fresh air. Keep victim quiet and warm.

SOLID
Harmful if swallowed. Remove contaminated clothing and shoes. Wash affected areas with plenty of water. If in EYES, hold eyelids open and flush with plenty of water.

Water
Effect of low concentrations on aquatic life is unknown. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.

Pollution
Effect of low concentrations on aquatic life is unknown.

1. CORRECTIVE RESPONSE ACTIONS

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop discharge</td>
<td>Contain</td>
</tr>
<tr>
<td>Collection Systems</td>
<td>Pump; Dredge</td>
</tr>
</tbody>
</table>

2. CHEMICAL DESIGNATIONS

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CG Compatibility Group</td>
<td>Not listed</td>
</tr>
<tr>
<td>Formula</td>
<td>UO2O2</td>
</tr>
<tr>
<td>CAS Registry No.</td>
<td>Not listed</td>
</tr>
<tr>
<td>DOT ID No.</td>
<td>Not listed</td>
</tr>
<tr>
<td>NAERG Guide No.</td>
<td>Not listed</td>
</tr>
<tr>
<td>IMO/UN Designation</td>
<td>Not listed</td>
</tr>
<tr>
<td>CG Compatibility Group</td>
<td>Not listed</td>
</tr>
<tr>
<td>DOT ID No.</td>
<td>Not listed</td>
</tr>
<tr>
<td>NAERG Guide No.</td>
<td>Not listed</td>
</tr>
<tr>
<td>IMO/UN Designation</td>
<td>Not listed</td>
</tr>
<tr>
<td>CG Compatibility Group</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

3. HEALTH HAZARDS

3.1 Personal Protective Equipment: Approved respirator, leather, gloves and protective goggles.

3.2 Symptoms Following Exposure: INHALATION: Radiation injuries. EYES: Mild irritation. INGESTION: Injury to capillaries, tubular and glomerular nephritis, hepatitis, glososarcoma, and acidosis.

3.3 Treatment of Exposure: Call a physician. INHALATION: Remove from exposure and place on bed rest. EYES: Wash for 15 minutes with running water. Call a physician. SKIN: Wash with soap and water. INGESTION: Excretion is speeded by sodium bicarbonate (10 g in water every hour). Sodium citrate may offer protection to kidneys. Sodium bicarbonate may offer protection to kidneys.

3.4 TLV-TWA: 0.2 mg/m³ as Uranium.
3.5 TLV-STEL: 0.6 mg/m³ (as uranium)
3.6 TLV-Ceiling: Not listed.
3.7 Toxicity by Ingestion: Grade 2; LD₅₀ 0.5 to 5 g/kg.
3.8 Toxicity by Inhalation: Currently not available.
3.9 Chronic Toxicity: Retained in the lungs where it causes radiation injuries; lung cancer may develop. May cause kidney damage.
3.10 Vapor (Gas) Irritant Characteristics: Not pertinent.
3.11 Liquid or Solid Characteristics: No appreciable hazard; practically harmless to skin.
3.12 Odor Threshold: Currently not available.
3.13 IDLH Value: 10 mg L⁻¹.
3.14 OSHA PEL-TWA: 0.05 mg/m³ (as uranium)
3.15 OSHA PEL-STEL: Not listed.
3.16 OSHA PEL-Ceiling: Not listed.
3.17 EPA AEGI: Not listed.

4. FIRE HAZARDS

4.1 Flash Point: Not flammable.
4.2 Flammable Limits in Air: Not flammable.
4.3 Fire Extinguishing Agents: Not pertinent.
4.4 Fire Extinguishing Agents Not to Be Used: Not pertinent.
4.5 Special Hazards of Combustion Products: Not pertinent.
4.6 Behavior in Fire: Decomposes to form UO₂ to UO₂ and oxygen.
4.7 Auto-Ignition Temperature: Not flammable.
4.8 Electrical Hazards: Currently not available.
4.9 Burning Rate: Not flammable.
4.10 Adiabatic Flame Temperature: Currently not available.
4.11 Stoichiometric Air to Fuel Ratio: Not pertinent.
4.12 Flame Temperature: Currently not available.

5. CHEMICAL REACTIVITY

5.1 Reactivity with Water: No reaction.
5.2 Reactivity with Common Materials: Currently not available.
5.3 Stability During Transport: Stable at ambient temperature.
5.4 Neutralizing Agents for Acids and Caustics: Not pertinent.
5.5 Polymerization: Not pertinent.
5.6 Inhibitor of Polymerization: Not pertinent.

