

COMMISSION MEETING SLIDES/EXHIBITS

BRIEFING ON READINESS FOR PLANT  
APPLICATIONS AND CONSTRUCTION

THURSDAY, JULY 19, 2001



# **FUTURE LICENSING AND INSPECTION READINESS ASSESSMENT**

**Presentation to the Commission**

**R. William Borchardt, NRR**

**Thomas L. King, RES**

**July 19, 2001**

# **Overview**

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**February 13, 2001 Staff Requirements  
Memorandum**

**Future Licensing and Inspection Readiness  
Assessment**

**Staffing**

**Policy Issues**

**Regulatory Infrastructure**

**Current Activities**

**Challenges and Summary**

# **February 13, 2001 Staff Requirements Memorandum (SRM)**

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- Assess technical, licensing and inspection capabilities**
- Assess the regulatory infrastructure supporting Parts 50 and 52**
- Integrate tasks with various related activities**

# **Future Licensing and Inspection Readiness Assessment (FLIRA)**

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- **Postulated scenarios, review durations,  
resource estimates**
- **Critical skills needed**
- **Necessary interfaces**
- **Recommendations and necessary follow-on  
activities**

# Staffing

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- **Current staffing (FLO, NRR; ARG, RES; SPB, NMSS)**
- **Proposed establishment of New Reactor Licensing Project Office**
- **Technical staff**

# Policy Issues

## Merchant Plants

- **Decommissioning funding assurance**
- **Antitrust reviews**
- **Financial qualifications**

# **Policy Issues (continued)**

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## **Modular**

- Price-Anderson protection**
- Number of licenses**
- Operator staffing**
- NRC annual fees**



# **Policy Issues (continued)**

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## **Non-LWR**

- **Decommissioning funding formula**
- **Uranium fuel cycle for gas reactors**

# **Current Activities**

- **Early Site Permits**
- **Construction Inspection Program**
- **Rulemaking**
- **Stakeholder Interaction**

# **Early Site Permits (ESP)**

- **Current activities include recent meetings with NEI ESP Task Force**
- **Three part review**
- **Staff needs to begin work early**

# **Construction Inspection Program (CIP)**

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- CIP reactivation**
- Reactivation of WNP-1 construction permit**
- Resolution of programmatic ITAAC issue**

# Rulemakings

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- **Part 52**
- **Part 51 (Tables S-3 and S-4)**
- **Alternative Sites**

# **Stakeholder Interactions**

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- **Web Page**
- **Initial workshop**
- **Future workshops**
- **Public meetings**

# Challenges

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- **Hiring and maintaining critical skills**
- **Industry plans and information**
- **Budget**
- **Identifying and implementing efficiencies**

# **Activities Currently Underway**

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- **AP-1000 pre-application activities**
- **PBMR pre-application activities**
- **Preliminary discussions on GT-MHR and IRIS**
- **International cooperation**



# **Technology and Technical Infrastructure**

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**NRC Readiness will depend upon:**

- understanding the technology**
- ability to independently confirm safety**
- developing and maintaining necessary skills**

# Technology

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- **Likely different than currently operating plants.**
- **Safety may be accomplished in non-traditional ways.**
- **New technology may also have applicability to current plants.**

# **Independent Capability**

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- **Many NRC regulatory decisions supported by independent confirmatory analysis and data.**
- **Future plant licensing decisions should also have this support.**
- **Development of independent capability takes time & resources.**

# Skills

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- **New skills will be required.**
- **Readiness assessment must address:**
  - **numbers and types of skills needed**
  - **strategies to obtain them**

# **Key Assumptions**

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- **Industry plans and schedules**
- **High quality applications**
- **NRC independent review capability**
- **Case-by-case application of 10 CFR in the near term**

# Potential Areas for Policy Issues

- **Technical**
  - **achievement of safety in non-traditional ways**
  - **risk-informed; performance-based approach/criteria**
- **Institutional**
  - **approach for licensing future plants**
  - **infrastructure needs**

