April 10, 2002

MEMORANDUM TO: Mark A. Satorius, Chief
Performance Assessment Section
Inspection Program Branch
Division of inspection Program Management
Office of Nuclear Reactor Regulation

FROM: John W. Thompson, Senior Reactor Operations Engineer ***/RA/***
Inspection Program Branch
Division of Inspection Program Management
Office of Nuclear Reactor Regulation

SUBJECT: PUBLIC MEETING SUMMARY ON THE UNAVAILABILITY/UNRELIABILITY PILOT PERFORMANCE INDICATOR REPLACEMENT HELD ON APRIL 3 & 4, 2002

On April 3 & 4, 2002, a public meeting was held at the Bethesda Hyatt-Recency Hotel to discuss open issues pertaining to ongoing work necessary to support the June 11-13 workshop. A list of participants and information exchanged at the meeting are included as Attachment 1. Attachments 2 & 3 are a meeting agenda and summary of the open issue highlights.

Attachments:

1. Attendance List
2. Agenda
3. April 3 & 4 UA/UR Pilot PI Meeting Highlights
4. Mitigating Systems Pilot PI Timeline of Planned Activities

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DATE:	04/10/02					

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Attachment 1

ATTENDANCE LIST

INDUSTRY/STAFF UNAVAILABILITY/UNRELIABILITY PILOT PERFORMANCE INDICATOR REPLACEMENT PUBLIC MEETING

April 3 & 4, 2002

	NAME	AFFILIATION
1.	Serita Sanders	NRC
2.	Steve Floyd	NEI
3.	Thomas C. Houghton	NEI
4.	Richard L. Thomas	Entergy
5.	Petteri Tiippana	NRC
6.	Don Hickman	NRC
7.	Robin Ritzman	PSEG
8.	Greg Gibson	SCE
9.	Ken Heffner	Progress
10.	David Hembree	INPO
11.	Stan Ketelsen	PS&G
12.	Hossein Hamzehee	NRC
13.	John Thompson	NRC
14.	Wade Warren	Southern Nuclear
15.	Duane Kanitz	APS
16.	Andy Holliday	Entergy
17.	Dale Ambler	Exelon
18.	Deann Raleigh	Scientech
19.	Patrick Baranowsky	NRC
20.	V.M. McCree	NRC
21.	W.E. Moorhoek	STP NOC
22.	John Ramsdell	SCE
23.	Michelle P. Carr	SCE
24.	Anees Fakruk	SNC
25.	Steve Eide	INEEL/NRC
26.	Don Olson	Dominion
27.	Gerry Sours	APS
28.	Terry Pickens	Nuclear Management Co.

Attachment 2

UNAVAILABILITY/UNRELIABILITY PILOT PROGRAM

AGENDA

Hyatt-Regency Hotel, Bethesda, Maryland
April 3 & 4, 2002

April 3, 2002

08:00 a.m.	Introduction and Overview of UA/UR Pilot Program (Attachments 1 & 2)
08:15 a.m.	Discussion on Industry Homework Regarding UR Modeling Techniques
10:00 a.m.	15 minute break
10:15 a.m.	Discussion of Appropriate Methodology for UR Indicator (Attachment 3)
12:00 p.m.	Break for Lunch
1:00 p.m.	Discussion on Criteria for Train Boundaries, Risk Significant Functions, Functional Success Criteria, and Parameters
2:00 p.m.	Breakout session (if needed)
3:30 p.m.	Discussion of Approach for Setting and Criteria for Changing Baseline Values and Thresholds
4:30 p.m.	Adjourn

April 4, 2002

08:00 a.m.	Brief Overview Previous Day's Issues and Remaining Agenda
08:30 a.m.	Discussion of Pilot Implementation Issues
09:30 a.m.	15 minute break
09:45 a.m.	Discussion of Comments on Draft UA/UR Guidance Document
12:00 p.m.	Break for Lunch
1:00 p.m.	Continue Discussion of Comments on Draft UA/UR Guidance Document
3:00 p.m.	15 minute break
3:15 p.m.	Discussion of UA/UR Timeline, Open Items, and Follow Up Assignments for Next Meeting
4:30 p.m.	Adjourn

Attachment 3

April 3 & 4 UA/UR Pilot PI Meeting Highlights

Background:

