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EPRI Radiation Management Program Highlights and Activities

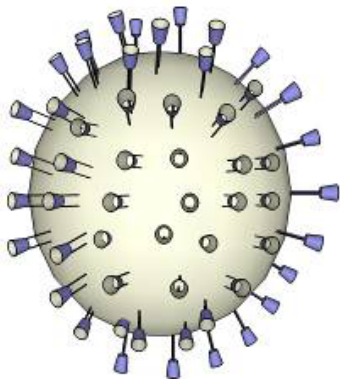
ISOE North American ALARA Symposium/EPRI Radiation
Protection Conference
Fort Lauderdale
January 11, 2010

Dennis Hussey
EPRI Senior Project Manager Manager
Radiation Management, Fuel Reliability, and Chemistry

Additional Information provided by:
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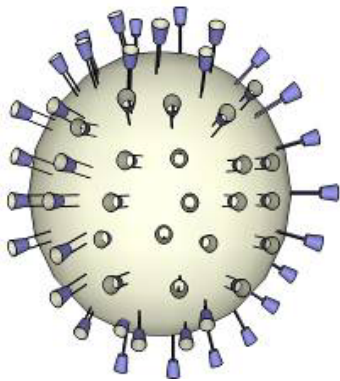
Radiation Management Program

- Industry's Needs & Program's Response
- Current Focus & Action
- High-Value Results & Importance



Radiation Management Program

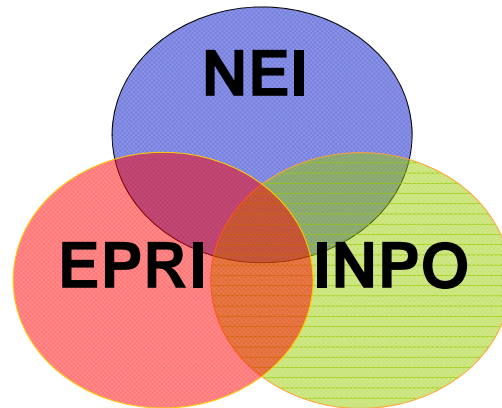
- Industry's Needs & Program's Response
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Partners in Creating RP 2020

Radiation Protection Managers

Chief Nuclear Officers



NEI = Policy

INPO = Performance

EPRI = Research

RP2020 Mission

Reshape radiological protection at nuclear power plants to achieve significant improvements in safety performance and cost-effectiveness.

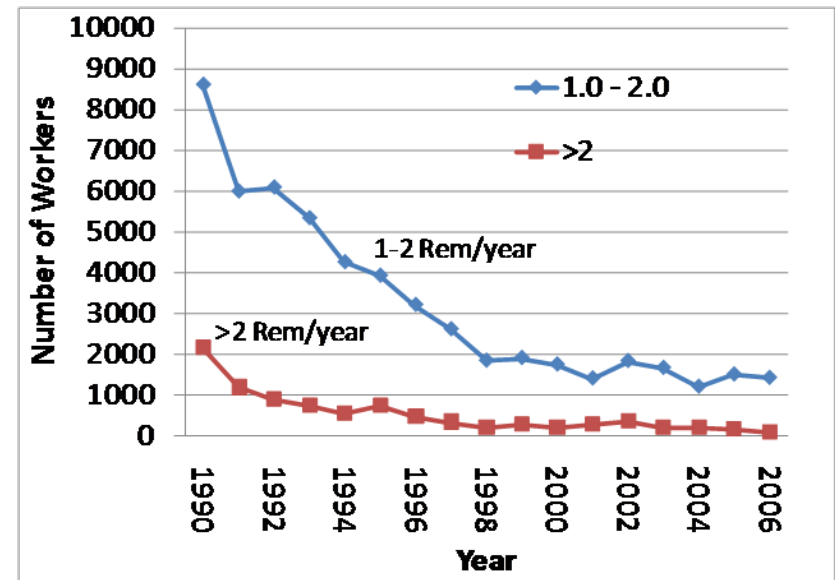
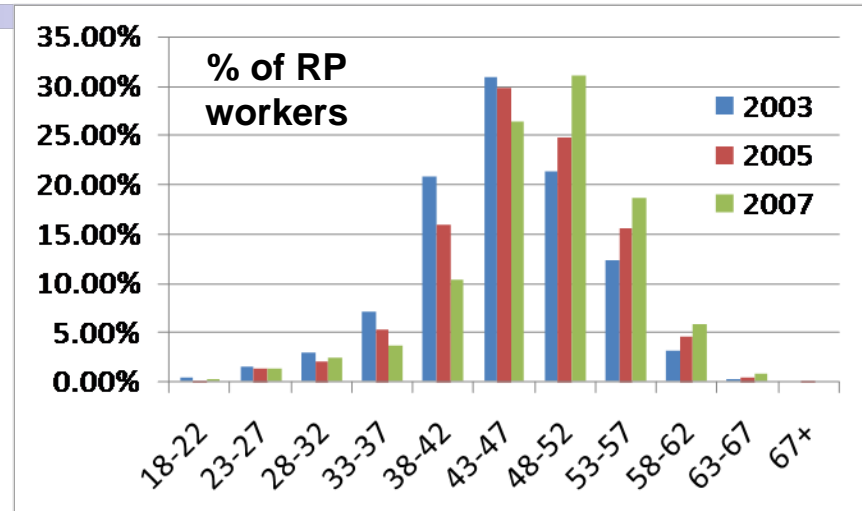
RP2020 Key Challenges

Workforce and Infrastructure

- RP Staff is getting older
- Younger staff change careers
- Technology implementation is lagging

Lower Dose Limits

- NRC adoption of ICRP 10 Rem over 5 years is being considered
 - 2 Rem/year limit may be adopted
- Many workers still approach or exceed 2 Rem/year

