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Royal Roads University

Management of Used Nuclear Fuel

July 1st – August 14th, 2005

Moderated by Dr. Ann Dale

Dialogue

#1: Welcome to participants

Author: Ann Dale, Posted: Wed Jul 06, 2005 5:09 pm

Thank you for participating in this public forum on the management of used nuclear fuel in Canada. Make a difference now and make your voice heard on the recently released draft study report from the Nuclear Waste Management Organization.

We invite you to review the NWMO draft study report, make your views known, share ideas, and ask questions which the NWMO staff will be pleased to answer.

The forum will be open from now until July 31, 2005, following which we will prepare a public report to the NWMO and also published on this website.

Thank you, Ann Dale

"The future of civil society is grounded in a continuing conversation about the values and conditions that underwrite participation in that society. Our current practice as a society is to insist that questions of life and death, of purpose and meaning, of vocation, values and community must be decided without reference to the very terms in which those questions are grounded."

---Michael Peeves, The Globe and Mail, Saturday, March 16, 2002

#1: Is there research into other uses for this waste?

Author: Steve, PostPosted: Fri Jul 01, 2005 7:07 am

On page 19 of the draft report it mentions "The cost of this management approach for used nuclear fuel is conservatively estimated to be about \$24 billion (2002 dollars)".

How much priority and funding is specifically being allocated towards research in finding environmental friendly applications for this used nuclear fuel? If this has already begun, is it a part of the above mentioned \$24 billion? Or is this money simply to build a "safe" home for this waste?

Are the organizations that produce this stuff footing the bill or will Canadians be yet again paying?

Is there any existing recommendation from your organization that requires "the creators" to set aside a specific fund to address this issue?

I am not overly thrilled about storing this toxic waste, but if we can find a practical application for this stuff in the future that would make nuclear fuel much more palatable to Canadians and be a welcome alternative to burning coal.

#2: Author: Randal Leavitt, PostPosted: Sun Jul 03, 2005 8:13 am

The fuel that has been used once in a CANDU reactor is a highly valued energy source. Less than once percent of the energy available in the uranium is consumed during the fuel's first 18-month pass through the reactor. At that rate the fuel could be reused to produce electricity more than 137 times. So that used once fuel that is sitting at our reactor sites holds enough energy to power Canada for a century. The last thing we want to do is bury it. It is worth billions of dollars.

#3: Author: NWMO, PostPosted: Tue Jul 05, 2005 10:11 am

Thank you for your questions Steve. We hope the following comments address the issues you have raised.

Level of research funding? The NWMO's Draft Study Report Choosing a Way Forward has recommended Adaptive Phased Management for the long-term care of Canada's used nuclear fuel. This approach identifies the important role of research during all stages of implementation (for example, see Chapter 16). The anticipated level of funding for research is approximately \$10 million to \$20 million dollars per year.

Is research on environmentally friendly applications included? Reprocessing and transmutation of the used fuel is one application that Canadians have expressed an interest in as a means of potentially recycling some elements of the fuel and/or reducing the hazard or volume of the waste to be managed. At present, CANDU reactors use a once-through fuel cycle and thus far there has not been a strong case for Canada to reprocess used nuclear fuel (see Draft Study Report Appendix 8). Nevertheless, it is recognized that other fuel cycles aimed at the optimum use of uranium and plutonium could at some point be implemented in Canada. Therefore, the NWMO has recommended that Canada keep a watching brief on the international research activities associated with reprocessing, partitioning and transmutation of used nuclear fuel.

Further details with respect to specific research activities will be developed during implementation of the approach selected by the Government of Canada.

Funding by waste producers? The Government of Canada policy and the Nuclear Fuel Waste Act require that the producers of used nuclear fuel provide sufficient funds to pay for the total cost to manage the material (see Draft Study Report Chapter 18). Currently, the waste owners include the three nuclear utilities Ontario Power Generation Inc., Hydro-Québec and NB Power Nuclear, and Atomic Energy of Canada Limited. To date, these four corporations have contributed \$770 million to the trust fund. Following a decision by the Government of Canada on the long-term management of Canada's used nuclear fuel, trust fund contributions to be made by each producer will be reviewed and adjusted to reflect improved projections of overall costs and number of fuel bundles to be produced.

#1: Nature's used nuclear fuel

Author: Jaro, PostPosted: Tue Jul 12, 2005 6:11 pm

FYI, a little info about Nature's used nuclear fuel.....

Jaro

-----Original Message-----

From: J. Marvin Herndon

Sent: Tuesday, July 12, 2005 8:19 PM

To: Jaro

Subject: Teaching About Nature's Nuclear Reactors

Dear Jaro,

I am pleased to attach a new paper, intended for science teachers, entitled "Teaching About Nature's Nuclear Reactors" and posted at <http://arXiv.org/physics/0507088> . The paper introduces the subject of natural nuclear fission and describes some of methodology and ethical considerations that are inherently a part of well executed scientific investigations. In particular, the paper emphasizes the importance of discussing, debating, and challenging current thinking in a variety of areas. Enjoy.

All best,

Marvin

#1: The term "waste" is obsolete

Author: Randal Leavitt, PostPosted: Sun Jul 03, 2005 8:41 am

The operation of a CANDU reactor does not release radioactive waste. The used once fuel that anti-nuclear people have been referring to as waste is not waste. It can be used to produce 135 times as much energy as was released during its first pass through the reactor. Reusable stored energy is not waste.

Waste is something that you throw away and hope to never see again. That does not happen with used once fuel. All that used once fuel is not thrown away or released as we would do with waste - it is kept at the reactor site. And this is a good thing because that material is worth a fortune as an energy source.

The word "waste" is associated with sewage, and the good old days when we used to dump our detritus in the river and send it down stream out of our lives forever. Waste is bad. This word has been employed by people who want to stop the use of nuclear power to give the nuclear power industry a bad reputation. The term "waste" is manipulative, and a lie.

CANDU reactors are clean and quiet. They do not release any waste. They do not release green house gas pollution. They do not release any radioactive waste. Nothing. They just output electricity and used once fuel which is all accounted for, kept on site, and causes no problems for anyone.

OK - but what should we do with that little bit of used once fuel that is slowly accumulating at our reactor sites? The answer is that we should handle it with great care and respect. It is worth billions of dollars. We can use it in fast reactors to produce electricity. (Note: CANDU reactors are not fast reactors.) The first pass through a CANDU reactor consumes less than one percent of the energy potential of the uranium. The remaining 99% is sitting there in that used once fuel, all nicely mined, prepared, packaged, and ready to use. It will have to be processed - fission products extracted, oxides reduced to metals, transuranics extracted (along with a little uranium), metallic fuel fabricated, etc. But then it can be reused to produce hundreds of times more electricity. The rate of expansion of fast reactors will be limited by the availability of fissile material -- the fuel has to be some 20% fissile to start the reactor. Once fueled, however, a fast reactor can generate enough fissile material to keep itself going, with some to spare.

So we have enough stored up energy in our used once fuel to power Canada for more than a century - carbon dioxide free, no new mine tailings, nothing. We have a huge energy reserve sitting there right under our noses and all we have to do is use it. No oil wars needed, no pipelines through aboriginal lands, no problems.

CANDU reactors are really clean, and really valuable. They can give us a high standard of living, lots of employment based on the power they give our industries, and a hope that we can get through the global warming crisis. But we will have to evolve to using fast reactors to get the full benefit of the uranium that we are mining. We don't have to

rush into this as long as we keep the used once fuel around for reuse when they are built.

CANDU reactors are more than waste free, they are energy wealth accumulators..

OK - are fast reactors also waste free? The answer is no. When uranium is consumed in a fast reactor it is broken down into elements that cannot break down further due to fission, mostly cesium and strontium. These elements are radioactive, but have very short half lives. We can dump them into a repository and the radioactivity levels will be less than the normal background level of the planet within three hundred years. The millions of years of toxic pollution concept that is so threatening for environmentalists has gone away. The problem is solved, there is hope, and we can live in a better way.

#2: Author: Lenore Newman, PostPosted: Mon Jul 11, 2005 7:10 am

Wow, that's a pretty optimistic post. I guess the obvious question is if the previous is accurate why does the government want to bury the waste? Why haven't we built fast reactors? There must be some sort of reason. What do they produce that is a problem? Are they really expensive? I mean, let's be honest, nuclear power has cost Canada a fortune. I guess my other question is if the Candu is so great, why haven't we sold many? Why are the Chinese researching pebble bed reactors? Cheaper? Better? Safer? I would love to know.

As the NWMO has recommended a disposal path, not a reuse path, they must know something about fast reactors that I don't. What is it? Anyone?

#3: Author: NWMO, PostPosted: Wed Jul 13, 2005 10:23 am

On the question of 'waste'. ... The NWMO has referred to used nuclear fuel as a waste in its study, consistent with the position of the Government of Canada as outlined in our governing legislation – The Nuclear Fuel Waste Act.

However, the question of whether used nuclear fuel is truly a waste or in fact a resource which can be 'recycled' or 'reused' has been raised and debated in dialogues throughout the NWMO's study.

In response to both the interest expressed in dialogues and ongoing international work in this area, the NWMO has included in its study a review of the potential and practicability of using "Reprocessing, Partitioning and Transmutation" to reuse used nuclear fuel in Canada. (See NWMO Background Papers 6-4 and 6-14, and Appendix 8 of Draft Study Report).

NWMO has suggested that for a number of reasons reprocessing as a management approach is considered to be highly unlikely as a viable option at this time. The necessary facilities are very expensive, and inevitably produce residual radioactive

wastes that are more difficult to manage than used nuclear fuel in its un-reprocessed form. Reprocessing, and associated technical methods, also requires a commitment to an expanded and multi-generational nuclear fuel cycle, and it potentially separates out material (e.g. plutonium) which could be used to produce nuclear weapons. The abundant reserves of natural uranium in Canada suggest that it is unlikely that Canada will implement reprocessing in the near future. Canada is a leader in uranium mining and Canadian uranium reserves are far from being depleted. The cost of reprocessing is quite high and is not about to be exceeded in the near future by the cost of mined natural uranium.

However, economic conditions and technologies could be much different in 50 or 300 years. This is, in part, the reason why the NWMO is suggesting a flexible and adaptive implementation plan. A waste management approach that ensures accessibility to the used fuel for an extended period would provide the adaptability and flexibility to enable future generations to make decisions on the case for reprocessing, as well as other technologies, in the future.

The flexibility and adaptability of NWMO's proposed approach has been a point of discussion in recent submissions to the NWMO and in dialogue sessions. We welcome further comment on this aspect of the recommendation as well.

#4: Author: Jeremy Whitlock, PostPosted: Thu Jul 14, 2005 3:25 pm

As an historical "aside": it is interesting to note that reprocessing/recycling of reactor fuel was the first fuel cycle strategy explored by countries with nuclear programs in the early decades, including within Canada, and quite aggressively. From the outset of nuclear reactor operation in Canada, scientists at Atomic Energy of Canada Ltd. were examining ways to safely dispose of the leftover waste that results from the reprocessing of used fuel. The reason for this focus was the belief that uranium was a scarce economical resource. Once large deposits of uranium were located around the world, and particularly within Canada, the economic incentive for "recycling" used fuel disappeared. However, given that ~99% of the energy potential of uranium fuel remains after it is removed from the reactor, many consider it highly unethical to plan anything that restricts the access of future generations to this resource. Clearly, the concept of sustainable development implies doing as much as we can now to safely sequester the used fuel, while avoiding any action that limits our descendents' options. This concept is inherent in the NWMO's draft plan of Adaptive Phased Management.

#5: Author: Randal Leavitt, PostPosted: Sun Jul 17, 2005 4:50 pm

Are fast reactors really expensive? That is an interesting question. We can derive all our energy needs by burning wood. That would be really cheap. Of course, all the trees would be gone by next year. But we would save a lot of money for one year. Or we could derive all our energy by running windmills. Of course, we would not have any

computer networks since they need steady, regular power. But we could save a lot of money and just learn to live without computer networks. So what do we mean by expensive? We have two choices: cheap coal which includes global warming planet death, or expensive nuclear which offers a hope of continued existence. I find the "cheap" choice difficult to get enthusiastic about.

#1: the proposed "central sites"

Author: Sarah Veemy, PostPosted: Mon Jul 04, 2005 7:23 am

If this plan is implemented who decides where to store this waste?

Does it get put way up north somewhere out of the way of any population or does it get stored near some town that is paid lots of money to accept this waste? Are there any guidelines that require this waste to be stored "x amount of km" away from existing populations?

If it is near a "town" do the citizens get to vote on whether or not they want this waste or would the leaders of this town (influenced by the input of money into their community or their pockets depending) and the federal governments make the decisions?

#2: Author: NWMO, PostPosted: Tue Jul 05, 2005 2:30 pm

Thank you for your questions Sarah. We hope the following comments address the issues you have raised.

In the Draft Study Report, Choosing a Way Forward, the NWMO states it intends to seek a willing community to host the centralized facilities. It also suggests that in order for a site to be acceptable, it would need to address a number of social/ethical principles and technical siting factors to ensure that any facility built is both fair and capable of protecting us and future generations, other life-forms and the biosphere as a whole into the indefinite future. (These principles and factors are outlined on pages 163 and 164 of the report.) With this as a starting point, the NWMO has suggested that a detailed siting process should be collaboratively developed with those potentially affected following a Government of Canada decision on the management approach. The NWMO welcomes comment on the appropriateness of this list of principles and factors, and any suggestions for additions or deletions to this list.

Close or far from population centres? As it stands, there is no requirement in this list concerning how far or how close the facilities should be from existing population centres. The question of proximity to population centres would be addressed as siting proceeds and the suitability of interested communities which may come forward is examined.

What constitutes a "willing" host? Any potential host community will have to demonstrate that it has community support to host a central facility. In the Draft Study Report, the NWMO suggests that the process which a potential host community uses to assess its own support should be developed with the involvement of the community itself and may be different from one community to another. The social/ethical principles suggest that the active involvement of residents of the community is important.

Is it necessary to site the facility in the north? The NWMO has recommended that siting for a central long-term management facility should focus on the four provinces that are directly involved in the nuclear fuel cycle (Saskatchewan, Ontario, Quebec and New Brunswick). The potential central site for long-term management of used nuclear fuel will be subject to a collaboratively-developed siting process and engagement program, feasibility studies, site characterization, an environmental assessment and the licensing process in Canada. A potential host community could be in the northern portion of those provinces or it could be in the southern portion of those provinces, provided it met the necessary conditions for a facility.

#3: Author: Edward Oleen, PostPosted: Wed Jul 06, 2005 7:31 pm

The "central site" should IMHO be a government reservation of some sort: probably military. This is to provide a suitable guard force as well as isolation from anti-anything demonstrators, would-be saboteurs, "innocent passers-by", etc. Since there is a great deal of concern over the spreading of nuclear technology, such a precaution is only reasonable. If a large enough area is set aside for the storage site when it becomes time to reprocess the fuel elements, the facility can be built in immediate proximity to the material to be reprocessed. Again, if an appropriate site is selected an area can be set aside for the long-term, if not permanent, storage/disposal of the small amount of true waste that would result from reprocessing activities.

In other words: put all the eggs in one basket and guard the hell out of it.

#4: Author: Jaro, PostPosted: Thu Jul 07, 2005 6:06 pm

FYI, the sprawling site of AECL's Chalk River Laboratories is located next to the Petawawa military base.

See also

<http://www.nwmo.ca/adx/asp/adxGetMedia.asp?DocID=1312,349,86,21,1,Documents&MediaID=2441&Filename=Beaudoin.doc>

#5: Author: Lenore Newman, PostPosted: Mon Jul 11, 2005 9:00 am

In my opinion the site should be a long way, say 500km, from any population centre. Put a military base up to guard it, and have only one access, probably by rail given the need to transport waste there. There is no need to have this material in a community. We have a big country, and so we can take advantage of this vastness to increase security.

#6: Author: Randal Leavitt, PostPosted: Sun Jul 17, 2005 7:53 pm

The fuel for our future reactors has to be moved to the new reactor sites to be used. So lets build new reactors and move the CANDU used once fuel directly there. That minimizes the amount of effort needed to haul the stuff around. It is heavy. In the mean time, store it where it was generated. It is harmless and causes no problems sitting there. It is worth billions of dollars though, so perhaps it should be monitored by cameras.

The new reactors will be fast reactors that are completely safe, reliable, and boring (e.g no manual intervention needed for thirty or more years to run them). Getting power from them to the users is a problem since power lines are easily disrupted by weather and other events. So these new reactors should be close to their users to minimize distribution distances. That means right in the middle of our cities and towns, preferably underground.

The final fission products (cesium and strontium) have short half lives and are cool. They can be dropped into a simple bore-hole kind of repository. Their radioactivity will be dissipated in three hundred years. These holes could be drilled anywhere. No guarding needed, etc.

#1: What is the recommendation is rejected?

Author: Jeremy, PostPosted: Tue Jul 05, 2005 6:14 am

What happens if after all of this research and involvement the Canadian Government rejects your recommendation?

Do they have a backup plan? Does this start all over again? Can they choose any option, regardless of the hazards?

Or, will this waste just stay where is it until they finally decide what to do? Which I suppose could drag on for many years...

Jeremy

#2: Author: NWMO, PostPosted: Tue Jul 05, 2005 2:44 pm

Jeremy, here is what we know.

According to the Nuclear Fuel Waste Act, the NWMO must submit its study and recommendations to the Minister of Natural Resources Canada by November 15th, 2005. (Under the Act, the NWMO must also make the study public at the same time.)

It is on the recommendation of the Minister of Natural Resources that the Government of Canada will make a decision. According to the Act, following review the Minister of Natural Resources will recommend a management approach from among the options in the NWMO study. That is, the Minister may choose any of the approaches which NWMO studied, and does not need to accept the approach recommended by the NWMO. The Minister may choose to further consult the public on the management approaches studied by the NWMO. The Minister may also ask the NWMO to revise and re-submit its study.

Pending a Government of Canada decision, the used nuclear fuel will continue to be safely stored at nuclear reactor sites where it is currently. These interim storage facilities are licensed and regulated by the Canadian Nuclear Safety Commission.

Once the Government of Canada decides upon an approach, the NWMO will implement that approach subject to all of the necessary regulatory approvals including an Environmental Assessment and licensing by the Canadian Nuclear Safety Commission.

#3: Author: Randal Leavitt, PostPosted: Sun Jul 17, 2005 8:05 pm

Jeremy - you can rest assured that the greed of the market place will drive this solution. The depleted uranium that comes out of CANDU reactors (and that people who are opposed to the use of fission call waste) is worth billions of dollars. You could get some of that money if you started working on it now. Believe me, many are. So the repository being reviewed by the NWMO will never be used. A scaled down version of it may be used to hold the fission products of fast reactors, but even that would be gross overkill.

Currently the coal industry is sitting pretty with guaranteed sales and lots of business. The global warming nightmare is waking them up. Some of them will hold onto their old ways and they will go out of business. Others of them will move into the fission energy business, along with the newcomers. These revolutions are always chaotic. What is interesting in this case is that the rate of change is being determined by the weather instead of by economic adjustments. I hope we make it.

#1: Changes To The Canadian Environmental Assessment Act

Author: Dan Parrott, PostPosted: Thu Jul 14, 2005 2:19 pm

The Draft Study Report notes at page 204 that, "The linked issues of fairness and justice lie at the centre of many socio-economic concerns." Yet, there are elements of the regulatory framework that appear to work against these outcomes.

Take, for example, the Canadian Environmental Assessment Act ("CEAA"). As noted during a Five-year Review held in 2000, there are serious omissions in this piece of legislation that appear designed to undermine any fairness and justice in the socio-economics of a proposed development. As the CEAA will also apply to any nuclear waste repository, I believe that these omissions should be noted and, if possible, remedied.

CEAA's section 4(b) encourages responsible authorities to take actions that promote sustainable development and thereby achieve or maintain a healthy environment and a healthy economy. CEAA defines "environment" as the components of the Earth, and includes (a) land, water and air, including all layers of the atmosphere, (b) all organic and inorganic matter and living organisms, and (c) the interacting natural systems that include components referred to in paragraphs (a) and (b). While the word "healthy" is not defined, one can make a logical guess based on the definition of sustainable development, that it means able to support life now and in the future.

CEEA does not define the term "economy", however. And without such a definition it is difficult to know what a "healthy economy" would look like.

This is a serious omission.

In Saskatchewan, particularly in the assessment and licensing of uranium mines in the north, this type of omission has led to tragic economic and social consequences for local communities.

In the 1960s, government and industry noted that northern Saskatchewan could be described very much as a "third world country." The provincial government and mining companies used this poverty as a justification for further expanding the uranium mining activity in this region. Both promised that this type of economic activity would raise the living standards of people in these local communities.

This rise in living standards never happened. Instead, in the early 1990s, a Commission on Health Care Direction found that northern Saskatchewan communities still lived under what could best be described as "third world conditions."

Obviously, the entire economic model surrounding the uranium mining industry was flawed, and the promises from the industry were empty. Yet, when new, richer uranium deposits were discovered in the late 1980s and early 1990s, the region's poverty again became the justification for a new round of mine expansion in the north.

Ultimately, the existing regulatory regime guaranteed that billions of dollars worth of wealth could be extracted from a region in Canada experiencing grinding third-world poverty.

More details surrounding the socio-economics of mining in Saskatchewan's north can be found in my submission to the Five-year Review found on their Website at: http://www.ceaa-acee.gc.ca/013/001/0002/0004/0001/parrott_f.htm

I believe that this would not have happened if the elements of a "healthy economy" had been defined. If an industry failed to raise living standards, to properly contribute to the establishment of a "healthy economy", then its licence to operate could have been challenged, or further licensing denied.

