

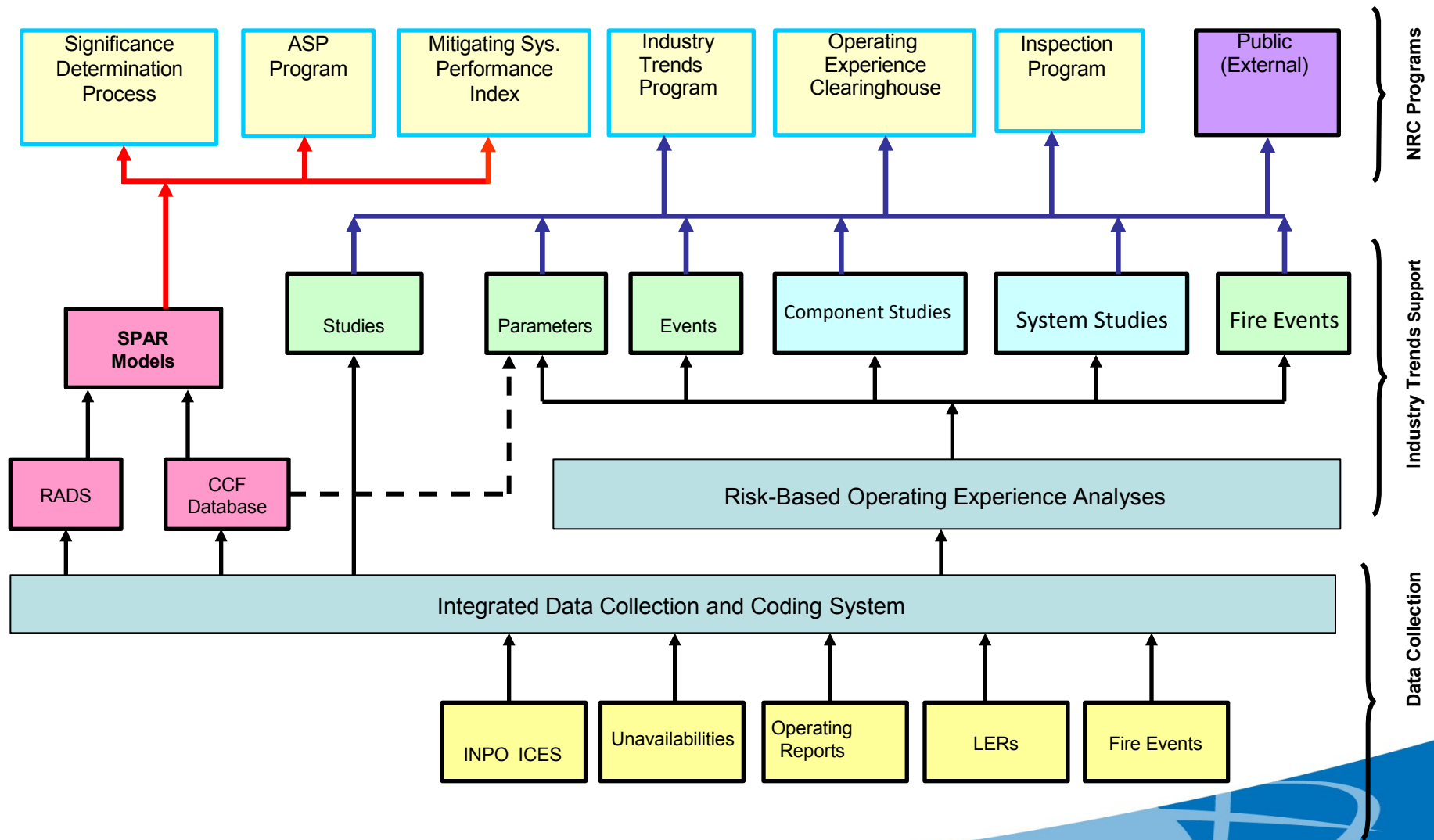
# NRC Operating Experience (OpE) Programs

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SPAR Workshop Public Meeting  
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# RES Data Collection, Analysis, and Trending Programs





# Publicly Available Data Summaries

<http://nrcoe.inel.gov/resultsdb/>

## Reactor Operational Experience Results and Databases

This area contains updated results for a variety of previously published studies conducted by the office of Nuclear Regulatory Research.

