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Beyond Risk-Based Communications: Framing the Message, Seizing the Initiative

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Beyond Risk-Based Communications: Framing the Message, Seizing the Initiative

Topics: Beyond Risk-Based Communications

- **Background**
- **Considerations**
- **Message Features**
- **Conclusions**
- **Implementation**
- **Questions?**



Background: What Is Risk-Based Communication?

- Absolute risk expressions, very technical, little context for Jane and John Doe
- Benefits are ignored or treated too simply
- Risk comparisons minimal – e. g., background or medical comparisons on individual bases
- Full society or community impact ignored
- Audience left to “connect the dots”
- Good intention - convey low risk - but content does not serve audience
- In sum: non-comparative, non-contextual content conveying little enlightenment or assurance for public

Beyond Risk-Based Communications: USTC Basis and Purpose

- Basis: closing U.S. fuel cycle key to renewing nuclear alternative (ReNuAI)
- USTC purpose: enable ReNuAI by facilitating spent fuel transport acceptance
- Transportation: ongoing, leading-edge, cross-cutting linkage for fuel cycle closure
 - public understanding is key, effective communications a pre-requisite
- Use 2006 U.S. National Academy of Sciences (NAS) report on spent fuel transport (***Going the Distance***)
 - identified actions in the transportation risk arena
 - presented definitive methods on comparative risks

NAS Report: Transport Risk Findings and Recommendations

- Fact: little health, safety (technology) risk from spent fuel transportation
- Perception: spent fuel transportation presents radiation dose risk
- Social risks (anxiety, economic impacts, etc) pose different challenges, receive less attention than health and safety issues
- Increase openness, transparency of transport planning, programs
 - build community abilities to mitigate risks, increase confidence
- Establish mechanisms to characterize, communicate, mitigate social, health, and safety risks from emerging transport campaigns

But “social risk” is group response to collective technology risk perception. Technology risk perception must first be changed to modify society’s behavior.

Considerations: USTC's Beyond Risk-Based Communications Initiative

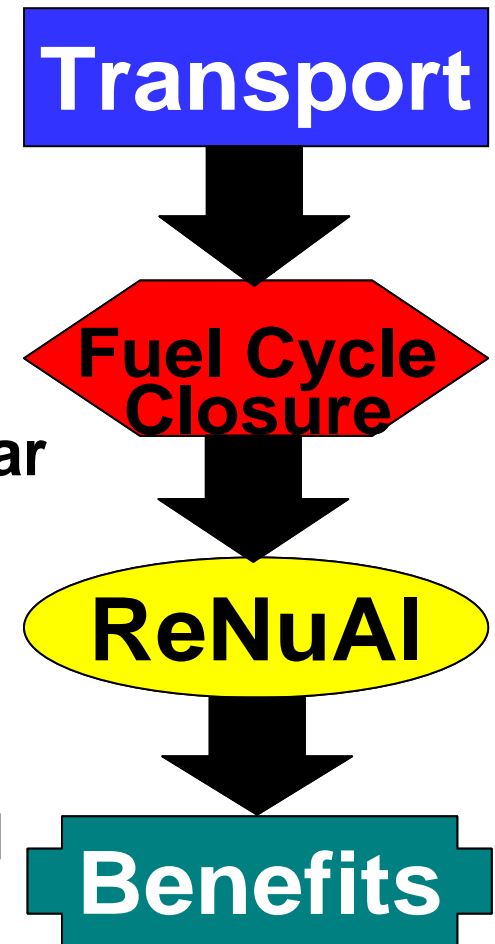
- Enabling ReNuAI means closing the fuel cycle
- Spent fuel transport a common element in closure options
- Risk jargon, hyper-focus on social risk not productive; must change perception of *relative* technology risk
- Change risk perception two ways: show high benefits from risk, show risks are low compared to accepted risks
- NAS report offers opportunity for expanded applications
- Finite window of opportunity at hand
- USTC Outreach Committee initiative: formulate message using NAS report, other information sources, to expand public understanding of ReNuAI benefits/risks

Considerations: USTC's "Beyond Risk-Based Communications" Focus

- Explain amplified benefits of ReNuAI – what public receives
- Compare spent fuel transport/ReNuAI risk with non-nuclear industries' risk in context of what people fear: dose, radionuclides
- Show large benefit upside, low comparative risk of what people fear
- Solving technology risk perception = solving most social risk issues
- Other features
 - Repetition as often as necessary – this is a long-term effort
 - Transparency
 - “Grass-tops” bridge-building – work to assist at community level
 - Incorporate tactical features when called for
 - Break the NIMBY code: Safe and Necessary Disposal at Yucca (SANDY) ???
 - Deploy lessons learned from global campaigns

