



U.S. DEPARTMENT OF  
**ENERGY**

**Nuclear Energy**

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## **Advanced Reactor Concepts 2015 (ARC 15)**

Brian K. Robinson  
Office of Nuclear Energy (NE)

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### ■ Interactions with various trade groups:

- Electric Power Research Institute (EPRI) including formal MOU
- Nuclear Energy Institute
- US Nuclear Infrastructure Council

### ■ Technical Review Panel (TRP) Process to inform R&D decisions

- Issue Request For Information to solicit R&D needs of Industry to influence programs at Labs and determine scope of Funding Opportunity Announcements for industry cost-share financial assistance
- Four awards in 2013 (\$3.5M) and five awards in 2014 (\$13M)

### ■ Recent Funding Opportunity Announcement

- Supports a broad scope including such areas as R&D, design analysis, scale testing or licensing
- Supports multi-year funding (up to \$100M, with 20% cost-share)
- Announced awards on January 15, 2016 to X-energy and Southern Company Services



### ■ FY 2015 Appropriations Language

*“\$12,500,000 is for the further development of two performance based advanced reactor concepts, of which \$7,500,000 is for industry-only competition of two performance based advanced reactor concepts and \$5,000,000 is for the national laboratories selected to work with the awardees to perform the work required by the awardees to meet the goals of the awards.”*

### ■ FOA issued 7/31/2015

- Designed to support multi-year funding (up to \$100M, with 20% cost-share)

### ■ Applications due 10/28/2015

### ■ 14 Applications Received

- 9 Different Reactor Concepts

### ■ Awards announced on January 15, 2016



# Evaluation of Applications

- **A Merit Review was conducted to support the selection of applicants for award**
- **Adjectival ratings were assigned and determined based on the evaluated strengths, weaknesses, and deficiencies of each application**
- **Three evaluations criteria:**
  1. Technical Merit of the Reactor Concept
  2. Furtherance of the Reactor Concept
  3. Applicant Team Capabilities and Experience, Including Management Capability



# Criteria

## ■ Technical Merit of the Reactor Concept

- a) Safety - Design features that address defense-in-depth, accident prevention and accident mitigation
- b) Operations - Operational features that simplify operation, minimize radioactive waste, reduce maintenance and staffing requirements, provide for improved reliability, and enhance safeguards and security
- c) Economics - Design features that provide for improved economics

## ■ Furtherance of the Reactor Concept

- a) The degree to which the proposed near-term project activities provide significant furtherance of the performance-based reactor concept
- b) That the proposed short-term activities represent a realistic approach which demonstrates the applicant understands the technical, regulatory, and market requirements influencing the progression of the reactor concept to demonstration
- c) That applicant's program plan is viable and significantly progresses commercial demonstration of the reactor concept and provides schedule, cost, and roles and responsibilities for long-term project activities



■ **Team Capabilities and Experience, Including Management Capability**

- a) That the capabilities and qualifications of engineering and technical personnel, project managers, other key contributors (including FFRDC), and subcontractors are such that they can successfully accomplish the technical and regulatory scope of this project
- b) That the applicant team has demonstrated successful experience/past performance, knowledge and understanding of the business and regulatory requirements for projects of similar size, scope and complexity in achieving project technical success within budget and on time with no significant safety and quality issues
- c) An acceptable and clear/convincing assessment of how the experience and capabilities described above will translate into progressing the proposed advanced reactor concept



# Programmatic Evaluation Factors

- **“Other Selection Factors” are applied at the discretion of the Selection Official**
  - Balanced to best optimize the selection of an appropriate mix of technologies to meet program goals
  - No potential, apparent, or actual organizational and individual conflicts of interest may be given preferential consideration
  - Extent of industry cost-share (i.e., proposed contributions greater than 20%) may be given preferential consideration



### ■ X Energy – Xe-100 Pebble Bed Advanced Reactor

- TRISO Fuel
- Power 48 MWe
- Efficiency 38.4%
- BWXT, Oregon State University, Teledyne-Brown Engineering, SGL Group, INL, and ORNL

### ■ Southern Company Services – Molten Chloride Fast Reactor

- Molten Chloride Salt
- Power 30 MWe
- Efficiency 46%
- TerraPower, EPRI, Vanderbilt University, and ORNL





## Nuclear Energy

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### ■ Kick-off Meetings conducted:

- Southern Company – February 24 -25, 2016
- X-energy – March 16 – 17, 2016

### ■ Negotiation of Award Underway

- Review of Risk Posed
- IP Negotiations
- Technical Evaluation of Budget
- Cost/Price Analysis of Budget
- Terms and Conditions

### ■ Statement of Substantial Involvement

- Meaningful and achievable milestones to track project progress
- Reviewing performance to ensure objectives, terms, and conditions of award are accomplished and discussing corrective actions
- Performing technical reviews to determine whether to continue funding the next budget period