



## **RM – LLW – REP Overview**

**David Perkins**

Program Manager

**Phung Tran, Billy Cox**

Senior Project Manager

**Karen Kim, Dan Wells, PHD**

Project Manager

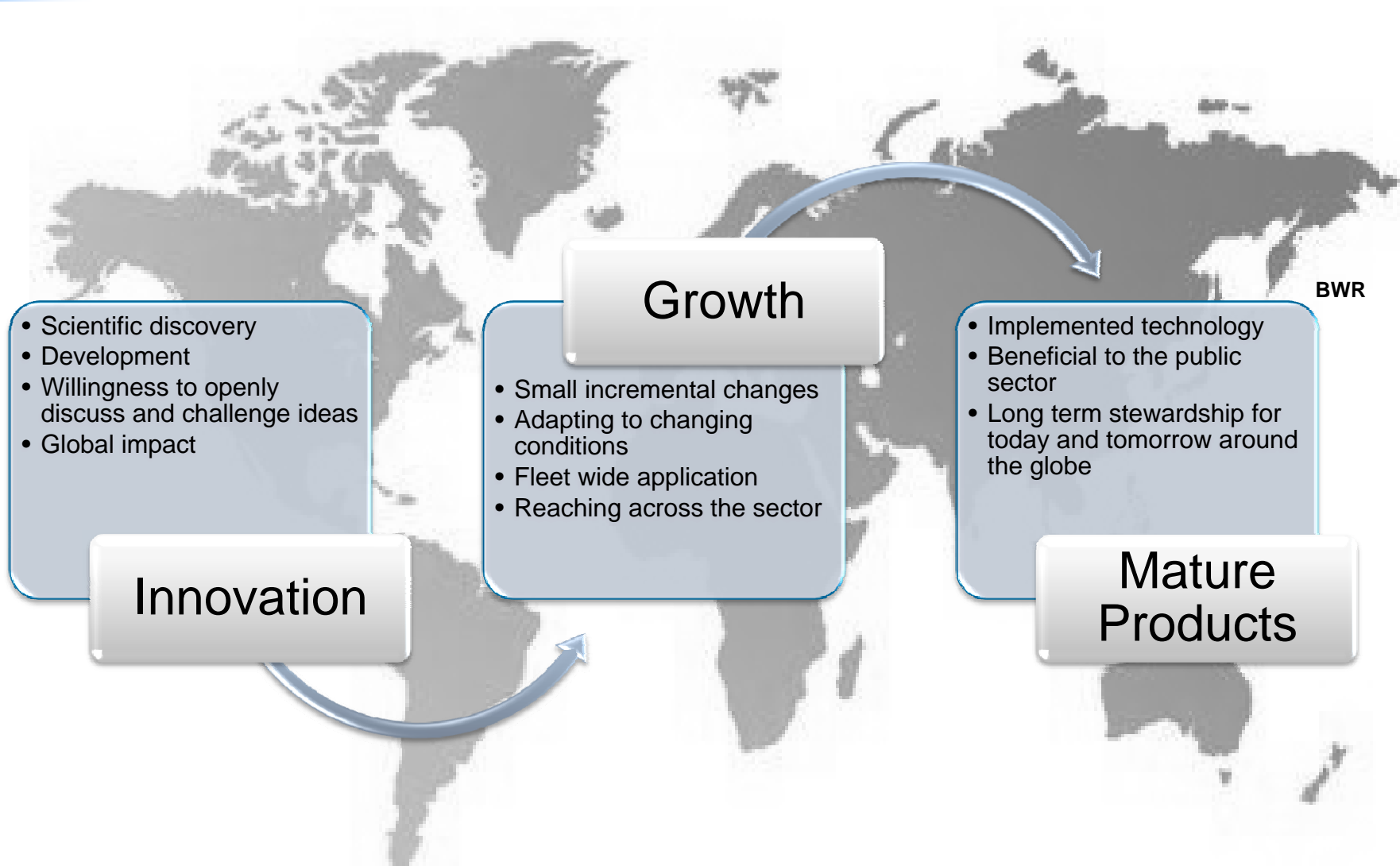
**North American ISOE Meeting**

January 2013

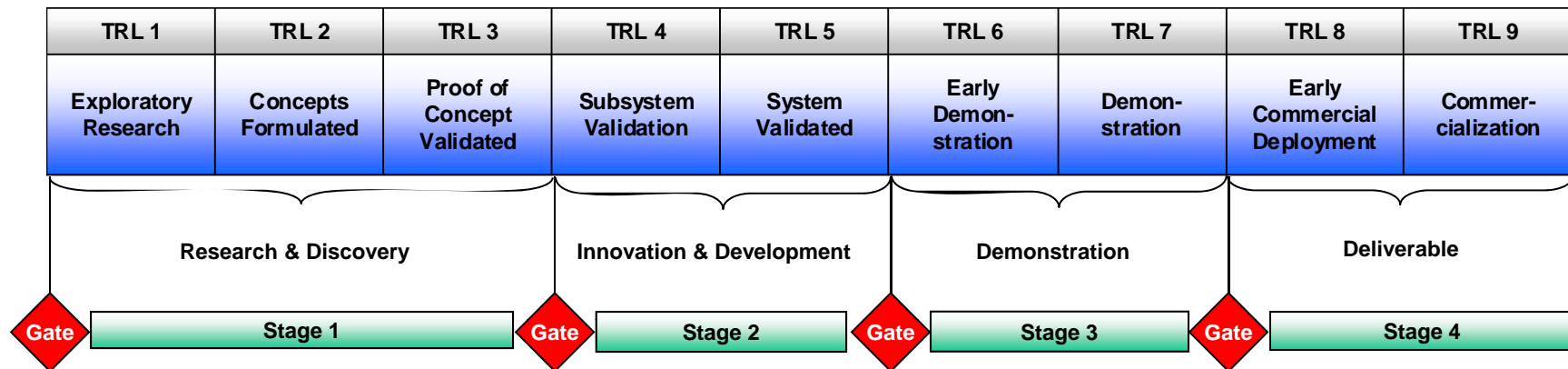
# Global Challenges – The Challenges



# Global Challenges: The Long Road...



# A Process...



- Process

- Broad range of effort with checks and balances along the way
- Overview
  - Discovery – Exploratory, evaluation
  - Development – technology development and validation
  - Demonstration – can it be implemented
  - Deliver to industry



# Radiation Management Program

**Phung Tran**

Senior Project Manager for RM Program

**Daniel Wells**

Project Manager

# The Drivers

## Industry Challenges:

- Regulatory questions
  - Dose limits
    - Total effective dose:
      - Global Limits
    - Lens dose: → 2 Rem/yr
    - Non-cancer dose limits → ??
- Industry/INPO Performance Goals
  - Plateau on CRE (INPO IER L211-1)
  - Other Indicators: PCEs, RAM & HRA Events

## Collaborative Effort:

- Industry Lead Groups (e.g. Fleet RPMs, ALARA Group, Chemistry)
- EPRI, INPO, NEI, ANI