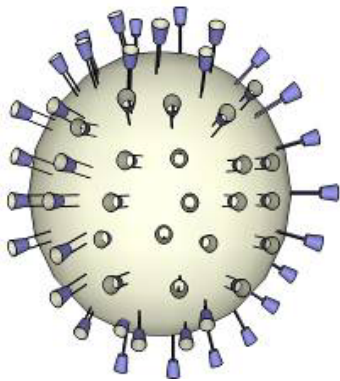


RP2020 Strategies

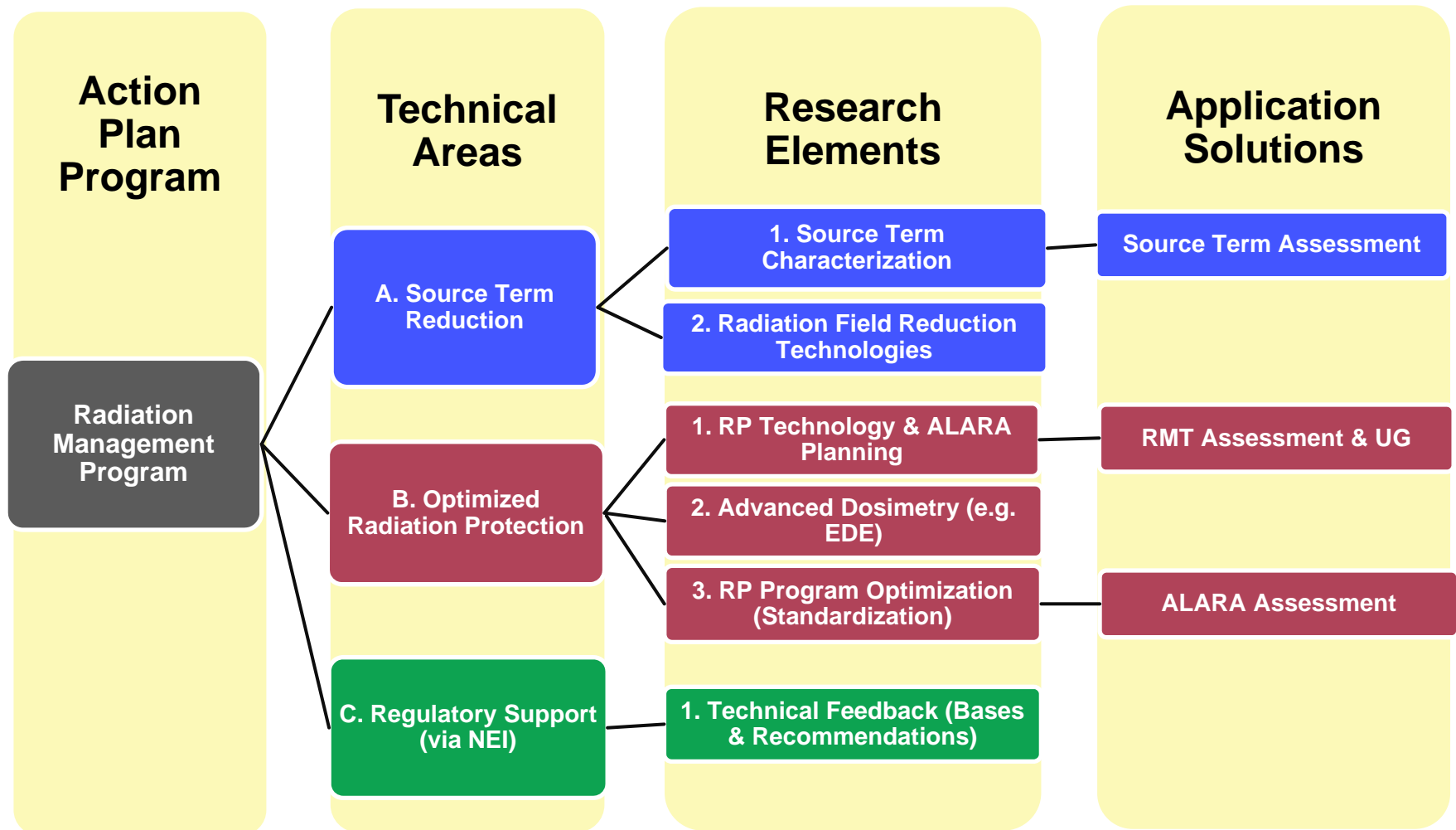
1. Reduce radiation fields (EPRI)
2. Improve technologies utilization (EPRI)
3. Align RP workforce supply & demand (NEI)
4. Inform and influence RP regulations (NEI)
5. Standardize RP practices (NEI/INPO)
6. Improve RP transparency and openness (NEI)

Radiation Management Program

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Radiation Management Program Elements



Emerging Issue: Anticipated 2 REM Dose Limit

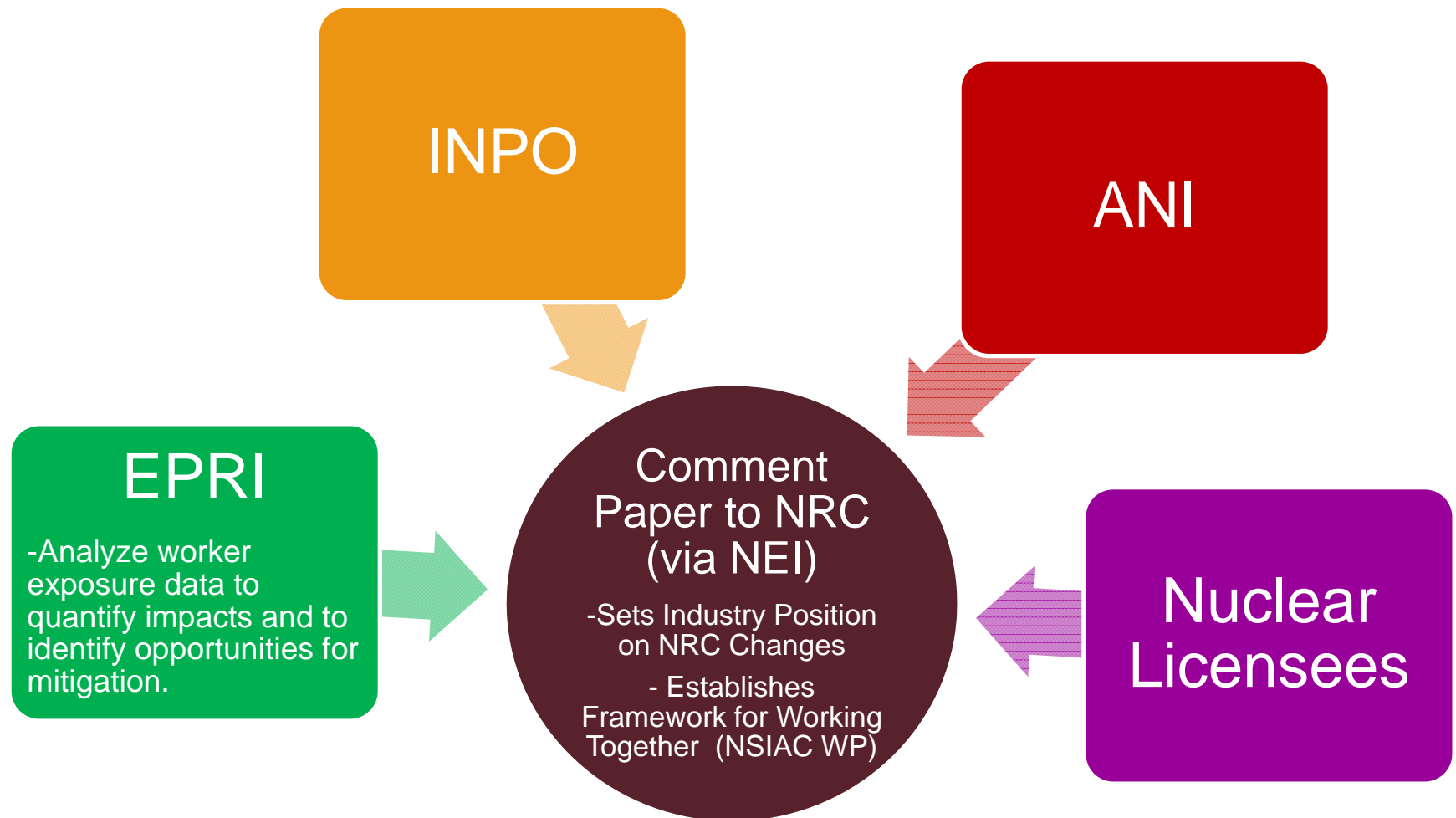
Why change the rules?

