Establishing New Nuclear Power Programs

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CH2MHILL

Contents

- Safety Topic
- Brief Introduction to CH2M HILL
- Principles and Considerations for New Nuclear Programs
- Lessons Learned from Major Complex Programs
- Summary

Safety Topic

Creating and Maintaining a Nuclear Safety Culture For the Next Generation of Nuclear Industry Begins Now

Introduction to CH2M HILL

CH2M HILL Today

Industry-leader in program management, construction management, engineering, procurement, and operations

- **More than 23,500 employees world-wide – 5,000 staff outside of United States**
- Active in all sectors including Nuclear, Energy, Environment, Water, Transport & Industrial
- US$6.3 billion in revenue - $1bn from outside of US
- Active projects in Russia, Central and Eastern Europe, in oil and gas and industrial sectors
- Nuclear experience in Europe, Middle East, US and Canada

CH2M HILL Today

Working on Extraordinary Programs World-wide:

- London 2012 Olympic and Paralympic Games
- Emirates Nuclear Energy Corporation, Abu Dhabi
- Panama Canal Expansion Program
- U.S. Forces Korea Base Relocation in South Korea
- Crossrail, London
- First offshore development on North Slope in Prudhoe Bay, Alaska

Global Reputation

CH2M HILL is rankedNo.1 in

- Program Management
- Environmental Firms
- Site Assessment and Compliance
- Manufacturing
- Pipelines
- Sewerage and Solid Waste
- Wastewater Treatment
- Water Supply/Treatment
- Semiconductors
- Sewer Waste

Source: *Engineering News-Record,* July 2009

ENR Ranks #1 CH2M HILL in Programme Management for 5 consecutive years

Top Employer in Poland by Hewitt

- CH2M HILL ranked the fourth best company to work for in Poland (within the service industry) for the company's commitment to work/life balance, its focus on people, and for overall benefits.

2009 World's Most Ethical Companies

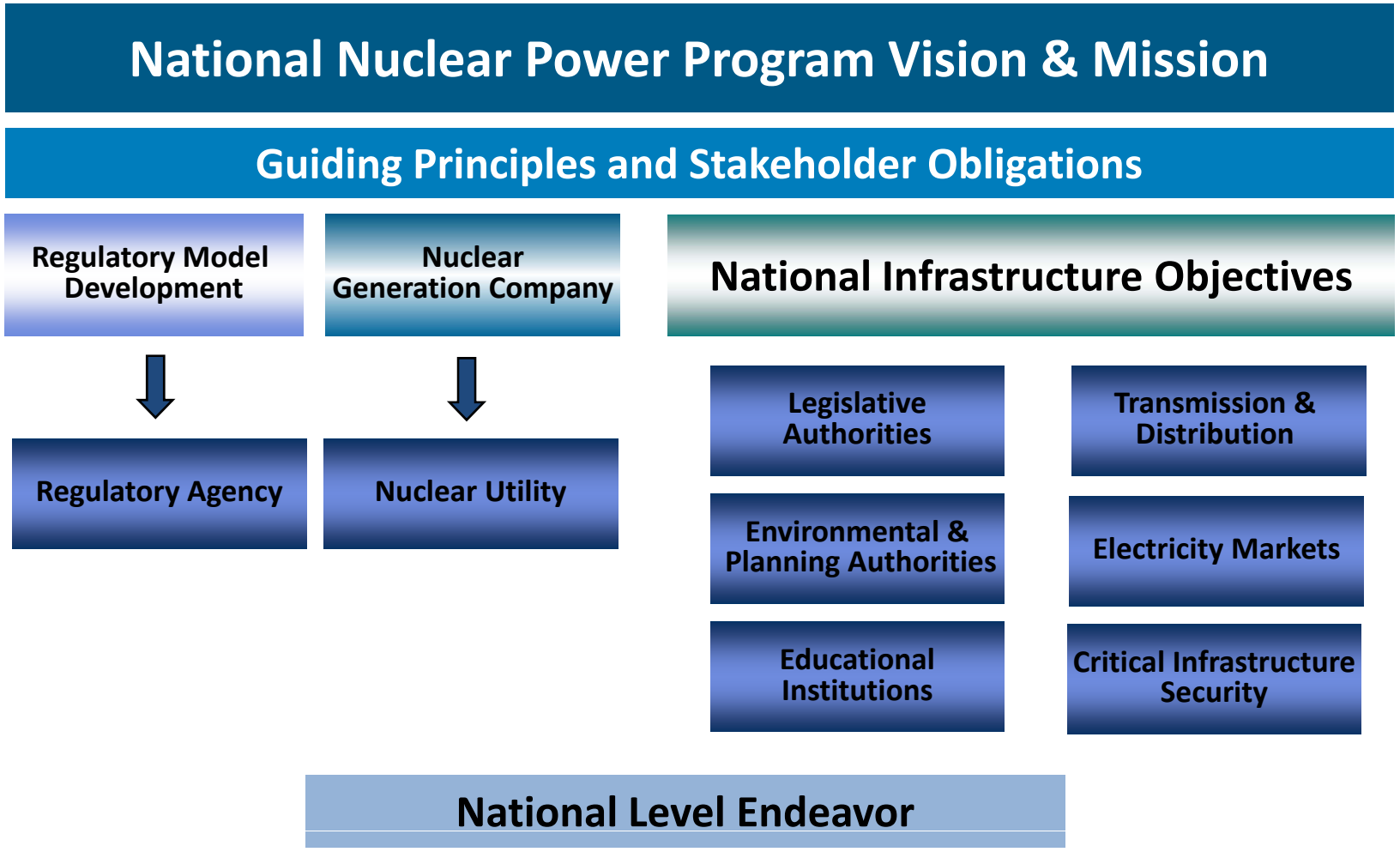
- One of 99 companies selected globally by an independent organization dedicated to the advancement of best practices in business ethics and corporate social responsibility.

