

# The Future of Nuclear Power: Using Nuclear Power to Develop the Oil Sands

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Duane Bratt  
Department of Policy Studies  
Mount Royal College  
Calgary, Alberta



# Prairie Atoms

- This presentation is an update of a paper that I delivered at the Canadian Nuclear Society conference on June 1, 2009.
- You might also be interested in a paper that I wrote for the Canada West Foundation (Sept 2008) entitled ***Prairie Atoms: The Opportunities and Challenges of Nuclear Power in Alberta and Saskatchewan.***
- This can be accessed for free at <http://www.cwf.ca>

# Outline

1. Panels on Nuclear Power
2. History of Nuclear Involvement
3. Political Support
4. Public Support
5. Market Conditions
6. Conclusion



# 1. Competing Panels

## NUCLEAR POWER EXPERT PANEL REPORT



# 1. Nuclear Power Expert Panel (Alberta)

- Established in April 2008, released its report March 29, 2009
- Mandate: “Prepare a balanced and objective Report for the government of Alberta on factual issues pertinent to the use of nuclear power to supply electricity in Alberta.”



# 1. NPEP Panel Members

- Harvie Andre – Panel Chair
  - former Mulroney Cabinet Minister and President/CEO, Wenzel Downhole Tools Ltd.
- Joseph Doucet
  - Enbridge Professor of Energy Policy, University of Alberta, School of Business
- Harrie Vredenburg
  - Suncor Energy Chair in Competitive Strategy and Sustainable Development, Haskayne School of Business, University of Calgary
- John Luxat
  - 25 years nuclear industry experience (OPG), currently in the Department of Engineering Physics, McMaster University .



# 1. NPEP Key Findings

- Alberta's economy/population will continue to grow requiring additional electricity.
- Each technology has trade-offs
- Private sector decision, but province can say no.
- Nuclear power is safe and does not release carbon dioxide.
- Nuclear waste is an issue
- Any large construction project has social impacts

