

2020

U.S. Nuclear Power Industry

# Emergency Classification Notifications

Statistics, Trends & Operating Experience



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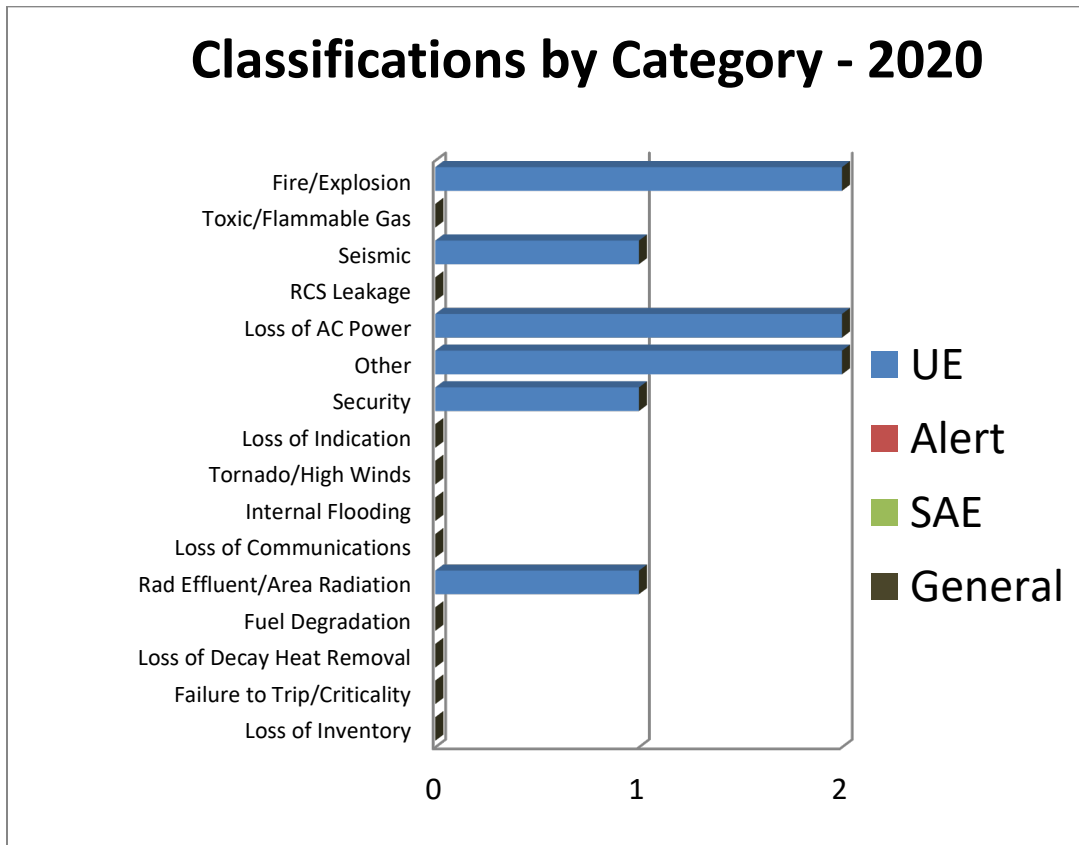
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### STATISTICS & TRENDS

During 2020, there were nine Unusual Event (UE) emergency classification notifications made to the U.S. Nuclear Regulatory Commission (NRC)<sup>1</sup>. **Figure 1** shows the categories and number of initiating events that led to notifications in 2020. The categories are those we have tracked since the inception of our annual report in 2008.

