

# Used Nuclear Fuel—Fact Sheet for First Responders

U.S. Department of Energy's (DOE's) Atlas railcar with test weights.

## What Is Used Nuclear Fuel (UNF)?

UNF is a solid, intact material that is removed from nuclear reactors after being used to generate electricity. It is packaged and shipped inside heavy, shielded metal casks that are certified by the U.S. Nuclear Regulatory Commission (NRC) to be protective of human health and withstand a range of severe accident conditions.

UNF is primarily ceramic and metal material, NOT gas or liquid. It is not flammable or explosive. The primary safety concern is ionizing radiation, not fire or chemical toxicity. Key safety considerations are time, distance, and shielding.

## Transportation Cask Characteristics

- UNF is shipped in NRC-certified Type B(U)F packages (casks) for high-activity, fissile material.
- Casks are made from very thick steel and internal shielding material with redundant lids and seals.
- Casks are engineered to withstand high-speed impact, puncture, fully engulfing fire, and water submersion.
- Even in severe transportation accidents, cask failure and nuclear material release are extremely unlikely.

## Radiation Hazards

- UNF is radioactive and generates heat. Cask shielding greatly reduces external radiation dose.
- UNF packages must meet Federal regulations for radiation dose limits at the cask surface and 2 meters from the cask to be transported.
- Radiation levels are low enough for short-term presence. For personal protection, minimize time spent near the cask and maintain a safe distance of a few meters away.
- Extended, very close contact to the cask surface increases radiation exposure.

## Emergency Response Planning

- Federally-recognized Tribes and States along transportation routes receive advance notice of UNF shipments and should follow established emergency response procedures, if needed.
- The U.S. has been shipping UNF by road and rail for more than 65 years with few incidents. The most likely transport incidents are motor vehicle collisions on the road, and grade-crossing conflicts on rail.
- For U.S. Department of Energy (DOE) UNF rail shipments, security personnel aboard DOE's rail escort vehicle provide first-line security response.
- In the extremely unlikely event of a cask breach, DOE's cross-country Nuclear Emergency Support Team (NEST) and Radiological Assistance Program (RAP) teams are ready to respond to any accident with expertise and equipment.



UNF cask on a railcar.

