

efficiency bulletin

Dec. 2, 2016

Efficiency Bulletin: 16-33

System Health Reporting Efficiencies

Low-value system health reports and associated administrative burdens will be eliminated. Elimination of this low-value activity will enable engineers to focus better on the station's most important systems and action plans to resolve adverse trends and degrading conditions.

Addressees: Chief nuclear officers, NEI APCs and INPO APCs

Issue: ENG-004, Standardize System Engineering Core Business

Background

- Over the years, system health content has increased beyond that associated with AP-913 critical components, probabilistic risk assessment (PRA) risk significance, single point vulnerability mitigation or maintenance rule risk-significant functions. Consequently, the additional reporting diverts system engineering focus from other core duties.
- This bulletin provides recommendations to eliminate low-value system health reports and associated administrative burdens. Elimination of this low-value activity will enable engineers to focus better on the station's most important systems and action plans to resolve adverse trends and degrading conditions. The guidance provides a tiered approach to system selection with corresponding recommendations for system health reporting content and frequency. Additionally, recommendations are provided to address software issues to further reduce administrative burdens.

Color Code: BLUE
Due: June 2017

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- The recommendations provided in this bulletin should be applied, as appropriate, to align with each company's goals and business model. For example, fully integrated, continuous or trigger-based system health monitoring can be used in place of the time-based guidance if required by the utility process. The elimination of low-value system health reporting, walkdowns or system monitoring does not change scoping requirements, relieve stations of required regulatory activities such as 10 CFR 50.65 maintenance rule monitoring or license renewal commitments, or de-emphasize achievement of relevant industry standards.
- Change management considerations have been provided to help with implementation of the recommendations provided in this document.
- Subsequent efficiency bulletins will provide a streamlined set of standardized core duties focused on system health monitoring, management of critical components and long-term system management.

Summary of Efficiency Opportunity

- Desired end-state—Reduction of system health reporting by as much as 75 percent. In addition, reduction of time spent on remaining system health reporting by as much as 50 percent.
- Value proposition (vision of excellence)—Depending on the utility's processes, indirect cost savings are available from reduction of time spent by system engineering on health reporting. The time saved should be redirected to focus on developing action plans to resolve adverse trends and degrading conditions and executing the plans for important, off-color systems.
- Why is it important?—System health reporting has been an industry standard for communicating system issues and driving system reliability. Reducing administrative burdens associated with health reporting processes will enable engineering staffs to focus on systems that are most important to safety and reliability.
- Industry benchmark value(s)—Equipment reliability index (ERI) will continue to meet or exceed current performance.
- Measure of effectiveness—ERI goals are met or exceeded. Guidrails are fully established and industry performance for both safety and reliability will be maintained or improved.

Relevant Standards

- Performance Objectives and Criteria (INPO):
 - EN.1, Engineers communicate emerging technical issues and the related potential risks to management and the operations staff as information becomes available to ensure necessary compensatory and contingency actions are implemented.
 - ER.1, Station managers use a system and component health process to improve equipment performance that promotes high levels of collaboration among Operations, Engineering, Maintenance, and Work

Key to Color Codes:

Red: NSIAC initiative – full participation required for viability

Blue: Action expected at all sites, but is not needed for broad industry viability

Green: Utility discretion to implement, consistent with its business environment

Management. The process ensures station managers are informed and included in the decision process.

- ER.2, System, program, and component health reports document off-normal conditions and the associated risk. These conditions include latent, degraded, and low margin conditions.
- ER.2, Senior managers periodically review and challenge component and program health reports. These reports are used as input for resource prioritization.
- ER.2, System, component, and program health reports are used as a communication tool to summarize equipment conditions and needed corrective actions to management.
- INPO Event Report (IER) L2 11-2, 2009-2010 Scram Analysis, Recommendation 7c:
 - 7. Ensure programs and processes used to evaluate and track off-normal or degraded conditions for scram-risk-significant systems and equipment have the following attributes:
 - c. System and component health reports require appropriate documentation of off-normal conditions and the associated risk. These should include latent, degraded, and low margin conditions. Members of the Plant Health Committee periodically review and challenge the reports.

