

An Overview of Repository Programs

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The Repository World

- Disposal in a geologic repository remains the preferred ultimate solution, with or without reprocessing
- Much of the technical community has confidence in determining site suitability
- A number of geologic media are being pursued
- Most programs have experienced substantial difficulties
- Siting remains the biggest hurdle
- Select ideas have become prominent, e.g. volunteer/veto, retrievability, monitoring, phased management
- We will have storage for decades
- Hope springs eternal...

Some Highlights and Lowlights

- National programs have been abandoned or siting stopped
 - France, U.K., Canada, Germany, Spain, Switzerland, U.S.A. (e.g. Lyons, 1st repository, 2nd repository)...
- National (re)reviews have been undertaken
 - Canada, France, U.K.,....
- Schedules have been delayed
 - Almost everywhere
- Some countries have moved forward and others have restarted
 - Finland, Sweden, U.S.A., France, Canada, Japan, U.K....

In the Beginning...

- Many siting approaches were taken
- Some used the “decide, announce, defend” method
- Many decisions were taken in private with little involvement or recognition of stakeholder interests
- Often technical promise and (perceived) political expediency drove siting decisions
- In several instances political and societal backlashes stopped programs
- Fresh reviews were undertaken
- A number of similar conclusions emerged, e.g.
 - Siting is key, difficult, and requires full societal engagement
 - Transparency and openness are essential
 - Voluntary host communities should have appropriate involvement and compensation
 - Retrievability and post-closure monitoring

An (Optimistic) Current Snapshot

- Countries with candidate sites
 - Finland, Sweden, U.S.A.
- Countries with programs underway
 - Canada, France, Belgium, Japan, U.K., Switzerland,...
- Countries “thinking about it”
 - Spain, South Korea, China, India,...
- Countries starting out
 - Argentina, Slovakia, Slovenia, South Africa,...

A Few Current Issues

- The linkages between disposal and new nuclear build
- The impacts of direct disposal v. reprocessing
- Attention and controversy regarding multinational or international repository programs
- The growing awareness of the relationship among nuclear waste management, national security, and the spread of nuclear power

