Why Jurisdiction and Uranium Deposit Quality are Essential Considerations for Exploration and Mining of Uranium

David R. Miller
President and CEO
DECLAN RESOURCES INC.
June 24, 2014

Why Jurisdiction and Uranium Deposit Quality are Essential Considerations for Exploration and Mining of Uranium

OUTLINE

1. Jurisdiction Issues: Is the Government with you or against you?
   I. National Government, State Government, Local Government:
      a) Regulatory Agencies
      b) Legal System

2. Deposit Quality: Grade is king? Brief review of historical and current production.
   I. High grade versus low grade: Why mine low grade?

3. Comparison of top producing countries attributes, be they uranium deposit quality (grade, size) versus government involvement (government helpful or hurtful).
What is important in Exploration, Development and Mining of Uranium around the world?

• **Jurisdiction**: Is the government with you or against you?

• **Uranium Deposit Type and Grade of Deposit**: Grade does matter!
JURISDICTION

Is the government with you or against you?

What is important?

• Government allows uranium mining?
• Government does not allow uranium mining?

Uranium mining banned:

1. Virginia, US.
2. British Columbia, CA.
3. Greenland, Removed ban last year!
4. Queensland, Removed ban 2 years ago.
Is the government with you or against you?

Government does allow uranium mining.

Some governments are encouraging uranium mining. Permits are fast and efficient.

Examples:
  Kazakhstan
  Namibia
JURISDICTION

Secondary considerations:

1. Permitting
   - Government controlled?
   - Government regulated?

2. Delays (US- Env. Lawsuits)
   - Time Value of Money
   - Missed Market Opportunity

Discussion: Some jurisdictions may not outright ban uranium mining but can make it onerous and costly to pursue. Sometimes governments change the terms of mining after discovery or even development of the mine.

Examples: New Mexico, US. Niger
Grand Canyon uranium mining to be banned for 20 years
Environmental groups hail ban on new mining claims around the canyon, saying it will secure Obama’s green legacy

Queensland lifts uranium mining ban

22 October 2012

Uranium mining will be allowed in the Australian state of Queensland after the state government overturned 23 years of prohibition. The state has not produced uranium since 1982.

Virginia Keeps Ban on Uranium Mining

By CAMERON MCWHIRTER
Jan. 31, 2013 6:39 p.m. ET

CANADA: BAN ON URANIUM MINING IN BRITISH COLUMBIA
French nuclear company Areva reaches uranium mining deal with Niger after protests

PARIS – French nuclear manufacturer Areva has reached a deal with Niger’s government to continue uranium mining after promising to pay more taxes and invest in local development.

Critics say the country’s uranium riches aren't translating into wealth for its citizen and have accused Areva of exploiting Niger since it began operations in 1971. Niger is the world's fourth-largest uranium producer.
Fraser Institute: Ranking of Countries: 2013

The Fraser Institute’s vision is a free and prosperous world where individuals benefit from greater choice, competitive markets, and personal responsibility. Our mission is to measure, study, and communicate the impact of competitive markets and government interventions on the welfare of individuals.