So how could a "healthy economy" be defined? Some suggestions that I made to the Five-year Review included:

"To start it could be modest, and simply state that depressed regions like third world regions that exist in this country are not examples of a healthy economy.

Bolder language could suggest that private sector hyper-exploitation of depressed regions is not in the interest of that region specifically, or of Canada generally.

Bolder still, language could direct federal authorities to critically examine the sources of poverty in depressed regions.

Lastly, the Act could suggest that the private sector has a responsibility of ensuring the development of a "healthy economy". If major industries enter a depressed region promising to improve living standards, they should be held to these promises. Future licensing approvals would depend on how well employment rates, infant mortality rates, disease and suicide rates improve. No improvement would mean canceled licenses or no license renewals."

I believe that similar socio-economic metrics should apply to the NWMO. The NWMO should also address and advocate for this type of clarification in CEAA. I think it would be a significant contribution, not only on the nuclear fuel waste question, but in other environmental assessments as well.

#2: Author: Jaro, PostPosted: Thu Jul 14, 2005 5:19 pm

In respect to uranium mining, the events of two years ago, in Saskatchewan, are of interest.

Specifically, in the case of the McClean Lake uranium mine appeal, the Attorney General of Saskatchewan and the Lac La Ronge Indian Band et.al. have been granted status to intervene in the case before the Federal Court of Appeal to appeal the decision

by a lower court to cancel the operating licence of the McClean Lake uranium operation owned by Cogema Resources Inc.

In their affidavit, the group stated, "We do not see the continued operation of the McClean Lake mine and mill as a threat to the environment or the health and safety of our people." It added that employment, training and business opportunities created by the uranium mining industry are critical for northern peoples to build healthy communities.

"These people (the Inter-Church Uranium Committee Educational Co-operative) are playing games with people's livelihoods, and the court must put an end to it," said Dave McIlmoyl, Vice-President of Northern Resource Trucking. "The First Nations and Metis communities that own 71 per cent of NRT have a big stake in this case - uranium mining is the lifeblood of many northern communities."

But eventually the legal and regulatory cloud hanging over the McClean Lake uranium mine and mill was blown aside by the Federal Court of Appeal :

CanWest News Service, Sun 06 Jun 2004

Murray Lyons, Saskatoon StarPhoenix

SASKATOON - The legal and regulatory cloud hanging over the McClean Lake uranium mine and mill has been blown aside by the Federal Court of Appeal.

The court has overturned a ruling made by a federal court judge in September 2002 that had quashed the federal operating licence for McClean Lake and put the short-term operation of the mine in jeopardy.

The initial ruling is said to have cost the Saskatchewan mining industry millions of dollars and delivered a "black eye" to its image.

The open pit mine and mill has been operating since then on a stay of the 2002 court decision, which had arisen from a legal challenge by the Inter-Church Uranium Committee Educational Co-operative (ICUCEC).

Linda Murphy, the president of the committee, said Sunday that "extreme disappointment" describe her feelings on the higher court's reversal of the anti-uranium mining group's initial win.

"There's always the hope that right will prevail and justice will be done, so we figured with our first win that was the way it should be," she said.

But Friday the Federal Court of Appeal panel of three judges agreed unanimously with arguments made by Cogema Resources Inc., operators of McClean Lake, and the Canadian Nuclear Safety Commission (CNSC) that the mine's federal operating licence, granted in 1999, was properly obtained and was based on a valid environmental assessment.

In 2002, the lawyer for ICUCEC argued successfully before the trial judge that the mine should have been forced to undergo an environmental assessment under the rules of the Canadian Environmental Assessment Act (CEAA), which came into force in 1995. Cogema and the nuclear safety commission argued that the assessment had started in 1991 under the former 1985 federal regulations and should still be valid.

Tim Gitzel, chair of Cogema Resources and director of the mining business unit for the French parent company AREVA, said McClean is Cogema's flagship operation and the company considers its environmental performance to be exemplary.

"The court case was about the interpretation of federal laws, not our mining and milling operation," stated Gitzel in a press release.

"Unfortunately, the case cast a false and unfair shadow on the project and caused a great deal of needless uncertainty for the people and businesses that depend on the mine for their livelihoods. We're exceedingly pleased to have this issue resolved."

Reached in Paris on Sunday where he has taken up his new duties with AREVA, Gitzel said the ICUCEC court challenge has cost the company and the Saskatchewan uranium industry millions of dollars in legal costs and consulting contracts to restart environmental assessments on McClean Lake and Cigar Lake where Cogema is a minority partner with Cameco Corp.

"The dollars are an important cost. But it's cost Saskatchewan a bit of a black eye in terms of the certainty of the regulatory process," Gitzel said.

"This (court) decision has gone a long way to reassuring us at Cogema, our shareholder in France, our Japanese partners, and our Canadian partners that the system _ although it's complex _ you can rely on it if you follow the steps."

Representatives of several First Nations-owned businesses appeared as intervenors in Calgary May 3 and 4 during the appeal process. They included the Lac La Ronge Indian Band, Kitsaki Development Limited Partnership, and Northern Resource Trucking (NRT).

"I think it's important these matters are cleared up for the public and industry," said Chief Harry Cook of the Lac La Ronge band Sunday. His band is tied closely to the uranium mining industry through investments in companies such as Kitsaki and NRT. Cook also sits on the board of directors of Cameco Corp., which is involved in McClean Lake in a minority position.

"The mining industry has been very responsible in actions taken so that employees, the environment and all the other things are protected to the best of the ability of the industry," Cook said in a phone interview.

Murphy said it's too early for the committee to know if this is the end of its court challenge.

The appeal court judges awarded costs to Cogema and CNSC following the overturn of the appeal, which could mean ICUCEC is facing a big legal bill. Murphy said the committee doesn't know what the costs will be.

ICUCEC continues to raise concerns about uranium mining and will make presentations Wednesday at environmental hearings on Cogema's licence to decommission the Cluff Lake project.

"We've got a fight ahead of us," Murphy said. "We're not giving up the ghost yet."
<end quote>

...it appears they've taken their fight to the NWMO.

#3: Author: Dan Parrott, PostPosted: Fri Jul 15, 2005 4:34 pm

In response to Mr. Jaro:

Harry Cook, NRT, Kitsaki and others are all part of an operation designed to transfer and that has in fact transferred billions of dollars worth of wealth out of northern Saskatchewan. Considering Cogema's involvement, much of this wealth probably ends up in France.

Meanwhile, a large majority of people in northern Saskatchewan remains living under third world conditions.

I believe that the above are facts and are a matter of public record.

What is really grotesque and cynical, is how this poverty is turned around and used to justify this massive transfer out of the north's natural resources: "Oh, the north is poor; so let's use the situation to create jobs transferring out as much northern wealth as is physically possible." No thought is given to why the north is poor, or how extracting and transferring wealth out of the north perpetuates this poverty.

This cynical justification was challenged during the environmental review process surrounding the uranium mine expansions at Cluff, McClean Lake, etc. during the 1990s. The aboriginal member on this review panel, John Dantouze, began talking about "revenue sharing." In other words, Mr. Dantouze proposed that the wealth being extracted from the north should be shared with northern communities. Northern communities should also have a say in how much wealth they would retain.

Myself, personally, I thought that northern communities should have been allowed to tax foreign multinational corporations like Cogema. I thought that a 50/50 split between this corporation and the local communities would have been more than fair. What do you think, Mr. Jaro? Would leaving billions of dollars in the hands of local northern communities have been fair? Maybe it should have been a 60/40 split in favour of northern communities?

I'm not sure what percentages that Mr. Dantouze had in mind, but I know that I encouraged the review panel to vigorously recommend revenue sharing.

The revenue sharing idea was adopted by the review panel, and it appeared as a recommendation in one of panel's first reports. If I remember correctly, the federal and provincial governments' responses to the panel's report rejected revenue sharing.

Instead, both level of government made it clear that the only economic development that would be allowed to northerners would be the jobs related to transferring the billions over to France.

The governments' position essentially doomed the north to ongoing poverty.

Not surprisingly, Mr. Dantouze soon resigned. For a brief while he was involved in blockading uranium mine roads as part of a bid to encourage the provincial government

to reconsider its stand on revenue sharing. This did not work. Eventually, Mr. Dantouze retired from public life.

In the meantime, northern Saskatchewan remains a third world zone. In the midst of this poverty, multinational corporations extract billions of dollars of wealth and transfer it elsewhere. There are, granted, a few jobs created by this extraction and transfer. But to call this a plan to build the north's economy is ridiculous, however.

To make matters worse, once the uranium is gone, northern Saskatchewan will be a third world zone with a significant nuclear waste problem (even without the NWMO's waste fuel repository).

So the questions for NWMO: Does it care that the existing regulatory framework helps create such perverse socio-economic outcomes? Will it take steps to remedy this, in particular, help develop progressive language around CEEA's section 4 "healthy economy"? Or will it simply work to pass along Ontario, Quebec and New Brunswick's nuclear waste problems onto people living in depressed third world conditions?

#4: Author: Jaro, PostPosted: Sat Jul 16, 2005 3:59 pm

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I am not a social engineer, so unlike Mr. Perrott I don't feel qualified to support the claim that creating a welfare-dependent society is healthy for a society -- particularly since we all know that the ore will in fact eventually run out (and then what?).

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According to geologist Randy Turner, president of Triex Minerals and Diamondex Resources Ltd. of Vancouver, "the handful of prospectors for uranium in the Athabasca basin two years ago has risen to about 45 companies, and there could be plenty more" - including of course aboriginal companies, either alone or in partnerships.

Because uranium deposits are so common, dozens of not-so-new projects are coming online to take advantage of the current boom in demand. For example, just last week, a "Dazzling Uranium Strike" was reported at the Shea Creek joint venture in Saskatchewan. Exploratory drilling intercepted ore bodies with 27.4% U₃O₈ over 8.8 metres, including 58.32% U₃O₈ over 3.5 metres. And last year, exploratory drilling in the Maverick Zone at the Moore Lake uranium project in the Athabasca Basin of northern Saskatchewan intersected ore bodies with 5.14% U₃O₈ over 6.2 metres, including a 4.4 metre interval of 7.02% U₃O₈. [U₃O₈ is raw uranium oxide, courtesy of mother nature]

But I agree that Canada in general, and Saskatchewan in particular, do have opportunities for creating added value from the uranium that is mined on its land and "build an economy," as Mr. Perrott seems to wish.

Nor is that a terribly original idea.

It is even supported by some politicians and other public figures in Saskatchewan - as well as in other uranium-producing countries of the world, like for instance Australia.

Jerry Grandey, president and CEO of Cameco Corp., said recently (The Leader-Post, Regina, Wed 08 Jun 2005) that "Saskatchewan should be taking greater advantage of its world-class uranium resource by converting uranium to fuel, storing spent fuel and even building a small nuclear reactor..... If the political will is there, this province could reap the benefits of not only money from royalties based on mining the uranium ... but we would also benefit from the fees collected for taking back used fuel and storing it." But Grandey "warned Saskatchewan could lose its status as the world's leading uranium producer to other parts of the world with more competitive tax regimes" -- be they of the provincial or "revenue sharing" kind -- adding that if changes aren't made to Saskatchewan's royalty and tax rates, which are the highest in the world, investment will occur in places like Kazakhstan, where both Cameco and Saskatoon-based AREVA/Cogema are opening mines.

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In 2003, then Saskatchewan Party energy critic Lyle Stewart responded favorably to a suggestion by Alberta Energy Minister Murray Smith that a nuclear reactor be built in northern Saskatchewan to provide electricity to the Athabasca oilsands.

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[...] Tighe told his audience that Saskatchewan produces 30 per cent of the world's uranium, but could gain much more in economic activity out of the nuclear industry than it does.

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"John Wright can have his opinion, but I think his vision is limited," Tighe told a questioner. "I think he's looking at too small of a picture.

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In the end, there may not even be enough gas reserves to process the oil sands, in all of the Mackenzie River Delta (thought to hold six trillion cubic feet of natural gas).

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According to The Observer (Canberra, Jun 13, 2005), "in the space of a few months, key environmentalists and political figures are talking up the need for a 'nuclear debate.' [...] New South Wales Premier Bob Carr, who has quadrupled the national parks of his state, and banned a range of mining and timber ventures on environmental grounds, says: "Nuclear power has to be on the table for new large power plants in New South Wales. "Our massive coal reserves equal massive greenhouse gas contamination of the atmosphere if we keep building coal burning plants," he says. "And apart from rising demand for power that has to be met somehow, we need lots of extra electrical energy if we pursue large scale desalination of sea water to help solve a looming crisis in the supply of fresh water" [...] Conservative Prime Minister John Howard [...] said: "I don't think global warming [from fossil fuel burning] is a myth. I have seen enough scientific evidence ... and while I think some of the extreme manifestations of global warming are mythical, I do think there is a very strong case for controlling greenhouse gas emissions."

[...] Australian Foreign Minister Alexander Downer went further, saying: "Technology is the answer to global warming, not the Kyoto protocol, and nuclear energy is part of that answer in the context of global warming."

He also said: "The public seems more persuadable that nuclear power is a safe alternative, and there should be a debate -- a sophisticated debate not a rant -- from the Greens."

[...] Peter Garrett, the famously anti-American and anti-nuclear industry lead singer of the rock band Midnight Oil and former leader of the Australian Conservation Foundation, says: "We have no option but to look again very carefully at nuclear technology." Garrett said that soon after he took his seat as a Labor party member in Australia's Federal Parliament, rattling many of its supporters, for whom opposition to nuclear power and the enforced closure or curbing of existing Australian uranium mines had been an unchallenged policy position for decades.

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Australia's push for a nuclear energy debate comes as state governments find themselves squeezed between limited supplies and increasing energy demands from consumers that has led to "brownouts" across the country at peak seasonal periods. Yet Australia is the world's second largest exporter of uranium, after Canada, supplying 13 countries with uranium fuel, among them Japan.

Japan's 54 nuclear power stations alone save the equivalent of Australia's total greenhouse emissions.

But Australia produces much of its energy using coal, giving it the world's highest rate of greenhouse gas emissions per capita -- 27 tonnes per person a year -- and has coal reserves tipped to last up to 300 years. They also have 25 new coal-fired power stations either under construction or approved.

Lastly, I would also take issue with Mr. Perrott's insinuations, in his statement that "northern Saskatchewan will be a third world zone with a significant nuclear waste problem."

By way of example, in July of last year, Cogema Resources Inc has been issued with a decommissioning license by the Canadian Nuclear Safety Commission (CNSC) for its Cluff Lake uranium project in northern Saskatchewan. The license allows the company to decommission the mining facility, which consists of two underground mines, four open-pit mines, a mill, waste management systems, and associated site facilities. The granting of the license follows five years of environmental assessment, public discussions and regulatory review. Activities such as covering and sealing the tailings area and dismantling the mill will be followed by several years of monitoring to ensure the environment is being protected. Cluff Lake has also achieved ISO 14001 certification, which verifies that environmental management systems used by Cogema Resources are strictly monitored and conform to rigorous international standards.

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#5: Author: Jaro, PostPosted: Sat Jul 16, 2005 4:16 pm

CONTINUATION :

From a more general perspective, it is important to remember that the uranium that has been extracted by the mining operations in northern Saskatchewan came from the same land where the mine tailings are sealed. Moreover, the radioactive half-life of the uranium is typically thousands of times longer than that of the stuff in the tailings.

And of course when we fission uranium in nuclear reactors, the fission products typically have radioactive half-lives about a billion times shorter.

Thus in the very long run, the net effect of uranium mining and nuclear power is to reduce the natural radioactivity of the Earth.

If Canadians can make some clean energy and mining profits in the process, that is certainly a welcome bonus.

#6: Author: Dan Parrott, PostPosted: Sun Jul 17, 2005 4:04 pm

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(I never once said that the nuclear industry is not profitable. The industry does fine. In the case of northern Saskatchewan these profits are at the expense of northern communities. Billions move out of the north, while a large majority of residents live under third world conditions.)

I am not a social engineer, so unlike Mr. Perrott I don't feel qualified to support the claim that creating a welfare-dependent society is healthy for a society -- particularly since we all know that the ore will in fact eventually run out (and then what?).

(Mr. Yaro - the people up north are now "welfare dependent" living off. Revenue sharing would make these people active participants on how profits would be distributed.)

This is something for the democratically elected provincial government of Saskatchewan to decide, since it is they who receive the "billions of dollars" of tax revenue from all the uranium mining operations.

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(All this is nice, but it has never worked. Uranium mining has expanded for decades within the same poverty and third world conditions. I defy you to show me how any new projects will change this, especially when historically any new projects have never made a whit of difference.)

But I agree that Canada in general, and Saskatchewan in particular, do have opportunities for creating added value from the uranium that is mined on its land and "build an economy," as Mr. Perrott seems to wish. nor is that a terribly original idea.

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According to an article in The Edmonton Journal, "provincial records show a total of 4,500 square kilometres has been staked for metallic and industrial mineral exploration across the province, including uranium, since early 2004. The province cannot quantify how much of that was for uranium, but it is believed to be the highest level of prospecting not related to diamond staking for some time."

According to geologist Randy Turner, president of Triex Minerals and Diamondex Resources Ltd. of Vancouver, "the handful of prospectors for uranium in the Athabasca basin two years ago has risen to about 45 companies, and there could be plenty more" - including of course aboriginal companies, either alone or in partnerships.

Because uranium deposits are so common, dozens of not-so-new projects are coming online to take advantage of the current boom in demand. For example, just last week, a "Dazzling Uranium Strike" was reported at the Shea Creek joint venture in Saskatchewan. Exploratory drilling intercepted ore bodies with 27.4% U₃O₈ over 8.8 metres, including 58.32% U₃O₈ over 3.5 metres. And last year, exploratory drilling in the Maverick Zone at the Moore Lake uranium project in the Athabasca Basin of northern Saskatchewan intersected ore bodies with 5.14% U₃O₈ over 6.2 metres, including a 4.4 metre interval of 7.02% U₃O₈. [U₃O₈ is raw uranium oxide, courtesy of mother nature]

(All this is nice, but it has never worked. Uranium mining has expanded for decades within the same poverty and third world conditions. I defy you to show me how any new projects will change this, especially when historically any new projects have never made a whit of difference.)

But I agree that Canada in general, and Saskatchewan in particular, do have opportunities for creating added value from the uranium that is mined on its land and "build an economy," as Mr. Perrott seems to wish. nor is that a terribly original idea.

It is even supported by some politicians and other public figures in Saskatchewan - as well as in other uranium-producing countries of the world, like for instance Australia.

Jerry Grandey, president and CEO of Cameco Corp., said recently (The Leader-Post, Regina, Wed 08 Jun 2005) that "Saskatchewan should be taking greater advantage of its world-class uranium resource by converting uranium to fuel, storing spent fuel and even building a small nuclear reactor..... If the political will is there, this province could reap the benefits of not only money from royalties based on mining the uranium ... but we would also benefit from the fees collected for taking back used fuel and storing it." But Grandey "warned Saskatchewan could lose its status as the world's leading uranium producer to other parts of the world with more competitive tax regimes" -- be they of the provincial or "revenue sharing" kind -- adding that if changes aren't made to Saskatchewan's royalty and tax rates, which are the highest in the world, investment will occur in places like Kazakhstan, where both Cameco and Saskatoon-based AREVA/Cogema are opening mines.

The article added that Industry and Resources Minister Eric Cline said the province is open to look at all options to increase the economic impact of the uranium industry in Saskatchewan. "We're the No. 1 producer of uranium in the world and it will be the policy of the government of Saskatchewan to ensure that that remains the case," Cline said. Specifically, the government would consider any proposal to convert uranium to fuel or store spent fuel in the province. "It makes sense to further process uranium that is mined in Saskatchewan ... We should take advantage of that economic opportunity."

Last October, an article about the debate over nuclear power for Saskatchewan appeared in The Leader-Post (Tue 19 Oct 2004).

<quote>

Following a weekend policy meeting, provincial Liberal Leader David Karwacki plans to appoint a party task force to look at all aspects of nuclear energy and make recommendations to the party.

Saskatchewan Party Leader Brad Wall's new economic plan for the province mentions nuclear power as part of Saskatchewan becoming an "energy capital" for North America.

He expects his party will adopt a more formal position on nuclear power as part of the policy review currently underway.

Karwacki said it's important to look at nuclear power for Saskatchewan because of the impact the Kyoto Protocol on climate change will have on the province.

The task force, and the Liberal Party, may ultimately decide nuclear energy is not an option to be pursued but it could also end up advocating such options as a nuclear power plant to be located somewhere in Saskatchewan.

"That is another question that was tabled and we need to do more research on. A plant in the north feeding into the tar sands, a plant down south exporting power, or a plant, certainly one of the suggestions was a plant between Saskatoon and Regina, the two major centres. So what makes sense economically, what makes sense politically, or does this make sense at all?" Karwacki said in a Monday interview.

[...] "We just ship the ore out, we don't add any value here, there's no refining that happens here. It just doesn't make any sense," Wall said in an interview.

Wall, like Karwacki, said it's possible the party may adopt a position against development of the nuclear industry. But party members attending policy meetings often mention their interest in the issue, he pointed out.

In 2003, then Saskatchewan Party energy critic Lyle Stewart responded favorably to a suggestion by Alberta Energy Minister Murray Smith that a nuclear reactor be built in northern Saskatchewan to provide electricity to the Athabasca oilsands.