Principles and Considerations for Nuclear New Build

Context for Nuclear New Build

- Important part of green house gas and energy security issues
- More than ever now a “Global Market”
- Performance of existing plants a key enabler
- Getting it “right the first time” is critical
- New forms of financing and investment evolving
- Continued sharing industry experience important – especially between “Haves” and “Have Not’s”
- New Programs involve much more than a technology selection
- Limited operating experience to date for “new” reactors
- Public Confidence issues remain

Components of a National Nuclear Program



Regulatory Framework – Licensing Reactor Designs

- Harmonization of reactor design review and approvals is important for an efficient and predictable market
  - **Trend is for greater regulatory cooperation**
- Internationally recognized safety and design standards important
- Align regulatory structure with “Country of Origin” when appropriate
- Ensure first of a kind (FOAK) issues are dealt with rigor – once
- Separate regulatory functions from promotion and coordination functions
- Openness and transparency in all activities necessary for confidence
- Establish appropriate safety culture at each activity stage

IAEA.org International Atomic Energy Agency

WNTI World Nuclear Transport Institute

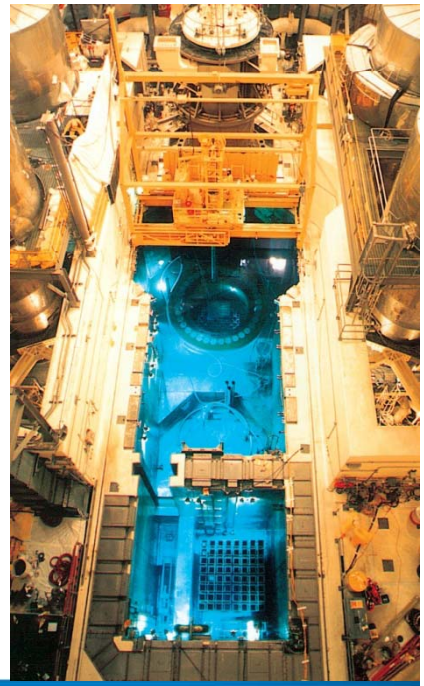
WANO

Success Factors for New Build

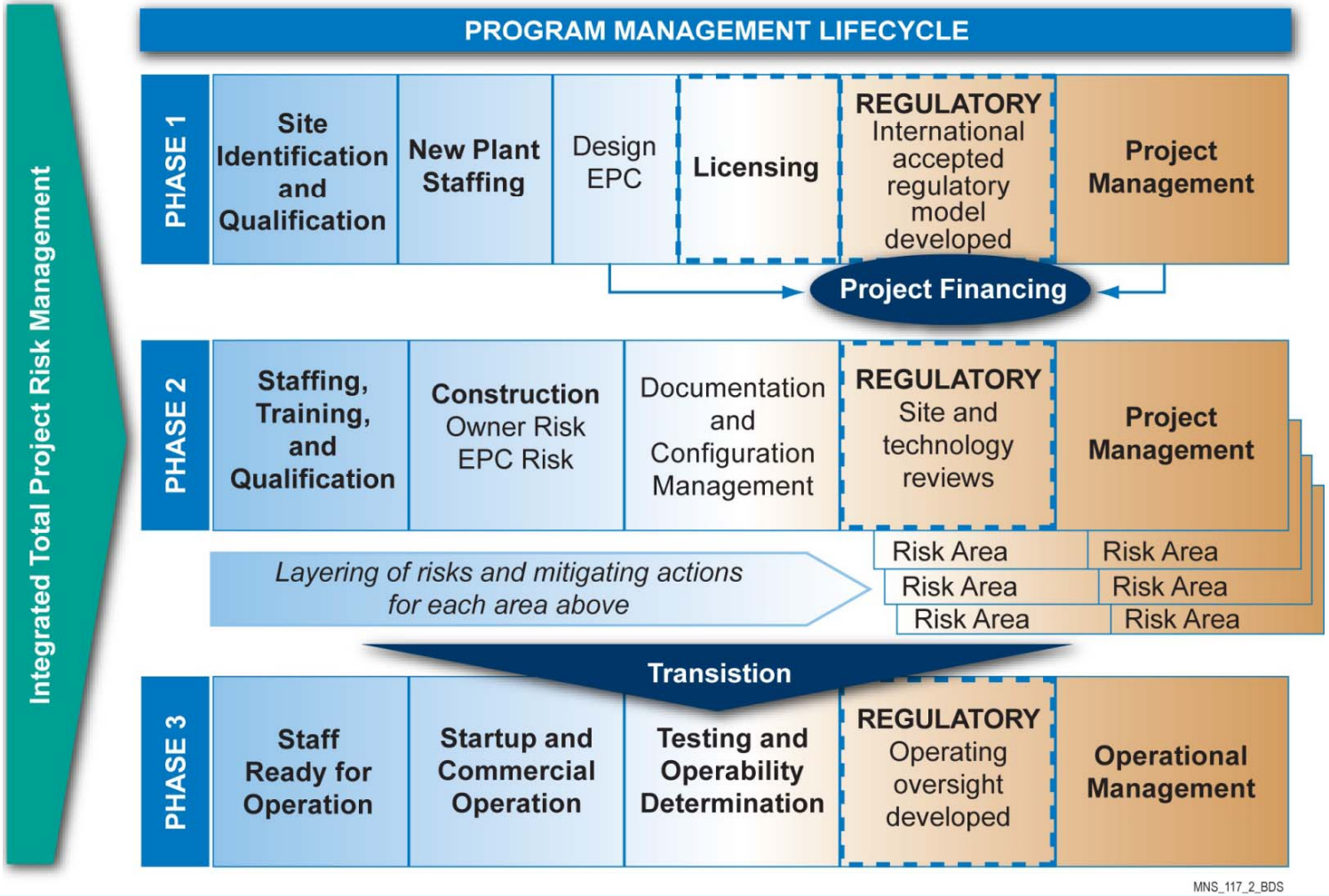
- **International Conventions** – establish clear policies and commitments on non-proliferation, security, safety and nuclear liability
- **Intelligent Customer –** ensure development organization has sufficient technical and commercial knowledge and experience