What's New in the 2013 Update  
Summary of Significant Trends for 2013   
Overview and Reference 

### Parameter Estimates

- Industry Average Parameter Estimates
- Common-Cause Failure Parameter Estimates
- Loss of Offsite Power
- Industry Performance of Relief Valves

### Trends and Insights

- Initiating Events
- System Studies
- Component Performance
- Common-Cause Failure Insights
- International Common-Cause Failures
- Fire Events

### Supplemental Information

- Operating Time
- Industry Performance Data
- Other Documents
- Published Report List 

### Databases and Programs












- Common-Cause Failures (CCFDB)
- Reliability and Availability Data System (RADS)
- Reliability Calculator

#### SYSTEM NOTICES

**2013 results are  
now available.**

#### RELATED INFORMATION

[Events Assessment](#)  
[Industry Trends](#)  
[Generic Issues](#)  
[Emergency Response](#)

Fire Protection   
Fitness-for-Duty Programs   
Access Authorization Programs   
Human Factors   
Operating Reactor Maintenance Effectiveness   
Multiple/Repetitive Degraded Cornerstone Column   
PWR Sump Performance   
Reactor Pressure Boundary Integrity Issues for Pressurized Water Reactors   
Reactor Vessel Integrity   
Steam Generator Action Plan   
Groundwater Contamination (Tritium) at Nuclear Plants   
Buried Piping Activities  
Results and Databases



# Primary OpE Data Sources

## ICES/EPIX

- Institute for Nuclear Power Operations (INPO) – Industry organization established to promote safety and reliability in U.S. nuclear power plants
  - Equipment failure data captured in the INPO Consolidated Events Database (ICES), formerly the Equipment Performance Exchange System (EPIX)
    - Data is proprietary
    - Data is input by each utility in the U.S.
    - The amount of data provided varies by utility
    - Includes demand and run time data for selected safety systems

# Primary OpE Data Sources (Cont'd)

- Licensee Event Reports (LERs)
  - 10CFR50.73
  - Event Report Guidance provided in NUREG-1022
  - Primary source of initiating events information
  - 60-day reporting requirement
- Event Notification Reports
  - immediate notification reporting requirements include immediate, 1-hour, 4-hour and 8-hour telephone notifications
  - Inspection Reports

# LER Reporting

- LERs—Licensee Event Reports
  - Submitted by U.S. nuclear plant licensee as required by regulation 10CFR50.73 within 60 days of a reportable event
    - Plant shutdown resulting from a Tech Spec requirement
    - Operations or plant conditions prohibited by Tech Specs
    - Safety barriers degraded
    - A previously unanalyzed condition
    - A natural phenomena posing a threat to the facility
    - Manual or automatic reactor scram
    - Inadvertent actuation of the Containment Isolation System, ECCS, emergency diesel generators, Containment Heat Removal System
    - Operations or plant conditions prohibited by Tech Specs
    - Safety barriers degraded
    - A previously unanalyzed condition
    - A natural phenomena posing a threat to the facility
    - Manual or automatic reactor scram
    - Inadvertent actuation of the Containment Isolation System, ECCS, EDGs
    - Containment Heat Removal

## Operating Experience Clearinghouse

### Inputs

### OpE Program

### Products

#### U.S. Industry: Industry OpE Reports

Daily Event Reports  
Plant Status Reports  
Licensee Event Reports  
Part 21 Reports  
INPO Reports

#### U.S. NRC Reports

Inspection Findings  
Preliminary Notifications  
Regional Project Calls  
Construction Experience  
Studies/Trends

#### International OpE Reports

Incident Reporting System (IRS)  
International Nuclear Event Scale (INES)  
Bilateral Exchanges

#### OpE Clearinghouse (NRR)

Screening  
Communication  
Evaluation  
Application

#### Influencing Agency programs

Inspection  
Licensing

#### Informing Stakeholders

Generic Communications  
OpE Briefings  
COMMunications  
Periodic OpE Newsletter  
OpE Notes  
Notable OpE  
Tech Review Group Report

