



MiningWatch Canada

Mines Alerte

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Submission to the Bureau des audiences publiques sur l'environnement (BAPE) Uranium Inquiry

October 30, 2014

MiningWatch Canada is pleased to submit these brief comments to you regarding the future of uranium exploration and mining in Quebec.

MiningWatch is a pan-Canadian initiative based in Ottawa. We work to improve mining's social and environmental practices and the legal and policy framework that guides them. We also work to prevent irresponsible projects and practices where affected Indigenous peoples and other citizens choose to oppose them. We are active members of the Coalition Québec Meilleure Mine and have engaged in the environmental assessment and permitting process for the Matoush Uranium Project and Kipawa Rare Earths Project.

MiningWatch fully supports the position of many First Nations, individuals, organizations, and municipalities that have raised their voice in opposition to uranium mining in Quebec. We also support the demand for a moratorium on rare earth element (REE) mining made by the Assembly of First Nations of Quebec and Labrador and the Algonquin First Nations of Eagle Village and Wolf Lake.

This broad opposition represents a dramatic failure of the industry to gain a social licence to operate and to obtain the Free Prior Informed Consent (FPIC) of affected Indigenous peoples. The BAPE should acknowledge this failure and the valid reasons that underlie this opposition.

Despite industry efforts to portray uranium and REE exploration and mining as by in large the same as other types of mining, it is not, and those who oppose uranium and REE mining have strong basis for their concerns. Importantly, uranium and REE mining are different in the potential for contamination from radioactive elements. In the case of uranium there is also the important fact that most mined uranium is destined for nuclear power plants, which leads to increasingly dangerous radioactive wastes, the management of which has not been satisfactorily resolved anywhere in the world. While only a small amount of uranium is used in nuclear weaponry, the threat this poses cannot be ignored. As discussed during the BAPE hearing in Chelsea, we are not satisfied with the assurances provided by the industry and the CNSC that uranium mined in Quebec could not find its way into nuclear weapons, especially given much of the projected growth of nuclear power and uranium exports is in China and India – both nuclear weapons holding states that are not signatories to the Non-proliferation Treaty.

Given the level of concern surrounding uranium exploration and mining, MiningWatch developed the attached policy statement calling for a halt to new uranium developments in Canada. We feel this statement remains current seven years after it was drafted.

Some industry supporters will argue that a uranium and REE ban in Quebec would create significant economic disadvantages. This risk is not credible, given the experience of other jurisdictions and the current market context for uranium and REEs.

Given the current price of uranium and REEs and the available supply from other sources, Quebec's uranium projects are unlikely to be economically viable in the near term. Strateco Resources, for example, based its assumptions about profitability of the Matoush project at a price of \$75 per pound, more than double the current priceⁱ. Analysts have widely varying levels of optimism about a return to higher prices; however, we strongly recommend reading an overview by nuclear consultant Steve Kidd that was published in Nuclear Engineering International earlier this year (the article is included with our submission). Mr. Kidd comments: "We are now more likely to see a long period of relatively low prices, in which uranium producers will find it hard to make a living."

As you no doubt know, opposition to uranium exploration and mining resulted in bans in Nova Scotia and British Columbia. These bans have not resulted in the provinces being abandoned by the mining sector, and in fact the government of BC continues to successfully pursue a very pro-mining agenda. Price Waterhouse Coopers' 2013 survey of the industry in BC notes: "In spite of some financial challenges over the last couple of years, B.C.'s mining sector continues to move forward. Since 2011, the Copper Mountain, New Afton, and Mount Milligan mines in B.C. have come into production. The province has a number of new mines under construction and the new Red Chris and Roman mines should open in 2014."ⁱⁱ

In conclusion, we urge you to recommend that Quebec institute a full ban on uranium exploration and future exploitation. This would be a protective measure for the environment while respecting First Nations' right to Free Prior Informed Consent, and the broad opposition in Quebec society. We also urge you to recommend a moratorium on REE mining as demanded by the AFNQL and Algonquin Nations. Given the questionable economics of proposed uranium and REE projects, and the alternative development opportunities for Quebec, the downside costs of implementing these recommendations are negligible.

