

TSTF / NRC Meeting  
February 18, 2016

Proposed Reactor Coolant Leakage Requirements  
Traveler

1

TSTF-554, Revise Reactor Coolant Leakage Requirements

- The TSTF is creating TSTF-554, which will revise the leakage related definitions and specifications to improve clarity and to provide Actions commensurate with the level of degradation.
- The following discussion reflects the current state of the proposed traveler.

2

## Definitions

- The definition title is changed from LEAKAGE to REACTOR COOLANT LEAKAGE.
- The subdivisions of LEAKAGE in the existing definition are made separate defined terms, IDENTIFIED LEAKAGE, UNIDENTIFIED LEAKAGE, TOTAL LEAKAGE, and MATERIAL FAULT LEAKAGE, all listed under the REACTOR COOLANT LEAKAGE title.
- The proposed definitions define the systems to which they apply. The PWROG and BWROG definitions are different to reflect system differences.

3

## Definitions

- PWR REACTOR COOLANT LEAKAGE introductory paragraph
  - Proposed
    - REACTOR COOLANT LEAKAGE shall be leakage of reactor coolant, excluding reactor coolant pump seal water injection or leakage, from any pressure-containing components that are part of the reactor coolant system (RCS) and up to and including the second of two isolation valves of connections to the RCS.
- The introduction includes the PWR identified and unidentified LEAKAGE exception for reactor coolant pump (RCP) seal water injection and leakoff in order to eliminate duplication.
- The system boundary is the RCS and any connected systems (such as ECCS injection lines) up to the second isolation valve.

4

### Definitions

- BWR REACTOR COOLANT LEAKAGE introductory paragraph
  - Proposed
    - REACTOR COOLANT LEAKAGE shall be leakage of reactor coolant into the drywell from any pressure-containing components that are part of the reactor coolant system (RCS) or connected to the RCS.
- The introduction includes the existing BWR identified LEAKAGE qualification as leakage into the drywell.
- The system boundary is the RCS and any connected systems within the drywell.

5

### Definitions

- The existing definitions of identified LEAKAGE, unidentified LEAKAGE, and total LEAKAGE (BWR only) are reworded for clarity with no change in intent. For example:

PWR Identified LEAKAGE

1. LEAKAGE, such as that from pump seals or valve packing (except reactor coolant pump (RCP) seal water injection or leakoff), that is captured and conducted to collection systems or a sump or collecting tank,
2. LEAKAGE into the containment atmosphere from sources that are both specifically located and known either not to interfere with the operation of leakage detection systems or not to be pressure boundary LEAKAGE, or
3. Reactor Coolant System (RCS) LEAKAGE through a steam generator to the Secondary System (primary to secondary LEAKAGE);

PWR IDENTIFIED LEAKAGE

1. leakage that is captured and conducted to collection systems or a sump or collecting tank, such as that from pump seals or valve packing;
2. leakage from sources that are specifically located and known to not interfere with the operation of leakage detection systems; or
3. leakage into the secondary system through a steam generator.

6

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## Pressure Boundary LEAKAGE Definition Replaced with MATERIAL FAULT LEAKAGE

### PWR Pressure Boundary LEAKAGE

LEAKAGE (except primary to secondary LEAKAGE) through a nonisolable fault in an RCS component body, pipe wall, or vessel wall.

### PWR MATERIAL FAULT LEAKAGE

IDENTIFIED LEAKAGE or UNIDENTIFIED LEAKAGE through a material fault in a component body, pipe wall, or vessel wall, excluding leakage into the secondary system through a steam generator. Leakage past seals and gaskets is not MATERIAL FAULT LEAKAGE.

### BWR Pressure Boundary LEAKAGE

LEAKAGE through a nonisolable fault in a Reactor Coolant System (RCS) component body, pipe wall, or vessel wall.

### BWR MATERIAL FAULT LEAKAGE

IDENTIFIED LEAKAGE or UNIDENTIFIED LEAKAGE through a material fault in a component body, pipe wall, or vessel wall. Leakage past seals and gaskets is not MATERIAL FAULT LEAKAGE.

7

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## Specifications

- PWR TS 3.4.14 and BWR TS 3.4.4 are renamed from "RCS Operational LEAKAGE" to "REACTOR COOLANT LEAKAGE."
- The LCOs and SRs are unchanged except to use the new defined terms.
- The existing TS Actions on UNIDENTIFIED LEAKAGE, IDENTIFIED LEAKAGE, TOTAL LEAKAGE and UNIDENTIFIED LEAKAGE increase have no technical changes except to use the new defined terms.

8

### PWR Actions for MATERIAL FAULT LEAKAGE

- Required Action B.1: Close the associated isolation valve immediately.
  - A note provides an exception:
    - Not applicable to MATERIAL FAULT LEAKAGE in a component body, pipe wall, or vessel wall with an [inner] diameter  $\leq$  [XX] inches.
    - We are still developing criteria for the component size.
  - If the note does not apply and there is no isolation valve, the default (shutdown) Action applies.

### BWR Actions for MATERIAL FAULT LEAKAGE

- Required Action B.1: Close the associated isolation valve immediately.
  - There is no Note.
    - BWR licensees don't enter the drywell during plant operation, so there is no opportunity to determine the location of a leak and the size of the leaking component.
  - If there is no isolation valve, the default (shutdown) Action applies.

## PWR & BWR Actions for MATERIAL FAULT LEAKAGE

- Required Action B.2: Determine system is acceptable for continued operation in 72 hours.
  - Applies whether or not the isolation valve is closed.
  - Bases require considering:
    - the effect of the flaw on the material strength of the affected component, such as seismic response, thermal cycling, and flaw propagation;
    - the effect of continued degradation of the affected component during reactor operation prior to repair due to leakage through the fault, including leakage past any closed isolation valve;
    - the potential for interference with leakage detection systems;
    - the quality of the water passing through the flaw (liquid versus steam); and
    - (PWRs) the effect of any boric acid deposition on the affected component or other systems.

11

## Schedule

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|---|---------------|
| • Complete traveler and distribute for industry 3-week review | End of April  |
| • Resolve industry comments and provide draft to NRC          | Early June    |
| • TSTF/NRC Presubmittal meeting                               | End of June   |
| • Traveler submittal  | End of August |

12