COMMISSION BRIEFING SLIDES/EXHIBITS

PERIODIC BRIEFING ON NEW REATOR ISSUES

OCTOBER 22, 2008

U.S.NRC

United States Nuclear Regulatory Commission

Protecting People and the Environment

PERIODIC BRIEFING ON NEW REACTOR ISSUES

Bill Borchardt

Executive Director for Operations

October 22, 2008

Agenda

- **Summary of Recent New Reactor Activities**
- **New Reactor Construction Inspection Program**

Overview of New Reactor Accomplishments and Status

Michael R. Johnson, Director
Office of New Reactors

Accomplishments

- Acceptance reviews
- Final Environmental Impact Statement for Vogtle Early Site Permit
- Next Generation Nuclear Plant Licensing Strategy Document

Accomplishments (continued)

- Memorandum of Understanding with the Army Corps of Engineers
- Final Rule on consideration of aircraft impacts
- Committed and obligated over $75 million worth of contracts

Status of Reviews

- 3 Design Certifications and 1 amendment under review
- 1 Early Site Permit /Limited Work Authorization application under review
- 17 Combined License applications under review

New Reactor Construction Inspection Program

Glenn M. Tracy, Director
Division of Construction Inspection and Operational Programs

Overview

- Substantial progress in program development since last year
- Industry is moving towards construction
- The Construction Inspection Program will be ready to support the oversight of new plant construction

Stakeholder Engagement

- All program development activities proceeding with open and collaborative stakeholder communications
- Continuing and expanding interface with international colleagues to share experience and improve programs

Inspection Readiness

Robert Lukes, Team Leader

Inspection Program Team

Construction Inspection and Allegations Branch

Inspection Procedures

- **Inspection procedures will be in place to meet the challenge**

- **We are moving from developing to refining in many areas**

New Reactor Inspection Program IT Infrastructure

- Established an Information Technology Working Group
- Inspection scheduling
- Inspection reporting methodology

Inspection Program

- Construction site inspections will be led by Region II
- NRC estimates 35,000 inspection hours
- Based on inspection of ITAAC and non-ITAAC

ITAAC Implementation

Richard Laura, Team Leader

Construction Oversight Team

Construction Inspection and Allegations Branch

Overview

- ITAAC Quality
- ITAAC Inspection
- ITAAC Closure
- NRC Closure Verification
- Commission Finding
- Construction Experience (ConE)

ITAAC Quality

- **Issued a generic communication on ITAAC lessons learned**

- **Reviewing DCDs and COLs to verify ITAAC are clearly written and maximize inspection effectiveness**

ITAAC Inspection

- Developed generic NRC inspection schedules for ITAAC
- Developed list of ITAAC requiring NRO engineering support
- Targeted ITAAC lists made publicly available

ITAAC Closure

- **ITAAC Closure Notifications**

- **ITAAC Closure Guidance on sufficient information and format**

NRC Closure Verification Process

- Developed a flow process for review of the incoming closure letters
- Includes review of the inspection record, technical and OGC reviews, and issuing a Federal Register notice

Commission Finding

- **Maintenance of closed ITAAC until the Commission finding**
- **The acceptance criteria for all ITAAC must be met**

Construction Experience (ConE)

- **NRO is systematically reviewing international ConE**

- **International exchange of construction inspectors**

Assessment & Enforcement

Robert Pascarelli, Team Leader

Assessment, Enforcement, & Allegations Team

Construction Inspection and Allegations Branch

Program Development

- Lessons learned
- Programmatic relationships
- Types of findings

Construction Assessment

- **Construction Response Table**

- **Findings and Construction Safety Focus Issues are Inputs**

Traditional Enforcement Process

- NRC Enforcement Policy applies to NRC regulated construction activities
- Notices of Violation issued for inspection findings

Region II Center for Construction Inspection

Luis Reyes
Regional Administrator
Region II

Center for Construction Inspection

- Staffing
- Resident Offices
- Planning and scheduling
- Resource planning uncertainties

Summary

- **Significant program development accomplishments**
- **Effective coordination with international colleagues and industry**
- **Broad participation and insightful contributions from stakeholders**

Next Steps

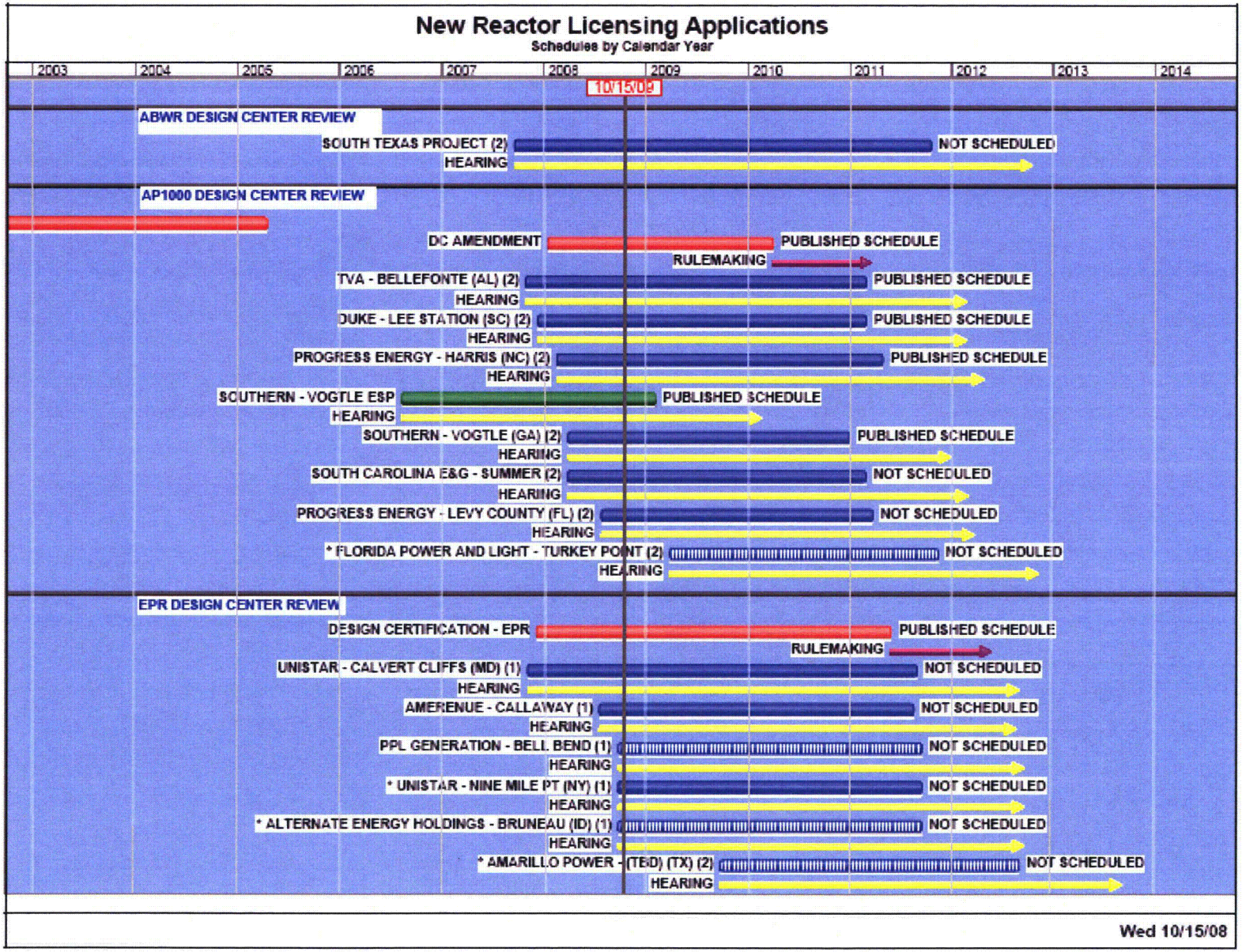
- Areas of focus:
  - Engineering design verification inspections
  - Role of safety culture in inspection program
  - ITAAC inspection at module vendors
  - Transition to ROP

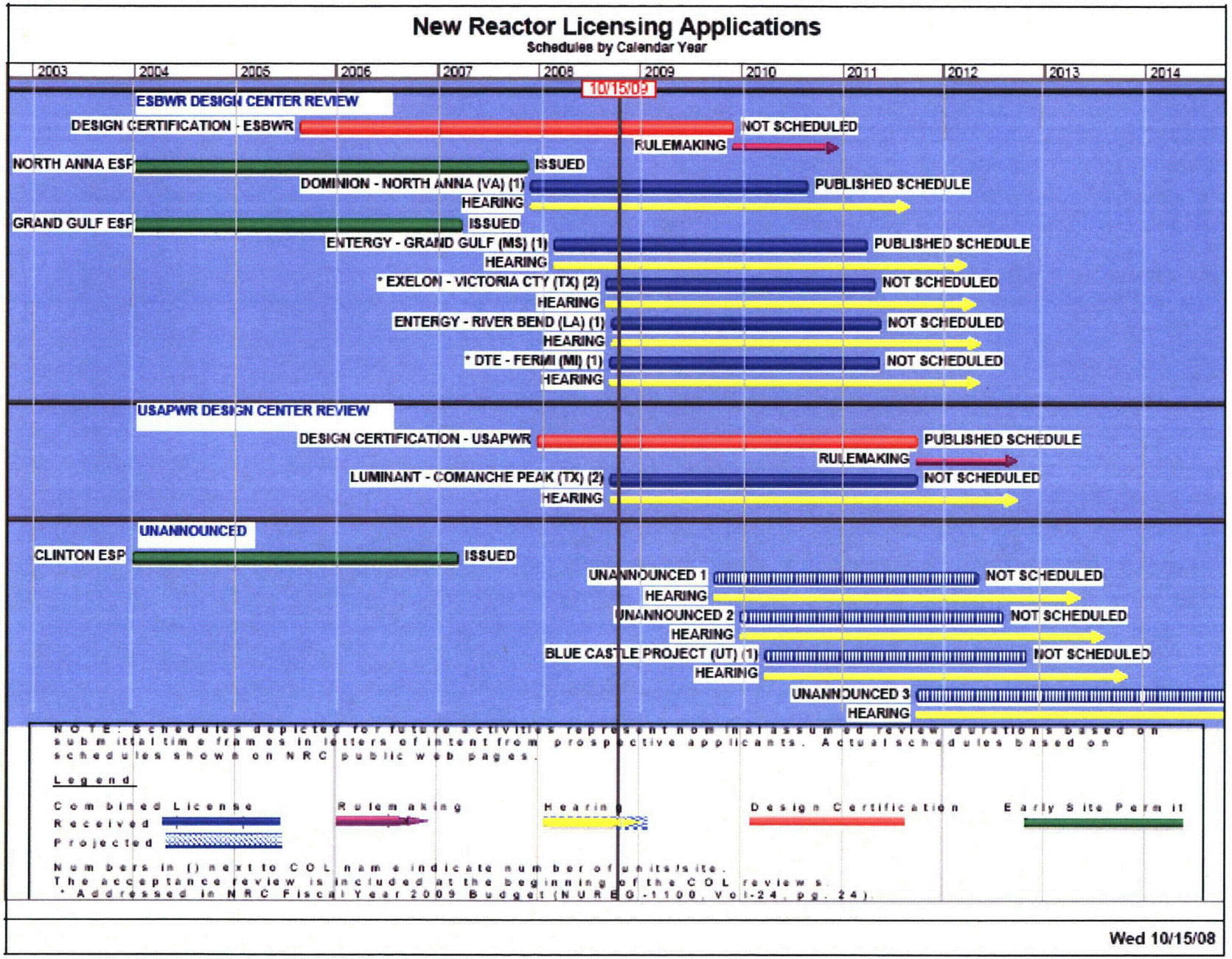
Acronyms

- COL – Combined License
- DCD – Design Control Document
- IT – Information Technology
- ITAAC – Inspections, Tests, Analyses, and Acceptance Criteria
- NRO – Office of New Reactors
- OGC – Office of General Counsel
- ROP – Reactor Oversight Process

