

## Form to Propose a Generic Issue (GI)

Name or Person Submitting Request	E-Mail Address	Date of Request
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### GENERAL INSTRUCTIONS FOR COMPLETING AND SUBMITTING THIS FORM:

The Generic Issue Program is managed by the Regulatory Guidance and Generic Issues Branch in the Office of Nuclear Regulatory Research. The public (or NRC staff) should fill out this form, then email it to [GIP.Resource@nrc.gov](mailto:GIP.Resource@nrc.gov), or send by US Mail to US Nuclear Regulatory Commission, Generic Issues Program, Washington, DC 20555-0001, Mail Stop C-2C07M.

The proposer should review the Web Site to understand the criteria that will be used by staff to screen a proposed issue.

NRC Public Web site: [www.nrc.gov/about-nrc/regulatory/gen-issues.html](http://www.nrc.gov/about-nrc/regulatory/gen-issues.html)

Website for NRC staff: [www.internal.nrc.gov/RES/projects/GIP/UserInstructions.html](http://www.internal.nrc.gov/RES/projects/GIP/UserInstructions.html)

Contact the [GIP.Resource@NRC.gov](mailto:GIP.Resource@NRC.gov) for assistance in responding to the entries on the form below if needed.

- 1. If you believe this issue is an immediate safety concern, or identifies an inadequacy associated with NRC- regulated activities at a licensee or other regulated party, you should instead report the issue through the procedures listed under "Report a Safety or Security Concern" found at:**

<http://www.nrc.gov/about-nrc/regulatory/allegations/safety-concern.html>.

**Otherwise, describe the situation, condition, cause and significance of occurrence or adverse consequence by providing as much detail as practical. Identify the current regulatory requirements or guidance or describe why this proposed issue is not addressed by existing regulations and guidance. Provide a basis for your statements if available, or indicate that it is your opinion or belief, as applicable. (Use additional pages as needed)**

#### **Problem Statement:**

Many power reactor sites in Region IV are missing Technical Specification (administrative section, Reg Guide 1.33) required Off-Normal (abnormal) procedures for "Inadvertent Start of ESFAS equipment." I believe that this is a generic safety issue that requires generic communications to industry to establish further what RIS-2005-29 implied with respect to procedures and training for these Condition II transient events, even if they do not escalate to a Condition IV event (fuel damage).

I also believe that some licensees are not implementing the operating experience program appropriately because they are not creating or adding Off-Normal event procedures when events occur at other plants that are applicable to all power reactor licensees. This program, if implemented correctly, would require evaluation and if it

meets the guidance in RG 1.33 as “other expected transients,” would require an Off-Normal (abnormal) procedure. A great example of this type of event is the hydrogen deflagration event at Cooper Nuclear Station in the late 1990s due to a hydrogen gas leak from the main generator. Several licensees today still do not have any procedure for this type of event, which could lead to permanent damage to the main turbine and generator, cause a reactor trip, damage other equipment, and possibly injure or kill plant staff.

**Background:**

While authoring an initial exam in 2015 at River Bend Station (RBS) in Region IV, I noticed that they did not have a procedure to address an Inadvertent Start of Emergency Core Cooling System (ECCS) equipment. I wrote a violation on this based on the licensee’s claim that there is a potential for fuel damage at BWR-6 designs when High Pressure Core Spray (HPCS) is inadvertently started at full power, because this system sprays directly inside the shroud on the fuel.

**Requirements:**

The admin section of Technical Specifications links Regulatory Guide 1.33 to procedures as well as Criterion V of Appendix B to 10 CFR part 50. This regulatory guide requires Off-Normal (or Abnormal) Procedures for a list of abnormal events and a generic topic for “other expected transients” that may be applicable. In my opinion it is clear that an inadvertent start of an ECCS system would be one of the “other expected transients” that would require an Off-Normal or Abnormal Procedure. Furthermore, the NRC issued Regulatory Issue Summary RIS-2005-29 to explain the concerns with these types of events. This RIS, “Anticipated Transients That Could Develop Into More Serious Events” defines inadvertent ECCS actuation as a “relatively frequent” Condition II event with the potential to lead to a more serious condition. Since inadvertent ECCS actuation is defined as a relatively frequent event by the RIS, it is my opinion that the RG-1.33 provision of an “expected transient” would be met. Further, as the RIS explains, the abnormal condition has the potential to lead to a Condition III or IV event and Emergency Operating Procedure (EOP) entry. Therefore, the condition would meet the RG-1.33 expectation for a “significant event.” Any relatively frequent abnormal event that has the potential to lead to EOP entry if not addressed should have an associated abnormal operating procedure to help mitigate the situation prior to EOP entry being required. Relying on skill of the craft for a relatively frequent Condition II event is inconsistent with the RIS and RG-1.33, and in my opinion, has the potential to adversely affect the initiating events, mitigating systems, and barrier integrity cornerstones.

