

Nuclear Power 2010

Program Overview

Presentation to the
Nuclear Energy Research Advisory Committee



Shane Johnson

Office of Nuclear Energy, Science and Technology

April 15, 2002

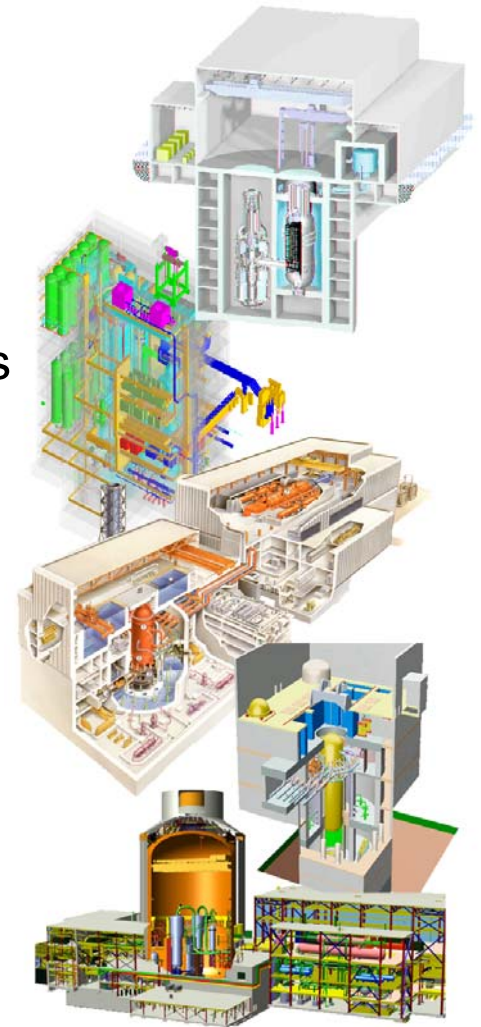


Nuclear Power 2010 Overview

- ◆ New program initiative unveiled February 2002
- ◆ Based on Near-Term Deployment Roadmap
- ◆ Public/private partnership to:
 - Develop advanced reactor technologies
 - Explore sites that could host new nuclear power plants
 - Demonstrate new Nuclear Regulatory Commission (NRC) regulatory processes

Goals

- ◆ Orders for one or more new nuclear plants by 2005
- ◆ Operation of new nuclear power plants by 2010





Nuclear Power 2010 - Phased Action Plan

Early Site Permit Application

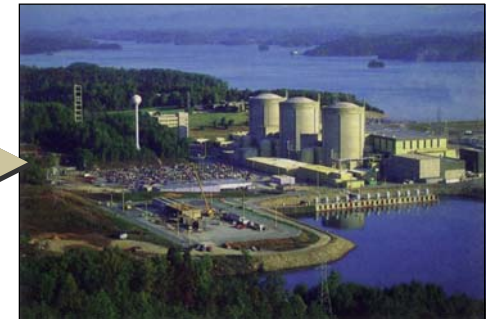


For new U.S. Nuclear Power Plants to be a reality by 2010, DOE must support key R&D and assist industry to demonstrate unproven NRC processes

Combined Construction and Operating License Application



Advanced Nuclear Power Systems Online by 2010



Design Certification and Completion

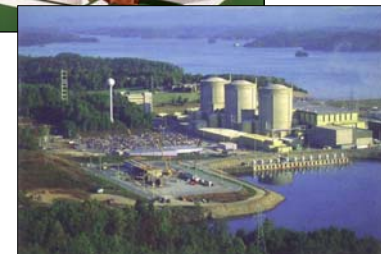


- Market-driven initiatives
- Government-industry cost share
- Responsive to Near-Term Deployment Roadmap



Nuclear Power 2010

- ◆ **Market Driven, Cost-Shared Approach**
 - Competitive process -- best proposals win
 - Encourage industry to rally around 1 or 2 designs
- ◆ **Regulatory Demonstration Tasks**
 - Early Site Permit (ESP) Application
 - Design Certification (DC)/Final Design Approval (FDA) for advanced reactor designs
 - Combined Construction and Operating License (COL)
- ◆ **Design Completion Tasks**
 - Material, component and system testing
 - Fuel irradiation and testing
 - First-of-a-kind engineering
- ◆ **Nuclear Plant Business Case Study**





Nuclear Power 2010 - Early Site Permit Application

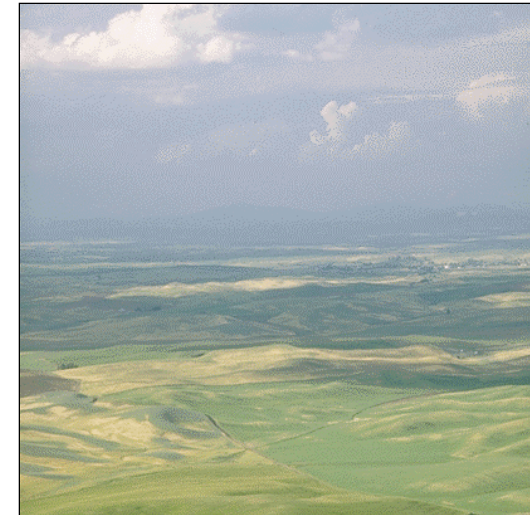
Purpose - Demonstrate new, untested Early Site Permit (ESP) licensing process - 10 CFR Part 52