#### Potential Regulatory Actions

Rulemaking  
Information Request

# Clearinghouse Specialists

## Clearinghouse Specialists

- “Center of Expertise” approach with participation from RES and NRO
- Day to day interface with regions
- Screening/awareness of all events/issues that meet thresholds
- Database stores all screening/coding info
- Communicates OpE to tech staff/management

## Analysis Specialists

- Longer-term focus
- Looks for trends in events, industry data, inspection results
- Interface with INPO
- Interface with NRC Technical Review Groups (TRGs)



# Screening Function

## Tiered response/disposition

Formal screen in → Issue for Resolution

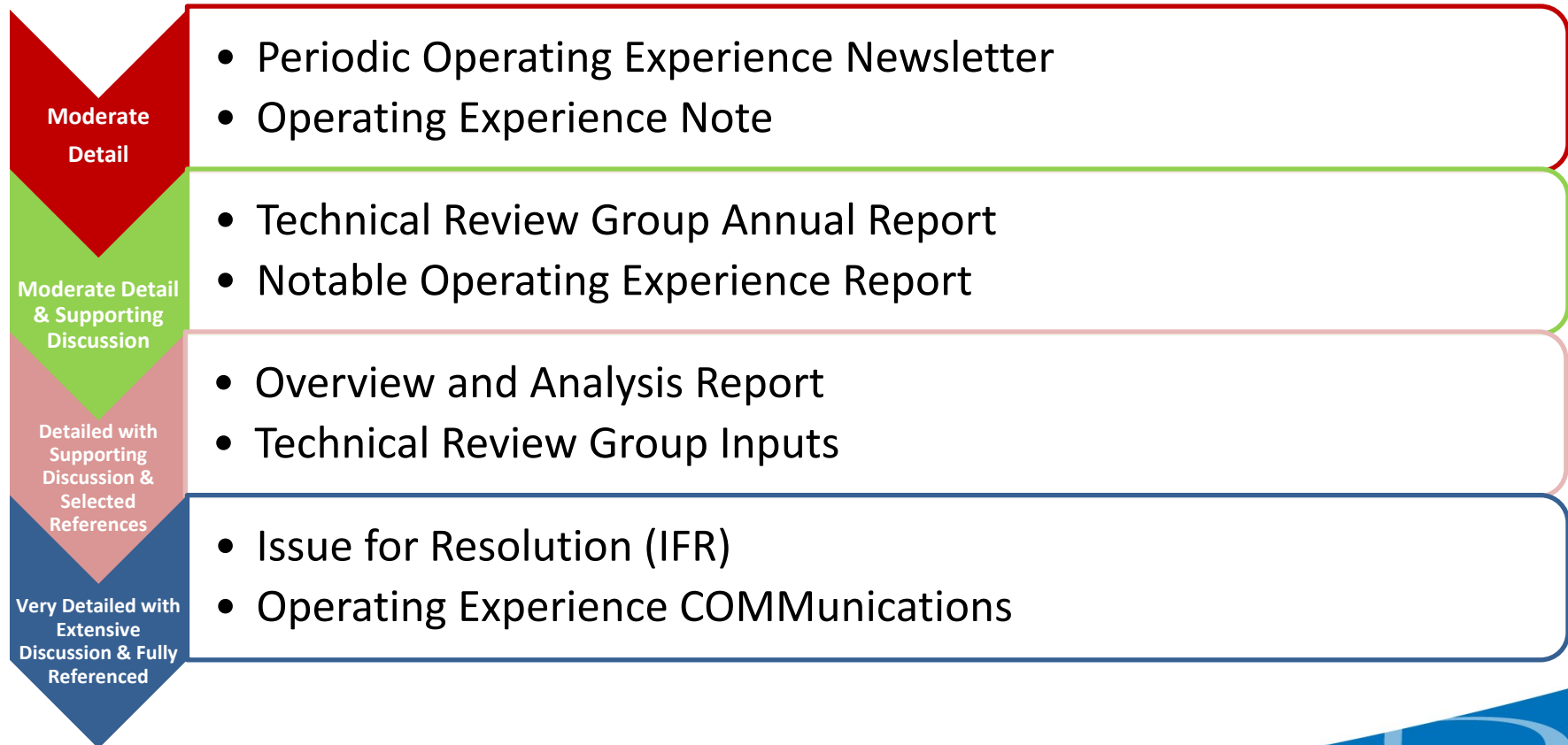
Staff follow-up and summary → OpE COMMunication