- New ICRP recommendation issued in 2007 (ICRP 103)
- NRC regulations based on 30- and 50-year-old ICRP recommendations
- Nuclear industry is becoming increasingly global

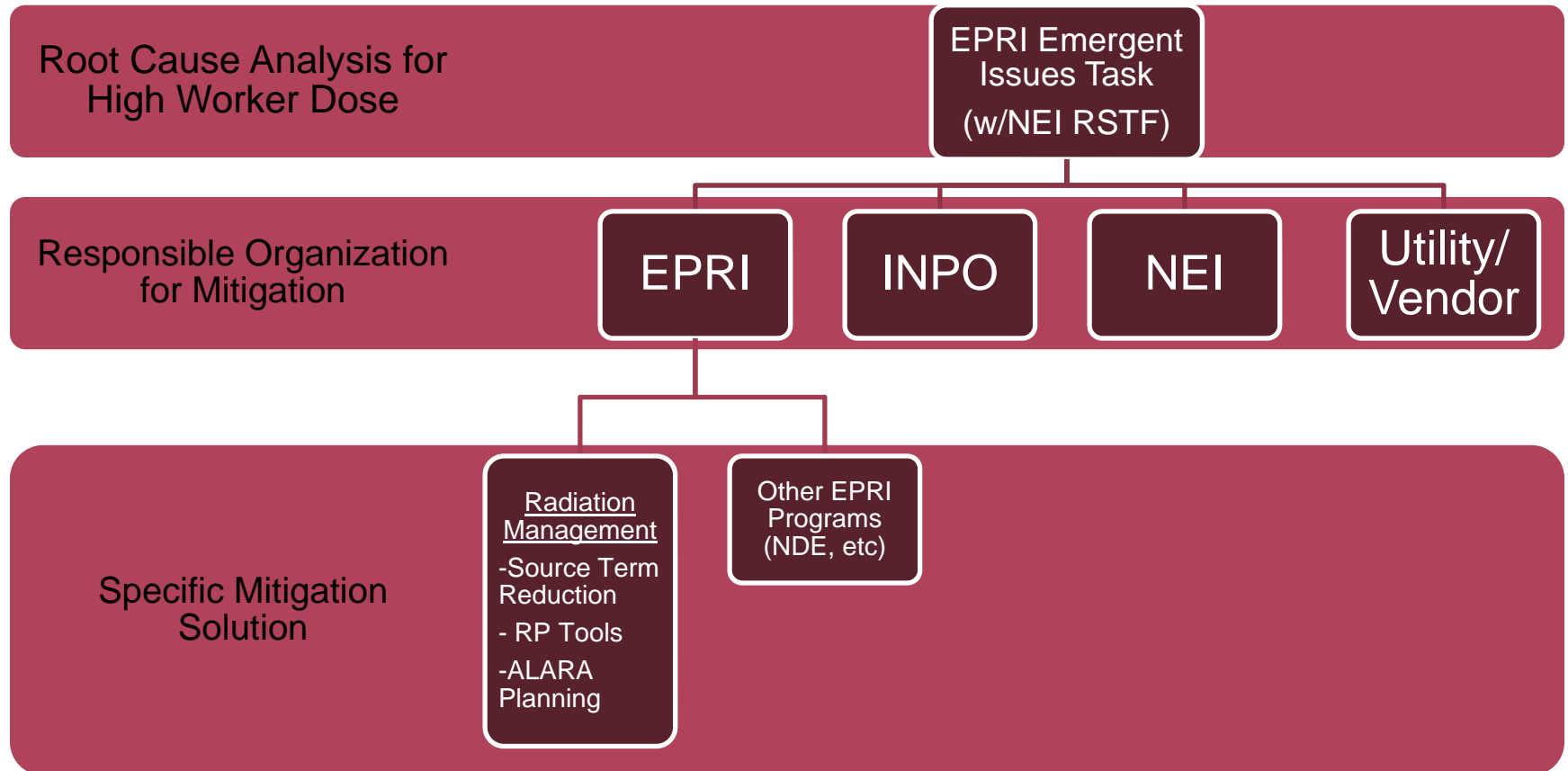
What's different?

- **Lower occupational dose limits (2 REM/yr average for workers)**
- **Dose constraints (set below limits)**
- **Updated technical basis, methodology, units and terms**