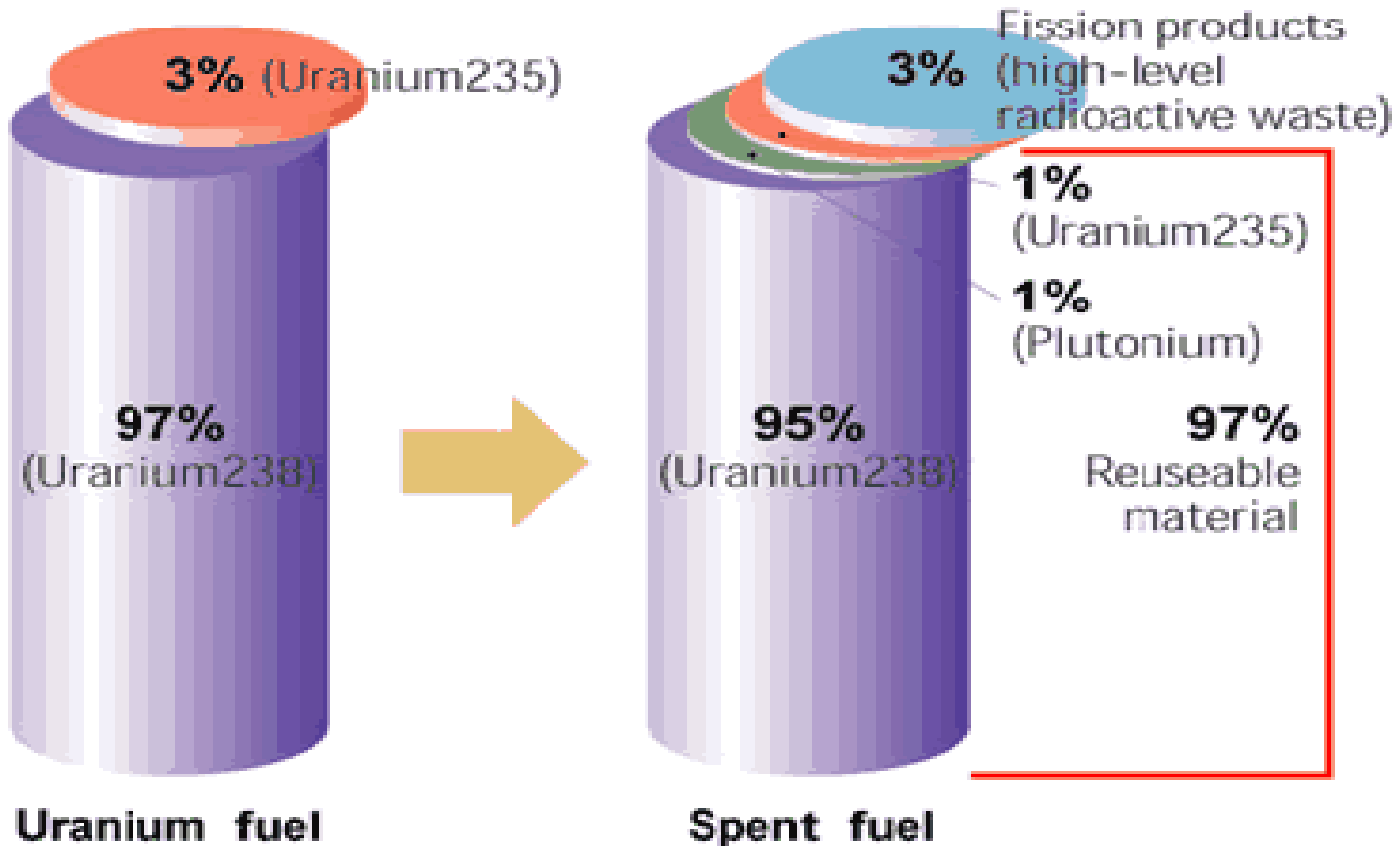


# 1. NPEP Tone and Emphasis

- Puts nuclear power on a level playing field
- Mitigates the fear over nuclear waste
  - Emphasizes recycling and the NWMO's Phased Adaptive Management
- Takes time to identify all of the safety features in a nuclear reactor
- Minimizes the Cherobyl accident
- Maintains that there are no separate social issues that are unique to nuclear generation
- Unique Challenges: size of reactor, labour issues