Background Slides

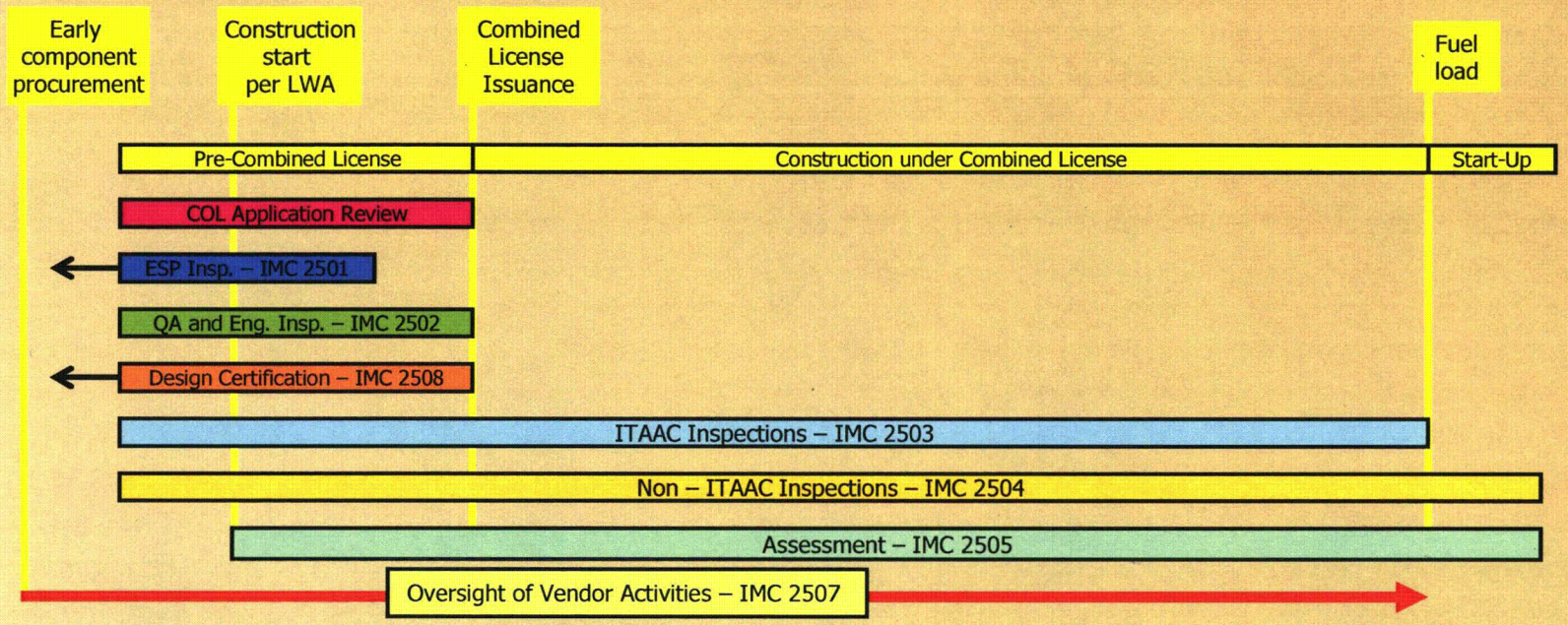
1. New Reactor Licensing Applications (2 slides)
2. NRC Construction Oversight
3. Implementation Under 10 CFR 52.99 and 10 CFR 52.103(g)
4. Construction Findings Flowchart


New Reactor Licensing Applications
Schedules by Calendar Year
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
10/15/08
ABWR DESIGN CENTER REVIEW
SOUTH TEXAS PROJECT (2)
NOT SCHEDULED
HEARING
AP1000 DESIGN CENTER REVIEW
DC AMENDMENT
PUBLISHED SCHEDULE
RULEMAKING
TVA - BELLEFONTE (AL) (2)
PUBLISHED SCHEDULE
HEARING
DUKE - LEE STATION (SC) (2)
PUBLISHED SCHEDULE
HEARING
PROGRESS ENERGY - HARRIS (NC) (2)
PUBLISHED SCHEDULE
HEARING
SOUTHERN - VOGTLE ESP
PUBLISHED SCHEDULE
HEARING
SOUTHERN - VOGTLE (GA) (2)
PUBLISHED SCHEDULE
HEARING
SOUTH CAROLINA E&G - SUMMER (2)
NOT SCHEDULED
HEARING
PROGRESS ENERGY - LEVY COUNTY (FL) (2)
NOT SCHEDULED
HEARING
* FLORIDA POWER AND LIGHT - TURKEY POINT (2)
NOT SCHEDULED
HEARING
EPR DESIGN CENTER REVIEW
DESIGN CERTIFICATION - EPR
PUBLISHED SCHEDULE
RULEMAKING
UNISTAR - CALVERT CLIFFS (MD) (1)
NOT SCHEDULED
HEARING
AMERENUE - CALLAWAY (1)
NOT SCHEDULED
HEARING
PPL GENERATION - BELL BEND (1)
NOT SCHEDULED
HEARING
* UNISTAR - NINE MILE PT (NY) (1)
NOT SCHEDULED
HEARING
* ALTERNATE ENERGY HOLDINGS - BRUNEAU (ID) (1)
NOT SCHEDULED
HEARING
* AMARILLO POWER - (TBD) (TX) (2)
NOT SCHEDULED
HEARING
Wed 10/15/08


New Reactor Licensing Applications
Schedules by Calendar Year
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
10/15/08
ESBWR DESIGN CENTER REVIEW
DESIGN CERTIFICATION - ESBWR
NOT SCHEDULED
RULEMAKING
NORTH ANNA ESP
ISSUED
DOMINION - NORTH ANNA (VA) (1)
PUBLISHED SCHEDULE
HEARING
GRAND GULF ESP
ISSUED
ENTERGY - GRAND GULF (MS) (1)
PUBLISHED SCHEDULE
HEARING
* EXELON - VICTORIA CTY (TX) (2)
NOT SCHEDULED
HEARING
ENTERGY - RIVER BEND (LA) (1)
NOT SCHEDULED
HEARING
* DTE - FERMI (MI) (1)
NOT SCHEDULED
HEARING
USAPWR DESIGN CENTER REVIEW
DESIGN CERTIFICATION - USAPWR
PUBLISHED SCHEDULE
RULEMAKING
LUMINANT - COMANCHE PEAK (TX) (2)
NOT SCHEDULED
HEARING
UNANNOUNCED
CLINTON ESP
ISSUED
UNANNOUNCED 1
NOT SCHEDULED
HEARING
UNANNOUNCED 2
NOT SCHEDULED
HEARING
BLUE CASTLE PROJECT (UT) (1)
NOT SCHEDULED
HEARING
UNANNOUNCED 3
HEARING
NOTE: Schedules depicted for future activities represent nominal assumed review durations based on submittal time frames in letters of intent from prospective applicants. Actual schedules based on schedules shown on NRC public web pages.
Legend
Combined License
Received
Projected
Rulemaking
Hearing
Design Certification
Early Site Permit
Numbers in () next to COL name indicate number of units/site.
The acceptance review is included at the beginning of the COL reviews.
* Addressed in NRC Fiscal Year 2009 Budget (NUREG-1100, Vol-24, pg. 24).
Wed 10/15/08

NRC CONSTRUCTION OVERSIGHT HAS MULTIPLE COMPONENTS

Oversight will assure plants are constructed as designed.



Abbreviations

ESP – Early Site Permit
IMC – Inspection Manual Chapter
ITAAC – Inspections, Tests, Analyses, and Acceptance Criteria
LWA – Limited Work Authorization

IMC 2501

-ESP QA controls on integrity & reliability of data collected for site characterization.
-ESP controls for application preparation

IMC 2502

-QA for design, procurement, & construction
-Translation of certified design into design details
-COL controls for application preparation

IMC 2503

Verification of successful performance of ITAAC-related activities

IMC 2504

-QA for construction & operations
-Problem identification, reporting, & corrective action
-Work planning/control over work & contractors
-Translation of certified design into design details
-Design change process
-Pre-operational & startup testing
-Operational programs & operational readiness