## Industry Not Meeting Dose Goals

~ 115 Workers >2 Rem

~1300 Workers >1 Rem

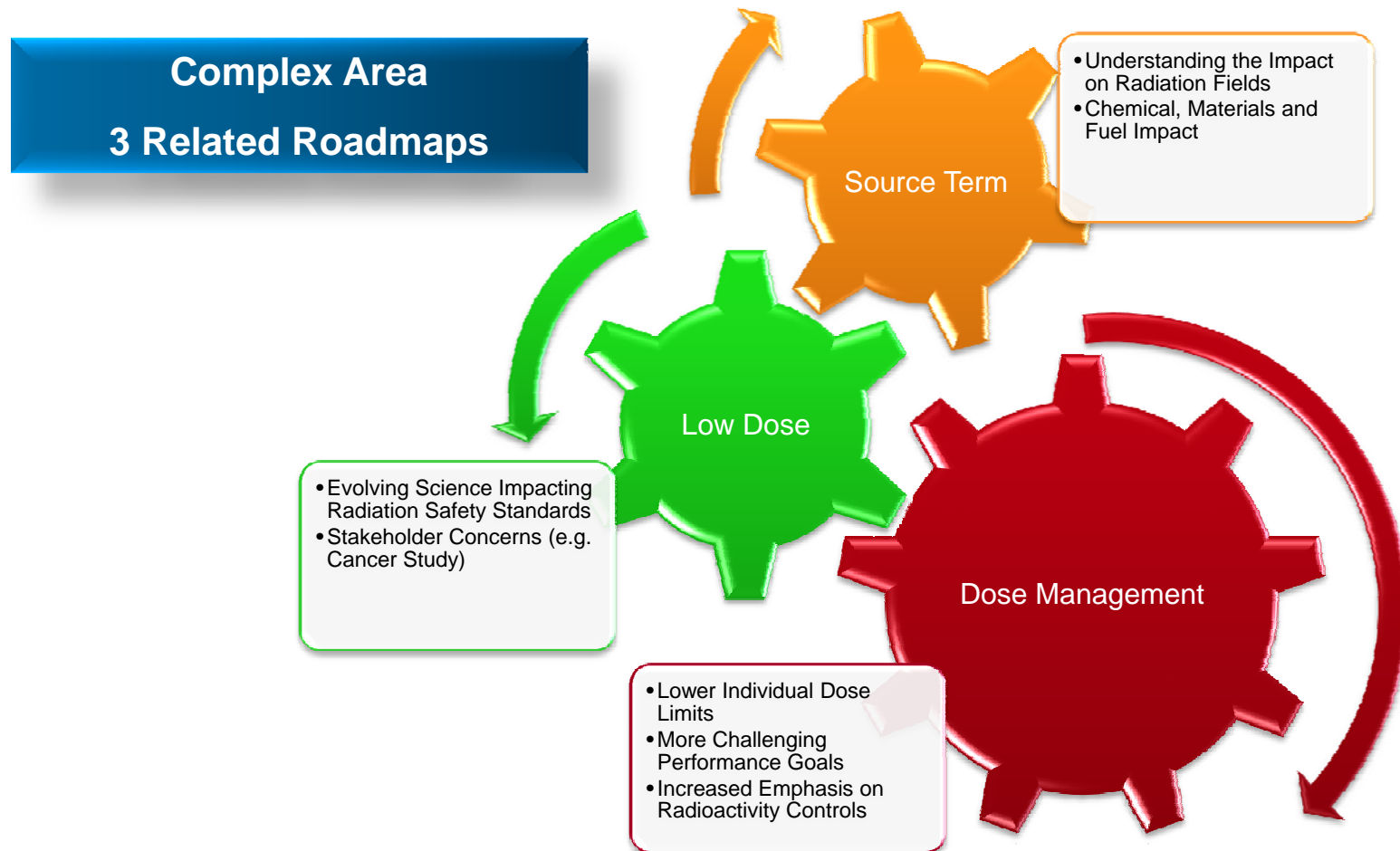
24 BWRs NOT meeting CRE

28 PWRs NOT meeting CRE



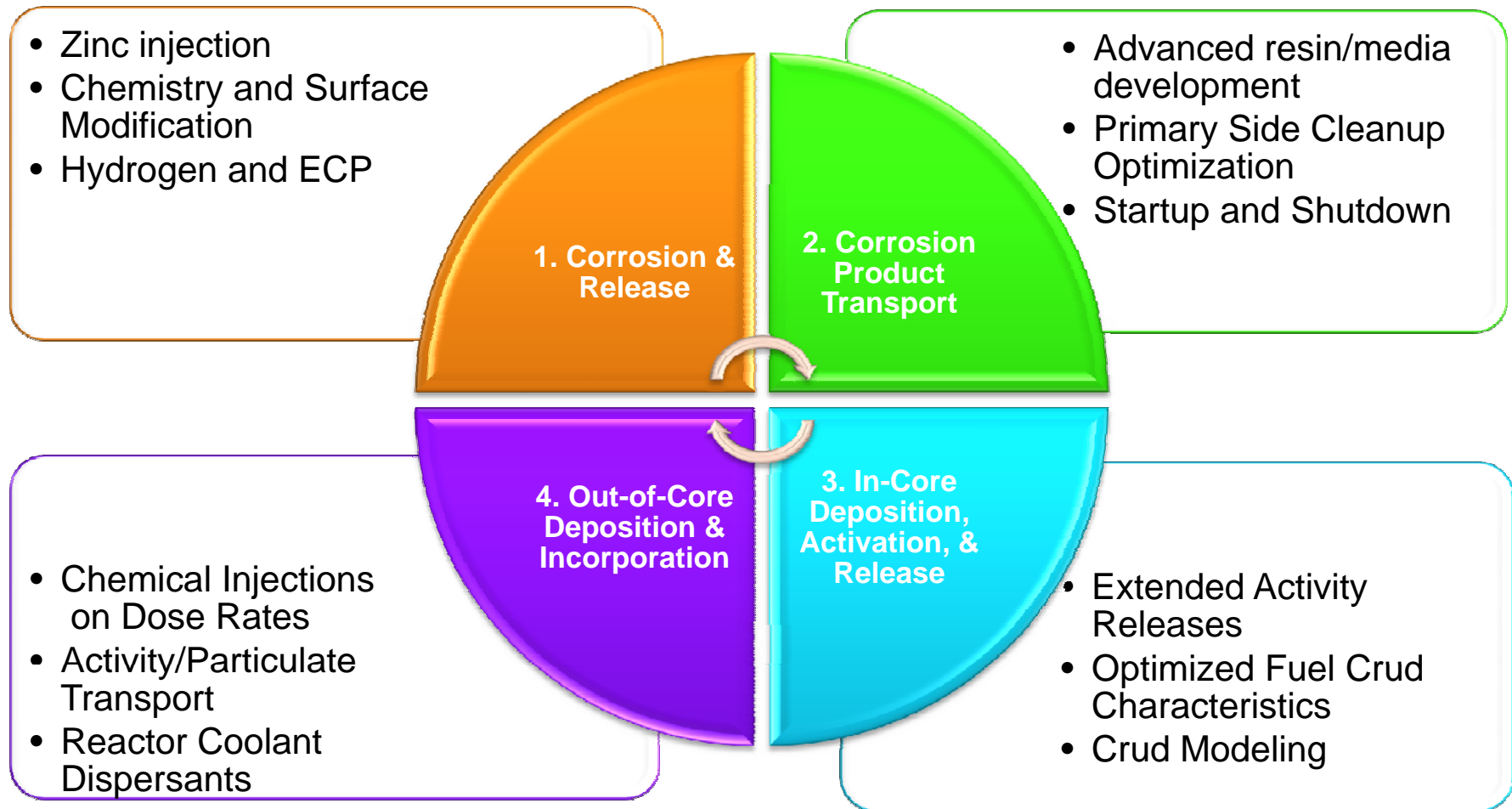
**Provide the Means to Meet The Goals**

# Radiation Management Program Elements (Simplified)





# Source - Interrupting the Phases of Radiation Field Generation





# 2013 Radiation Management Projects

Project Name	Average Utility Score
Alpha Guideline Update	4.86
SRMP/BRAC revision & maintenance	4.83
Impacts of Chemistry on Dose Rates	4.72
EDEX Implementation Guide	4.37
Robotic Tech. for Cavity Decon (w/EdF)	4.34
Reactor Head Set Improvements (w/NMAC)	4.08



# **Radiological Environmental Protection Program**

**Karen Kim**  
Project Manager

# Issue: Public Confidence and Accurate Recording

- Public Confidence Issue:
  - Leaks and spills have occurred
  - Fukushima
  - Increasingly concern about environmental protection
  - Challenges nuclear power plant licensing and operations
- Accurate Reporting:
  - C-14 (complete dose pathway)
  - H-3 (Decom. Planning Rule)
  - Fe-55, Ni-63 (Hard to detects)

## [Tritium leaks plagued nuclear plants, including San Onofre - OC ...](http://taxdollars.ocregister.com/2011/06/28/tritium-leaks...san.../87003/)

[taxdollars.ocregister.com/2011/06/28/tritium-leaks...san.../87003/](http://taxdollars.ocregister.com/2011/06/28/tritium-leaks...san.../87003/)