**Figure 1**



Notable observations about the 2020 notifications:

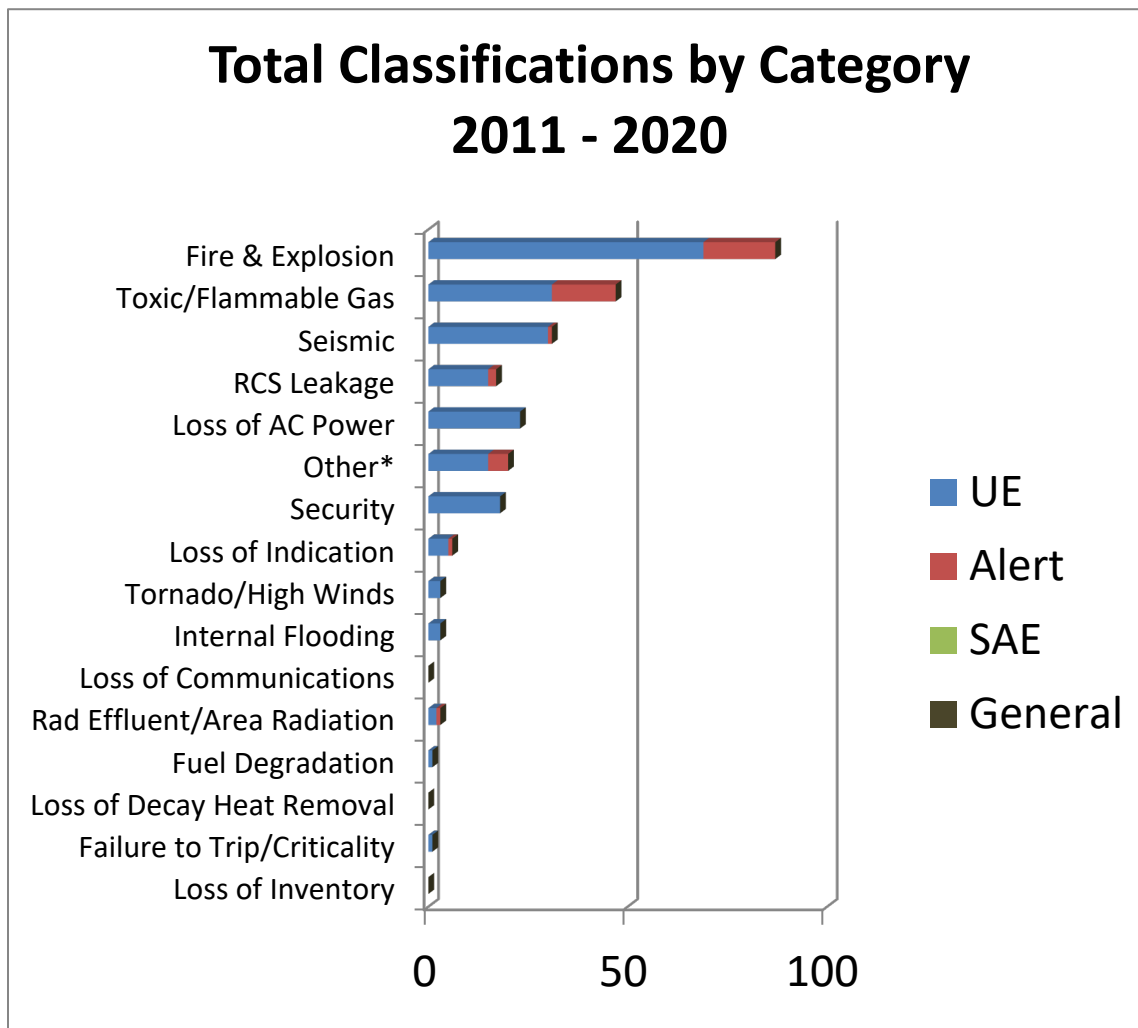
- For the second year in a row, there was no Alert declaration.
- Two of the UE declarations occurred at non-power reactor facilities with emergency classification schemes conforming to ANSI/ANS 15.16.
- For the power reactor facilities, two of the seven UE declarations occurred at sites that do **not** use an emergency classification scheme based on Nuclear Energy Institute (NEI) 99-01, Revision 6. Neither of these declarations would likely have been required had the site implemented the guidance in NEI 99-01, Revision 6.