Beyond Risk-Based Communications: Benefit Features of Message

- Closing the fuel cycle enables utility pursuit of ReNuAI
- Spent fuel transport leads to fuel cycle closure, ReNuAI, concomitant benefits
- MIT's 2003 report, **The Future of Nuclear Power**, shows a 50-year nuclear energy growth path for ReNuAI
 - 300 GWe by 2058 (~ 300 plants)
 - 50-year average is 200 GWe installed



Benefits of Spent Fuel Transport and ReNuAI

Benefits of ReNuAI, Enabled by Spent Fuel Transport

- Avoids megatons of fossil fuel air pollution each year; avoided >4 megatons of these compounds in 2006
- Decreases utility reliance on natural gas, reducing demand, price; annual savings of about \$2 billion to consumers
- Electric cars become viable, attractive: reduces oil dependence, offers developing economies cheaper oil (ethical policy), cuts Persian Gulf imports to improve U.S. security, stability
- Avoids megatons of CO₂ emissions; avoided >800 megatons in 2006, equivalent to removing 96% of U.S. cars from road
- Best platform (no emissions) for producing hydrogen, fuel for transportation systems of a more distant future

Benefits of Spent Fuel Transport and ReNuAI

U.S. Economic Benefits of Growth to 300 GWe

- Based on U.S. averages during 50-year ReNuAI period, benefits would be in range of :
 - Almost \$5 trillion in goods, services, and salaries
 - About \$1 trillion in federal, state, and local taxes
 - About \$600 billion in emissions avoidance savings
 - About \$2 trillion in plant construction/modernization
- Economic stimulus approaches three times the annual U.S. federal budget; with 50-year investment of about \$2 trillion, offers an excellent return for society

Benefits of Spent Fuel Transport and ReNuAI

Other Societal Benefits of Spent Fuel Transport

- Centralizes spent fuel; improves economics, operational efficiency
- Centralizing enhances safety, security (avoids population centers)
- Boosts community jobs and business growth [since 2000, Yucca Mountain (YM) contributed more than \$1.2 billion to Nevada economy, \$900 million increase in disposable income]
- Centralized facility construction and operation enhances gross state product (GSP) from wages and salaries [YM shows GSP exceeding \$10 billion]
 - Construction, operation of YM will increase jobs by ~7,000

Benefits of spent fuel transport and resulting ReNuAI are very large and compelling.

Beyond Risk-Based Communications: Risk Features of Message

- Anti-nuclear *Fear of Fission* campaign a substantial success
- Built on primal fear of radiation: public nuclear risk perception (plant operations, spent fuel, nuclear waste) founded on this fear
- USTC risk message to focus on public radiological exposures
- NAS report gives definitive guiding principles, methods, and approaches for comparative public dose risk assessments
- Comparative dose risks must be part of public dialogue, within context of large benefits
- ***Compare ReNuAI fuel cycle population doses with those routinely experienced from unregulated, non-nuclear industries***

Early *Fear of Fission*

First came . . .



Then came . . .



The origin of the Nuclear Age was the first nuclear fear.
Radiation drove that fear and nuclear fears since then.

**Question: Would The Public Have Ever Accepted
Electricity If the Electric Chair Came First?**

Risks of Spent Fuel Transport and ReNuAI: Use of NAS Report *Going the Distance*

- NAS confirms: no radiation exposures or releases above limits from spent fuel transports in 60 years of transporting spent fuel
- NAS: “The mean collective dose risk is most useful as a comparative tool.”, where risk = probability x limiting collective dose
- NAS defines guiding principles for comparative risk assessment of radiological exposures:
 - compare risks associated with like physical causes, e.g. radiological exposures; and
 - compare risks associated with similar outcomes, e.g. potential health consequences from radiation exposure
- Present total ReNuAI risk, including spent fuel transport, disposal
- Use NAS guiding principles and methods

Risks of Spent Fuel Transport and ReNuAI: Use of Other Sources

- Other sources for risk analysis of ReNuAI fuel cycle collective population doses
 - DOE *FEIS for YM*
 - DOE *DSEIS for YM*
 - UNSCEAR 2000 Study
 - 2003 MIT report, ***The Future of Nuclear Power***
- Other sources for collective population doses for unregulated, non-nuclear industries
 - various published articles
 - UNSCEAR 2000 Study
 - various DOE publications
 - various EPA publications