Jun 28, 2011 – **Tritium** — a radioactive form of hydrogen — has **leaked** from at least 48 of 65 nuclear power plant sites, including the one closest to Orange ...

## [tritium](http://healthvermont.gov/enviro/rad/yankee/tritium.aspx)

[healthvermont.gov/enviro/rad/yankee/tritium.aspx](http://healthvermont.gov/enviro/rad/yankee/tritium.aspx)

Soil testing in the area around the **leak** has measured concentrations of radioisotopes consistent with a **leak** of nuclear reactor water. Steadily decreasing **tritium** ...

## [Tritium Leaking in 48 of 65 Nuclear Sites Across America Reports ...](http://www.infowars.com/tritium-leaking-in-48-of-65-nuclear-sites-across-...)

[www.infowars.com/tritium-leaking-in-48-of-65-nuclear-sites-across-...](http://www.infowars.com/tritium-leaking-in-48-of-65-nuclear-sites-across-...)

Feb 3, 2012 – The latest **leak** occurred at the San Onofre plant in San Diego, California, after a plant in Byron, Illinois, **leaked tritium** late last month.

## [Radioactive Tritium Leaks from Nuke Plant; Also Two Million EXIT ...](http://www.forbes.com/.../radioactive-tritium-leaks-from-nuke-plant-also-t...)

[www.forbes.com/.../radioactive-tritium-leaks-from-nuke-plant-also-t...](http://www.forbes.com/.../radioactive-tritium-leaks-from-nuke-plant-also-t...)

Aug 18, 2011 – The Vermont Department of Health said it has found radioactive **tritium** in the Connecticut River, which probably **leaked** from the nearby ...