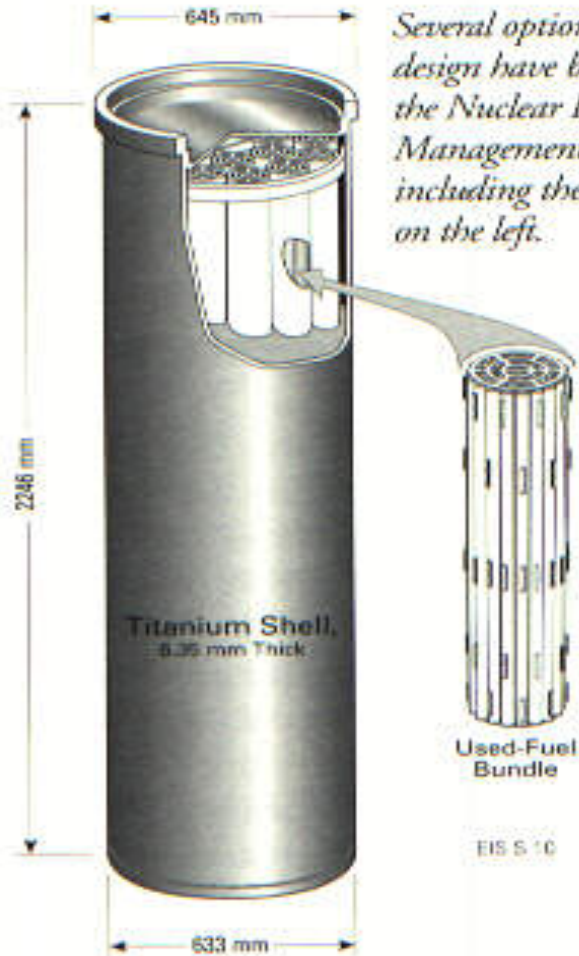


# 1. Recycling Nuclear Waste

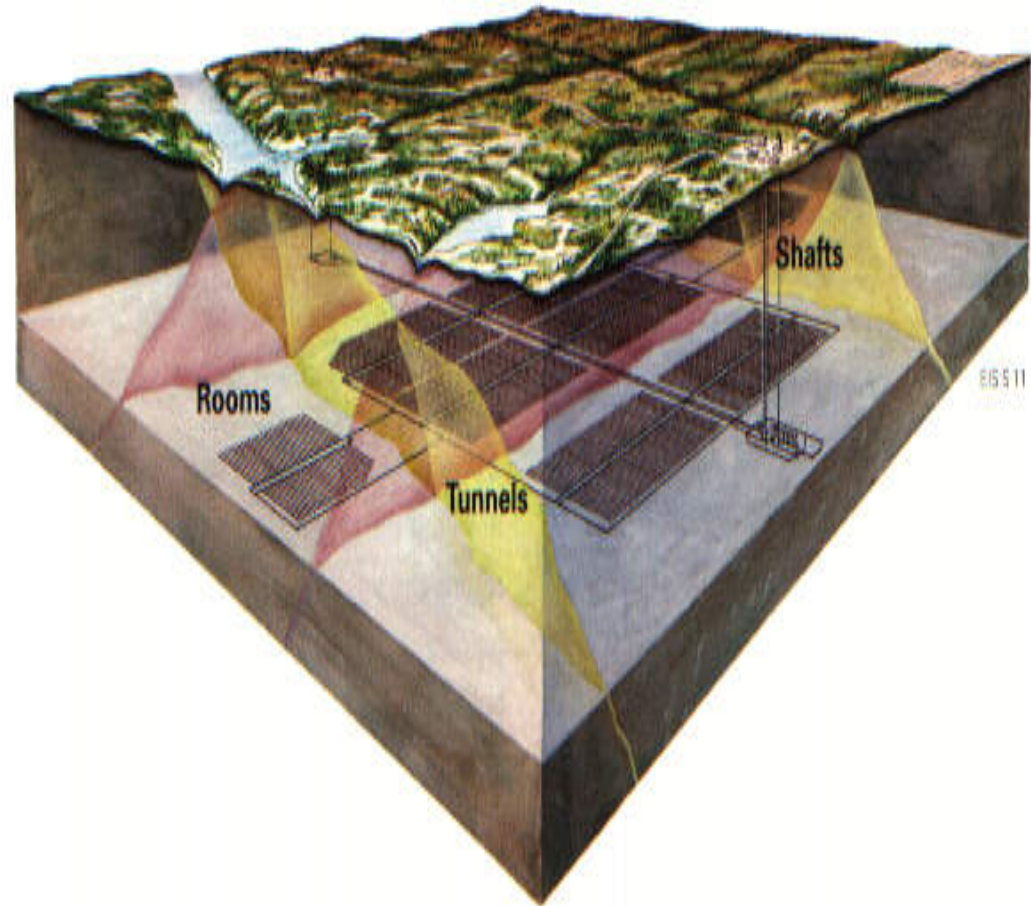


# 1. Storing Nuclear Waste

## DISPOSAL CONTAINER



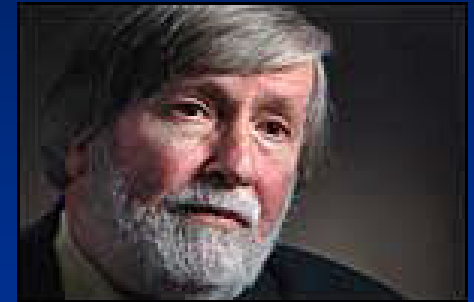
*Several options for container design have been studied in the Nuclear Fuel Waste Management Program, including the design shown on the left.*



ARTIST'S VIEW OF A DISPOSAL VAULT IN RELATION TO THE ROCK STRUCTURE

# 1. NPEP Opposition

- Gordon Edwards, Canadian Coalition for Nuclear Responsibility
  - “They are really presenting a very one-sided, very limited picture which doesn’t give the average member of the public, or the average politicians, any real insight into the nature of the hazards that are peculiar to nuclear.”
- Brian Mason, NDP Leader
  - The Panel “cannot claim to be unbiased when it clearly tried to abdicate responsibility of the decision to have or not have nuclear power. B.C. and Manitoba have anti-nuke policies and we should too.”