Risks of Spent Fuel Transport and ReNuAI: Summary of Population Dose Risk Results

For 50 years and 200 GWe average installed U.S. nuclear capacity, population and worker risk from ReNuAI life cycle is:

<u>Event/Scenario Definition</u>	<u>50-Year Risk: Expected Value of Total Collective Dose (Person-cSv)</u>
Normal operation: worker & population collective doses	3,000,000
Spent fuel transport: worker & population collective doses	6,900
Repository operation: worker & population collective doses	13,000
Nuclear accidents: population & worker collective doses	55,000
<u>Total 50-Year Risk for ReNuAI</u>	< 3,100,000

Risks of Spent Fuel Transport and ReNuAI: Discussion of Population Dose Risk Results

- Calculations very conservative – numbers are likely high by some 50% to 100%
- DSEIS accident and relevant sabotage doses included in transport and repository operations
- Plant accident doses derived from MIT report and UNSCEAR study of Chernobyl event
- Probabilities of accidents from various sources are incorporated using NAS methodology
- Average exposed population annual dose is much, much less than background

Risks of Spent Fuel Transport and ReNuAI: Summary of Population Dose Risk Results from Five Non-Nuclear Industries

More than a dozen non-nuclear industries produce very large annual population and worker doses above background, all ***unregulated, unmonitored, unreported, uncontrolled, and . . . undisputed***, with a probability of 1.0. Here are the doses from just five:

Industry	Annual Collective Dose Risk to Population & Workers (Person-cSv)	50-Year Collective Dose Risk to Population & Workers (Person-cSv)
Aviation	>460,000	>23,000,000
Building Design & Construction	>14,900,000	>745,000,000
Potable Water Supply	>1,500,000	>75,000,000
Agriculture	>1,300,000	>65,000,000
Construction Materials	>2,000,000	>100,000,000
<u>Total Collective Dose Risk</u>	>20,000,000	>1,000,000,000

Risks of Spent Fuel Transport and ReNuAI: Summary of Population Dose Risk Results From Just One Nevada Non-Nuclear Industry

Even one non-nuclear industry in the state of Nevada presents more than a 45% higher 50-year collective dose risk than the full ReNuAI fuel cycle in the entire U.S. (< 3,100,000 Person-cSv)

Nevada Industry	Annual Collective Dose Risk to Population & Workers (Person-cSv)	50-Year Collective Dose Risk to Population & Workers (Person-cSv)
Building Design & Construction	>90,000	>4,500,000

The state of Nevada has not proposed regulating the radiological aspects of the state's Building Design & Construction industry, let alone shutting it down due to its radiological threat.

Risks of Spent Fuel Transport and ReNuAI: Social Risk Considerations

- Social risks: anxieties/actions that follow threat perceptions (decreased property values, loss of property, reduced economic activity, etc.); social risk is the collective, social amplification of individual fears

SOCIAL RISKS = SUM OF ALL FEARS

- Social risks may be muted or amplified by policy makers
- Biased/fearful policy makers amplify social risk
- All fears must be addressed by education
 - Policy makers must understand comparative risks
 - Key point: if non-nuclear industries cause significantly more population dose risk, why haven't policy makers acted to reduce the risks from such industries?

Comparative Risks and Benefits of Spent Fuel Transport and ReNuAI: Conclusions

- Benefits from spent fuel transport and ReNuAI are demonstrably high
- ***Hypothetical*** ReNuAI population dose risks **dwarfed** by ***actual*** doses from just five non-nuclear industries
- ReNuAI technology risk far below what policy makers routinely accept
- No federal or state agency has proposed regulating the radiological characteristics of non-nuclear industries; therefore, non-nuclear industry dose risks are below policy maker concern
- With overwhelmingly low dose risks, correspondingly high benefits, spent fuel transport and ReNuAI make abundant sense
- This must be part of the fabric of public outreach efforts facilitating fuel cycle closure to enable ReNuAI

Where Knowledge Fails, Fear Prevails

Beyond Risk-Based Communications: Implementation

- USTC finalizing significant white paper on comparative benefits and risk
- White paper may translate into journal publication(s)
- White paper to provide foundation and fundamentals of public outreach materials and effort
- Public outreach may be collaboration with other entities having expertise in such efforts

***The less people know, the more they suspect.
To be above suspicion, we must give people knowledge.***

Beyond Risk-Based Communications: Framing the Message, Seizing the Initiative

QUESTIONS?

**The Stone Age began when people understood stones;
the Petroleum Age started when people figured out oil;
the Nuclear Age arrives when people know nukes.**

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