6. WATER POLLUTION

6.1 Aquatic Toxicity: Currently not available.
6.2 Waterfowl Toxicity: Currently not available.
6.3 Biological Oxygen Demand (BOD): Currently not available.
6.4 Food Chain Concentration Potential: Currently not available.
6.5 GESAMP Hazard Profile: Not listed.

8. HAZARD CLASSIFICATIONS

8.1 49 CFR Category: Not listed.
8.2 49 CFR Class: Not pertinent.
8.3 49 CFR Package Group: Not listed.
8.4 Marine Pollutant: No.
8.5 NFPA Hazard Classification: Not listed.
8.6 EPA Reportable Quantity: Not listed.
8.7 EPA Pollution Category: Not listed.
8.8 RCRA Waste Number: Not listed.
8.9 EPA FWPCA List: Not listed.

7. SHIPPING INFORMATION

7.1 Grades of Purity: Currently not available.
7.2 Storage Temperature: Currently not available.
7.3 Inert Atmosphere: Currently not available.
7.4 Venting: Currently not available.
7.5 IMO Pollution Category: Currently not available.
7.6 Ship Type: Currently not available.
7.7 Barge Hull Type: Currently not available.

9. PHYSICAL & CHEMICAL PROPERTIES

9.1 Physical State at 15°C and 1 atm: Solid.
9.2 Molecular Weight: 338.06.
9.3 Boiling Point at 1 atm: Decomposes.
9.4 Freezing Point: Decomposes 239°F = 115°C = 388.2 K.
9.5 Critical Temperature: Currently not available.
9.6 Critical Pressure: Currently not available.
9.7 Specific Gravity: Currently not available.
9.8 Liquid Surface Tension: Not pertinent.
9.9 Liquid Water Interfacial Tension: Not pertinent.
9.10 Vapor (Gas) Specific Gravity: (Calculated) 1.66.
9.11 Ratio of Specific Heats of Vapor (Gas): Currently not available.
9.13 Heat of Combustion: (Estimated at 190°C) 68.0 Btu/lb = 154.45 cal/g = 2.28 X 10⁶ J/kg.
9.14 Heat of Decomposition: (Estimated at 190°C) 88.0 Btu/lb = 208.6 cal/g = 5.41 X 10⁶ J/kg.
9.15 Heat of Solution: Currently not available.
9.16 Heat of Polymerization: Currently not available.
9.17 Heat of Fusion: Currently not available.
9.18 Limiting Value: Currently not available.
9.19 Reid Vapor Pressure: Currently not available.

NOTES

JUNE 1999
### Uranium Peroxide (URP)

#### 9.20 Saturated Liquid Density

<table>
<thead>
<tr>
<th>Temperature (degrees F)</th>
<th>Pounds per cubic foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOT</td>
<td>PEERTINE</td>
</tr>
</tbody>
</table>

#### 9.21 Liquid Heat Capacity

<table>
<thead>
<tr>
<th>Temperature (degrees F)</th>
<th>British thermal unit per pound-F</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOT</td>
<td>PEERTINE</td>
</tr>
</tbody>
</table>

#### 9.22 Liquid Thermal Conductivity

<table>
<thead>
<tr>
<th>Temperature (degrees F)</th>
<th>British thermal unit inch per hour-square foot-F</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOT</td>
<td>PEERTINE</td>
</tr>
</tbody>
</table>

#### 9.23 Liquid Viscosity

<table>
<thead>
<tr>
<th>Temperature (degrees F)</th>
<th>Centipoise</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOT</td>
<td>PEERTINE</td>
</tr>
</tbody>
</table>

#### 9.24 Solubility in Water

<table>
<thead>
<tr>
<th>Temperature (degrees F)</th>
<th>Pounds per 100 pounds of water</th>
</tr>
</thead>
<tbody>
<tr>
<td>INSOLUBLE</td>
<td>CURRENTLY</td>
</tr>
</tbody>
</table>

#### 9.25 Saturated Vapor Pressure

<table>
<thead>
<tr>
<th>Temperature (degrees F)</th>
<th>Pounds per square inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>CURRENTLY</td>
<td>NOT AVAILABLE</td>
</tr>
</tbody>
</table>

#### 9.26 Saturated Vapor Density

<table>
<thead>
<tr>
<th>Temperature (degrees F)</th>
<th>Pounds per cubic foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>CURRENTLY</td>
<td>NOT AVAILABLE</td>
</tr>
</tbody>
</table>

#### 9.27 Ideal Gas Heat Capacity

<table>
<thead>
<tr>
<th>Temperature (degrees F)</th>
<th>British thermal unit per pound-F</th>
</tr>
</thead>
<tbody>
<tr>
<td>CURRENTLY</td>
<td>NOT AVAILABLE</td>
</tr>
</tbody>
</table>