ⁱ <http://www.stratecoinc.com/data/pdf/2012/RPAStratecoMatoushMemoDec42012Final.pdf>

ⁱⁱ <http://www.pwc.com/ca/en/mining/mining-industry-british-columbia.jhtml>

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Attachment 1: Uranium Policy



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Policy Statement on Uranium Mining

Uranium mining is a highly contentious issue across Canada and globally. Uranium mining, from exploration through to mining, processing, and eventual decommissioning, is risky and dangerous to the environment, wildlife, local peoples and communities, and workers.

Uranium is used for three purposes: weaponry, medical and scientific technology, and energy. MiningWatch Canada believes that there is no public support in Canada for the use of uranium for weaponry, and that medical and scientific technology uses could be well served by existing stockpiles of uranium.

The use of uranium for energy purposes is complex and contentious:

- The efficiencies, sustainability, costs, and benefits of nuclear energy must be considered and weighed against the efficiencies, sustainability, costs, and benefits of other energy sources (for example: gas, oil, coal, wind, and thermal), and against greatly enhanced conservation.
- The opportunity costs of the use of non renewable fuels (for example: coal, oil, and gas) for energy must be considered and weighed.
- The very serious short and long term waste management issues and risks of nuclear energy must be considered and weighed. At this point, there is no proven or publicly accepted technology for managing the long term risks.
- The risks of nuclear energy (for example: terrorist attacks and serious failures of nuclear plants) must be considered and weighed, particularly as these risks have far wider public impacts beyond the impacts on local environments, wildlife, people, and communities.
- Arguments have been made that nuclear energy is environmentally “clean and green”. While this may be true at the point of burning processed uranium as a fuel, the nuclear industry, seen as a whole, is not clean, nor green. It does contribute to green house gas emissions.
- There is no public consensus across Canadian society about overall energy policy, nor about nuclear energy as a key or primary part of public energy policy.

MiningWatch Canada takes the position that ***there should be a total moratorium on uranium exploration and new uranium mines across Canada until such time as:***

- *There is a full, well informed, and serious public debate and national consensus regarding energy policy, and the role of nuclear energy as part of this overall energy policy;*
- *The destructive environmental legacy of past and existing uranium mining has been cleaned up and permanently neutralized, and the people who have suffered injury to their health from involvement in or exposure to uranium mining and processing have been adequately compensated individually and collectively; and*
- *There is a sound, long term, economically feasible, scientifically demonstrated, and publicly acceptable means of isolating radioactive wastes (from the mining, processing, and use of uranium) from the environment and from human communities.*

Uranium exploration and mining creates serious negative short and long term impacts on the environment and on individuals and local communities. *MiningWatch Canada takes the position, as it does with all exploration and mining, that these impacts must be minimized and mitigated against, no matter what the public benefits may be.*

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Attachment 2: The Future of uranium – higher prices to come?



to come?

6 May 2014 by [Steve Kidd](#)

Predictions of the rise in price of uranium are unjustified; they do not fully appreciate the segmented nature of the market.

The world uranium market has fallen back substantially from the highs it sustained in the period around 2005-2010, when the spot price peaked at over \$130 per pound in summer 2007. After the Fukushima accident in 2011, the price drifted down further and has been stable at the \$35 per pound level since last summer. Although this is well above the \$10 per pound that prevailed for the long period from the late 1980s up until 2003, it is universally agreed that very few (if any) new mines can be developed at today's price level. The suggestion is therefore made (particularly by uranium producers and their financial sector backers) that with rising demand, there will be shortages of supply in future unless we soon have much higher prices to encourage new production. On the demand side, a lot of attention is currently being to the upcoming Japanese reactor restart programme, in terms of timing and number of reactors.



[Cartoon by Alexey Koveynev]

A recent report from my company (East Cliff Consulting, 'The Fifth Age of Uranium') shows why the case made by the uranium bulls is in reality full of holes. We are now more likely to see a long period of relatively low prices, in which uranium producers will find it hard to make a living.

