December 6, 2002

MEMORANDUM TO: Maggalean W. Weston
Senior Staff Engineer
ACRS

FROM: Stephen L Rosen, Acting Chairman
Reliability and Probabilistic Risk Assessment Subcommittee
ACRS

SUBJECT: CERTIFICATION OF THE MINUTES OF THE MEETING OF THE ACRS SUBCOMMITTEES ON RELIABILITY AND PRA AND PLANT OPERATIONS SUBCOMMITTEES, NOVEMBER 1, 2002, ROCKVILLE, MD

I hereby certify that, to the best of my knowledge and belief, the minutes for the Reliability and PRA And Plant Operations Subcommittees meeting on Risk Management Technical Specifications and on the Industry Trends Program and Performance Indicators, Issued December 6, 2002, are an accurate record of the proceedings for that meeting.

S. L. Rosen 12/17/02

Stephen L. Rosen, Acting Chairman Date

UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D.C. 20555-0001

December 6, 2002

MEMORANDUM TO: Maggalean W. Weston
Senior Staff Engineer
ACRS

FROM: Stephen L Rosen, Acting Chairman
Reliability and Probabilistic Risk Assessment Subcommittee
ACRS

SUBJECT: CERTIFICATION OF THE MINUTES OF THE MEETING OF THE ACRS SUBCOMMITTEES ON RELIABILITY AND PRA AND PLANT OPERATIONS SUBCOMMITTEES, NOVEMBER 1, 2002, ROCKVILLE, MD

I hereby certify that, to the best of my knowledge and belief, the minutes for the Reliability and PRA And Plant Operations Subcommittees meeting on Risk Management Technical Specifications and on the Industry Trends Program and Performance Indicators, issued December 1, 2002, are an accurate record of the proceedings for that meeting.

Stephen L. Rosen, Acting Chairman Date

UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D.C. 20555-0001

December 6, 2002

MEMORANDUM TO: Stephen L Rosen, Acting Chairman
Reliability and Probabilistic Risk Assessment Subcommittee
ACRS

FROM: Maggalean W. Weston,
Senior Staff Engineer
ACRS

SUBJECT: WORKING COPY OF THE MEETING MINUTES OF THE ACRS SUBCOMMITTEES ON RELIABILITY AND PRA AND PLANT OPERATIONS SUBCOMMITTEES, NOVEMBER 1, 2002, ROCKVILLE, MD

A working copy of the minutes for the Reliability and PRA and Plant Operations Subcommittees meeting on Risk Management Technical Specifications and on the Industry Trends Program and Performance Indicators held on November 1, 2002, is attached for your review. Please provide me with any comments you might have.

Attachment:
As Stated

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
RELIABILITY AND PRA AND PLANT OPERATIONS SUBCOMMITTEES
RISK MANAGEMENT TECHNICAL SPECIFICATIONS
AND
THE INDUSTRY TRENDS PROGRAM AND PERFORMANCE INDICATORS
ROOM T-2B3, 11545 ROCKVILLE PIKE, ROCKVILLE, MARYLAND
MEETING MINUTES
NOVEMBER 1, 2002

INTRODUCTION

The ACRS subcommittees on Reliability and Probabilistic Risk Assessment and on Plant Operations held a meeting on November 1, 2002, with representatives of the NRC staff to discuss Industry Trends (Performance Indicators) and Risk-Informed Technical Specifications. The purpose of the meeting was to hear two presentations regarding staff progress at risk informing the Industry Trends Program (ITP), particularly the development of an index for initiating events, and the development of risk-informed improvements to the technical specifications. The meeting was open to the public. Maggalean W. Weston was the cognizant ACRS staff engineer and designated federal official (DFO) for this meeting. There were no written comments provided by the public. The meeting was convened by Stephen L. Rosen, acting as Chairman of the Reliability and Probabilistic Risk Assessment Subcommittee at 8:30 a.m. on November 1, 2002, and adjourned at 12:21 p.m. that day.

ATTENDEES

Attendees at the meeting included ACRS members and staff, and NRC staff.

ACRS Members/Staff

S. Rosen, Chairman
M. Bonaca, Member
T. Kress, Member
G. Leitch, Member
W. Shack, Member
J. Sieber, Member
G. Wallis, Member
M. W. Weston, DFO

NRC Staff

William Beckner, NRR
Tom Boyce, NRR
Cindi Carpenter, NRR
Robert Dennig, NRR
Don Dube, RES
Adel El-Bassioni, NRR
Ron Frahm, Jr., NRR
Dave Gamberoni, NRR
Christopher Grimes, NRR
Don Hickman, NRR
Kerry Kavanagh, NRR
Stewart Magruder, NRR
Dale Rasmuson, RES
Mark Reinhart
Nick Saltos, NRR
Carl Schulten, NRR
Petteri Tiippana, NRR
Bob Tjader, NRR
Larry Turner, NRR

Industry

Biff Bradley, Nuclear Energy Institute
Tom Houghton, Nuclear Energy Institute
Bob Youngblood, Information Systems Laboratories

A list of those attendees who registered is attached to the office copy of these minutes.

PRESENTATIONS AND DISCUSSION

The presentations to the subcommittees and the related discussions are summarized below. The presentation slides and handouts used during the meeting are attached to the office copy of the minutes.