There are several significant issues associated with the current safety system unavailability (SSU) performance indicator (PI). Principal among these issues are the concerns that the SSU PI is neither plant-specific nor sufficiently risk-informed, and therefore it may not accurately indicate the risk significance of system performance calculated from the reported data. To resolve these and other concerns, a NRC/Industry Working Group has developed a replacement indicator for the SSU PI that is intended to more accurately reflect risk-significant performance of the monitored systems. This new PI will be called, "The Pilot Mitigating Systems PI (MSPI)." The MSPI will involve calculating unavailability and unreliability by train separately, using the raw data reported as planned and corrective (maintenance) unavailable hours for unavailability and valid demands and failures of the monitored active components for unreliability. Each of the two parameters will have an algorithm that will calculate a total delta core damage frequency ($\triangle$cdf) index for unavailability (all trains) and for unreliability (all trains). The two indexes will be subsequently summed together to indicate a single overall system performance index. The overall number of PIs will increase from four to five PIs.

Plants Participating in the UA/UR Pilot PI:

Region I	Region II	Region III	Region IV
Peach Bottom*	Surry 1/2	Braidwood 1/2*	Cooper
Millstone 2/3			Fort Calhoun
Hope Creek			Palo Verde 1/2/3
Salem			San Onofre 2/3
Prairie Island 1/2			

(* recently confirmed)

Resolved Issues:

1. The MSPI Committee agreed to use a "delta CDF index" parameter as the PI performance measure. Although the index is not a true indicator of core damage frequency, it does give relative changes in plant risk due to changes in the performance health of the monitored system. The Committee agreed to call the new PI, The Mitigating Systems Performance Indicator. The equations required to compute the MSPI were also agreed upon by the Pilot Committee. These equations are listed below.

   Algorithm for Combining UA and UR PIs for a Given PI for a Two-Train System:

   $$\text{Total}\triangle\text{CDF}_{\text{MSPI}} = \text{Total}\triangle\text{CDF}_{\text{UR}} + \text{Total}\triangle\text{CDF}_{\text{UA}}$$

   $$\text{Total}\triangle\text{CDF}_{\text{PI}} = (\triangle\text{CDF}_{\text{UR-train A}} + \triangle\text{CDF}_{\text{UR-train B}}) + (\triangle\text{CDF}_{\text{UA-train A}} + \triangle\text{CDF}_{\text{UA-train B}})$$

   Unreliability Equation:

   $$\text{Total}\triangle\text{CDF}_{\text{UR}} = \triangle\text{CDF}_{\text{UR-train A}} + \triangle\text{CDF}_{\text{UR-train B}}$$

   $$\triangle\text{CDF}_{\text{UR-Train A}} = [Q_P (FV_{\text{UR-Train A}})/UR_{\text{PRA-Train}}](UR_{\text{Bayesian Update-Train}} - UR_{\text{Baseline-Train}})$$
   $$\triangle\text{CDF}_{\text{UR-Train B}} = [Q_P (FV_{\text{UR-Train B}})/UR_{\text{PRA-Train}}](UR_{\text{Bayesian Update-Train}} - UR_{\text{Baseline-Train}})$$
   $$UR_{\text{Bayesian Update-Train}} = \sum UR_{\text{Bayesian Update-Component}}$$
   $$UR_{\text{Baseline-Train}} = \sum UR_{\text{Baseline-Component}}$$

Unavailability Equation:

$$\text{Total}\Delta CDF_{UA} = \Delta CDF_{UA\text{-train A}} + \Delta CDF_{UA\text{-train B}}$$

$$\Delta CDF_{UA\text{-train A}} = [Q_P (FV_{UA\text{-Train A}})/UA_{PRA\text{-Train}}](UA_{Train} - UA_{Baseline\text{-Train}})$$
$$\Delta CDF_{UA\text{-train B}} = [Q_P (FV_{UA\text{-Train B}})/UA_{PRA\text{-Train}}](UA_{Train} - UA_{Baseline\text{-Train}})$$

2. The $UA_{Baseline\text{-Train}}$ value will be computed by the sum of the plant-specific planned UA + the generic unplanned UA

   The computation for the plant UA baseline value will be as follows:
   - -pilot participants will use data gathered between the years of 1999 through 2001
   - -fault exposure hours will be subtracted from this data
   - -corrective maintenance UA due to demand failures will also be subtracted
   - -overhaul online maintenance will be added
   - -shutdown unavailability will be subtracted
   - -any unavailability of the system due to support system cascading will be subtracted
   - -this total sum will then be divided by the total critical hours to arrive at the plant UA baseline value

3. The generic unplanned UA will be computed using WANO industry mean train data collected between the years of 1995 through 1997.