# Milestones

- **Future Licensing and Inspection Readiness Assessment -9/01**
- **Proposed Rule on 10 CFR Part 52 Revision -9/01**
- **Paper on Exelon's Legal/Financial White Papers -11/01**
- **Paper on Exelon's Regulatory Licensing Approach -11/01**

# **Milestones (continued)**

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- **AP-1000 Phase 2 Review Report -1/02**
- **Recommendation on Programmatic ITAAC -3/02**
- **Paper on Technical Issues for PBMR - 4/02**
- **Paper on Technical Policy Issues for PBMR -9/02**



# Stakeholder Briefing on New Nuclear Plants

NRC Commission Briefing

July 19, 2001

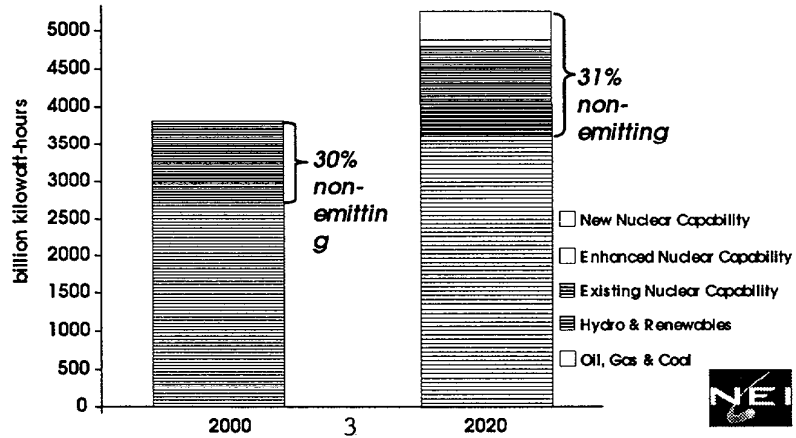


## The Energy and Environmental Imperatives

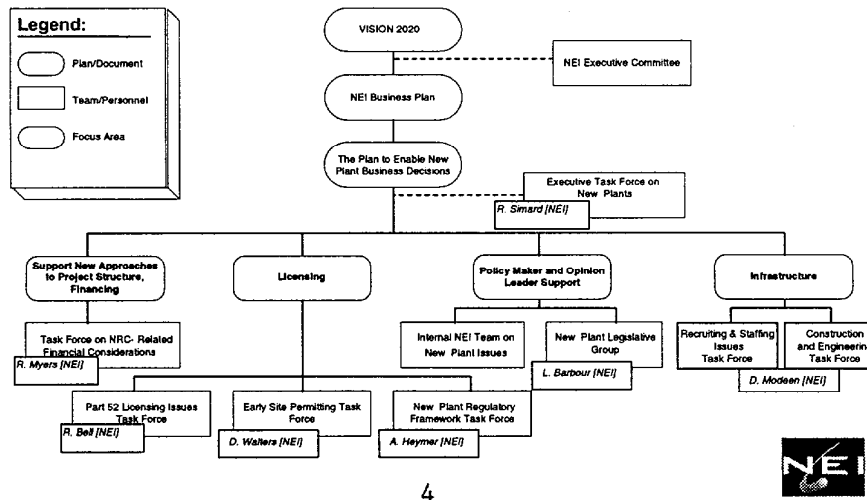
- 400,000 MW of additional capacity needed by 2020 (to replace existing plants that reach end of life and to meet new demand)
- A 50% increase in nuclear capacity is needed *just to maintain* the current percentage of emission free generation in the electricity sector



# Vision 2020



# Activities in support of the plan to enable new plant business decisions



## Four Focus Areas

### 1. Optimize new plant economics & project structures

- Energy policy initiatives
- Innovative project financing
- Improved cost & schedule estimates
- Updated financial requirements

### 2. Ensure predictable licensing and stable regulation

- Early site permits/combined licensing
- Construction inspection
- Transition to operation
- Risk-informed regulatory framework

### 3. Enhance policymaker and public support

- Congress and Administration
- Financial community, media, state/local opinion leaders, private sector policy groups, etc.