# 1. NPEP Opposition



# 1. Uranium Development Partnership (Saskatchewan)

- Appointed in November 2008, released its report on March 31, 2009.
- Mandate: Make recommendations to the government on value-added opportunities in the uranium industry (conversion, enrichment, reactor fuel manufacturing, nuclear reactors)



# 1. UDP Panel Membership

- **Richard Florizone – Panel Chair**
  - VP UofS and nuclear physicist
- **Duncan Hawthorne, CEO Bruce Power**
- **Jerry Grandey, CEO Cameco**
- **Armand Laferre, CEO Areva Canada**
- Edward Mathie, nuclear physicist UofR
- Patrick Moore, Co-founder of Greenpeace
- Ray Ahenakew, Sask Indian Institute of Technology
- Keith Brown, Sask Chamber of Commerce
- Neil Collins, Int Brotherhood of Electrical Workers
- Allan Earle, Sask Urban Municipalities Association
- Jim Hallick, Sask Association of Rural Municipalities
- Alex Pourbaix, TransCanada

# 1. UDP Recommendations

- **Exploration and Mining**
    - Measures to assist the uranium mining industry in Sask (ie., royalty framework, infrastructure, foreign ownership guidelines)
  - **Upgrading**
    - Sask should not pursue a conversion/fuel fabrication facility
    - In the long-term, uranium enrichment
  - **Power Generation**
    - Build a nuclear reactor
  - **Used Fuel Management**
    - Do not pursue fuel reprocessing
    - Consider hosting a long-term nuclear waste repository
  - **Research, Development, and Training**
    - Create a centre for excellence for nuclear research & training
    - Build a research reactor
    - Pursue medical isotope production
- 

# 1. UDP Evaluation

1. The UDP rejected Premier Wall's repeated public calls for Sask to diversify away from its mining base and start adding value to uranium
  - Industry Leaders on Panel (who have new facilities in France, Kazakstan, and the US) knew that there was no demand
2. Sask govt quickly distanced itself from recommendation regarding a permanent nuclear waste repository.
3. Public Consultation process – much more extensive than the one in Alberta.



# 1. NPEP and UDP Comparison

- Similarities
  - Basic comparisons of all electricity sources
  - Increased demand for electricity
  - Nuclear Reactors are safe
  - Nuclear reactors do not emit GHGs



# 1. NPEP and UDP Comparison

- Differences
  - NPEP focused solely on reactors, but UDP covered the entire fuel cycle
  - NPEP was to provide objective/technical knowledge about nuclear power (no recommendations), but the UDP was to assess the economic opportunities of the uranium value chain (detailed recommendations and timelines)
  - NPEP emphasized fuel recycling, but the UDP discouraged it.
  - NPEP looked only at Alberta, but UDP recognized that “significant potential exists for exports” to Alberta.

# 2. History of the Nuclear Industry

- Alberta is virgin territory for the nuclear industry
- Saskatchewan
  - Uranium Mining since the 1950s
  - Govt panels
    - Bayda Commission (Cluff Lake 1977-78)
    - Key Lake Board of Inquiry (1979-81)
    - Rabbit Lake Panel (1993-94)
    - Joint Fed/Prov Panel on Uranium Mining in North Sask (1991-97)
  - Warman Uranium Refinery Debate (1979-80)
  - CANDU-3 Debate (1991-92)

# 3. Political Support - Alberta

- Evolution, commiserate with growing public support, in support of leading Alberta politicians towards nuclear power.
- Ralph Klein
  - Nuclear is “the least acceptable” option for the oil sands (2005)
  - “we have to consider nuclear power” (2006)
  - Co-authored a think tank study on continental energy that was supportive of nuclear power (2008)
- Stelmach govt – since the creation of the NPEP – has had a cone of silence on nuclear power.
- Liberals are also quiet, the NDP vocally oppose.