[...] Wall said Saskatchewan Party support for a nuclear plant would likely hinge on being able to export the excess electricity generated.

<end quote>

On 17 Aug 2004 The StarPhoenix (Saskatoon), reported that,

<quote>

Saskatchewan's location in the centre of North America makes it well-placed to make money off nuclear power generation, says an official with the Atomic Energy of Canada Ltd. (AECL).

The province's geographic position would especially work in the province's favour if nuclear power, as expected, becomes the most cost-effective way to make hydrogen into a transportation fuel.

Patrick Tighe, vice-president of marketing and business for AECL, was a guest presenter Monday at a luncheon sponsored by the Prairie Centre Policy Institute, a Saskatoon-based, pro-business think-tank.

[...] Tighe told his audience that Saskatchewan produces 30 per cent of the world's uranium, but could gain much more in economic activity out of the nuclear industry than it does.

Tighe said SaskPower could buy two ACR units, producing a total of 1,400 megawatts of power, and replace a large portion of its coal-powered generation.

He says nuclear power would also offer much more stable rates because nuclear fuel is not the main cost in operating a nuclear power plant.

"The price of uranium can double and that will only increase costs by five per cent," he said.

Tighe said building a nuclear power plant only to make power for the province's grid is not sustainable, but Saskatchewan being in the centre of a power-hungry continent can make money from nuclear power exports.

In the past, Saskatchewan Crown corporation executives such as former SaskPower president John Wright have said Candu reactors are too big for Saskatchewan's future needs.

"John Wright can have his opinion, but I think his vision is limited," Tighe told a questioner. "I think he's looking at too small of a picture.

"I am not saying Saskatchewan should have nuclear power. I'm saying you should look at it and have a debate, an open debate that looks at the numbers and not be limited to Saskatchewan's grid."

Tighe said nuclear power could be "the driver of an economic revival of Saskatchewan."

Tighe presented slides which show that Saskatchewan is a net importer of electricity and that the province has become too dependent on imported electricity, with a deficit of annual power imports of \$15 million a year on average.

Asked to comment, SaskPower spokesperson Larry Christie said the utility doesn't break down its profits on export and imports. But he says the utility has enough electrical production to meet the province's needs, with 3,500 megawatts of capacity and domestic peak loads that have only reached 3,000 megawatts.

Christie says SaskPower only imports electricity if the price is cheaper than what it can generate on its own, which usually happens if it can buy cheaper power instead of burning natural gas, which is the utility's most expensive form of generating power.
<end quote>

Of course the Athabaska oil sands deposits extend into north-western Saskatchewan. But they tend to be somewhat deeper than many of those already being exploited in Alberta, requiring different technology, called 'Steam Assisted Gravity Drainage' (SAGD).

According to reports, most of the new oilsands facilities to be built in the coming years by companies like Husky Energy, Nexen Inc., Devon Energy and ConocoPhillips plan to use SAGD, where steam is pumped deep into the ground through one well to melt the bitumen reserves, which are then sucked out through another well (Petro-Canada already has one steam-assisted plant called Mackay River, and has three or four potential locations for another steam-assisted plant that would produce between 30,000 and 40,000 barrels per day).

But steam-assisted oil production requires huge amounts of energy to produce the steam - typically using natural gas heating. Up to 25% of the energy content of a barrel of synthetic oil is consumed in the extraction process.

Some people complain that the oil sands companies are burning a clean fuel (natural gas) to produce a dirty fuel (oil).

Also, burning large quantities of gas in the oil sands drives up prices for residential gas users.

In the end, there may not even be enough gas reserves to process the oil sands, in all of the Mackenzie River Delta (thought to hold six trillion cubic feet of natural gas).

According to a report in the Daily Oil Bulletin (4 May 2005), using nuclear power, producers could shave up to 20% off input costs in the form of lower gas use. Feasibility studies have determined the latest generation of Candu reactor could power a 200,000 barrel-per-day SAGD operation with little environmental impact and zero emissions of greenhouse gas: "The units are modular and could be scaled to meet individual needs. Although capital costs are higher, the supply cost of the produced energy is low. [...] nuclear reactors are comparable in price to an equivalent capacity coal-fired cogeneration plant. Uranium fuel for a reactor is readily available and would come from Saskatchewan and parts of northern Alberta."

Similarly, Australia has also recently begun considering expansion of its nuclear industry beyond uranium mining.

According to The Observer (Canberra, Jun 13, 2005), "in the space of a few months, key environmentalists and political figures are talking up the need for a `nuclear debate.' [...] New South Wales Premier Bob Carr, who has quadrupled the national parks of his state, and banned a range of mining and timber ventures on environmental grounds, says: "Nuclear power has to be on the table for new large power plants in New South

Wales. "Our massive coal reserves equal massive greenhouse gas contamination of the atmosphere if we keep building coal burning plants," he says. "And apart from rising demand for power that has to be met somehow, we need lots of extra electrical energy if we pursue large scale desalination of sea water to help solve a looming crisis in the supply of fresh water" [...] Conservative Prime Minister John Howard [...] said: "I don't think global warming [from fossil fuel burning] is a myth. I have seen enough scientific evidence ... and while I think some of the extreme manifestations of global warming are mythical, I do think there is a very strong case for controlling greenhouse gas emissions."

[...] Australian Foreign Minister Alexander Downer went further, saying: "Technology is the answer to global warming, not the Kyoto protocol, and nuclear energy is part of that answer in the context of global warming."

He also said: "The public seems more persuadable that nuclear power is a safe alternative, and there should be a debate -- a sophisticated debate not a rant -- from the Greens."

[...] Peter Garrett, the famously anti-American and anti-nuclear industry lead singer of the rock band Midnight Oil and former leader of the Australian Conservation Foundation, says: "We have no option but to look again very carefully at nuclear technology." Garrett said that soon after he took his seat as a Labor party member in Australia's Federal Parliament, rattling many of its supporters, for whom opposition to nuclear power and the enforced closure or curbing of existing Australian uranium mines had been an unchallenged policy position for decades.

<end quote>

Australia's push for a nuclear energy debate comes as state governments find themselves squeezed between limited supplies and increasing energy demands from consumers that has led to "brownouts" across the country at peak seasonal periods. Yet Australia is the world's second largest exporter of uranium, after Canada, supplying 13 countries with uranium fuel, among them Japan.

Japan's 54 nuclear power stations alone save the equivalent of Australia's total greenhouse emissions.

But Australia produces much of its energy using coal, giving it the world's highest rate of greenhouse gas emissions per capita -- 27 tonnes p

#8: Author: Dan Parrott, PostPosted: Sun Jul 17, 2005 4:09 pm

Jaro wrote:

CONTINUATION :

From a more general perspective, it is important to remember that the uranium that has been extracted by the mining operations in northern Saskatchewan came from the same land where the mine tailings are sealed. Moreover, the radioactive half-life of the uranium is typically thousands of times longer than that of the stuff in the tailings.

Mr. Yaro, 85% of the ionizing radiation stays with the uranium mine and mill tailings. Most of this is in the form of the pernicious alpha radiation.)

And of course when we fission uranium in nuclear reactors, the fission products typically have radioactive half-lives about a billion times shorter.

Thus in the very long run, the net effect of uranium mining and nuclear power is to reduce the natural radioactivity of the Earth.

(Mr. Yaro, please. Nothing like spreading these alpha-emitters all over the planet...)

If Canadians (but not northern Saskatchewan people) (French? Cogema is French) can make some clean energy and mining profits in the process, that is certainly a welcome bonus.

#9: Author: Randal Leavitt, PostPosted: Sun Jul 17, 2005 9:00 pm

I think Dan Parrott has a good point. If Saskatchewan wants to really benefit from its uranium wealth it has to do a lot more than simply dig it up and ship it out. Third world countries have done that with their resources for years now, without getting any richer. So Saskatchewan should get into the business of reactor development and clean fission systems. Clearly there is going to be a booming opportunity in this area, and Saskatchewan has a unique opportunity to be in the middle of it. Establishing a fast reactor site in Saskatchewan that converts CANDU used once fuel into short half life fission products, and generates billions of dollars of electricity at the same time, would seem like a logical step. Take the money from this electricity and send everyone in Saskatchewan through university and let them fan out all over the world as nuclear energy consultants. We have an amazing opportunity before us, and a global warming imperative to get on with it. Come on, Dan, let's get busy. You can make a difference for the very people you are talking about.

#10: Author: Dan Parrott, PostPosted: Mon Jul 18, 2005 8:50 am

Let me start with a housekeeping item. I want to apologize for referring to Jaro as Mr. Yaro. I apologize for the misspelling "Y" instead of "J" in Yaro, and for assuming that Jaro is a "Mr." My mistakes.

Here are my final words on this topic. I hope to address both Jaro and Mr. Leavitt's comments.

I agree that uranium mining is profitable. No argument there. I would even agree that, within reason, profitability can be a positive thing (The line gets crossed with the likes of Tyco, Global Crossing, WorldCom, Enron, etc.). In fact, I probably wouldn't have had much more to say about this except that during the uranium mine expansions in the

1970s and 1990s, the mining corporations made such a big deal about raising living standards in Saskatchewan's northern communities. Essentially, these corporations used the third-world conditions that I recounted in my earlier posts as a key justification for being allowed access to these mineral resources.

In short, these companies promised that if they were allowed access, they would make significant and material contributions to increase the standard of living in this region. You can find some examples of these corporate promises in my submission to the CEAA Five-Year Review at:http://www.ceaa-acee.gc.ca/013/001/0002/0004/0001/parrott_e.htm

So, you see Jaro, it was your guys in the corporate sector that made the promises, holding out the possibility of a brighter future. It wasn't us over in the environmentalist camp doing this – we wanted the moratorium. It was your boys that wanted to do the “social engineering”.

Since the corporations raised the issue and made the promises, I think it's only fair to review the history to determine how well these promises were fulfilled.

When you look at the record, it is clear that these promises were not kept. Writers in the 1960s and early 1970s described the “third world” conditions in the north. Thirty years later, documents still described the north as a “third world” area. So, whether the corporate strategy to fulfill these promises was based on an economic “trickle-down” theory, or a “rising-tide-lifts-all-boats” theory, it was obvious that it didn't work. The region started out and ended up with its present third world status.

When mine expansion was discussed in the 1990s, the same “third world” conditions were once again noted. The corporations again used this as a pretext for being allowed access to these mineral resources. Cynically, they offered nothing but the same failed strategies, the utterly useless approaches that were known not to work.

Even today, the north's poverty continues to be used as a justification for more mining, more “value added”, more nuclear waste.

What seems to work best in this arrangement is the protection of corporate profits.

More important in this thread is the role of CEAA. I think that at very least CEAA should be used as a tool to make corporations keep their promises. If they promise to raise living standards in a region, and then fail to do so, then the companies should be held to account. Licenses should be revoked or refused.

Right now, the non-existent language around CEAA's section 4(b) “healthy economy” lets proponents off the hook, since it appears that anything can be called a “healthy economy”, even third world conditions. This kind of loophole allows billions to be taken out of northern Saskatchewan and sent to France. Nice for French shareholders, but

what about a northern community that doesn't have access to running water? Glad that French shareholders get a dividend, but what about Canadian citizens?

All in all, this doesn't say much for CEAA that a third world region, in Canada of all places, is considered an example of a "healthy economy." Nor does it say much for the industries that make promises, don't keep them, and then avoid accountability by exploiting the vague and ambiguous legislative language in this section.

I agree wholeheartedly with Mr. Leavitt: I think that we can do better. I hope that NWMO will play a positive role in this. Thank you again for your responses to my posts.
Regards, DP

#1: Fantastic Opportunity

Author: Randal Leavitt, PostPosted: Tue Jul 19, 2005 5:40 pm

I am going to start a new money saving service for all my friends. Anyone who wants to give me their money can be assured that I will keep it safe. And people will be able to withdraw up to one percent of their money for their own use. So if you give me a dollar I will keep 99 cents safe forever and you can have 1 cent back if you ever need it. Oh yes, there is a \$100 fee for opening a new account too. So send your money to me and be confident in the knowledge that it is safe.

This is what the NWMO is proposing for the nuclear power industry. From every kg of mined uranium the NWMO wants to take more than 99 percent and bury it forever in a repository. Not a bad way to kill an enterprise - take away more than 99 percent of its primary asset up front.

If you want to really waste uranium I cannot imagine a better way to do it - make it hot and radioactive and throw it in a hole that will be a problem to manage for ever. For the life of me, I cannot imagine a worse approach.

The depleted uranium that results from a CANDU reactor is harmless and easily managed. It can be readily detected with bubble detectors and Geiger counters, so a spill would be easy to clean up if it ever happened. It is a heavy solid substance that does not blow around or dissipate. Just keep it at the reactor sites where it is produced. There is not very much of it so this is really easy to do. Then build fast reactors to replace our second generation CANDU systems, and use this depleted uranium to fuel them. The fission products from a fast reactor have very short half lives and can be readily placed in a simple repository.

What an amazing amount of effort has gone into not solving a non problem!

For further information about this:

Advanced Fuel Cycle Initiative (AFCI)
<http://www.ne.doe.gov/afci/afci.html>

<quote> A longer-term effort will develop fuel cycle technologies to destroy minor actinides in fast neutron spectrum systems, greatly reducing the long-term radiotoxicity and heat load of high-level waste sent to a geologic repository. This will be accomplished through the development of a transmutation fuel cycle using Generation IV fast reactors.</quote>

Or take a look at my nuclear folksonomy:
<http://de.lirio.us/rubric/entries/user/RandalLeavitt>
Use the "fast" tag to extract the articles about fast reactors.

#1: the subjective nature of radiation

Author: Ian Turnbull, PostPosted: Mon Jul 11, 2005 2:42 pm

This e-Dialogue forum looks promising. I'll post to it a synopsis of the material I have already submitted to the NWMO, in response to their invitation for contributions from the public regarding the future management of the radioactive waste materials.

I wonder what others make of their report ? I find it a very professional document. Well written and open and generous with information. Good. Here surely is a healthier way to approach this troubling subject than we've had to date. Both before and subsequent to the report being published, I wrote to NWMO to say that if we are to develop the best possible practice around waste management, I believe it essential that we allow information and ideas about the subjective nature of radiation, and the atomic world, into our deliberations.

The extraordinary blind spot for me in our understanding of radiation - and indeed, the whole fission process - is how there is no inquiry or concern to monitor and determine the feeling of radiation.

Radiation is clearly an emotionally-charged effect. It is a radiant energy that is so painful and pain-full that the cells of our body can not bare to feel or hear it without being distressed themselves.

The technical terms, like alpha, beta, and gamma particles tell us nothing about the emotional quality of the energy that is constantly weeping from the fissioned materials. There is useful and vital information available to us that is being ignored: Simply because the scientific method is in the habit of excluding subjective information from its observations and measurements. This is its strength, and also its weakness, and now creates a blind spot in our understanding of the particle world.

I advance these comments on the basis of working one year at Dounreay, the site of an experimental fast breeder reactor in northern Scotland. (I was a geologist employed there on a site investigation being undertaken by Nirex). Being an introspective kind of

person and generally curious about the atomic world and the fission process in particular, I often toured the reactor hall and was surprised to find a place where I could get some small experience of radiation. It was in the laboratory where fuel rods were being cut up for metallurgical testing. It was actually the discomfort and dislike of the place by the women in our group that made me aware of the atmosphere of unwellness, of silent pain that was in that space - the way that an hospital ward can be. I made a habit of visiting the lab, and on several occasions was able to tuck myself in a corner and listen and feel into what this (diluted by the lead glass windows) field of radiation felt like. It was always sad and quietly distressing. I would go there feeling good and clean, and each time felt these feelings arrive in me, coming I assumed from the energy emanating from the spent fuel rods in the adjacent chamber. I related my experience to the managers of the site, and wrote to Nirex about it. But there was no interest to pursue this line of inquiry. The engineering and containment concerns consume nearly all of our attention. And still, I think we are missing out on gaining some greater insight and understanding of natural processes that are alive and important in the particle world.

This then is the theme of my submission to NWMO. That the terms of reference of their inquiry are really too tight. We have an excellent knowledge of the physics of the atom, of its objective character. But we are proceeding to plan for the next few hundred or thousand years without making any effort to probe the subjective nature of this same small world.

There are several areas I can see that are pregnant with subjective content. For instance - the four interactive forces (which explain all known behaviour of the particles) make even more sense when they are considered for their social nature. Instead of me explaining their social effects, readers might like to feel for themselves what is the subjective equivalent of Electromagnetism, Gravity, and the Strong and the Weak Nuclear Forces.

By rigidly adhering to the doctrines of an (inherited) scientific method, and not questioning or updating them, I think we are missing out on developing a much larger and more comprehensive picture of the atomic world: A picture that can only but help us respond more effectively to this whole awkward business of the radioactive materials.

Okay. Enough for now. I tend to think we are still in the early days of our relationship with the atomic world. I sense there is a new adventure somewhere in this whole subject, waiting to ambush us. And hope so.

Meanwhile, thanks NWMO and Dr Ann Dale for creating this open space for reflection and feedback.

Good luck everyone ! says Ian Turnbull.

#2: Author: Randal Leavitt, PostPosted: Sun Jul 17, 2005 8:22 pm

Ian - many people all over the world think that radiation feels good. There is a thriving industry involving radon mines, radon spas, radium hot springs, and many other forms

of heat and radiation from natural sources. This kind of healing and rejuvenation has been used for thousands of years. So radiation may make you feel sad, but it makes lots of other people feel much better.

There is an explanation for this. Our immune system has evolved on a radioactive planet. Cells that could not detect, correct, and live with radiation did not make it. We are the products of a billion years of radiation sensitivity training. When our immune system detects radiation damage it does not fool around. It goes into an accelerated clean up mode, getting rid of damaged tissue and repairing broken links. The response is generally much stronger than what is minimally needed to react to the immediate problem. So we get a boost of health and vigor from a low dose of radiation.

As you can imagine, there is a lot of information available about all this, and it quickly gets into the realm of the incredible, similar to faith healing and magic. But you should know that not everyone feels as you do. I don't dispute your feelings - everyone has their own way of sensing this world.

More information about this can be found at:

<http://www.radonmine.com/>

#3: Author: Ian Turnbull, PostPosted: Wed Jul 20, 2005 10:40 am

Okay Randal, I hear your enthusiasm for the fast breeder reactors and re-using the used fuel from the Candu reactors. My concern is for the universal and humanitarian aspects of our use of nuclear power. I find this invitation by NWMO for an e-dialogue opens the door for some necessary new thinking in this whole area.

Indeed, reading the postings in this forum makes me aware once again of the many different ways we Humans choose and use to see our world. In this context, while this site is still available for postings, I still feel the need to reiterate my abiding concern that we are not yet looking with enough personal and universal interest at the affective nature of radiation.

I keep advocating an inquiry about the subjective nature of the atomic world because I believe that when our understanding of radiation is more complete, becomes close to being holistic, then we will be able to respond and deal with the waste issue within a lifetime. To pass this awkward issue onto future generations is in my opinion totally unethical and discourteous.

I know the merit of the scientific approach: How it builds on rigorous analysis of quantifiable data. Affirmed by experiment, there is then consensus about the interpretation and world view that comes from this thoughtful method. I liked physics more than anything when I was a young man. It described the processes of the Universe and the atomic world in a well-reasoned way.

Now, having been around more and raised a family, I see how there are patterns and effects in our Universe that science still doesn't know how to measure and address.

Here's an analogy. Suppose you were taken to hospital with some unspecified complaint. And the medical team came and checked and measured the chemical and physical integrity of your body with every conceivable diagnostic test. Yet no one asked you how you felt. Wouldn't you think that this team was missing out on some vital information.

Our efforts to understand the substantial dis-ease of radiation is identical to this analogy. We have an excellent knowledge of the physical forces at work within the atom. We have names for the different forms of radiation and know the decay times of the many radioactive isotopes. But we have excluded from our studies any attempt to identify the emotional information that is within the signals being broadcast by the fissioned particles.

Our knowledge is incomplete if we ignore the subjective. This can be remedied. But it needs us to take down the barriers that have been erected around our work in the atomic world. This may sound paradoxical, but I sense that if we become more curious and concerned for the well-being of the particle world, we would be well on the way to making our own world more secure and healthy.

The skills for an inquiry into the subjective nature of radiation are mostly with learning to listen into and feel for the changing effects of radiation. It needs common sense and the awareness and collective strength and consensus of a group of people, men and women, working together. A weak dose of radiation contains the same information as a strong measure. The process will surely evolve with practice. By this means we will at last acquire an holistic knowledge of the particle world.

I would add that the insights of quantum theory has substantially shifted our understanding of the particle world from the mechanistic view of the atom that prevailed eighty years ago. There has been significant discussion since at least the 1970's that the organisation of our universe is along holographic lines. It therefore concerns me that this new awareness does not feature in the NWMO report and plans for managing the waste issue.

My overall apprehension is that we are now treating the recently-discovered 'sub-continent of Atomica' in the same imperious manner that the Europe nations used for two hundred years in their dealings with the continent of Africa. We have essentially colonised and now exploit the resources of this smaller realm that is virtually inside of us, without having the wit to consider how our activities infringe (once again !) upon the native communities of this new (to us) world.

Atoms are clearly the family and community structures of the particle population. Fission works (for us) by destroying family life at the particle level. Radiation is basically an expression of the immense distress and pain that is a consequence of any family system breaking up. This is the kind of quantum thinking that we need to pursue. It can only but give us greater knowledge of the situation we are now in.

Well, what else do I want to say, while I'm saying these things ?

