



# Preparing for the Next Generation Nuclear Power Plants

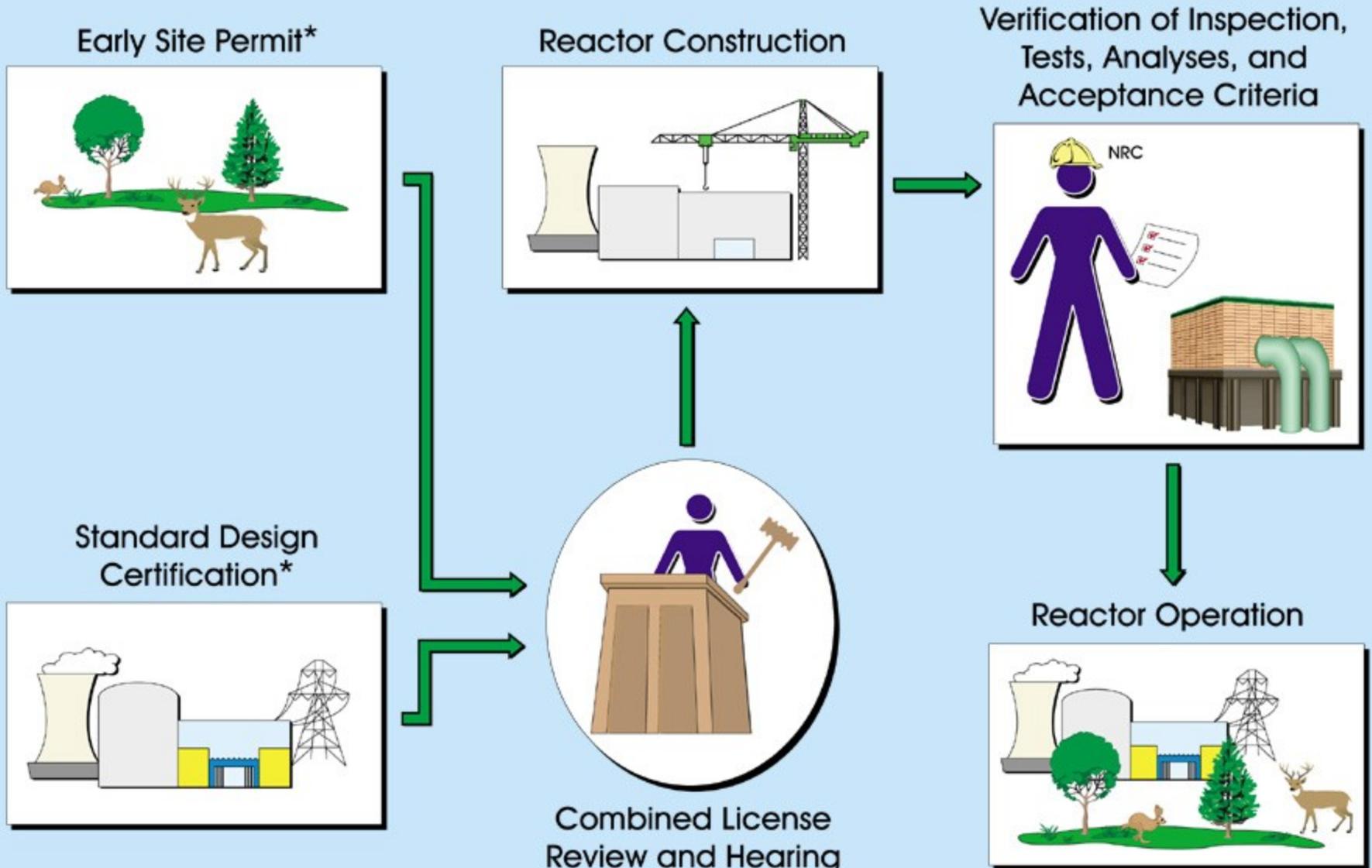
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U.S. Nuclear Regulatory Commission

Presented at  
The Joint TRTR and IGORR Meeting  
Gaithersburg, MD  
September 14, 2005

# Business Drivers to Enable New Construction

- Maintain safety of currently licensed plants
- Enhanced safety for future plants
- Independent and credible regulator
- Meaningful public participation
- Predictable licensing process
- Support national energy policy goals