IMC 2505

-Guides inspection planning

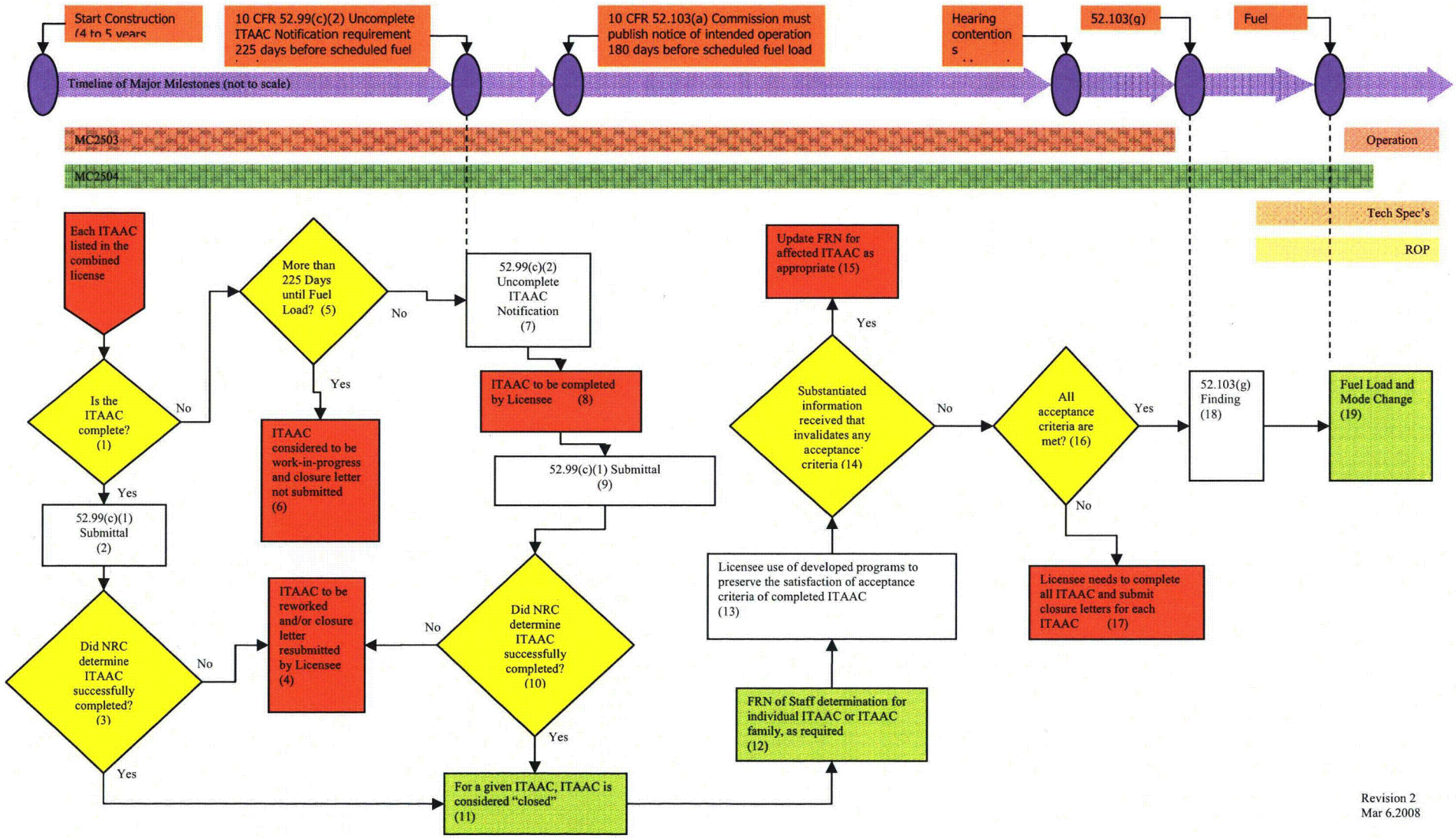
IMC 2507

- Verification of QA program implementation, compliance, reporting and corrective action

IMC 2508

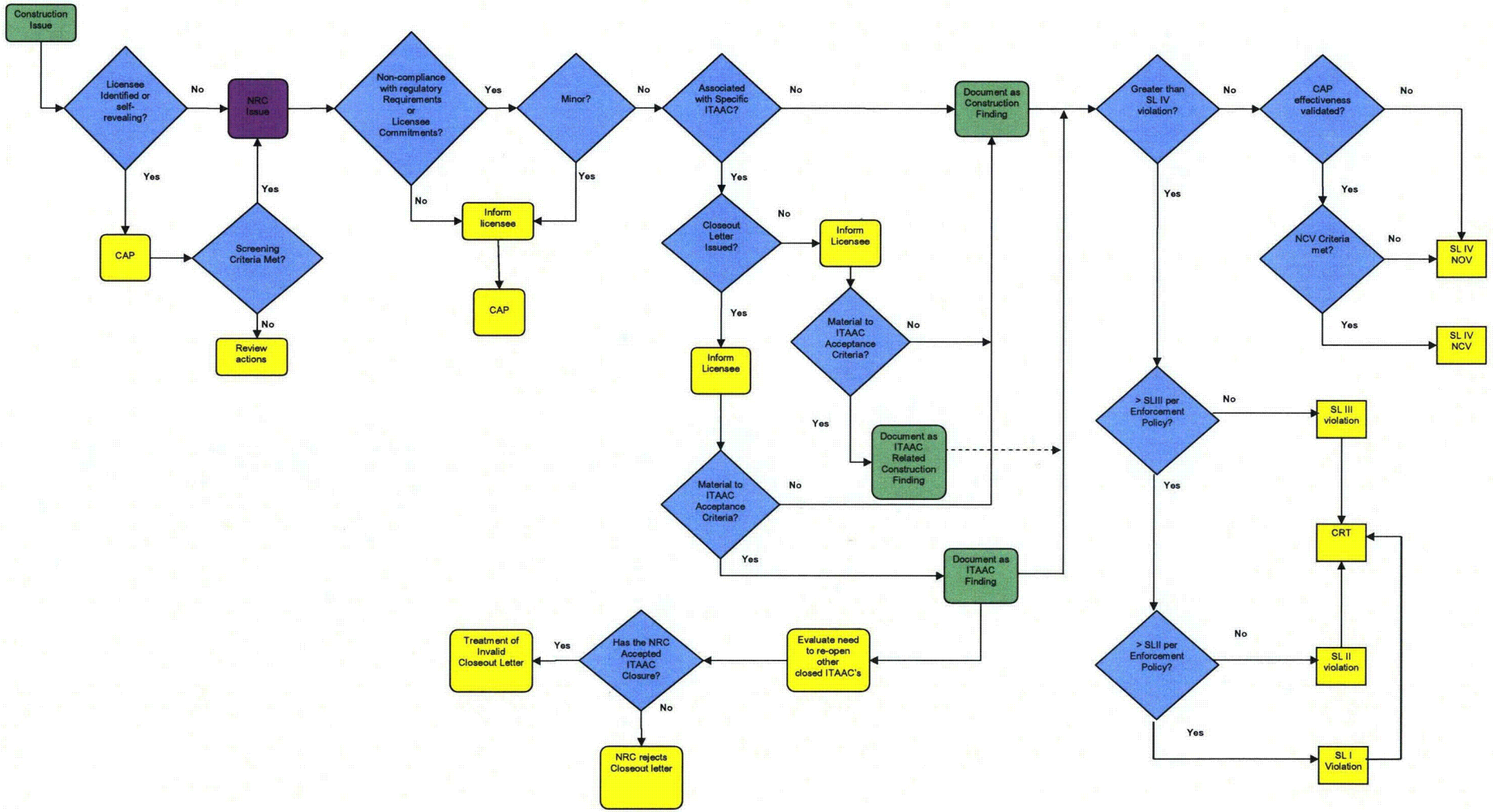
- Verification of QA program implementation for the preparation of a Certified Design.

Flowchart and Description of Implementation Under 10 CFR 52.99 and 10 CFR 52.103(g)



Revision 2
Mar 6.2008

Construction Findings Flowchart



REMARKS

Joseph Hunt

General President

International Association of Bridge, Structural
Ornamental and Reinforcing Ironworkers

Industry Readiness for New Nuclear Reactor Construction

Nuclear Regulatory Commission
Rockville, Maryland
October 22, 2008

Thank you, Chairman Klein and members of the Commission for inviting here for this most important discussion.

I come before you today, not just as the General President of the Ironworkers Union, but as a representative of the Building and Construction Trades Department, AFL-CIO.

The Building Trades Department is an alliance of 13 national and international unions which collectively represent 2.5 million skilled craft workers in the United States and Canada.

And in addition to the 13 unions officially affiliated with the Building Trades Department, we maintain corresponding relationships with the International Union of Operating Engineers and the United Brotherhood of Carpenters.

Suffice it to say, the men and women comprise America's Building Trades Unions are the safest, most highly trained and productive workforce known to mankind.

And that is a point worth noting as we come together here today to discuss whether or not the U.S. construction industry is ready to meet the challenges association with the construction of a new generation of nuclear power reactors.

From our perspective...I can give you a confident answer in the affirmative.

For we recognize that in the upcoming environment whereby Construction Operating Licenses will be issues, it will be part of the Nuclear Regulatory Commission's statutory responsibility to ensure and regulate a safe and healthy environment surrounding both the construction and the operation of these facilities.

We fully recognize that public confidence and credibility is critical in this regard...

And we are fully prepared to meet this challenge in a myriad of ways.

First, we operate the finest, and most comprehensive, training programs for skilled craftspeople at over one thousand facilities across this nation.

Collectively, our unions spend over $750 million on this training.

And rest assured, safety and health is a primary component in this training infrastructure.

In fact, quality and safety are paramount in our culture.

[PAUSE]

But, in order to successfully meet the challenges associated with the construction of an entirely new generation of nuclear power facilities in this country, we have to deal with the realities associated with current and future workforce projections.

Put simply, the current supply of skilled crafts people is insufficient to meet projected demands.

At the core of this problem are a few root causes:

The first is **Demographics**.

Our current skilled workforce is aging and nearing retirement age.

Another root cause is **Economics.**

The North American construction industry has failed miserably to maintain levels of compensation that are necessary to attract the "best and the brightest."

Lastly, we continue to witness a high proportion of the so-called "open shop" sector lagging behind the organized sector of our industry when it comes to making the necessary investments in sustained skilled workforce development and training.

In contrarian fashion, many open-shop contractors are pursuing a misguided strategy predicated upon building a cheap, low-wage, and exploitable workforce comprised of significant numbers of untrained, and in many cases undocumented, workers.

As you can imagine, the results of this strategy are predictable.

Unreliable, low-quality work fraught with safety and productivity issues.

Much of our industry's short-term vision competes with its long-term needs.

Now, due to the current economic troubles that our nation is currently experiencing, the demand for skilled craft labor may actually fall...as the needed capital for certain heavy and industrial projects becomes scarce.

However, should the economy rebounds in a significant fashion over the next 18-24 months, we could easily return to a "perfect storm" scenario of high demand and low supply in the skilled construction labor market.

For the nuclear industry, that will be especially troubling.

13 of the 19 "First Movers" – those plants that will most likely move into construction phase first – are located in the Southeast or South central states.

Those are precisely the regions where labor shortages are expected to be the most challenging.

So, indulge me for a moment while I do a little math.

Each new reactor facility will require roughly 4,000 skilled crafts people at peak construction.

Let's be conservative and say that only half of the 19 "First Movers" – 9 or 10 of them – actually break ground.

Then, conservatively, the peak craft demand would be in the neighborhood of 36,000 to 40,000 workers.

If the craft ramp-up begins in 2010 – with Calvert Cliffs being the first – the projected overall peak would be sometime between 2012 and 2015.

And we need always to keep in mind that most of these planned facilities are to be located in remote, small-town and rural areas...

Where craft labor supply is smallest...

And where the challenge of providing the necessary skilled craft manpower will be the greatest.

So, what are America's Building Trades Unions prepared to do to meet these challenges?

First, you should know that we have performed a "critical needs analysis" focusing upon the construction of a 21st century nuclear power generation facility.

And we are engaged in on-going discussions with nuclear industry leaders...including utilities and contractors.

As a result of these discussions, the Building and Construction Trades Department is now developing the framework for a ground-breaking "Nuclear Power Construction Labor Agreement."

This framework is an unparalleled, no-nonsense approach that recognizes and makes a commitment to the national importance of nuclear power.

It is designed to address the many unique challenges of nuclear power construction...

And it is based upon a regional framework, rather than a single-site approach.

Perhaps most importantly, it is structured to maximize efficiencies and contain costs.

Specifically, the framework of this agreement will be designed to:

- Address shortages in one craft with available workers from another craft

- Allow 100% portability for outage work for the same owner, so that workers can be used in a manner the owner deems to be most effective. And if the same owner starts another project in the same region, the agreement would permit the contractor to transfer up to 20% of the workforce to "jump start" the new project.

- Mandate the use of apprentices and other sub-journeymen workers to contain unit costs and to encourage efficient crew composition.

- Establish on-site...or near-site...multi-craft training facilities in order to ensure a steady supply of qualified workers; to provide specialized training for journeymen and apprentices; and to provide a location for vendors to train and certify workers on the installation of specialized equipment.

