

To: Canadian Nuclear Safety Commission

From: Canadian Coalition for Nuclear Responsibility

**Re: Refurbishment and Continued Operation
of the Darlington Nuclear Generating Station**

Date: October 15 2012

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The Canadian Coalition for Nuclear Responsibility (CCNR) was formed in 1975 with two goals: (1) to act as a clearinghouse of information on nuclear issues for communities, non-governmental organizations and independent researchers across Canada, and (2) to call for a national inquiry into the hazards and benefits of nuclear power in order to provide the people of Canada and their elected representatives with a body of objective and balanced information on which to base public policy on nuclear issues.

Nuclear Disasters are Man-Made

Following the Fukushima Dai-ichi catastrophe in Japan on March 11 2012, the Japanese Diet (Parliament) commissioned a number of independent experts to work together to produce a report on the cause of the disaster. The report found that it was a man-made disaster, brought about in large part by collusion between the industry, the regulator and the government. Reassurances were given and decisions were made not primarily to protect the public interest but to ensure the continuation and to promote the success of the nuclear industry.

In October 2012, Tokyo Electric Power TEPCO itself has admitted that many things could have been done ahead of time to prevent or to mitigate the disaster, but the company was more concerned about preventing anxiety about nuclear power than preventing catastrophe. TEPCO did not want to provide encouragement to individuals and organizations that are critical of nuclear power.

Around the world, nuclear regulatory agencies tend to ally themselves with the nuclear industry to work together in a common effort to make nuclear energy an economically viable and “acceptably safe” energy choice. Although they may try to deny it, the fact of the matter is that there is zero tolerance in these organizations for any anti-nuclear attitudes among staff, while pro-nuclear attitudes are considered normal, healthy, and even desirable. Thus there is a strong inherent bias in both the industry and in the regulatory bodies that nuclear energy is fundamentally desirable and safe.

As the President’s Commission on Three Mile Island concluded, however, the number one cause of the TMI accident was the false belief – prevalent among workers and managers alike – that nuclear energy is inherently safe. According to the Presidential Commission, headed by John Kemeny, there will surely be future meltdowns caused by a combination of human error and equipment failure unless this attitude is fundamentally changed. This view has been confirmed and strengthened by the report on Fukushima Dai-ichi prepared for the Japanese Diet, and by TEPCO’s latest admissions.

The Commissioners of the CNSC seem oblivious to the obvious pro-nuclear bias of their own staff – perhaps because it is a bias that they themselves share. Even when the Commissioners were told by their own director of licensing in December 2011 that under certain conditions, “definitely the core will melt”, the Commissioners exhibited no curiosity to determine what precise combination of mechanical failures would in fact lead to a CANDU core meltdown. This could be construed as dereliction of duty, given the enormous potential consequences of an uncontained core meltdown.

Lessons of Fukushima Not Learned

The lessons of Fukushima have not been learned In Canada. We must learn to accept the idea that nuclear disasters are a very real possibility, and plan accordingly.

Are we prepared to accept the possibility of massive radioactive contamination of the Great Lakes Basin and the St. Lawrence River as an “acceptable risk”, however small the calculated probability may seem to be?

Are we prepared to witness the radioactive contamination of large land areas on the shores of Lake Ontario, spreading through ecosystems and food chains for decades or even centuries?

Are we prepared to allow generic safety problems with the CANDU reactor design to go uncorrected, in hopes that fallible safety systems will operate flawlessly when needed to prevent catastrophe?

These are questions that go far beyond the competence of an unelected body such as the CNSC to adjudicate. Such questions go to the very heart of our willingness as a society to jeopardize the safety of present and future generations, as well as the integrity of our environment and the sustainability of our economy. It is up to society as a whole to decide whether these are risks that are worth taking, and if so, the extent to which we should go to safeguard against such risks.

It is a sobering thought that the Government of Canada, through the existing Nuclear Liability Act and the proposed Nuclear Compensation and Liability Act, explicitly recognizes that the risk of a nuclear catastrophe is real – real enough to require a special law to provide financial and legal protection for owners and operators of nuclear reactors as well as for the manufacturers of nuclear equipment, exempting those corporations and their officers from any meaningful legal liability in case a nuclear catastrophe.

It is a reasonable question of public policy to ask why the population should accept such a risk to public health, the environment and the economy, when the industry that poses such risks is not even willing to accept the legal or financial risks associated with such a disaster.

The CNSC has a legal and moral responsibility not only to protect the health and safety of Canadians and the environment, but also to

report to parliament when there are safety considerations that must be dealt with in a manner that goes far beyond the licensing function that CNSC normally carries out. In a civil or criminal trial, a judge is expected to recuse himself or herself from cases where the judgment may be prejudiced due to a lack of impartiality on the judge's part.

The CCNR formally requests the CNSC to recuse itself from judging the acceptability of extending the lifetime of the four Darlington nuclear reactors for another 30 years on the shore of Lake Ontario.

