Status Update for ROPTF Short Term Action Plan:

Remove Planned Unavailability (UAP) from the Mitigating Systems Performance Index (MSPI)

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Objective

Demonstrate that planned unavailability is an inconsequential contributor to managing margin to safety and, therefore, can be eliminated from MSPI

Why Pursue?

- Experience suggests that removing Planned UA (UAP) from MSPI should have a negligible impact on the indicator and therefore should not degrade any margins of safety indicated by MSPI values.
  - UAP is subject to re-baselining within the current NEI 99-02 guidance
- Collecting, trending, and verifying UAP input data places a high burden on both licensees and NRC (particularly Senior Resident Inspectors for PI verification), with little benefit to safety
- Definition of Unplanned UA will need to be revised as an enabler to removing UAP
- Current MSPI UAP due to degrading (but operable) trends (e.g., high vibes, high DP, etc.) will continue to be captured by the Maintenance Rule program (including after the transition to MR 2.0)

Data Review Results So Far

- Reviewed all plant data back to 2006 to determine impact of removing UAP from the Unavailability Index (UAI).
  - Review identified 11 of 114 WHITE indicators (only 5 Units) that would have remained GREEN if UAP was removed from the UAI calculation. The new proposed Unplanned UA definition was introduced to capture these 11 WHITE indicators.
  - Review also identified that several plants have a large planned UAI relative to the overall MSPI. In the worst case (Waterford 2006) UAP contributed an order of magnitude reduction in margin to WHITE for the MSPI. The new proposed Unplanned UA definition will be applied to a few recent high UAP examples to determine acceptability.

Data Results Review (cont.):

- Five (5) individual sites contributed to the 11 WHITE indicators that would have stayed GREEN. A review of these sites identified the following insights:

  - **FORT CALHOUN (4Q13):** Plant attributed several months of mitigating system unavailability to the Planned unavailability input due to the recovery action plan following significant flooding event.
    - *This would be considered an abnormal situation in which the MSPI was one of several indicators adversely impacted by a very significant event. In this case, the MSPI provides no predictive or preventative function.*

  - **NINE MILE POINT (4Q08 thru 3Q09):** Plant attributed several months of Cooling Water System Planned unavailability due to a failure of a non-monitored component which resulted in system unavailability.
    - *Based on the proposed new definition of Unplanned unavailability to include ALL components in the MSPI system, this would still be counted in the Unavailability Index (as UNPLANNED) and still contribute to the total MSPI.*

Data Results Review (cont.)

- **Browns Ferry (2Q07 thru 3Q07)** - Still seeeking historic data
- **Farley Unit 2 (3Q07 thru 1Q08)** – Driven to WHITE due to three main contributors on a single train: Multiple MSPI failures, excessive unplanned unavailability and planned unavailability beyond baseline.
  - *Planned unavailability hours, under the proposed change, will be tracked by either the revised definition of Unplanned UA or MR and MR2.0.*
- **Crystal River (2Q12)** – MSPI was GREEN when unit shutdown and projected to WHITE due to historical UA and loss of critical hours due to the extended shutdown. MSPI will be evaluated on a case by case basis for extended outages, per FAQ.

Data Review Results (cont.)

- A review of the worst case planned UAI impact on MSPI Margin to WHITE (Waterford 2006) could not be fully analyzed based on the amount of time that had past since the site experienced the drop in margin.
  - The new proposed Unplanned UA definition will be applied to a few recent high UAP examples to determine acceptability.

- Contribution of Planned UAI is likely high due to three primary contributors:
  1. Revised maintenance strategy without taking action to establish new baseline – Current process allows re-baseline (no potential missed WHITEs with change)
  2. Failure of non-MSPI components within the monitored system boundary. Currently, this is planned UA and with be treated as Unplanned UA with the new proposed definition (no potential missed WHITEs with change)
  3. Repeated and/or long duration Corrective Maintenance on degraded but operable equipment is currently counted as planned unavailability. Revised definition of Unplanned UA will not include these hours (removal of scope from MSPI and reliance on MR and MR2.0 to capture this performance issue).