Substantial oversupply in the Fourth Age

The starting point is to understand the full history of uranium supply and demand. This is covered in the WNA's biennial fuel market report, which identifies four distinct ages running from 1945 until today. The fourth of these began in 2003, when prices started rising sharply to mark the end of the third age, which was the long period of inventory rundown and constrained production lasting from the late 1980s. Talk in 2003 was of a "renaissance" of nuclear power and lots of new mines were apparently needed to meet their fuel requirements, while previously abundant secondary supplies would gradually wither away. Not so different from what the optimists are saying about uranium today.

World production certainly responded strongly to the obvious price signal back then and it had risen by half by 2010. One curious feature, however, was that the increase was almost entirely concentrated in only one country, namely Kazakhstan. Apart from this, hundreds of "junior" uranium companies suddenly appeared but the only company successful in establishing new large-scale production facilities was Paladin, with Langer Heinrich in Namibia and Kayelekera in Malawi. The others succeeded in

mining only the financial markets.

Another remarkable fact was that despite all the hype about nuclear growth plans, the level of underlying uranium demand did not rise at all during this period. This is even without the adverse impact of the accident at Fukushima in 2011. Shutdowns of ageing reactors in various countries were just balanced by the commissioning of new units (increasingly in China). Another crucial factor has been a fundamental realignment in the relationship between uranium and enrichment requirements.

The closure of the inefficient gaseous diffusion enrichment plants removed the high marginal cost production which had propped up prices, while notably higher uranium prices in themselves encouraged the use of higher enrichment (through reducing the optimum "tails assay"). Enrichment is now expected to remain cheap and abundant as centrifuge plants are modular and capacity can be expanded relatively easily to meet demand, so this substitution of enrichment for uranium will continue to be important.

The impact of much higher production combined with static demand during this fourth uranium age is substantial over-supply in the world uranium market, with prices naturally falling back to lower levels. The other obvious corollary of this period has been a renewed upsurge in uranium inventory levels in the United States, Europe and (with the shutdown of reactors since Fukushima) Japan. Some of this has been entirely voluntary on the part of the fuel buyers, who want more security of supply. The biggest increase has been in China, which has been building huge inventory balances to provide security for the anticipated fuel requirements of its rapid reactor building programme. On the other hand, some of the accumulation (such as in Japan) has been involuntary and this material can be used to balance the market over the next period, effectively at the expense of fresh production.

In fact China can be seen as the mirror image of the production growth in Kazakhstan, as the majority of Chinese imports have been sourced from there. The rest of the world has continued much as before, with no overall nuclear growth and not much of any real substance happening in the development of new uranium mines, except a few key projects such as Cigar Lake in Canada.

Uranium demand to increase in China and Russia

"Uranium demand will almost certainly fall in the key markets in Western Europe and North America"

The uranium bulls continue to point to the prospects for nuclear growth to 2030. The problem is that most of this will be concentrated in China and Russia. Over half will likely be in China and the Chinese may also become important in supplying reactors to other countries in the 2020s. The Russian domestic nuclear programme is now progressing quite well, and they too will be a key supplier of reactors to other countries in the period to 2030. When the

"Despite all the hype about nuclear growth plans, the level of underlying uranium demand did not rise at all during this period"

Russians supply a reactor, they invariably include long-term fuel contracts. What is important is that uranium demand will almost certainly fall in the key markets in Western Europe and North America, which are satisfied by the established uranium producers. Many Japanese reactors will undoubtedly restart but it will take a long time to unwind the inventory accumulation there.

Those who believe in higher uranium prices take an over-optimistic demand scenario. It can now be argued that the range of possibilities has actually narrowed considerably and it is appropriate to centre discussion on just one main case to 2030. Upper scenarios showing rapid nuclear growth in many countries including plants starting up in new countries now look very unlikely, certainly before the late 2020s. If there is to be a nuclear renaissance, it is now much more likely to happen later, and with a new generation of reactors. On the other hand, predictions that another major accident would shut down nuclear in lots of countries have been negated by the experience of Fukushima. Although there remain some uncertainties, the outlying upper and lower cases are much less credible than before.

Uranium market split into three

So we are entering a fifth era of uranium, where the market is split into three.

