Discussion Guide

For public health decision-making in a nuclear/radiological response

Nuclear Power Plant Incident

Scenario

At 7:32 a.m. on May 21, 2019, a severe thunderstorm watch with potential for tornadic activity was issued by the U.S. National Weather Service. This bulletin was received by the nuclear power plant control room. The projected radar predicts that the storm will pass directly over the nuclear plant.

At 8:44 a.m., a tornado touches down and strikes the switchyard next to the plant. Two switchyards are severely damaged, resulting in a loss of external power to the plant. In accordance with their procedures, crews attempt to start Diesel Generator #1 to restore power to the pumps, but their attempts initially fail. `After several minutes, Diesel Generator #1 eventually starts but develops a serious oil leak. Operators are able to start Diesel Generator #2, but discover it is also leaking oil. Given these conditions, at 9:54 a.m., the plant declares a Site Area Emergency and initiates emergency notifications to the U.S. Nuclear Regulatory Commission (NRC) and local and state authorities. This procedure is part of their emergency notification protocol. NRC, _____ **(fill in local agency)** and _____ **(fill in state agency)** authorities activate their emergency response plans.*

There is a total station blackout as both diesel generators fail, and the plant has no AC power. The total station blackout causes emergency coolant pumps to fail, and the plant can no longer pump water to cool the reactor. As a result of these failures, some of the fuel assemblies begin to melt, and some fuel cladding is breached, leading to a release of radioactive water into the containment building. Pressure, temperature, and radiation alarms for the containment building are going off. The high-pressure results in a breach of the containment building. The breach results in a radiological release into the environment.

As conditions continue to deteriorate, at 11:02 a.m., the operator declares a General Emergency. _____ **(fill in local agency)** and _____'s **(fill in state agency)** plans call for initiation of an evacuation order 2 miles around and 5 miles downwind of the plant. They also issue a notice to shelter in place for the other 5-mile sectors around the plant.*

** NRC has established Emergency Classifications that group events or conditions according to (1) potential or actual effects or consequences, and (2) resulting onsite and offsite response actions. The emergency classifications increase in severity from lowest to highest: Notification of Unusual Event (NOUE); Alert; Site Area Emergency (SAE); and General Emergency (GE). Definitions of each classification type can be found at Emergency Classification | NRC.gov*

Artificialities and Assumptions

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

1. *The following designated evacuation routes have been damaged by the severe weather, making them impassable: _____(**fill in routes**).*
2. *Fifty percent (50%) of the community has no electrical power, including designated shelters.*

Example Key Issues

- Lack of conclusive evidence or information
- Public information needs
- Healthcare coordination and support

Real-Life and Exercise Scenario Example

IAEA Tests Global Emergency Response in Largest Ever Nuclear Accident Simulation