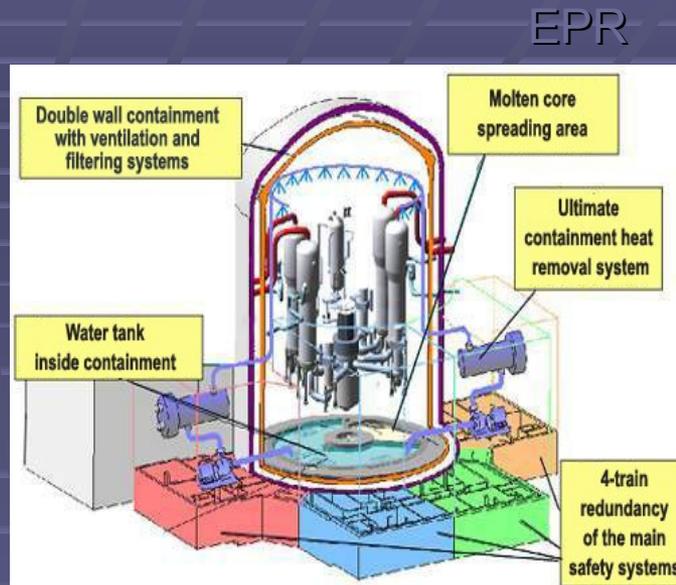
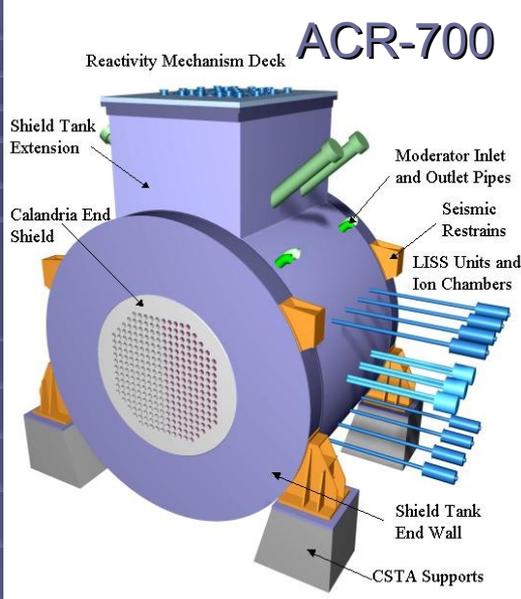
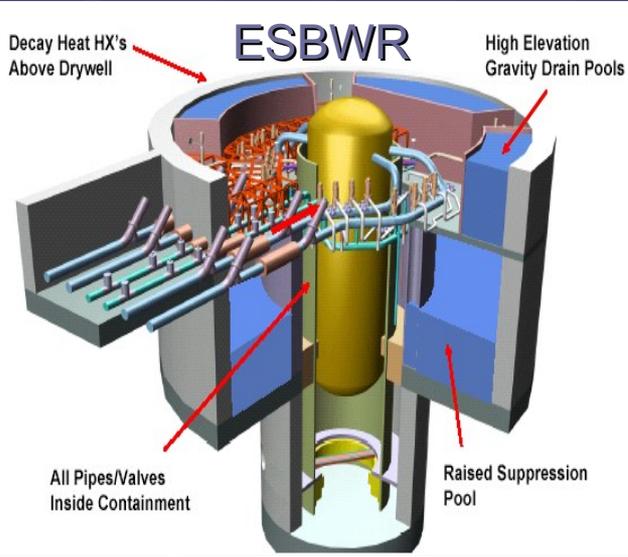
# Combined Licenses, Early Site Permits, and Standard Design Certifications



# Design Certifications

- NRC review and approval of a standardized design by rulemaking
- Already certified:
  - C-E System 80+
  - General Electric Advanced Boiling Water Reactor (ABWR)
  - Westinghouse AP600
- Certification Rulemaking in progress:
  - Westinghouse AP1000-FSER/FDA Completed September 2004
  - Proposed Rule sent to the Commission Spring 2005
- Pending certification reviews:
  - General Electric Economic and Simplified Boiling Water Reactor (ESBWR)
  - European Pressurized Reactor (EPR)
  - Pebble Bed Modular Reactor (PBMR)

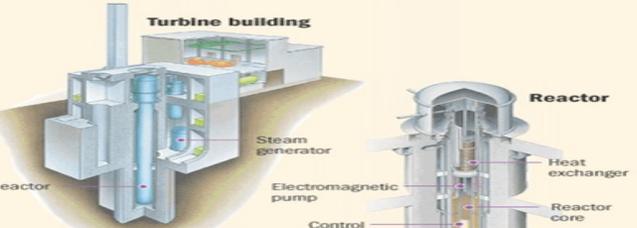
# Current and Potential Pre-application Reviews



