



**RIC 2010**

**Plant Experience for Implementation  
of Risk-Informed Technical  
Specification Initiative 4b on Risk  
Managed Technical Specifications**

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# RMTS Outline

- Background
- RICTCal – Risk Informed Completion Time Calculator (Operation’s RMTS tool)
- RMTS Use at STP
- RMTS Lessons-Learned at STP



## **RMTS at STP**

- Approved by NRC on 7/13/07
- Added RMTS Tech Spec 6.8.3.k:

k. Configuration Risk Management Program (CRMP)

A program to calculate risk-informed completion time in accordance with NEI 06-09, “Risk-Managed Technical Specifications (RMTS) Guidelines, Rev. 0”. The CRMP may be used for calculating a risk-informed completion time only in Mode 1 and Mode 2. In accordance with NEI 06-09, the completion time determined using the CRMP shall not be more than 30 days.



# Example RMTS LCO Action

3.7.14 At least three independent Essential Chilled Water System loops shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

- a. With only two Essential Chilled Water System loops OPERABLE, within 7 days restore at least three loops to OPERABLE status or apply the requirements of the CRMP, or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- b. With two or more Essential Chilled Water System loops inoperable, within 1 hour restore at least two loops to OPERABLE status or apply the requirements of the CRMP, or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.



# U.S. NRC

UNITED STATES NUCLEAR REGULATORY COMMISSION

*Protecting People and the Environment*

INCREASED CORE DAMAGE PROB.  
(ICDP)