Chairman's Comments

Stephen Rosen, acting as Chairman of the Reliability and Probabilistic Risk Assessment Subcommittee, convened the meeting. He stated that the purpose of the meeting was to discuss the Risk Management Technical Specifications and the Industry Trends Program as it related to the Initiating Events Performance Index.

NRC Staff Presentations

The NRC presentations on Risk Management Technical Specifications was made by Bob Dennig, Bob Tjader, and Nick Saltos, all of NRR. The Topics covered were:

I. Rick Management Technical Specifications

   A. Initiative 1 - End State Modifications
   B. Initiative 2 - Missed Surveillance Requirements
   C. Initiative 3 - Mode Restraint Flexibility
   D. Initiative 4b - Industry pilots on Completion Times
   E. Initiative 5 - Surveillance Test Interval Changes
   F. Initiative 6 - Actions and Completion Times
   G. Initiative 7 - Support System Operability Impact
   H. Initiative 8a - Relocation of Non-Risk Significant Technical Specifications

The NRC presentations on the Industry Trends Program and Initiating Events Performance Index were made by Tom Boyce and Dale Rasmuson. The topics covered were:

I. Industry Trends Program
   A. Initiating Events Performance Indicator Characteristics
   B. Current Performance Indicators
   C. Integrated Industry Initiating Event Indicator

Risk Management Technical Specifications

Consistent with the Commission's policy statements on technical specifications and the use of PRA, the staff and the industry are developing risk-informed improvements to technical specifications. The term "risk management technical specifications" is used to emphasize the goal of constructing technical specifications that reinforce the pro-active management of the total risk presented by the plant configuration and actions that may be needed to respond to emerging conditions.

The use of risk information and technology has long been a fundamental ingredient in improving technical specifications. In the 1983 publication "Technical Specifications - Enhancing the Safety Impact," (NUREG-1024), the NRC Task Group on Technical Specifications commented that the times associated with surveillance frequencies, allowable outage times, etc., have been established on a deterministic basis using engineering judgement. However, the Task Group believes that the use of insights from probabilistic risk assessments could be a significant aid in arriving at these judgements."

Technical Specifications have taken advantage of risk technology as experience and capability have increased. Since the mid-1980's, the NRC has been reviewing and granting improvements to technical specifications that are based, at least in part, on probabilistic risk assessment (PRA) insights. In its final policy statement on technical specification improvements of July 22, 1993, the Commission stated that it expects that licensees will utilize any plant specific PRA or risk survey in preparing their technical specification related submittals. The Commission reiterated this point when it issued the revision to 10 CFR 50.36, "Technical Specifications," in July 1995. In August 1995, the NRC adopted a final policy statement on the use of PRA methods in nuclear regulatory activities that encourage greater use of PRA to improve safety decision making and regulatory efficiency. Since that time, the industry and the NRC have been pursuing increased use of PRA in developing improvements to technical specifications. The staff is currently looking at eight initiatives submitted by industry as listed above.

Currently, only Initiative 2 has been approved and is being adopted by plants. The Safety Evaluation Report (SER) for the topical report submitted by Combustion Engineering Owners Group (CEOG) was issued and the Boiling Water Reactor topical SER is in concurrence for Initiative 1. A consolidated line item improvement process (CLIIP) Federal Register Notice has been published for Initiative 3. The staff is preparing an SER based on a CEOG submittal for Initiative 6. Work on the other Initiatives is in various stages of development and completion.

Subcommittee Comments

Dr. Bonaca commented that in reference to "rudimentary capability," it might seem acceptable, based on engineering judgement to take on component out of service, but when you begin to two, three, or more components out of service, he would not agree with the rudimentary concept because it takes it takes some sophistication and analysis to understand the consequences of multiple components and different trains, for example, taken out of service. The response was that the Maintenance Rule is what, in our regulatory space, currently handles multiple equipment out of service. B. Bradley of NEI commented that all plants use probabilistic safety assessments for their on-line at-power maintenance equipment out of service. And also for shutdown, typically, some plants do use qualitative methods.

B. Bradley further commented that regarding the regulatory framework for 50.65(a)(4), Regulatory Guide 1.182 is the guide that references the applicable portions of NUMARC 9301, which is the implementation guidance. The staff has developed inspection procedures for (a)(4), so there is an explicit delineation of what is expected for the program, it is inspectable, laid out, and referenced in the Regulatory Guide.

Regarding Initiative 2, Dr. Kress asked how many surveillances were you allowed to miss at the same time. The response was, not many.

Mr. Sieber indicated that missing many surveillances would be a management problem.

Dr. Bonaca asked if licensees still have to report missed surveillances. The response was no, they are no longer reportable. That requirement was taken out.

Dr. Bonaca asked if licensees had to trend rnissed surveillances. The response was that licensees have to trend all adverse conditions in the plant.

Mr. Leitch asked if the initiative 3, Mode Flexibility risk analysis is performed on a plant-by-plant basis. The response was that a generic analysis was done to rule out certain transitions.

Mr. Rosen indicated that subcommittee was concerned with patterns of abuse that might emerge and wanted to know if the staff had thought about that. The response was yes, the staff had thought about the abuses and shared the subcommittee's concerns.

Mr. Leitch asked if it would be proper to think of initiative 4, extending completion times, as almost eliminating the request for enforcement discretion relating to extending out of service times. Mr. Dennig responded that one way to conceptualize these initiatives is that this and others address areas where there have historically been NOED situations.