Collaborative Effort to Provide Feedback on Regulatory Changes

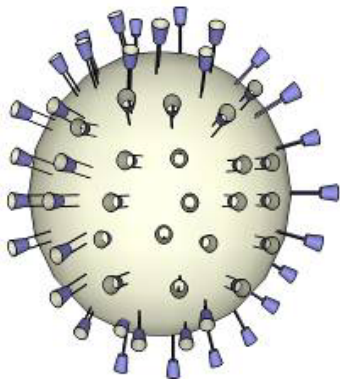


Organizational Responsibility to Address Challenges from Regulatory Change

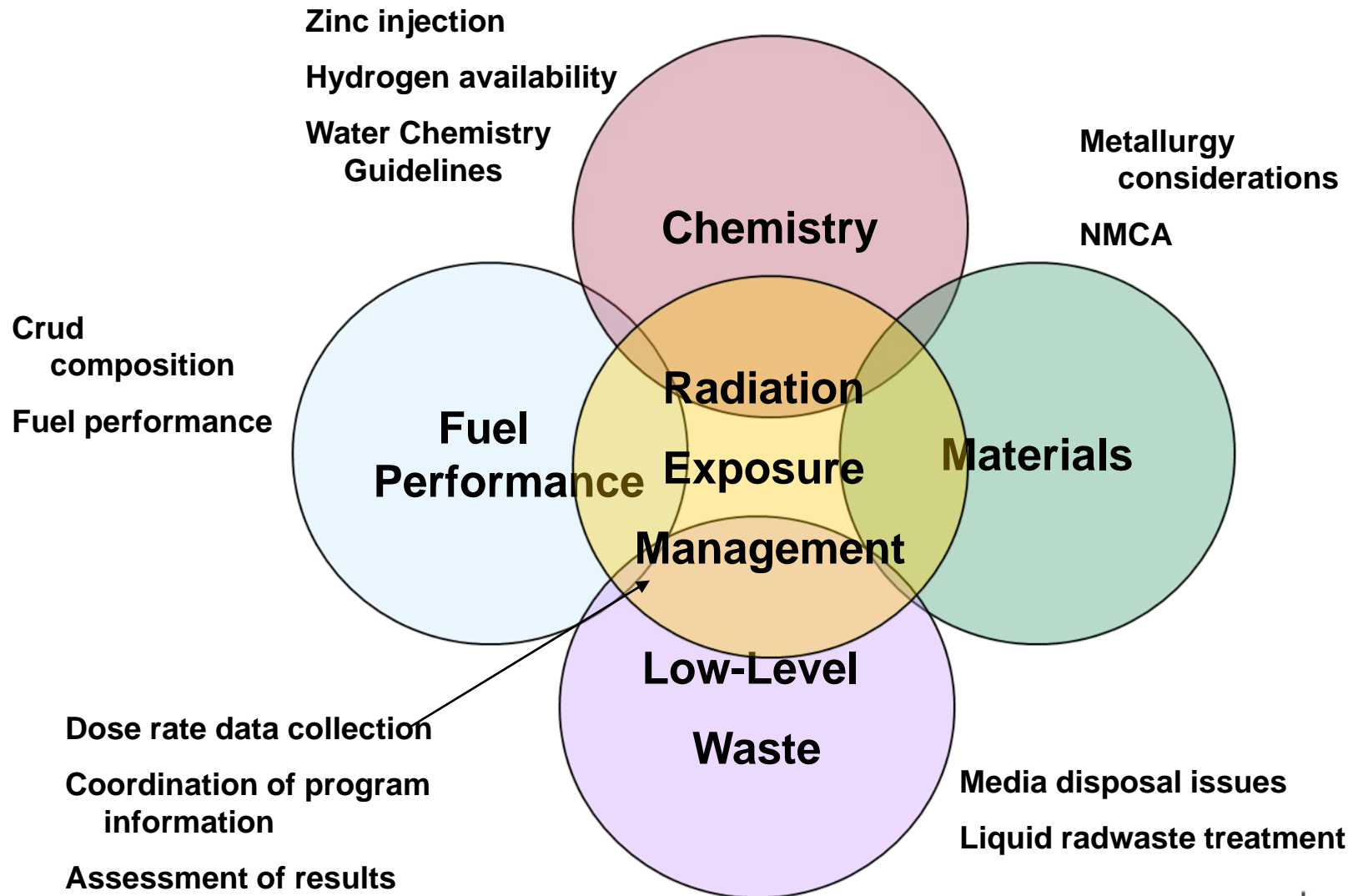


Radiation Management Program

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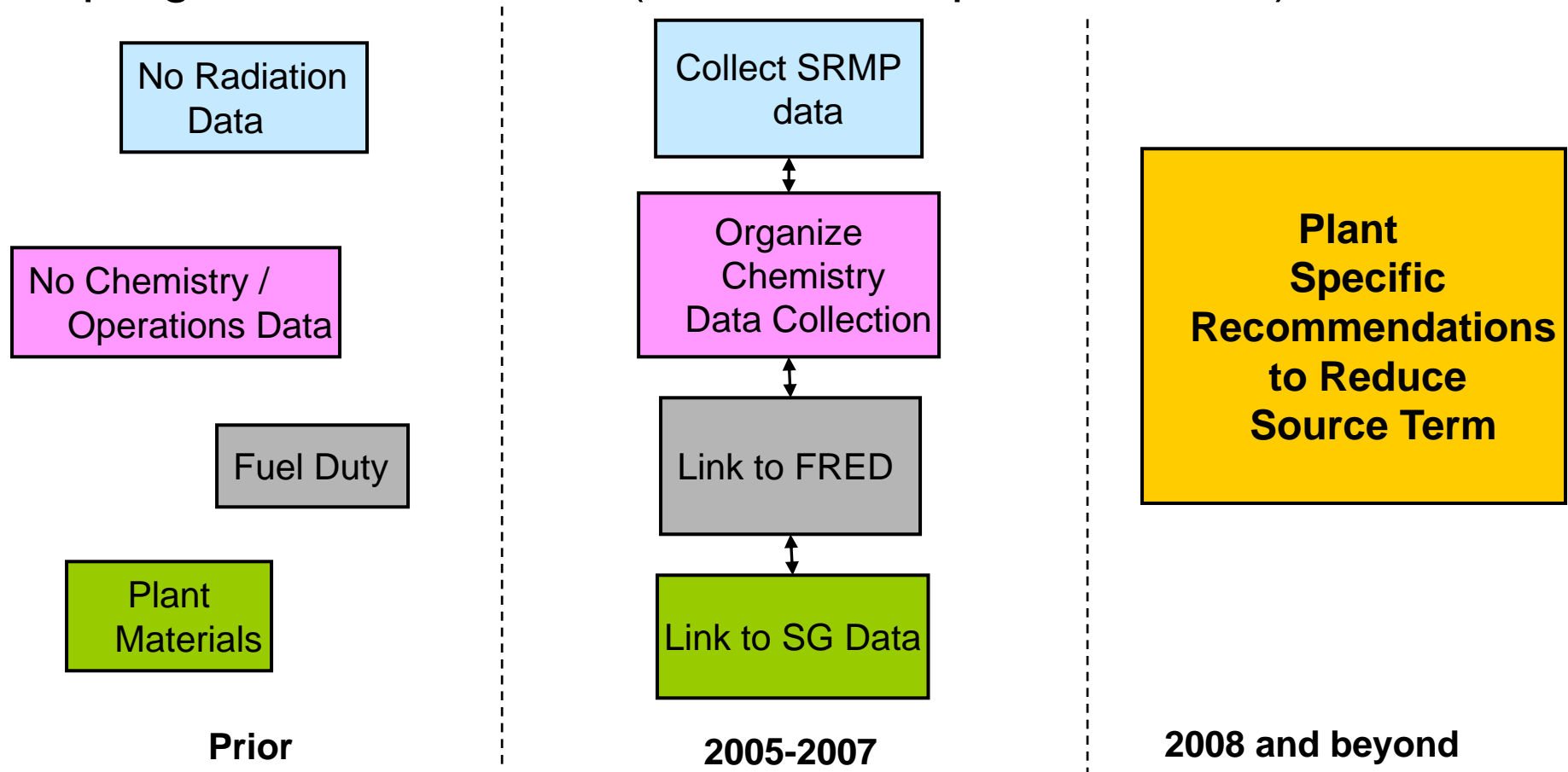