I wish the Church(es) would take an greater interest in the process of nuclear fission. There is evidence, most especially in the description of the Four Interactive Forces, that the energy field at the nucleus or heart of every atom has attributes that religious people would call The Holy Spirit.

Fission, in this context, is as the crucifixion of matter.

If Science and Religion represent the belief systems of our left and right brains, how can we encourage these two halves of our whole creative self to communicate and work together on this particular issue ?

In this same vein, is it not a matter of concern that our knowledge of the Atomic world is a construct of our masculine mind. Men men men ! Our gender has explained and analysed and reasoned and worked out all the mechanisms that gives us access to nuclear power. But sharing a home and raising a family with a woman, I am reminded everyday that there is another good way of seeing and valuing things. And this other way, perceptive and compassionate and wise around relationships, is not represented in our male account of the highly-social particle world.

This is simply another reason why I think we have a long way to go, towards fully knowing the intrinsic nature of the particle world. I'm optimistic thought, that when our knowledge is more complete and wholesome, we will be able to develop a process that can beneficially treat the radioactive materials, rather than just keep them in storage.

In the end, I want to say - thank you again NWMO people. Thanks for being willing to handle and hold this study. It is really a responsibility of us the public to resolve, since it is our continuous demand for cheap and abundant energy that caused the reactors to be built in the first place.

I hope you can hear that I'm on your side, even as I propose an alternative kind of inquiry to yours. Concepts are always changing, even as we and the consciousness of our society changes.

Many other sciences are in the process of moving to a more holistic attitude and awareness of their field of expertise. I sense the same shift is coming to this concern for the radioactive waste, with its link to the whole atomic world. I think it noble work. For we are seeking to understand the sublime nature of the innermost part of our Universe. It is an adventure, with a steep learning curve built in.

Good luck.

Ian Turbull

#1: Regulatory Changes Are Necessary - Nuclear Liability Act

Author: Dan Parrott, PostPosted: Fri Jul 08, 2005 3:06 pm

Some important regulatory changes are necessary if the NWMO wants to be seen as providing credible solutions to the nuclear waste problem.

First and foremost, the Nuclear Liability Act needs to be repealed. This piece of federal legislation was passed in the late 1960s and was expressly designed to encourage the private sector to participate in the construction of a civilian reactor program in Canada.

The private sector was concerned that a nuclear accident would create immense personal injury and property damage claims. The possibility that the private sector could be held liable for and have their assets seized to compensate these claims made them reluctant to participate in the development of this industry.

The federal government's response was to pass the Nuclear Liability Act. The Act shielded private industry from any and all claims in the event of a nuclear accident. It did not matter if a private contractor was negligent, wilfully blind, or just simply idiotic in its design and construction of a reactor or reactor component that subsequently exploded. Legally, the contractor would carry absolutely no liability, regardless of how much property was damaged or how many people were hurt.

Instead, the Act states that the only liable party in the event of an accident is the nuclear "operator", and that the operator's liability was capped at a paltry \$75 million dollars.

In short, the nuclear industry was built on a regulatory framework that guaranteed a total absence of accountability. The industry could be as reckless as it wanted, and it knew that it could never be held responsible or financially drawn to account.

This recklessness is evidenced today: Here we are discussing what to do with the industry's wastes, when this discussion and dialogue should have happened over 50 years ago.

This type of legal privilege should be abolished, especially if the NWMO is proposing to act as a nuclear "operator" and transporting nuclear waste through communities across Canada. I wouldn't want this kind of hazard rolling through my community, knowing that in the event of a mishap those responsible are completely off the hook, and that any other redress is severely limited.

In the end, credibility is important. Yet what kind of confidence will the public have in this project if the private sector is seen as fleeing responsibility and avoiding accountability at every turn? Again, this Act should be repealed if the NWMO is serious in its attempt to manage the nuclear waste problem in this country.

The Nuclear Liability Act is not the only problem. I will attempt to discuss these in future posts.

#2: Author: Jeremy Whitlock, PostPosted: Fri Jul 08, 2005 10:22 pm

Before responding to this comment, it must first be noted that the issue of the Nuclear Liability Act (1976) has little to do with the NWMO and the topic of this e-dialogue. The NWMO is neither a nuclear operator nor a nuclear supplier under the terms of the NLA.

That said, Mr. Parrott's comments contain some inaccuracies that must be addressed:

DP> "This piece of federal legislation was passed in the late 1960s and was expressly designed to encourage the private sector to participate in the construction of a civilian reactor program in Canada."

The NLA (1976) was in fact designed with a second purpose that Mr. Parrott does not mention, which is to provide a streamlined claims process for citizens in the case of a nuclear accident. Since all public liability sits with the operator (the utility, in the case of power reactors), a homeowner claiming to have suffered damage due to a reactor does not need to prove negligence (which would require a technical argument and likely the naming of reactor component suppliers as part of suit) -- it is sufficient to establish damage. In return for accepting sole responsibility in this "no fault" insurance regime, the operator's liability is capped (currently \$75M).

DP> "The Act shielded private industry from any and all claims in the event of a nuclear accident. It did not matter if a private contractor was negligent, wilfully blind, or just simply idiotic in its design and construction of a reactor or reactor component that subsequently exploded. Legally, the contractor would carry absolutely no liability, regardless of how much property was damaged or how many people were hurt."

This statement overlooks the fact that nuclear suppliers are not shielded from legal action from the nuclear operator, for the recovery of on-site property damage costs. In any credible accident scenario (and supported by the historical record) it is much more likely that on-site property damage, up to and including the cost of the reactor itself (roughly a billion dollars for a large-scale power reactor), will be incurred before any off-site significant effect.

DP> "In short, the nuclear industry was built on a regulatory framework that guaranteed a total absence of accountability. The industry could be as reckless as it wanted, and it knew that it could never be held responsible or financially drawn to account."

This statement does not make sense. A supplier industry that behaved "as reckless as it wanted" would not stay in business. As mentioned above, there is no protection for the supplier industry (except bankruptcy protection) against the wrath of its customer.

DP> "This recklessness is evidenced today: Here we are discussing what to do with the industry's wastes, when this discussion and dialogue should have happened over 50 years ago."

The question of "what to do in the long-term" with used nuclear fuel has been under discussion within the industry since its inception. At all times, however, the industry has placed utmost importance on the safe handling of its wastes, mostly likely to a greater degree than can be found in any other industry on the planet (and many with far more toxic waste products).

In terms of medium and long-term handling, the need to adequately isolate the radionuclides in used nuclear fuel from the biosphere was recognized at the outset of Canada's nuclear program in the late 1940s and 1950s, with research and development in this field progressing apace with the development of the industry.

As Canada's nuclear power program geared up in the 1950s the research focused upon the reprocessing and subsequent recycling of the useful fraction of used fuel, due to the then-perceived limited availability of uranium ore. In this case, for example, the leftover waste from reprocessing would have been incorporated into glass blocks, which had been confirmed through field tests to be resistant to leaching.

By the late 1960s, with uranium known to be an abundant Canadian resource, the focus shifted to a once-through fuel cycle and the direct isolation of the resulting used fuel without reprocessing. The time-scale for this isolation can be separated into "interim storage" and "long-term management" requirements, and it is the latter that is being discussed today.

In fact this public discussion on "long-term" management has been underway since for over fifteen years, since the start of the Environmental Assessment of AECL's Deep Geological Disposal proposal.

#3: Author: Dan Parrott, PostPosted: Sat Jul 09, 2005 4:27 pm

Thank you Mr. Whitlock for your response to my earlier post. I would like to address some of your comments.

First, I believe that the Nuclear Liability Act ("NLA") does indeed apply to the NWMO and to this e-dialogue. Section 6 of the Nuclear Fuel Waste Act states that every nuclear energy corporation shall become and remain a shareholder/member of the NWMO. These corporations are all nuclear operators as defined by the NLA. I find it hard to imagine that these operators would be allowed to spin-off a non-operator entity to deal with their nuclear waste problem.

The NWMO also has to apply to the CNSC for a licence before beginning any operations. The NWMO's Draft Study Report notes at page 176 that before such a licence is issued, the CNSC has to determine that the NWMO fulfilled "...the legislative and regulatory requirements of the Nuclear Liability Act..." The Study also notes at page 289 that one of the key pieces of federal legislation governing nuclear waste in Canada includes the NLA.

So I believe that it is both appropriate and relevant to include the NLA as a topic of discussion in this e-dialogue.

Second, I stand by my statement that the NLA was introduced primarily to protect private sector corporations from any legal and financial liabilities arising from what has been euphemistically called “nuclear incidents.” In other words, corporations did not want to risk exposing their assets to the gigantic financial damage claims following a serious nuclear accident. This was no great secret. The government-of-the-day freely admitted as much while the NLA was being debated as a Bill.

R. J. Orange, Parliamentary Secretary to the Minister of Energy, Mines and Resources, explicitly acknowledged that "... the fear of being held liable for radiation injury could cause anxiety, for example, to manufacturers of equipment used in nuclear installations about the possibility of being exposed to exceptionally large damage claims." (House of Commons Debates, 2nd Session, 28th Parliament, Vol. III, February 6, 1970, at 3315.)

The resulting Nuclear Liability Act (R.S.C. 1985, c. N-28) took great pains to alleviate these corporate anxieties. The NLA makes the nuclear operator the only liable party in the event of an “incident.” Section 4 of the Act makes an operator, such as AECL or Ontario Hydro, absolutely liable in the event of an “incident.” Section 10 eliminates the operator's right of recourse or indemnity from third parties. Section 11 declares that no other person other than the operator can be held liable.

While you are correct that the NLA provides some form of compensation for victims and survivors, this does not in any way detract from the fact that the legislation insulates the private sector from any kind of liability, regardless of its level of negligence, incompetence, etc. The fact that the entire compensation scheme offered by the NLA is shaped by the fact that no corporate liability exists in the event of a nuclear incident, strongly suggests that the NLA’s primary objective was to eliminate corporate liability. After all, there was already a perfectly good venue for the public to bring and pursue damage claims, i.e. the courts. It was being dragged into open court that these corporations feared. So the rules regarding liability had to be changed in their favour, and this was accomplished with the NLA’s passage.

You also mention that, “...nuclear suppliers are not shielded from legal action from the nuclear operator, for the recovery of on-site property damage costs. In any credible accident scenario (and supported by the historical record) it is much more likely that on-site property damage, up to an including the cost of the reactor itself (roughly a billion dollars for a large-scale power reactor), will be incurred before any off-site significant effect.”

The above may be true. However, the NLA deals primarily with catastrophic “nuclear incidents”(Section 2) that happen to “..any other person...” (Section 3). Again, and in this “nuclear incident” involving “any other person” context, Section 10 eliminates the

operator's right of recourse or indemnity from third parties. And if Section 10 wasn't clear enough, then Section 11 also declares that no other person other than the operator can be held liable.

My earlier post stated that, "...the nuclear industry was built on a regulatory framework that guaranteed a total absence of accountability. The industry could be as reckless as it wanted, and it knew that it could never be held responsible or financially drawn to account." This seems to require some clarification.

First, I am not suggesting that the private sector is somehow inherently reckless. What I am suggesting is that the regulatory framework, exemplified by this legislation, creates the absence of accountability. It is the regulatory framework that allows this industry to avoid financial responsibility in the event of a catastrophic nuclear accident.

I think that at very least this legislation passes along a terrible responsibility from the industry onto the operator. It forces the public to absorb the financial consequences of a "nuclear incident", regardless of a manufacturer's or supplier's negligence.

I also believe that the present nuclear waste problem is consistent with this framework. Instead of having solved the waste problem before investing heavily in this industry, the entire problem has been once again passed along to burden other innocent third parties, in this case future generations.

I think it is time to squarely address the problems built into the regulatory framework supporting this industry. I think that this needs to be part of any solution regarding long-term nuclear waste disposal, especially if this solution is to survive public scrutiny and win public support.

#4: Author: Dan Parrott, PostPosted: Sat Jul 09, 2005 4:31 pm

THIS IS A CONTINUATION OF MY JULY 9, 4:27 PM POST IN REPLY TO MR. WHITLOCK.

The above may be true. However, the NLA deals primarily with catastrophic "nuclear incidents"(Section 2) that happen to "...any other person..." (Section 3). Again, and in this "nuclear incident" involving "any other person" context, Section 10 eliminates the operator's right of recourse or indemnity from third parties. And if Section 10 wasn't clear enough, then Section 11 also declares that no other person other than the operator can be held liable.

My earlier post stated that, "...the nuclear industry was built on a regulatory framework that guaranteed a total absence of accountability. The industry could be as reckless as it wanted, and it knew that it could never be held responsible or financially drawn to account." This seems to require some clarification.

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I think it is time to squarely address the problems built into the regulatory framework supporting this industry. I think that this needs to be part of any solution regarding long-term nuclear waste disposal, especially if this solution is to survive public scrutiny and win public support.

#5: Author: Jeremy Whitlock, PostPosted: Sun Jul 10, 2005 12:00 pm

THIS IS A CONTINUATION OF MY JULY 8, 10:22 PM POST IN REPLY TO MR. PARROTT'S FIRST MESSAGE (CUT OFF DUE TO TEMPORARY 600-WORD LIMIT).

By the late 1960s, with uranium known to be an abundant Canadian resource, the focus shifted to a once-through fuel cycle and the direct isolation of the resulting used fuel without reprocessing. The time-scale for this isolation can be separated into "interim storage" and "long-term management" requirements, and it is the latter that we are discussing today.

In fact the broad public discussion on used nuclear fuel management was initiated over fifteen years ago, at the start of the Environmental Review for Canada's Deep Geologic Disposal proposal.

#6: Author: Jeremy Whitlock, PostPosted: Sun Jul 10, 2005 11:31 pm

In response to Mr. Parrott's most recent posts of July 9, 4:27 PM and 4:31 PM (and attempting to stay below 600 words!):

My mistake: It is clear that a discussion of the NLA does indeed have relevance to the NWMO. I had misunderstood "nuclear operator", under the specification of the Act, to apply only to those in possession of material capable of sustaining a self-sufficient chain reaction. (This brings up an interesting challenge of NLA reform, which is its liability

limit, currently \$75M: how such a universal quantity can be deduced is an interesting challenge.)

Regarding the purpose of the Act, I have not objected to the notion that it served to encourage industry participation in nuclear development. I'm merely pointing out that a second, and equally important, purpose of the Act is to provide a simplified claims regime for the public. Yes the public would have otherwise had access to the courts, but this is precisely the point: the NLA removes the need for that.

Regarding liability of the industry, it is simply incorrect to claim that "the legislation insulates the private sector from any kind of liability, regardless of its level of negligence, incompetence, etc." The supplier industry is not insulated from liability to its customer (the nuclear operator) and in any kind of nuclear accident involving off-site consequences, whether catastrophic or otherwise, you can bet that significant on-site consequences are involved.

Regarding the ethics of passing on part of the burden of nuclear waste management to future generations, this is in many ways a very personal issue and therefore a contentious one. Personally I feel that the nuclear industry has probably done more than any other industry to limit the burden of its activities passed to future generations, and that condemning an industry that has sequestered almost all of its waste products from a half-century of operation while investing heavily in the development of a technology to further sequester those waste products ad infinitum, is being a bit harsh. I respect the rights of others to feel differently, however, and this is in fact precisely where Seaborn left off and the NWMO came in.

#7: Author: Dan Parrott, PostPosted: Thu Jul 14, 2005 1:33 pm

My last word on this exchange about Nuclear Liability Act ("NLA") comes from page 204 of the Draft Study Report: "If the distribution of costs, benefits, risks and responsibilities is perceived as fair and just, a sense of integrity emerges.... However, if a sense of unfairness arises, rather than a sense of integrity, it is bitterness, contempt, and even helplessness that come to dominate."

As noted in earlier posts, I believe that the NLA does not properly distribute the costs, benefits, risks and responsibilities surrounding this industry. This has created decades of bitterness and contempt. The NWMO's study is a chance to acknowledge the existence of unfair elements in this regulatory framework and to insist on corrections.

#8: Author: Randal Leavitt, PostPosted: Sun Jul 17, 2005 9:23 pm

Dan Parrott stated:

"This recklessness is evidenced today: Here we are discussing what to do with the industry's wastes, when this discussion and dialogue should have happened over 50 years ago. "

Nobody is interested or taken in by this kind of propaganda any more. Calling the industry reckless when it has the best safety record ever seen on this planet is just stupid, or dishonest, or both.

And we are not discussing waste. We are discussing a reusable energy resource, namely used once CANDU fuel. Dan, of course, will not see this because he wants to oppose the use of nuclear energy and he thinks calling reusable fuel waste will help his cause. Of course, all it does is make him look like a liar or a manipulator.

There are huge dis-incentives associated with accidents in the nuclear business and Dan knows this. Pretending that this is not the case is again only manipulative.

So cut the crap, Dan, and outline what changes in law will get the nuclear industry accelerating in Canada. Cause if we don't get going soon we are all going to fry.

#9: Author: Dan Parrott, PostPosted: Mon Jul 18, 2005 1:34 pm

OK Randal; I'll take the bait.

If nuclear power is as safe as you say, then repeal the Nuclear Liability Act. I mean, what kind of industry needs an absolute shield from property damage and personal injury claims?

If you won't advocate for a repeal of the NLA, then why not? No other industry requires this kind of protection from the public. How come the nuclear industry?

In short, you can't have it both ways Randal: Either the industry is as safe as you say and it doesn't need the NLA ; or, there is a big safety concern (which by the way, never has been denied - note the parliamentary debate quoted in my earlier post) and the NLA is required to protect corporate assets from public claims.

Regarding my views on recklessness: The NLA means never having to say your sorry, or to pay compensation to the victims of a nuclear catastrophe for that matter. Please explain to me how this acts to encourages responsible corporate behaviour.

Personally, I am of the view that liability laws are a civilizing influence. You hurt someone, you pay. This simple, yet elegant principle will certainly cause people and companies to think twice before embarking on potentially harmful or lethal courses of action. The fact that this principle has been suspended for the nuclear industry should cause any thinking person a considerable amount of concern.

With all respect Randall, I would love to see the nuclear industry join the rest of the human race, instead of standing above us as a menacing, uncivil and unaccountable behemoth. What the industry would look like without this special legal protection I don't know. I think it would be irresponsible to advocate "accelerating" its development under the present regulatory regime, however.

Lastly, I'm not the one calling it waste, Randal. The "Nuclear Fuel Waste Act" or NFWA must just drive you nuts, eh Randal? You can't blame me for that one.

Many thanx for the opportunity to exchange views. Regards, DP

#10: Author: Jeremy Whitlock, PostPosted: Tue Jul 19, 2005 10:48 am

We've dealt with this. Mr. Parrott has yet so suggest a credible explanation for how the NLA leads to reduced safety.

Is a hydro dam safe? Then why don't dam operators carry liability insurance against catastrophic public damage? A dam breaks and the government declares a state of emergency, much like the NLA after the first \$75M.

Does this make the operators of hydro dams act with diminished concern for public safety? Of course not.

Does this absolve the operators of hydro dams from criminal liability? Of course not.

Does the NLA protect nuclear suppliers from liability for damage to their customer's facility? Of course not.

Is facility damage much more likely (orders of magnitude) than public damage anyway? Of course.

Does the public care who supplied the grapple-grommet that broke the thingy which bent the chummy that lead to an off-site release, and would they be disappointed if the plant's operators took full responsibility and were found legally liable, without the public having to establish fault or negligence in a court of law, or even contact a lawyer? Of course not.

Does actual safety or harm have anything to do with public litigation? Of course not (e.g. TMI).

Is nuclear power a unique technology that breeds terror in the hearts of citizens, regardless of its actual safety record and level of risk, but is absolutely necessary anyway, so ergo the NLA? Of course.

Would open-ended public litigation in the absence of the NLA, given the above sociocultural phenomenon, breed terror in the hearts of every company, big or small, that considered operating or supplying parts for a nuclear power plant, regardless of its actual level of safety? Of course.

Can the nuclear industry do a better job of public education and communication? Of course.

Does the NLA limit have to be \$75M? Of course not. The concept is sound. The details are negotiable. Finding an appropriate value in complex, however, given the actuarial field's preference for past examples (there have been no claims under the NLA), and the diversity of the types of "operators" (as I've recently learned) such as the NWMO in the near future.

Does the NLA represent a subsidy for the nuclear industry? In a way, yes -- since the industry would probably not exist without it, given the above sociocultural phenomenon and the actuarial industrial's problem with a technology that has had so few off-site consequences (which, by the way, is a good thing). On the other hand, at least in the case of this countries largest nuclear operators, Bruce Power and OPG, the NLA's requirement to obtain commercial indemnity is certainly not a subsidy since these large corporations would otherwise self-insure against public nuclear liability as they do for their other operations not falling under the NLA.

#11: Author: Dan Parrott, PostPosted: Tue Jul 19, 2005 2:09 pm

Mr. Whitlock; allow me to be blunt.

The NLA represents a legal regime whereby the some negligent corporation can irradiate your property making it unlivable, poison and even kill your family, and guess what? Under this regime you get to come to me, another taxpayer, for compensation.

Now tell me this: Why should I pay? I don't know you, and I certainly didn't cause your tragedy.

And while we're at it, why should this negligent corporation have absolutely no financial responsibility towards you and your surviving family members? Why am I forced to assume this responsibility?

If you can't see how outrageous this is, then well, there's not much more I can say, other than "res ipsa locutor."

How does this regulatory scheme affect safety? Simple. The nuclear industry wants to act just like all the other companies out there. You know, cut corners, keep costs low, make a profit, keep shareholders happy, etc. The NLA creates a fiction that they're just "one of the boys", out there doing business, just like anyone else.

