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Written Submission from

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In the Matter of

Ontario Power Generation Inc.

Proposed Environmental Impact Statement for OPG's Deep Geological Repository (DGR) Project for Low and Intermediate Level Waste

Joint Review Panel

September 16 to October 12, 2013

Mémoire de

Jan Norris

À l'égard de

Ontario Power Generation Inc.

Étude proposée pour l'énoncé des incidences environnementales pour l'Installation de stockage de déchets radioactifs à faible et moyenne activité dans des couches géologiques profondes

Commission d'examen conjoint

16 septembre au 12 octobre 2013

Canada

Written Submission on OPG-DGR Proposal
By Jan Norris

I am grateful to have had the opportunity to read the proposal for a Deep Geological Repository put forward by OPG, as well as the subsequent information requests from the JRP, all of which I've found informative, thought provoking and sometimes even reassuring.

But while both the OPG and the JRP examined the DGR in great detail, they failed to consider two important aspects, either of which could place the health and safety of people and the environment at great risk.

Waste Transport:

The first concerns the transportation of the waste from the Pickering and Darlington reactor sites.

OPG states that much of the waste to be placed in the DGR is already on the Bruce nuclear site, but the repository will also take low and intermediate level waste from all OPG operations. One assumes the waste will be shipped by truck or train from the Pickering and Darlington reactors, across densely populated Southern Ontario, to the DGR at the base of the Bruce Peninsula.

It may be that transport of the wastes is for some reason considered to be outside the scope of this hearing. Perhaps it is because the license OPG is seeking is for "Site Preparation and Construction" only.

Or maybe it is because such shipments would be regulated under the International Atomic Energy Agency's "Requirements and Controls for Transport" and are therefore considered adequately looked after already. But the IAEA states that there may be deviations to their rules "relative to national regulations". Their requirements are also very difficult to apply to the DGR project without knowing more specific information about the waste material and means of transport. Thus we have effectively been left in the dark as far as transport goes.

Furthermore a license under the Nuclear Safety Control Act requires the applicant "make adequate provision for the protection of the environment, health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed."

Without analyzing the methods and risks of transporting the radioactive waste that will be placed in the DGR how can the CNSC know that the "protection of the environment, health and safety of persons" is sufficiently ensured? And without such assurance how can it grant the license to site and construct?

Maybe the process is such that the DGR would be granted a license to construct, go ahead and build the repository, then apply for a license to operate; at which time the CNSC would examine the transportation aspect of the project. But that, I think most would agree, would be ludicrous, and calls into question the integrity of the process, since it would be virtually (and politically?) impossible for the CNSC to deny an operating license based on the high risks involved in transporting the waste once millions (billions?) had been spent building the DGR. It makes more sense to look at the project as a whole now, including the transport of the waste, before the people of Ontario have paid for the DGR's construction.

And after the Lac Mégantic tragedy (the recent train accident that killed 47 people and wiped out the downtown core) no one is feeling very confident on the question of train safety; and truck transport is even more accident-prone.

So it's odd that nothing was mentioned about this important aspect of the project.

Transport of the waste is an integral part of the DGR and arguably the riskiest, since it occurs outside the fences and regulatory control of OPG facilities, in close and unpredictable proximity to the public. These risks should be analyzed and openly discussed.

The people of Ontario deserve to know that any hazards associated with radioactive cargo passing through their communities are thoroughly understood, strictly regulated and effectively minimized.

Having apparently not examined these hazards, I submit that both the OPG's EIS, as well as the JPR's response, are incomplete. I hope this is rectified before any recommendations are made to license the DGR.

<u>GHG Emissions:</u>

There is another important consequence of the DGR project that was absent in the EIS. This is its anticipated emission of greenhouse gases.

For the first time in at least a million years the levels of carbon dioxide in the earth's atmosphere have reached 400 parts per million (from pre-industrial levels of 270 ppm) largely due to burning fossil fuels. We have thereby committed the planet to 2 degrees warming (on average; it will more than that closer to the poles). Any hotter and scientists warn the consequences will be direr by far than what we've witnessed up to now. Furthermore the rate of warming is faster than expected: what climatologists considered worst-case scenarios a decade ago are coming to pass with alarming rapidity.

Yet we're making no attempt to reduce our emissions! On the contrary, global use of fossil fuels is rising relentlessly year after year. It is a sad situation for an intelligent species.

Given the seriousness of our predicament, it is no longer permissible for an Environmental Assessment to ignore the carbon emissions of the project under review.

The DGR's output of many chemical compounds was analyzed. Why not carbon dioxide? Why do we continue to act as if greenhouse gas emissions have no effect on health, safety or the environment?