Industry Trends Program

The Industry Trends Program (ITP) was discussed in SECY-02-0058, "Results of the Industry Trends Program for Operating Power Reactors and Status of Ongoing Development." The purpose of the ITP is to provide a means for the NRC to ensure that the safety performance of operating power reactors is being maintained. Based on the information currently available from the industry-level indicators originally developed by the former Office for Analysis and Evaluation of Operational Data (AEOD) and the Accident Sequence Precursor (ASP) Program implemented by the Office of Nuclear Regulatory Research (RES), no statistically significant adverse trends have been identified through FY 2001.

The Initiating Events Performance Index (IEPI) is a new concept for combining initiating events at the industry level into a single performance indicator for the initiating events cornerstone of safety. Subcommittee presentations will include an overview of the ITP and the IEPI.

The staff is continuing to use the AEOD and ASP indicators while it develops additional indicators that are more risk-informed and better aligned with the cornerstones of safety in the ROP. These additional industry indicators should have the following characteristics:

- They can be used as performance measures in the NRC's performance and accountability report to Congress
- They are complementary to the plant-specific ROP
- They provide industry information for a ROP cornerstone
- They use industry data available from current NRC programs
- They are related to or tied closely to risk (e.g., core damage frequency [CDF] or change in CDF [delta CDF])
- They utilize risk-informed methods for assessing their significance (e.g., a safety goal, RG 1.174)

The first ROP cornerstone to be addressed is initiating events. Initiating events are related to risk via core damage frequency. An expression that combines risk information and operating experience for initiating events has been developed. This expression is related to CDF and also delta CDF. Such an expression, or a similar one, is a possible candidate for an integrated industry initiating event indicator. Risk-informed thresholds can be established that consider (1) the subsidiary safety goal for CDF and (2) the characteristics/ behavior of the integrated indicator.

Subcommittee Comments

Members present discussed and raised questions about the trend line and the equation used to construct it. They also questioned the time period that the trend line represented.

Mr. Leitch questioned the value of the program with respect to internal NRC actions. The response was that this the staff is still trying to work its way through the program. Some effort is being made to tie the indicators to specific actions.

Members present discussed the integrated industry initiating event indicator that is being developed by staff in terms of CDF. Delta CDF, what the data represents, how best to present the data, whether or not the data should be a complementary list or a disaggregation, and whether or not the trends are in safety or trends in performance.

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

SUBCOMMITTEE MEETING ON RELIABILITY & PROBABILITY RISK ASSESSMENT AND PLANT OPERATIONS

NOVEMBER 1, 2002
Today's Date

NRC STAFF SIGN IN BELOW
PLEASE PRINT

NAME	NRC ORGANIZATION
R. L. Dennig	NRR/RORP/TSS
T.R. Tjader	NRR/RORP/TSS
W. Beckner	NRR/RORP
Kerri Kavanagh	NRR/RORP/TSS
Carl Schulten	NRR/RORP/TSS
Stu Magruder	NRR/ORIP
Nick Saltos	NRR/DSSA/SPSB
Chris Grimes	NRR/ORIP/RPRP
Mark Reinhart	NRR/DSSA/SPSB
Dale Rasmuson	RES/DRAA/OERAB
Don Dube	RES/DRAA/OERAB
Dave Gamberoni	NRR/DIPM/IIPB/PAS
Ron Frahm Jr	NRR/DIPM/IIPB/PAS
Larry Turner	NRR/DIPM/IIPB/PAS
Cindi Carpenter	NRR/DIPM/IIPB
Adel El-Bassioni	NRR/SPSB
Tom Boyce	NRR/DIPM/IIPB
Petteri Tiippana	NRR/DIPM/IIPB
Don Hickman	NRR/DIPM/IIPB

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

SUBCOMMITTEE MEETING ON RELIABILITY & PROBABILITY RISK ASSESSMENT AND PLANT OPERATIONS

NOVEMBER 1, 2002
Today's Date

ATTENDEES PLEASE SIGN IN BELOW
PLEASE PRINT

NAME	AFFILIATION
Biff Bradley	NEI
Tom Houghton	NEI
Bob Youngblood	ISL

United States Nuclear Regulatory Commission

Davis-Besse Reactor Vessel Head Degradation
Lessons-Learned Task Force

Briefing for ACRS

December 5, 2002

Overview

Background

- NRC has taken the initiative to conduct lessons-learned reviews for significant issues
  - Self-critical
  - Improvements made
  - Examples:
    - Indian Point 2 steam generator tube failure (2000)
    - NRC inspections at the South Texas Project (1995)

Overview

Objectives and Scope

- Perform independent evaluation
- Review:
  - Reactor oversight process
  - Regulatory processes
  - Research activities
  - International practices
  - Generic Issues program
- Identify and recommend improvements

Overview

Composition and Attributes

- Multi-disciplined, experienced team
- No previous significant involvement in Davis-Besse Nuclear Power Station (DBNPS) oversight
- Observation by State of Ohio
- Stakeholder input to task force review activities
  - Solicited input at two public meetings

Overview

Review Methods

- Comprised of two groups
- Performed document reviews and conducted interviews
- Conducted fact finding at DBNPS site
- Conducted reviews at NRC Regional Offices and Headquarters

Overview

Report

- The report is available on ADAMS (the NRC electronic document management system)
  - Accession number: ML022760414
- The report is also available on the NRC's public website:
  - http://www.nrc.gov/reactors/operating/ops-experience/vessel-head-degradation/news.html
- The report issuance was coordinated with other NRC offices because of ongoing NRC-related reviews
  - DBNPS plant-specific issues were provided to the NRC's 0350 Oversight Panel for follow up, as appropriate.