### 4. Maintain robust infrastructure for current and future plants

- Qualified people with the right skills
- Technical services
- Hardware

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## Predictable Licensing and Stable Regulation

- Today's business environment demands more certainty than ever
  - Project schedule (time to market)
  - Project cost
- Part 52 is necessary, but not sufficient
  - Update of other regulatory infrastructure needed to reflect new paradigms
  - Effective, efficient processes are essential

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## Ensuring Efficient Processes

- Exclude operational programs from the scope of required combined license ITAAC
- Modify Parts 51 & 52 to eliminate need for power, alternative sources and alternative sites from NRC consideration under NEPA
- Add provisions to Part 52 to avoid duplicative NRC review and hearing on valid, existing site or facility information previously approved by NRC
- Establish a clear and workable process for ITAAC verification by NRC

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## Keys Going Forward

- Continued NRC leadership in maintaining safety while responding to new regulatory challenges
- Constructive industry and stakeholder interactions with NRC
- Vigilance to ensure safety focus, efficiency and certainty

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## Stakeholder Panel on New Plants

Commission Briefing  
July 19, 2001

J.A. Muntz  
Vice President, Nuclear Projects

### Exelon is considering the PBMR

- Modular design based on proven technology
- Minority investor (12.5%)
- BNFL/Westinghouse, Eskom & IDC
- Exelon is a potential early customer
- Board decisions in December 2001
  - Demonstration unit in RSA
  - USA license application ESP/COL
- View PBMR as merchant nuclear power

## NRC response to date

- Identification of Points of Contact for PBMR
  - Project managers in RES & NRR
  - support evident from NMSS & OGC
- Creation of FLO
- Funding from DOE
- Monthly meetings established for key legal, economic, and technical issues
- Appropriate and Adequate

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## Pre-application Period

- Mutually beneficial
- Recurring Issue:
  - Where's the final design for us to review?
  - vs.
  - What criteria will be sufficient to license a gas-cooled reactor in the USA?
- Staff recommendations and Commission Policies expected to support basis for licensing the PBMR – we are engaging on the current regulations
- Exemptions as required

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## Certainty and timeliness valued

- Determine the economics of this design
  - Part 52 ESP/COL, Price Anderson, Antitrust, Decommissioning funds, one license for multiple modules, annual fees
- Influence the design so it will be licensable
  - Fuel Performance, Source Term, Containment, ITAAC/Confirmatory testing, SSC Classification, Staffing, Materials
- Expectation at end of Pre-application Period 9/02
  - Commission positions known, Commission process established to support application

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## Schedule

- Exelon values its hard-earned reputation as the premier operator of nuclear plants and will only operate safe plant designs
- PBMR and Exelon desire to determine as quickly as possible if this technology is economically feasible in the US – license, build, operate & decommission

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## Dominion Generation\* Early Site Permitting Project

To ensure the steady supply of economic electricity that is so vital to our region's growth, Dominion Generation is continually looking at new electricity generation options. On June 1, 2001, a small but important new group was created within Dominion's nuclear business unit—the Early Site Permitting project team. That action signified Dominion's continuing interest in new nuclear power as a potentially viable element within its diverse energy generation portfolio to meet our nation's growing energy needs.

The primary goal of Dominion's ESP project is to provide an option for possible future additions of nuclear baseload generating capacity. The ESP project will evaluate available reactor technologies to determine whether such plants offer an attractive return on investment. In addition, the ESP project will help validate the improved, but as yet not-fully-tested, licensing process described in Part 52 of the Commission's regulations.

In the near-term, the ESP project will focus its attention on Surry and North Anna as the initial sites to be evaluated for an early site permit. A preliminary study will be completed this year to evaluate going forward with an ESP. Assuming a decision is made to go forward, one of the sites would be selected and an ESP application prepared in 2002, with the goal of submitting the application to the NRC in early 2003. Of course, all this is subject to our continuing assessment of market conditions.

Over the longer-term, and in parallel, the ESP project will continue to evaluate other selected sites and technologies.