Email issue → Technical Review Group

Information only → No Action

Items screened by the Clearinghouse are coded and stored in the Issue Tracking Database

# Operating Experience Reports



# External Interfaces

## INPO's Events Analysis Division

- Operating Experience; Event Follow up; Data Analysis
- Additional Interfaces
  - NRC/INPO Memorandum of Agreement; Document sharing; Special Projects

## International Activities

- Relationship focused
  - NEA's Working Group on Operating Experience (WGOE)
  - National Coordinator for IAEA's International Reporting System
  - ICDE-International Common Cause Data Exchange
- International OpE is handled similarly to domestic OpE
  - IRS - International Reporting System for Operating Experience (similar to LERs)
  - INES - International Nuclear and Radiological Event Scale

# Industry Trends Program

**Purpose:** Provide means to assess whether the nuclear industry is maintaining the safety performance of operating reactors, and to identify significant trends in safety performance

## Objectives:

- Provide feedback to the Reactor Oversight Process
- Assess the safety significance and cause of any statistically significant adverse industry trends
- Communicate to Congress and stakeholders
- Support the NRC's performance goal of safety

Reference: SECY-15-0061, "Fiscal Year 2014 Results of the ITP for Operating Power Reactors" (ML15065A275)

# ITP

## Process:

- Collect indicator data
- Use prediction limits to identify short-term issues
- Use trend lines to identify statistically significant long-term adverse trends
- Evaluate BRIIE results
- Analyze identified issues
- Respond as appropriate
- Communicate results

# ITP Indicators

## Long-term and short-term ITP indicators:

- Automatic scrams while critical
- Safety systems actuations
- Significant events
- Safety system failures
- Forced outage rate
- Equipment forced outages
- Collective radiation exposure
- Unplanned power changes
- Reactor coolant system activity
- Reactor coolant system leakage
- Drill and exercise performance
- Emergency response organization drill participation
- Alert and notification system reliability
- Accident sequence precursors