- **Industry Collaboration –** establish open and strong relationships with IAEA, WANO, and Industry Peers
- **Program Management Platform –** develop integrated program delivery approach
- **Commercial Terms** – reflect risk allocation, market realities, delivery model, and support long term relationship
- **Site Selection and Qualification** – may occur early in program. Apply internationally recognized standards, including quality assurance
- **Radioactive Waste Strategy** – necessary for public confidence

Success Factors for New Build (cont.)

- **Governance –** a strategy framework will promote understanding, decision-making and risk management
- **Delivery Model –** identify and engage key participants in planning, establishing a safety culture and executing new build. Know HOW plant will be built.
- **Management Model –** appropriate management systems especially critical for new programs
- **Supply Chain Management –** engaging global suppliers and ensuring they meet safety and quality standards
- **Stakeholder Management –** integral to delivery plan, and includes many national and international communities
- **Risk Management –** integrated and dynamic risk management is essential



Phased Program Development



Lesson Learned from Major Complex Programs

Learning from Other Sectors

Successful non-nuclear programs demonstrate how other industries tackle similar issues, resulting in:

- Greater degree of cost and schedule certainty
- Integrated performance monitoring capability
- Availability of human and material resources
- Bridging the skills and, importantly, “experience” gap
- Management of stakeholder concerns
- Provision of credible data for interim cost recovery

