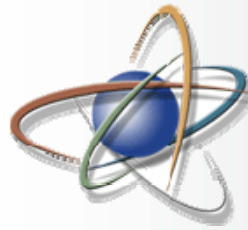




U.S. DEPARTMENT OF
ENERGY

Nuclear Energy



U.S. NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment



Overview of NRC, DOE & Industry Programs

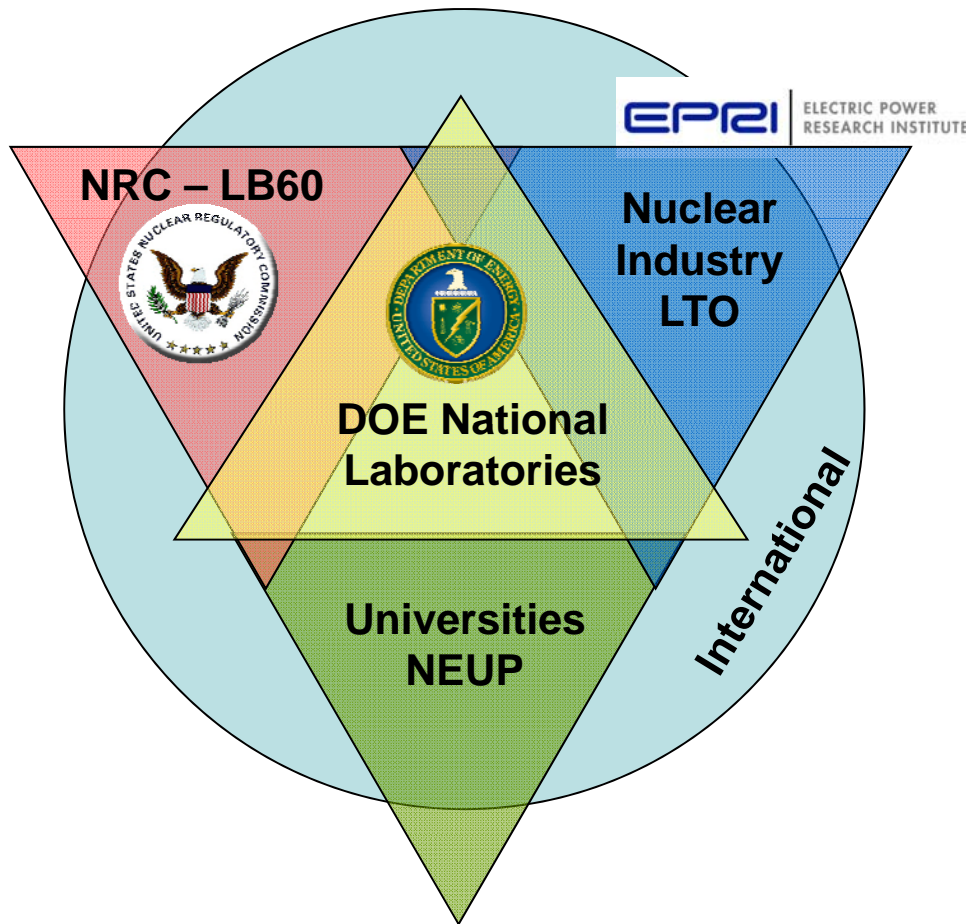
**2011 Second Workshop on US Nuclear Power Plant
Life Extension Research and Development
Washington , DC, February 22-24, 2011**

**Ronaldo Szilard, Session Lead, LWRS (INL)
John Gaertner, LTO (EPRI)
Rich Reister, LWRS (DOE)
Gene Carpenter, LB60 (NRC)**