- Provide a commitment to train nuclear plant operations and management personnel for a utility by integrating them into the construction phase and rotating them throughout the various

craft disciplines. This would provide a more well-rounded employee who understands in greater detail the workings of the entire facility.

- Mandate OSHA-10 safety certification for every employee as a condition of employment.

Finally, each project will be staffed with individual craft stewards who will be trained and certified in their union's "Code of Excellence" or "Accountability" program, and will be given complete authority to demand compliance with these programs.

Overall, we believe this agreement is a revolutionary concept that is already being met with rave reviews from industry leaders.

[PAUSE]

A lot has changed in the 30 years since our nation last built a nuclear power facility.

I truly hope, after my presence here today, that the Commission realizes that America's Building Trades Unions have changed as well.

What hasn't changed is our desire to be full partners in this crucial American endeavor.

Again, I would like to thank the Commission for giving me this opportunity to present these views.

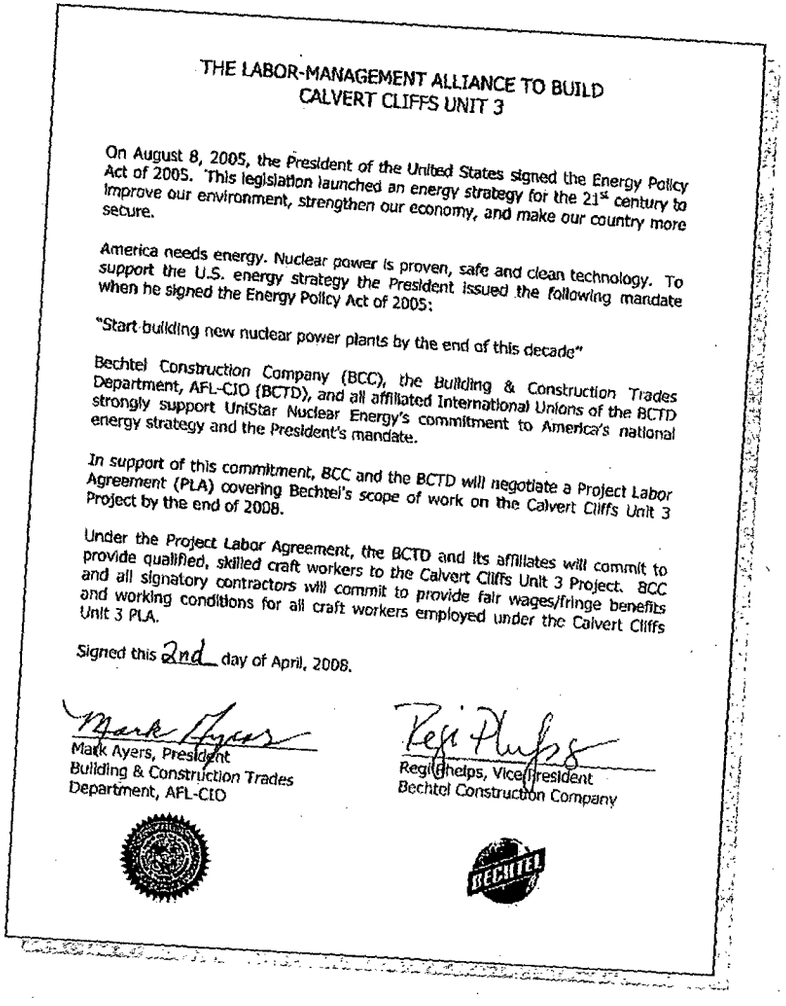
I would welcome any questions you may have.

Preparing for New Reactor Construction

October 22, 2008
Brian P. Reilly
Principal VP, Manager of Nuclear Operations
Bechtel Power Corporation

Preparing for New Reactor Construction

- **MOU for labor agreement - Calvert Cliffs Unit #3**
  - Front-end planning
  - Aligned expectations
- **Comprehensive overview with labor**
  - Plant Overview
  - Engineering/Construction process review
  - Facility walkdown of Flamanville Plant



THE LABOR-MANAGEMENT ALLIANCE TO BUILD
CALVERT CLIFFS UNIT 3

On August 8, 2005, the President of the United States signed the Energy Policy Act of 2005. This legislation launched an energy strategy for the 21st century to improve our environment, strengthen our economy, and make our country more secure.

America needs energy. Nuclear power is proven, safe and clean technology. To support the U.S. energy strategy the President issued the following mandate when he signed the Energy Policy Act of 2005:

"Start building new nuclear power plants by the end of this decade"

Bechtel Construction Company (BCC), the Building & Construction Trades Department, AFL-CIO (BCTD), and all affiliated International Unions of the BCTD strongly support UniStar Nuclear Energy's commitment to America's national energy strategy and the President's mandate.

In support of this commitment, BCC and the BCTD will negotiate a Project Labor Agreement (PLA) covering Bechtel's scope of work on the Calvert Cliffs Unit 3 Project by the end of 2008.

Under the Project Labor Agreement, the BCTD and its affiliates will commit to provide qualified, skilled craft workers to the Calvert Cliffs Unit 3 Project. BCC and all signatory contractors will commit to provide fair wages/fringe benefits and working conditions for all craft workers employed under the Calvert Cliffs Unit 3 PLA.

Signed this 2nd day of April, 2008.

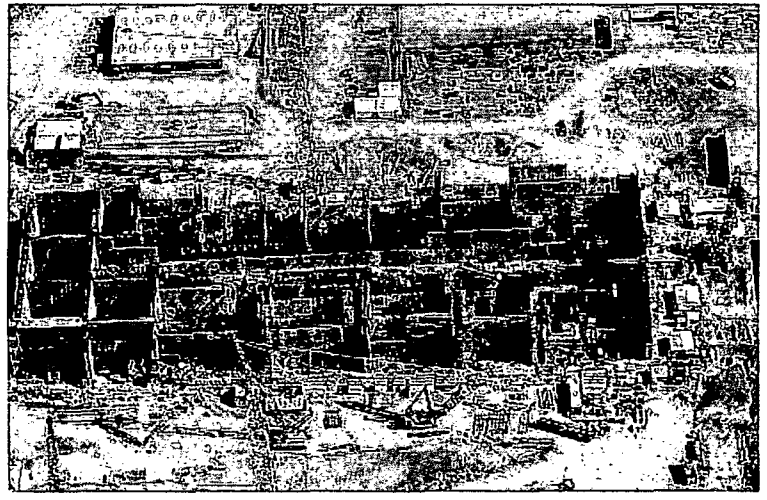
Mark Ayers, President
Building & Construction Trades Department, AFL-CIO

Regi Phelps, Vice President
Bechtel Construction Company

Preparing for New Reactor Construction

Waste Treatment Plant

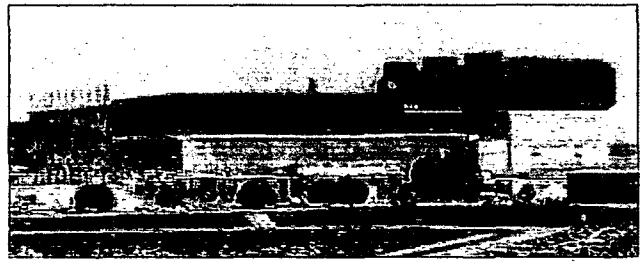
- Scope of work: Lead contractor for design, construction, and commissioning of largest radioactive waste treatment plant in the world
- Employees: 4,300 peak staffing
- Major Challenge: Sourcing of safety-related material and equipment.



Preparing for New Reactor Construction

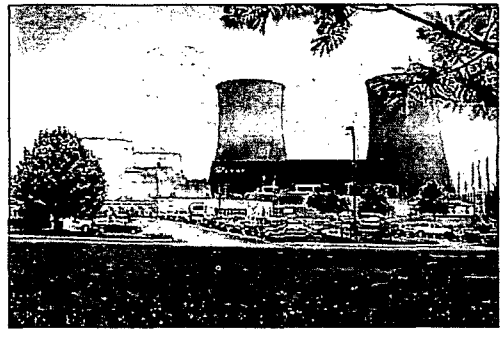
Browns Ferry Unit 1 Restart

- Scope of work: Engineering support for recovery & restart
  - Bechtel employees: 700 peak staffing

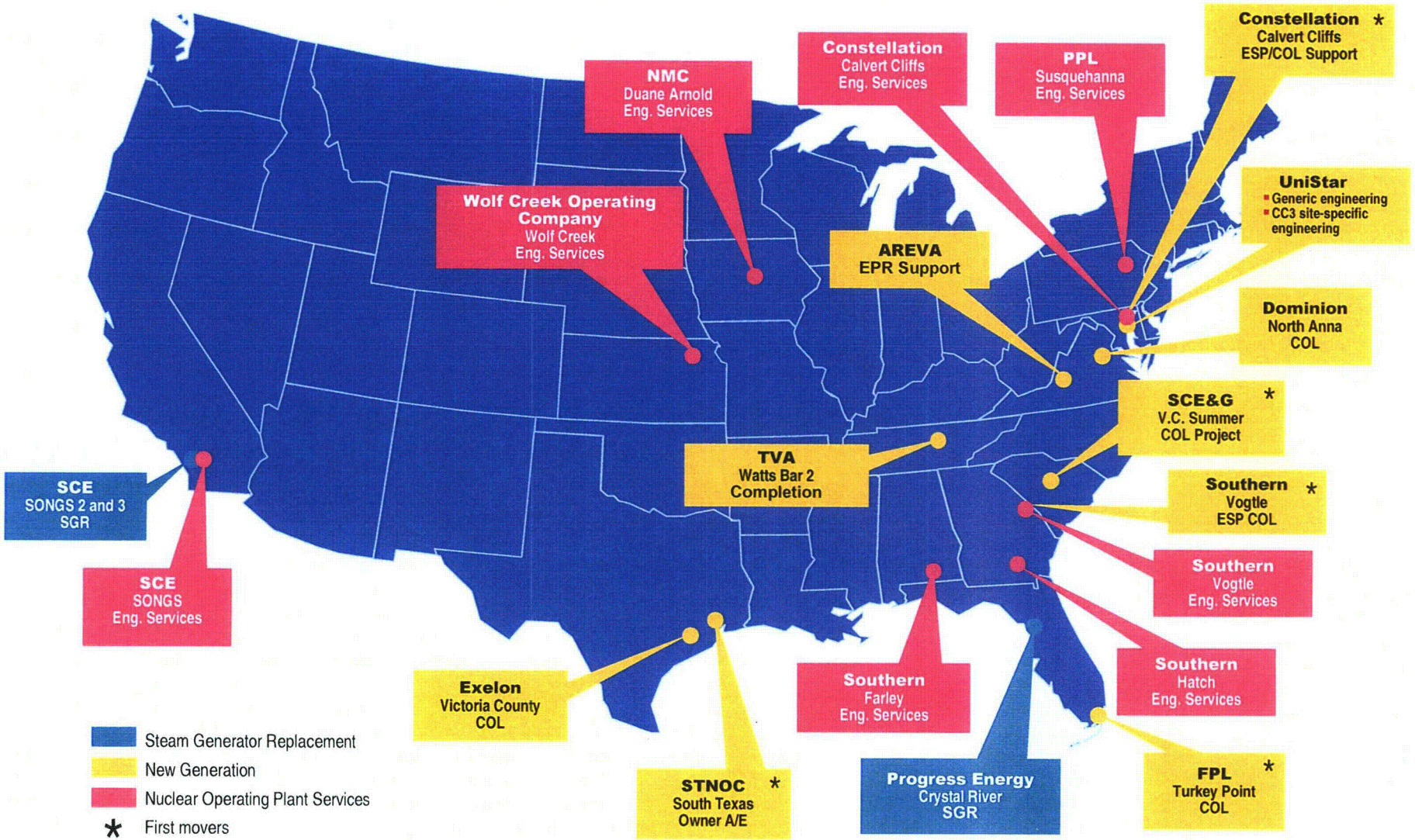


Watts Bar Unit 2 Completion

- Scope of work: Engineering, Procurement & Construction for plant completion
- Bechtel employees: 2300 peak staffing



Current Bechtel Nuclear Activities



NUCLEAR CONSTRUCTION ISSUES

October 22, 2008
Hal Thornberry
Vice President – Construction, Nuclear
Shaw Power Group

Shaw®

Shaw: Well-Positioned for Nuclear Renaissance

- **AP1000 Consortium**
  - **Shaw owns 20% of Westinghouse**
  - **Shaw is EPC contractor for domestic AP1000™ projects and EPCM contractor in China**
- **EPC Contracts**
  - **Shaw/Westinghouse consortium has the first EPC contracts awarded in 30 years to build new U.S. nuclear plants**

Shaw®

Shaw: Well-Positioned for Nuclear Renaissance (cont.)