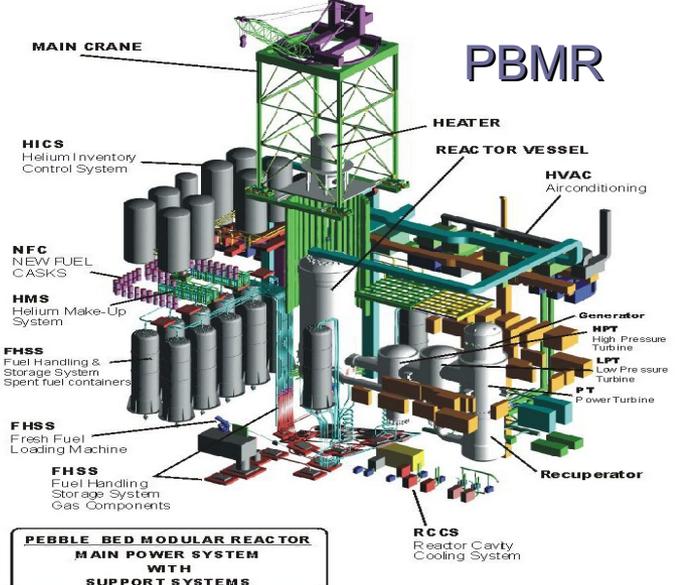
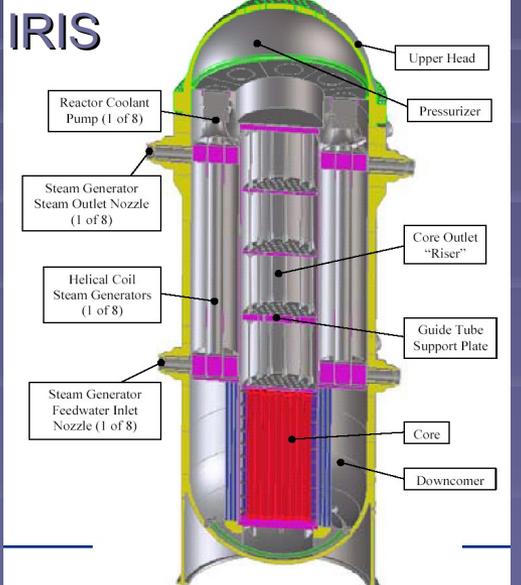
## Toshiba 4S

**Nuclear power for rural villages**

Toshiba is proposing a small modular nuclear reactor to supply power for Galena, a Yukon River town of 713. It has yet to be constructed, but would likely consist of a 70-foot tube with a garbage-can-sized uranium core at the bottom and a liquid metal heat exchanger in the upper section. The assembly would be buried in a concrete silo. The slow-burning uranium would last 30 years, powering steam turbines to create electricity. Conceptual drawings of the plant are below.



- Reactor specs**
- **HEIGHT:** About 70 feet
  - **WEIGHT:** About 60 tons
  - **ELECTRICAL PRODUCTION:** About 10 megawatts. A typical lower 4S nuclear plant is 1,000 megawatts or more. When the fuel is spent, the core can be removed and recycled.
  - **ELECTRICAL COST:** The plant could generate electricity at 10 cents a kilowatt hour, which is slightly more than in Anchorage or Fairbanks, but a half to two-thirds the current cost in Galena.
  - **CONSTRUCTION:** The modular plant is constructed in a factory and could be delivered by barge to the site. Components are small enough to be delivered by truck or helicopter.
  - **PROJECT COST:** \$20 million. Toshiba says it will install the Galena reactor free, as a demonstration project.
  - **NUMBER OF EMPLOYEES:** The reactor has no operator or maintenance personnel; the steam generator would probably require the same number of people as the diesel-powered plants.
- Source: Toshiba  
RON ENGSTROM / Anchorage Daily News



# Early Site Permit (ESP)

- Allows early resolution of siting issues and 'banking' of a site for 10-20 years
- Review Areas
  - Site Safety
  - Emergency Preparedness
  - Environmental Protection