But this industry is not just another set of companies. I mean really, Jeremy, in your own words this is an industry that "breeds terror" in the hearts of its customers, as well as the citizenry writ large. So who are you trying to kid?

So the recklessness is inherent and comes from trying to appear normal, wanting to behave just like other businesses, when in fact they are very different.

Imagine, without the NLA, this industry would have to act very, very carefully. Every cost, every cut, every contract for screws, nuts and bolts would be scrutinized. The level of care the industry would exercise without the NLA would greatly set it apart from the regular world of business. And this wouldn't necessarily be because they are trying to protect the public. More to the point, they would be trying to reassure shareholders and other investors that their investments won't disappear in a flash.

I agree with you that the NLA represents a huge public subsidy, without which the industry in its present form would likely not exist. Would you invest money in an industry that faced even the remote possibility of gigantic liabilities that could wipe out any and all corporate assets and collateral?

From my point of view, do I want public money invested in a project that could, quite literally, wipe me out? Either as a victim, or as the taxpayer obliged to compensate victims?

I believe that the NLA should be repealed and in this way have the industry brought back into society.

I also believe that any project involving the NWMO should not operate under the NLA regime.

Nuclear waste disposal is not normal business. The NWMO shouldn't be allowed to operate under the legal fiction that somehow their project is normal business (to their credit, I believe the NWMO understands the extraordinary nature of their undertaking). The NWMO should face the same legal and liability pressure that face other businesses. This would be a stricture, without doubt, but it would force the NWMO to tread very, very carefully during its operational phases. As a citizen, this is exactly the outcome that I want to encourage.

Thank you again for the opportunity to exchange views. Regards, DP

#12: Author: Jaro, PostPosted: Tue Jul 19, 2005 6:05 pm

Just to add to Jeremy's comments :

Here in Quebec many of our largest dams are in the sparsely populated North of the James Bay, and the ones in the south are mostly low-head, so while the hazard is potentially large, the risk is generally quite small.

But even relatively small dams can cause great devastation, as we learned several years ago, when unusually strong precipitation combined with stuck flood gates at dams in the Lac St. Jean region proved to be a lethal combination.

In the population centers of the south, the greater concern is -- or rather should be -- industries using poison gases.

Just today there was an interesting article about this in the Montreal Gazette, entitled "The blaring sound of a gas leak."

I thought it amazing that these industries were allowed to operate all these years without warning systems.... not quite nuclear standards (obviously), even though the gas can kill much faster..... (of course there are no containment buildings with negative pressure, and no impact-resistant walls around the process equipment either, but who cares....).

Relevant to this discussion is of course the fact that these industries don't have accident insurance to cover something like another Bhopal.

According to the article, by LINDA GYULAI,
<quote>

Major gas leaks may be uncommon, but Montreal's industry-heavy east end is establishing a public warning system similar to Sarnia just in case.

Four east-end plants that work with toxic chemicals are installing sirens that will warn about 30,000 residents of Mercier, Montreal East and Pointe aux Trembles of any gas leaks.

The initiative, developed by the city of Montreal, the industries and local residents, has been in the works for years, said Jean-Bernard Guindon, the director of Montreal's emergency preparedness centre.

The sirens, posted outside each plant, will be connected to the 911 call centre and to the fire department. The fire department, in turn, will alert local radio stations to broadcast an emergency warning and instructions for residents if there is ever a leak, Guindon said. A siren test is planned for September, he said.

"A lot of thought has gone into developing this system," Guindon said. Other neighbourhoods with industrial plants, including LaSalle and St. Laurent, are looking at adopting the east end's sirens project, he added.

Interquisa Canada, which manufactures a material that's used in polyester, installed a siren atop a 17-metre pole at its plant on Sherbrooke St. E. in Montreal East a few weeks ago.

The siren, which wails like an air-raid alarm, has four speakers to carry the call in all directions over a radius of at least 1.5 kilometres. About 8,000 people live in that radius.

The siren is loud enough to be heard inside a home, said Lina Lachapelle, director of environmental health, safety and quality at Interquisa. About 20 employees will be trained on how and when to trigger the siren, she said.

Montreal's sirens would be set off by plant workers. In Sarnia, only municipal officials can activate the sirens.

The other companies - Shell, Noranda and Marsulex - are at different stages of installing their sirens, Guindon said.

East-end industries started evaluating risks and talking about a rapid warning system after the 1984 gas leak at a chemical plant in Bhopal, India, that killed 3,800 people, said Pierre Frattolillo, the director of the Association industrielle de l'est de Montreal, representing major east-end companies.

Frattolillo and Guindon head a committee that was created in 1995. The committee, representing the city, residents, industry and other levels of government, considered different warning systems before settling on the sirens, Guindon said.

"It's not the only measure, but it's an important measure to make people safe," said Nicole Loubert, a Mercier resident who sits on the committee. Loubert said local residents' groups have been concerned about the risk of leaks for years.

The committee launched a public awareness campaign more than a year ago to make sure residents, businesses and schools know about the sirens, the risks from a toxic gas leak and how to protect themselves.

In case of a leak, the campaign emphasizes: take shelter immediately, close all windows, doors and vents, don't use the phone unless necessary and listen to the radio for instructions. The campaign also urges parents to resist rushing to collect their children at school. Gas travels so rapidly, a person could die before they get there, Guindon said.

Until now, the only recourse if there had been a gas leak would have been to call 911 and have firefighters warn residents one by one to stay indoors.

"We think it's a great thing," Marsulex plant manager Guy Thibault said of the sirens. "It gives us a much more rapid warning to the community."

For information on the sirens: www.aiem.qc.ca/cmml-site/cmml

<end quote>

Of course Mr. Perrott is right -- the nuclear industry isn't like other industries -- it takes far greater care to make it as safe as possible.

As for the transportation and storage of old spent nuclear fuel for NWMO projects, this whole debate is really way over the top, as we are talking about solid substances -- not at all like poison gas or even liquids, and there's certainly far less of it than shoe polish, another hazardous substance which shouldn't be consumed.....

#13: Author: Dan Parrott, PostPosted: Wed Jul 20, 2005 8:34 am

I have yet to hear of a "Hydro Liability Act", or a "Natural Gas Liability Act" giving absolute immunity from liability to contractors involved in those industries.

So what's so unique about the nuclear industry that it requires a NLA? Why won't investors invest in nuclear without a guarantee of absolute immunity?

Again, I believe that the NLA should be repealed. Real market forces will factor in the risks and determine how this industry continues to develop. Maybe the market will allow it to grow, maybe it will trim it back.

I also believe that the NWMO should also operate in this real world, with its contractor fully accountable for their actions.

Regards, DP

#14: Author: Jeremy Whitlock, PostPosted: Wed Jul 20, 2005 1:33 pm

> So what's so unique about the nuclear industry
> that it requires a NLA? Why won't investors invest
> in nuclear without a guarantee of absolute immunity?

Is this microphone on? I discussed this four posts up.

And it's not "absolute immunity" by the way -- this point has been made several times.

#15: Author: Dan Parrott, PostPosted: Wed Jul 20, 2005 2:11 pm

Jeremy; Yes, I know. That's why I didn't add the answer. You did it so eloquently yourself: the industry "breeds terror" etc.

And sorry, Jeremy, it is absolute immunity. Re-read sections 4, 10 and 11 of the NLA. These sections mean exactly what they say. If a negligently installed widget causes a catastrophic radiation release, and your home is irradiated and you die, then your surviving family members get to sue.... no one. The negligent corporation walks away scott-free.

Instead, they get to beg \$\$ from other tax payers like me.

If you have trouble reading the English language, I can happily download the French NLA version for you.

#1: Is the proposed implementation plan appropriate?

Author: NWMO, PostPosted: Mon Jul 25, 2005 11:27 am

We are interested in any and all comment you may have on the implementation plan the NWMO proposes to recommend. ... What are the conditions required to successfully

implement the approach? What matters to you most in implementation? What assurances are needed to be confident in implementation?

For example, you may wish to comment on:

- Design of implementation plan
- Citizen engagement
- Financing
- Siting process
- Governance and institutions
- Mitigation
- Research and intellectual capability

#1: Should Saskatchewan Even Host A Potential Waste Site?

Author: Dan Parrott, PostPosted: Fri Jul 08, 2005 2:37 pm

I attended the NWMO dialogue in Saskatoon on June 28-29.

During the meeting someone asked why Saskatchewan would be a potential site for a nuclear waste repository as this province has no nuclear reactors. The reply from the NWMO reps suggested that Saskatchewan was included because the uranium used to fuel the reactors in Ontario, Quebec and New Brunswick came from this province's uranium mines. In other words, the nuclear fuel and waste cycle originated in Saskatchewan, so it only seemed proper that this province share some responsibility for this problem.

Another participant then noted that, historically, the uranium fuel for Ontario, Quebec and New Brunswick reactors did not come from Saskatchewan. In fact, much of Saskatchewan's uranium was and continues to be mined by French corporations such as Cogema Resources Ltd., and is then shipped overseas to France. So it appears that Saskatchewan's uranium was mainly for international export, and that there is little if any chance that any significant amounts ended up in the nuclear reactors in central/eastern Canada.

This changed situation changed relatively recently when Cameco Corporation bought a stake in the Bruce reactors, in effect guaranteeing an Ontario market for Saskatchewan uranium for the first time.

The implication of this is that Saskatchewan is really not part of the nuclear fuel cycle that created the waste problems in Ontario, Quebec or New Brunswick. Saskatchewan did not originate this problem, nor should it automatically be placed on a list of potential host communities.

Would anyone from the NWMO care to add to or comment on this?

#2: Author: NWMO, PostPosted: Wed Jul 13, 2005 12:09 pm

In the Draft Study Report, NWMO has suggested that the objective of fairness would best be achieved if the site selection process is focused within the provinces that are directly involved in the nuclear fuel cycle. For this reason, we have proposed that the process of implementation be in the provinces that have benefited from activity associated with the nuclear fuel cycle. This includes the three provinces that generate electricity from nuclear power and consequently create used nuclear fuel as a by-product (Ontario, New Brunswick and Quebec), as well as Saskatchewan, which has benefited economically from the mining of uranium that is used to make our used nuclear fuel. We believe that these provinces have a greater responsibility than do other provinces and territories to manage the waste stream arising from the nuclear process.

You have raised the question whether Saskatchewan ought to be included in the list of provinces with a greater responsibility on this issue. Representatives from the uranium mining industry in Canada have advised the NWMO that a "significant fraction" of the uranium used in commercial nuclear reactors in Canada originates from the uranium mines in Saskatchewan. On this basis, the NWMO continues to believe that Saskatchewan is among the provinces with a special responsibility on this issue.

Thank you for raising this question. NWMO would be interested in your further thoughts, and the thoughts of others, on this question.

#3: Author: Dan Parrott, PostPosted: Wed Jul 13, 2005 4:57 pm

Thank you for your reply. Can you provide some details regarding this "significant fraction" of Saskatchewan uranium used in Ontario, Quebec and New Brunswick reactors? Thank you again.

#4: Author: Jeremy Whitlock, PostPosted: Thu Jul 14, 2005 5:11 pm

There is some semantic flip-flopping going on here, but I believe a correct statement of the use of uranium in Canada would be the following:

1. Most of Canada's uranium (~80%) is exported. Canada accounts for about one-third of the world's supply of uranium.
2. Most, and likely all, of the uranium used in Canada comes from Canada: First mainly from the Northwest Territories, then mainly from northern Ontario, and since the early 1990s mainly from northern Saskatchewan.

Therefore it is correct to say that a significant fraction of the used-fuel now in existence, and to be created in the foreseeable future, comes from the province of Saskatchewan (as the NWMO response states). The opposite statement, that a significant fraction of Saskatchewan uranium ends up in Canadian reactors, is not true.

Background reading:

(1) "Economic Impact of the Nuclear Industry in Canada", Section 2.2, Canadian Energy Research Institute (CERI), July 2003: www.cna.ca/english/files/study/CNAStudySept16-03.pdf

(2) "Canada's Uranium Production & Nuclear Power", Nuclear Issues Briefing Paper #3, Uranium Information Centre, May 2005, <http://www.uic.com.au/nip03.htm>

#5: Author: Randal Leavitt, PostPosted: Sun Jul 17, 2005 7:34 pm

I agree with Dan Parrott. The jobs and economic benefits of developing the further use of used once fuel should not be located in Saskatchewan. Ontario needs high tech jobs with strong long term prospects. I don't want any of that employment and economic stability moved out to Saskatchewan when we could really benefit from it right here in Ontario. Ontario has the universities, industrial centres, and scientific interests needed to really profit from this advanced new industrial base. So I want this exciting new industry located in Ontario where I can directly benefit from the employment that it offers.

#6: Author: NWMO, PostPosted: Thu Jul 28, 2005 9:28 am

Mr. Parrott, Our inquiries in response to your question have suggested, as has Dr. Whitlock, that the source of uranium for Canadian reactors has varied over time. And it will likely continue to do so. Our inquiries with the Canadian uranium mining and nuclear industry have also confirmed that Saskatchewan is an important stable source of uranium for Canadian reactors. However, the amount of uranium in Canadian reactors which originates from mines in Saskatchewan varies depending on market conditions and the time frame being considered. The NWMO has been advised that a 'significant fraction' of uranium in Canadian nuclear reactors originates from mines in Saskatchewan, but the precise amount is commercially-sensitive information and is not available from the supplier.

You have sparked an interesting discussion with the question you raised and its implications to what constitutes 'responsibility' on this matter. Thank you for raising the question for discussion."

#7: Author: Lenore Newman, PostPosted: Fri Jul 29, 2005 1:42 pm

I see a technical problem with a Saskatchewan repository- the lack of good transportation corridors between the reactors and Saskatchewan. The waste from New Brunswick would have to travel through Montreal and the Toronto area, and all of the waste would have to travel the very poor highways and rail lines that go around the great lakes. Anyone who has driven or taken the train between Toronto and Winnipeg can say how bad these highways and rail lines are.

Given the condition of infrastructure in Canada, it will be likely that significant upgrading of roads and rail lines will have to be done before we can think about moving nuclear waste on them. So doesn't it make sense to locate the repository as centrally as possible?

#8: Author: Jaro, PostPosted: Fri Jul 29, 2005 5:19 pm

The condition of infrastructure in Canada hasn't stopped the transportation of perishable radiopharmaceuticals. They're perishable because of their short half-life. The short half-life means they're much more radioactive than old spent nuclear fuel.

So this "technical problem" is in fact not a problem.

However, long transportation routes create opportunities for antinuke activists to stage "media events."

For THAT reason I would agree that a closer location to power plants is desirable.

See for example <http://www.nwmo.ca/Default.aspx?DN=1312,349,86,21,1,Documents>

#1: Health and Safety Regulation Need More Review

Author: Dan Parrott, PostPosted: Mon Aug 01, 2005 3:01 pm

For decades the uranium mining industry in Saskatchewan has operated within a health and safety regulatory framework overly dominated by non-health sciences such as physics and chemistry. While these disciplines have some usefulness in defining radiation exposure limits in workers, or developing standards such as surface water quality guidelines, they have been inappropriately used as the ultimate determinant in occupational, public and environmental health and safety.

The implication is that the uranium mining industry has been declaring itself "safe" for decades, without any sound scientific basis.

For example, most uranium miners wear radiation badges while a work. These badges are designed to detect and measure their radiation exposure. This data can be compared to occupational radiation exposure guidelines, and be used as part of an occupational health and safety regime to limit exposure.

On the surface this appears to represent a sound response to legitimate occupational health and safety concerns. It appears to be based on “hard” science. There is a significant problem with this approach, however. These radiation detection badges do not pick up the ionizing radiation produced by alpha particles, i.e. alpha radiation.

This omission is significant. Alpha has an extreme biological impact. The damage done to cell structures in a living organism by an alpha particle’s ionizing radiation is immense, especially when compared to other forms of ionizing radiation such as found in beta particles or gamma rays. The difference between an alpha particle and a gamma ray exposure in a living cell has been described as the difference between a cannon ball and a BB pellet.

This becomes even more significant when one considers that uranium and uranium decay products are almost all significant alpha-emitters. Uranium miners are therefore working in a physical environment drenched with alpha-emitters, without any method of detecting alpha-radiation levels, exposure or dosage.

The mining companies have historically dealt with this problem by telling miners that alpha represents large molecule-sized particles unable to pass through simple barriers such as paper, clothes, skin, etc. As a result, these alpha particles pose a negligible risk. This convenient explanation overlooks the fact that alpha gets into the air in the form of dust, or as radon gas; it gets into the water; it travels wherever dust and dirt travels. To the miner, this means that these particles can be inhaled and ingested. Once inside the miner’s body, these particles can lodge and begin bombarding cells, tissues and organs with a fierce rain of ionizing radiation.

The fact that alpha exposure represents an occupational hazard that flies by undetected by the “hard” sciences, apparently became a topic of review by the Lee Panel during the 1990s. Dr. Annalee Yassi, an expert trained in Community Health, Occupational and Environmental Health, was a member of this panel. Dr. Yassi attempted to analyze the health impacts of this industry from a health science perspective.

Dr. Yassi’s approach was clearly resented by the uranium mining industry. Dr. Lee even had to publicly scold the industry for not being forthcoming and timely with occupational data that could be used for analysis. Eventually, Dr. Yassi resigned from the panel.

Dr. Yassi’s resignation was a tremendous loss. Not only would the industry’s claim that it was historically “safe” not be tested using epidemiological tools and methods, but the industry’s future impact on workers, communities and the environment would also remain unknown.

This reliance on selected “hard” sciences also affects how the uranium industry is regulated.

For example, a regulator with a physics background once told me that he believed that the environment surrounding several uranium mines in northern Saskatchewan had

spontaneously healed itself. He based this on the fact that his Geiger-counter readings taken in areas 10 kilometers out from these mines showed nothing more than normal background radiation levels. In his mind, this was nothing short of miraculous. He was therefore convinced that the mines' radiation impacts were negligible.

This regulator's very simple scientific model of cause and effect is completely useless in determining the health and environmental impacts of these mines. To authoritatively conclude that uranium mining is "safe" on this basis is ridiculous, especially when Geiger-counters are not able to detect alpha-radiation.

What is required in northern Saskatchewan, or in any debate surrounding the safety of transporting and storing radioactive waste?

First, health experts like Dr. Yassi must be involved.

During the Lee Panel hearings, public presenters noted that neo-natal birth defects were twice as high in northern Saskatchewan as in the southern part of the province. Taking Geiger-counter readings around a uranium mine is in itself sufficient to determine causation. Such a problem requires the input of health scientists, in particular epidemiologists such as Dr. Yassi.

Second, health experts and scientists should be involved pro-actively. There is no point in involving them after-the-fact, to simply confirm that birth-defect counts have actually soared.

Third, a mitigation strategy should be put into place. Occupational, community and environmental health baselines should be established. If a nuclear waste storage facility appears to be increasing birth defects when compared to the baseline, then some form of mitigation strategy should be activated. Compensation and/or assistance for victims should also form part of this strategy.

Last, this type of health science/epidemiological approach should be built into the regulatory framework. Only in this way can the public be assured that meaningful regulatory interventions will take place.

In conclusion, "hard" science has its place. But to use chemistry or physics to answer health and safety questions, while excluding the health sciences represents a huge regulatory mistake. Worse, it exudes manipulation, bad science and bad faith.

#2: Author: Jaro, PostPosted: Mon Aug 01, 2005 4:40 pm

"Hard' science has its place"..... in antinuke propaganda attempting to undermine the credibility of incontrovertible facts.

Of course we're going way off on a tangent (away from NWMO-related topics), but so be it.....

Regarding measurement of alpha radiation -- chiefly from Radon gas -- Dr. Philippe Duport of the U of Ottawa (please see http://www.ie.uottawa.ca/English/AboutIE/Institute_Personnel.htm#duport), who worked periodically at Saskatchewan's uranium mines as AECB inspector from 1975 until 1998, told me that radon was in fact measured during that time.

Radon was measured monthly at Elliot Lake mines in Ontario, and more frequently in Saskatchewan's high-grade mines.

In fact, Dr. Duport, with his colleagues, developed a personal alpha dosimeter for uranium miners, now used worldwide.

So much for alpha radiation not being measured.

Who does Mr. Parrott think he's going to fool with his misinformation, anyway ?

CANADIAN NUCLEAR SAFETY COMMISSION

JUNE 18, 2004

CNSC/Update: Saskatchewan Uranium Miners' Health Studies

OTTAWA, ONTARIO--(CCNMatthews - Jun 18, 2004) - The Saskatchewan Uranium Miners' Cohort Study Group released today an update of its studies on the health of Saskatchewan uranium miners. As a member of the Study Group, the Canadian Nuclear Safety Commission concurs with the conclusions in this update.

These conclusions were reached in response to the Joint Federal-Provincial Panel on Uranium Mining Developments in Northern Saskatchewan and their 1993 recommendation to conduct ongoing health studies of past, present and future uranium miners. The Panel felt it was necessary to see if working with uranium ores might affect current miners' health, especially in terms of lung cancer associated with radon gas inhalation.

The Study Group comprises representatives from the Canadian Nuclear Safety Commission, the Government of Saskatchewan, and two mining companies involved in uranium mining in Saskatchewan (Cogema Resources Inc. and Cameco Corporation). This group initiated two important health studies of Saskatchewan uranium miners to address the Panel's recommendation. The mining companies were represented by both management and the mine workers' occupational health and safety committees.