# FY 2014 ITP Results

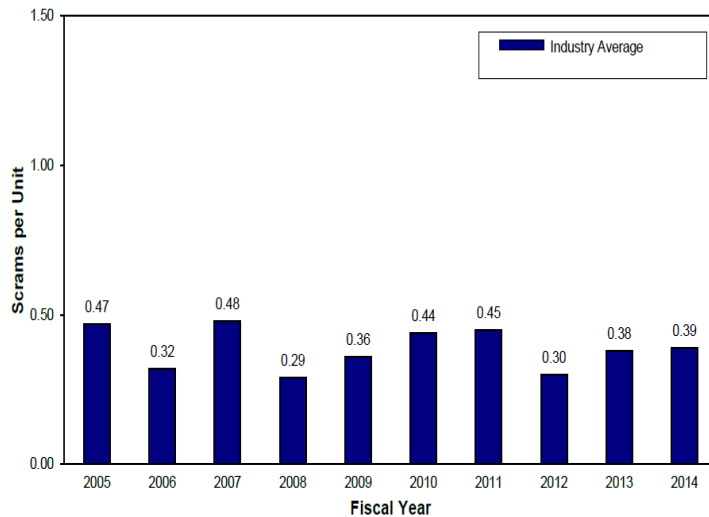


Figure 1. Automatic scrams while critical

Unplanned automatic scrams while reactor critical

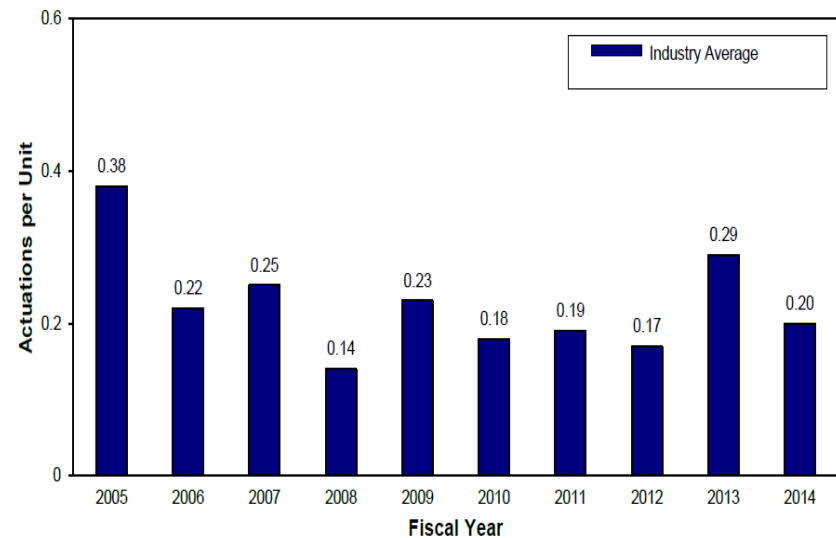


Figure 2. Safety-system actuations

Manual or automatic actuations of either the ECCS or Emergency AC Power

# FY 2014 ITP Results

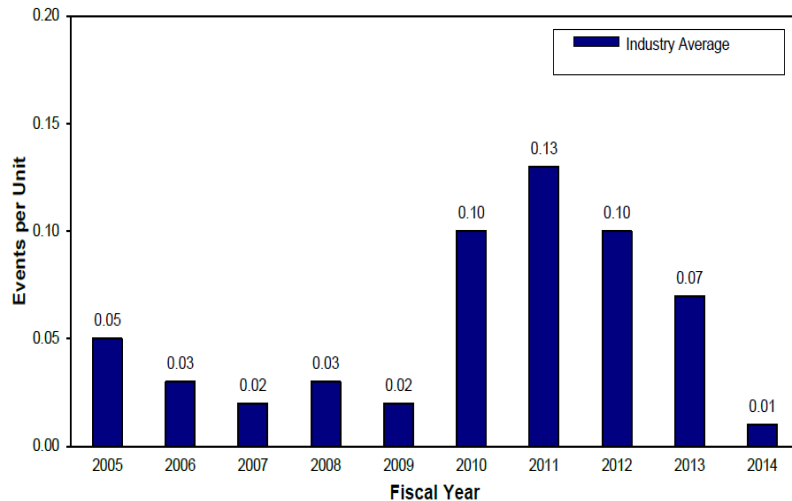


Figure 3. Significant events (FY 2014 inputs are not yet complete)

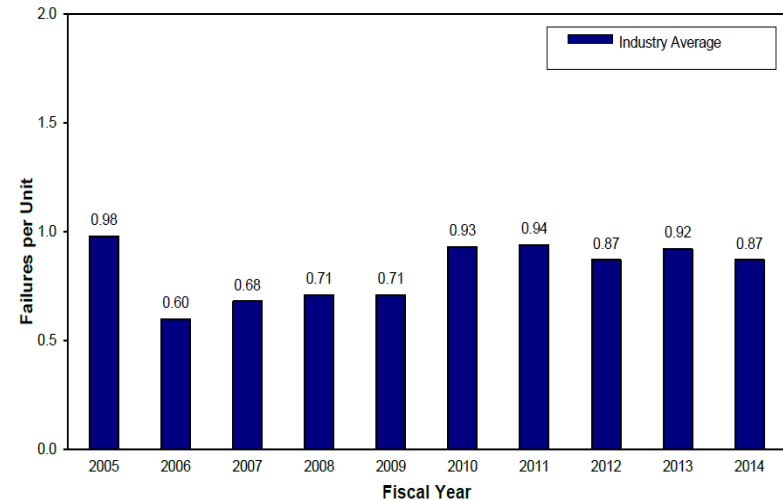


Figure 4. Safety-system failures

- Yellow/Red ROP Finding
- Event 10E-05 CCDP or change in CDP
- Abnormal Occurrence (Mgmt Dir 8.1)
- Internat'l Nuclear Event Scale of 2 or greater

Event or condition that could prevent a safety function from operating



# Baseline Risk Index for Initiating Events

- General transient
- Loss of condenser heat sink
- Loss of main feedwater
- Loss of offsite Power
- Loss of vital AC bus
- Loss of vital DC bus
- Stuck open safety/relief valve
- Loss of instrument air
- Very small loss of coolant accident
- Steam generator tube rupture (PWR)