## [AP IMPACT: Tritium Leaks Found at Many Nuke Sites - ABC News](http://abcnews.go.com/US)

[abcnews.go.com/US](http://abcnews.go.com/US)

Jun 21, 2011 – Radioactive **tritium** has **leaked** from three-quarters of U.S. commercial nuclear power sites, often into groundwater from corroded, buried piping, ...

## [AP IMPACT: Tritium leaks found at many nuke sites - Yahoo! News](http://news.yahoo.com/ap-impact-tritium-leaks-found-many-nuke-sites-07...)

[news.yahoo.com/ap-impact-tritium-leaks-found-many-nuke-sites-07...](http://news.yahoo.com/ap-impact-tritium-leaks-found-many-nuke-sites-07...)

Jun 21, 2011 – From Yahoo! News: Radioactive **tritium** has **leaked** from three-quarters of U.S. commercial nuclear power sites, often into groundwater from ...

## [75% US Nuclear Plants Leaking Toxic Tritium Radiation Into ...](http://www.youtube.com/watch?v=Jo1Kqez3fUU)



[www.youtube.com/watch?v=Jo1Kqez3fUU](http://www.youtube.com/watch?v=Jo1Kqez3fUU)

Jun 22, 2011 - 2 min - Uploaded by IranContraScumDid911

Radioactive **tritium** has **leaked** from three-quarters of United States commercial nuclear power sites, often ...

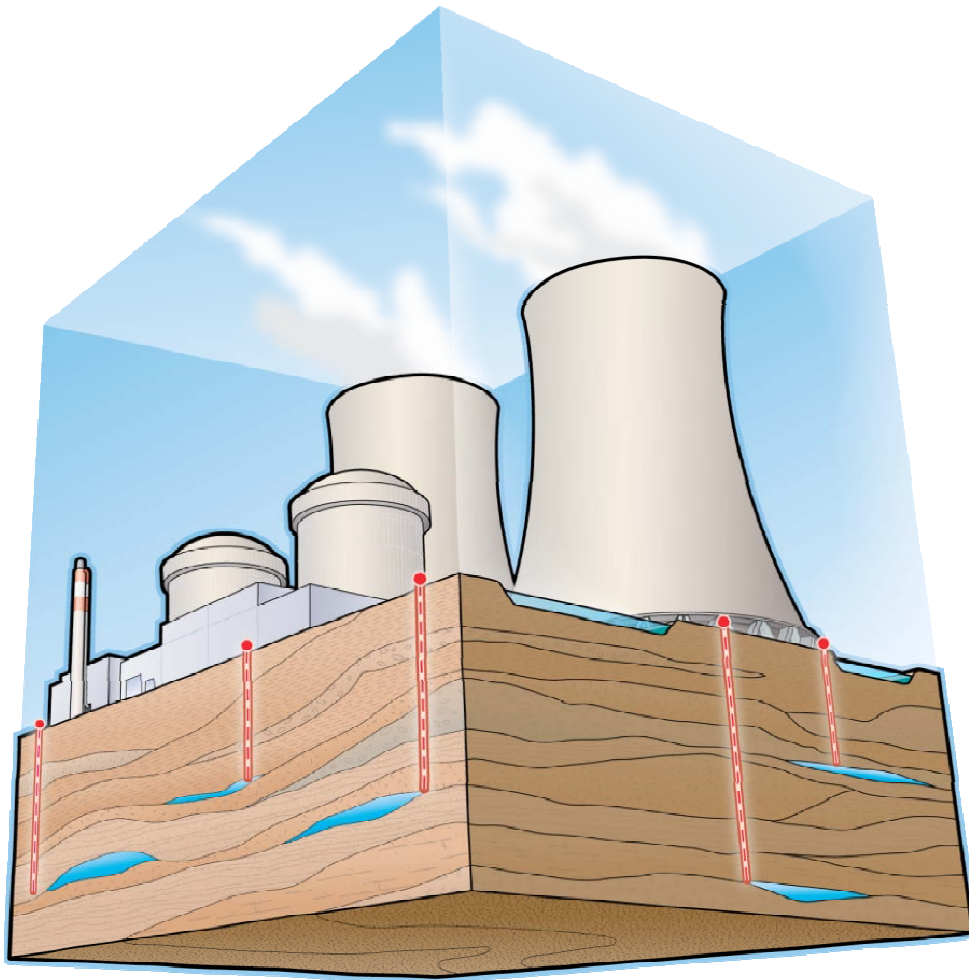
[More videos for tritium leaks »](#)

## [Tritium Leaks Cause Public Health Concerns](http://www.greenchipstocks.com/articles/tritium-leaks-cause-public.../1353)