In keeping with the theme of today's Commission meeting, the Part 52 licensing process is of particular interest to Dominion. There are three major elements to the regulation: early site permits, design certification, and combined operating licenses. Of those three, only one, design certification, has been fully demonstrated. Our interest, and our

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\* Prepared remarks of Eugene S. Grecheck, Vice President-Nuclear Support Services, Dominion Resources, at the July 19, 2001 NRC Commission Briefing on Readiness for New Plant Applications and Construction.



concern, lies with the other two elements, and equally important, how the Commission envisions those three elements to interact and support, or possibly constrain, each other.

As the Commission noted in the Statement of Considerations accompanying the publication of Part 52, "...*Ideally, a future applicant will reference an approved site and a certified design in an application for a combined license, thus obviating the need for an extensive review of the application and construction...*" Unfortunately, as we all know, the world is not ideal. With the advent of a competitive marketplace and the reasonable likelihood of merchant nuclear generating plants, the sequence and timing of the ideal licensing process may find itself somewhat at odds with the needs of future applicants and the demands of the marketplace.

As an example, assuming Dominion goes forward and submits an ESP application (that supports more than one reactor design) in 2003, some within industry estimate an NRC review period of roughly two years. In a competitive world, much can change in that time. It is foreseeable that an opportunity might present itself such that a utility may desire to advance its ESP application directly to an application for a Combined Operating License. That COL request could either include a design for which certification has already been granted, or one that would be in the NRC certification process. Thus, the intent would be to continue with the NRC review of the ESP application enveloping several reactor designs while also requesting NRC review of a COL application for a specific reactor design. That approach would take advantage of the ongoing ESP review in concert with either a certified design or an ongoing NRC certification review. (Dominion would continue to pursue review of the initial ESP application supporting several designs because of its potential longer-term value.)

Our reading of the regulation has identified no legal or procedural barrier or impediment to proceeding in such a fashion. However, we believe that as a matter of policy, the Commission should direct the staff to ensure that the Part 52 process remains sufficiently flexible to support the needs of the competitive market while in no aspect diminishing the NRC's primary responsibility of protecting public health and safety.

# EARLY SITE PERMITTING PROJECT

Eugene S. Grecheck

Vice President - Nuclear  
Support Services



July 19, 2001

# ESP PROJECT

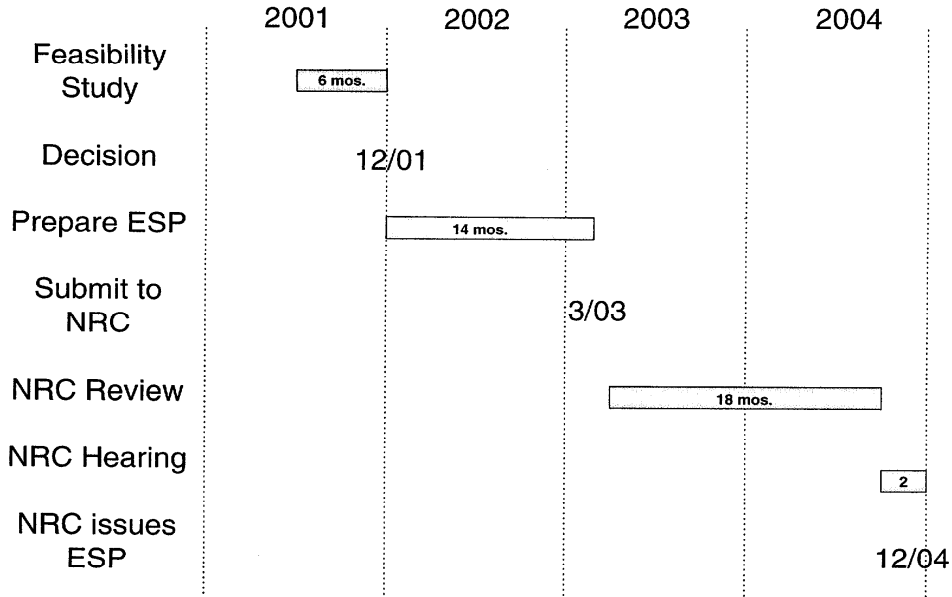
- Launched June 1, 2001
- Validate the Part 52 licensing process
- Evaluate available reactor technologies