- **Maintenance**
  - **Shaw provides maintenance at 42 of 104 operating U.S. nuclear plants**
- **Pipe Fabrication**
  - **Shaw supplies more than 50% of fabricated pipe in the United States**
  - **Shaw is largest U.S. supplier of nuclear-grade fabricated pipe**

Shaw®

Module Fabrication and Assembly Facility

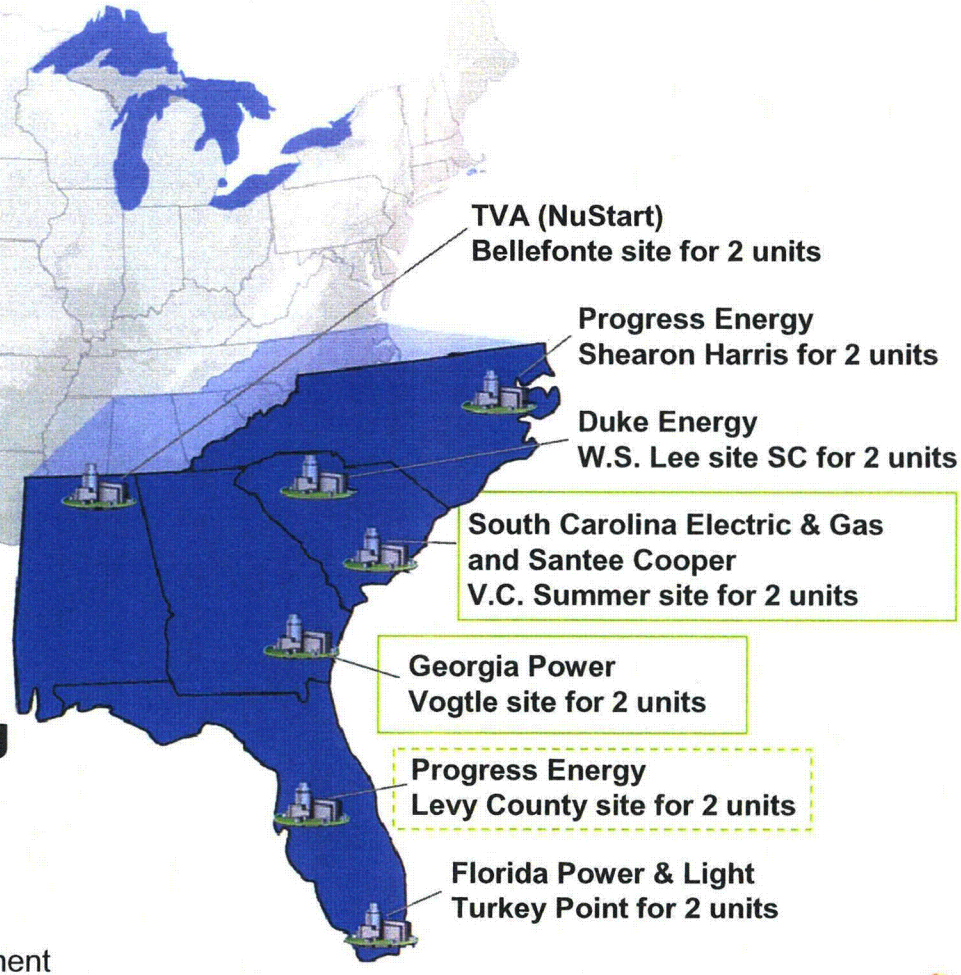
- 600,000 square-foot facility located in Lake Charles, Louisiana
- Joint venture with Westinghouse
- Will assemble structural, piping and equipment modules for new nuclear plants using AP1000™ technology
- Facility will employ 1,400 workers or more at full capacity

Shaw®

AP1000™ U.S. Projects/Prospects

Westinghouse/Shaw Consortium furnishes AP1000™ to domestic utilities:

- Conceptual design
- Integrated EPC team
- Detailed engineering
- Project management
- Construction management
- Site-specific engineering
- Startup and commissioning



= EPC Contract signed = Interim Agreement

Shaw®

Supply Chain Challenges

- Limited safety-related certified suppliers
- Competition for shop space with other infrastructure projects
- Need to validate that shop QA programs meet requirements

Shaw®

Supply Chain Challenges (cont.)

- Confirm suppliers have appropriate attention to document detail
- Re-evaluate progress to prevent fraudulent parts and components

Nuclear Construction Readiness

- Lessons learned from recent nuclear projects including MOX, LES, Browns Ferry 1, AP1000s and Olkiluoto 3
- Evaluation of INPO reports on industry lessons learned from last generation of nuclear construction

Shaw®

Nuclear Construction Readiness (cont.)

- Realignment of construction procedures with NRC programs, including ITAAC inspections
- Flow mapping of construction installation activities, turnover and documentation processes
- Implementation of construction readiness reviews in accordance with CII guidelines

Shaw®

New Construction Workforce Development

- Dedicated team focused on growing nuclear construction talent
- Establish initial resource profile by construction discipline and skills required
- Complete labor surveys to forecast discipline-specific needs

Shaw®

New Construction Workforce Development (cont.)

- Partner with outside organizations to attract skilled resources
- Work with NCCER to develop standardized craft training and certification programs

Shaw®

How the Commission Can Help

- NRC should allocate resources based on which applicants are closest to actual construction
- Module fabrication facilities are most similar to construction; should come under NRC construction inspection program
- NRC should continue to emphasize support of vocational/technical training programs

Shaw®

Table of Acronyms

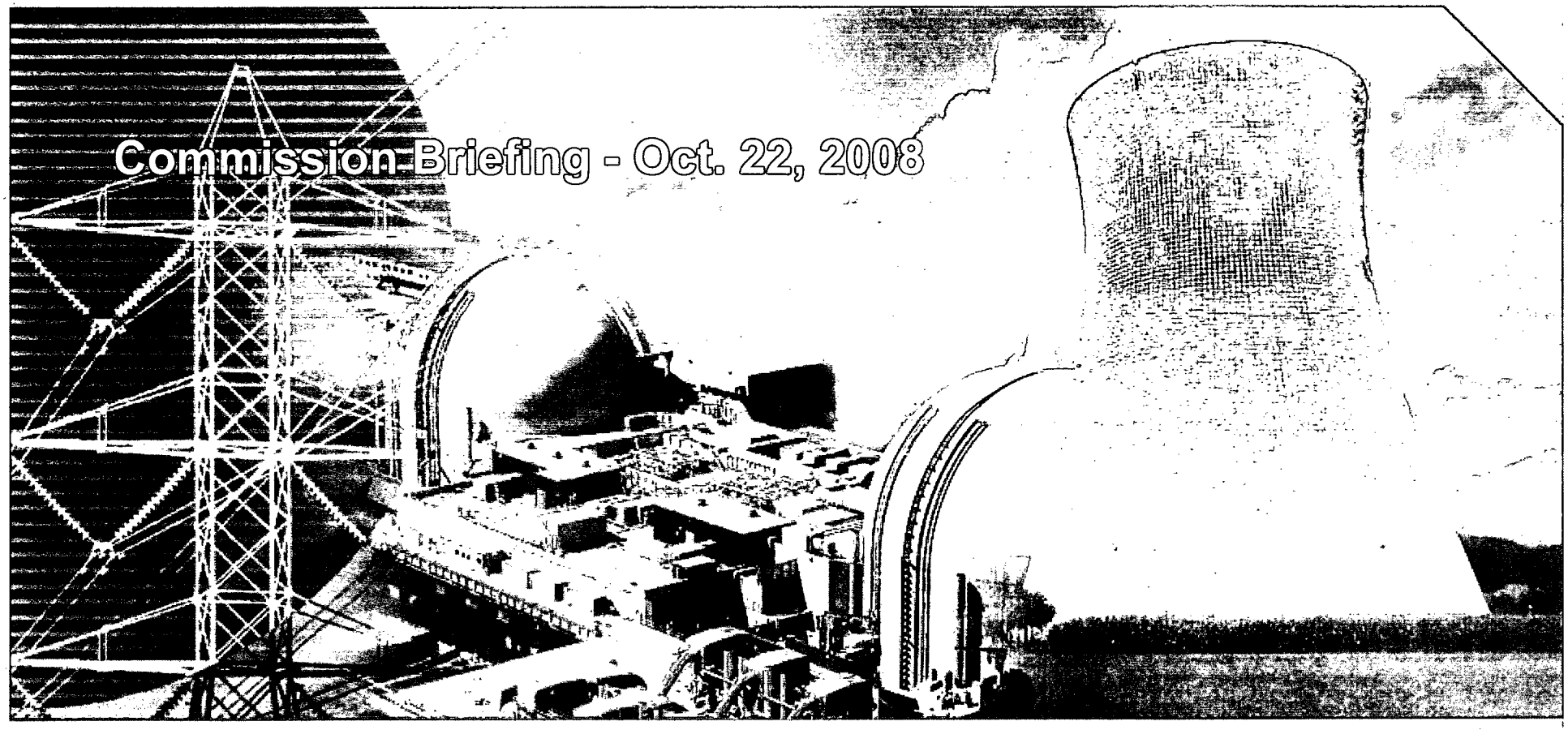
- AP1000™ – Advanced pressurized water reactor technology developed by Westinghouse
- CII – Construction Industry Institute
- EPC – Engineering, procurement and construction
- EPCM – Engineering, procurement and construction management
- INPO – Institute of Nuclear Power Operations

Shaw®

Table of Acronyms (cont.)