[www.greenchipstocks.com/articles/tritium-leaks-cause-public.../1353](http://www.greenchipstocks.com/articles/tritium-leaks-cause-public.../1353)

# Proactive versus Reactive

# Radiological Environmental Protection Program Objectives



**1. Identify radionuclides of concern in gaseous and liquid effluents.**

**2. Accurate and up-to-date dose calculations.**

**3. Minimize and manage soil and groundwater contamination.**

**4. Understand impacts of nuclear power plant operations on humans and the environment**

# 2013 Radiological Environmental Protection Projects

Project Name	Average Utility Score
Carbon-14 Dose Pathways	4.94
Revision of Groundwater Protection Guidelines	4.83
Cancer Study	4.5
Accurate Reporting of HTM Radionuclides in Effluents	4.28

# NRC/National Academies (NA) Cancer Study of Populations Living Around Nuclear Facility

- Objective: Update 1990 evaluation of cancer risk in populations living around nuclear facilities.

- ✓ Phase 1 (late 2010-2012):

- NA Committee explored the feasibility and approaches for conducting an updated study.

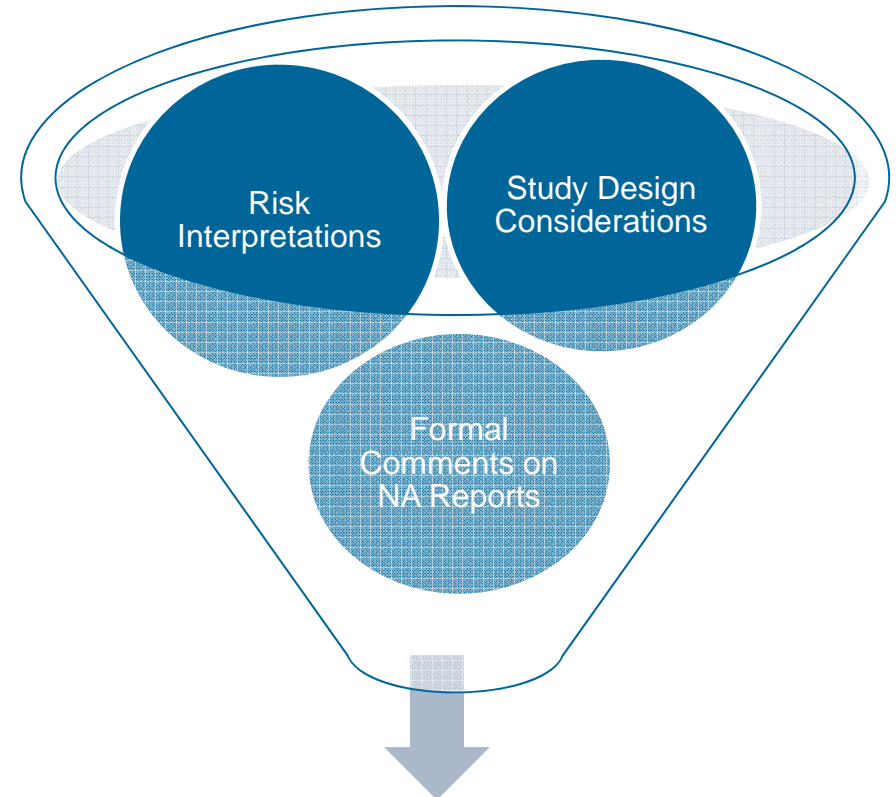
- Interim Phase (2013-2014+)<sup>1</sup>

- Perform pilot study at seven sites to evaluate the feasibility of the Phase 1 approaches.

- Phase 2 (?)

- Cancer risk assessment for balance of facilities.

EPRI provides feedback to National Academies Committee<sup>2,3</sup>



Ensure More  
Meaningful Study  
Results

1. SECY 12-0136, Next Steps for the Analysis of Cancer Risks in Populations Near Nuclear Facilities Study, Oct. 5, 2012.

2. EPRI Letter to National Academies, May 2012.

3. *Technical Considerations for the NRC/NAS Proposed Study: Cancer in Populations Living Near Nuclear Facilities*. EPRI, Palo Alto, CA: 2011. 1024677

# EPRI's Future Efforts

- 2013: Base Project

- Develop more specific recommendations for study design based on assessment of pilot site data:

- off-site doses vs background radiation,
    - population sizes and characteristics
    - quality of cancer mortality and incidence data,
    - assessment of other sources and types of potential exposure