# FY 2014 BRIIE Results

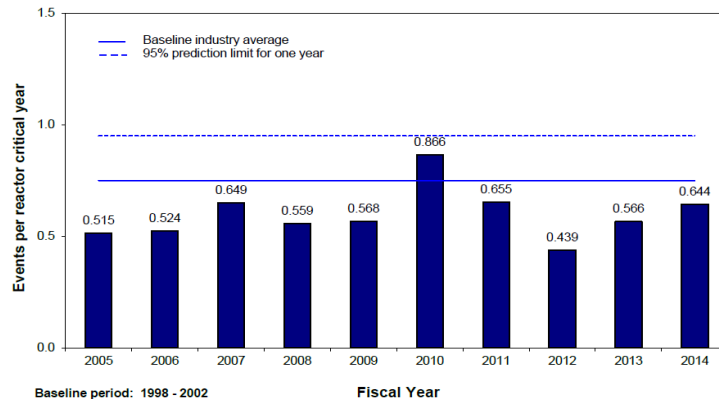


Figure 1. Pressurized-water reactor (PWR) general transients

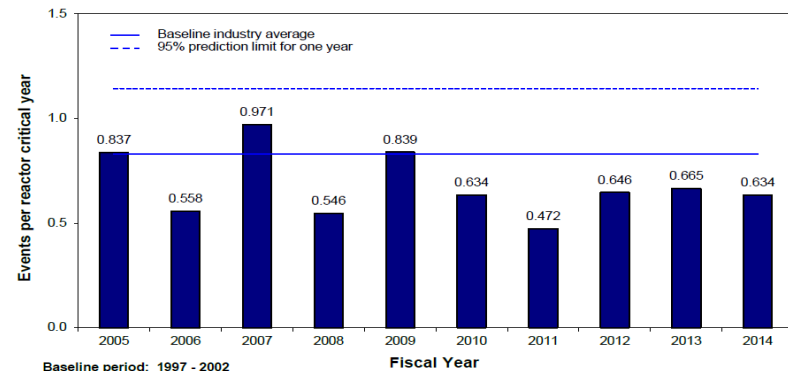


Figure 2. Boiling-water reactor (BWR) general transients

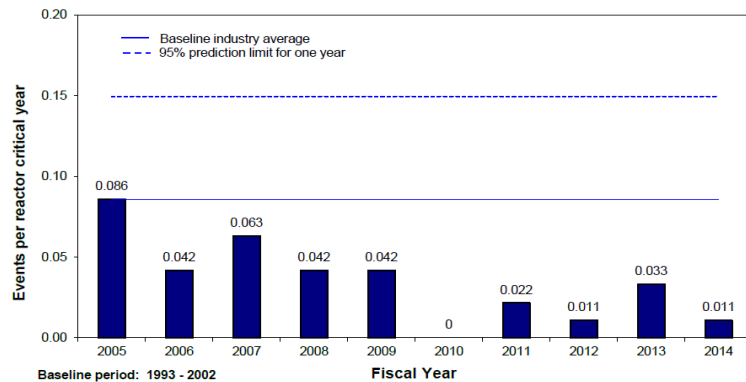


Figure 5. Loss of main feedwater

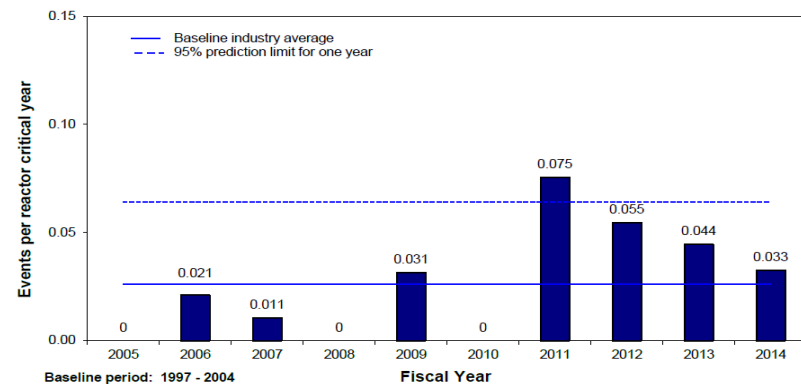


Figure 6. Loss of offsite power