4. Check valves that change position in order for the train to perform its risk-significant safety function will be included as monitored components for the train.

5. For component unreliability parameters, failures to start (FTS) and failures to run (FTR) will be defined as less than 1 hour, and greater than 1 hour, respectively.

6. Discovered conditions (to include old design issues) revealed from periodic surveillance testing that render the train unavailable are to be included in the unreliability portion of the PI and recorded as a demand and a demand failure. There will be no unavailability component for discovered conditions. The significance of discovered conditions and old design issues not capable of being found from periodic surveillance testing will be determined by using the SDP.

7. The two additional support system PIs, CCW (or equivalent) and ESW (or equivalent) will be combined into one PI. Only issue is how to model multiple systems that are significantly different in function and design.

Open Issues:

1. Whether or not to use the inspection process and SDP tool to evaluate the significance of any demand failure that occurs within the MSPI. Industry wants performance issues that fall within the MSPI to only be evaluated using the MSPI, and not additionally to use the SDP and inspection process to determine agency action, as is currently program guidance. Staff has agreed, in principle, as long as the MSPI is sufficiently risk-informed and there would not be any foreseeable unintended consequences.

2. When should a MSPI be declared invalid or grey? The issue is where some licensees, based on their unique plant design, would trip the green-white threshold with a single support system train failure hit. This may be because these systems are highly reliable and have high risk worth and a single failure would consequently constitute a greater than 1E-6 Δcdf index step change. Industry is questioning the appropriateness of a 1E-6 green-white threshold value.

Attachment 4

MITIGATING SYSTEMS PILOT PI PROGRAM
TIME LINE OF PLANNED ACTIVITIES

MONTH OF APRIL		**Program/Technical Lead**
April 2	Industry pre-meeting on MSPI topics	N/A
April 3-4	Industry/staff MSPI Pilot Committee public meeting Draft TI to be shared (Bethesda Hyatt)	John Thompson
April 16	Receive Markup on Changes to Guidance Document from NEI	NA
April 23	Industry MSPI Committee internal pre-meeting	N/A
April 24	Industry/Staff MSPI Committee public meeting (OWFN 9B4) Draft RIS to be shared	John Thompson/ Serita Sanders
April 25	Industry/Staff ROP public meeting (OWFN 7B4)	John Thompson
MONTH OF MAY		
May 3	Final draft of MSPI RIS and TI made available via e-mail	N/A
May 21	Industry pre-meeting on MSPI topics	N/A
May 22	Industry/staff MSPI Committee public meeting	John Thompson
May 23	Industry/Staff ROP monthly public meeting	John Thompson
MONTH OF JUNE		
June 12-14	UA/UR Workshop (place TBD)	John Thompson/Serita Sanders
June 19-20	ROP Public Meeting	John Thompson
June 26	Issuance of MSPI RIS and TI	John Thompson/Serita Sanders
June 27	ROP Public Meeting	John Thompson
MONTH OF JULY		
July 1	Start of data collection for pilot	N/A

Current Issues With The SSU PI

There are several significant issues associated with the current safety system unavailability (SSU) performance indicator (PI). Principal among these issues are the concerns that the SSU PI is neither plant-specific nor sufficiently risk-informed, and therefore it may not accurately indicate the risk significance of system performance calculated from the reported data. To resolve these and other concerns, a NRC/Industry Working Group has developed a replacement indicator for the SSU PI that is intended to more accurately reflect risk-significant performance of the monitored systems. The pilot UA/UR PI will involve calculating unavailability and unreliability by train separately, using the raw data reported as unavailable hours for unavailability and valid demands and failures for unreliability. Each of the two parameters will have an algorithm that will calculate a total delta core damage frequency (△cdf) for unavailability (all trains) and for unreliability (all trains). The two parameters will be subsequently summed together to indicate a single overall system performance indicator. The overall number of PIs will increase from four to six PIs.