- Brief NA committee and/or NRC as necessary



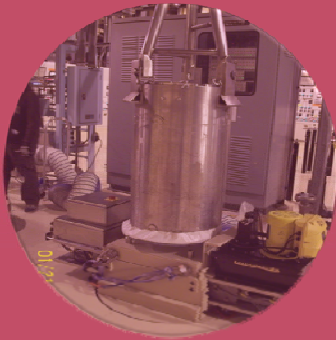


# **Low Level Waste**

## **Optimized Storage and Disposition of Low and Intermediate Level Waste**

**Billy Cox**  
Sr. Project Manager

# 3 Prong Strategy for Low Level Waste



## Waste Minimization

- ✓ Class A Minimization
- ✓ Class B/C (ILW) Minimization – Onsite
- Class B/C (ILW) Minimization – Offsite
- Integrated Strategies
- Advanced LRW Processing



## Safe Storage

- ✓ Facility Design
- ✓ Waste Forms
- ✓ Waste Containers
- ✓ Storage Facility Operating Guidelines Rev.1 & Rev 2
- ★ • Activated Hardware
- Centralized Storage



## Disposal Flexibility

- ★ • BTP Revision
- 10CFR61
- VLLW
- ✓ • BTP Implementation Guidance
- Global Profiles
- International Alignment

BC (ILW) Wet Waste Volume Reduction Technology

RadBench

## Focused Areas for the Future

- RadBench™ **Global** Revision
- **GLOBAL** Waste Characterization Investigation
- Waste Characterization Guidelines update (last updated in 1996, domestic and international applications)
- Water Usage Reduction and Advanced Water Processing Technologies (w/ Environmental)
- LLW Equipment Reliability and Maintenance Rule Guidance (w/ NMAC)
- Collaboration on New Plant Radwaste System Design and Technology Back-fit (w/ ANT and NEI)

# 2013 LLW Projects

Project Name	Average Utility Score
High Activity Spent Resin Volume Reduction	4.86
10 CFR Part 61 Limited Rulemaking Technical Support	4.75
Implementation of BTP Revision	4.47
International Waste Characterization Schemes	4.28
RadBench International	4.14

# What is a Technical Strategy Group

**Technical Strategy Groups (TSG) provide a peer to peer forum for the exchange of ideas, benchmarking information, application of EPRI research, technology updates, and management strategies.**

**In Addition, TSG's use their dues to fund additional activities. These may include:**

- Webcasts**
- Site Specific Support**
- Workshops**
- Collaborative Research**
- Website**

## **Benefits:**

- Accelerate and improve application and benefit of EPRI research**
- Inform basic research needs and ensures OE is included in base program**