E-05

E-06

CALCULATED RISK

RISK INFORMED COMPLETION  
TIME

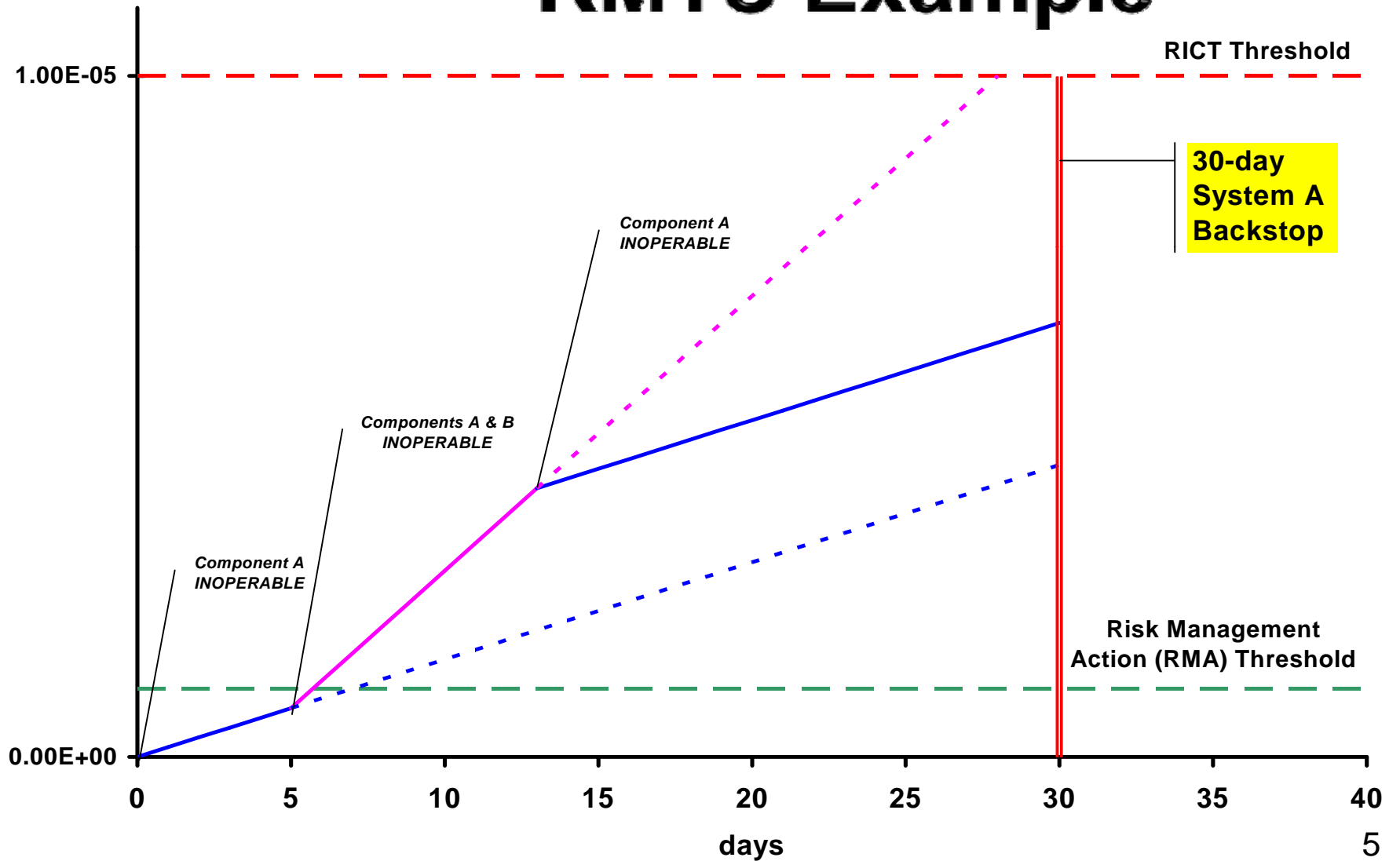
**RICT**

RISK MANAGEMENT ACTION TIME

**RMAT**

TIME

# RMTS Example





## What is RICTCal?

- RICTCal = **Risk Informed Completion Time Calculator**
- Extension of the On-Line Maintenance (a)(4) tool, RAsCal, Measures increases in ICDP and ILERP based on OPERABLE/INOPERABLE times
- Calculates time remaining (RMAT & RICT) to specified risk thresholds in accordance with RMTS
- Located on STP's enterprise database platform (ORACLE)



## **STP RMTS Experience**

- Used for planned 1E 120VAC instrument inverter maintenance, 24 hour TS front stop. NRC performed inspection activity and QA performed RMTS audit.
- Used to replace Train A and Train C class 1E batteries in Units 1 & 2 - 5 day work window planned. 2 hour TS front stop. No risk threshold issues
- Not typically used but on occasion it has almost been used (e.g., instrument inverter failure and emergent ECW pump maintenance. (Didn't have to mobilize for the NOED we "might" need)





## **Lessons Learned (from a software development perspective)**

- Early involvement from Operations and Work Control
- Draft procedures and other plant specific guidance documents with multiple review cycles BEFORE beginning software development
  - Electrical trains pose particular issues relative to cascading LCO impacts (STP wrote a special procedure to ensure consistency)
- Train on RMTS concepts in multiple Licensed Operator Requal cycles
  - “multiple clocks” [e.g., front stop, RMAT, RICT (ICDP or ILERP), back stop]
  - scenario development
  - software demos



## **STP RMTS Lessons**

- Important to train on new concepts like "PRA Functional", RMAT, and RICT. Target training to Operations, Work Control, Station Management, and Engineering.
- Formed RMTS working group and met monthly to develop program, procedures, and policies.
- RMTS has improved the quality of the station's working environment by providing an approved process for addressing Tech Spec equipment issues while also reducing administrative and regulatory burden for both STP and NRC



## **STP RMTS Lessons**

- Dose mitigation functions of Control Room HVAC need to be addressed as separate action statements for CRMP purposes. Take away is that implementation of RMTS is broad-scope change; look for cascading system-to-system impacts
- Dose is not modeled in PRA. CDF/LERF are key surrogate figures-of-merit.
  - Restricts (can't go past front stop) RMTS use for systems supporting dose function relative to cooling/humidity specification for Filtration, Essential Cooling Water, Essential Chillers for more than one train out of service.



## Example Use of RMTS

- Extended LCO Train Weeks supporting major DG inspections and other train related work
- Replacing Class 1E Batteries on-line
  - 2 hour Tech Spec front stop
  - Rigorous pre-job challenge reviews
  - Used RMTS procedures to control the whole evolution

http://oracleprod.corp.stpegs.net - PRD2 Oracle Application Server Forms Services - WebUtil - Microsoft Internet Explorer provi

RAFMAIN - RictCal and Rascal Main Form - T045067@PI0

Action Edit Query Block Record Field Favorites Help

Entry RICTCal

RA Seq No: 1138 Unit: 1 **SRO - MODE** Print Report CALC

Current Config: PORVA  
 Time Now: 06/02/2009 08:16 Current Rict Start: Duration: 1367.27  
 CDF: 1.06E-05 ICDP (Year): 3.13E-06 ICDP (Hour): 3.58E-10 ICDP (RICT): 4.49E-07  
 LERF: 4.37E-07 ILERP (Year): 2.11E-07 ILERP (Hour): 2.41E-11 ILERP (RICT): 2.72E-08

