

Doug / Bill

Here is a revised version. This is not final yet.

Sam
01/09/01**Meeting Agenda for Steam Generator (SG) Performance Indicator (PI)**

- **Purpose of meeting**

- To discuss the resolution to the SG Action Plan, action item 7. This action item requires the staff to determine the need to incorporate a new SG PI.

- **Current PIs for monitoring barrier integrity**

- Reactor Coolant System Activity

- Reactor Coolant System Leakage- measured in g.p.m. which is too high to be a useful indicator for trending as a tube rupture precursor.

- Indian Point (IP) - 2 task group recommendation 5e requires the staff to assess how performance indicators could be revised to adequately identify adverse trends in primary to secondary leakage to use an indicator of SG degradation.

- The existing reactor coolant leakage PI leakage thresholds could be reduced. Based on review of previous tube ruptures, very low levels of leakage (< 5 gallons per day) have typically preceded a tube rupture. In some instances licensees are allowed to use leak limiting sleeve repairs which would mask these low level of tube leakage from defective tubes. Further, for the seven incipient tube rupture events documented in NUREG/CR-6365, the licensees have shut down the plant within hours of developing leak rates from 12-120 gallons per hour. Thus, modifying the existing PI by reducing the threshold for identified leakage would not provide additional benefit and is not recommended.

- **Potential need for a new performance indicator**

- IP-2 SG tube rupture event February 2000 --- Barrier integrity PI (Reactor Coolant System Leakage) went from green to yellow following the event.

- A special followup inspection completed in July of 2000 (not a supplemental inspection) identified a finding with red risk significance associated with poor corrective actions for disposition/analysis of eddy current testing (ET) data on SG tubes (for ET performed in 1997).

- This red finding would not likely have been identified by following the current guidance for baseline and supplemental inspections:

- The red issue was identified by an independent evaluation of licensee ET data which is not done by the NRC under the current baseline inspection procedure.

- A supplemental inspection for a degraded cornerstone triggered by the yellow leakage PI would not call for an independent NRC review of licensee ET data.

- **Proposed SG PI**

- IP-2 task group recommendation 5f required staff to establish risk informed thresholds through PIs or SDP process, that can be applied to the results of the periodic SG inspections to identify tube degradation that warrants increased NRC attention.

- Memorandum from J. Strosnider to B. Boger dated February 14, 2000, describes a

J/14/01

proposed SG tube integrity PI. This proposal attributes PI colors based on the degree to which the licensee maintains structural or leak tight integrity of the SG tubes. This PI has advantages and disadvantages discussed below:

Advantages

- Provides early indication of a plant operating with degraded SG tubes.
- Provides a clear definition of an unacceptable performance for SG tubes prior to a tube rupture.
- Data for this indicator is readily available following the inspection of each SG.
- Would provide a consistent and appropriate basis for triggering a supplemental inspection.

Disadvantages

- Data for this indicator is updated only after an inspection during an outage. Thus, new data is only provided every 12, 18 or 24 months.
- Older PWRs who have not replaced SGs could likely be in the white range and remain there until the SGs are replaced.

- Examples of how this new PI would be used is as follows:

After SG ET the licensee identified that more than one percent of the tubes are defective and need repair (Technical Specification Category C-3). The licensee would be required to identify this condition as white under this new performance indicator. No additional supplemental inspection for this white indicator alone would be required.

After SG ET the licensee identified three tubes with ET indications that are significant and meet criteria for in-situ pressure testing. Based on this testing two of these tubes fails to meet the 3X normal operating pressure integrity requirement. This condition would require entering the Yellow range for this new PI. This could require a supplemental inspection of licensee corrective actions.

After startup the licensee experiences leakage which exceeds the plant technical specifications for identified leakage (typically 10 g.p.m.) and is required to shutdown. After shutdown the licensee determines that this leakage is due to tube leakage and it is estimated that this tube would have ruptured if it had been subjected to a main steam line break differential pressure. This condition would require entering the Red range under the proposed PI. A supplemental inspection with independent NRC review of licensee corrective actions would be required.

• **Alternatives to a SG PI**

- Revise the ISI procedure such that a detailed review of SG tube ET data (when warranted) is included in the baseline inspection procedure

Advantages

- No new PI required and less reporting burden on industry.
- Rapid inspection response to plants with degraded SG tubes is possible.
- NRC more directly involved in licensee decisions to operate with degraded SG

tubes.

Disadvantages

- Current ET training of most Region based ISI inspectors is inadequate to be able to implement this immediately. Further, ongoing training would need to occur as advances in ET technology occur.
 - Likely this would require increasing the total inspection resource burden for inspection hours at some PWR sites when ET data is evaluated. As an alternative all the hours for these sites could be spent on ET data at the expense of inspecting other elements of the licensee's ISI program.
 - May require additional travel costs for ET data analysis done at vendor sites.
- Do nothing to current PI or ISI procedure

Advantage - No additional direct costs to the industry or Agency.

Disadvantage - Current program allowed IP-2 to operate with severely degraded SG tubes which represented a Red level of risk for the public. The other options discussed above are intended to minimize the potential for this condition from recurring.