◆ Conduct DOE/Industry Scoping Study

- Develop schedule & cost estimates for ESP application
- Competitive cost-shared proposals

◆ Conduct ESP Regulatory Demonstration Project

- Demonstrate effectiveness of NRC licensing process
- Implement generic industry guidelines
- Demonstrate process for variety of site types
- Solicitation issued: Feb 27 Proposals due: April 15
- Awards: Spring 2002 ESP license: 30 months later in Fall 2004

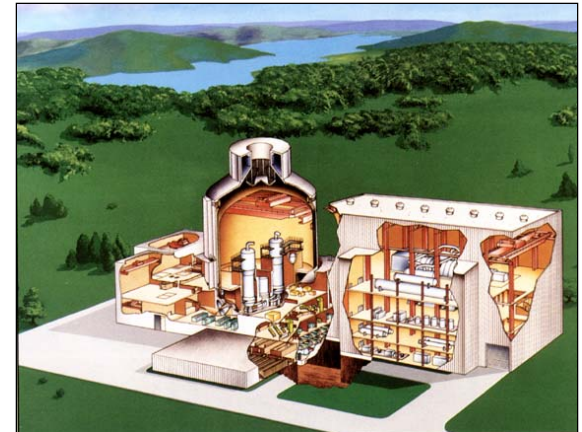




Nuclear Power 2010 - Design Certification

Purpose - Obtain NRC approval for advanced reactor designs prior to plant order

- ◆ **Continued DOE/NRC cooperation for development of gas reactor regulatory framework**
- ◆ **Cost shared projects that support NRC design certification or final design approval**
 - Market Driven
 - 50 percent minimum industry cost-share
 - 25% vendor and 25% end-user





Nuclear Power 2010 - Combined Construction & Operating License

Purpose - Demonstrate new, untested regulatory process for licensing the construction and operation of new plants. Implement first-of-a-kind engineering, system and component R&D and testing

- ◆ **Initiate cooperative cost-shared projects with utilities to submit license application to build/operate new nuclear plants**
 - Solicitation and award selection: 2003
 - COL application submittal to NRC: 2004
 - COL from NRC: 2005

- ◆ **Gas reactor fuel qualification - Conduct irradiation and testing of Gas Reactor Fuels**





Nuclear Power 2010 - Planned Activities

FY 2002 - \$8 million

- ◆ Complete ESP Scoping Study
- ◆ Complete Nuclear Plant Business Case Study
- ◆ Initiate cost-shared projects for ESP Application(s)
- ◆ Solicit and select cost-shared projects for the design certification/approval of advanced designs
- ◆ Continue planning and test fixture fabrication for gas reactor fuel irradiation

FY 2003 - \$ 38.5 million Request

- ◆ Solicit and select cooperative cost-shared COL Demonstration projects
- ◆ Initiate a Nuclear Industry Infrastructure Assessment
- ◆ Initiate gas-reactor fuel irradiation experiments



BACKUP



NTD Roadmap Conclusions

Can Be Deployed by 2010

- ABWR (General Electric)

Probably Can Be Deployed by 2010

- AP600 (Westinghouse)
- AP1000 (Westinghouse)
- PBMR (Exelon)

Possibly Can Be Deployed by 2010

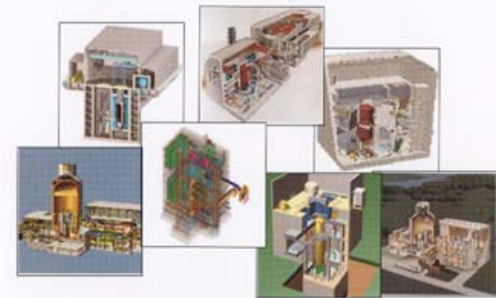
- SWR-1000 (Framatome)
- ESBWR (General Electric)
- GT-MHR (General Atomics)

Cannot Be Deployed by 2010

- IRIS (Westinghouse)

A Roadmap to Deploy New Nuclear Power Plants in the United States by 2010

Volume I Summary Report



Prepared for the
United States Department of Energy
Office of Nuclear Energy, Science and Technology
and its
Nuclear Energy Research Advisory Committee
Subcommittee on Generation IV Technology Planning

October 31, 2001

Conclusions of the Expert Study:

A Roadmap to Deploy New Nuclear Power Plants in the United States by 2010



Recommendations -- an Overview

- ◆ **Implement a “Phased Plan of Action”:**
 - Regulatory Approvals
 - Design Completion
 - Construction and Startup
- ◆ **Establish Financial Incentives**
 - Cost Share for Regulatory Approval & Design Completion Phases
 - Financial Incentives for Construction & Startup Phase
- ◆ **Conduct a Nuclear Industry Infrastructure Assessment**
- ◆ **Development of National Nuclear Energy Strategy**



Nuclear Power 2010 - Nuclear Business Case Study

- ◆ **Developed from discussions with representatives of financial and nuclear industries**

- ◆ **Identifies:**
 - Competitive conditions under which utilities would add new nuclear capacity
 - Business risk profile for new nuclear plants
 - Business hurdles that must be overcome
 - Strategies to close the “risk-gaps” identified in the Near-Term Deployment Roadmap Summary Report

- ◆ **Findings and recommendations due May 21, 2002**