

System Health Reporting

Review of ERWG's Performance
Monitoring Minimum Expectations
and Best Practices

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Nolan Strawder, Wolf Creek Nuclear

Cory Rosenblad, Exelon Nuclear

What is the ERWG?


- The Equipment Reliability Working Group (ERWG) is comprised of industry peers dedicated to improving equipment reliability through effective implementation of AP-913
- Supported by EPRI, INPO, and NEI
- Developed a guide in 2011 to determine Minimum Expectations and Best Practices of System Health Performance Monitoring


ERWG System Health Performance Monitoring Guide – Sept. 2011

- Surveyed industry, gathered most utilities System Health Reports; compared SystemIQ Scorecards
- Comparison analysis performed to develop list of possible standard indicators
- An indicator set was established as the Minimum Expectation and Best Practices criterion.

SHR Indicators

 **Green (Exemplary)** – Fully Healthy, *no additional action beyond routine maintenance*

 **White (Satisfactory)** – Minor Deficiencies Exist, *degradation presents challenges to long-term reliability and safe and efficient operability*

 **Yellow (Marginal)** – Degraded Requiring Near Term Attention *to minimize operational challenges and safety and reliability concerns*

 **Red (Needs Improvement)** – Significant Degradation Requires Immediate Attention *to minimize operational challenges and safety and reliability concerns*

Lagging Indicators

- **Maintenance Rule** *(Minimum Expectation)*
 - Maintenance Rule Margin (unavailability, FFEs margin) *(Best Practice)*
- **MSPI** *(Minimum/Best)*
- **Plant Scram/Trip** *(Minimum/Best)*
 - Unplanned Generation Losses *(Best Practice)*
- **Equipment Regulatory Violations** *(Minimum Expectation)*
 - Equipment Regulatory Violations – Licensee Event Reports *(Best Practice)*
- **Unplanned LCO Entries (72 hr sd)** *(Minimum Expectation)*
 - Unplanned LCO Entries (All) *(Best Practice)*

Leading Indicators

- Operator Work Arounds *(Minimum Expectation)*
 - Operator Burdens *(Best Practice)*
- Operator Challenges *(Minimum/Best)*
- “High” Critical Component Failures
- Preventive Maintenance Deferrals *(Minimum Expectation)*
 - Preventive Maintenance Deferral Backlog *(Best Practice)*
 - First Time Preventive Maintenance Backlog *(Best Practice)*
- Temporary Modifications *(Minimum Expectation)*
- Perf. Monitoring Plan Concerns *(Minimum Expectation)*
- Unmitigated SPVs *(Minimum/Best)*

Leading Indicators (cont)

- Long Term Action Plan Status (Minimum Expectation)
- System Health Improvement Actions (Minimum Expectation)
- Modifications Backlog (Minimum Expectation)
- Obsolescence (Minimum Expectation)
- Important System Work Orders (Minimum Expectation)
- Corrective Critical (CC) Work Order Backlog (Minimum Expectation)
 - Corrective Non-Critical (NC) Work Order Backlog (Best Practice)
- Deficient Critical (DC) Work Order Backlog (Minimum Expectation)
 - Deficient Non-Critical (DN) Work Order Backlog (Best Practice)
- System Margin Issues (Minimum/Best)
- Reactivity Management (optional)
- System Chemistry Effectiveness (optional)

Action Plan

- Need one when system health is degraded beyond acceptable per plant (Yellow or Red)
- GOALS should focus on improving health
- ACTIONS, when completed, will result in improvement desired
 - Plan Type
 - Plan Goal
 - Cause
 - Current Health
 - Plan Owner
 - Administrator
 - Action Type
 - Corrective Action
 - Action Due Date
 - Action Status

Example Action Plan:

SYSTEM HEALTH ACTION PLAN			
Action Plan Type:		Applicable System:	
Current Health Color:	Current Health Trend:	Current Health Score:	Goal Health Score:
Action Plan Goal:			
Cause for Action Plan:			
Actions			
<u>Deficiency / Point Loss</u>	<u>Action Type / Action Statement</u>	<u>Responsibility (Dept/Owner)</u>	<u>Due Date</u> <u>On Track</u>
1.	/		YES <input type="checkbox"/> NO <input type="checkbox"/>
2.	/		YES <input type="checkbox"/> NO <input type="checkbox"/>
3.	/		YES <input type="checkbox"/> NO <input type="checkbox"/>
4.	/		YES <input type="checkbox"/> NO <input type="checkbox"/>
5.	/		YES <input type="checkbox"/> NO <input type="checkbox"/>
Explanation for Items NOT on Track/Due Dates Passed:			
<u>Description</u>		<u>Tracking Mechanism</u>	
1.		1.	
2.		2.	
3.		3.	
Overall Comments:			
Action Plan Development Date:	System Engineering Manager Approval Date:	PHC Approval Date:	Last Update Date:
Action Plan Administrator:		System Engineering Manager:	
Action Plan Team Members:		Action Plan Owner:	

System Health Cumulative Impact Reductions – Sept. 2015

- ERWG made several recommendations to minimize System Health Requirements/Burdens
 1. System Selection and Use of a Tiered Approach
 - Only require SHR's for PRA Risk Significant Systems, Systems with elevated scram sensitivity (many SPVs), and Systems with high AP-913 critical components
 - Adjust frequency of SHR to a graded approach; considering PRA Risk, Generation Risk, and historical System Health

System Health Cumulative Impact Reductions – Sept. 2015 (cont)

2. System Health Reporting Content

- At a minimum, include Executive summary, Scorecard, and Action Plan
- Consider combining SHRs (Feedwater + Condensate)

3. Software

- Obtain software that can better extract data automatically to reduce data collection by Engineers (i.e. SystemIQ)
- Advanced Pattern Requisition (APR) software to monitor equipment more in-depth and analytical