<sup>1</sup> Compiled from data available on the [Nuclear Regulatory Commission Event Report website](#)

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- Of the five remaining declarations, two of those were later retracted based on information developed/learned after the event.
- Therefore, had all power reactor facilities been using schemes based on NEI 99-01, Revision 6, and removing the two retracted declarations, the total number of emergency declaration notifications in 2020 would have been only three. This assessment confirms our ongoing forecast that the annual number of emergency declarations would continue to decrease as the industry completes implementation of emergency classification schemes based on NEI 99-01, Revision 6.

**Figure 2**



\* The **Other** category includes reported events such as: high and low ultimate heat sink/intake levels, loss of site access due to offsite hazards such as flooding, fuel processing incidents, and Emergency Director Judgment.

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**Figure 2** shows the distribution of emergency initiating events over the preceding 10-year period, sorted by our event tracking categories. It is projected that these cumulative totals will continue to decrease at an accelerated rate in the next few years consistent with the decrease in overall declarations per year, as shown in **Figure 3**.

**Figure 3** depicts the total number of emergency declarations reported to the NRC per year for the years 2011 through 2020. The 2020 total of nine represents the seventh year in a row that total declarations are significantly below the benchmark average (~33 declarations per year). As noted above, the decrease in the number of emergency declarations over the past seven years is attributable to the industry's ongoing implementation of NEI 99-01, Revision 6, and related positions captured in Emergency Preparedness Frequently Asked Questions (EPFAQs)<sup>2</sup> submitted by NEI and approved by the NRC. Both NEI and the NRC continue to refine emergency classification guidance to ensure that declarations are aligned with Fukushima lessons learned and the actual consequences of events.

**Figure 3**



\* Sixteen (16) Unusual Events and one (1) Alert were declared on 8/23/11 due to an east coast seismic event.

<sup>2</sup> The [NRC EPFAQ](#) process provides a mechanism for addressing emergency preparedness issues in which regulatory guidance may not be sufficiently clear or where consistency in application would benefit the public, NRC and licensees. Some EPFAQs are related to clarification of generic EAL guidance.

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### INSIGHTS

#### After-the-Fact Declarations

There was one after-the-fact emergency declaration in 2020 ([55034](#)); this occurred at a non-power reactor facility.

#### Emergency Classification Notification Retractions

Two emergency classification notifications made in 2020 were retracted ([54531](#) and [54938](#)); both retractions were for power reactor facilities.

#### Update: EPFAQ 2019-04 - BWROG EPG/SAG Revision 4 Impact on Emergency Action Levels

The Boiling Water Reactor Owners Group (BWROG) authors generic guidance for the development of site-specific emergency operating procedures and severe accident management guidance for boiling water reactor designs. In June 2018, the BWROG issued Revision 4 of the Emergency Procedure and Severe Accident Guidelines (EPGs/SAGs). EPG/SAG Revision 4 contains procedural enhancements that address shutdown and refuel operating modes, insights from the March 2011 accident at Fukushima, better integration with other event mitigation procedures (FLEX and B.5.b), post-Fukushima regulatory requirements, and lessons learned from previous changes (e.g., training and implementation feedback).

NEI, in conjunction with the BWROG, developed EPFAQ 2019-04 to identify EAL impacts and provide recommended changes to maintain alignment between a plant's emergency operating procedures, severe accident management guidelines, and emergency classification scheme. The EPFAQ was submitted to the NRC. Several follow up meetings between the public, NRC, NEI and the BWROG were held to discuss and come to agreement on the final responses. The EPFAQ has been approved by the NRC and is available [here](#). BWR licensees should consider making the changes described in the EPFAQ.