RICT BSCT: 05/06/2009 09:00  
 For: BATTA  
 Risk Informed: 06/19/2012 01:59  
 Bounded By: Backstop

| CDF            |          |                  | LERF      |          |                  |
|----------------|----------|------------------|-----------|----------|------------------|
| Threshold      | CT       | Completion Date  | Threshold | CT       | Completion Date  |
| RMAT: 1.00E-06 | 1541.34  | 08/05/2009 13:36 | 1.00E-07  | 3016.04  | 10/06/2009 00:18 |
| RICT: 1.00E-05 | 26705.72 | 06/19/2012 01:59 | 1.00E-06  | 40315.21 | 01/07/2014 03:28 |

CT: 05/06/2009 09:00

**Maintenance States:**

| Seq No | Start Time       | Maintenance State              | Front Stop Exceeded | Duration | CDF      | ICDP     | LERF     | ILERP    |
|--------|------------------|--------------------------------|---------------------|----------|----------|----------|----------|----------|
| 2      | 04/06/2009 10:00 | BATTA CCA DGA IV-1201          | Y                   | 1.00     | 3.14E-05 | 2.74E-09 | 1.69E-06 | 1.67E-10 |
| 3      | 04/06/2009 11:00 | BATTA CCA DGA IV-1201          | Y                   | 142.12   | 3.14E-05 | 3.89E-07 | 1.69E-06 | 2.37E-08 |
| 4      | 04/12/2009 09:07 | BATTA CCA DGA IV-1201 PORVA    | Y                   | 7.72     | 3.45E-05 | 2.38E-08 | 1.69E-06 | 1.29E-09 |
| 5      | 04/12/2009 16:50 | AFA BATTA CCA DGA IV-1201 PORV | Y                   | .58      | 3.56E-05 | 1.88E-09 | 1.71E-06 | 9.89E-11 |
| 1      | 04/06/2009 09:00 | BATTA CCA DGA IV-1201          |                     | 1.00     | 3.14E-05 | 2.74E-09 | 1.69E-06 | 1.67E-10 |
| 6      | 04/12/2009 17:25 | BATTA CCA DGA IV-1201 PORVA    | Y                   | 2.67     | 3.45E-05 | 8.23E-09 | 1.69E-06 | 4.44E-10 |
| 7      | 04/12/2009 20:05 | PORVA                          |                     | 1.58     | 1.06E-05 | 5.66E-10 | 4.37E-07 | 3.82E-11 |
| 8      | 04/12/2009 21:40 | DGA PORVA                      |                     | .08      | 2.75E-05 | 1.91E-10 | 1.47E-06 | 1.18E-11 |
| 9      | 04/12/2009 21:45 | PORVA                          |                     | 55.38    | 1.06E-05 | 1.98E-08 | 4.37E-07 | 1.34E-09 |
| 10     | 04/15/2009 05:08 | NO RMTS EQUIPMENT INOPERABLE   |                     | .00      |          |          |          |          |