The first study, started in 2000, updates the historic Beaverlodge miners' study. The original study found a higher than normal rate of lung cancer among underground uranium miners at the Beaverlodge mine in northern Saskatchewan which operated from 1949 to 1982. The updated study will provide 20 more years of follow-up information on these workers since 1980, when the original study was conducted. The update is expected to be completed by 2006.

The second study was started in 2002. The report of this study was released today. It concludes that it is not scientifically feasible to conduct a study of present and future miners who work in modern Saskatchewan uranium mines (1975 onward). Today's

Saskatchewan uranium miners have radon exposures that are between 100 and 1000 times lower than those of past uranium miners, such as miners from Beaverlodge, because of dose limits, improved mining techniques, and other radiation protection practices.

Any higher-than-normal rates of lung cancer from such workplace exposures would be virtually impossible to measure.

The feasibility study was completed in October 2003 and it was then reviewed by three internationally respected radiation researchers.

Based on the conclusions and recommendations of the study and reviewers, the Canadian Nuclear Safety Commission, the Government of Saskatchewan, and the workers and management from the mining companies agreed to continue to carefully monitor the occupational exposures of uranium miners to ensure that they remain at the current low levels. Records of these exposures will be maintained for the indefinite future. However, an ongoing health study of modern Saskatchewan uranium miners will not be conducted.

Regulations require that following the closure of the mine, the tailings ponds be drained off (with water filtering of course) and the remaining sediment be buried by a layer of earth. This essentially returns the natural hazardous material back to where it came from - under ground.

#3: Author: Dan Parrott, PostPosted: Tue Aug 02, 2005 1:54 pm

Without having had the opportunity to review the studies presented by Jaros, allow me to give an initial response.

First, if there is an alpha dosimeter being used worldwide, all I can say is good. It's about time. This certainly doesn't eliminate the problems posed by alpha, but it is a step in the right direction.

Second, the two epidemiological studies would also appear to be a good start. A little late, mind you - 50 years after the first Saskatchewan mines opened, 7 or so years after the Lee Panel began its work, and without the benefit of Dr. Yassi's participation.

I don't have much more to add, except to advocate the expansion of these kinds of health studies. An ongoing health study of modern Saskatchewan uranium miners SHOULD be conducted (that would be my position, especially if I was working in the mines). Similar community and environmental baseline and health studies should also be undertaken and monitored on an ongoing basis.

I hope that the NWMO will adopt and expand on the health science approach revealed in Jaro's post.

#4: Author: Jaro, PostPosted: Tue Aug 02, 2005 4:55 pm

I hope that the NWMO will avoid wasting the public's money in chasing ghosts. Of course if we MUST do so, then let's waste money in an equal-opportunity style by, for instance, conducting endless studies of radiation health effects on airline crews and frequent fliers (who get higher doses at altitude), farmers (who get increased levels of Radon every time they plow their fields), and of course all beer drinkers and banana consumers (who get low doses from increased concentrations of carbon-14 and potassium-40).

All this will likely achieve is provide additional support for previous results demonstrating a radiation hormesis effect (a beneficial effect of low doses of radiation). It may also show no significant effect at all, as in the studies of large populations in high-natural-radiation areas of the world, such as Kerala (India), Guarapari (Brazil) and Ramsar (Iran).

If however, we prefer intelligent use of limited budgets, then we should apply them towards far more beneficial programs, such as improving road safety or increasing smoking health hazards awareness, particularly among young people.

Current regulations for uranium mining require levels of ventilation in underground mine shafts that keep radon gas concentrations (and therefore radiation exposure) to very low levels.

Without radiation dose, it makes no sense to conduct health studies -- unless of course your intent is to perpetuate unfounded fear and impose unjustified costs, as part of the antinuclear industry's goal.

But I ask again -- what does any of this have to do with the NWMO ?

#5: Author: Dan Parrott, PostPosted: Wed Aug 03, 2005 10:40 am

Ghosts? Jaro, what planet are you on? Here on earth, it is widely know and reported that one out of every two Canadians can expect to have cancer in his or her lifetime. We all know people who have had, been treated for, been mutilated in treatment, or else have died from this condition.

If your research hasn't detected this epidemic, then I have serious questions regarding its reliability. And, for the record, are you suggesting that airline crews and frequent flyers are breathing/ingesting alpha? For that matter, are you suggesting that farmers and uranium miners share the same radon and alpha radiation exposure risks? Or miners and beer drinkers and banana consumers for that matter?

Oh, and while we're at it, when uranium mines are vented, this means that alpha-emitters are spewed into the environment. Nice that you care so much about the

miners, but consider also that radon can drift for hundreds if not thousands of kilometers. We downwinders thank you.

Lastly, what does this have to do with NWMO? The uranium industry's disposal of its own nuclear waste has provided the public with interesting and instructive lessons over the years. For instance, 60 years later governments are still squabbling over the cleanup costs of tailings that the industry "disposed" of by simply dumping them into northern Saskatchewan lakes. So there's a problem that's still on the books and doesn't look like will go away anytime soon. And if that wasn't bad enough, I guess we'll all soon get to see how well the tailings management facilities will work once the pumps are turned off....

Oh so many problems with this industry, and we'd probably found many more if the proper community and environment health baselines and surveillance studies had been put in place before the first mines were opened....

For the NWMO to ignore northern Saskatchewan's experience with uranium mining would represent a serious oversight.

So, again, I call for increased reliance on health science in these matters. More health studies. Damn the costs!! We're already suffering cancer in epidemic proportions, and it isn't the banana industry causing it!!

PS: Jaro, I hope that you get your wish and they let you keep the nuclear waste nice and close by wherever it is you live.

#6: Author: Dan Parrott, PostPosted: Wed Aug 03, 2005 2:11 pm

PPS: Unless it's close to where I live. ;)

#7: Author: Jaro, PostPosted: Wed Aug 03, 2005 4:40 pm

Cancer occurs in every province and territory in Canada. Not only is the incidence of cancer unrelated to whether-or-not a particular province has uranium mines or nuclear power plants, it is also unrelated to the proximity of regions within provinces to nuclear plants or mines that may be located there.

According to the published document, Canadian Cancer Statistics 2005, the cancer mortality rates in all the provinces are close to the national average (224 and 148 cancer deaths per 100,000 population of males and females respectively), as are the cancer incidence rates (468 and 345 cancer cases per 100,000 population of males and females respectively).

Here in Quebec, the cancer mortality rate is 256 and 158 per 100,000 population of males and females respectively, and the cancer incidence rate is 482 and 350 cancer cases per 100,000 population of males and females respectively.

The fact that the Quebec cancer rates are slightly higher than the national rates is due almost entirely to the high rates of lung cancer in Quebec, due to the continuing high popularity of cigarette smoking, relative to other provinces. The rates of all other cancer types in Quebec are virtually identical - and in some cases lower - than the national average.

By comparison, in Saskatchewan, the cancer mortality rate is 220 and 136 per 100,000 population of males and females respectively, and the cancer incidence rate is 453 and 333 cancer cases per 100,000 population of males and females respectively.

All figures are considerably lower than those for Quebec.

Maybe we should start mining uranium.

As for Radon gas emissions, these are associated with the presence of uranium (since Radon is a radioactive decay product of uranium).

But uranium is a very common element in the soil.

According to Dr. Philippe Duport, Director of the International Center for Low Dose Radiation Research at the University of Ottawa,

<< The Earth's crust contains some seventy chemical elements that are naturally radioactive. They irradiate us from the outside and from inside the body. The bulk of radioactive materials contained in rocks and soil are from uranium and thorium. They emit gamma radiation and release a radioactive gas (radon), which is present everywhere in varying quantities. There are heavily populated areas in the world where natural levels of radiation exceed several times the maximum Canadian dose limits for radiation workers. If such levels were observed in Canadian a nuclear facility, their operator would be required to drastically reduce radiation exposures and, failing this, a shutdown of the facility.

Typically, the first top meter of a 15 by 25-metre house lot contains, on average, three kilograms of uranium and ten kilograms of thorium. One of the elements borne from the decay of uranium is a gas called radon. Radon escapes continuously to the air from the surface of the earth. In average, every square meter of land releases about 10 thousand atoms of radon every second, that is, a source of 10,000 Becquerels. Radon, which is also radioactive, decays into a series of radioactive atoms, one of them being polonium 210. Rain, fog, snow, and dust bring polonium 210 back to the ground, where it accumulates. Since the source of radon never stops, the quantity, and the activity (quantity) of polonium on the ground remains constant at about 10,000 Becquerels per square meter.>>

While the Radon discharges from uranium mine ventilation systems are relatively large compared to an equal area of typical soil, the overall quantity of Radon released is absolutely insignificant, because of the enormous difference in total emitting area -- the entire Province of Saskatchewan, 651,942 square kilometers, versus a few square kilometers for the uranium mines.

Since a large part of the Province is farmland, you can bet that the combined effect of plowing all those fields has a far greater overall Radon emissions impact than operating a few uranium mines.

Another important source of radioactivity, of particular concern in oil and gas producing provinces like Alberta and Saskatchewan, is petroleum pipe scale, which consists of concentrated inorganic solids such as barium sulfate. This deposits in the inside of down-hole pipes during the normal course of oil field pumping operations (it comes from subterranean water moving upwards with petroleum) A portion of this scale has been shown to contain naturally occurring radioactive materials (NORM), predominantly compounds of radium.

When these pipes are removed from the well, there is a potential for radiation doses to the oil field workers handling the pipes, especially as the pipes are cleaned for reuse. It has been found that based on cleaning 20 pipes per day, 250 days per year on average, the annual external dose from dispersed material was estimated to be from 280 mrem to 410 mrem.

On top of that, the annual inhalation doses for the operators ranged from 11 mrem to 45 mrem, and for incidental ingestion from 1.9 mrem to 9.7 mrem. Worker annual external dose from the pipe racks ranged from 0 to 28 mrem.

Of course unlike uranium mines, the vastly larger oil & gas industry is not considered to be a "nuclear industry," and therefore is not subject to the regulations of the Canadian Nuclear Safety Commission (CNSC).

Also interesting is the MARINA II report, published two years ago by the European Commission: "Update of the MARINA Project on the radiological exposure of the European Community from radioactivity in North European marine waters"

(283KB pdf available at

http://www.europa.eu.int/comm/energy/nuclear/radioprotection/doc/studies/rp132/marina_en.pdf)

The study found that naturally occurring radioactive materials (NORM) now dominate doses to the European Union (EU) population from industrial discharges, both in terms of alpha activity and overall impact (collective dose).

Norway is the largest oil producer in the North Sea and is estimated to provide the greatest impact from current discharges. Norway is closely followed by the U.K., with Denmark and the Netherlands contributing relatively little.

In 2000, according to the study, radioactive discharges from the non-nuclear industries were estimated to contribute more than 90% of the European population's total exposure from discharges into the marine region covered by the Ospar (Oslo & Paris) Convention.

Oil and gas operations contributed 35.3% and phosphates 55.4%.

This compared with the contribution to the collective radiation dose rate from discharges of 3.3% from weapons fallout, 0.2% from Chernobyl fallout, and 0.1% from nuclear power stations.

Its a good bet that in Saskatchewan too, radioactive discharges from the non-uranium-mining industries contribute more than 90% of the population's total exposure.

The radiological impact of any deep geological spent nuclear fuel repository would be truly minuscule. Talking about health impacts on the public in this context makes about as much sense as worrying about stubbing your toe on a rock buried 500 meters underground.

"Damn the costs!!" as Mr. Parrott suggests, implies frivolous spending of limited budgets in the face of urgent needs such as reducing the thousands of annual deaths from traffic accidents, and improving our cancer diagnostics and treatment facilities by boosting funding of nuclear medicine facilities & equipment.

PS.

FYI, regarding potassium-40 (K-40) natural radioactivity in bananas, there is an interesting calculation that Michael G. Stabin, Assistant Professor of Radiology and Radiological Sciences in the Department of Radiology and Radiological Sciences at Vanderbilt University, mentioned earlier this year :

If Americans consume approximately 20 billion bananas per year (a reasonable figure), this represents a release to the public of:

$(440 \text{ mg K/banana}) \times (1.18 \times 10^{-4} \text{ g K-40/g K}) \times (7 \times 10^{-6} \text{ Ci/g K-40}) \times (2.04 \times 10^{10} \text{ bananas/year}) \times (1 \text{ g/1000 mg})$

or around 7.4 CURIES of activity per year.

Potassium-40 decays by electron capture and beta minus decay.

Its most significant emissions are a 0.585 MILLION electron-volt beta particle and a 1.46 MILLION electron-volt gamma ray.

The specific gamma ray constant for K-40 is about 0.78 R-cm²/mCi-hr, implying that the dose rate near (1 cm) this amount of K-40, without shielding, would be 5800 R/hr, which would be lethal in about 4 minutes.

To shield this amount of activity to 5% of its initial value, which would still produce death in a little over an hour, one would need over 20 cm of concrete.

This material is decaying only with a half-life of 1.3 billion years, meaning that its activity will be with us for generations untold, irradiating our children, and their children, forever.

The annual effective dose from K-40 in the body is around 16 mrem for adults and 18 mrem for children, according to the UNSCEAR 1993 report, accounting for an annual population dose of 4.6 million person-rem, assuming a population of 270 million people.

<end quote>

Author: Dan Parrott, PostPosted: Mon Aug 01, 2005 3:01 pm

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physics and chemistry. While these disciplines have some usefulness in defining radiation exposure limits in workers, or developing standards such as surface water quality guidelines, they have been inappropriately used as the ultimate determinant in occupational, public and environmental health and safety.

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Dr. Yassi's approach was clearly resented by the uranium mining industry. Dr. Lee even had to publicly scold the industry for not being forthcoming and timely with occupational data that could be used for analysis. Eventually, Dr. Yassi resigned from the panel.

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The Study Group comprises representatives from the Canadian Nuclear Safety Commission, the Government of Saskatchewan, and two mining companies involved in uranium mining in Saskatchewan (Cogema Resources Inc. and Cameco Corporation).

This group initiated two important health studies of Saskatchewan uranium miners to address the Panel's recommendation. The mining companies were represented by both management and the mine workers' occupational health and safety committees.

The first study, started in 2000, updates the historic Beaverlodge miners' study. The original study found a higher than normal rate of lung cancer among underground uranium miners at the Beaverlodge mine in northern Saskatchewan which operated from 1949 to 1982. The updated study will provide 20 more years of follow-up information on these workers since 1980, when the original study was conducted. The update is expected to be completed by 2006.

The second study was started in 2002. The report of this study was released today. It concludes that it is not scientifically feasible to conduct a study of present and future miners who work in modern Saskatchewan uranium mines (1975 onward). Today's Saskatchewan uranium miners have radon exposures that are between 100 and 1000 times lower than those of past uranium miners, such as miners from Beaverlodge, because of dose limits, improved mining techniques, and other radiation protection practices.

Any higher-than-normal rates of lung cancer from such workplace exposures would be virtually impossible to measure.

The feasibility study was completed in October 2003 and it was then reviewed by three internationally respected radiation researchers.

Based on the conclusions and recommendations of the study and reviewers, the Canadian Nuclear Safety Commission, the Government of Saskatchewan, and the workers and management from the mining companies agreed to continue to carefully monitor the occupational exposures of uranium miners to ensure that they remain at the current low levels. Records of these exposures will be maintained for the indefinite future. However, an ongoing health study of modern Saskatchewan uranium miners will not be conducted.

Regulations require that following the closure of the mine, the tailings ponds be drained off (with water filtering of course) and the remaining sediment be buried by a layer of earth. This essentially returns the natural hazardous material back to where it came from - under ground.

#3: Author: Dan Parrott, PostPosted: Tue Aug 02, 2005 1:54 pm

Without having had the opportunity to review the studies presented by Jaros, allow me to give an initial response.

First, if there is an alpha dosimeter being used worldwide, all I can say is good. It's about time. This certainly doesn't eliminate the problems posed by alpha, but it is a step in the right direction.

Second, the two epidemiological studies would also appear to be a good start. A little late, mind you - 50 years after the first Saskatchewan mines opened, 7 or so years after the Lee Panel began its work, and without the benefit of Dr. Yassi's participation.

I don't have much more to add, except to advocate the expansion of these kinds of health studies. An ongoing health study of modern Saskatchewan uranium miners SHOULD be conducted (that would be my position, especially if I was working in the mines). Similar community and environmental baseline and health studies should also be undertaken and monitored on an ongoing basis.

I hope that the NWMO will adopt and expand on the health science approach revealed in Jaro's post.

#4: Author: Jaro, PostPosted: Tue Aug 02, 2005 4:55 pm

I hope that the NWMO will avoid wasting the public's money in chasing ghosts. Of course if we MUST do so, then let's waste money in an equal-opportunity style by, for instance, conducting endless studies of radiation health effects on airline crews and frequent fliers (who get higher doses at altitude), farmers (who get increased levels of Radon every time they plow their fields), and of course all beer drinkers and banana consumers (who get low doses from increased concentrations of carbon-14 and potassium-40).

All this will likely achieve is provide additional support for previous results demonstrating a radiation hormesis effect (a beneficial effect of low doses of radiation). It may also show no significant effect at all, as in the studies of large populations in high-natural-radiation areas of the world, such as Kerala (India), Guarapari (Brazil) and Ramsar (Iran).

If however, we prefer intelligent use of limited budgets, then we should apply them towards far more beneficial programs, such as improving road safety or increasing smoking health hazards awareness, particularly among young people.

Current regulations for uranium mining require levels of ventilation in underground mine shafts that keep radon gas concentrations (and therefore radiation exposure) to very low levels.

Without radiation dose, it makes no sense to conduct health studies -- unless of course your intent is to perpetuate unfounded fear and impose unjustified costs, as part of the antinuclear industry's goal.

But I ask again -- what does any of this have to do with the NWMO ?

#5: Author: Dan Parrott, PostPosted: Wed Aug 03, 2005 10:40 am

Ghosts? Jaro, what planet are you on? Here on earth, it is widely know and reported that one out of every two Canadians can expect to have cancer in his or her lifetime. We all know people who have had, been treated for, been mutilated in treatment, or else have died from this condition.

If your research hasn't detected this epidemic, then I have serious questions regarding its reliability. And, for the record, are you suggesting that airline crews and frequent flyers are breathing/ingesting alpha? For that matter, are you suggesting that farmers and uranium miners share the same radon and alpha radiation exposure risks? Or miners and beer drinkers and banana consumers for that matter?

Oh, and while we're at it, when uranium mines are vented, this means that alpha-emitters are spewed into the environment. Nice that you care so much about the miners, but consider also that radon can drift for hundreds if not thousands of kilometers. We downwinders thank you.

Lastly, what does this have to do with NWMO? The uranium industry's disposal of its own nuclear waste has provided the public with interesting and instructive lessons over the years. For instance, 60 years later governments are still squabbling over the cleanup costs of tailings that the industry "disposed" of by simply dumping them into northern Saskatchewan lakes. So there's a problem that's still on the books and doesn't look like will go away anytime soon. And if that wasn't bad enough, I guess we'll all soon get to see how well the tailings management facilities will work once the pumps are turned off....

Oh so many problems with this industry, and we'd probably found many more if the proper community and environment health baselines and surveillance studies had been put in place before the first mines were opened....

For the NWMO to ignore northern Saskatchewan's experience with uranium mining would represent a serious oversight.

So, again, I call for increased reliance on health science in these matters. More health studies. Damn the costs!! We're already suffering cancer in epidemic proportions, and it isn't the banana industry causing it!!

PS: Jaro, I hope that you get your wish and they let you keep the nuclear waste nice and close by wherever it is you live.

#6: Author: Dan Parrott, PostPosted: Wed Aug 03, 2005 2:11 pm

PPS: Unless it's close to where I live. ;)

#7: Author: Jaro, PostPosted: Wed Aug 03, 2005 4:40 pm

Cancer occurs in every province and territory in Canada. Not only is the incidence of cancer unrelated to whether-or-not a particular province has uranium mines or nuclear power plants, it is also unrelated to the proximity of regions within provinces to nuclear plants or mines that may be located there.

According to the published document, Canadian Cancer Statistics 2005, the cancer mortality rates in all the provinces are close to the national average (224 and 148 cancer deaths per 100,000 population of males and females respectively), as are the cancer incidence rates (468 and 345 cancer cases per 100,000 population of males and females respectively).

Here in Quebec, the cancer mortality rate is 256 and 158 per 100,000 population of males and females respectively, and the cancer incidence rate is 482 and 350 cancer cases per 100,000 population of males and females respectively. The fact that the Quebec cancer rates are slightly higher than the national rates is due almost entirely to the high rates of lung cancer in Quebec, due to the continuing high popularity of cigarette smoking, relative to other provinces. The rates of all other cancer types in Quebec are virtually identical - and in some cases lower - than the national average.

By comparison, in Saskatchewan, the cancer mortality rate is 220 and 136 per 100,000 population of males and females respectively, and the cancer incidence rate is 453 and 333 cancer cases per 100,000 population of males and females respectively. All figures are considerably lower than those for Quebec. Maybe we should start mining uranium.