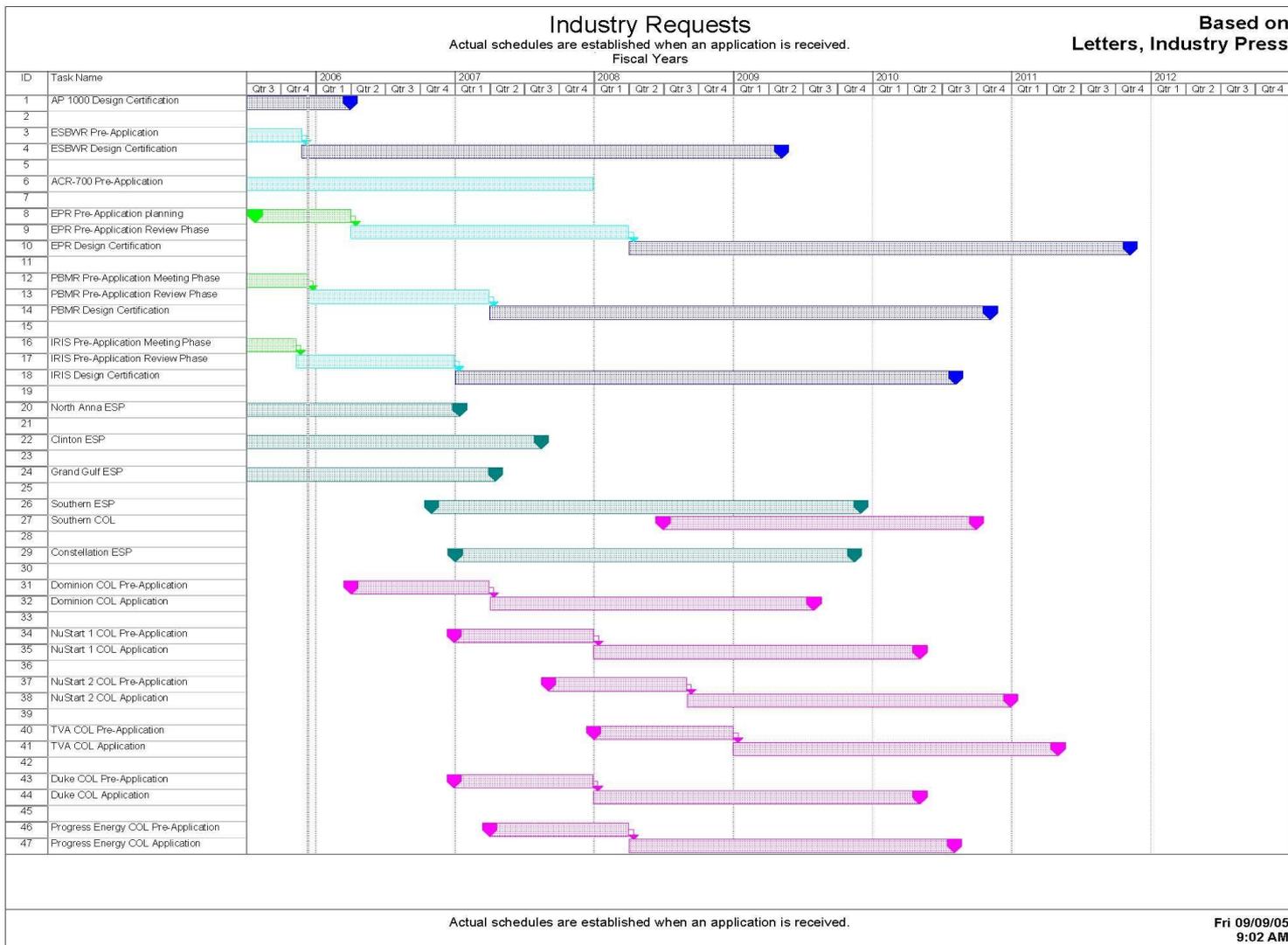
# COL

- Combined construction permit and conditional operating license for a nuclear power plant
- COL is the fundamental licensing process in Part 52 for reducing regulatory risk for companies building nuclear power plants
- May reference an ESP, a standard design certification, both, or neither
- Objective is to resolve all safety & environmental issues before authorizing construction
- Prior to fuel load, must verify the facility has been constructed in accordance with COL (CIP-ITAAC)

# ESP & COL Applications

- ESP Applications Received
  - September 2003 – Dominion (North Anna)
  - September 2003 – Exelon (Clinton)
  - October 2003- Entergy (Grand Gulf)
- Proposed ESP Applications
  - 2006 – Southern Company
  - 2007 – Constellation
- Proposed COL Applications
  - Dominion
  - NuStart
  - Duke
  - Progress Energy

# Current and Upcoming New Reactor Licensing Activities



# NRC Management Challenges

- Keeping the focus on safety first
- Constant change in external environment
- Infrastructure Challenges
  - Knowledge base for non-LWRs
  - Research / Testing Infrastructure
  - Programmatic Infrastructure
- Personnel
  - Anticipated losses (need for knowledge transfer)
  - Critical Skills required (fungibility)
  - Hiring and Training strategies

# Strategies

- Expand NRC staff capabilities
- Expand NRC contractor utilization
- Disciplined licensing approach

# Role of the RTR Community

- Long-term industry staffing issues
- Near-term NRC need for trained nuclear engineers
- Long-term NRC generational change