Results

Overall Conclusions

- NRC and industry recognized potential for this type of event nearly 10 years ago
- Initial conclusion was that vessel head penetration nozzle cracking was not an immediate safety concern
  - Further reviews became protracted
- NRC and DBNPS failed to learn key lessons from past boric acid-induced degradation events

Results

Overall Conclusions (continued)

- The leaking nozzle and vessel head degradation was not prevented
  - The NRC, DBNPS, and the nuclear industry failed to adequately review, assess, and follow up on relevant operating experience
  - DBNPS failed to assure that plant safety issues would receive appropriate attention
  - The NRC failed to integrate known or available information into its assessments of DBNPS's safety performance

Results

Overall Conclusions (continued)

- Other contributing factors
  - Guidance and requirements
  - Staffing and resources
  - DBNPS communications
  - Licensing processes and implementation

Results

NRC, DBNPS, and Industry Review, Assessment, and Follow up of Operating Experience

- Significant operating experience involving boric acid leakage and corrosion
- Generic Communication Program implementation
- Generic Issues Program implementation
- Operating experience involving foreign nuclear power plants
- Assessment and verification of industry technical information
- NRC operating experience review and assessment capabilities

Results

DBNPS Assurance of Plant Safety

- Reactor coolant system leakage symptoms and indications
- Boric acid corrosion control program and implementation
- Owners group and industry guidance implementation
- Internal and external operating experience awareness
- Oversight of safety related activities

Results

NRC Integration of Information into Assessments of DBNPS Safety Performance

- Reactor coolant system leakage assessment
- Inspection program implementation
- Integration and assessment of performance data
- Guidance and requirements
- Staffing and resources
- Davis-Besse Nuclear Power Station communications
- Licensing process guidance and implementation

Recommendations

Recommendation Areas

- Inspection guidance
- Operating experience assessment
- Code inspection requirements
- NRC programs and capabilities (including training and experience)
- Leakage monitoring requirements and methods
- Technical information and guidance
- NRC licensing processes
- Previous NRC lessons-learned reviews

Future Activities

Senior Management Review Team

- Team of senior NRC executives reviewed report and recommendations
- Action plan developed to implement recommendations

Closing Remarks

Summary

- The NRC conducted a comprehensive, self-critical assessment of its regulatory processes as a result of the DBNPS degraded reactor vessel head.

- The NRC identified a number of areas for improvement and has initiated actions to address these areas.

Integrated Industry Initiating Event Indicator

Dale M. Rasmuson
Operating Experience Risk Analysis Branch
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission

ACRS Subcommittees on PRA and Operating Experience
November 1, 2002

Outline of Presentation

- Industry Trends Program (ITP)
- Performance Indicator Characteristics
- Current Performance Indicators
- Integrated Industry Initiating Event Indicator (IIIEI)
- Conclusions
- Next Steps

Indicator Characteristics

- Be used as performance measures in the annual performance report to Congress
- Are complementary to the plant-specific ROP
- Provide industry information for an ROP cornerstone
- Use industry data available from current NRC programs
- Are related to or tied closely to risk (e.g., CDF or ΔCDF)
- Utilize risk-informed measures for assessing their significance (e.g., safety goal, RG 1.174)

Performance Indicators

ROP Cornerstone	Ex-AEOD	ROP PIs	Other
Initiating Events	Automatic Scrams Significant Events	Unplanned Scrams Scrams with Loss of heat removal Unplanned power changes	ASP 15 Initiating Events
Mitigating Systems	Safety System Actuations Safety System Failures Equipment Forced Outages Forced Outage Rate	Unavailability of HPCI, HPCS, RCIC, EP, RHR (BWR) HPSI, AFW, EP, RHR (PWR)	
Barrier Integrity		RCS Activity RCS Leakage	
Emergency Preparedness		Drill/Exercise Performance ERO Drill Participation Alert and Notification System	
Occupational Radiation Safety		Occupational Exposure Control	
Public Radiation Protection	Collective Radiation Exposure	Radiological Effluents	
Safeguards		Personnel Screening Personnel Reliability	