The **Chinese** will favour investing directly in mines to satisfy their requirements. These (like Husab in Namibia) will not necessarily be at the low end of the cost curve: there are important geopolitical considerations too and the Chinese are keen to get involved directly in the economic development of many countries, particularly in Africa. They are also not going to "play ball" with the established uranium market. Although they will maintain a presence in the spot market and sign further long-term supply contracts with producers, they have learned their lesson from the iron ore market. In that sector their heavy dependence on imports from BHP Billiton, Rio Tinto and Vale has given these producers fantastic profits.

The **Russians** will continue to be significant nuclear fuel exporters but their own market will remain essentially closed to outsiders. They still have secondary supplies to tap into (plenty of surplus HEU remains to be down-blended) and they will follow the Chinese and invest directly in uranium assets if their own domestic production remains constrained. Their recent acquisition of the producer Uranium One can be seen very much in this vein.

The **established uranium producers** will have the remainder of the market to satisfy and that will likely be declining in magnitude. There are bright spots are South Korea and the Middle East (where Saudi Arabia may join the UAE in having a nuclear programme) but the prospects in North America and Europe are not so good. In the United States, the number of operating reactors will fall by 2030, with a small number of new units not sufficient to compensate for closures due to cheap shale gas and the incursion of subsidised renewable energy into power markets. Although reactors may well be licensed for up to 80 years, they will not operate unless the economic fundamentals are right. In Canada too, it seems unlikely that all three nuclear stations in Ontario will be

refurbished, and there is a strong possibility that Pickering will close. In Europe, even in France the future of the currently operating units is now in question. It is likely that there will be a gradual reduction in the nuclear share of electricity in France towards 50% and so older units (beyond Fessenheim) will likely close by 2030. New-build in the United Kingdom will only compensate for units shutting down, while further new units will only happen in a few countries such as Finland and (possibly) the Czech Republic. So with countries like Belgium and Switzerland following Germany into a nuclear phase-out, the overall European situation is one of gentle decline.

This market segmentation and the way the Chinese and Russians will operate means that the two prime analytical devices utilised in the uranium market are both now useless. First, calculated annual world supply-demand balances (miraculously often showing a shortage after 3-5 years) are irrelevant in a segmented market, where key actors with expanding demand choose to go it alone. For a time in the early 2000s, it looked as if a globalised world nuclear fuel market could emerge, but this has not happened and it is arguably now going into reverse. Secondly, uranium supply curves (based on mine cost data), demonstrating the need for higher prices as demand expands, are also invalidated. China and Russia (and probably India too, if it eventually gets its nuclear act together) will develop uranium assets wherever it best suits them. They have the confidence to bypass the conventional market, which could increasingly become merely a sideshow.

"China and Russia...will develop uranium assets wherever it best suits them. They have the confidence to bypass the conventional market, which could increasingly become merely a sideshow."

Another issue to watch is the persistence of secondary supplies beyond Russia. Only part of the 2.5 million tonnes of uranium mined since 1945 has been utilised. Almost 2 million tonnes of depleted uranium is an attractive resource while there is overcapacity in enrichment and cheaper prices. In the very long term, China, Russia and India are committed to reprocessing their used fuel and will probably eventually succeed in tempering their uranium use by building large reprocessing plants. Any substantial replacement of uranium, however, will have to await the next generation of reactors, which will be fuelled very differently from today's large light water designs.

Fifth Age price predictions

In this fifth age of uranium, prices will essentially be determined by the cash costs of production of operating mines (and not by the full costs of future mines). This means a reversion to the long period of low (but relatively stable) uranium prices of the late 1980s and 1990s (the third age), but at a higher level to reflect the greater level of production now, the escalation of mining costs and the movements in currency exchange rates. The shortages predicted by many analysts (leading to rapid price increases to provide good rates of return on their favourite projects) are

purely a mirage.

The outlook is therefore not favourable for either current or prospective uranium producers. Only those with low-cost operations will prosper. Others will struggle to stay in business and further mine closures (beyond Paladin's Kayelekera which is now on "care and maintenance") are definitely on the horizon. A high-profile mine closure is one factor that could cause the price to spike, but historical experience is actually rather different: once mines get into operation, owners will usually withstand short-term financial losses so long as they are convinced that there are better times around the corner. And they tend to be incurable optimists.

Steve Kidd is an independent nuclear consultant and economist with 17 years of work in senior positions at the World Nuclear Association and its predecessor organization, the Uranium Institute.

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