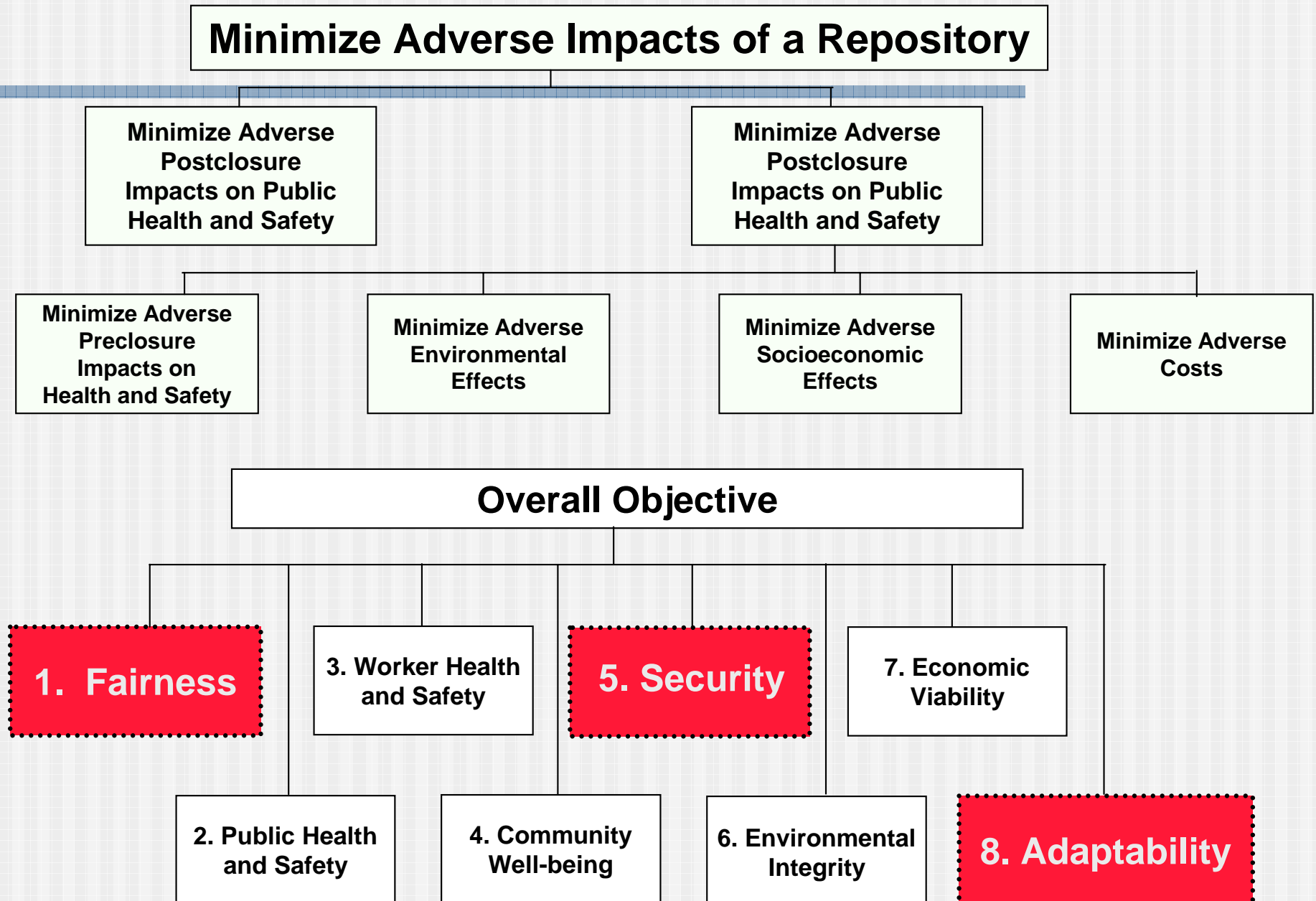
Some Keys to the Canadian Approach

- Process is as important as the choice itself
- Intense and widespread dialogue with citizens, affected parties, and decision-makers
- Interactive approach with three discussion documents
- Extensive use of the web
- Ethics roundtable
- Transparency of process

“Choosing a Way Forward”: The Foundation

- “...this generation of citizens which has enjoyed the benefits of nuclear energy has an obligation to begin provision for managing that waste.”
- “...our obligation is to give them (succeeding generations) a real choice and the opportunity to shape their own decisions while at the same time not imposing a burden which future generations may not be able to manage.”

A Comparison of Objectives 20 years apart; U.S. and Canadian Objectives



“Choosing a Way Forward”: Some Key Recommendations

- Sequential decision-making and flexibility in the pace and manner of implementation through “Adaptive Phased Management”
- Ultimate centralized isolation in a deep geologic repository
- Option for interim step of shallow underground storage at the central site
- Program of continuous learning and R&D
- Long-term monitoring with potential for retrievability
- Seek an informed, willing community as host

What makes nuclear waste management special?

- The technical challenge
 - Performance over geological time
 - “Proof” not possible
 - Central role of “ologists”

 - The institutional challenge
 - The extraordinary time frame
 - Siting
 - Linkage to other agendas
 - Values and ethics in conflict
 - Political implications
 - Nuclear stigma and fears
- But there are unique advantages...

Virtues of a Repository

- Passive
- Occurrences will be slow
- No inherent energy to release materials
- Retrievable
- Only a repository upon closure, when future generations are comfortable

Some Key Enduring Features

- Program need convincingly established
- Core, stable goal
- Roles and responsibilities clear
- Clear, open, and transparent decision making process
- Respect for fairness and societal consent apparent
- Sequential decision-making and contingency planning
- Possibility of altering or reversing course
- Appropriate compensation

Some Potential Lessons Learned

- Take the necessary time - go slow in order to go fast
- Assign importance to the societal considerations as well as the technical ones
- Having senior officials involved makes a difference
- There are many ways to effectively engage the public and key stakeholders
- Listening, respecting, and then responding can build trust and even advocacy, particularly with local community
- Plan carefully and involve the right experts
- Be prepared to respond in real time to unexpected events
- Promise, then deliver, then do it again and again

Some Concluding Thoughts

- The program will last for generations
 - Focus on ethical decisions, earning trust, and preparing for change
 - Fairness in the process, Safety in the outcome
- Defining the need is necessary for success
 - It's either storage or disposal
 - What is the ethical thing to do?
 - Waste management programs are central to energy, security, and the environment