# APPROACH

- Feasibility study
- Management decision
- Prepare ESP application
- Submit ESP application

# ESP TIMELINE



# POLICY ISSUE

- Part 52 rulemaking envisioned a specific sequence-- DC and ESP completed first; then COL--but did not preclude alternatives
- To meet the needs of the new nuclear market, flexibility is required in the sequence and timing of the various Part 52 licensing processes
- The Commission should ensure that the staff designs sufficient flexibility into its licensing processes to accommodate DC, ESP, and/or COL applications that may proceed in parallel as well as in series



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**Commission Briefing on Readiness for  
New Plant Applications and  
Construction**

**Regis Matzie  
Sr. VP, Nuclear Systems  
Westinghouse Electric Company**

July 19, 2001

## Topics

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- Westinghouse New Plant Designs and Status
- AP1000 Design Certification Approach
- Status of AP1000 Pre-certification Review
- IRIS Design Status & Plans
- Other Westinghouse New Plant Activities
- Summary

## Westinghouse New Plant Designs & Status

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- System 80+
  - Design Certification issued in 1997
- AP600
  - Design Certification issued in 1999
- AP1000
  - Pre-certification review - ongoing
  - Submit Design Certification Application - April 2002
    - Pending successful resolution of pre-certification review in 2001
  - Design Certification Target - January 2005
- IRIS
  - NRC pre-certification review and interaction on testing starting in 2002



## AP1000 Design Certification Approach

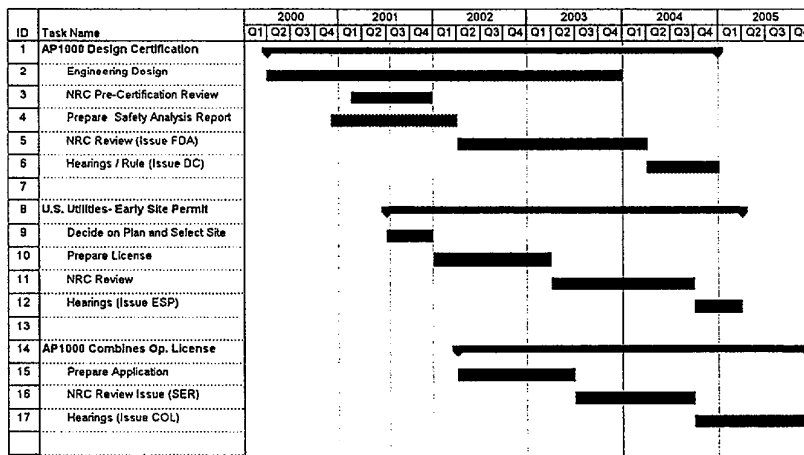
- Leverage AP600 Design and License
  - Minimize design changes (80% of AP600 DCD not impacted)
- Obtain early NRC agreement on a plan to avoid high cost activities during Design Certification review
  - Testing
  - Safety code development
  - Costly detailed engineering activities
- Jointly develop plan and cost estimate for AP1000 Design Certification
  - Target DC submittal: April 2002
  - Target DC issued: January 2005
  - Target NRC Fees: <6 MUSD



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## AP1000 Licensing Plan Can Result in Design Certification by 2005



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## **Status of AP1000 Pre-Certification Review**

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- Agreement achieved on scope and process of pre-certification review
- Westinghouse submittals complete
  - AP1000 Plant Description and Analysis Report - 12/12/2000
  - AP1000 Seismic and Structural Design Report - 2/2/2001
  - AP1000 PIRT and Scaling Assessment Report - 2/6/2001
  - AP1000 Code Applicability Report - 5/4/2001
- Staff pre-certification acceptance review completion commitment - 7/31/2001
- Several meetings held with NRC staff and ACRS
  - RAIs received and responses are being prepared



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## **IRIS Design Status & Plans**

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- Conceptual design complete, preliminary design in progress
- NRC staff introduced on May 1, 2001, and ACRS on June 1, 2001
- Licensing plan under development
- Test planning involving NRC starting FY02
- Pre-application review starting in FY02
- SAR submittal target FY05
- Design Certification target FY08