LWRS Program: An Integrated Collaborative R&D Program



A Brief Program History

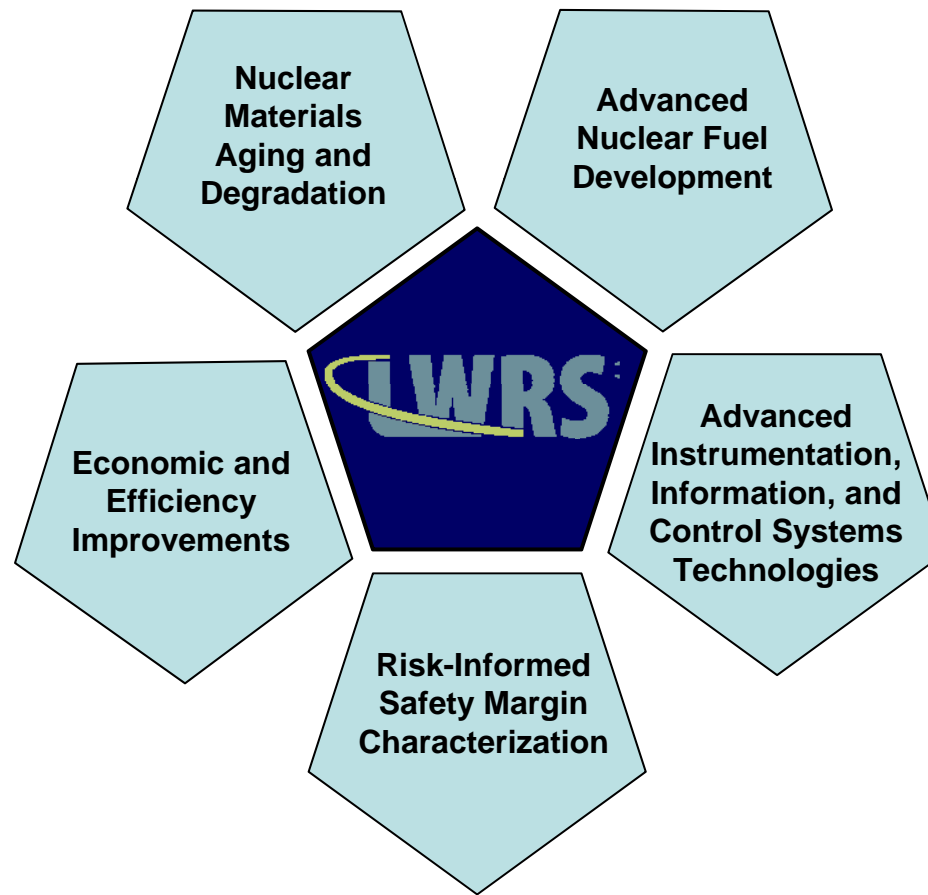
- **Nov. 2007** – INL/Nuclear Power Industry Strategic Plan for LWR R&D
- **Feb. 2008** – NRC/DOE Workshop on US Nuclear Power Plant Life Extension R&D
- **Oct. 2008** – DOE LWRS FY09 funded (\$2M)
- **Jan. 2009** – EPRI Long Term Operation established
- **Apr. 2009** – NRC/DOE MOU on Cooperative Nuclear Safety Research
- **Sep. 2009** – DOE LWRS Program Plan FY 2009-2013
- **Oct. 2009** – DOE LWRS FY10 funded (\$10M)
- **Apr. 2010** – DOE-NE R&D Roadmap
- **Apr. 2010** – Constellation Pilot Project
- **July 2010** – DOE associate membership with HRP
- **Sep. 2010** – DOE LWRS Program Plan FY 2011-2020
- **Oct. 2010** – DOE LWRS FY11 funds proposed (\$28.1M)
- **Nov. 2010** – DOE/EPRI MOU on LWR Research Programs
- **Feb. 2011** – DOE R&D Roadmap Implementation Plans rolled out to private industry
- **Feb. 2011** – DOE-NE FY12 President's Budget Request (LWRS- \$21.4M)
- **Feb. 2011** – 2nd NRC/DOE/NEI Workshop on US Nuclear Power Plant Life Extension R&D
- **Apr. 2011** – LTO/LWRS Joint Strategy Program
- **July 2011** – Five Technical R&D Plans
- **May 2012** – IAEA Third International Conference on NPP Life Management for Long Term Operation