Figure 1: Policy Perception Index

<table>
<thead>
<tr>
<th>BEST</th>
<th>Worst</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweden</td>
<td>Zambia</td>
</tr>
<tr>
<td>Finland</td>
<td>Panama</td>
</tr>
<tr>
<td>Alberta</td>
<td>Poland</td>
</tr>
<tr>
<td>Ireland</td>
<td>Vietnam</td>
</tr>
<tr>
<td>Wyoming</td>
<td>Argentina: Jujuy</td>
</tr>
<tr>
<td>Western Australia</td>
<td>Tanzania</td>
</tr>
<tr>
<td>New Brunswick</td>
<td>India</td>
</tr>
<tr>
<td>Nevada</td>
<td>South Africa</td>
</tr>
<tr>
<td>New Brunswick &amp; Labrador</td>
<td>Brazil</td>
</tr>
<tr>
<td>Norway</td>
<td>Liberia</td>
</tr>
<tr>
<td>South Australia</td>
<td>Myanmar</td>
</tr>
<tr>
<td>Saskatchewan</td>
<td>Guyana</td>
</tr>
<tr>
<td>Northern Territory</td>
<td>Malaysia</td>
</tr>
<tr>
<td>New Zealand</td>
<td>Mali</td>
</tr>
<tr>
<td>Minnesota</td>
<td>Colombia</td>
</tr>
<tr>
<td>Utah</td>
<td>Niger</td>
</tr>
<tr>
<td>Michigan</td>
<td>Fiji</td>
</tr>
<tr>
<td>France</td>
<td>Suriname</td>
</tr>
<tr>
<td>Yukon</td>
<td>Nigeria</td>
</tr>
<tr>
<td>Arizona</td>
<td>Mozambique</td>
</tr>
<tr>
<td>Alaska</td>
<td>Guinea (Conakry)</td>
</tr>
<tr>
<td>Quebec</td>
<td>Ethio pa</td>
</tr>
<tr>
<td>Greenland</td>
<td>Kenya</td>
</tr>
<tr>
<td>Queensland</td>
<td>Nicaragua</td>
</tr>
<tr>
<td>Botswana</td>
<td>Studi Araba</td>
</tr>
<tr>
<td>Manitoba</td>
<td>Uruguay</td>
</tr>
<tr>
<td>Tasmania</td>
<td>Argentina: Santa Cruz</td>
</tr>
<tr>
<td>Ontario</td>
<td>Papua New Guinea</td>
</tr>
<tr>
<td>Nova Scotia</td>
<td>DR (Congo)</td>
</tr>
<tr>
<td>Chile</td>
<td>Remora</td>
</tr>
<tr>
<td>Idaho</td>
<td>Kazakhstan</td>
</tr>
<tr>
<td>British Columbia</td>
<td>China</td>
</tr>
<tr>
<td>Victoria</td>
<td>Greece</td>
</tr>
<tr>
<td>Namibia</td>
<td>Argentina: Ro Negro</td>
</tr>
</tbody>
</table>
Who Controls The Uranium?

"The ‘operator’ should not start … operations in a district which is oppressed by a tyrant, but should carefully consider if the overlord there be friendly or inimical."

-Georgious Agricola, 1556, De Re Metallica

inimical - “having the disposition of an enemy”
OUTLINE

1. Jurisdiction Issues: Is the Government with you or against you?
   I. National Government, State Government, Local Government:
      a) Regulatory Agencies
      b) Legal System

2. Deposit Quality: Grade is king? Brief review of historical and current production.
   I. High grade versus low grade: Why mine low grade?

3. Comparison of top producing countries attributes, be they uranium deposit quality (grade, size) versus government involvement (government helpful or hurtful).
URANIUM DEPOSIT TYPES

The International Atomic Energy Agency assigns the uranium deposits according to their geological settings to 15 main categories of deposit types, arranged according to their approximate economic significance [IAEA2004]:

- Unconformity-related deposits
- Sandstone deposits
- Quartz-pebble conglomerate deposits
- Vein deposits
- Breccia complex deposits
- Intrusive deposits
- Phosphorite deposits
- Collapse breccia pipe deposits
- Volcanic deposits
- Surficial deposits
- Metasomatite deposits
- Metamorphic deposits
- Lignite
- Black shale deposits
- Other types of deposits
2012 World Uranium Production
By Deposit Geology

- Sandstone: 56%
- Unconformity: 21%
- Evaporite: 8%
- Hem-Breccia: 5%
- Vocanic: 4%
- Other: 5%

http://www.world-nuclear.org/info/Nuclear-Fuel-Cycle/Mining-of-Uranium/World-Uranium-Mining-Production/
WORLD CUMULATIVE URANIUM PRODUCTION