As for Radon gas emissions, these are associated with the presence of uranium (since Radon is a radioactive decay product of uranium). But uranium is a very common element in the soil. According to Dr. Philippe Duport, Director of the International Center for Low Dose Radiation Research at the University of Ottawa, << The Earth's crust contains some seventy chemical elements that are naturally radioactive. They irradiate us from the outside and from inside the body. The bulk of radioactive materials contained in rocks and soil are from uranium and thorium. They emit gamma radiation and release a radioactive gas (radon), which is present everywhere in varying quantities. There are heavily populated areas in the world where natural levels of radiation exceed several times the maximum Canadian dose limits for radiation workers. If such levels were observed in Canadian a nuclear facility, their operator would be required to drastically reduce radiation exposures and, failing this, a shutdown of the facility. Typically, the first top meter of a 15 by 25-metre house lot contains, on average, three kilograms of uranium and ten kilograms of thorium. One of the elements borne from the decay of uranium is a gas called radon. Radon escapes continuously to the air from the

surface of the earth. In average, every square meter of land releases about 10 thousand atoms of radon every second, that is, a source of 10,000 Becquerels. Radon, which is also radioactive, decays into a series of radioactive atoms, one of them being polonium 210. Rain, fog, snow, and dust bring polonium 210 back to the ground, where it accumulates. Since the source of radon never stops, the quantity, and the activity (quantity) of polonium on the ground remains constant at about 10,000 Becquerels per square meter.>>

While the Radon discharges from uranium mine ventilation systems are relatively large compared to an equal area of typical soil, the overall quantity of Radon released is absolutely insignificant, because of the enormous difference in total emitting area -- the entire Province of Saskatchewan, 651,942 square kilometers, versus a few square kilometers for the uranium mines.

Since a large part of the Province is farmland, you can bet that the combined effect of plowing all those fields has a far greater overall Radon emissions impact than operating a few uranium mines.

Another important source of radioactivity, of particular concern in oil and gas producing provinces like Alberta and Saskatchewan, is petroleum pipe scale, which consists of concentrated inorganic solids such as barium sulfate. This deposits in the inside of down-hole pipes during the normal course of oil field pumping operations (it comes from subterranean water moving upwards with petroleum) A portion of this scale has been shown to contain naturally occurring radioactive materials (NORM), predominantly compounds of radium.

When these pipes are removed from the well, there is a potential for radiation doses to the oil field workers handling the pipes, especially as the pipes are cleaned for reuse. It has been found that based on cleaning 20 pipes per day, 250 days per year on average, the annual external dose from dispersed material was estimated to be from 280 mrem to 410 mrem.

On top of that, the annual inhalation doses for the operators ranged from 11 mrem to 45 mrem, and for incidental ingestion from 1.9 mrem to 9.7 mrem. Worker annual external dose from the pipe racks ranged from 0 to 28 mrem.

Of course unlike uranium mines, the vastly larger oil & gas industry is not considered to be a "nuclear industry," and therefore is not subject to the regulations of the Canadian Nuclear Safety Commission (CNSC).

Also interesting is the MARINA II report, published two years ago by the European Commission: "Update of the MARINA Project on the radiological exposure of the European Community from radioactivity in North European marine waters"

(283KB pdf available at

http://www.europa.eu.int/comm/energy/nuclear/radioprotection/doc/studies/rp132/marina_en.pdf)

The study found that naturally occurring radioactive materials (NORM) now dominate doses to the European Union (EU) population from industrial discharges, both in terms of alpha activity and overall impact (collective dose).

Norway is the largest oil producer in the North Sea and is estimated to provide the greatest impact from current discharges. Norway is closely followed by the U.K., with Denmark and the Netherlands contributing relatively little.

In 2000, according to the study, radioactive discharges from the non-nuclear industries were estimated to contribute more than 90% of the European population's total exposure from discharges into the marine region covered by the Oskar (Oslo & Paris) Convention.

Oil and gas operations contributed 35.3% and phosphates 55.4%.

This compared with the contribution to the collective radiation dose rate from discharges of 3.3% from weapons fallout, 0.2% from Chernobyl fallout, and 0.1% from nuclear power stations.

It's a good bet that in Saskatchewan too, radioactive discharges from the non-uranium-mining industries contribute more than 90% of the population's total exposure.

The radiological impact of any deep geological spent nuclear fuel repository would be truly minuscule. Talking about health impacts on the public in this context makes about as much sense as worrying about stubbing your toe on a rock buried 500 meters underground.

"Damn the costs!!" as Mr. Parrott suggests, implies frivolous spending of limited budgets in the face of urgent needs such as reducing the thousands of annual deaths from traffic accidents, and improving our cancer diagnostics and treatment facilities by boosting funding of nuclear medicine facilities & equipment.

PS.

FYI, regarding potassium-40 (K-40) natural radioactivity in bananas, there is an interesting calculation that Michael G. Stabin, Assistant Professor of Radiology and Radiological Sciences in the Department of Radiology and Radiological Sciences at Vanderbilt University, mentioned earlier this year :

If Americans consume approximately 20 billion bananas per year (a reasonable figure), this represents a release to the public of:

$(440 \text{ mg K/banana}) \times (1.18 \times 10^{-4} \text{ g K-40/g K}) \times (7 \times 10^{-6} \text{ Ci/g K-40}) \times (2.04 \times 10^{10} \text{ bananas/year}) \times (1 \text{ g/1000 mg})$

or around 7.4 CURIES of activity per year.

Potassium-40 decays by electron capture and beta minus decay.

Its most significant emissions are a 0.585 MILLION electron-volt beta particle and a 1.46 MILLION electron-volt gamma ray.

The specific gamma ray constant for K-40 is about 0.78 R-cm²/mCi-hr, implying that the dose rate near (1 cm) this amount of K-40, without shielding, would be 5800 R/hr, which would be lethal in about 4 minutes.

To shield this amount of activity to 5% of its initial value, which would still produce death in a little over an hour, one would need over 20 cm of concrete.

This material is decaying only with a half-life of 1.3 billion years, meaning that its activity will be with us for generations untold, irradiating our children, and their children, forever. The annual effective dose from K-40 in the body is around 16 mrem for adults and 18 mrem for children, according to the UNSCEAR 1993 report, accounting for an annual population dose of 4.6 million person-rem, assuming a population of 270 million people.
<end quote>

#1: False Fear

Author: Randal Leavitt, PostPosted: Wed Aug 03, 2005 9:12 pm

The proposal to waste all our used once uranium by burying it in an expensive repository will not work. Canadians will never accept this idea. This concept does nothing to reduce the false fear that Canadians have with regard to nuclear fuel. The idea of burying this filthy stuff is just not on. We all know that it will leak out again - the chickens always come home to roost. Even if it does not actually leak out, everyone will always believe that it will, and everyone will always be terrified by this solution. It is an unhappy concept.

What we need is an approach that works physically, and that puts the population at ease. We need an approach that is both effective and hopeful.

How can we do this? Well, instead of "burying waste" we can reuse and reuse our uranium wealth to the fullest. This approach is efficient, and respectful of the Earth's limited resources. It suits the Canadian psyche. And we don't have to rush into this either. Uranium lasts a long time. We can reuse it now, or a long time from now. There is no hurry, as long as the plan is to fully benefit from our wealth appropriately.

This lesson was learned in France and is an essential element in the French public acceptance of nuclear power. A more detailed explanation can be read at:

Why The French Like Nuclear energy

<http://www.pbs.org/wgbh/pages/frontline/shows/reaction/readings/french.html>

The converse picture, the one we are dealing with here, is described at:

Why Do Americans Fear Nuclear Power

<http://www.pbs.org/wgbh/pages/frontline/shows/reaction/interviews/dupont.html>

What we need is a different understanding that is widespread. We need to see used once fuel as a positive factor. That should not be difficult, since it is extremely valuable. We just need to get more people to see it that way. An approach for managing used

once fuel that gives people hope and optimism would be really a lot better than the current doomsday plan.

OK - my point again is seeing the truth... used once fuel is not waste. It can be reused. When it is reused fully the final fission products have very short half lives and return to a below background level in less than three hundred years. A simple repository for these cooler final products is all that is needed, and that can be postponed for hundreds of years if we choose. Don't waste our uranium, instead make full use of it.

#1: Is the proposed management approach appropriate?

Author: NWMO, PostPosted: Mon Jul 25, 2005 11:37 am

We are interested in any and all comment you may have on the appropriateness of the management approach which we propose to recommend. ... Is the recommended management approach appropriate for Canada? In what ways, if any, is it appropriate? What concerns, if any do you have? How can it be improved?

For example, you may have a comment on one or more of the key elements of the approach:

- Ultimate containment and isolation of the used nuclear fuel in a deep geologic repository in suitable geologic formations;
- Flexibility in the pace and manner of implementation through a phased decision-making process, supported by a program of continuous learning, research and development;
- Provision for an interim step in the implementation process in the form of shallow underground storage of used fuel at the central site, prior to final placement in a deep repository;
- Continuous monitoring of the used fuel to support data collection and confirmation of the safety and performance of the repository;
- Potential for retrievability of the used fuel for an extended period, until such time as a future society makes a determination on the final closure, and the appropriate form and duration of postclosure monitoring.

#2: Author: Lenore Newman, PostPosted: Tue Jul 26, 2005 5:38 pm

What I like about the approach is that it will get the waste away from population centres. There is an opportunity to pick a very isolated spot. However that raises the question of transport, but that issue has been addressed in Europe, and likely could be safely addressed here.

What I do worry about is that the approach is based upon the amount of waste we will have given Canada's current minimal use of nuclear energy. What happens if there is an expansion of this use? Will we need more repositories? What happens if Newfoundland opens a reactor, for example? Do we transport by sea, or build a repository there? What if there is ten times more waste than we expected? How do we address that?

Perhaps this is a bit beyond the scope of the study, but it seems to me it would be interesting to look at different scenarios- management with no additional waste, management with many new sources of waste, etc.

#3: Author: Ian Turnbull, PostPosted: Mon Aug 01, 2005 2:01 pm

Dear NWMO,

Being sympathetic to the intention of your organisation, and approving of your effort to involve us 'the public' in developing policies for the management of 'our' radioactive materials - I would like to respond to the general invitation in this posting of yours - about the "appropriateness of the management approach".

Responding firstly to the question "Is the recommended management approach appropriate for Canada? In what ways, if any, is it appropriate? "

I have ploughed through your Choosing the Way Forward report several times. I am still impressed by the thoughtful layout and presentation of the options you consider are best. Because the text is always lucid and the diagrams informative, I find myself inclined to sit back and trust that the whole issue has been thoroughly researched and considered. So, in this mood, I have to say that the Adaptive Phased Management scheme that you propose appears eminently sensible and entirely appropriate to the future management of the waste materials, as we now know them.

Still, you are cautious enough to ask - "what concerns do you have? How can it (the management approach) be improved?"

You may find I am repeating comments I have made elsewhere, but my need for a consideration of the implicit spiritual nature of nuclear energy and radiation remains strong.

Early in your report, where you are outlining the principles of your study, there is this pithy sentence: "However, scientific and technical evidence and analysis, while essential, cannot be the sole basis of our choice" (page 12) A fine sentiment ! But in the reading and reasoning of your whole report, it is clear that scientific thought and technical evidence provide all the basic assumptions on which your planning is predicated. Here then is my first concern.

In this context, I wonder if it would be helpful if I brought Einstein's basic equation $E=mc^2$ into this discussion.

Energy and matter are inter-changeable, says this profound and profoundly simple equation. Energy, in the modern vernacular, can equally well be interpreted as Spirit. 'Spirit and Matter are inter-changeable' is then another way of presenting this universal equation.

Einstein's formula in effect reiterates the universal truth that Christ sought to communicate to his followers some two thousand years ago. That we are Body and Spirit, matter and energy.

I trust you can hear that I am not advocating any particular religious view so much as pointing to where scientific and spiritual knowledge overlap and say the same thing.

Now, our understanding of the particle world and nuclear energy is entirely confined to a Matter/material/secular interpretation of Einstein's equation. Yet all the while, the implication and promise of this universal equation is how we can move to the other side of its terms and equally well discuss and develop an account of nuclear energy and fission and radiation that refers to its Energetic/spiritual nature.

Is this tough to assimilate ? On the material side, we use the mathematical and technical language of physics to describe what's going on or likely to happen in the particle world. At the same time, on the energetic/spiritual side, there is a symbolic language available to us which uses familiar experiences, like patterns of social behaviour and the nature of inter-family relationships, to illuminate the processes and affairs amongst the particles. This symbolic language also has the ability to predict how local events in the particle world might respond to external influences.

I do not see it as your task to comment in depth on this concept of the spiritual or universal nature of the atomic world. But I do think it part of your remit to invite such comment, or arrange for this aspect to be considered by expert authorities, in the same way that you employ engineering consultants to advise you on materials matters.

'A management approach appropriate for Canada' would ideally present knowledge from both sides of the formula writ large by Einstein. In much the same way that the Federal Government argues its case in both the French and English languages, and strives for policies that embrace the attitudes and customs of each culture (as well as those of the First Nation people). This is the Canadian way !

There is always the option to follow the Americans and replicate their Yucca Mountain scheme. It is direct and central and single-minded in its concept and undertaking. But isn't the Canadian way more about providing the framework for a multi-cultural society to flourish, without quite knowing what it will look like in the end. The precedent is already in place for this impossibly bizarre but outrageously bold idea that we look into the particle world and begin to think how this too - in its very distant and small (to us) way - is part of our society and needs to be valued and cared for as best we can.

I still need to mention my other concern: which is about a specific attitude within the NWMO report.

It is the way that the discussion about decision-making in the future is somehow twisted and presented as being of benefit to future generations. As though we are doing them a favour. Because they will 'have the choice' about how to proceed with managing the waste materials.

Now this is a very sneaky and underhand piece of spin ! I'm surprised you have not been called on this attitude before. Imagine leaving a heavily mortgaged unmarketable and decrepit house to your children and telling them in a benevolent manner that they are free to choose how to pay for the wreck that it is. Even this analogy fails to convey the unholy expensive mess we expect future generations to pick up and attend to.

This evasive way of describing future scenarios only goes to help us deny and evade our collective responsibility for the waste issue. I strongly believe that if we develop the will and the words to more fully own the public responsibility for creating this nuclear waste issue, we would in turn establish a national mood in which an acceptable and much more immediate process for managing the waste materials could arise.

The very fact that only a handful of people participate in this e-dialogue is a clear indicator that we/you have still not found a way to reach into and engage the collective consciousness of the Canadian population, nor tap into the wisdom that is latent in there.

As for your invitation to comment on a list of key elements, while I respect that the invitation is made in good faith, the questions once again confine us to looking only at the material nature of things. We already have enormous knowledge and experience in this arena, on the subject-matter of matter. I'm confident that we can make safe and enduring underground repositories, beyond even the dreams of the Pharaohs. Let's acknowledge our engineering competence, that we can give more time and attention to exploring the social and affective nature of the atomic world.

'Measure twice cut once' is a good carpenter's axiom. I think it applies as much to this thing we are trying to sort as to framing a house.

"An approach appropriate for Canada" ? The Canadian way more often than not has a quiet deep and hopeful dream for the well-being of life at every level stitched into its outlook. This is what I think we can add to any inquiry about radiation and the radioactive particles.

Okay ? Thanks for this window. And again, good luck with all your endeavours.

Ian Turnbull

#4: Author: Randal Leavitt, PostPosted: Wed Aug 03, 2005 8:11 pm

We could do a lot better than what is proposed.

I view the current proposal as a death sentence for the Canadian nuclear industry. If we accept the lie that used once fuel is useless and dangerous, then we will be forced into

unnecessary and expensive diversions such as the proposed deep repository. This will make a Canadian nuclear industry uncompetitive. We will lose our ability to work with this kind of technology. The engineers employed in this field will move to the USA and India. Canadians will look forward to future work as fishing tour guides, hunting guides, and water sellers (until the water and animals are gone).

There is no waste to deal with.

Just to be clear about this, let me say it another way:

.htiw laed ot etsaw on si erehT

The used once fuel is harmless, small, easy to monitor, and extremely valuable. It can be consumed in a fast reactor to produce 137 times the energy released during its first reactor session. Build a fast reactor beside a CANDU reactor that has been running for 20 years. That fast reactor will be able to run for 2000 years on the used once fuel from the CANDU.

So put the used once CANDU fuel into cement cannisters at each reactor site and leave it there. Take the money proposed for "waste management" and build some fast reactors instead. Use the electricity generated to create employment, power electric cars, plasma torch garbage, and all sorts of other things that make life cleaner, better, and less destructive.

France, India, China, Russia, and Japan are using fast reactors to achieve long term, secure, safe, and clean energy. Canadians have a choice - figure out how to make our own energy, or figure out how to buy it from the USA.

#5: Author: Jason Martino, PostPosted: Mon Aug 08, 2005 6:36 pm

I believe the ultimate goal of the program to safely store the used fuel in stable geologic formations, either in the Canadian Shield or similar formation, which has exist for many times to span of time the used fuel is expected to have a radiation level above natural values is a sound one. It is based on many years of scientific study and is at its heart based on natural analogues. Cigar Lake in Canada has very rich uranium deposits with no surface expression of their presence. The natural geology of the Cigar Lake is similar to what has been developed for the concept of a repository.

Although there is some merit to consider recycling current used fuel a second generation fast reactors to there are currently no plans in Canadian for such an initiative and I believe the task at hand is to find a method where the material may safely be isolated from the environment for long periods with the need for ongoing societal control. Deep Geologic Disposal and the Adaptive Phased Management (APM) approach provide this ability.

These two methods both give responsibility for the first steps in dealing with the used fuel to the current generation where they should be. Subsequent generations can decide to use some or all of the material. Placement in a repository still permits future access, albeit with more effort than storage on surface.

A risk I can see with APM is that the many steps become a process for inaction. Some early stage decisions should be included as part the proposed process. A decision to have storage at or not at a selected site is one that should be made at the outset. In addition, a demonstration installation (with or without used fuel) could also be part of the process. This could potentially be done at a separate installation to demonstrate the processes required and prove the technology as the actual site is being selected and examined prior to excavation of a site specific URL.

#1: Room for dissent?

Author: Mike Robinson, PostPosted: Wed Aug 10, 2005 1:32 pm

I admit to not having followed this dialogue closely, however an hour spent pouring over the summary and the comments leads me to a few questions. I understand that this dialogue is about how to safely dispose of spent fuel, but it seems to me that an acceptable solution is being crafted in an attempt to begin a new round of nuclear marketing, possibly due to the reality that we have only 25 to 35 years of oil left available. Does anyone deny this assertion?

Personally I think people wanting to promote nuclear energy have a few screws loose or have been indoctrinated by an outdated and misguided Cartesian mental model. Why?

This planet is awash in energy. Solar, wind, tidal, wave, hydroelectric, electromagnetic, geothermal, and some of the more esoteric proposals like Tesla or biomorphic energy fields. Taken individually they may not meet our needs but as a package they could substitute for oil, coal, gas and nuclear energy.

Powerful corporate elites and governments love technologically complex energy sources because they are basically impossible for common folks to use or control. Control the means of energy production and you control the population that uses that energy source. At the moment we are all watching with disgust the travesty that is playing out in the middle east. I suggest this is an aggressive war fueled by the thirst for oil, and while you may believe otherwise I think it impossible to deny that oil is a major factor.

Can you see wars being fought over sunshine or geothermal energy sources? How about wind or currents? Uranium and plutonium however are in scarce supply and are dangerous and technologically challenging to obtain (and obviously, to dispose of).

I don't want my government to support research into an inherently undemocratic form of energy when there are so many harmless and simple alternatives. I am willing to use less energy to ameliorate the shift to sustainable sources. You?

Let's spend a moment to consider the "vested interests" involved in this discussion. Who is going to profit from a revitalized nuclear industry? Some of the nuclear proponents commenting here may fit the description. My point is that it is wise to know why an individual or organization is promoting a technology or idea, and in my experience, being aware of the bias this "vested interest" can create allows me to make a truly informed decision.

My challenge to you: Look in the mirror and ask yourself who will really benefit from a renewed nuclear program. Why do YOU think this initiative is a good idea and explain to me how you personally will benefit and how I personally will benefit, and finally how the biosphere will benefit. After all we all are connected. (The old line about reducing dependence on foreign oil won't wash. Any of the alternative forms I mentioned will do that without the other challenges I mentioned earlier). If you can honestly say that learning how to manage nuclear waste better, in this country, is going to make the world safer, fairer, cleaner and healthier and will not lead to more nuclear proliferation, then carry on. If not, then put your energies toward an energy source that will leverage the social and ecological change you wish to see in the world.

Thank you for your consideration, Mike

#2: Author: Mike Robinson, PostPosted: Thu Aug 11, 2005 8:58 am

A couple of thoughts. I can see the potential of nuclear power if used in space. It makes less and less sense to me as we continue to poison our environment with waste and accidents.

While Canada may find a safe place for disposal of its waste, other nations using the technology may not be so diligent. Can we take the chance that proper disposal procedures (if there is such a thing) will be used by other nuclear aspirants.

The context that a technology is used within, is often more important than the technology itself. Can we be confident that the technology related to nuclear power will be used only for peaceful and democratic purposes? What would you base this confidence on?

In the meantime we have a crapload of hazardous waste material scattered all over the world (this is not just a national issue). Is sweeping it under the rug the best plan? Maybe it is better that we continue to trip over our mistakes. This may encourage us to make better, cleaner, more sustainable choices in the future.

M

#3: Author: Mike Robinson, PostPosted: Fri Aug 12, 2005 10:19 am

Final thoughts.

Many proponents of the nuclear industry refer to the technology as clean. My question is: "In comparison to what?" Oil and Coal, yes. Wind, sun, tidal, no. One of the commenters referred to the "waste" generated by the industry as simply useful and valuable material that we cannot yet utilize. I suggest that this form of doublethink is misleading. After all, the poop I create on a daily basis is a "useful" and "valuable" product if I compost it and spread it around the fruit trees. But it is still a waste product any way you slice it!

