# Challenges and Potential Solutions to the Procurement and Construction of new nuclear units in the US

Trinity Local Section

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# Outline

- ANS Mission (Are we unique among societies)
- New nuclear unit construction challenges

# Why join a Professional Society?

- Relationships (Local, National, International)
  - Professional
  - Personal
- Knowledge Transfer
  - Meetings/Conferences
  - Exhibits
  - Publications
- Achieve consensus in the practice of our profession (standards)
- Life Insurance

**Technology Town Square**

# Relevant Professional Societies

- ASME
- ANS
- IEEE
- AICHE
- ASCE…….

**ALL SOCIETIES HAVE COMMON FUNCTIONS**

**But not entirely**

# ANS IS UNIQUE

- ANS is called upon to provide a unique role among Professional Societies

**Addressing fear of**

**“Nuclear”/ “Radiation”**

- **PUBLIC OUTREACH**

**INFORMING OTHERS**

# New Construction Challenges

- Financing
- Licensing
- Sourcing
- **Human Resources**
- **Cost**
- **Schedule**
- Risk

# Cost and Schedule

- Can a new plant be constructed for a predicable cost and schedule?
- Yes – Consider the Japanese experience
- The Japanese have been constructing plants for decades – we have not.
- They construct the plants in a predictable manner and cost.
- Take lessons from those learned in Japan

# Hitachi data

- Proprietary Hitachi data removed at the speaker's request
  (10 slides)

# Remember back

- New Regulations: Developed in parallel with design, manufacturing and construction activities
- New codes and standards: ASME Section III, IEEE Class 1E,… did not exist
- Design Drawings: Pencil on Mylar
- Document reviews: Hard copies for everyone (The copier was overburdened)
- Typewriters (Proof reading again and again, and again)
- Incorporation of comments: Cut and Paste (literally)
- Slide Rules (I still have mine)
- Composite drawings (Crude Interference detector)
- Great leadership

# ALL THINGS NUCLEAR ARE SPECIAL

- Why is this?
- Mystique accompanies the industry
  - Terms “Nuclear” “Atomic” introduced to general population with the advent of “The bomb”
  - Movies (China Syndrome, Silkwood, or simply SciFi)
- Have we contributed with some of our terms?
  - Critical
  - Burnable poisons
  - Meltdown
  - China syndrome

# Do we also contribute to the fear factor in another less obvious way?

**Does emphasis on safety have unintended consequences?**

- Ironically, it hurts our image!!!!
- Safety, of course, is paramount. It should be!

**Unintended Consequence**

- Public interprets a level of danger commensurate with the attention we pay to safety.

# Case in Point

- Actual comment from lawyer at New Years Eve party:

**“Whenever I drive by Indian Point, I shudder!”**

# What about TMI

- TMI was not a close call as some folks in the general public believe.  Most of the core was damaged.
- Nonetheless the harm to the public was effectively zero with the exception of the psychological trauma unnecessarily inflicted.
- It was an economic disaster.
- Industry response was commendable with the “Lessons Learned” applied throughout the fleet.
- But what is the public’s perception? Probably that a major disaster was narrowly averted.

# What is the Answer?

- Certainly not less devotion to our culture of safety!!
- But we need to be able to explain our behavior and why the safety culture within our profession is so extraordinary.

- How do we deal with this dilemma?

# Part of the problem lies in the application of conservativism

- Conservative approach
  - Common engineering practice
  - Simplifies analysis
  - Ensures success (maybe not)

# Conservatism in our work

"Nuclear Energy: Not a Faustian bargain but a near-perfect providential gift" by Ted Rockwell Nuclear News (November 2008)

- 1980-1981 EPRI study concluded that "Each of the many steps that would have to occur to cause serious public consequences had previously been too pessimistically estimated."
- Consequently, "a "conservative" estimate becomes simply wrong. "

# Shoreham

- Multibillion dollar investment discarded
- Issue: Evacuation from Long Island
- Conclusions influenced by overly conservative assumptions.

**Consequences of Wrong decision:**

- Power shortages
- High energy cost
- Lost jobs
- Dirtier environment
- Greater waste

- **Deaths**

(Quote from
Bernard Cohen
Retired *Professor* Emeritus
*University of Pittsburgh*)

# Study of Childhood cancer near NPP

- Study results don’t matter
  - The mere fact that the study occurred has the intended impact on public opinion.
- How to deal with such tactics??
- Propose our own studies.

# Study to site 2- 1500 Mwe NPPs off Manhattan Island

- NPPs are generally sited a distance from high population areas.  Why?
- The routine operation of fossil fired plants have health consequences on nearby and distant population, but not nuclear plants.
- It's the accident scenario. Yes the one that we exaggerated.
- We exaggerate because the NRC is weighing one factor: safety and the potential impact on the public. There is no reason to impart realism.

# The Proposition: an NPP near Manhattan

- What if a terrorist group interrupts power supply to Manhattan Island.  Not so difficult to accomplish, is it!
- How many folks will actually die?  There will be deaths due to the disruption of vital services.
- Under this scenario we need to have a realistic assessment of the alternatives to weigh the real risks and make an appropriate selection.
- Thus we need an estimate of the potential for harm from a reliable, secure, large, consistent source of electric power such as nuclear power and balance it against a potential power disruption.

# Conclusions

- ANS can play a vitally important and unique role
  - Inform the public and elected representatives
    - Ensure folks will not be unnecessarily traumatized
    - Increase contribution from nuclear energy
    - Mitigate threat of Dirty Bomb
  - Develop policy based on rational thinking and solid facts