Initiating Events for BWRs

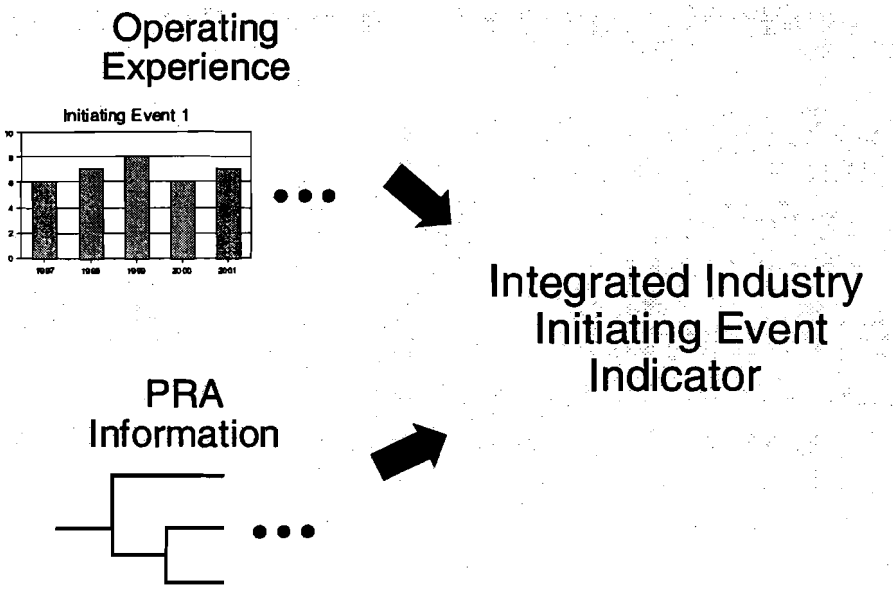
- Loss of Offsite Power
- Loss of Vital AC Bus
- Loss of Vital DC Bus
- Small / Very Small LOCA
- Loss of Feedwater
- BWR General Transients
- BWR Loss of Instrument Air
- BWR Loss of Heat Sink
- BWR Stuck Open Relief/Safety Valve

Initiating Events for PWRs

- Loss of Offsite Power
- Loss of Vital AC Bus
- Loss of Vital DC Bus
- Small / Very Small LOCA
- Loss of Feedwater
- PWR General Transients
- PWR Loss of Instrument Air
- PWR Loss of Heat Sink
- PWR Stuck Open Relief/Safety Valve
- Steam Generator Tube Rupture

Philosophy

- Trending individual initiating events does not capture the risk importance
- Mitigating systems performance indicator (MSPI) has provided a way of combining risk information with operating experience
- MSPI approach can be used for initiating events



What is the Integrated I.E. Indicator?

- The integrated industry indicator
  - Is average of the sum of the products of the current operating experience value for each initiating event and the appropriate risk weight obtained from PRAs
  - Is related to core damage frequency
  - Allows combined trending of frequent and infrequent events with different risk importances
- One indicator for BWRs and one for PWRs

Integrated Industry I.E. Indicator Equation (IIIEI)

$$IIIEI = \frac{1}{N} \sum_{i=1}^{m} \sum_{u=1}^{N} B_{iu} \lambda_i$$

where

N = number of units

B_{iu} = Birnbaum importance measure for initiating event i at unit u

m = number of initiating events

λ_i = current estimated industry frequency for initiating event i

Sample Calculation

- Consider two initiating events - loss of a vital DC bus and general transients
- The integrated industry initiating event indicator for this sample calculation is calculated by:

$$IIIEI = (B_1\lambda_1 + B_2\lambda_2)/N = 6.09\times10^{-5}$$

where B_1 = 0.206 and B_2 = 9.30×10^{-5} are sums of the plant-specific Birnbaum importance measures, λ_1 = 1.67×10^{-3}/reactor-critical year and λ_2 = 0.808/reactor-critical year are the industry initiating event frequencies, and N=69

Risk Information

- The relevant risk information for each initiating event used in the Rev. 3 SPAR models
  - A measure similar to a conditional core damage probability (CCDP)
  - Birnbaum importance measure

(*N.B.* Rev. 3 SPAR models are plant-specific event tree/fault tree linked models that are being benchmarked against licensees' PRAs.)

Integrated Indicator Calculation

- Can be calculated in two ways
  - Absolute value
    - Related to core damage frequency
    - Results are always positive
    - Safety Goal
  - Deviation from a baseline
    - Related to change in core damage frequency
    - Results can be positive or negative
    - Regulatory Guide 1.174
- Both ways are equally valid

Some Issues

- Do we use absolute or difference formulation?
- What period do we use for baseline initiating event frequency?
- How should the initiating event current performance (λ's) be estimated?

Trial Baseline Values

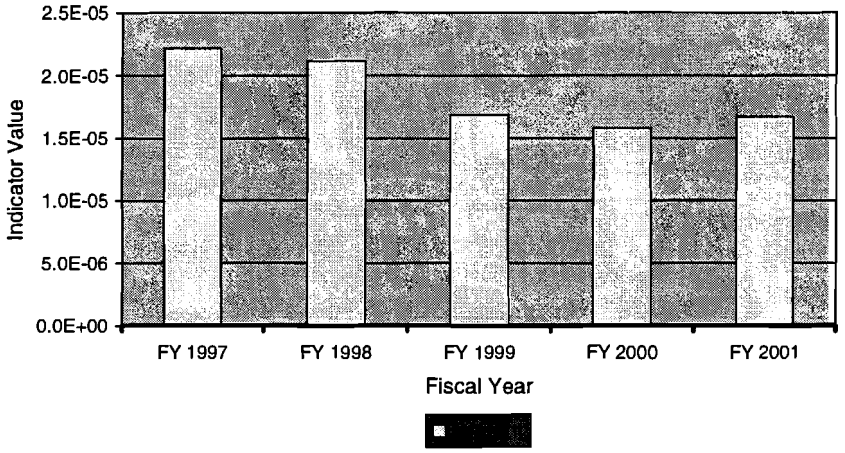
- Obtained from operating experience over an interval on which the trend is basically constant (trend parameter is not statistically significant)
- For initiating events with few occurrences, the interval is 1988-2001.
- For I.E.'s with more frequent occurrences, the interval is shorter, but includes at least 4 years

Current Performance

- Current performance is estimated using
  - Maximum likelihood estimator or
  - Bayesian update (A constrained non-informative prior distribution based on the baseline value)
  - One or more years of data (events and reactor critical years)
- The difference between the current value and the baseline can be positive or negative since the current value can be less than or greater than the baseline value.