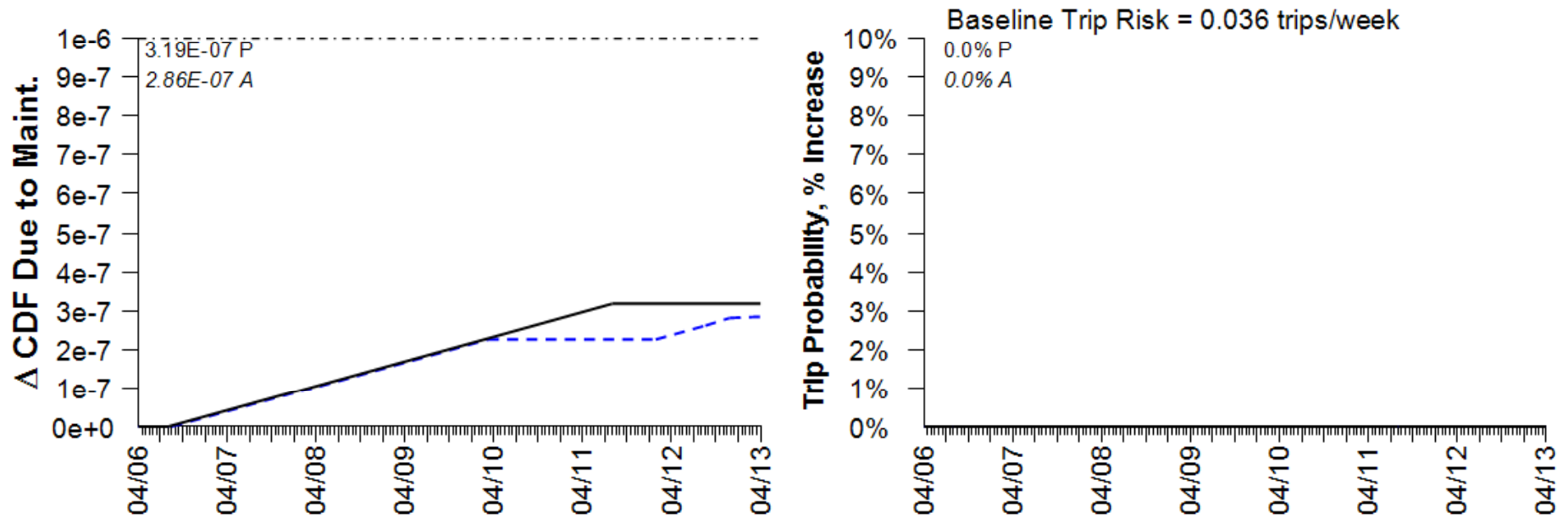
Quantified  
Unquantified

Send Unquantified Maintenance States to Risk Mgmt

Record: 1/10 ... <OSC>

Applet oracle.forms.engine.Main started Internet

## Actual Risk Profiles for Unit 1 Week of 04/06/2009



| PRA Component | Planned Time Non-Functional | Planned Time Functional | Duration (hh:mm) | Actual Time Non-Functional | Actual Time Functional | Duration (hh:mm) |
|---------------|-----------------------------|-------------------------|------------------|----------------------------|------------------------|------------------|
| BATTA         | N/A                         | N/A                     | N/A              | 04/11/2009 19:42           | 04/12/2009 15:41       | 019:59           |
| BATTA         | 04/06/2009 08:00            | 04/11/2009 08:00        | 120:00           | 04/06/2009 09:00           | 04/09/2009 22:25       | 085:25           |
| PORVA         | N/A                         | N/A                     | N/A              | 04/12/2009 09:07           | 04/12/2009 23:59       | 014:52           |

| BOP Component | Planned Time Non-Functional | Planned Time Functional | Duration (hh:mm) | Actual Time Non-Functional | Actual Time Functional | Duration (hh:mm) |
|---------------|-----------------------------|-------------------------|------------------|----------------------------|------------------------|------------------|
| NONE          |                             |                         | N/A              |                            |                        |                  |



# STP RMTS Experience

| Date    | Tech Spec & Component                                      | TS Front Stop | RMAT      | RICT            | Actual Inop Time | Actual ICDP | Actual ILERP |
|---------|--|---------------|-----------|-----------------|------------------|-------------|--------------|
| 3/17/08 | TS 3.8.3.1<br>Class 1E Instrument Inverter #1203<br>Unit 1 | 24 Hr         | > 30 days | 30 day Backstop | 29.1 Hr          | 9.7E-09     | 7.2E-10      |
| 3/23/09 | TS 3.8.3.1<br>Train C 1E Battery<br>Unit 1                 | 2 Hr          | 2 weeks   | 30 day Backstop | 3.6 days         | 2.7E-07     | 1.8E-08      |
| 3/30/09 | TS 3.8.3.1<br>Train C 1E Battery<br>Unit 2                 | 2 Hr          | 2 weeks   | 30 day Backstop | 3.6 days         | 2.7E-07     | 1.8E-08      |
| 4/6/09  | TS 3.8.3.1<br>Train A 1E Battery<br>Unit 1                 | 2 Hr          | 2 weeks   | 30 day Backstop | 6.6 days         | 4.4E-07     | 2.7E-08      |
| 4/13/09 | TS 3.8.3.1<br>Train A 1E Battery<br>Unit 2                 | 2 Hr          | 2 weeks   | 30 day Backstop | 3.5 days         | 2.3E-07     | 1.4E-08      |

***2 train stations would realized increased operational flexibility, most likely 2/3 that of a 3 train station.***



## Future Planned RMTS Uses

- Planning to replace ESF Transformer on-line
- Evaluating other uses for RMTS to incorporate safety and reliability improvements



2008  
THIRTY-THREE AWARDS

B. Ralph Sylvia  
Best of the Best Award  
Presented to STP Nuclear  
Operating Company  
South Texas Project  
for its Risk-Managed  
Technical Specifications





# Summary

- RMTS is a significant process and technological improvement for nuclear power plant operation & maintenance
- It is also a quality of life/work enhancement
- It facilitates safety and reliability improvements by managing plant configurations
- All US risk groups should have RMTS in their respective strategic plans