Facing Complex Challenges

London 2012 Olympic and Paralympic Games

- Management and integration of design, construction, commissioning, procurement, scheduling and cost management functions
- Coordination of stakeholder input, procurement oversight, oversight of assurance functions, coordination with new adjoining Stratford City Development, and coordination with onsite and adjoining utilities and transport

Lessons learned: Applicability to New Build

New Build Success Factors	London 2012 Example
Governance	Rigorous risk review, trending & change control; Structured integration process
Management Model	Clearly defined roles & responsibilities between ODA and Delivery Partners
Delivery Model	Complex Logistics: Managing 1 vehicle through security every 6 seconds
Supply Chain Management	Results oriented; NEC contracting; Setting sustainability targets
Stakeholder Management	Strong Public Outreach and Security and Health & Safety Focus; Early Warning
Risk Management	Robust program controls from procurement through construction

Facing Complex Challenges

Panama Canal Expansion Program

- New locks and navigational channels for both Pacific and Atlantic entrances, widening and deepening of Gatun Lake, deepening of Gaillard Cut
- Interface with locks design/builder and with all other design and construction activities, provide ongoing construction oversight, including quality, safety, and operability
- Interface with local and international stakeholders and provide ongoing training and coaching to staff

Lessons learned: Applicability to New Build

New Build Success Factors	Panama Canal Example
Governance	Rigorous risk review, trending & change control; Structured integration process
Management Model	Aligned with objective to leave legacy of highly trained workforce
Delivery Model	More than 150 program personnel trained to PM tools and processes
Capacity Building	Preparing staff to take PgMP exam – several have already been certified

Major Programs -- What have we Learned?

Governance and Capacity Building

- Set clear leadership structure
- Establish country institutions, leadership, and skill base for development and operations

Management Model

- Define Roles and Responsibilities and align with risk allocation
- Ensure line management owns the actions

Delivery Model

- Ensure Infrastructure Projects integrated into Program Schedules
- Define assumptions and level of effort for front end work been defined
- Evaluate and ensure construction techniques are proven for the design
- Working within an environmentally conscious and sustainable framework is becoming an industry expectation

Major Programs – What have we Learned?

Supply Chain Management

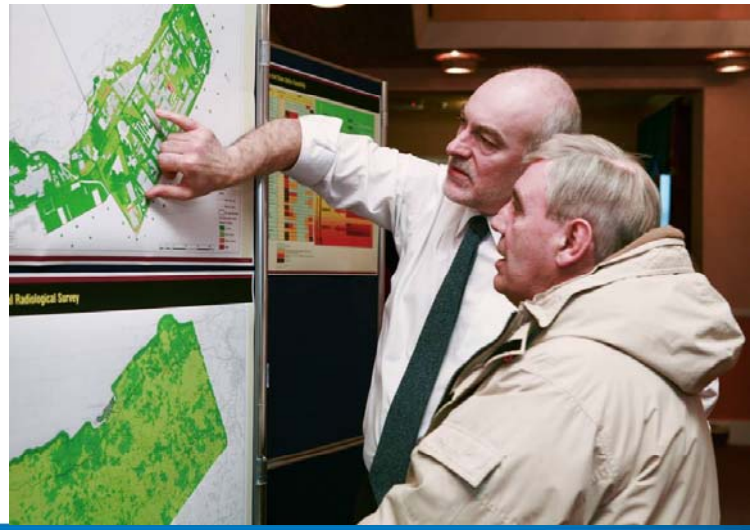
- Supply Chain Development – Rapidly evolving national and international supply chain presents challenges and opportunities
- Prioritize logistics planning in advance of construction
- Identify Engineering, Procurement and Construction dependencies

Stakeholder Management

- Include outreach efforts in program baseline
- Continuously measure results

Risk Management

- Align cash flow with work flow
- Using mature, proven risk management tools
- Integrate mitigation actions in schedule(s)



Summary

The nuclear renaissance is taking place within a truly global market. There are many lessons to be learned from our own history and that of other industrial sectors:

- New nuclear programs will entail “national level” effort
- International nuclear cooperation continues to evolve
- Use of standardized and proven plant designs is important
- Harmonizing regulatory reviews remains a high priority
- Leverage modern engineering and construction techniques
- Develop integrated schedule for the entire program
- Share lessons learned – we are as strong as the weakest link
- Implement strong Quality Assurance – use industry lessons learned
- Establish strong nuclear safety culture from Day 1 – this is our legacy with the next generation

Thank you for listening