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## Other Westinghouse New Plant Activities

- Active involvement in NEI New Plant Task Forces
- Lead DOE NERI Project on New Licensing Framework
- Support of PBMR US Licensing activities for BNFL and Exelon
- Support early site permit and combined operating license applications by power companies as requested

## Summary

- Administration and Congress depending on nuclear power to play significant role in nation's energy strategy
- NRC resource planning should include AP1000 Design Certification starting in April 2002
- Westinghouse supporting other new plant IRIS and PBMR activities
- NRC support is needed in preparation for new plant applications in terms of qualified staff resources, review priorities, and streamlined licensing processes

## ***New Nuclear Plants: General Electric Activities***

***July 19, 2001***

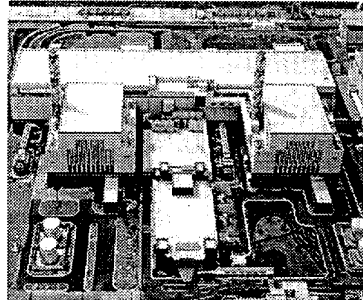
***John Redding***

***Manager, Marketing and Public Affairs***

***GE Nuclear Energy***

### ***Kashiwazaki ABWRs***

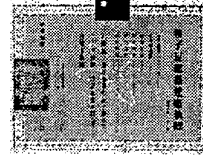
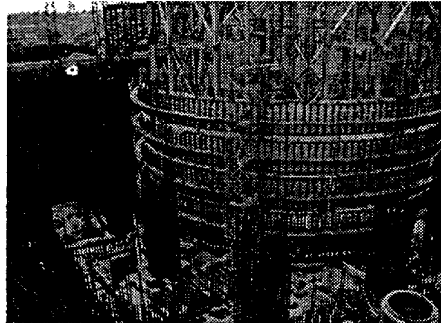
- ***Sixteenth and seventeenth nuclear units operated by TEPCO--all BWRs.***
- ***Both ABWRs in cycle 4.***
- ***One scram due to a lightning strike.***
- ***Occupational exposure: 20 mrem per year.***
- ***Radwaste: 60 drums/year.***
- ***12% increase in availability.***



***Kashiwazaki Units 6&7***

***All performance goals met or exceeded***

## Taiwan's Lungmen ABWR Project



Lungmen Construction Permit

Project over 30% complete

**These ABWRs are based upon USNRC certified design**

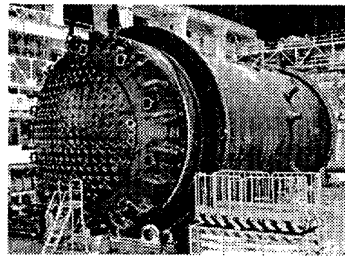
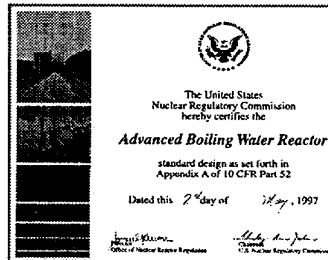


Photo 2 Fit up of Shell and Bottom Head

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## U.S. Activities

- **Successfully completed ABWR FOAKE program in Sept. 1996**
- **ABWR Design Certification received in May 1997**
- **International projects have kept our infrastructure intact.**
  - Design, licensing, equipment supply, construction and project delivery



ABWR Design Certification

**ABWR licensed and ready for U.S. project**

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## ***Prove the 1 Step Licensing Process***

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- ***GE supports the Early Site Permit (ESP) Programs***
  - *Demonstrate the ESP process*
  - *Budget sufficient resources for timely ESP approval*
  - *Minimize the need to duplicate valid existing site information*
  - *Delete requirement for assessment of alternative sites*
  - *Leverage the Certified Design's site envelope*

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## ***Prove the 1 Step Licensing Process***