Plants Participating in the UA/UR Pilot PI

Region I	Region II	Region III	Region IV
Exelon East	Surry 1/2	Exelon West	Cooper
Millstone 2/3			Fort Calhoun
Hope Creek			Palo Verde 1/2/3
Salem			San Onofre 2/3
Prairie Island 1/2			

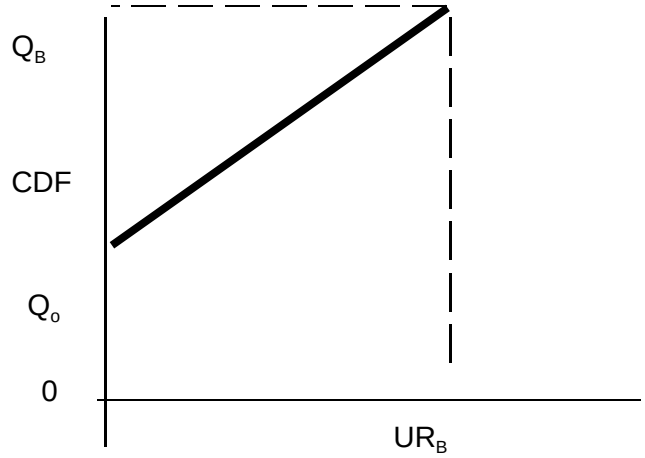
List of Systems for the UA/UR PI Pilot

The following is the list of systems, risk-significant functions, and success criteria within scope of UA/UR PI pilot:

BWRs: HPCI/HPCS
- RCIC
- RHR
- EDGs (Emergency AC Power)
- ESW (Essential Service Water or equivalent)
- RBCCW (Reactor Building Closed Cooling Water or equivalent)

PWRs: HPSI
- AFW
- RHR
- EDGs (Emergency AC Power)
- ESW (Essential Service Water or equivalent)
- CCW (Component Cooling Water or equivalent)

Methodology for Determining Unreliability for the UA/UR Pilot PI



Algorithm for Combining UA and UR PIs For a Given Performance Indicator (PI) for a Two-Train System:

$$\textbf{Total}\Delta\textbf{CDF}_{\textbf{PI}} = \textbf{Total}\Delta\textbf{CDF}_{\textbf{UR}} + \textbf{Total}\Delta\textbf{CDF}_{\textbf{UA}}$$

$$\textbf{Total}\Delta\textbf{CDF}_{\textbf{PI}} = \Delta\textbf{CDF}_{\textbf{UR-train A}} + \Delta\textbf{CDF}_{\textbf{UR-train B}} + \Delta\textbf{CDF}_{\textbf{UA-train A}} + \Delta\textbf{CDF}_{\textbf{UA-train B}}$$

Unreliability Equation:

$$\textbf{Total}\Delta\textbf{CDF}_{\textbf{UR}} = \Delta\textbf{CDF}_{\textbf{UR-train A}} + \Delta\textbf{CDF}_{\textbf{UR-train B}}$$

$$\Delta CDF_{\text{UR-Train A}} = [Q_P (FV_{\text{UR-Train A}}) / UR_{\text{PRA-Train}}](UR_{\text{Bayesian Update-Train}} - UR_{\text{Baseline-Train}})$$

$$\Delta CDF_{\text{UR-Train B}} = [Q_P (FV_{\text{UR-Train B}}) / UR_{\text{PRA-Train}}](UR_{\text{Bayesian Update-Train}} - UR_{\text{Baseline-Train}})$$

$$UR_{\text{Bayesian Update-Train}} = \sum UR_{\text{Bayesian Update-Component}}$$

$$UR_{\text{Baseline-Train}} = \sum UR_{\text{Baseline-Component}}$$

Unavailability Equation:

$$\textbf{Total}\Delta\textbf{CDF}_{\textbf{UA}} = \Delta\textbf{CDF}_{\textbf{UA-train A}} + \Delta\textbf{CDF}_{\textbf{UA-train B}}$$

$$\Delta CDF_{\text{UA-train A}} = [Q_P (FV_{\text{UA-Train A}}) / UA_{\text{PRA-Train}}](UA_{\text{Train}} - UA_{\text{Baseline-Train}})$$

$$\Delta CDF_{\text{UA-train B}} = [Q_P (FV_{\text{UA-Train B}}) / UA_{\text{PRA-Train}}](UA_{\text{Train}} - UA_{\text{Baseline-Train}})$$

Definitions:

$FV_{UR\text{-}Train\ A}$	Fussel-Vessely value from PRA model for train A unreliability only
$FV_{UR\text{-}Train\ B}$	Fussel-Vessely value from PRA model for train B unreliability only
$UR_{Baseline\text{-}Train}$	The historical train unreliability value based on 1995-1997 industry data
$UR_{Baseline\text{-}Component}$	The historical unreliability value of a component in a monitored train, based on 1995-1997 industry data
$UR_{Bayesian\ Update\text{-}Component}$	The Bayesian updated value of actual 12 quarter unreliability (sum of Bayesian updates by component to derive train value)
$UR_{Bayesian\ Update\text{-}Train}$	The Bayesian updated value of actual 12 quarter unreliability (sum of Bayesian updates by component to derive the train value)
$UR_{PRA\text{-}Train}$	The unreliability of the monitored train as assumed in the PRA model
Q_P	Baseline CDF value from the PRA, assuming no maintenance

Pilot Implementation Issues

1. Pilot participants should bring the following to the workshop:

   -all PRA-modeled, risk-significant functions for the monitored systems
   -all maintenance rule-related risk-significant functions
   -performance (success) criteria for each risk function
   -accounting rules used by the PRA to calculate UA/UR
   -monitored system boundaries definitions and list of components

2. Pilot participants should develop their list of Maintenance Rule-related risk-significant functions from the five or six UA/UR PI systems, to include the accounting rules, and the functional success criteria. This information would be available for review/inspection by resident inspectors onsite at the start of the pilot data collection period.

3. Pre-defined PRA functional success criteria needs to be developed for those identified risk-significant functions and parameters. Each pilot participant should develop pre-defined functional success criteria prior to the June 2002 Workshop. This information would be made available to the staff prior to start of the workshop.

4. The RIS to be issued on the pilot will clearly communicate the expected level of quality and accuracy of the data, as well as the 50.9 implications. TI guidance to be issued about May, 2002.

5. Questions raised by the pilot plants or other stakeholders during the UA/UR pilot would be addressed through the UA/UR Working Group. The UA/UR Working Group will plan to hold public monthly meetings twice a month to handle any questions or concerns resulting from the pilot program. Actual schedule dates are TBD.

6. For purposes of this pilot, old or existing UA/UR FAQs would be applicable during the pilot, unless it conflicts with specific pilot guidance.

7. The industry's Consolidated Data Effort (CDE) consists of the EPIX database, monthly operating reports, INPO's WANO indicators, and the ROP's PIs. With regard to the UA/UR pilot program, EPIX will be the appropriate repository for the reported data, although the database may need some minor modifications.

8. The mechanics of the PI data submittals for the pilot effort would require licensees to submit a data stream to the CDE. The UA/UR unavailability/unreliability algorithms would need to be developed for the CDE, but should be constructed in a similar fashion to how licensees currently submit their data. Unavailability/unreliability data would also be available onsite for inspector review. The licensee calculational worksheets w/raw PI data would also be submitted to NRR/IIPB during the pilot data collection period. However, licensees will need to flag any functional criteria changes and notify the NRC of those changes.

NRC INSPECTION MANUAL

IIPB

TEMPORARY INSTRUCTION 2515/XXX

SAFETY SYSTEM UNAVAILABILITY AND UNRELIABILITY
PERFORMANCE INDICATOR VERIFICATION

CORNERSTONE: MITIGATING SYSTEMS

APPLICABILITY: This temporary instruction (TI) applies to all holders of operating licenses for light water nuclear power reactors utilizing the unavailability/unreliability (UA/UR) PIs, as stated in Appendix A to this TI.

2515/xxx-01 OBJECTIVE

The objective of this TI is to verify that licensees have correctly implemented the UA/UR PI guidance (Appendix A) on how to define and report unavailability and unreliability for the pilot monitored safety systems. The information gathering will help the NRC staff decide whether to adopt this pilot PI and what changes may be needed for future PI development.

2515/xxx-02 BACKGROUND

02.01 Current Issues with the SSU PI

There are several significant issues associated with the current safety system unavailability (SSU) performance indicator (PI). Principal among these issues are the concerns that the SSU PI is neither plant-specific nor sufficiently risk-informed, and therefore it may not accurately indicate the risk significance of system performance calculated from the reported data. To resolve these and other concerns, a NRC/Industry Working Group has developed a replacement indicator for the SSU PI that is intended to more accurately reflect risk-significant performance of the monitored systems. The pilot UA/UR PI will involve calculating unavailability and unreliability by train separately, using the raw data reported as unavailable hours for unavailability and valid demands and failures for unreliability. Each of the two parameters will have an algorithm that will calculate a delta core damage frequency (△cdf), and then the two trains will be summed together for a single system overall performance indicator. The overall number of PIs will increase from four to six PIs.

