

# **First Responder Guide For Space Object Re-Entry**

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**FEMA**

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## Information for the Public

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A United States satellite is falling back to earth and could potentially impact almost anywhere on the planet.

The satellite has hazardous materials on board that could pose immediate hazards to people if they come in contact with the material.

Specifically, the satellite contains fuel and metal containers that are considered hazardous materials and could survive entry intact.

Any debris should be considered potentially hazardous, and should not be touched, handled, or moved.

Citizens who observe or encounter falling debris should notify your local public safety agency and stay away from it.

## Information for First Responders

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The satellite that is degrading from orbit has hazardous materials on board that could pose immediate hazards to people if they come in contact with the material.

The craft contains fuel and specialized containers that are considered hazardous materials and could survive entry intact.

Any debris should be considered potentially hazardous, and first responders should not attempt to pick it up or move it.

First responders should secure a perimeter and control access around any debris. **DO NOT** pick up any debris. Notify your local emergency manager of its location immediately.

The concerns are similar to those encountered after the space shuttle Columbia entered the atmosphere. However, this craft has far less hazardous materials and is much smaller in size.

The following information about the two hazardous materials of concern is provided for first responders.

**US Department of Transportation**  
**Emergency Response Guidebook (ERG) 2004**

**Hydrazine, anhydrous**

**ERG Guide 132**

**ERG ID Number 2029**

**Potential Hazards**

***Fire or Explosion***

- Flammable/combustible materials.
- May be ignited by heat, sparks or flames.
- Vapors may form explosive mixtures with air.
- Vapors may travel to source of ignition and create flashback.
- Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Vapor explosion hazard indoors, outdoors, or in sewers.
- Those substances designated with a "P" may polymerize explosively when heated or involved in a fire.
- Runoff to sewer may create fire or explosion hazard.
- Containers may explode when heated.
- Many liquids are lighter than water.

***Health***

- May cause toxic effects if inhaled or ingested/swallowed.
- Contact with substance may cause severe burns to skin and eyes.
- Fire will produce irritating, corrosive and/or toxic gases.
- Vapors may cause dizziness or suffocation.
- Runoff from fire control or dilution water may cause pollution.

**Public Safety**

- As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.

- Ventilate closed spaces before entering.

### **Protective Clothing**

- Wear positive pressure Self Contained Breathing Apparatus (SCBA).
- Wear chemical protective clothing that is specific for this product. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

### **Evacuation**

- Large Spill
  - See the Table (see DOT ERG) of Initial Isolation and Protective Action Distances for highlighted substances. For non-highlighted substances, increase in the downwind direction, as necessary, the isolation distance shown under “PUBLIC SAFETY”
- Fire
  - If the tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (0.5 miles) in all directions. Also, consider initial evacuation for 800 meters (0.5 miles) in all directions.

### **Emergency Response**

#### ***Fire***

- Some of these materials may react violently with water.
- Small Fires
  - Dry chemical, carbon dioxide, water spray, or alcohol-resistant foam.
- Large Fires
  - Water spray, fog, or alcohol-resistant foam.
  - Move containers from the fire area if you can do so without risk.
  - Dike fire-control water for later disposal; do not scatter the material.
  - Do not get water inside containers.
- Fire Involving Tanks or Car/Trailer Loads
  - Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
  - 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 tanks engulfed in fire.

- For a massive fire, use unmanned hose holders or monitor nozzles. If this is impossible, withdraw from the area and let the fire burn.

### *Spill or Leak*

- Fully encapsulating, vapor-protective clothing should be worn for spills and leaks with no fire.
- ELIMINATE all ignition sources (no smoking, flares, sparks, or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Do not touch or walk through spilled material.
- Stop the leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements, or confined areas.
- A vapor-suppressing foam may be used to reduce vapors.
- Use clean non-sparking tools to collect absorbed material.

### *Large Spills*

- Dike far ahead of the liquid spill for later disposal.
- Water spray may reduce vapor but may not prevent ignition in closed spaces.

### *First Aid*

- Move victim to fresh air.
- Call 9-1-1 or emergency medical services.
- Give artificial respiration if the victim is not breathing.
- **Do not use mouth-to-mouth method if the victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- Keep victim warm and quiet.
- Effects of exposure (inhalation, ingestion, or skin contact) to substance may be delayed.
- Ensure that medical personnel are aware of the materials involved and take precautions to protect themselves.

**US Department of Transportation**  
**Emergency Response Guidebook (ERG) 2004**

**Beryllium compound, n.o.s.**

**ERG Guide 154**

**ERG ID Number 1566**

**Potential Hazards**

***Health***

- **TOXIC:** Inhalation, ingestion, or skin contact with material may cause severe injury or death.
- Contact with molten substance may cause severe burns to skin and eyes.
- Avoid any skin contact.
- Effects of contact or inhalation may be delayed.
- Fire may produce irritating, corrosive, and/or toxic gases.
- Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution.

***Fire or Explosion***

- Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.
- Some are oxidizers and may ignite combustibles (wood, paper, oil, clothing, etc.).
- Contact with metals may evolve flammable hydrogen gas.
- Containers may explode when heated.

**Public Safety**

- As an immediate precautionary measure, isolate the spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate enclosed areas.

## Protective Clothing

- Wear positive pressure Self Contained Breathing Apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

## Evacuation

- **Spill**
  - See the Table (see DOT ERG) of Initial Isolation and Protective Action Distances for highlighted substances. For non-highlighted substances, increase in the downwind direction, as necessary, the isolation distance shown under “PUBLIC SAFETY”
- **Fire**
  - If the tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (0.5 miles) in all directions. Also, consider initial evacuation for 800 meters (0.5 miles) in all directions.

## Emergency Response

### *Fire*

- Small Fires
  - Dry chemical, carbon dioxide, or water spray
- Large Fires
  - Dry chemical, carbon dioxide, alcohol-resistant foam, or water spray
  - Move containers from the fire area if you can do so without risk.
  - Dike fire-control water for later disposal; do not scatter the material.
- Fire Involving Tanks or Car/Trailer Loads
  - Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
  - 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 tanks engulfed in fire.

### ***Spill or Leak***

- ELIMINATE all ignition sources (no smoking, flares, sparks, or flames in immediate area).
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop the leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements, or confined areas.
- Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers
- DO NOT GET WATER INSIDE CONTAINERS

### ***First Aid***

- Move victim to fresh air.
- Call 9-1-1 or emergency medical services.
- Give artificial respiration if the victim is not breathing.
- DO NOT use mouth-to-mouth method if the victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- For minor skin contact, avoid spreading material on unaffected skin,
- Keep victim warm and quiet.
- Effects of exposure (inhalation, ingestion, or skin contact) to substance may be delayed.
- Ensure that medical personnel are aware of the materials involved and take precautions to protect themselves.