



Small-scale Transportation Incident

Scenario

The nuclear density gauge measures the decay of cesium-137 (Cs-137) by recording the count rate of the radiation transmitted directly through the pavement material from the Cs-137 source to the Geiger–Mueller tubes. These counts are then translated to the wet density of the material through a calibration process. High-energy (fast) neutrons are emitted by an americium-241 (Am-241) radiation source and detected and counted by the helium-3 (He-3) tube. The fast neutrons are slowed by interactions with hydrogen atoms. A wetter material will slow a greater number of neutrons; the gauge counts the rate of slow neutrons to measure the moisture content. The device is placed on the surface of the pavement, and the sources and appropriate detectors are activated to measure the number of gamma rays and neutrons.¹

At _____ (fill in time) on _____ (fill in date), an Acme Road Construction Company crew uses a portable soil density gauge to check the integrity of _____ (fill in name of a busy road in your community). After completing their check, they set the soil density gauge on the tailgate of the truck without securing it. They then merge in with traffic where, after a few minutes, the gauge falls off the back of the truck onto the roadway. The gauge is hit multiple times by cars, crushing and damaging its housing. The workers are concerned that the housing was breached, and the sealed radioactive source has separated from the gauge, potentially releasing radioactive material (Cs-137) onto the roadway.

The construction crew immediately notifies the police of the incident. A hazmat team responds to the scene and closes a quarter-mile radius around the scene while they search for the radioactive source using Geiger counters.

Local media outlets quickly learn of the incident and begin broadcasting it on radio, television, and social media. Much of the information being broadcast is incorrect and overblows the threat of radiation exposure. Some of the people in the cars and trucks that struck the soil density gauge on _____ (fill in name of road) are showing up at hospitals and the health department without symptoms of radiation sickness. They are still demanding to be tested for it. People living near the accident scene are calling to ask if they are in danger. Local media outlets are asking public health agencies what the public should do.

¹ From [Pavements – Nuclear Density Gauge \(NDG\)](#) by the U.S. Department of Transportation Federal Highway Administration



Artificialities and Assumptions

The following artificialities and assumptions have been identified for the purposes of the scenario:

- 1. This incident takes place in the summertime.*
- 2. It is a clear, sunny day with a temperature of 80 degrees F.*
- 3. No traffic accidents occur as a result of traffic hitting the gauge.*

Example Key Issues

- Misinformation and public information needs
- Assess medical surge needs/issues
- Determine if population monitoring is required

Real-Life and Exercise Scenario Examples

[Tiny radioactive pellet responsible for shutting down part of I-25 in Colorado on Wednesday](#)

[Transportation Accident Exercise Scenarios | Teppinfo.com](#)