Integrated BWR IE Indicator

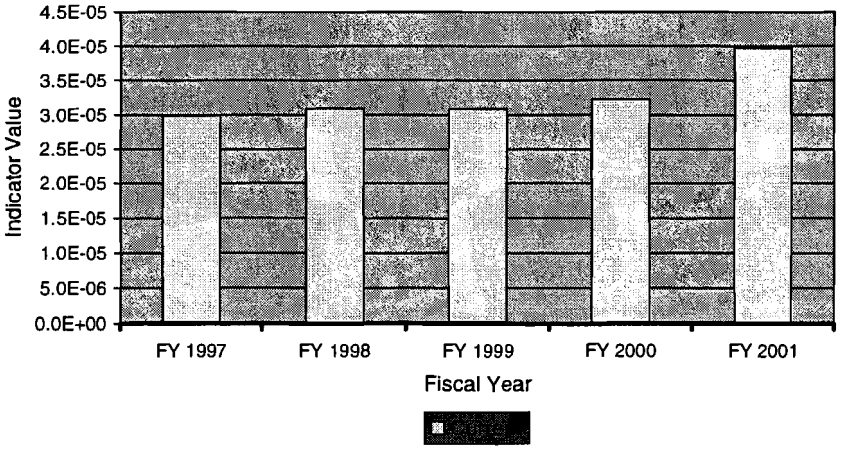
(3-Year Bayesian Update)



October 30, 2002 Integrated Industry Indicator 17

Integrated PWR IE Indicator

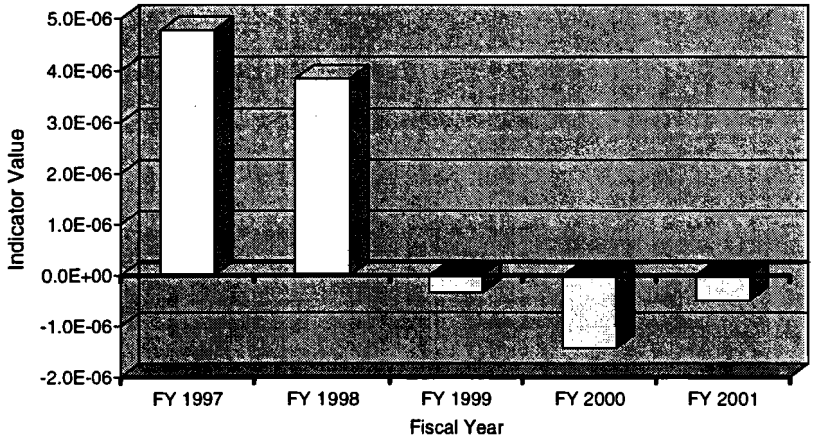
(3-Year Bayesian Update)



October 30, 2002 Integrated Industry Indicator 18

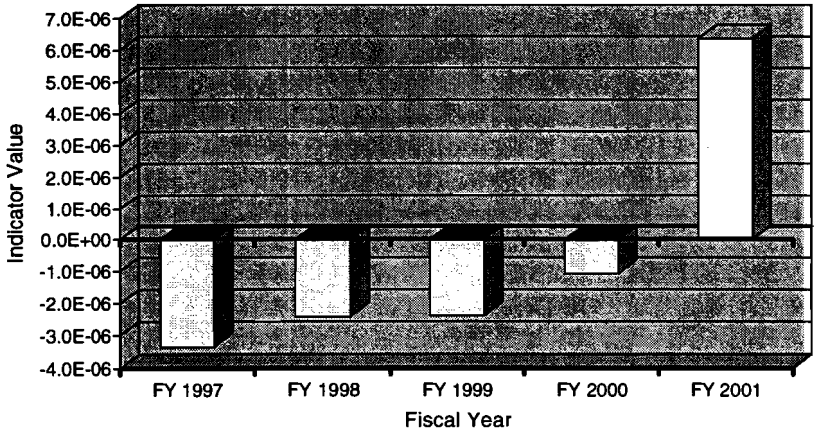
Integrated BWR IE Indicator

(3-Year Bayesian Update)



Integrated PWR IE Indicator

(3-Year Bayesian Update)



Uncertainties in the Indicator

- Initiating event frequencies
  - Baseline frequencies
  - Current frequencies
- Birnbaum importance measures
  - Parameter uncertainty from the PRAs
  - Plant-to-plant variability

Indicator Significance

- Congress (via the GPRA) has requested that the NRC use performance goals and performance targets (thresholds) to assess the significance of the performance measures
- The Commission has told the staff to develop risk-informed thresholds "as soon as practicable"

Thresholds for Integrated Indicator

- Thresholds should be set using the following considerations:
  - Safety Goal and/or Regulatory Guide 1.174
  - Behavior of the integrated indicator
    - Simulations
    - Contributors
    - Maximum value
    - Past operating experience trends for initiating events
  - Consistency with the ROP
  - Expert panel where logical relationships and/or parameters are difficult to derive or where pragmatic issues arise

Conclusions

- Single industry-wide performance measure that has a logical relation with risk metrics (CDF or ΔCDF)
- Potentially relatable to the Safety Goal
- Allows rational combination of events with different risk importances and frequencies
- Can establish early-warning and agency action thresholds
- Complementary to plant-specific PIs