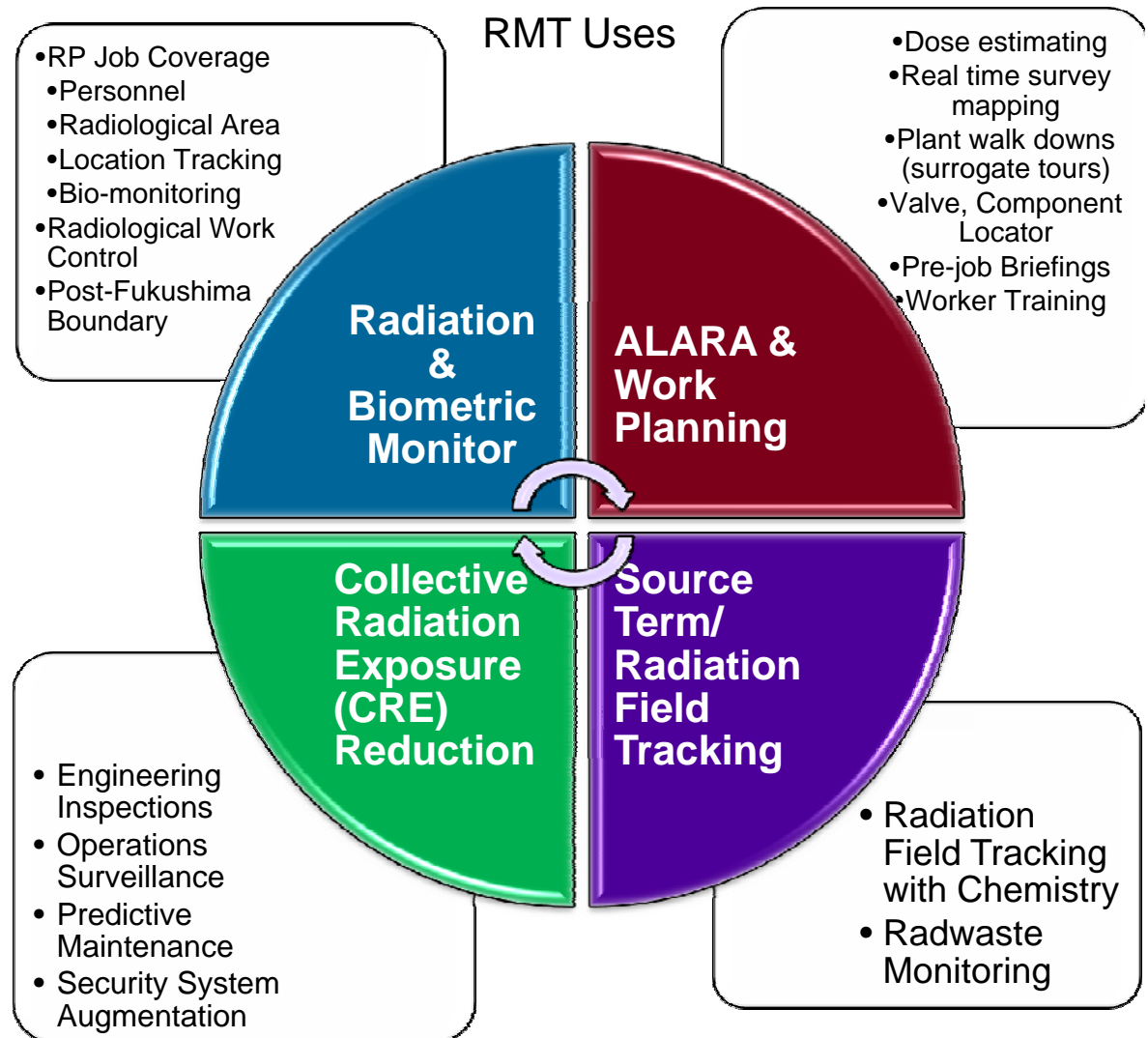
## Examples of Topical Webcasts from 2011-2012

- Webcast #1: Plant Experience with Implementing Source Term Reduction Technologies during a Recent Outage at Calvert Cliffs
- Webcast #2: Scoping of Expanded Standard Radiation Field Data Collection
- Webcast #3: Industry Utilization of Remote Monitoring Technology for Radiation Protection Functions
- Webcast #4: EDEX and Use of Tungsten Vests at ANO
- Webcast #5: Industry Experience with Chemical Decontamination

*Webcasts are recorded and materials posted for later viewing on collaboration website.*

# Workshop: Remote Monitoring Technology Workshop

- September 18-20, 2012
- Hosted by: Palo Verde
  - Utility presentations
  - Round table discussion of plant status/initiatives
  - Plant tour
  - New technology options
  - Use with 3D simulation tools
- 32 attendees





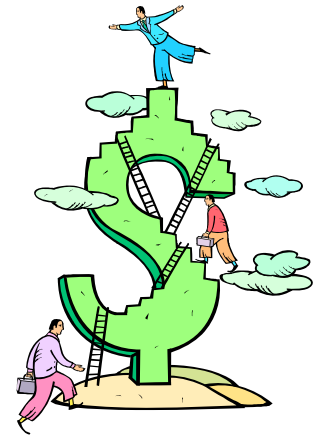
# Assessment: ALARA Assessment

- ❖ Personnel spend 10 man days at site
  - ✓ Identify opportunities for program and process alignment
- ❖ Site report
  - ✓ Prioritized improvement recommendations
  - ✓ Results benchmarked to industry
- ❖ Formal exit with station management
- ❖ Fleet assessments
  - ✓ Single report with fleet wide alignment recommendations and strategy



## Example Feedback: Plant A Scaffold Assessment

- **Plant Feedback:** Scaffold Program Manager: “Very thorough scrub of program that will be beneficial to the station”
- **Recommendations (>50)**
  - Install permanent towers for select locations
  - 8 work control Priority recommendations
  - Perform laser scanning of drywell and reactor bldg.
  - Creating a permanent scaffold crew
  - Assigning a dedicated senior RP technician to support the scaffold group each outage using PMod budget to report directly to PMod group
  - ~30 procedure related recommendations
- **Benefits**
  - Potential for ~30% reduction in number of builds/effort
  - **LOP Savings: Labor = \$12.2M, Dose = 75 person-Rem**



## Closing

*“...in fact, the only justification for society’s supporting R&D is not to keep society happy at that time, but to make the world better for the future...”*



# **Together...Shaping the Future of Electricity**