EPRI Radiation Management Program Collaboration



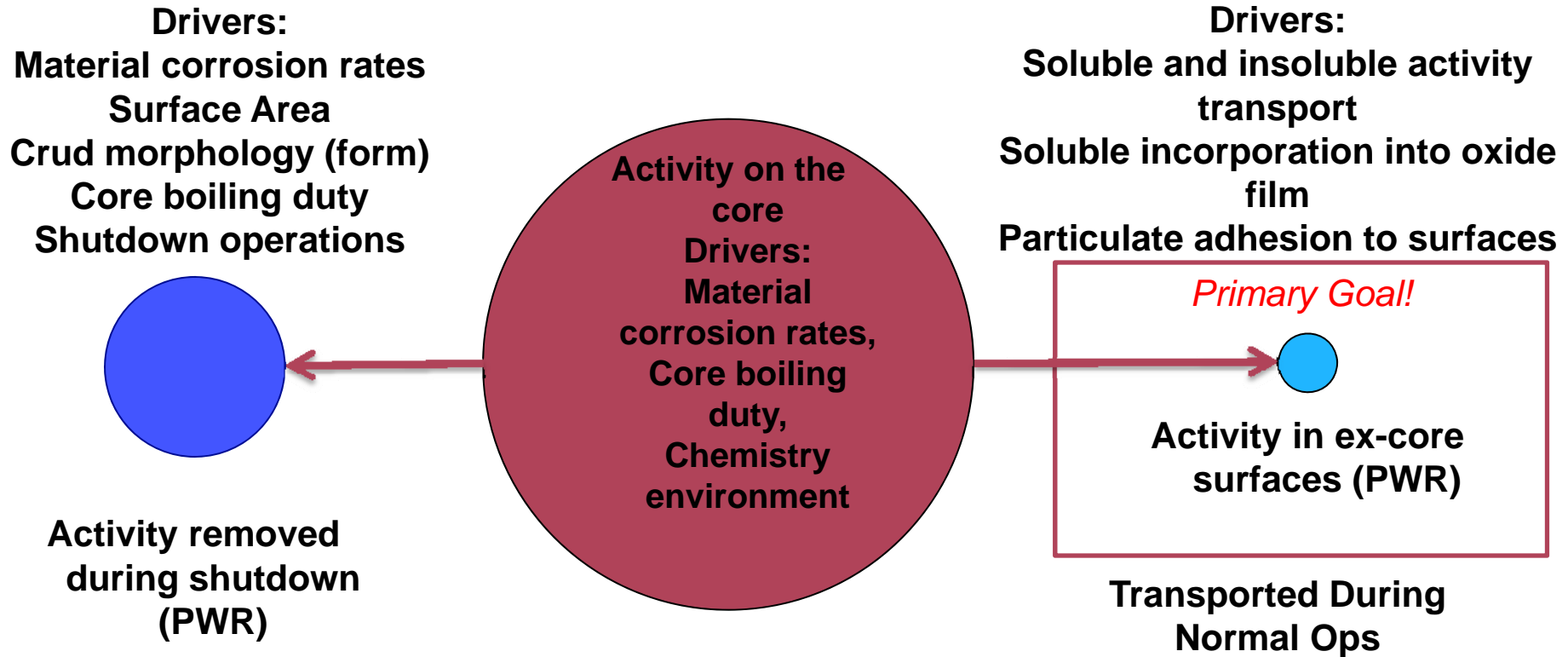
EPRI Source Term Reduction Strategy

- EPRI Source Term Reduction Program—Results through program collaboration (Download report 1019225)