#### Focus Area: NEI 99-01 Revision 7

10 CFR 50.47 and 10 CFR 50 Appendix E require licensees to implement a standardized emergency classification and action level scheme. The first NRC-endorsed guidance for meeting these requirements was provided in Appendix 1 of NUREG-0654, published in 1980. In January of 1992, NUMARC/NESP-007 "Methodology for Development of Emergency Action Levels" was published and endorsed by the NRC as an acceptable alternative method of meeting the requirements. This improved methodology was based on years of operating experience with EALs based on NUREG-0654 as well as incorporation of insights from various industry initiatives such as symptom-based EOPs. Emergency classification scheme guidance

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continued to evolve with the subsequent publication of NEI 99-01 Revisions 4, 5 and 6. Each revision incorporated prior operating experience and lessons learned as well as the approved EPFAQs related to the then current endorsed scheme guidance. NEI 99-01 Revision 6, published in November of 2012, also incorporated early insights from the Fukushima accident.

NEI and the NEI EAL Task Force are currently drafting Revision 7 of NEI 99-01, "Development of Emergency Action Levels for Non-Passive Reactors." Revision 7 will incorporate outstanding approved EPFAQs related to EALs as well as operating experience and lessons learned from implementation of Revision 6. This revision will also address industry and NRC-identified issues that were deemed to be beyond the scope of the NRC EPFAQ process.

**2020 Classification Notification Summaries by Category**

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Event identification numbers are enclosed in parentheses and hyperlinked to the [NRC Event Report website](#).



**FIRE/EXPLOSION**

**2/19/20 UNUSUAL EVENT – FIRE IN CONTROL BUILDING [**Retracted**]**

**Watts Bar Nuclear ([54531](#))**

At 0957 a Notification of Unusual Event [NOUE] was determined to be present at the Watts Bar plant Unit 1 under criteria HU4 for a fire potentially degrading the safety of the plant (fire for more than 15 minutes). The fire was declared extinguished at 1033. The NOUE was terminated at 1126. Investigation into the cause of the fire was in progress.

Watts Bar Nuclear subsequently retracted the NOUE based on the following additional information:

- WBN reported a condition that was determined to meet the definition of a FIRE in the plant Emergency Preparedness Implementing Procedures (EPIP) based on indications available to the decision-maker at the time the declaration was made. A fire, without observation of flame, is considered present if large quantities of smoke and heat are observed.
- Moderate quantities of smoke were observed coming from an electrical cabinet not required to support safe plant operation. Once Fire Brigade personnel were able to access the affected room, no evidence of flame or significant heat was observed. Plant personnel ultimately determined that an overheated electrical component (transformer) resulted in the smoke. As such, the actual conditions did not meet the EPIP definition of a fire.

NEI 99-01 Revision 6

**5/1/20 UNUSUAL EVENT – FIRE IN NON-SAFETY RELATED ELECTRICAL SWITCHGEAR**

**VC Summer Nuclear Station ([54688](#))**

At approximately 1238 an alarm indicated smoke on a non-safety related electrical switchgear bus in the turbine building. Plant personnel were dispatched to investigate. Smoke and heat were found coming from the bus. At 1253 a Notification of Unusual Event was declared. At 1308 the fire was declared out and fire watches posted.

Offsite assistance was requested during the event and the Jenkinsville, SC fire department responded to the site. There were no plant personnel injuries or impact to the health and safety of the public.

The cause of this event was unknown at the time. The electrical bus was de-energized. The unit was in a planned refueling outage.

The Notification of Unusual Event was terminated at 1737 on May 1, 2020. The cause of the event was still under investigation.

NEI 99-01 Revision 6

**SEISMIC**

**11/8/20 UNUSUAL EVENT – EARTHQUAKE FELT ONSITE**

**Millstone Power Station ([54988](#))**

Millstone Units 2 & 3 declared an Unusual Event at 0921 after an earthquake was felt onsite. The earthquake monitoring instrumentation did not actuate, and there were no station system actuations. No damage was detected at the time. Millstone initiated their Abnormal Operating Procedure for an earthquake and performed station walkdowns.