02.02 Pilot Objectives

4/01/02

The objectives for the UA/UR PI Pilot are:

9. To exercise the full data reporting mechanics and calculational methodology for the revised unavailability and the new unreliability (UA/UR) performance indicators.

10. To calculate the revised unavailability and unreliability PI values and to compare the results to the existing UA/UR PI data to ascertain whether the proposed changes address the existing concerns and suit the needs of the ROP.

11. To determine the appropriate database method for capturing UA/UR PI data.

12. To address the unreliability technical issues.

13. To examine feasibility and to develop a methodology to establish UA/UR PI thresholds (plant-specific or generic).

14. To identify the differences and relationships between the maintenance rule, PRA, and ROP programs.

15. To address the agency performance goals of maintaining safety, reducing unnecessary regulatory burden, increasing efficiency and effectiveness, and increasing public confidence.

The NRC has developed a Web page to keep the public informed of pilot UA/UR PI program activities. This web-page (*http://www.nrc.gov/NRC/REACTOR/XXX/index.html*) provides links to information regarding the UA/UR pilot, along with documentation of the NRC's interactions with the industry (industry submittals, meeting notices, presentation materials, and meeting summaries). The NRC will continue to update this Web page as new information becomes available.

02.03 Pilot Success Criteria

The following is the list of success criteria for the UA/UR Pilot PIs.

a. Do the UA/UR PIs maintain safety?
   - Are the UA/UR PIs implementable and inspectable?
   - Can pilot participant licensees implement the UA/UR PIs with no major problems by the end of the pilot period?
   - Can the NRC inspect and verify the pilot UA/UR PIs without major problems? (Can inspectors verify during the pilot program that the list of systems, risk-significant functions, and success criteria were correctly established by pilot participants at the start of UA/UR PI data collection?)

e. Do the pilot UA/UR PIs increase ROP efficiency & effectiveness?

- Do the UA/UR PIs solve the T/2 unavailability issue?
- Do the pilot UA/UR PIs more accurately reflect performance?
- Do we address the monitored system cascading of availability issue with respect to support systems?
- Are the UA/UR PIs more consistent with the maintenance rule, risk-informed technical specifications, and other ROP program guidance?
- Do the UA/UR PIs reflect risk-significant performance, as oppose to design basis performance?

c. Do the new UA/UR PIs reduce unnecessary industry/staff burden?
- Do pilot participants believe the guidance is clear and practical?
- What is the change in staff/licensee PI data collection/reporting resource burden?
- If it is an increase in burden, do the benefits justify the increase resource expenditure?
- What is the staff/licensee burden and impact of establishing and maintaining plant-specific thresholds?

d. Did the pilot demonstrate the feasibility and a workable methodology to establish plant-specific risk thresholds and development of those thresholds for the UA/UR PIs?

e. Are the unintended consequences, if any, acceptable ?

f. Were the Agency goals met by the UA/UR pilot program?

2515/xxx-03 INSPECTION REQUIREMENTS

Licensee participation in this pilot UA/UR PI program is voluntary. However, participating licensees have agreed to follow the guidance and reporting format herein to ensure consistency in reporting and to aid in validation of the pilot results. The following subsections provide direction and information basic to the guidance and format of the UA/UR PI.

03.01 General

The information provided on the NRC's Internal Web site (http://nrr40.nrc.gov/XXX/index.html) will give inspectors a basic understanding of the UA/UR pilot PI. This WEB site does not stipulate additional inspection requirements beyond those identified in this TI. Additional guidance can be found in Appendix A to this TI and in NEI 99-02, Revision 2, "Regulatory Assessment Performance Indicator Guideline."