There are also several cases of operating experience where these types of events have actually occurred.

The NRC added these events to the Knowledge and Abilities catalogs for both PWR and BWR designs in the 1990s timeframes with revision 2 (NUREG-1122 and NUREG-1123, rev 2, respectively) and testing began on these items at that time. For terminology

considerations, the NRC considered all inadvertent ESFAS actuations (not just ECCS systems) because each system within a specific design could have challenging consequences if inadvertently started and there is Operating Experience that each of these items has occurred at a power reactor facility. The table below illustrates this:

\* depending on actual plant design and configuration

<b><u>Event for PWR</u></b>	<b><u>Potential Consequences*</u></b>
Inadvertent start of AFW/EFW	reactivity event, steam generator water level challenges, inadvertent release, damage to pump if aux oil pump not also started
Inadvertent start of ECCS	RCS inventory event, overpressurization, fuel damage,
Inadvertent start of Containment Spray	damage equipment in containment, overpressurization

<b><u>Event for BWR</u></b>	<b><u>Potential Consequences*</u></b>
Inadvertent start of RCIS	reactivity event, reactor water level challenges, inadvertent release, damage to pump if aux oil pump not also started
Inadvertent start of ECCS (incl HPCS, LPCS, LPCI, and HPCI)	RCS inventory event, overpressurization, fuel damage for extreme cases w/ATWS
Inadvertent start of Containment Spray	damage to equipment in containment, overpressurization

- 2. Describe why the issue should be processed as a GI. Please provide your input on the following: The issue can have its risk or safety significance adequately determined or estimated; issue may affect public health, safety, common defense and security, or environment; issue applies to two or more plants; issue is not being addressed by other regulatory processes; issue will likely result in actions by licensees; or issues may result in new or revised regulation, policy, or guidance.**

As mentioned above, these events can cause reactivity excursions, water level transients, overpressurization events, radiation releases, and possibly fuel damage. Without adequate procedures this could affect public health and safety and the environment if not stopped in a timely fashion. Furthermore, the procedures network has not been inspected as a program since early 1990 and some plants have deleted these procedures, modified them, or never developed them for these events based on the timeline of FSAR development and operating experience studies.

- 3. Identify source(s) of information or references for the proposed GI (self, NRC process, research, other).**

While at South Texas Project (STP) this year I asked them about the inadvertent start of AFW or ECCS events and they stated that they have no procedure for the AFW event and would use skill of the craft or a normal operating procedure to shutdown an ECCS system for this type of event. They also do not train on either of these events so I could not use these events on the initial exam due to NUREG-1021 Exam requirements (lack of a procedure). I expected to write another violation similar to the one at RBS for 2015 but STP had their licensing staff consult with other plants in region 4 and they concluded that this is a generic issue (at least in Region –IV). South Texas Project sent in a white paper to Region IV stating that 26 PWR plants in the US fleet did not have an abnormal operating procedure (AOP) for an inadvertent AFW pump start. For inadvertent actuation of SI/ECCS pump start at power, 5 sites of the 27 had procedures. Only one of the Westinghouse PWRs sampled have an at-power AOP for inadvertent SI/pump start.

As a senior examiner in Region IV, I requested information for Region IV licensees via phone calls and I also looked on our procedure networks that we currently have for current exam development projects and verified that there are several plants that are missing some of these procedures and use skill of the craft to secure them or in some cases a normal operating procedure. During our attempts to sample these items by including them in a scenario or a job performance measure, they either did not perform well or refused to allow their inclusion on the examinations because they did not train on the events, and/or had poor or missing procedures.

Conclusion:

I recommend generic communications to request the analysis of what each part 50 licensee has in their network of Abnormal Procedures, what aspects they are vulnerable to for Condition II or higher events, and what procedures, training, and evaluations have been done based on operating experience and NRC generic communications on these topics over the past twenty-seven years since we inspected the procedures network.

This is also important because other events would be captured in this communication, such as hydrogen explosions and leaks. This would be another example of an event which should have an AOP for hydrogen issues with the main generator that many licensees do not have in their procedure network today (See OP Ex from CNS in 1998, hydrogen deflagration event, OP Ex 2009 from STP where contaminated hydrogen led to complete destruction of the main turbine and generator).