Next Steps

1. Apply new proposed Unplanned UA definition to a couple of units with recent high UAP (examples provided in background slides).
   - Plan is to investigate Perry Unit 1 and Farley Unit 2, since both units had larger UAP values in 2019 with different systems.
2. Continue to seek information on Browns Ferry 2Q07-3Q07 to understand what underlying issues drove the planned UA above baseline.
3. Determine UAP values sufficiently low enough to be considered insignificant / inconsequential
4. Submit draft White Paper on the proposed change to the NRC – April 2020

Background Slides

Highest Planned UAI Contribution since 2018

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tblALLPlannedExclusionResults

Navigation Pane

Unit	LocId	PeriodYrMn	GroupCode	System	URI	UAI	Planned UAI	MSPI	MS
Perry Unit 1	1036	201903	MS07	ROP-MSPI-HPI	-1.34168004706225E-07	4.39113790662304E-07	4.71207367271628E-07	3.04945785956079E-07	-1.6
Perry Unit 1	1036	201812	MS07	ROP-MSPI-HPI	-1.34168004706225E-07	4.30023334274665E-07	4.62119071350501E-07	2.9585532956844E-07	-1.6
Perry Unit 1	1036	201806	MS07	ROP-MSPI-HPI	-1.34168004706225E-07	4.12241121239276E-07	4.44336932914052E-07	2.78073116533051E-07	-1.6
Perry Unit 1	1036	201809	MS07	ROP-MSPI-HPI	-1.34168004706225E-07	4.05981097628683E-07	4.38076934746521E-07	2.71813092922457E-07	-1.6
Perry Unit 1	1036	201906	MS07	ROP-MSPI-HPI	-1.34168004706225E-07	4.05577139872548E-07	4.37670364884007E-07	2.71409135166323E-07	-1.6
Columbia Unit	1144	201709	MS07	ROP-MSPI-HPI	-2.89674034092968E-07	4.11532170119244E-07	4.35105219635587E-07	1.21858136026276E-07	-3.1
Columbia Unit	1144	201712	MS07	ROP-MSPI-HPI	-2.91505614313792E-07	4.11487548035439E-07	4.35060607932025E-07	1.19981933721647E-07	-3.1
Grand Gulf Uni	1123	201809	MS07	ROP-MSPI-HPI	-6.10058989991558E-08	4.82843688587309E-07	4.29946487943816E-07	4.16605814734794E-07	-1.3
Grand Gulf Uni	1123	201806	MS07	ROP-MSPI-HPI	-3.09130747666586E-08	4.75234713803729E-07	4.15782381399664E-07	4.39080139358339E-07	2.3
Perry Unit 1	1036	201712	MS07	ROP-MSPI-HPI	-1.34168004706225E-07	3.77683875285584E-07	4.09779691123987E-07	2.43515870579358E-07	-1.6
Perry Unit 1	1036	201803	MS07	ROP-MSPI-HPI	-1.34168004706225E-07	3.44735553881037E-07	3.76830801977237E-07	2.10567549174812E-07	-1.6
Perry Unit 1	1036	201709	MS07	ROP-MSPI-HPI	-1.36058773136938E-07	3.26941915318457E-07	3.59037912605137E-07	1.90883142181519E-07	-1.6
Grand Gulf Uni	1123	201803	MS07	ROP-MSPI-HPI	-3.49726256843041E-08	4.0182771954278E-07	3.50594711121907E-07	3.66855090305762E-07	1.6
Grand Gulf Uni	1123	201712	MS07	ROP-MSPI-HPI	-6.55908536373317E-08	4.01717869635831E-07	3.50362868434717E-07	3.361270159985E-07	-1.4