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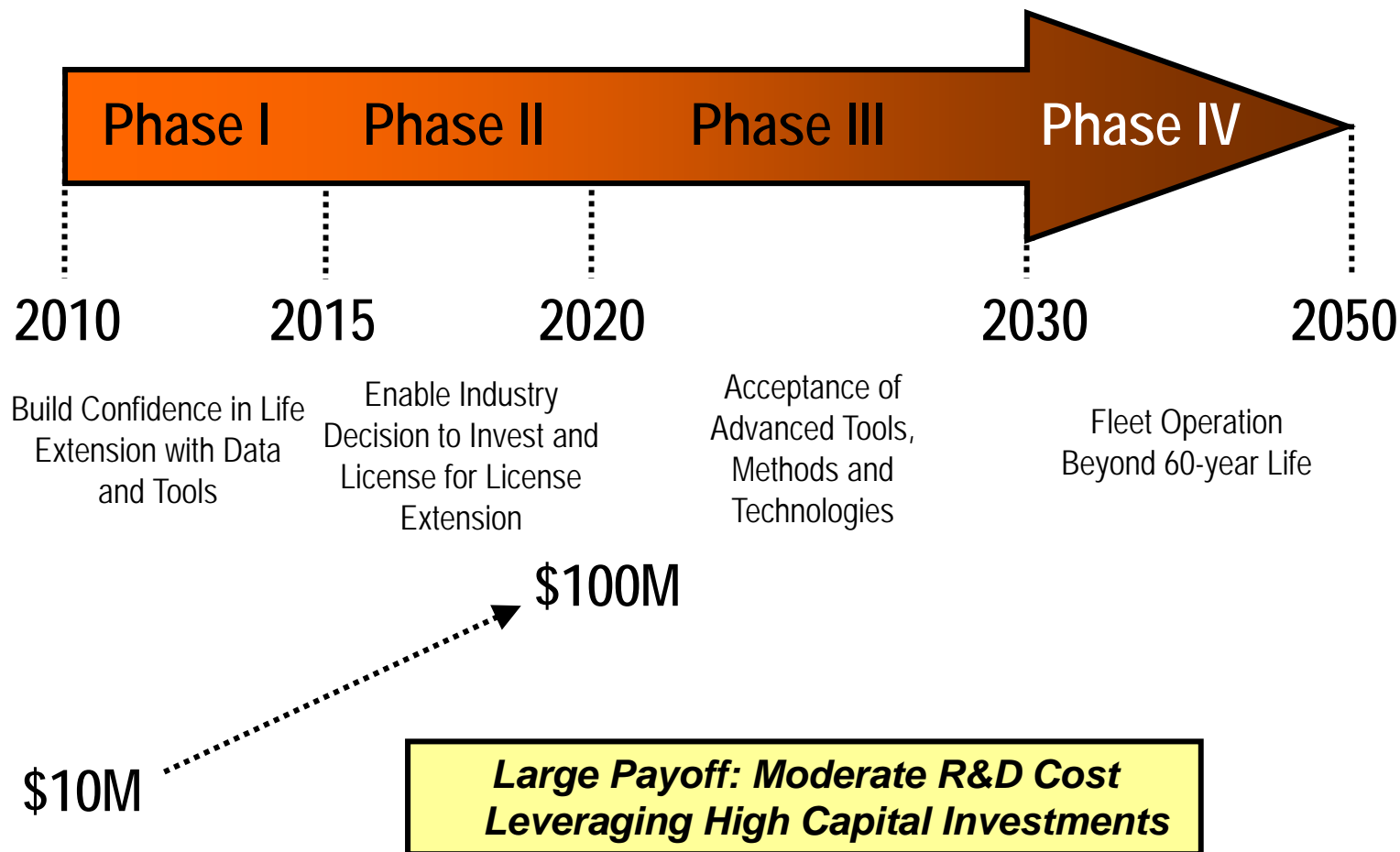
LWRS Program Technical Elements

Nuclear Energy





LWRS Program Schedule – supports investment & licensing decisions for long term operation





Key Program Deliverables Schedule – Phase 1

Nuclear Materials Aging and Degradation

- ◆ Complete comprehensive assessment of materials degradation and reliability issues; Action plan for lifetime prediction models

Advanced LWR Nuclear Fuel Development

- ◆ Complete preliminary safety analysis reports for advanced cladding materials and initiate fuel lead rod testing

Advanced Instrumentation, Information, and Control Technologies

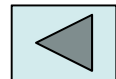
- ◆ Pilot demonstration of online monitoring; Testing of advanced II&C modernizations; Development of online NDE

Risk Informed Safety Margin Characterization

- ◆ Development of R7 code; Development of RISMC framework

Economics and Efficiency Improvement

- ◆ Water conservation technology development; Advanced design methods and containment analysis methods development for power uprates.





Key Program Deliverables Schedule – Phase 2

Nuclear Materials Aging and Degradation

- ◆ Test advanced mitigation strategies; Materials data, mitigation strategies and performance models developed to enable applications for life extension

Advanced LWR Nuclear Fuel Development

- ◆ Initial lead test assembly irradiation with advanced composite cladding materials

Advanced Instrumentation, Information, and Control Technologies

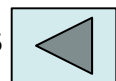
- ◆ Fleet-wide testing of online monitoring; Accepted modernization strategy for II&C; Testing of next generation on line NDE

Risk Informed Safety Margin Characterization

- ◆ R7 code testing, demonstration and validation; RISMC framework advances and demonstration

Economics and Efficiency Improvement

- ◆ Cost reduction and efficiency improvement for alternative and new cooling technologies; Advanced design methods and containment analysis methods testing and validation for power uprates.





Key Program Deliverables Schedule – Phase 3

Nuclear Materials Aging and Degradation

- ♦ Validation and implementation of lifetime performance models; Validation and implementation of mitigation strategies and advanced materials

Advanced LWR Nuclear Fuel Development

- ♦ Initial core reload with advanced cladding; Implementation of advanced cladding and advanced fuel designs underway

Advanced Instrumentation, Information, and Control Technologies

- ♦ Application of online monitoring; Implementation of modernized II&C; Application of next generation NDE technologies

Risk Informed Safety Margin Characterization

- ♦ Validation and implementation of RISMC methods and tools

Economics and Economics Improvement

- ♦ Demonstration of alternative and new cooling technologies; Application of power uprate enabling technologies.