This country cannot afford a nuclear industry, even if we have a lot of uranium that for some incredibly stupid reason we are spreading around the surface of the planet making it more readily available to those who may not use the technology or material safely or appropriately.

Scientists often live, work and think within a bubble. Like the artist who finds transcendence in creating meaning, scientists in the pursuit of knowledge can miss the bigger sociological or ethical questions related to the avenue of inquiry. Specialists are not the types I want making important decisions that affect us all because they usually cannot see the bigger picture.

Finally, this industry operates within what Jacques Ellul would call the "technological imperative". So convinced it seems of our technologies capability to solve and resolve our problems that it has lost sight of the reality that it has created the problems it now seeks to solve. A vicious circle (reinforcing feedback) develops fueling even more research and application.

I know nuclear proponents are good people. They mean well. They want clean limitless energy sources for the benefit of humankind. I believe that for many many reasons the nuclear pathway is the wrong path to be on. So scientists I ask you, "Is this technology going to help those who need assistance the most? Those starving AIDS kids in Africa, the child labourers in Bangladesh, the kid sniffing gasoline in Labrador, the people living in the radiation shadow of Chernobyl.

It may seem that more energy is the solution, but I suggest it may be the problem. After all, what do we do with energy? Mostly we use it to locomote, to make products that we don't really need and to entertain ourselves after a boring or busy day. Hardly laudable or lofty goals. Sometimes less is more, and I believe that less uranium mining, less enrichment less, power, less centralized or commercial control, and yes less waste will offer us more personal autonomy or democracy, more sustainability, more security, a cleaner environment and a better example to the rest of the world.

Thank you, Mike

#1: Absolving responsibility?

Author: Denver, PostPosted: Tue Jul 26, 2005 12:05 pm

I think my biggest issue with this plan is the way in which it could absolve decision makers from considering alternative modes of renewable energy production and/or means of reducing per capita energy consumption. Will this disposal method be used only for existing nuclear waste (in which case I support many parts of it), or will it be used to facilitate and justify further expansion of a dangerous and unsustainable energy production system? Although I certainly acknowledge a need to deal with nuclear waste disposal from existing reactors, I fear that the (false) sense of security that comes with such a plan allows further procrastination of some larger changes that must inevitably be made and that we thus pass on to future generations. We are most definitely "discounting the future" when we choose to continue playing with radioactive isotopes.

Radioactive materials are most certainly part of earthly existence-- for instance, those living in basement suites are apparently exposed to higher levels of naturally occurring radiation than those who live above-ground. I'd even suggest that radiation is perhaps partly responsible for the earth's current (and threatened) levels of biodiversity via its influence on mutation. However, both ancient wisdom and modern science suggest that disturbances, such as those caused by exposure to radiation, must occur in small amounts in order to ensure the continued durability of life. My point being that attempts to "naturalize" radioactive waste fails to recognize the rather unprecedented form and concentration this type of material currently takes. Much like GMO, there are too many unknowns for radioactive experiments to be justified outside the lab.

As far as some of the alternative suggestions and insinuations for waste disposal discussed earlier: up north is not, "out of the way of any population," as we can see by the high-cancer rates found amongst the First Nations residing there; and, I cannot see radioactive waste "mudbaths" or "bathhouses" being particularly popular except amongst those with suicidal tendencies. This latter suggestion is ridiculous.

Thanks for your time,

Denver Nixon

#2: Author: Jeremy Whitlock, PostPosted: Thu Jul 28, 2005 7:25 am

Your question about a "solution" for nuclear waste absolving decision makers from looking for alternative energy sources is a frequently-raised concern, but it doesn't make much sense. I currently have a very good solution for the waste from my home: on a weekly basis it is trucked away to a modern landfill site where it is properly sequestered. However, this doesn't dissuade me from recycling and composting as much as I can to

reduce my contribution to the municipal waste stream. Why? (1) because I know it's the right thing to do, and (2) because a market exists for recycled materials, enabling that option to be open to me.

The same goes for energy supply. The people who decide how we will generate our electricity in the future are interested in resource availability, maturity of the technology, environmental impact, efficiency, costs, liabilities, reliability, etc. If a technology meets the criteria, it will be developed, and this is how every technology we have at our disposal today came to exist.

Regarding the danger of moving radionuclides out of the natural environment and concentrating them elsewhere, we do that all the time with everyday materials, involving public radiation exposures in far greater amounts than you'll ever get from the nuclear fuel cycle (which in fact isolates uranium daughter products from mankind and thus reduces potential exposure). In my neighbourhood supermarket's parking lot this Spring a six-foot-high pile of lawn fertilizer bags effectively doubled the background radiation exposure rate for anyone standing or working in the vicinity. On a shelf in the same supermarket a dozen or so cans of sodium-free salt quadrupled the exposure rate for anyone standing nearby. In both cases this increased exposure was due to the natural potassium (which is naturally radioactive) used in these products. The same effect occurs when you stand in a crowded elevator -- again, due to potassium, a natural ingredient in humans, unnaturally concentrated.

Regarding radiation exposure due to waste repositories, the objective is to actually have zero measurable effect at the surface, for eternity. This is routinely achieved in nature and all we have to do is copy her. Northern Saskatchewan has the world's most concentrated deposits of uranium ore (up to 60-80% in places) and yet they lay hidden through decades of intense uranium prospecting precisely because there was no radioactive signature at the surface -- despite these ores lying in fractured rock, at the unconformity between two highly heterogeneous formations, and with exposure to significant ground water flow since their initial mineralization (all characteristics that will be explicitly avoided in a man-made repository). The reasons for the amazing integrity of these deposits include a clay overburden and other aspects which have direct relevance to the principles of our proposed repositories.

#3: Author: Randal Leavitt, PostPosted: Wed Aug 03, 2005 8:31 pm

We are not discounting the future when we choose to continue playing with radioactive isotopes. We are desperately trying to have a future. The discounting takes place every time we continue playing with fire. We are loading the atmosphere with green house gases as a result of playing with fire. It has to stop - soon. Nuclear fission gives us heat without global warming. There are no alternatives.....

And please allow me to ask you to reconsider "a dangerous and unsustainable energy production system". The nuclear power industry in Canada is the safest, cleanest, best

managed, and most secure industry that we have. I find it interesting how an industry with this track record can still have such a negative reputation. The facts don't line up with the results. There must be something else causing this. So I would like to ask you to take a second look at your statement. Perhaps you won't change your mind, but I changed mine when I dug into the details.

#4: Author: Mike Robinson, PostPosted: Thu Aug 11, 2005 8:10 pm

It is curious how certain some are of the advantages of nuclear energy. Randall and Jeremy seem to be active proponents of a Canadian nuclear strategy. Would I be wrong in supposing they work within the industry? If so, this is where perspectives can be skewed to support mental models that operate within existing paradigms. If not, well they sure make earnest cheerleaders ;-)

All kidding aside, Randall suggests that "The nuclear power industry in Canada is the safest, cleanest, best managed, and most secure industry that we have. I find it interesting how an industry with this track record can still have such a negative reputation". That's a pretty strong statement to make, and I'm not sure one could prove it. But I have a few ideas why most Canadians are suspicious of re-opening this can of mutant worms.

First are the huge federal subsidies.

"The figure of \$13 billion funding to AECL represents a real cash subsidy by taxpayers to AECL, and does not include any "opportunity cost", i.e. what the subsidies would be worth if the government had instead invested them in profitable ventures. George Lerner, now the Dean of the Faculty of Management at the University of Lethbridge, undertook a study of AECL for the Economic Council of Canada in 1987. [12] Recently he updated that study, and concluded that using a real social discount rate of 7.5%, federally funded nuclear research and development expenditures alone represented a real opportunity cost of about \$73 billion up to 1995. [13]

By contrast, Nuclear Sunset looks at a wider range of federal government subsidies to AECL. In addition to research and development, it also includes various expenditures for reactors and heavy water support. Based on total subsidies to AECL from 1952 to the end of fiscal year 1995, this study concludes that the real opportunity cost is \$120.444 billion (Martin, 1996 retrieved from: <http://www.ccnr.org/sunset1.html#2>). More at http://www.greenpeace.ca/e/feature/nukes/background_0305.php

Imagine what a few billion in R&D would do to the alternative energy sector

So there is one good reason. Another idea comes to me from the news today that Iran is resuming its nuclear program. Apparently that is not such a good thing, but us doing it is a good thing. I don't understand?

In another post I mentioned that technologically complex and expensive industries are always controlled by those with existing capital or heavy-handed governments. Even

Jeremy and Randall won't be able to have a mini-Candu reactor in their basements. On the other hand, almost anyone can have solar panels, a wind generator, a methane digester, a small well-insulated home and an economical vehicle, bicycle or transit, a garden, etc. All these things save energy, contribute to a healthy lifestyle and offer a measure of independence. If they were supported or subsidized their efficiencies would increase, ameliorating some concerns about supply and demand. If we are going to engage in corporate welfare handouts, we ought to ensure that it leads to clean and sustainable and democratic energy sources.

Thanks for considering, M

#5: Author: Jaro, PostPosted: Fri Aug 12, 2005 7:24 pm

Mike Robinson wrote:

Even Jeremy and Randall won't be able to have a mini-Candu reactor in their basements.

Forget basements -- try the chest cavity - as in nuclear pacemakers : http://www.cns-snc.ca/branches/quebec/plutonium_Grnpc_pacemkr.jpg

#1: Transporting the waste a key concern

Author: Lenore Newman, PostPosted: Sat Jul 16, 2005 7:16 am

As I read the NWMO report, I am pleased to see that the option being suggested seems flexible and quite well reasoned. However I do get a little concerned about the transport phase: it seems to me that transportation of the waste poses risk- risk from accident, terrorism, and from public disruption. (I am thinking of waste transportation in Europe, which is often disrupted). I also think some thought has to be given to a question not addressed:

How will the future path of nuclear energy in Canada impact the effectiveness of the chosen method?

It seems to me that the disposal method is being chosen with a very small industry in mind. But in the event of industry expansion, say to fifty reactors or so, would, for example, the transport of way more waste across long distances and many routes greatly increase risk? Would we suddenly need more storage facilities? Thinking along a similar line, if private companies started running non-CANDU reactors would the method still be adequate?

I raise these issues because though I like the chosen course of action, it is designed with today's problem in mind. Will tomorrow's problem look the same?

#2: Author: Randal Leavitt, PostPosted: Sun Jul 17, 2005 7:18 pm

The proposed disposal method is hopeless as you point out. It assumes a very small nuclear industry. If our nuclear industry is that small, global warming will solve the problem for us. No need to dig a deep hole if we are all cooked.

Nuclear fuel should be transported carefully. Note that fuel that has passed through a CANDU reactor is still fuel. Less than one percent of its energy potential has been extracted in this first pass. This fuel should be moved to fast reactor sites, and then remain there until it is completely fissioned. This is much, much easier than moving gasoline, or propane. This nuclear fuel does not evaporate, dissipate into the air, or explode. It is so much safer than our current activities that this idea becomes difficult to believe. But think about it. Moving a cement box around with some heavy, non-reactive metal in it is a lot simpler than shipping and pipelining and storing explosive and poisonous gas.

In the end we need a repository where we can place the fission products from fast reactors. These products are a lot cooler, and a lot less radioactive than used once fuel, so the repository design can be a lot simpler and less expensive than the proposed one. But the scale needs to be a lot bigger, as you point out. We have to run our cars, heat and cool our buildings, operate our appliances, power trains and ships, and plasma torch all our garbage and sewage using fission generated energy. That is a lot more fission than this report imagines. And we had better hurry - if this summer is to be believed.

#3: Author: Eudoxia, PostPosted: Tue Jul 26, 2005 3:07 pm

While the report does seem positive on the surface (well, as positive as one can be concerning nuclear waste), my overall concern remains: why is nuclear power seen as a solution? Granted, we have to do something about the waste we currently have, and the report is helpful in that regard (though I do have questions about long-term viability, transportation, and security). But what about alternatives to nuclear power? Why is Canada not pursuing green power solutions, for example wind and solar power. Wind power is being used very successfully in South Africa - why not in Canada? Why not look at regulations for stricter recycling, home building, and the use of rooftop gardens? I think we need to move away from being such a consumer-based society (of goods, of energy, etc) into a greener-based society. Business can be regulated to produce less packaging that is turned into consumer waste. Car manufacturers can be legislated to recycle dead cars and tires. These things are being done now in Scandinavian countries. Individuals need to take some responsibility too, of course, but alternatives to the status quo need to be available, easy to use and not an economic burden. Lets look to other parts of the world for sustainable solutions, instead of creating nuclear waste that poisons the planet and our future.

#4: Author: Jeremy Whitlock, PostPosted: Thu Jul 28, 2005 6:43 am

The answer to "why stay with nuclear power" is simply that there aren't enough other options to meet the future electricity needs of Ontarians. This very question is of extreme importance and to the people that are responsible for supplying this electricity in a reliable fashion, and is they who point out the need -- even with unprecedented levels of conservation and alternative technology development (e.g. wind) -- for increased conventional supply. One of the reasons is that intermittent alternative energy sources like wind are not reliable enough for baseload supply.

That means more coal, gas, hydro, or nuclear, and the decision is amongst those options, nothing else. When you consider the environmental detriment of coal (leading to the recent decision to shut all coal plants in Ontario), and the lack of major new hydro resources in Ontario, the choice becomes gas or nuclear. Further discussion of Ontario's options can be found in an article by Prof. J.T. Rogers (Carleton University) posted at:

http://www.cns-snc.ca/media/CNS_Position_Papers/Ontario_coal.pdf

Regarding the waste product of nuclear energy (which can be argued is not really a "waste" product -- see Randall Leavitt's posts), the crucial point is that it is **NOT** poisoning the planet, and in fact nuclear waste is one of the most attractive things about the technology. Consider: the material is small, solid, highly inert, and virtually 100% contained. We know where all the waste is from decades of electricity production: it's not going anywhere and it's not interacting with the biosphere.

Now, factor in the possibility of re-cycling the waste until there are no long-lived nasties left, and you've got a pretty reasonable price to pay for a bountiful energy resource that emits no air pollution.

#5: Author: Jason Martino, PostPosted: Mon Aug 08, 2005 6:40 pm

Transportation is not such an issue as the technology to safely transport nuclear material exists today. Isotopes used in medical treatments travel around the world daily. Fuel for reactors is moved to reactor sites. I remember an experiment done in England where a (empty) fuel transport container was crashed into by a locomotive. The container remained intact; the locomotive didn't do so well. The survivability of the container indicates that used fuel can be moved safely.

#6: Author: Jeremy Whitlock, PostPosted: Wed Aug 10, 2005 8:00 am

Photos of the type of test that Jason refers to, performed at Sandia Laboratories in the U.S., can be seen at:

<http://www.nuclearfaq.ca/cask.htm>

Jeremy Whitlock

#7: Author: Mike Robinson, PostPosted: Thu Aug 11, 2005 9:14 am

[quote="Jeremy Whitlock"]The answer to "why stay with nuclear power" is simply that there aren't enough other options to meet the future electricity needs of Ontarians. This very question is of extreme importance and to the people that are responsible for supplying this electricity in a reliable fashion, and is they who point out the need -- even with unprecedented levels of conservation and alternative technology development (e.g. wind) -- for increased conventional supply. One of the reasons is that intermittent alternative energy sources like wind are not reliable enough for baseload supply."

This argument is perspective-based. First, some Ontarians perceive they have a need for more power. I don't think they do, but I agree that most industrial or commercially-minded people share this illusion. The argument that we can't live without cell phones, automobiles, street lights, lawn mowers and a TV in every room is spurious at best and dangerously delusional at worst. Second, there has never been "unprecedented levels" of alternative power development or conservation so there is no way to know if more investment in development would make alternative power sources more viable. In the US the oil and coal industry is subsidized to the tune of 40 billion a year (you may know how much Canada invests in nuclear related issues). I suggest some of these riches be invested in alternative energy sources and perhaps clean and egalitarian technological marvels will emerge from that process.

M

#8: Author: Jaro, PostPosted: Thu Aug 11, 2005 7:24 pm

Mike Robinson wrote:

The argument that we can't live without cell phones, automobiles, street lights, lawn mowers and a TV in every room is spurious at best and dangerously delusional at worst.

M

...and of course there was Pol Pot & friends, who figured that people didn't need eyeglasses - and those who thought otherwise were terminated.

Any other great ideas involving the imposition of someone's off-the-wall preferences on everyone else ???

"Arbeit macht frei," right ?

#9: Author: Mike Robinson, PostPosted: Thu Aug 11, 2005 8:49 pm

I fail to make the connection Jaro, between Pol Pot and the assertion that we can live a high quality of life without some of the energy consuming products of our culture. Are you suggesting you cannot live without these products, or would give up your life to defend your right to drive a big truck or have a TV in your bathroom? Probably not, eh?! Well I'm not suggesting we round up all the nuclear scientists and make them clean public washrooms with toothbrushes. I'm saying that consuming less energy is a reasonable way of ameliorating the fossil fuel crisis, and can buy us time while more democratic, cleaner and less expensive solutions are created. Other postings I have made try to illustrate this perspective. In other words we don't "need" some of the products and services we currently have in order to live well. I gave up the automobile last year and though it is less convenient, I am healthier and wealthier because of this choice. Sometimes less is more.

Let's consider for a moment that nuclear energy is a preference of a cadre of specifically educated (and possibly myopic) physicists and engineers. Hey guess what; they want to "impose their off-the-wall preferences on everyone else!" We all want others to share our perspectives. I'm not imposing anything.

Jaro, you seem to have some disdain for those who feel there are reasonable alternatives to refinancing and revamping the nuclear industry in Canada. Where do you fit in to the picture? What are your "vested interests"? Are you employed in the industry?

FYI, I am here purely out of interest in political and social matters and I am making my opinion heard in order to facilitate positive change as I perceive it. Are you hear for the same reasons? I can certainly accept your well-intentioned opinion, but am not pleased at being compared to the man who orchestrated the death of 2,000,000 innocents.

Just out of curiosity do you have any opinions on some of the other more significant points I made?

#10: Author: Jaro, PostPosted: Fri Aug 12, 2005 8:30 pm

To satisfy your curiosity, I have been riding my bike to work every weekday for about the last 20 years.

In winter I ride the commuter train.

At the same time, I realise that many others may not have the possibility to do this.

When I worked on the Laforge-2 hydro project in James Bay, and also inspected several of the completed hydro dams in the region, I was impressed by their enormous structures - something akin to the Great Pyramids of Egypt.

Of course the dams & associated dykes are quite tiny, compared to the vast reservoirs impounded by them.

Many *mini-hydro* projects could be built in the south of Quebec, but environmentalists are fiercely opposed to them, because of some inevitable environmental impacts.

Similar environmental impacts are associated with deployment of the huge numbers of windmills or solar panels required to produce significant amounts of energy.

Being unreliable energy sources, they also require backup power. That's what makes their cost far higher than other alternatives.

Also, photoelectric cells typically use toxic substances like arsenic and cadmium.

When hit by lightning, these toxic substances may be dispersed into the environment (there is no containment dome, as in nuclear plants, as this would impede solar rays).

Each time I visit a nuclear plant, I am impressed by their small size.

Even the inside of the containment dome has a lot of empty space.

Its amazing that 700 megawatts of clean electricity can be derived from such small equipment -- compared to hydro dams, or endless kilometers with row upon row of windmills.

Perhaps more important is reducing fossil fuel consumption.

The advancement of many developing nations is stymied to a large extent by their inability to compete against the rich nations for these scarce resources. In the worst case, wars can break out over these resources.

Of course the so-called renewable energy technologies don't help either, because they also are too costly.

Rich countries like Germany can afford to heavily subsidize the construction of a great many of them. But its ruining their economy, and the antinuclear government is about to get voted out of office in the coming fall election, following the resignation of Chancellor Gerhard Schroeder, after a defeat in a parliamentary non-confidence vote.

As for wind power here in Canada, please note the following:

From: Tom Adams [mailto:TomAdams@nextcity.com]

Sent: Wednesday February 06, 2002 12:57 PM

<snip>

In today's market, wind generation in Ontario is uneconomic by a significant margin (although some people might want to buy it anyway as a form of voluntary taxation). The OPG and BE wind projects now underway are all PR -
- no commercial substance.

<snip>

Tom Adams, Energy Probe

#11: Author: Mike Robinson, PostPosted: Fri Aug 12, 2005 10:01 pm

You bring up many reasonable points, and yet I see no significant obstacles to my ecotopian vision beyond public and private will. WE can do amazing things when the stakes are high; mobilize people, focus resources and energy, experience and direct collective paradigm shifts, remake political boundaries; in short, WE can create positive change to a more just and sustainable world. You probably agree.

Where we may disagree is how to achieve important collective goals, like reducing our squandering of fossil fuels or maintaining a reasonable standard of living. Clearly there are benefits and limits to each of our perspectives. Personally I seek answers that are less complex and centrally controlled, more democratic and hold less potential danger (accidents, terrorism, tailings, waste).

What is missing at the present time is a widespread awareness of the impact of human activities on earth and until a crisis hits it is likely that politicians, media and corporate interests will go on telling us that everything will be fine and WE can have more. My argument that everything is not alright, socially, economically and environmentally and WE need to change our collective ways and enjoy a more frugal lifestyle. I hope a minor crisis happens in time to wake us up, before a keystone in the ecological web disappears.

Ultimately I know the people who work in the nuclear industry have good intentions. I imagine thrilling and useful ideas on green energy might manifest from your intelligences and curiosities. Spread your talents around and wear a few caps. Maybe the nuclear industry is not your calling.

Take care, Mike