Grand Gulf Uni	1123	201812	MS07	ROP-MSPI-HPI	-5.81544128408495E-08	3.71936067722345E-07	3.18651540791037E-07	3.08554263028782E-07	-1.0
Columbia Unit	1144	201809	MS07	ROP-MSPI-HPI	-2.96853670533892E-07	2.90618544340759E-07	3.14162636140858E-07	-6.2351261931326E-09	-3.
Columbia Unit	1144	201812	MS07	ROP-MSPI-HPI	-2.98589469593935E-07	2.89069333803127E-07	3.12613453924822E-07	-9.52013579080813E-09	-3.
Columbia Unit	1144	201903	MS07	ROP-MSPI-HPI	-2.98589441172226E-07	2.81939207980031E-07	3.05485336411585E-07	-1.66502331921947E-08	-3.
Farley Unit 2	1025	201903	MS09	ROP-MSPI-RHR	-1.30171812884328E-07	2.27691558052356E-07	2.69819561068314E-07	9.75197451680287E-08	-1.7
Farley Unit 2	1025	201906	MS09	ROP-MSPI-RHR	-1.30171812884328E-07	2.15392489621991E-07	2.5753091084591E-07	8.52206767376629E-08	-1.7
Oconee Unit 2	1065	201712	MS09	ROP-MSPI-RHR	-6.916755523889 15E-08	2.689413349799E-07	2.5087383671612E-07	1.99773779741008E-07	-5.1
Oconee Unit 2	1065	201709	MS09	ROP-MSPI-RHR	-6.92893280529461E-08	2.66377526259021E-07	2.49337441694762E-07	1.97088198206075E-07	-5.2
Columbia Unit	1144	201803	MS07	ROP-MSPI-HPI	-2.93312325538864E-07	2.2008542543972E-07	2.43633280193071E-07	-7.32269000991437E-08	-3.1
Browns Ferry U	1128	201806	MS07	ROP-MSPI-HPI	-9.25404748386427E-08	1.90449171100227E-07	2.40243542891956E-07	9.79086962615838E-08	-1.4
Oconee Unit 1	1064	201712	MS06	ROP-MSPI-EAC	-2.83566130576673E-08	2.42119455151624E-07	2.3569166136187E-07	2.1376284564667E-07	-2.1
Oconee Unit 1	1064	201709	MS06	ROP-MSPI-EAC	-2.83566130576673E-08	2.40684471464192E-07	2.33549684972517E-07	2.12327861959238E-07	-2.1
Columbia Unit	1144	201806	MS07	ROP-MSPI-HPI	-2.95094821467501E-07	2.06550993198107E-07	2.30099519254014E-07	-8.8543828269394E-08	-3.1
Prairie Island U	1098	201712	MS06	ROP-MSPI-EAC	1.21679633480198E-07	2.05242486117641E-07	2.29815097204901E-07	3.26922105386984E-07	9.7
Oconee Unit 1	1064	201803	MS06	ROP-MSPI-EAC	-3.9047581168461E-08	2.32783932574421E-07	2.29186288063622E-07	1.93736354958673E-07	-3.5
Farley Unit 1	1024	201806	MS06	ROP-MSPI-EAC	-5.60858488540816E-08	1.80906639002387E-07	2.28170416605441E-07	1.24820786595592E-07	-1.
Grand Gulf Uni	1123	201903	MS07	ROP-MSPI-HPI	-4.38119478474164E-08	2.56456928582338E-07	2.27405417862456E-07	2.12923765730011E-07	-1.4
Oconee Unit 1	1064	201806	MS06	ROP-MSPI-EAC	-4.65709639740908E-08	2.30801205702846E-07	2.26667192076767E-07	1.84230245281469E-07	-4.2
Oconee Unit 1	1064	201809	MS06	ROP-MSPI-EAC	-4.65709639740908E-08	2.264386864681E-07	2.2230467555055E-07	1.79867726046723E-07	-4.2
Oconee Unit 2	1065	201712	MS06	ROP-MSPI-EAC	-2.63383164167408E-08	2.27049824275127E-07	2.208062728276E-07	2.007115114111E-07	-2.0