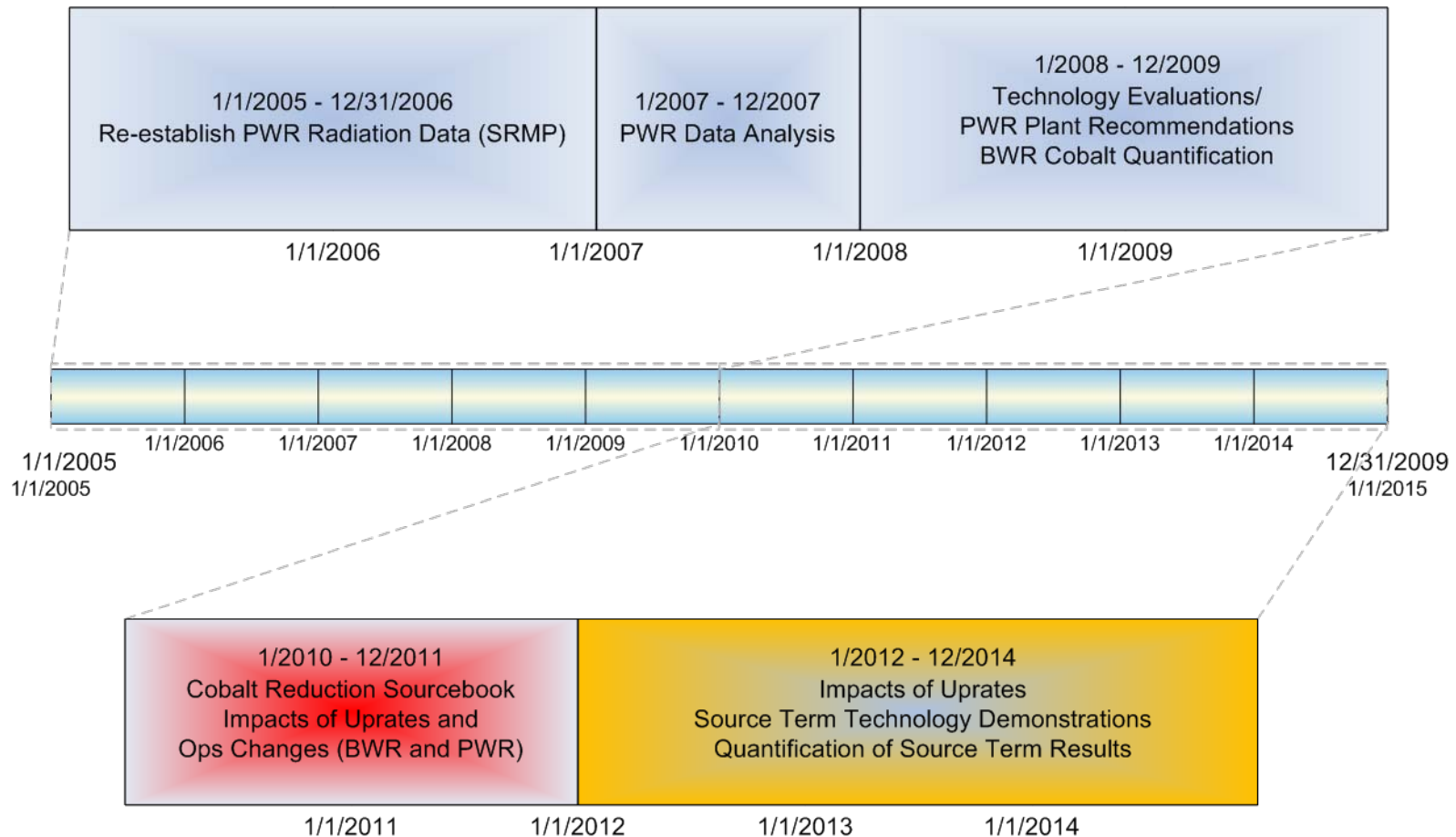
Source Term Definitions

Comparisons in Scale—PWR Case



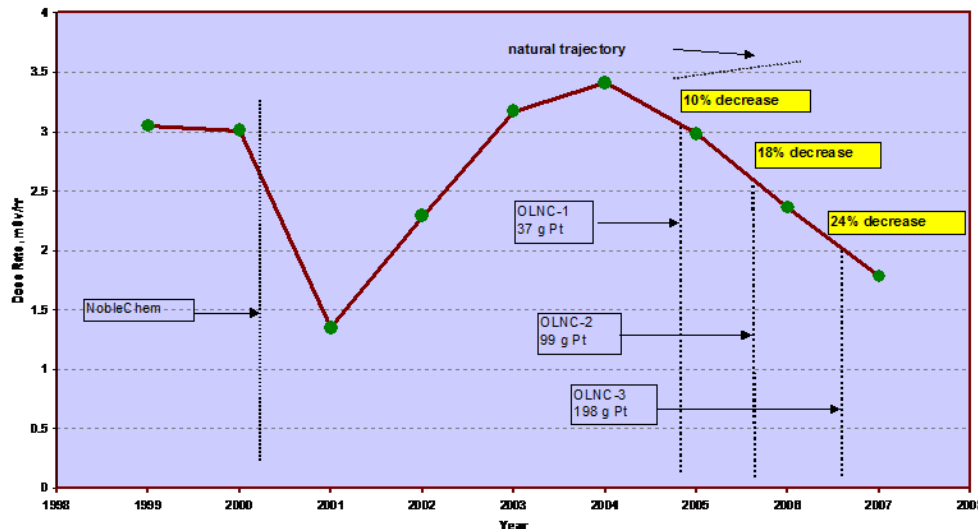
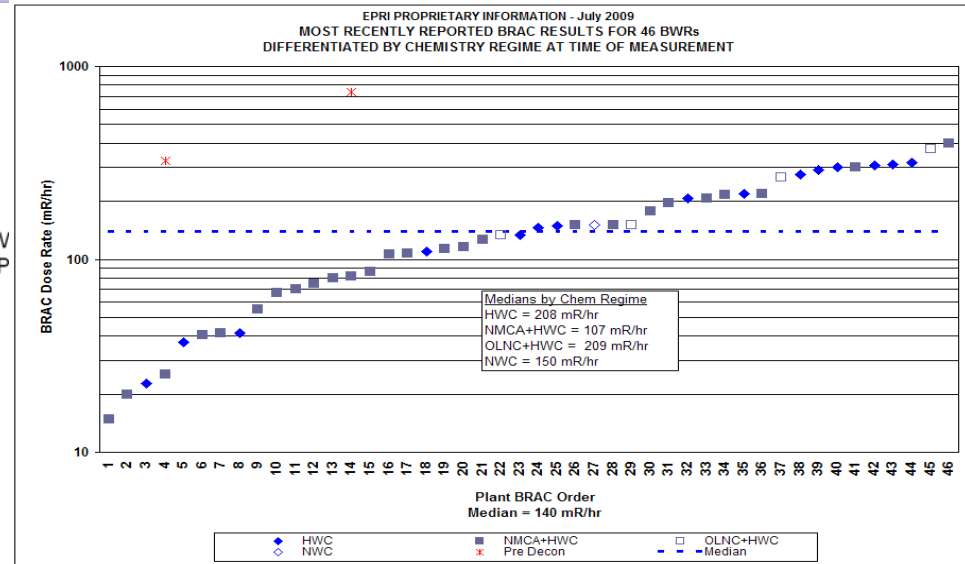
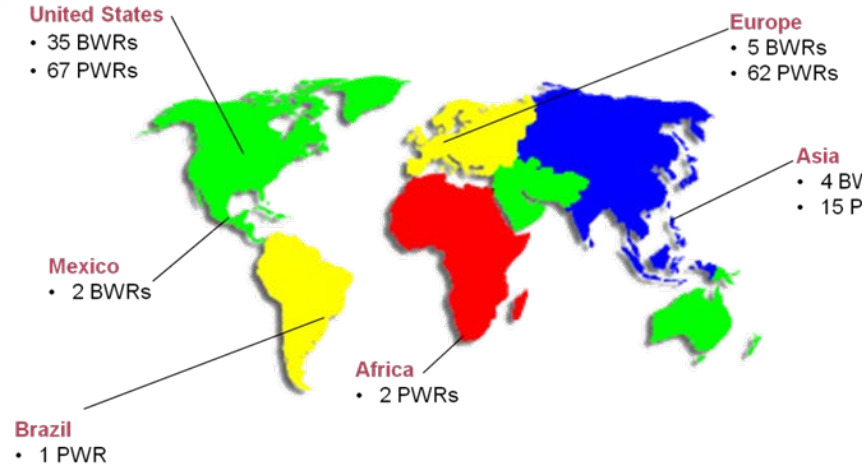
Source Term Reduction Timeline