At 1510 on November 8, 2020, Millstone Units 2 & 3 exited the Unusual Event due to the earthquake following plant walkdowns that revealed no damage to plant structures, systems, or components. Station and System walkdowns identified no issues due to the earthquake.

NUREG-0654

**LOSS OF AC POWER**

**8/3/20 UNUSUAL EVENT – LOSS OF OFFSITE AC POWER**

**Brunswick Nuclear Plant ([54812](#))**

At 2312 Brunswick Unit 1 declared an Unusual Event due to a loss of offsite power. The unit was at approximately 20 percent power and was not synced to the grid when the unit automatically scrammed. All control rods fully inserted. Emergency Diesel Generators started and began powering the safety buses. Safety systems actuated as expected. The Unit also experienced a loss of Fuel Pool Cooling and Cleanup

System, but one pump was returned to service. Unit 2 remained at 100 percent power and was unaffected.

At approximately 2302 a loss of offsite power occurred on Unit 1. This resulted in a Reactor Protection System (RPS) actuation. Per design, emergency diesel generators 1 and 2 properly started and loaded to their respective emergency buses. The Reactor Core Isolation Cooling (RCIC) system was manually started and was being used to control reactor water level. The High Pressure Coolant Injection (HPCI) system was manually started and was being used for pressure control. As previously reported, an Unusual Event was declared at 2312 due to the loss of offsite power. At the time of the event, Unit 1 was in the process of shutting down for maintenance associated with a ground on the main generator.

As a result of the reactor trip, reactor water level reached low level 1 (LL1). The LL1 signal causes a Group 2 (i.e., floor and equipment drain isolation valves), Group 6 (i.e., monitoring and sample isolation valves) and Group 8 (i.e., shutdown cooling isolation valves) isolations. The LL1 isolations occurred as designed; the Group 8 valves were closed at the time of the event. Per design, the loss of offsite power also caused a Group 1 (i.e., main steam isolation valve) isolations. Due to the Emergency Diesel Generator and Primary Containment Isolation System (PCIS) actuations, this event was also being reported as an eight-hour, nonemergency notification in accordance with 10 CFR 50.72(b)(3)(iv)(A).

Unit 2 was not affected. There was no impact to the health and safety of the public or plant personnel. The safety significance of the event was minimal. All safety related systems operated as designed.

Investigation of the cause of the loss of offsite power was in progress. At 1454 on August 4, 2020, the Unusual Event was exited when offsite power was restored to Unit 1. Per design, when the loss of offsite power to Unit 1 occurred, all four emergency diesel generators (EDGs) started and EDGs 1 and 2 properly supplied emergency buses 1 and 2. Since Unit 2 was not affected by the loss of power, EDGs 3 and 4 ran unloaded.

With restoration of offsite power to Unit 1, EDG 2 was secured. EDGs 1, 3, and 4 were secured as required by plant operating procedure.

NEI 99-01 Revision 6

**8/10/20 UNUSUAL EVENT – LOSS OF OFFSITE AC POWER DUE TO HIGH WINDS**

**Duane Arnold Energy Center ([54826](#))**

At 1258 Duane Arnold Energy Center declared an Unusual Event due to a loss of offsite power due to high winds. The event at the single unit plant resulted in an automatic scram from 82 percent power (Mode-1) to zero percent power (Mode-3). They headed to Mode-4 following the scram. There was damage on site, but the Reactor Building was intact. All rods inserted and cooling was being addressed via Reactor Core Isolation Cooling (RCIC) for level control and Safety Relief Valves (SRVs) were removing decay heat to the torus. Both Standby Diesel Generators (SBDGs) were running. In addition, a report was made under CFR 50.72 (b)(3)(iv)(A) and (B) due to PCIS [(Primary Containment Isolation System)] Groups 1, 2, 3, 4 and 5 [activating] due to loss of offsite power. All isolations went to completion. RCIC was injecting for level control. All rods fully inserted during the scram. The plant electrical line up was both SBDGs running. Decay heat was being removed via SRVs to the torus making progress towards shutdown cooling.

