

International Nuclear Event Scale Enhances Public Communications

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Key Points

■ The U.S. nuclear energy industry has a well-proven system that meets U.S. Nuclear Regulatory Commission requirements for classifying the safety significance of events at nuclear power plants. This system, part of the emergency preparedness program at every U.S. nuclear power plant site, is used during nuclear plant events to help determine what actions may be necessary to protect the public and the environment. The system has been in place for nearly 30 years.

■ A separate international system, developed by the members of the International Atomic Energy Agency (IAEA) in 1989, is now available to classify any event that involves radiation, radioactive material or the transportation of radioactive material. The IAEA's International Nuclear Events Scale (INES) complements the U.S. approach for classifying nuclear power plant events. It is focused on public communications and understanding of the safety significance of the event, rather than emergency response.

■ The U.S. industry supports the INES as a communications tool. However, the industry also believes it is essential to avoid confusion among the public, policymakers or the media concerning the use of both the NRC and INES classification system. Given the increasingly international nature of the nuclear energy business, the industry intends to further a broad understanding of how the INES works.

Background

Each nation establishes its own regulations for the commercial use of nuclear materials. Each country also has its own methodology for classifying the safety significance of events involving such materials. However, INES provides an

internationally consistent tool for communicating the safety significance of all events to the public both locally, and when necessary, internationally. The INES complements, but does not replace, individual nations' classification methods.

The NRC some 30 years ago established a four-level approach to classify nuclear power plant events. Although plants use the NRC scale in public and media communications, it is primarily a tool for protecting public safety.

The INES scale, developed in 1989, is oriented to public and media communications following an event. More than 60 nations, including the United States (via the NRC), now participate in the INES.

The NRC began limited participation in the INES in 1993, initially communicating internationally only reactor events that rated "alert" or higher on its scale. In 2002, the NRC announced that it would evaluate all reported nuclear events (reactor, fuel cycle, materials and transportation) for possible rating on the INES. The NRC has committed to provide a provisional report to the IAEA within 48 hours giving the INES classification of any U.S. events that it deems to warrant a rating of level two ("incident") or higher on the seven-level INES. (The NRC may report more quickly in an emergency.)

Some national regulatory agencies also report events at level one ("anomaly"). The IAEA shares the data with participating nations through their INES "national officers." In the United States, the NRC serves as national officer for the INES.

NRC Classification Approach Is Proven and Effective

The NRC's four emergency action level classifications range from "notification of unusual



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event”—which requires no emergency-plan activation—to “alert,” “site area emergency” and “general emergency.” The NRC provides guidance for classifying events at nuclear plants based on the potential severity of the incident.

- A notification of unusual event, the lowest classification, means that a minor plant event—either an operational event or security threat—has occurred, but no radiation release is expected.
- An alert means that there is an actual or potential reduction in the plant’s safety level or a security event that could threaten site personnel or damage plant equipment.
- A site area emergency suggests a more serious event. Major safety equipment either has failed or is deemed likely to fail.
- A general emergency is the most serious event. In this instance, radiation may leak outside the plant and beyond the plant boundary.

Nuclear power plants have detailed procedures for determining when to declare each of the event classifications. Each nuclear power plant conducts a comprehensive exercise of its emergency plan every two years with local emergency officials. The exercise includes the classification of hypothetical events.

The U.S. nuclear energy industry has found the NRC classification system to be a highly effective emergency response tool for use during an event at a nuclear power plant, whether it involves equipment malfunction or a security concern. The NRC approach is well-established and well-understood by local and state emergency response organizations in the 31 states that have nuclear power plants.

International Nuclear Event Scale Facilitates Communications

The need for an international nuclear event scale became clear during the late 1980s when many countries found that the safety significance of events was being exaggerated in the media and

they needed a simple means to communicate the true significance of the event.

The IAEA and the Nuclear Energy Agency of the Organization for Economic Co-operation and Development developed the INES in 1989. The scale is intended to ensure that events of the same significance that have occurred in different countries are labeled the same way in communicating with the media and public.

The INES has seven levels. The three lowest levels are considered “incidents”; the four highest levels, “accidents.”

The following explains the seven levels of the INES and provides examples of historical events that would have ranked at the five highest levels had the scale been in use at the time. The two lowest levels account for most of the reported events, according to the IAEA. Nations that participate in the INES have different requirements for reporting low-level events. For this reason, the IAEA cautions against making any comparisons between nations.

Level 1: Anomaly

The incident is outside normal operating parameters but had no on-site or off-site impact.

Level 2: Incident

The incident involves significant failures in safety provisions, and/or there were on-site consequences, such as contamination of part of the facility or worker exposure to radiation levels above regulatory limits.

Level 3: Serious Incident

The incident involves a “near accident” or has an on-site impact, such as widespread contamination with radioactive materials or acute health effects to a worker, and/or there was a very small off-site release of radiation such that public exposure was a fraction of regulatory limits.

Example: A 1983 event at the Vandellos nuclear plant in Spain resulted in significant fire damage to safety systems. There was no fuel damage, on-site contamination or off-site release. The

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INES classified the event as level three because the fire rendered many safety systems inoperable.

Level 4: Accident Without Significant Off-Site Risk

The accident has on-site effects, such as significant damage to the reactor or a worker fatality resulting from radiation exposure, and/or there was a minor off-site release of radiation that may have reached regulatory limits.

Example: A 1973 event at the Windscale (now Sellafield) reprocessing plant in the United Kingdom caused a significant release of radiation into an operating area of the facility. The INES classified the event as a level four accident because of the on-site impact.

Level 5: Accident With Off-Site Risk

The event has on-site impact such that it severely damaged the reactor, and/or there is a limited off-site release of radiation.

Example: The 1979 accident at Three Mile Island destroyed the reactor, but there was no significant off-site release of radiation. The INES classified that accident as level five because of the severity of the on-site damage.

Level 6: Serious Accident

The accident involves a significant release of radiation such that full implementation of emergency procedures likely will be needed to protect the public and the environment.

Example: A 1957 accident at the Kyshtym reprocessing plant in Russia caused a large off-site release of radioactive material. Emergency responders evacuated people in the area and took other measures to minimize effects on public health. The IAEA considers the event a level 6 accident.

Level 7: Major Accident

The accident involves a major release of radioactivity and has widespread health and environmental effects.

Example: The IAEA classified the 1986 accident at Chernobyl as level 7 because of its widespread environmental and public health effects.

The IAEA is preparing a revision to the INES user's manual, scheduled for release in 2008. The revision is primarily intended to bring together the guidance for facilities and the guidance for radiation sources and transport into a single document. It will not significantly change how IAEA or participating nations use the scale.

More detailed information on the international scale is available at the IAEA's INES Web page (<http://www-ns.iaea.org/tech-areas/emergency/ines.htm>). The agency provides information on events reported during the previous six months through its Nuclear Events Web-Based System (http://www-news.iaea.org/news/news_login.asp).

Conclusion

The U.S. nuclear energy industry recognizes the importance of the INES in supporting communications about nuclear power plant events. Knowing more about this tool will give the public, the media and other stakeholders a better understanding of nuclear-related events around the world.

This policy brief also is available at www.nei.org.