03.02 Plants Participating in the UA/UR Pilot PI

Region I	Region II	Region III	Region IV
Exelon East	Surry 1/2	Exelon West	Cooper
Millstone 2/3			Fort Calhoun
Hope Creek			Palo Verde 1/2/3
Salem			San Onofre 2/3
Prairie Island 1/2			

03.03 List of Systems for the UA/UR PI Pilot

The following is the list of systems, risk-significant functions, and success criteria within scope of UA/UR PI pilot:

BWRs:
- HPCI/HPCS
- RCIC
- RHR
- EDGs (Emergency AC Power)
- ESW (Essential Service Water or equivalent)
- RBCCW (Reactor Building Closed Cooling Water or equivalent)

PWRs:
- HPSI
- AFW
- RHR
- EDGs (Emergency AC Power)
- ESW (Essential Service Water or equivalent)
- CCW (Component Cooling Water or equivalent)

03.04 UA/UR PI Pilot Data Collection Guidance

The UA/UR PI pilot will require participating licensees to effectively capture the most recent three years of data prior to the start of the pilot program to ensure sufficient data for PI calculational purposes. The data can be captured by using six months of actual data with the additional data captured through best-effort means. Due to the variability in the quality and completeness of industry UA/UR data, and to utilize appropriate baseline UA/UR values, licensees were requested to established the unreliability baseline values using data between the years of 1995 and 1997. For establishing the unavailability baseline values, pilot participants were requested to use data between the years of 1999 and 2001.

For calculating the actual PI values, pilot participants were requested to use the most recent 3 years (12 quarters) of collected data for both the unavailability and unreliability portion of the PI.

03.05 UA/UR PI Calculational Guidance

Algorithm for Combining UA and UR PIs For a Given Performance Indicator (PI) for a Two-Train System:

$$\text{Total}\triangle\text{CDF}_{PI} = \text{Total}\triangle\text{CDF}_{UR} + \text{Total}\triangle\text{CDF}_{UA}$$

$$\text{Total}\triangle\text{CDF}_{PI} = \triangle\text{CDF}_{\text{UR-train A}} + \triangle\text{CDF}_{\text{UR-train B}} + \triangle\text{CDF}_{\text{UA-train A}} + \triangle\text{CDF}_{\text{UA-train B}}$$

$$\triangle\text{CDF}_{\text{UR-train A}} = [Q_P (FV_{\text{UR-Train A}})/UR_{\text{PRA-Train}}](UR_{\text{Bayesian Update-Train}} - UR_{\text{Baseline-Train}})$$

$$\triangle\text{CDF}_{\text{UR-train B}} = [Q_P (FV_{\text{UR-Train B}})/UR_{\text{PRA-Train}}](UR_{\text{Bayesian Update-Train}} - UR_{\text{Baseline-Train}})$$

$$UR_{\text{Bayesian Update-Train}} = \sum UR_{\text{Bayesian Update-Component}}$$

$$UR_{\text{Baseline-Train}} = \sum UR_{\text{Baseline-Component}}$$

Definitions:

FV_{ur}: Fussel-Vessely value from PRA model for train-specific unreliability terms only (risk achievement worth for perfect train)

FV_{ua}: Fussel-Vessely value from PRA model for train-specific unavailability terms only (risk achievement worth for perfect train)

$Q_{B:}$ The baseline maintenance value of CDF for the plant.

Q_P: Baseline CDF value from the PRA assuming normal maintenance values

$Q_{o:}$ The CDF value associated with complete train reliability.

UR_{Baseline} The baseline train unreliability assumed in the PRA.

$UR_{\text{Bayesian Update}}$ The Bayesian updated unreliabiliity (train-specific)

03.06 Data Accuracy and Quality

Licensees are exempt from the requirements of 10 CFR 50.9 for purposes of this voluntary pilot program. Guidance on the expected level of quality and accuracy of the data is contained in Attachment A (RIS).

2515/xxx-04 GUIDANCE

04.01 General

a. Questions raised during the pilot by the pilot participants or other stakeholders will be addressed through the UA/UR Working Group. The UA/UR Working Group will plan to hold public meetings twice a month to handle any questions or concerns resulting from the pilot program.

b. For purposes of this pilot, old or existing SSU FAQs would be applicable during the pilot, unless they conflict with specific UA/UR pilot guidance.

c. Inspectors may continue to use the feedback process to address questions or issues pertaining to the UA/UR pilot.