# 3. Political Support - Saskatchewan

- Premier Brad Wall is the most pro-nuclear politician in the country.
- “Saskatchewan is committed to creating the business environment, the research climate, is prepared to partner with real resources and provide the right environment so that we may thoroughly explore the chance for our province to be a leader in value-added opportunities related to this great resource.”



# 3. Political Support - Saskatchewan

- 60 years of all-party political support
- 1940-1950s: CCF initiated the uranium mining sector
- 1960s: Liberals established the Rabbit Lake mine
- 1970s-1980s: NDP created a provincial crown corp to mine uranium and supported the Warman Refinery
- 1991: PCs pursued the CANDU-3
- 1991-2007: NDP opened up new uranium mines and begin the initiative for value-added uranium production.



# 3. Political Support - Saskatchewan

- NDP has significant internal disagreement over nuclear power.
- Unlike other NDP parties, the Sask version contains:
  - Pro-nuclear supporters who recognize the economic significance of the uranium mining industry and northern economic development
  - Anti-nuclear critics who are concerned with its environmental, safety, and military aspects.
- When in power, the pro-nuclear faction dominates.
- When in opposition, the anti-nuclear faction dominates.
- November 1992 battle. Premier Romanow stared down his anti-nuclear faction and reversed an anti-nuclear motion at the party's policy convention.



# 3. Saskatchewan NDP Divisions

- NDP caucus supported a Legislative resolution supporting the development of nuclear power.
- Leadership contenders were divided on the nuclear issue:
  - Dwain Lingenfelter was pro-nuclear
  - Ryan Meili and Yens Pedersen were anti-nuclear
- Dwain Lingenfelter campaigned on a pro-nuclear platform, but over the course of the campaign modified his stance.
- NDP members passed an anti-nuclear resolution.
- Lingenfelter implied that he is not bound by the resolution, and instead, would take direction from a policy convention.



# 4. Public Support - Alberta

- Energy Alberta Corp commissioned Longwoods International to poll on the use of nuclear power in the oil sands in November 2005
  - 40% of Albertans supported
  - 36% of Albertans were neutral
  - 23% of Albertans opposed



# 4. Public Support - Alberta

- Calgary Herald poll in January 2007
  - 45% of Albertans supported nuclear power
  - 43% of Albertans were opposed
  - 12% unsure
  - Northern Alberta – home of the oilsands:
    - 36% supported nuclear power
    - 53% opposed
  - Calgary – home of the oilsands decision-makers:
    - 47% supported nuclear power
    - 41% opposed



# 4. Public Support - Alberta

- Public Consultation process
- Website surveys (all Albertans)
- Focus groups
- Invited stakeholders (Edmonton only)
- Little media coverage





# 4. Public Support - Saskatchewan

1. Opinion is polarized between those who strongly support and strongly oppose a nuclear reactor
2. Respondents feel poorly informed (40%)
3. Those who feel more informed are more likely to support a nuclear reactor, while those who feel less informed are more likely to oppose.
4. Largest reasons for opposing a reactor are safety and waste
5. Support for nuclear power is strongly correlated with income and gender.



# 4. Public Support - Saskatchewan

- Extensive Public Consultation process
- Headed by Dan Perrins, former head of Sask Public Service
- A special website was created
- Series of community meetings
- A major stakeholder conference
- Special input from First Nations groups
- Extensive Media Coverage



# 5. Market Conditions

	Alberta	Saskatchewan
Population	3.6 million	1 million
GDP	\$260 billion	\$45 billion
GDP Per Capita	\$75, 000	\$45, 000
Extra Electricity Demand	6, 6024 (2024)	1, 500 (2020)
Govt Finances	Small Deficit (no debt)	Small Surplus (larger debt)
Business Culture	Entrepreneurial	Crown Corporations

# 6. Conclusion

- Market conditions are stronger in Alberta.
- Political conditions are stronger in Saskatchewan.
- Likely scenario, a reactor built in Lloydminster, Sask but with export of surplus electricity to Alberta.