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*(continued)*

- ***ITAAC***
  - *Early and continuing NRC findings that generic programs are acceptable*
  - *Ensure ITAAC review is consistent with the construction schedule*
  - *Support timely review of those ITAAC that are completed near the end of the construction schedule*
  - *Develop Industry, NRC and other Stakeholders agreement on process and formalize it*
  - *Minimize the need for additional independent verification of ITAAC*
  - *Provide sufficient budgeted resources for timely ITAAC review*

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## ***Prove the 1 Step Licensing Process***

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*(continued)*

- **COL**
  - *Develop Industry, NRC and other Stakeholders agreement on COL process and documentation*
  - *Reaffirm that the COL is not vulnerable to other legal intervention or delays*
  - *Maintain high threshold for challenges from public hearings*

**PERSPECTIVES ON  
NEW NUCLEAR PLANT  
LICENSING**

**Edwin S. Lyman  
Scientific Director  
Nuclear Control Institute**

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**A DILEMMA**

- **Without public subsidy, new nuclear plants will be built only if they can mimic the desirable economics of gas turbines:**
  - low capital cost
  - short construction time
  - modularity

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**A DILEMMA**

- **Can this be done safely? Or are these objectives incompatible with nuclear technology?**
- **NRC policy decisions will play a decisive role in determining the economic viability of new plants -- a difficult situation for NRC**

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## **REGULATORY CHALLENGES**

- **NRC must ensure that these economic imperatives do not adversely affect**
  - **Safety**
  - **Risk of radiological sabotage**
  - **Waste management**
  - **Non-proliferation**
  - **Full public participation**

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## **EXAMPLE: PBMR**

- **PBMR characteristics fundamental to its economic viability deviate from traditional "defense-in-depth"**
  - **Lack of pressure containment**
  - **Significant reduction in number of safety-related SSCs**
  - **40-fold EPZ decrease (exploits GCR regulatory exemption)**

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## **PBMR FUEL PERFORMANCE**

- **Accident source terms must be accurately determined**
  - **Pebble performance very sensitive to initial conditions**
  - **Robustness of PBMR fuel is being oversold -- significant fission product release can occur well below fuel degradation temperature**

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**SABOTAGE: AN EVER-  
PRESENT RISK**

- **No reactor design can be rendered “inherently safe” from radiological sabotage**
  - **Deliberate graphite fire in PBMR**

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**SABOTAGE**

- **Features like absence of leak-tight containment, reduced EPZ, reduced safety system redundancy, reduced staffing levels must be evaluated in this context**

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**SABOTAGE**

- **Sabotage resistance should be incorporated into advanced plant design (per 1988 ACRS recommendation)**
- **Target set analysis for new reactor designs should be high-priority activity for NRC**

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## **PBMR WASTE DISPOSAL**

- **Spent pebbles create a huge waste problem: per MWD, compared to spent LWR fuel:**
  - **Volume and weight are about 10 times greater --- proportionate increase in storage and transport needs**
  - **Applicability of Waste Confidence Rule is unclear**

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## **PRICE-ANDERSON: AN UNFAIR ADVANTAGE**

- **Industry does not have a strong case for limited liability, especially for plants it claims are "meltdown-proof"**
- **NRC should not support a 15-fold retroactive assessment reduction for 100 MWe modular reactors -- assessments are at least 10 times too low already!**

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## **PUBLIC CONFIDENCE**

- **Public confidence may be enhanced by "gold-plating" plants -- inconsistent with eliminating containment, etc**
- **Part 52 (COL) and proposed elimination of formal hearing requirements for reactor licensing proceedings do not engender public confidence**

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**TIME: THE MOST IMPORTANT RESOURCE**

- **NRC must resist the false sense of urgency for expedited new plant licensing being fostered by**
  - **White House "energy crisis"**
  - **Short attention span of deregulated utilities**

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**TIME**

- **Aggressive licensing schedule for PBMR (20-month construction period, 2007 startup) is inappropriate for an immature technology**
- **"License by test" is just a PR exercise**

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**TIME**

- **Severe accident fuel testing at maximum burnup should be required -- will take time**
- **NRC should proceed more cautiously and ensure full resolution of all technical concerns is achieved**

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