04.02 UA/UR Implementation and Reporting Guidance

4/01/02

a. Pilot participants are requested to develop a plant-specific list of their Maintenance Rule high safety-significant functions (or risk-significant functions) for the five or six UA/UR PI systems, functional success criteria, and parameters. Inspectors should confirm that this information is available for review/inspection at the start of the pilot data collection period.

b. Confirm that the licensee is using a list of definitions for unavailability and unreliability as stated in the UA/UR guidance document, contained in Attachment A of this TI.

c. Confirm that the licensee is calculating a train-level unreliability value that accounts for its risk importance using the appropriate Fussel-Vessely coefficient, as determined by each licensee's PRA. Each train UR value will then be summed across all trains in the system to calculate the overall UR value for the system, in accordance with the UA/UR guidance document, contained in Attachment A of this TI.

d. Inspectors should conduct an audit of the system boundaries, risk-significant functions, pre-defined PRA functional success criteria, and parameters for each monitored system of the UA/UR PIs and compare them to the assumptions used by the ROP's significance determination process (SDP), Appendix A of IMC 0609. Assumptions and criteria contained in validated SPAR models may also be used. Note and document any significant differences.

e. Confirm that for PWR pilot licensee participants, RHR unavailability would only be included for the risk-significant safety functions required for at-power accident mitigation. Depending on the plant-specific definition of what is required for a risk-significant function for at-power accident mitigation, RHR availability may be required either during power or during a portion of post-accident shutdown operations. Refer to Appendix A of the TI for additional guidance for PWR RHR unavailability.

f. Inspectors should confirm that participating pilot licensees follow the guidance contained in Attachment A of this TI. As a minimum, inspectors should:

1. Confirm that for data collection purposes, the UA/UR PIs will only apply during power operations, but data collection for all monitored systems will include valid demands and valid failures on demand for monitored functions that occur while the reactor is shut down.

2. Confirm that the data reporting method for the UA/UR PI is set up as if it were a permanent PI value with actual reporting.

3. Confirm that the UA/UR PI data stream is in the same format as the current SSU PI format.

4. Confirm that the UA/UR algorithm that calculates the actual PI value is set up in accordance with the guidance contained in Appendix A of this TI.

g. Any significant inconsistencies identified as a result of the audit stated in 04.02 (a through f) above should be documented in the inspector's report. Regional and NRR management (the Projects Branch Chief and the NRR/DIPM/IIPB Assessment Section Chief) should be notified via email of the inconsistency. Examples of significant deficiencies include equipment that should be within the defined system boundary but was excluded, inappropriate functional success criteria and accounting rules, and incomplete risk-significant functions for any of the monitored safety systems.

h. Document any inconsistency in the above guidance in accordance with IP 71151, Performance Indicator Verification and send a copy of the applicable sections to NRR/DIPM/IIPB, Attention: Don Hickman, or e-mail to deh2@nrc.gov. Mr. Hickman can also be reached by telephone at (301) 415-8541.

2515/xxx-06 COMPLETION SCHEDULE

This TI should be completed by the end of the pilot data reporting period, on or before December 30, 2002.

2515/xxx-07 EXPIRATION

4/01/02

This TI will expire two years from the date of issuance. Before that date, each participating pilot licensee identified in this TI should have this TI performed once during the data collection period.

2515/xxx-08 CONTACT

For questions regarding the performance of this TI and emergent issues, contact John Thompson at (301) 415-1011 (jwt1@nrc.gov) or Don Hickman (301) 415-8541 or (deh2@nrc.gov).

2515/xxx-09 STATISTICAL DATA REPORTING

All direct inspection effort expended in connection with this TI is to be charged as baseline inspection hours assigned to IP 71151, "PI Verification."

2515/xxx-10 ORIGINATING ORGANIZATION INFORMATION

10.01 Organizational Responsibility

This TI was initiated by NRR/DIPM/IIPB.

10.02 Resource Estimate

The direct inspection effort to be expended in connection with this TI is estimated to be as follows:

a. Unavailability portion of the PI: 10 man-hours/unit inspection.
b.
c. Unreliability portion of the PI: 10 man-hours/unit inspection.

10.03 Training

It is expected that inspectors of sites who are participants in this pilot PI program will attend the public UA/UR workshop scheduled for June 11 through 13. No additional formal

training is proposed for the performance of this TI. Web-based information will be provided to inspectors via the NRC internal Web site (http://nrr40.nrc.gov/XXXX/index.html) for their insight and also for their preparation for this inspection. | 40002

END

Appendix A: Regulatory Information Summary on Guidance for the Unavailability/Unreliability Pilot Performance Indicators

Appendix A

4/01/02

Regulatory Information Summary on UA/UR PI