TONNES U
Countries with production > 75,000 tonnes U

World Cumulative Uranium Production
By Deposit Geology

- Sandstone: 29%
- Unconformity: 19%
- Evaporite: 7%
- Hem-Breccia: 5%
- Volcanic: 10%
- QTZ-Pebb: 1%
- Other: 17%
2012 versus World Cumulative Uranium Production By Deposit Geology
## URANIUM RESOURCES

### Reasonably Assured Resources

**Tonnes U**

<table>
<thead>
<tr>
<th></th>
<th>US</th>
<th>Canada</th>
<th>Kazakhstan</th>
<th>Total</th>
<th>US</th>
<th>Canada</th>
<th>Kazakhstan</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unconformity</td>
<td>-</td>
<td>237,927</td>
<td>-</td>
<td>237,927</td>
<td>-</td>
<td>292,527</td>
<td>-</td>
<td>292,527</td>
</tr>
<tr>
<td>Sandstone</td>
<td>0</td>
<td>0</td>
<td>19,177</td>
<td>19,177</td>
<td>39,064</td>
<td>-</td>
<td>278,875</td>
<td>317,939</td>
</tr>
<tr>
<td>Hem. Breccia</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Quartz Pebble</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Vein</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- **< $40/kg**
- **< $80/kg**

2012 World Uranium Production
Approximate Grade of Deposit Types

- **Sandstone**: 0.10%
- **Unconformity**: 10.00%
- **Evaporite**: 0.05%
- **Hem-Breccia**: 0.05%
- **Vocanic**: 0.20%
- **Other**: 0.20%
2012 World Uranium Production
Value of 1 tonne of Ore at $30/pound

- Sandstone: $60
- Unconformity: $6,000
- Evaporite: $30
- Hem-Breccia: $30
- Vocanic: $120
- Other: $120
ATHABASCA PROJECTS
By GRADE

WT Average = 12.97 % U

ATHABASCA PROJECTS

Weighted AV= 12.97 % U

12.97 % U

0.07 % U : This is the average grade of most other production in the world! “in-situ” “heap-leach”.

0.9 % U : This is the average grade of the very best grades available in the rest of the world. Examples would be Breccia Pipes (US), Vein/volcanic deposits in Europe/Asia/Australia.

2 % U : This is the average grade of the low grade deposits in the Athabasca Basin.

1x % U : This is the average grade of all deposits in the Athabasca Basin.
OUTLINE

1. Jurisdiction Issues: Is the Government with you or against you?
   I. National Government, State Government, Local Government:
      a) Regulatory Agencies
      b) Legal System

2. Deposit Quality: Grade is king? Brief review of historical and current production.
   I. High grade versus low grade: Why mine low grade?

3. Comparison of top producing countries attributes, be they uranium deposit quality (grade, size) versus government involvement (government helpful or hurtful).
JURISDICTION VERSUS U DEPOSIT ATTRIBUTES
Comparison of 6 POLITICAL AND GEOLOGIC ATTRIBUTES

FRASER INSTITUTE

GOVERNMENT WITH (NOT)

GRADE

DEPOSIT SIZE

PERMITTING

TIME
JURISDICTION VERSUS U DEPOSIT ATTRIBUTES
Comparison of the Three Major World Uranium Producing Areas
CONCLUSION

JURISDICTION versus GRADE

Grade is King! But government policy can and does affect the ability to mine.

Government can and does help get projects into production by:

• Streamlining Permit Process
• Favorable Royalty and Infrastructure Support
• And by default, faster approval allows a better economic return by hitting peak price and utilizing the time value of money factor.
JURISDICTION

Who Controls The Uranium?

"The ‘operator’ should not start … operations in a
district which is oppressed by a tyrant,
but should carefully consider if the overlord there be
friendly or inimical."

-Georgious Agricola, 1556, De Re Metallica

THANK YOU - QUESTIONS

2012 World Uranium Production
Approximate Grade of Deposit Types

JURISDICTION VERSUS U DEPOSIT ATTRIBUTES
Comparison of the Three Major World Uranium Producing Areas