Previous Five Years



Next Five Years

EPRI's BWR & PWR Monitoring & Assessment Programs – 193 Participating Units

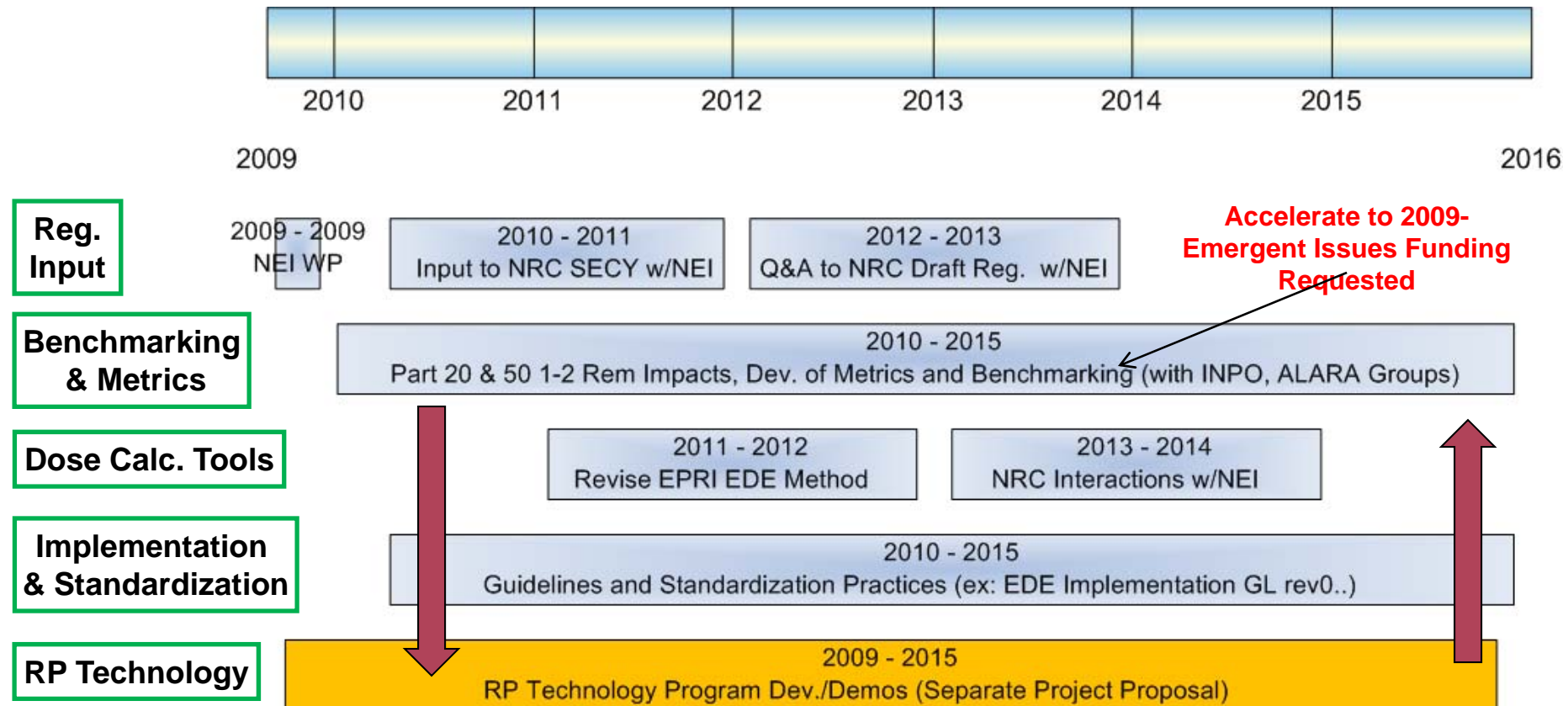


EPRI has unique role in analyzing industry and site specific chemistry trends

Current Source Term Reduction Deliverables

- Reports published in 2008
 - *1018371 BWR Source Term Reduction - Estimating Cobalt Transport to the Reactor*
 - *1016766 High Activity Crud Burst Impacts and Responses*
 - *1016769 Program on Technology Innovation: Feasibility Assessment of a Core Vacuum for Foreign Material and Activity Removal*
 - *1016767 Technology Evaluations and Operations Strategies for PWR Radiation Source Term Reduction (December, 2008)*
- Reports published in 2009
 - *1019225 Plant Specific Recommendations for PWR Radiation Source Term Reduction*

Technical Support of Part 20 and Part 50 Update: Project Timelines

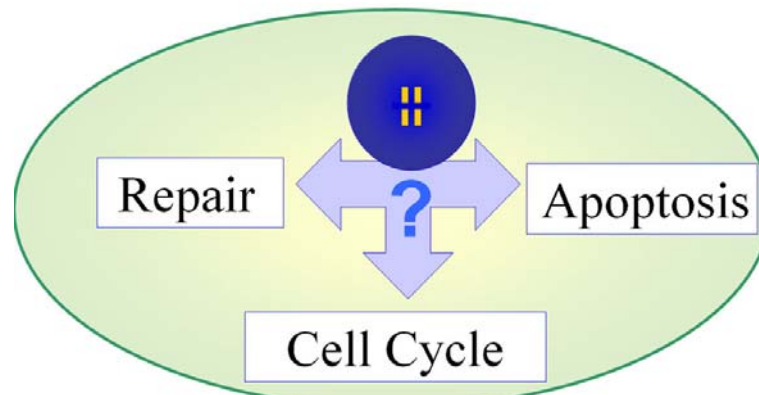


Current Radiation Protection Deliverables

- Reports published in 2009
 - 1019500, EPRI Alpha Monitoring Guidelines for Operating Nuclear Power Stations 12/23/2009
 - 1019224, Radioactive Material Monitoring & Control Guideline 12/14/2009
 - 1019227, Evaluation of Updated Research on the Health Effects and Risks Associated with Low-Dose Ionizing Radiation, 11/18/2009

The Recent Low Dose Research in Radiobiology & Epidemiology has ...

- Provided advances in biological and physical sciences to study low dose (<10 REM) radiation effects
 - Provides a strong scientific basis for adding to our understanding of the cellular and molecular mechanisms of action
- Identified a need for expanding radiation paradigms and challenged the models used to extrapolate risks from high dose rates to low dose rates



Example of Member Significance: For site release standards, a 6 mrem/year difference can translate to >\$17 million in additional remediation costs

2009 Supplemental Assessment Projects for Radiation Protection

PROJECT

ALARA Assessments

Scaffolding Management Program for Dose Reduction

ALARA Review of Materials Inspection Plans

Radiation Source Term Assessment

Remote Monitoring Technology Development and Assessment Program

Radiation Source Term Assessment

Objective:

- To provide plant-specific radiation field reduction guidance through an assessment of the plant materials, chemistry, and plant operations.
- Scope:
 - Evaluate the material and operation status of each unit and when possible, benchmark their performance to units of similar design.
- Review the radiation monitoring program and strategy for effectiveness in historical trending.
- Review plant chemistry controls relating to shutdown, operational and startup chemistry to achieve reduction in personnel exposure
 - Review the plant Strategic Water Chemistry Plan

Key 2009-2010 EPRI LLW and Decommissioning Meetings

- EPRI International LLW Conference & ASME/EPRI Radwaste Workshop
 - Westminster, CO. June 22-24, 2010
- EPRI International Decommissioning & LLW Workshops
 - 9th International Workshop- Fall, 2010, Madrid, Spain
 - Decommissioning Lessons Learned Workshop – Zion NPP, TBD

(watch the calendar at www.epri.com for details)


Key 2009-2010 EPRI RM Meetings

- Conferences and Workshops
 - **2010 ISOE/EPRI ALARA Symposium and RP Conference, Jan 11-13 Fort Lauderdale, FL**
- Project Meetings
 - **Cobalt Reduction Guidelines, EPRI Charlotte Offices, August TBD 2010**

(watch the calendar at www.epri.com for details)

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Together ... Shaping the Future of Electricity

An independent, nonprofit organization, EPRI brings together experts from academia and industry, as well as its own scientists and engineers to help address challenges in electricity generation, delivery, and use, including health, safety, and the environment. [Read more](#)




EPRI In The News

**EPRI Study Finds Greater Efficiency in Electric-End Use Technologies**


Conversion from fossil fuels could cut CO2 by 4,400 million tons by 2030.

- [Read the Press Release](#)

**EPRI Launches 2010 Portfolio**

EPRI has launched its 2010 Annual Research Portfolio which offers a range of research, development and demonstration programs in nuclear power, fossil generation, renewable resources, power delivery, energy efficiency, climate policy and other areas.

- [Read More](#)

**Forbes Spotlights EPRI Nuclear**

The development of EPRI's Nuclear sector and need to renew American leadership and momentum in nuclear generation is featured in a Forbes commentary by the magazine's publisher.

- [Read the Article](#)


PLUG-IN 2009

August 10 -13, 2009
Long Beach, California
[Learn more!](#)

EPRI Journal, Spring 2009

Energy Efficiency

- [Spring 2009 Issue](#) (7.43MB PDF)
- [More about EPRI Journal](#)



Industry Technology Demonstrations

EPRI's demonstration projects address the key issues facing the electric power industry over the next decade.

[Read more](#)

Featured Research

- [Level Waste Technology and Research Update Newsletter](#)

- Find out more about EPRI's research across the electricity industry
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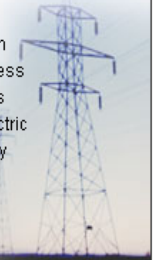
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Industry Technology Demonstrations

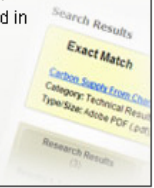
EPRI's demonstration projects address the key issues facing the electric power industry over the next decade.