- ITAAC – Inspections, tests, analyses and acceptance criteria
- LES – Louisiana Enrichment Services
- MOX – Mixed-oxide nuclear fuel
- NCCER – National Center for Construction Education and Research
- QA – Quality assurance

Construction Readiness Update



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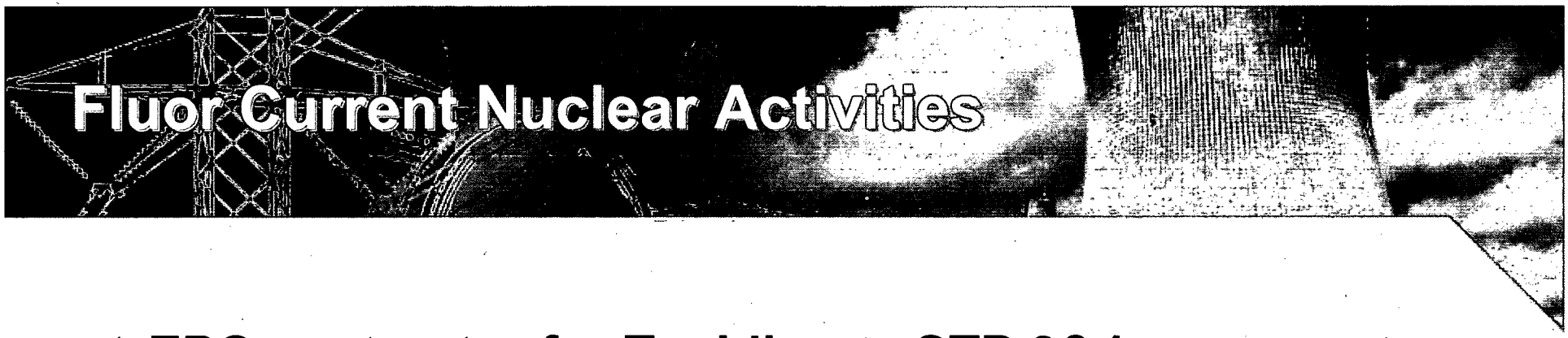

Fluor Current Nuclear Activities

- **EPC contractor for Toshiba on STP 3&4**
- **Duke Oconee Tornado Barrier Capital Project**
- **EPC contractor for USEC Uranium Enrichment Plant**
- **Savannah River Site M&O Contract**
  - Other DOE clean-up activities

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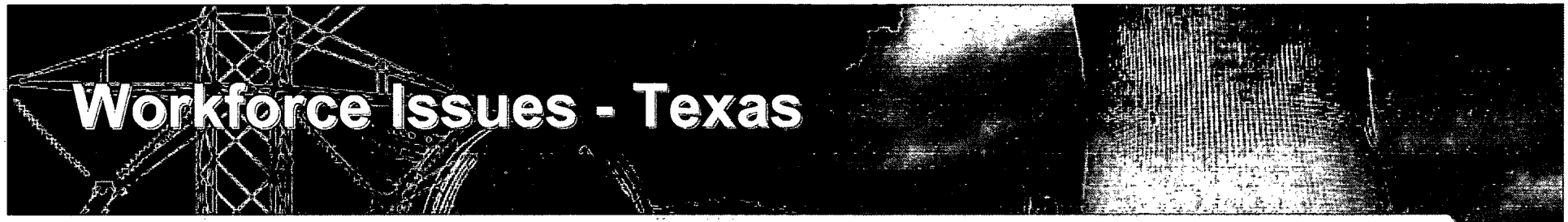

Workforce Issues - Texas

- **Labor challenges well understood:**
  - Significant shortage of skilled craft labor currently, and projected (over 30,000 construction workers needed)
    - Area undergoing a significant construction boom
    - Current plans for many owners were influenced by hurricane Ike (and its predecessors)
    - Houston area industrial construction market dominated by open shop craft
  - Main Craft Staffing Challenges:
    - Where we will get craft
    - How we will train them
    - How we will retain them

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Workforce Solutions

- **Present workforce solution plan for STP 3&4 is a combination of open shop and union construction**
- **Reducing on-site craft needs through modularization**
  - Many of today's reactor designs employ significant modularization
    - Including the Toshiba ABWR's we will install for STP 3&4
  - Fluor has been extensively using modularization for over 30 years and has done so on over 1,000 projects globally
- **Attracting, training, and retaining current and new craft workers**
  - We must attract, train and employ new craft now
    - OJT & continued development key for nuclear construction skills

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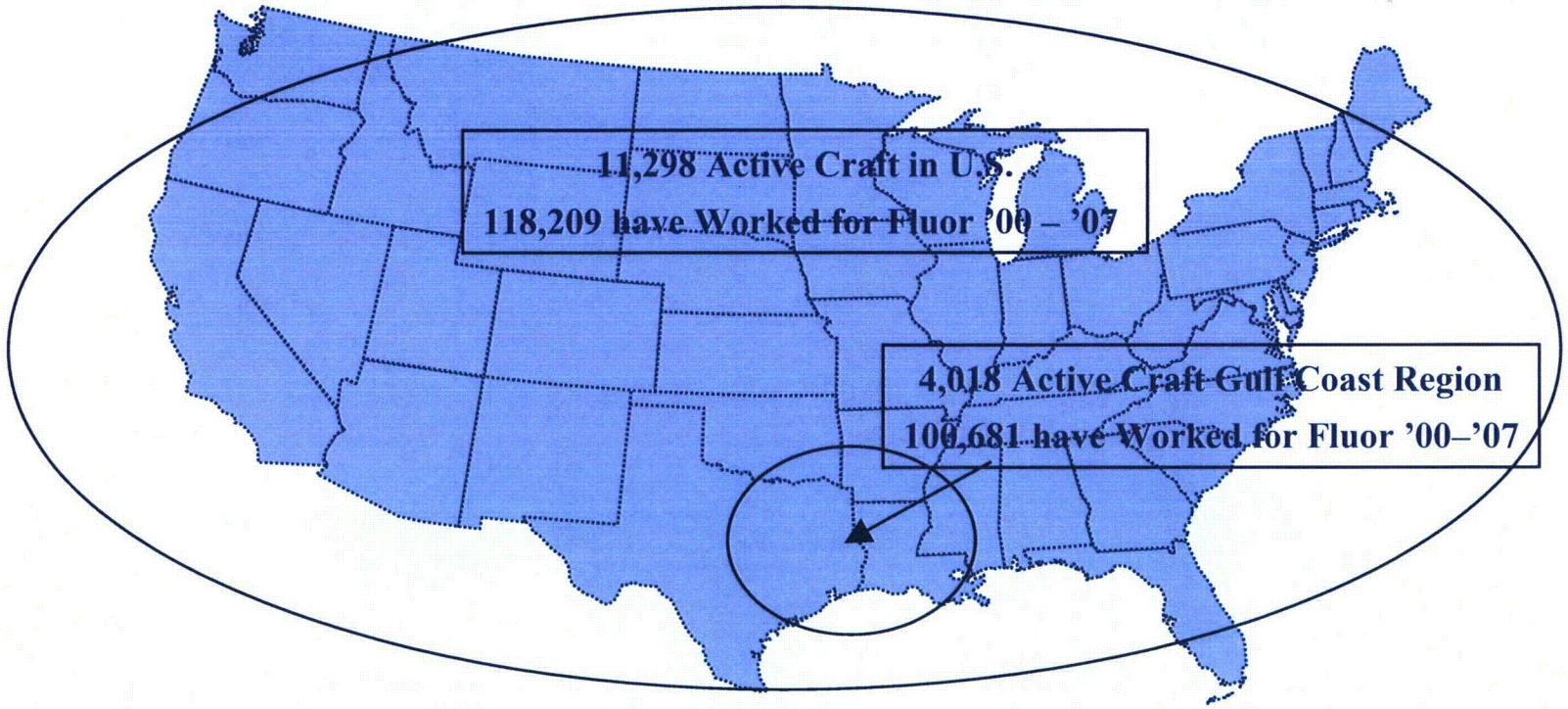
Recent U.S. Craft Experience



Fluor executes projects in open shop and union environments.

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Craft Workforce Development Training Resources

- **Training, Skills Assessment and Certification**
  - NCCER Curriculum utilized
  - Craft Online Skills Assessments
  - Craft Performance Verifications
  - Field Supervisor Development
- **Benefits of Fluor Craft Training Programs**
  - NCCER Curriculum utilized
  - Variable delivery platform
  - Individually paced
- **Training Focus**
  - Welder pre-employment entry and upgrade training
    - Tech schools partnerships
    - Fluor centers (Houston, Job sites, Louisiana)
  - Target training on developing Fluor advanced helper-level employees
    - Mid to top level helpers
    - Not training just for NCCER certification
  - Implement placement and retention
    - 100% Hiring commitment
    - Formally track and manage

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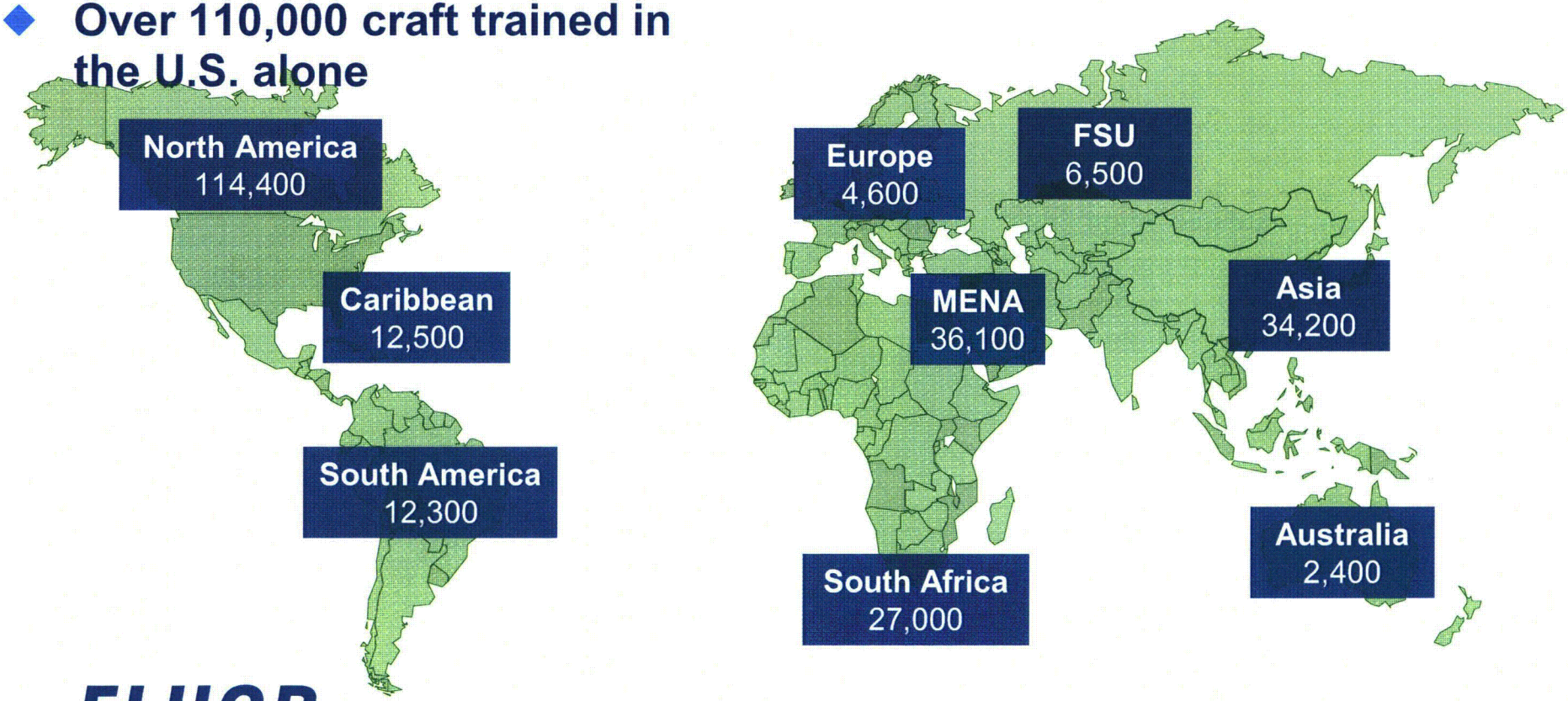
Meeting the Growth in Demand for Skilled Labor

Past 30 Years, Fluor has Trained 250,000 Craft

- **Global experience transferring knowledge, skills and abilities**
- **Over 110,000 craft trained in the U.S. alone**



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STP Labor Action Plan

- **Key elements underway or to be deployed:**
  - Early identification of the problems and potential solutions
  - Developing public private partnership
  - Identifying the target audience
  - Establishing the paths and methods to best reach the target audience
  - Identifying the most effective incentives to attract and retain your target audience

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STP Labor Action Plan, cont'd...