Relevant Regulatory Requirements

- 10 CFR 50.65, Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants

Guidance

System Selection and Use of a Tiered Approach

Station resources should use a graded approach to monitoring and reporting with primary focus on those systems that are most important to safety and reliability. The following guidance provides a graded approach:

Tier	System Criteria	Health Reporting / Comments
1	Tier 1 systems are the most important to nuclear safety and plant reliability: ▪ MSPI Systems ▪ Scram Vulnerable Systems* - o Condensate & Feedwater (incl. main condenser) - o Main Turbine (including auxiliary systems) - o Main Generator (including auxiliary systems) - o Electrical Dist. (incl. transformers/switchyard) - o Reactor Recirculation/Reactor Coolant	Semiannual completion of system health scorecard. If green/white score, an abbreviated report may be issued (refer to content guidance). Target: 10-12 health reports/unit (20-24 health reports/year/unit).
2	Tier 2 systems are important from a nuclear safety, plant reliability and risk standpoint but do not meet Tier 1 criteria: ▪ Systems with critical components as defined in AP-913, Rev. 5. ▪ Systems with high safety significant/risk significant components/functions that do not meet the criteria in Tier 1. Tier 2 systems may have system engineering support sustained through use of an assigned system engineer or point of contact engineer.	System health reporting is not a requirement. A graded approach to monitoring and trending should be used but must adhere to regulatory requirements. Trends should be reviewed at least once per refueling cycle. Action plans resolve adverse trends or degrading conditions and may be required based on issues identified by other processes or by management discretion.

3	Tier 3 systems are those that do not meet the criteria of either Tier 1 or Tier 2. These systems are routinely monitored by operator rounds and serviced by fix-it-now, EFIN or natural department stakeholders such as chemistry or maintenance. System engineering resources are not normally assigned to Tier 3 systems other than maintenance rule monitoring of any low safety significant or non-risk significant systems, if necessary. Examples of Tier 3 systems include security, FLEX, ISFSI, emergency response facilities, plant cranes (other than fuel handling), chemistry support systems and sirens.	No system health reporting is recommended for Tier 3 systems.
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* Systems may be excluded from Tier 1 if a documented evaluation determines a system failure would not result in a scram (e.g., an AP-1000 turbine trip does not cause a scram).

Additional Tier 1 and Tier 2 health reports may continue to be prepared for utilities with automated and integrated system health reporting functionality.

System Health Reporting Content and Frequency for Tier 1 Systems

Manually developed system health reports will be replaced with system health scorecards. The system health scorecard is a compilation of system metrics/indicators taken from various sources. At a minimum, the scorecard should include maintenance rule, MSPI, material condition, aggregate impact, system monitoring and trending. Automation is recommended to the extent practical.

System health scorecards should be completed on a semiannual frequency. When the scorecards indicate the system is green or white, an abbreviated report may be issued that only includes the scorecard documenting current performance.

When system health scorecards indicate the system is red or yellow, additional detail is recommended, including an executive summary and an action plan for recovery:

The executive summary provides a simple, concise statement of current system health along with the trend (i.e., improving, declining or steady). The summary should also include the basis for the red/yellow rating, a discussion of significant issues/consequences during the reporting period, and the key actions and time frames to improve overall system health to a level acceptable by the management team (i.e., green/white). The action plan includes both short- and long-term activities. These may include work orders, projects, modifications or any other asset management related tasks critical to the short- and long-term health of the system. These activities should clearly define the actions with due dates and owners. A specific focus should be placed on those actions needed to improve or sustain system health.