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epri.com Updates

The changes rolled out in February 2009 are highlighted in this [tutorial](#). (3MB PPS)



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EPRI Nuclear Landing Page

Research/Nuclear/Overview from EPRI.com home page

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You are here: Research > Nuclear > Overview

Research Areas

- Materials Degradation / Aging
- Fuel Reliability
- Used Fuel and High-Level Waste Management
- Nondestructive Evaluation and Material Characterization
- Equipment Reliability
- Instrumentation and Control
- Risk and Safety Management
- Advanced Nuclear Technology
- Chemistry, Low-Level Waste and Radiation Management

2010 Research Offerings

- View the 2010 Nuclear Research Portfolio

Related Links

- EPRI Quality Program Manual (PDF 160KB)

Program Websites

Nuclear

EPRI conducts research to ensure nuclear power remains a safe and economically feasible generation option, and a reliable source of electricity with zero greenhouse gas emissions. Through global collaboration with nuclear power plant operators, regulatory agencies, and other research organizations, EPRI develops cost-effective technologies that maximize deployment of new nuclear technology.

Spotlights

Webcasts Describe Long-Term Operations Project and New Instrumentation & Control Interest Groups
June 22, 2009

- Long-Term Operations webcast (WMV 4.3MB)
- Long-Term Operations presentation (PDF 480KB)
- I&C Interest Groups webcast (WMV 3.9MB)
- I&C Interest Groups presentation (PDF 278KB)

Instrumentation & Control (I&C) Program – Product List (PDF 245KB)
May 21, 2009

Nuclear Energy Research and Development
May 1, 2009

Events Calendar

Calendar 2009

Steam Generator NDE Workshop
August 3-5, 2009

All Nuclear Events

Newsletters

Library of EPRI nuclear-related newsletters, with some available in multiple languages.

- View all of the Nuclear newsletters

Product List and Implementation Categories

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EPRI's research products can be implemented in a number of different ways. The Nuclear Sector has developed a simple categorization tool to aid users in resource planning as it relates to the review and application of key products

- Learn More

Steam Turbine Guidelines

Library of EPRI nuclear-related

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Results 1-10 in Research Results for: fuel reliability

Sort by: **Relevance** | Publish Date | Product ID | Title [Search Tips](#)

Chemistry Monitoring and Control for Fuel Reliability	<input type="button" value="Download"/>	
Category: Technical Results Type/Size: Adobe PDF (.pdf), 6.92 MB	Published: 12/13/2004 Program: Nuclear Power	Product ID: 1009731
Abstract: Water chemistry has been identified as a known or potential contributing cause in recent corrosion-induced fuel failures and anomalies such as fuel crud spallation and enhanced nodular corrosion. The 2004 revision of the BWR Water Chemistry Guidelines (EPRI report 1008192) addressed these concerns by recommending tighter chemistry control limits and additional monitoring for contaminants and additives that can have an adverse effect on fuel cladding corrosion. The revision focused on chemistry ...		
Fuel Reliability Guidelines: PWR Fuel Cladding Corrosion and Crud	<input type="button" value="Download"/>	
Category: Technical Results Type/Size: Adobe PDF (.pdf), 6.01 MB	Published: 4/1/2008 Program: Fuel Reliability & Margins	Product ID: 1015449
Abstract: Developed in collaboration with utilities, industry organizations, and fuel vendors, a series of new EPRI guidelines capture state-of-the-art knowledge and describe best practices for eliminating fuel failures at nuclear power plants. The guidelines provide mandatory, needed, and best practice recommendations based on a thorough review of operating experience, fuel failure analyses, and fuel design and manufacturing procedures. More than 200 industry experts reviewed the guidelines to ensure accuracy and ...		
Fuel Reliability Guidelines: BWR Fuel Cladding Corrosion and Crud	<input type="button" value="Download"/>	
Category: Technical Results Type/Size: Adobe PDF (.pdf), 14.43 MB	Published: 4/1/2008 Program: Fuel Reliability & Margins	Product ID: 1015451
Abstract: Developed in collaboration with utilities, industry organizations, and fuel vendors, a series of new EPRI guidelines capture state-of-the-art knowledge and describe best practices for eliminating fuel failures at nuclear power plants. The guidelines provide mandatory, needed, and best practice recommendations based on a thorough review of operating experience, fuel failure analyses, and fuel design and manufacturing procedures. More than 200 industry experts reviewed the guidelines to ensure accuracy and ...		

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Technology Pathways Toward Nuclear Energy in a Sustainable Energy System: Interim Report

Product ID: 1011770
Date Published: 5/24/2005
File size: 235.52 KB

Sector Name: Nuclear
Document Type: Technical Update
File Type: Adobe PDF (.pdf)

Full list price: No Charge

This Product is publicly available.

Abstract

This study investigates the potential role of nuclear power and advanced nuclear reactor and fuel system technologies in the context of the global energy system and climate change. It extends the capabilities of an integrated assessment model, and it explores long-term scenarios in which nuclear technology evolves and advances along various pathways, with and without constraints on carbon emissions. Work focuses on how the choice of nuclear fuel cycle, the cost of nuclear technologies, and the presence of climate policy affect the deployment of nuclear energy systems and the overall market share of nuclear power, both globally and in the U.S. electric sector.

Results to date indicate that in a world with an ever-increasing demand for energy, new generations of nuclear fuel and power technologies with competitive cost and performance need to be developed just to maintain nuclear power's role as a significant contributor to the global energy supply portfolio. If advanced fuel and power technologies are available, nuclear energy's share of global and U.S. markets for electricity generation could increase substantially. Thousands of advanced reactors could be deployed globally by the end of the century, whether or not carbon constraints are imposed.

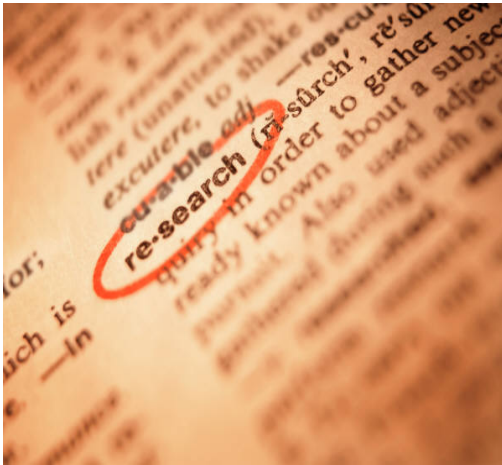
Priority issues identified by EPRI and an advisory group of experts will be examined in continuing analyses in 2005. The results of this work will be published in an EPRI technical report.

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What can I be doing?

Actively Participate



- Get on a committee
- Actively participate in key meetings and webcasts
- Sign up for eTIP reports
- Participate with your Nuclear Manager of EPRI Technology Transfer (NMETT) on supplemental allocation selections
- Get to know your EPRI technical contacts
- Visit program websites

Apply Results



- Download pertinent research and incorporate into your practices
- Read EPRI newsletters and success stories for relevance to you
- Take advantage of your subscriber requested assistance funds and available expert site visits
- Share your operating experiences with others (peers and your NMETT)

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