Next Steps

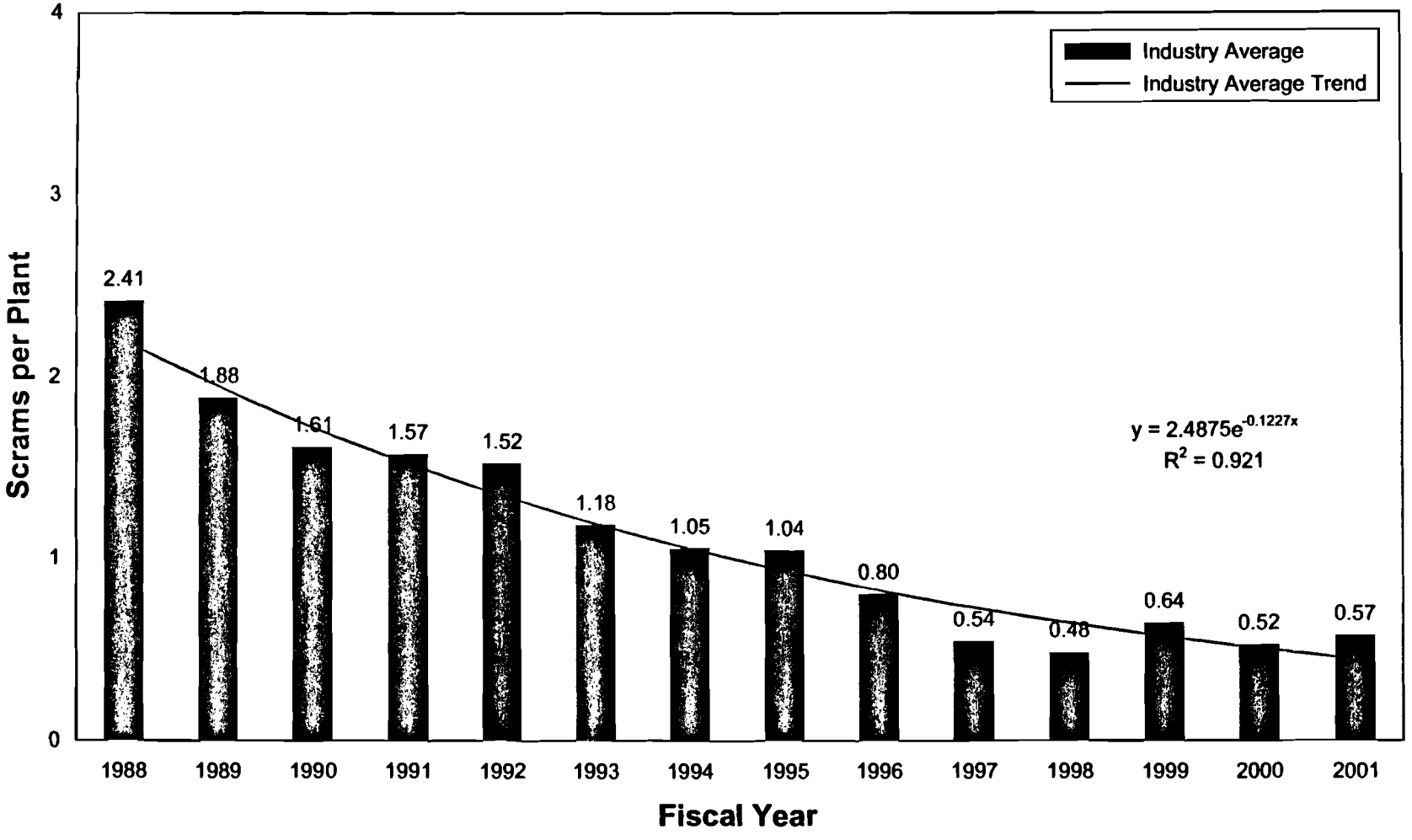
- Develop initial concept
  - Review and comment by stakeholders
  - Resolve comments
- Develop trial product
  - Review and comment by stakeholders
  - Resolve comments
- Develop final product
  - Review and comment by stakeholders
  - Resolve comments
- Implement product

ACRS BRIEFING ON

INDUSTRY TRENDS PROGRAM (ITP)

November 1, 2002

Automatic Scrams While Critical



Introduction

- Background
- Purposes and Role of ITP
- Communications
- Concepts and Approach
- Process for Industry Trends
- Development Efforts

Background

- Improving industry trends contributed to decision to revise ROP
- Strategic Plan performance goal measure of "No statistically significant adverse industry trends in safety performance" - annual report to Congress as part of NRC's Performance and Accountability Report
- NRR developed formal Industry Trends Program (ITP) in 2001, building on work by RES from former AEOD PI program
- Reports in SECY-01-0111 (6/2001) and SECY-02-0058 (4/2002)
- ACRS briefed in May 2002
- Commission briefed in May 2002
- No adverse industry trends identified to date

Purposes and Role of ITP

- Purposes:

  (1) Provide a means to confirm that the nuclear industry is maintaining the safety performance of operating reactors

  (2) By clearly communicating industry performance, enhance stakeholder confidence in the efficacy of the NRC's processes

- Complements existing NRC processes:

  (1) Plant-specific oversight by ROP

  (2) Processes for addressing generic issues (i.e., generic communications process in NRR and generic safety issues process in RES)