Software Considerations to Further Reduce Administrative Burden

Computer software and technology can increase the level and timeliness of information available to engineering staffs and equipment reliability teams. Database warehouses, such as CAP, can automatically be pulled into system health scorecards supporting near real-time system health reporting. Regardless of the platform used, a method should be utilized to collect and maintain historical system health data for subsequent system engineering analyses.

Acquiring operating data directly from station SSCs is critical to the accurate assessment of system health. Wireless-based data acquisition units can be utilized to collect pressure, temperature, vibrational and other raw data so that system performance can be more effectively monitored and trended. Automatic paging systems can alert a system engineer when a component is either degraded or about to fail. Advanced Pattern Recognition software can be utilized with both permanent and temporary monitoring instrumentation to provide a more in-depth and rigorous review of component/system operating data. These tools have proven largely successful in proactively identifying adverse conditions prior to failure.

Utilization of tablets or other electronic equipment to facilitate walkdowns and associated data collection can also reduce administrative burdens. Camera functions of the tablets can be utilized to truly document general area conditions and component as-found conditions while the development of simple applets will assist system engineering with collecting necessary information in the field.

Recommended Industry Actions

- Involvement by responsible industry groups such as the Equipment Reliability Working Group to provide further guidance, if required.

Change Management Considerations

Industry Activities

- Industry webinar to provide background for initiative, guiderails, and an open forum to clarify expectations and ask questions. Webinar information can be found at the following site: <https://web.inpo.org/Pages/Nuclear-Promise-Issues.aspx>

Company Actions

- Site/fleet process owner to revise governing processes and procedures.
- Issue corporate and sitewide communication on the initiative.
- Engineering management briefs system engineers on the new tiered approach and reporting requirements for each tier.
- Reinforce expectations for a healthy technical conscience, specifically that abnormal plant conditions or indications that cannot be readily explained are documented and evaluated to verify the conditions and indications do not challenge operational or design limits that protect plant safety and reliability.
- Obtain alignment from the station senior leadership team on systems in each tier.
- Efficiency Bulletin 16-08 previously eliminated the need for a formal margin management program and credited other station processes such as system health and program health for monitoring and managing safety and reliability margins. With the reduction of many system health reports, validate that adequate margins are maintained through other processes such as corrective action, engineering change or plant health committee.

Guiderails

- Implementation of this bulletin will result in many systems no longer having system health reports. Importantly, many of these systems may be safety-related, impact control room operations, affect reactivity management indicators or contribute to risk in the station PRA analyses. Consequently, stations should ensure that the following guiderails are in place:
 - Stations need to verify that no credit is being taken for Tier 2 or 3 system health reporting in meeting regulatory or industry commitments, such as 10 CFR 50.65 maintenance rule monitoring or license renewal.

- System and component engineers should continue establishing action plans to resolve adverse trends or degrading conditions on Tier 2 systems. If unintended, adverse consequences begin to occur on Tier 2 systems, establish corrective actions to address the causes of the unintended consequences.
- Condition reports should be initiated for any system health reports that are red or yellow and appropriately dispositioned, commensurate with their safety and reliability significance.
- Critical component failures should be trended and periodically analyzed to determine if failure to communicate adverse trends and degrading conditions to station management was a contributing factor.
- The age of red/yellow systems should be trended to ensure action plans are executed in a timely manner. An improving trend is expected.

Report Your Site's Results

Please report your company's implementation of this improvement opportunity, including the date of completion. Send this information along with your company point of contact to EfficiencyBulletin@NEI.org.

Industry Contacts

- Industry champions for this issue:
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Industry Approval:

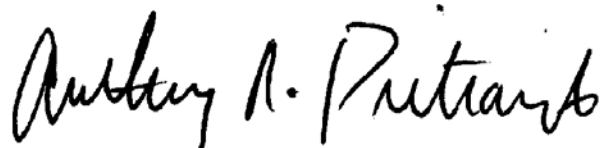
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A handwritten signature in black ink, reading "Anthony R. Pietrangelo". The signature is written in a cursive style with a large, stylized initial 'A'.