- **Attracting potentially interested students**
  - Hired local educator / training coordinator
  - Canvassing each high school w/in 100 miles (each 6 months for 3 years)
  - Supplement through regular job fairs/advertising
- **Arranging training infrastructure and coursework**
  - Develop a local training center
  - Partner with local colleges to conduct training
  - Fund through public/private partnership
- **Assuring continued, local development opportunities**
  - Work with others to ensure local jobs (OJT) to graduates
    - Fluor's Oak Grove & Port Arthur projects
    - Bechtel's Sandow & Port Arthur projects
    - STP outage and O&M work
  - Offer advanced training through Fluor's craft development program
  - Regularly communicate with all graduates throughout licensing period

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Strategic Partnerships – Learning from Japan

- **There are various forums on the STP 3&4 Project for exchanging lessons learned. An example of one in particular that has been extremely effective:**
  - The STP Construction Team Meeting:
    - Led by Fluor (5th one just completed)
    - Participants from:
      - STPNOC
      - Toshiba/TANE
      - IHI
      - Kajima
      - Sargent & Lundy
    - An intense, collaborative process, focusing on:
      - Construction techniques
      - Construction sequencing
      - ITAAC
      - Quality
      - Constructability
      - Logistics
      - Modularization
      - Etc.

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Preparing for New Reactor Construction

October 22, 2008

Carol L. Berrigan

Sr. Director, Industry Infrastructure

Nuclear Energy Institute

NEI

Preparing the Workforce

- Trends & Status
- Industry Activities
  - Nuclear Specific
  - Energy Sector
- Progress to Date

Current Status

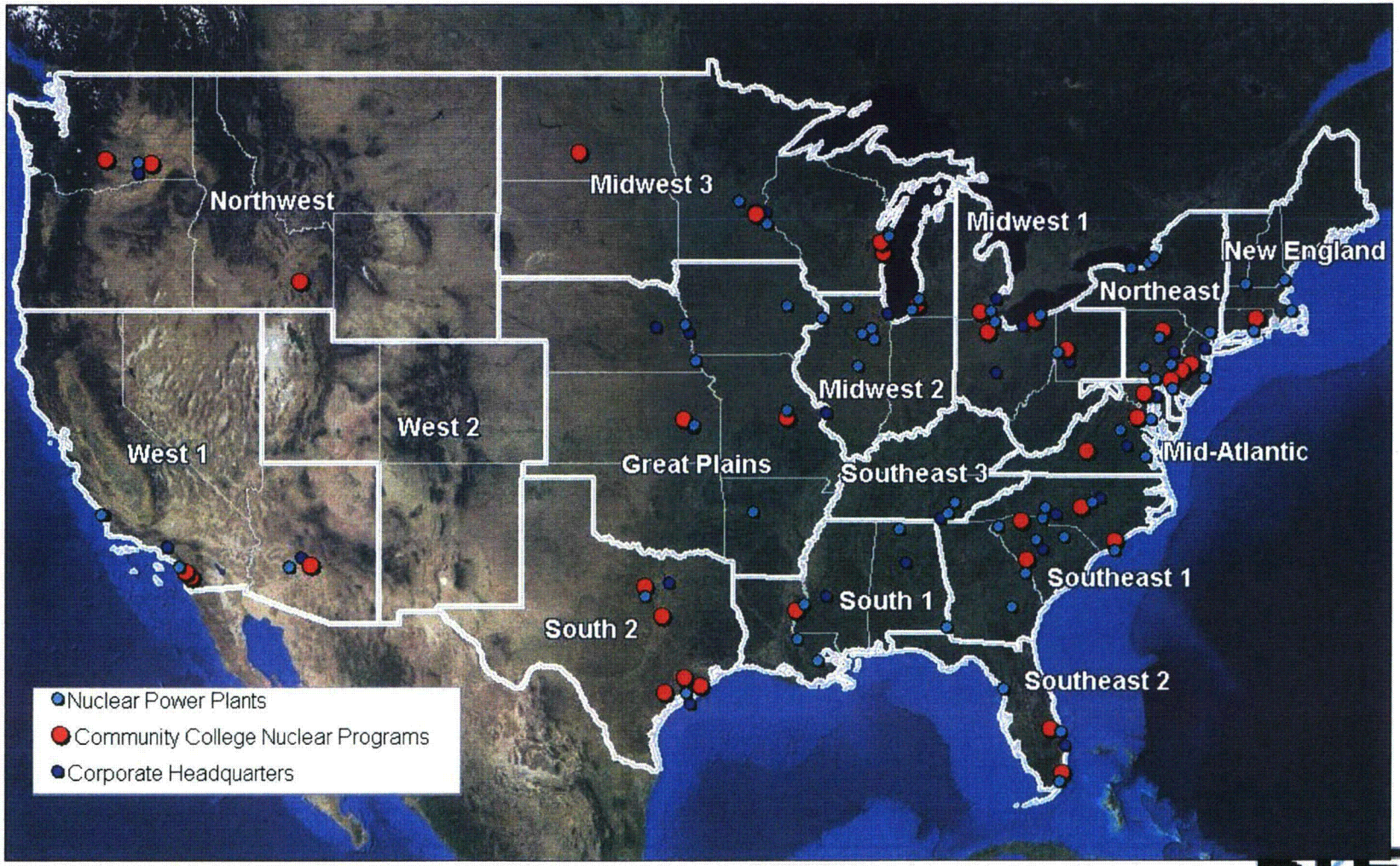
- 35 percent retirement eligible by 2012
- Growing demand for skilled workers
- $750+ billion in energy infrastructure by 2020
- Industry supporting over 42 community college programs
- 19 state-based workforce development efforts underway

NEI

Progress in Key Areas

- Significant increases in nuclear engineering enrollments and graduation
- Development of work force development programs at community colleges
- Expansion of "grow your own" programs

Regional Breakdowns



*** Data as of August 11, 2008**

Expanding the Supply Chain

- Key challenges
  - Increasing domestic capacity
  - Outreach to potential suppliers
  - Expanding domestic supplier access to foreign markets
  - Including nuclear in clean energy initiatives

Manufacturing Outreach Workshops

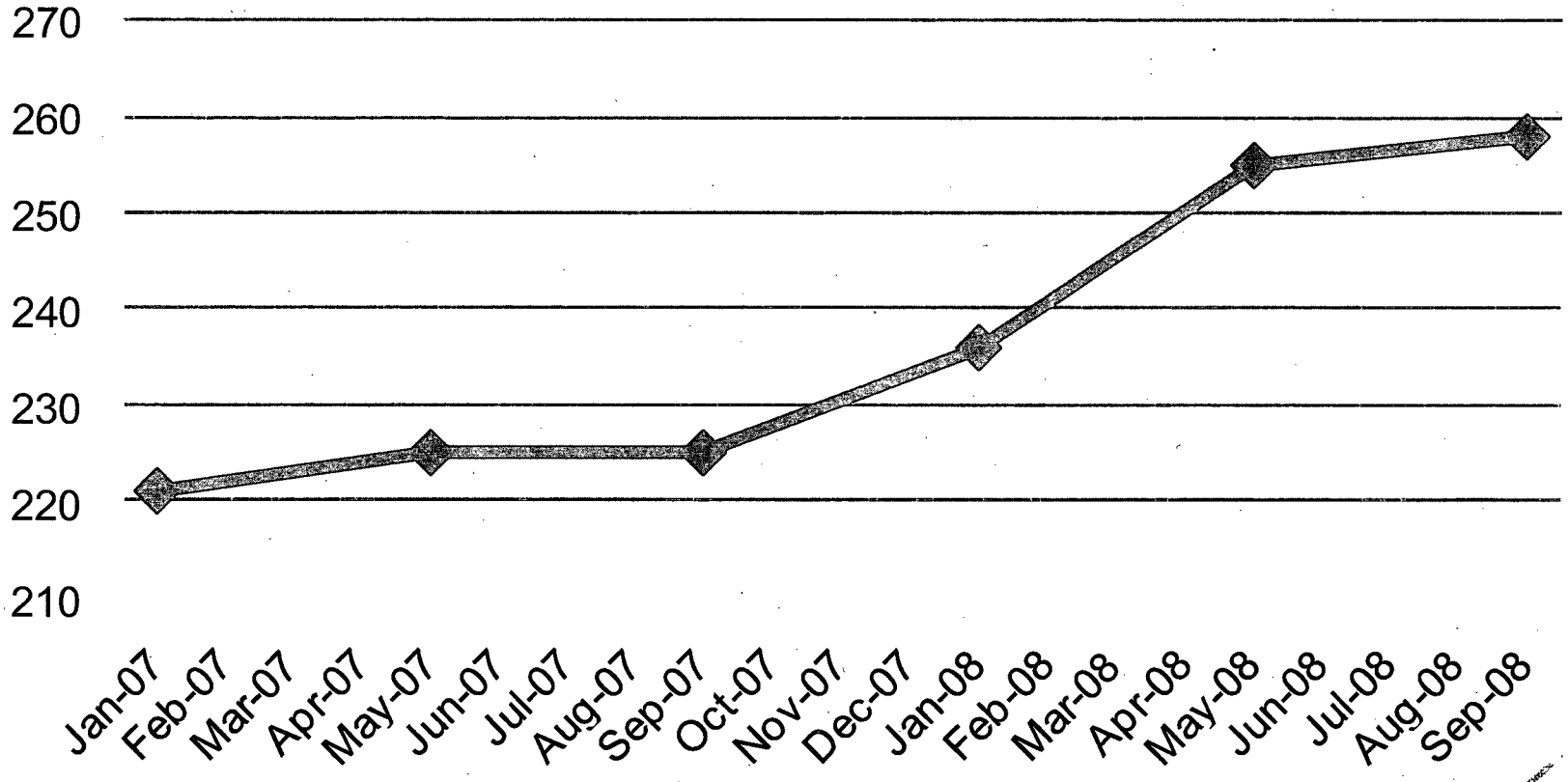
- Three events in 2008
  - March 27, Columbia, SC
  - April 14, Cleveland, OH
  - June 3, San Antonio, TX
  - Nearly 900 participated from 440 companies
- Four more planned in 2009
- Other outreach

NEI

Expand domestic supplier access to international markets

- Interagency Working Group &Civil Nuclear Trade Advisory Committee (CINTAC)
- Convention on Supplementary Compensation (CSC) deposited
- U.S.—India 123 Agreement signed
- Increasing engagement in foreign markets

Increases in U.S. Nuclear Certifications



Source: ASME Nuclear Subcommittee on Accreditation, October 2008

TESTIMONY

OF

HAL THORNBERRY
VICE PRESIDENT – CONSTRUCTION
NUCLEAR DIVISION OF THE POWER GROUP
THE SHAW GROUP INC.