Communications with Stakeholders

- Status of ongoing development efforts briefed to NRC/industry working group on ROP
- Industry indicators published on NRC web site
- Annual review at AARM and report to Commission
- Annual report to Congress in NRC Performance and Accountability Report
- Indicators presented at conferences with industry

Concepts and Approach for Development of Indicators

- Used existing programs for initial set of indicators
  - ex-AEOD indicators (7 indicators)
  - ASP program (1 indicator)

- Developing additional industry indicators for each cornerstone of safety
  - PIs derived from plant-level PIs in ROP (~19 indicators)
  - PIs from operating experience data (initiating events index combines 10 indicators into 1 indicator)

- Hierarchal approach to use of industry indicators
  - Qualified set of indicators used for reporting to Congress
  - Indicators may be "decomposed" into multiple indicators to investigate any trends

Current Process for Industry Trends

- Identify any statistically significant adverse trends in industry indicators
  - Statistically significant fit of a trendline to each indicator
  - Improving or flat trendlines = no adverse trend => done
  - Degrading trendlines = adverse => report to Congress & initiate evaluation
  - In addition, to investigate short-term variations before they become trends, single data point above prediction limit => initiate evaluation

- Evaluate underlying issues and assess safety significance
  - Decompose indicators and look for outliers
  - If appropriate, review of LERs and inspection reports

- Agency response IAW existing NRC processes for generic issues
  - Early engagement with industry and assessment of issues
  - Responses could include industry initiatives and requests for information
  - NRC may conduct generic safety inspections

- Review at AARM

Development Efforts

- Thresholds for PIs, risk-informed where possible; enables change to performance measure from trends-based to thresholds approach
- Indicators for cornerstones of safety derived from ROP PIs
- Framework/Guidance document
- Industry-level Mitigating Systems Performance Index (MSPI), depending on results of pilot program for individual plants in ROP
- Initiating Events Performance Index (IEPI)

Risk Management Technical Specifications

Presentation to ACRS Subcommittees on Plant Operations & Reliability and Probabilistic Risk Assessment

November 1, 2002

Development

- Standard Technical Specifications – 1974
- NUREG-1024 - 1983
- Interim Policy Statement - 1987
- Improved Standard Technical Specifications – 1992
- Implementation of 50.65(a)(4) – 2000
- Risk Management Technical Specifications Initiatives – 1998 to Present

Principles

- Coherence with other risk-informed regulation development
- Licensee discretion commensurate with capability – graded approach to crediting 50.65(a)(4) program
- Involve staff with cognizance for inspection, maintenance, risk assessment and management

Initiative 1- End States

- Effect: Allow repair time in hot shutdown instead of requiring transition to cold shutdown
- Basis: CEOG and BWROG generic analysis of preferred mode for repair given equipment inoperable
- Status: CEOG safety evaluation complete, reviewing TSTF translation into standard tech spec changes; BWROG safety evaluation complete, TSTF in preparation.

Initiative 2 – Missed Surveillance Actions

- Effect: Extension of flexibility granted in Generic Letter 87-09, allow up to one surveillance interval to make up inadvertent missed/incomplete surveillance
- Basis: Infrequent use, likelihood that equipment is operable, entry into corrective action program, assess and manage risk of delay as extension of (a) (4) program (treat as emergent condition)
- Status: 47 plants have adopted, 21 requests in process

Initiative 3 – Mode Flexibility

- Effect: Extension of flexibility granted in Generic Letter 87-09, allow mode transition up in power with inoperable equipment, relying on compliance with TS actions in higher mode
- Basis: Infrequent use, generic risk analysis ruling out some transitions, 50.65(a)(4) assessment and management of risk, oversight of 50.65(a)(4)
- Status: Resolving comments on FRN published August 2, 2002

Initiative 4 – Flexible Completion Times

- Effect: Extend completion time from a nominal value up to a "backstop" maximum using configuration risk management
- Basis: Under development, to include requirements for PRA technical adequacy, real-time quantitative capability, configuration and cumulative risk metrics
- Status: Industry writing detailed guidance paper for staff review, identifying plants for pilot amendments.

Initiative 5 – Relocation of Surveillance Test Intervals

- Effect: Requirement to perform surveillance remains in TS, frequency adjusted outside TS in licensee program using staff-approved methods
- Basis: Review of methods, PRA technical adequacy
- Status: Industry preparing guidance document and draft methodology, expect to use a pilot plant

Initiative 6 – Shutdown Tracks

- Effect: Risk-inform LCO 3.0.3 shutdown completion times
- Basis: CEOG quantitative bounding risk analysis
- Status: CEOG topical under review

Initiative 7 – Risk-Informing Support Equipment Impact

- Effect: Allow a TS train to be considered operable up to a maximum time with degraded non-TS design support features (barriers and snubbers)
- Basis: Generic calculation showing low risk due to low initiator frequency (internal flood, seismic event)
- Status: Staff reviewing draft proposal

Initiative 8 – Risk-Informing TS Scope

- Effect: (a) Allow relocation of LCOs not meeting any 50.36 criteria, including criterion on risk significance, (b) Limit scope of TS to risk-significant SSCs
- Basis: Adaptation/adoption of categorization approach from Option 2, generic analysis, PRA technical adequacy
- Status: (a) Industry preparing paper for staff review, (b) Requires rulemaking, schedule TBD