The sooner we change the way we regulate our industrial practices, indeed our whole approach to the economy, the better chance our kids and grandkids will have. Unfortunately, since we have already delayed so long, things need to change fast, starting now.

What should have happened? The carbon footprint of each of the three alternative waste disposal methods initially under consideration should have been measured and evaluated in determining which one to pursue further.

It's not too late. The use of concrete, for example, should be quantified. Concrete is hugely carbon-intensive, responsible for 5-8% of manmade CO2 emissions globally (rising to 9% by 2050 according to the International Energy Agency). How much concrete would be used under each of the three disposal scenarios, and how much CO2 therefore would each add to the atmosphere?

Then there is the transport of the waste: what greenhouse gas emissions will result from it and how would those change depending on which of the proposals is adopted? The waste is heavy and some of it must be shielded. (In what? Concrete?) How many truck or train-cars? Must they be specially designed? How much gasoline will be combusted, putting how much carbon in the atmosphere?

A comparison of emissions of methane, nitrous oxides, and all other greenhouse gases also ought to be included in a thorough assessment.

I urge the CNSC, or the JRP, or the OPG on its own initiative, to demand an examination the global warming implications of the entire DGR project and its alternatives. If this project is granted a license to construct without consideration of greenhouse gases – including mitigation measures wherever possible – the CNSC will have neglected its legislated mandate: to ensure that developments it licenses "make provisions to protect the health and safety of persons and the environment" and that "there will be no unreasonable risk to the environment". The Nuclear Safety Control Act is unambiguous.

Furthermore the CNSC should require such analyses from all future development proponents.

A sidebar rationale for doing thorough greenhouse gas analyses – if one is needed - is the fact that the best rationale for nuclear energy is that it reduces the burning of fossil fuels.
The argument is a weak one however without "cradle to grave" analyses: from the mining, shipping and refining of uranium to the decommissioning of the reactors and disposal of the waste.

I hope and trust a careful comparative analysis of the greenhouse gas emissions resulting from the DGR and its alternatives will be carried out before any license is granted.

Categorizing Waste Levels

Finally I'm concerned about the method of separation of radioactive waste into low, intermediate and high categories. In particular I find it troubling that, according to the OPG, there is no upper level dose rate for Intermediate Level Waste, as there is for Low Level Waste.

Why is this the case, and does it mean that High Level Waste could be included in ILW packages? If not, why not? What is there to prevent it?

There was nothing in the documentation that described how exactly the waste is separated. It seems possible if not likely that any solid waste which is not used fuel, ie. which didn't come out of a reactor, will be shipped to the DGR for disposal, no matter how radioactive it may be. This is troubling, especially given the unanalyzed (and therefore poorly regulated?) risks regarding its transport.

Necessary Uncertainty and Confirmation Bias

Many laypeople like me find reading through the details of proposals such as these and realizing the intellectual precision nuclear projects demand, when combined with the eons underlying the discussion – say Iodine129's vast half-life of 16,000,000 years - can be dizzying.

It's possible (if not plausible) our civilization will collapse within the next 300 years. All semblance of institutional or societal memory might be lost. We can easily imagine future scenarios that could threaten the DGR's integrity: there may be underground nuclear bomb tests that create faults in the rock; humanity may move underground to survive extreme weather or nuclear war; concrete may become so precious people try to mine the DGR to retrieve it…and, to quote the JPR, "The future behaviour of the geosphere barrier cannot necessarily be predicted based on its history."

This lack of certainty is reflected in the language of the documents involved: phrases such as "considered likely", "expected to be low", "reasonable assurance", "low

overall risk" and "not expected to have any significant adverse effects" are used frequently.

It is also evident in the huge differences among countries when it comes to regulating radiation dose rates – of tritium for example - for workers and the public. There seems no consensus, due to there being no certainty; the science is still relatively new.

For me in particular there is clearly a sad uncertainty concerning the DGR's effect on the rare species of plants or animals in the vicinity. It is impossible to know whether the DGR might in the end be responsible for the death of one animal or two or none or an entire species. OPG believes the DGR will not impinge on any rare or endangered animals' habitat or that mitigation measures will prevent any harm, (a snake-proof fence is mentioned but disappointingly not described). It is at best a well-informed belief. Eco-systems are too complex and interconnected for us make firm statements about how they will behave when we alter them.

So this decision needs to be made based on best predictions, aware of the confirmation bias we all bring to our analyses, and humble in the knowledge that no matter how much analysis we do we may be wrong, and it is surely best to err on the side of caution.

-Jan Norris