BEFORE THE

U.S. NUCLEAR REGULATORY COMMISSION

WEDNESDAY, OCTOBER 22, 2008

Chairman Klein and distinguished members of the U.S. Nuclear Regulatory Commission, thank you for holding this meeting today to focus on the industry's readiness and capability to support construction of the next generation of nuclear power plants in the United States.

My name is Hal Thornberry, and I am Vice President of Construction for the Nuclear Division of The Shaw Group Inc.'s Power Group.

The Shaw Group Inc. is a leading global provider of technology, engineering, procurement, construction, maintenance, fabrication, manufacturing, consulting, remediation and facilities management services for government and private sector clients in the energy, chemicals, environmental, infrastructure and emergency response markets. We are a Fortune 500 company with expected fiscal 2008 annual revenues in excess of $7 billion that is headquartered in Baton Rouge, La., and employs approximately 27,000 people at its offices and operations in North America, South America, Europe, the Middle East and the Asia-Pacific region. Shaw is the Power sector industry leader according to Engineering News-Record's list of Top 500 Design Firms.

* * * *

As we enter the nuclear renaissance, Shaw is well-positioned to play a major role in the engineering, procurement and construction of the next generation of nuclear power plants, in the United States and abroad.

Shaw was founded in 1987 by Jim Bernhard – now our Chairman and CEO – and two partners as a heavy-pipe fabricating company. In a little more than two decades, Mr. Bernhard's vision transformed Shaw from a company with a 50,000-square-foot fabricating facility into one of the fast-rising corporations in the Fortune 500.

Although Shaw is only a 21-year-old company, we bring more than a century of experience to the marketplace thanks to several significant strategic acquisitions – including the purchase of Stone & Webster in 2000 and the acquisition of a 20-percent share of Westinghouse Electric Company in 2006.

Today, Shaw's Power Group is a member of the AP1000 Consortium, working with our partner Westinghouse to provide engineering, procurement and

construction management services for four AP1000™ units in China – two each at Haiyang in Shandong province and at Sanmen in Zhejiang province. The first of those units is scheduled to begin commercial operation in 2013.

Closer to home, the Shaw and Westinghouse consortium won the first engineering, procurement and construction (EPC) contracts for new nuclear plants that have been awarded in the United States in more than 30 years. In April, Georgia Power signed EPC contracts for two new AP1000™ units at the existing Vogtle site near Augusta, Ga. In May, South Carolina Electric & Gas and Santee Cooper awarded the consortium EPC contracts for two AP1000™ units at the V.C. Summer nuclear plant site near Columbia, S.C

In addition, we are in negotiations with a number of other electric utilities in the United States and around the world. As you know, the NRC has stated that it expects as many as 23 combined Construction and Operating License applications for 34 units to be submitted by U.S. electric utilities by 2010. Of those, 14 units – at present – are expected to use the AP1000™ design.

If electric utilities move forward with even a fraction of those proposed nuclear plants, our industry and the NRC will face substantial challenges in the years ahead.

One of those challenges involves the global supply chain. The International Atomic Energy Agency recently said that as many as 50 countries are considering new nuclear power plants. In a world that has seen relatively little nuclear construction during the past two decades, such an ambitious build-up would likely strain existing supply chains.

As the global supply chain expands to meet the expected ramp-up of nuclear construction, our industry will face a number of hurdles, including:

- A limited number of safety-related certified suppliers of nuclear parts and components
- Competition for fabrication and manufacturing shop space – not just among nuclear power projects, but against myriad construction projects around the world as countries like the United States repair aging

infrastructure and emerging nations, such as those in the Middle East and Asia, embark on landmark building projects

- Ensuring that existing and new suppliers have nuclear-grade quality assurance programs and that they have processes in place to assure appropriate attention to document detail

- Monitoring all aspects of the supply chain to prevent the fabrication, distribution and use of fraudulent parts and components

At Shaw, we have taken a number of steps prepare for such supply chain issues.

For example, we recently announced a joint venture with Westinghouse to construct a 600,000-square-foot module fabrication and assembly facility in Lake Charles, La. This facility will primarily produce structural, piping and equipment modules for new nuclear power plants using the Westinghouse AP1000™ technology. The new module fabrication facility will use industry-leading technologies, as well as Shaw's proprietary operations management systems.

In addition, Shaw's standing as the leading supplier of fabricated pipe in the United States and the largest supplier of nuclear-grade fabricated pipe should insulate us from some of the competition for constrained supply chain resources. Also significant is the fact that while many companies allowed their nuclear certifications to lapse, Shaw's Fabrication & Manufacturing Group maintained its ASME N stamp.

Similarly, we have a long history in the area of quality assurance, which dates back to Stone & Webster's development of the first NRC-approved Nuclear Quality Assurance Program. Today, as we continue down the QA path, we are led by someone who should be familiar to the Commission and NRC staff: Geoff Grant, who served as Deputy Regional Administrator for NRC Region III.

Another challenge facing the industry is construction readiness. While no new nuclear power plants have been built in the United States since the 1980s, Shaw has found other ways to stay active in the nuclear arena.

First, our Maintenance Division is a leading supplier of outage and uprate services, with maintenance contracts for 42 of the nation's 104 operating units. Similarly, Shaw was the contractor for the restart of Browns Ferry 1, which involved some of the most recent construction work performed by the U.S. nuclear industry.

Shaw also has maintained its new-plant readiness by supporting such nuclear projects as the LES enrichment facility in New Mexico and the MOX facility in South Carolina. At the same time, we have studied the many reports issued by the Institute of Nuclear Power Operations about the lessons learned during the first generation of nuclear plant construction. Today, we are incorporating that experience and those lessons learned as the provider of engineering, procurement and construction management services at the Haiyang and Sanmen AP1000™ projects in China.

The nuclear renaissance poses an additional challenge related to construction readiness, and that is manpower. At Shaw, we forecast that we will need upwards of 10,000 craft workers during the peak of nuclear plant construction in the coming decade. When you add to that the amount of skilled labor required by our competitors and other construction industries, it is clear that our nation faces a significant manpower challenge.

At Shaw, as the nation's leading design firm in the power industry, we are fortunate to have a large number of skilled craft workers who could roll off of fossil-plant construction projects to take similar jobs as we begin to build the new AP1000™ units at Vogtle, V.C. Summer and elsewhere. Moreover, we have approximately 3,000 employees among our 27,000-person workforce who have nuclear-related experience. We believe that those two factors place Shaw in an enviable position as we move into the nuclear renaissance.

That said, like every one of our competitors, we will need to hire thousands of new craft workers in the coming years to construct the next generation of nuclear power plants.

At Shaw, we employ a "best-value contracting" approach when it comes to construction labor. This philosophy enables us to utilize both union and non-union labor to ensure that we have full access to the breadth of expertise

available in the marketplace. This approach has been successful for Shaw's Power Group and Shaw Constructors Inc., which have a history of employing union contractors on its construction projects in the United States – and of maintaining labor harmony on its worksites.

Yet, even with the ability to work with various labor partners, it is clear that the flow of talent from the current craft-labor pipeline needs to be increased.

In response, Shaw has built a dedicated team that is focused on developing and attracting the construction talent we will need for the nuclear renaissance. Our team is examining current labor availability, projecting future supply and demand, and developing networks to reach out to encourage key stakeholders to promote careers in construction.

We are working closely with the National Center on Construction Education and Research, local vocational and technical schools, high schools and colleges to create awareness about the rewarding careers that will be available to people interested in building the next generation of nuclear power plants. We are taking this message to educators so schools will develop the necessary programs and curricula to prepare students for careers in construction. And we are taking this message to students and their parents so they understand that the nuclear renaissance could conceivably offer high-paying construction, maintenance and operating jobs from the time they leave school until they are ready to retire.

Finally, Shaw's workforce development team has created an unparalleled training and certification program that provides our current hourly employees the opportunity to learn new skills and advance their careers.

* * * *

As Shaw prepares to construct the first new nuclear power plants in the United States in more than 30 years, we believe that Shaw is as well-positioned as a company can be as we enter the nuclear renaissance.

We have experience that dates back to the construction of the first commercial nuclear plant at Shippingport; we are part of the AP1000™ consortium with Westinghouse building advanced plants in China; we have a workforce that has both nuclear and large-project construction experience; and we have

unparalleled vertical integration that enables our company to provide nuclear utilities with cradle-to-grave services.

That said, Shaw's ability to help lead the nuclear renaissance requires a continued strong relationship with the NRC, and we are committed to open and beneficial interaction with the Commissioners and the NRC staff.

Going forward, there are several areas we would like to see the Commission address:

- The NRC should allocate its resources based on which combined Construction and Operating License applicants are closest to actual construction. As of October 1, the NRC had received 16 COL applications. However, not all applicants share the same level of commitment to actually move forward with construction. We believe that utilities that have signed EPC contracts or awarded letters of intent to negotiate EPC contracts should receive priority by the NRC when it comes to evaluating COL applications and related resource issues.

- The module construction facility being built by Shaw and Westinghouse should come under the NRC's construction inspection program. We believe module fabrication is more similar to construction than manufacturing, since without modularization these components and subcomponents would be constructed in the field at the job site.

- The NRC should continue to emphasize vocational and technical training programs. Given the current disparity between the supply of craft labor and the expected demand, the NRC's recently announced $15 million grant program to provide trade school scholarships and "support education in nuclear science, technology, and engineering to develop a workforce capable of supporting the design, construction and operation, and regulation of commercial nuclear facilities, and the safe handling of nuclear materials" is invaluable and should be maintained – or even expanded.

* * * *

In closing, I would like to thank you Chairman Klein and your fellow Commissioners for the opportunity to speak here today.

This is an exciting time for The Shaw Group and our industry, as we prepare for the nuclear renaissance. On behalf of Shaw, we look forward to working with the Commissioners and the NRC staff to ensure the safe design, construction and operation of a new fleet of AP1000™ nuclear power plants.

Thank you again for inviting me to participate in this panel discussion about nuclear construction issues, and I would be happy to answer any questions you might have.