NEI 99-01 Revision 6

**SECURITY**

**10/8/20 UNUSUAL EVENT – SECURITY EVENT [**Retracted**]**

**Monticello Nuclear Generating Plant ([54938](#))**

At 1125 Monticello Nuclear Generating Plant declared a Notification of an Unusual Event (NOUE) due to a Security Condition that did not involve a hostile action, due to a helicopter that hovered over the site for approximately 10 minutes. The unit remained at 100 percent power during the event.

At 1715 Monticello Nuclear Generating Plant terminated the NOUE (HU1.1), upon confirmation through federal law enforcement and conversation with the aircraft owner that the aircraft in question was performing power line inspections for a different utility and was not a threat to the plant. Monticello determined that this condition did not meet the 1-hour reporting requirements of 10 CFR 73.71.

Monticello Nuclear Generating Plant retracted this event notification based on subsequent information received that was not available at the time of the original notification. Following review of the additional

information collected by the site through an investigation performed with input from local and federal law enforcement, Xcel Energy determined the helicopter did not constitute a credible threat or compromise site safety or security. There was no impact to public health or safety.

NEI 99-01 Revision 6

**RADIOLOGICAL EFFLUENT**

**12/14/20 UNUSUAL EVENT – DISCOVERY AFTER-THE-FACT INADVERTENT RELEASE OF ARGON-41  
GAS**

**National Institute of Standards & Technology ([55034](#))**

[NOTE: NIST operates a 20 MW test reactor]

At 0336 operators declared an Unusual Event due to elevated radioactivity levels observed at the facility's ventilation stack. The elevated levels were due to a release of Argon-41 gas caused by a failure of the facility's fan system. This failure caused the Argon gas to be released to the ventilation stack into the atmosphere. The reactor was operating at 19.5 MW at the time of the incident and was shut down when the ventilation stack set point was reached. Facility personnel secured the offsite gas release and verified no fission product release occurred. The Unusual Event was terminated at 0422.

ANSI/ANS 15.16

**OTHER**

**5/19/20 UNUSUAL EVENT – POTENTIAL FLOODING**

**Dow Chemical Co. ([54719](#))**

At approximately 1930 the Dow Chemical Company TRIGA Reactor (300 kW) received notification of an upstream dam break in Sanford, Michigan and the potential to flood the facility. A Notification of Unusual Event was subsequently declared at 1930.

The reactor was in a shutdown condition at the time of the event and had been due to COVID-19. The licensee was monitoring the flood situation in the area and licensee personnel responded to the site. The NRC remained in the normal mode of operations.

At 0850 on May 21, 2020, the Dow Chemical Company TRIGA Reactor terminated the Notification of Unusual Event. The event was terminated after flood water receded. The flood water receded faster than was expected. As stated, the reactor was in a shutdown condition at the time of the event. There was no effect on the reactor due to the flood water.

**ANSI/ANS 15.16**

**7/31/20 UNUSUAL EVENT – HURRICANE WARNING**

**Plant St. Lucie ([54808](#))**

A Hurricane Warning was placed into effect for St. Lucie County including the plant site. A Hurricane Warning was confirmed with the State Watch Office at 1700. As a matter of procedure, St. Lucie Nuclear Power Plant entered an Unusual Event classification for the Hurricane Warning. The Hurricane Warning was downgraded to a Tropical Storm Warning by the National Weather Service for St. Lucie County, including the plant site. At time 1445, on 08/02/20, St. Lucie Nuclear Plant terminated from the Unusual Event classification. There were no changes in plant status for either unit. Both units were stable at 100% power.

**NEI 99-01 Revision 5**

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