

9. Emergency Response

9.1 If an incident occurs when a shipment of foreign research reactor spent fuel is in transit from its port of entry to INEEL or the Savannah River Site, who initially responds?

State, local, or tribal police, fire, and rescue personnel—known as “first responders”—will be notified in the event of an incident. The initial emergency call may come from one or more of several sources, including on-train personnel (DOE representatives and railroad workers), public law enforcement personnel who arrive first at the scene, TRANSCOM, and the carrier’s dispatch center.

First responders are trained in materials identification, regulations, response procedures, and personal protection so that they can deal effectively with incidents involving radioactive shipments. Their first responsibility upon arriving at an incident site is to secure the scene and address any fires, casualties, or security issues. Next, they notify state radiation experts and dispatch a hazardous response team to monitor the site.

9.2 After the first responders have completed their work, what roles do other responding agencies or organizations play?

- State or regional hazardous materials teams or radiological health organizations or the highway patrol are responsible for command and control at the site of the incident, accessing any other emergency response resources that are needed, and controlling communications at the site.
- In the case of rail incidents, the railroad provides law enforcement support, hazardous materials support teams, and technical assistance and equipment for response and cleanup.
- DOE provides support to the state or regional hazardous materials response team. Specifically, DOE can provide technical assistance for recovering or ensuring the integrity of the cask, for detecting and monitoring radiation at the site, for aerial or other forms of site monitoring, and for public information and communications activities.

- Other federal agencies are available to provide additional support as needed, including the Coast Guard for emergencies on waterways; the Environmental Protection Agency for environmental monitoring; and DOT, the Federal Emergency Management Agency, and other agencies, depending on the nature of the incident.

9.3 If a train derailed, what emergency response actions would be taken?

The specific response would depend on the exact nature of the derailment. What follows is a brief outline of actions that would be taken under a hypothetical scenario in which a train has derailed and damage is confined to the train, track, and immediate vicinity. The spent fuel cask has dislodged and fallen to the ground but stays intact.

- State and local emergency responders would arrive quickly at the scene.
- Representatives from relevant states, tribes, and federal agencies would verify that the cask is intact and not leaking, release the cask for shipment, inspect the tracks and cars, and assure that the site is in good condition and poses no hazard.
- The railroad would bring in equipment to move the cask and recover the derailed cars, reload the cask by crane onto the train or a truck, and clean up the rail right-of-way.
- The cask would proceed to its destination.

9.4 If a train derailed and a cask of spent fuel fell into a swiftly moving river surrounded by steep terrain, could the cask be recovered? If so, how long would recovery take?

If a train derailed and a cask fell into a river, the railroad would immediately provide a crane to recover the cask, which weighs about the same as an empty railroad boxcar. Once recovered, the cask would be placed on another train and proceed to its destination.

Because each incident is unique, it is not possible to specify how long recovery would take.

9.5 What would happen if a train derailed and a cask of spent fuel fell into a river that supplies drinking water?

Because designs for casks that carry spent fuel are required to withstand a series of tests that simulate severe accident conditions, it is highly unlikely that a cask would breach and release its contents even if it fell from a train into a river. If, however, a cask did fail and released a spent fuel element to the water or the ground, the radiation emitted would not contaminate the water or the ground if the element remained intact.

Spent fuel elements contain enriched uranium inside a stainless steel or aluminum jacket. The uranium is a solid that does not dissolve in water. Although spent fuel elements emit ionizing radiation, the source of the radiation is removed when the element is removed from an environment. In other words, the radiation remains with the material that emits it.

Therefore, if an intact spent fuel element fell into a body of water or onto the ground, the water or the ground itself would not become radioactive as a result. After the element's removal, the only remaining radiation would be background, or naturally occurring, radiation that had been present before the spent fuel element was introduced into the environment.

9.6 What would happen if terrorists attacked a shipment of foreign research reactor spent fuel?

Shipments of spent fuel from foreign research reactors are subject to strict regulatory controls aimed at ensuring the security of the shipment and protecting the public. In addition, the shipments are accompanied by armed escorts and are tracked by satellite.

The Navy, in conjunction with Department of the Army munitions experts, reviewed the potential effects of a terrorist attack on a spent fuel cask. That review, based on Army weapons testing, concluded that the consequences of such an attack would likely be negligible. Even if penetration did occur, the container would not explode. Any penetration created would be small, and the amount of radioactivity released, if any, would also be small.

A Guide to

**Foreign
Research
Reactor
Spent Fuel**