The environmental assessment report should not be accepted by the CNSC until there has been an appropriate democratically-based political process to decide on the acceptability or unacceptability of the catastrophe risks associated with extending the lifetime of the four Darlington reactors for another 30 years or so.

We urge the CNSC to report to Parliament that there is a need for clear political direction on these issues that transcend the needs of "business as usual". One way of achieving this would be to call for a national public inquiry into the future of Canada's nuclear industry – something that CCNR and some 45 other organizations across Canada have been calling for for more than a year.

Other Considerations

There are other reasons why permission should not be granted for the refurbishment and life extension of the Darlington reactors. Here are some of them:

1. The high-level nuclear waste problem is not solved.

Several reports in the 1970s, both in Canada and elsewhere, concluded that there should be a moratorium on any new nuclear reactor construction unless at least one method for safely storing irradiated nuclear fuel for the indefinite future has been demonstrated. The cancellation of the Yucca Mountain Project marks the eighth time that the American nuclear establishment has tried to site a high-level nuclear waste repository in the USA. They have failed all eight times.

Here in Canada the industry has not even broken ground – except in Manitoba, for an Underground Research Laboratory. But Manitoba has passed a law prohibiting the import of irradiated nuclear fuel for the purposes of long-term storage, and the Quebec National Assembly has passed a unanimous resolution to similar effect.

Earlier this year, the Commissioners of the US Nuclear Regulatory Commission voted unanimously to suspend all licence approvals for new reactors, or for life extensions of old reactors, for two years, so that an acceptable policy for the interim on-site storage of irradiated fuel can be worked out at the political level.

CCNR formally requests the CNSC to report to the Parliament of Canada that political direction from the Canadian population and their elected representatives is required on this question. Should CNSC be issuing licences for the continued production of irradiated nuclear fuel when no method for its indefinite long-term safe storage has been successfully demonstrated?

2. Safe dismantling of reactors has not been demonstrated

Every refurbishment project carried out in Canada to date has been a billion dollars or more over budget, one to three years behind schedule, and plagued with errors ranging from improper installation of calandria tubes to the callous exposure of hundreds of workers to internal bodily contamination with alpha-emitting dust, including plutonium dust, because some manager (who has never been held accountable) told them they didn't need to wear respirators.

This experience calls into question the ability of the nuclear industry to safely dismantle a nuclear power reactor which has been permanently retired, such as Douglas Point or the two Pickering A reactors that have already been shut down for good, or the Gentilly-2 reactor that will be shut down permanently in December of this year, within the budget constraints that have been laid down.

CCNR calls upon the CNSC to require a realistic re-evaluation of the cost of dismantling the Darlington reactors at the end of their useful lifetime before allowing any life extension work to take place. Since CNSC requires all licensees to have a decommissioning plan and to accumulate money in a segregated decommissioning fund to defray the ultimate costs of such dismantling, it would be irresponsible for the CNSC to accept bogus cost estimates – for if the money is not available when the time comes, the job cannot be done safely.

This concern is underscored by the recent statement from Hydro-Quebec that decommissioning the Gentilly-2 reactor will cost close to two billion dollars (est.), whereas the figure previously given to the CNSC for this job was well below one billion dollars (est.).

The only way to introduce some degree of realism into the decommissioning cost estimates is to base those estimates on an actual dismantling job, including the cost of packaging and transporting thousands of truckloads of radioactive rubble to some designated radioactive dump. Fortunately, some experience in this field can be gained rather quickly by dismantling the smaller power reactors that have already been shut down for decades, such as the NPD reactor at Rolphton, the Gentilly-1 reactor at Bécancour, or the Douglas Point reactor at the Bruce Nuclear Complex.

CCNR formally requests CNSC to report to the Parliament of Canada that political direction from the Canadian population and their elected representatives is required on the question of decommissioning costs. Given that every reactor that has been so far decommissioned has cost more to dismantle than it cost to build in the first place, and given the fact that the cost of nuclear electricity cannot be properly calculated without a realistic number for the decommissioning cost, should CNSC be authorizing the refurbishment of the Darlington reactors when there is so much uncertainty regarding the ultimate cost and therefore the ultimate safety of decommissioning those reactors?

3. Generic CANDU Safety Issue has not been resolved

The Darlington Nuclear Reactors share a common design flaw that afflicts all reactors having a pressure tube design that are fuelled with natural uranium fuel. This includes the NRX Reactor at Chalk River (which exploded, destroying the core of the reactor in 1952); the Lucens reactor in Switzerland (which exploded, destroying the core of the reactor in 1969), and the Chernobyl reactor in Ukraine (which exploded, destroying the core of the reactor in 1986).

The technical name for this design flaw is “positive void coefficient of reactivity” (PVCR). What it means is that whenever you have a “loss of coolant” accident in this kind of reactor (caused by a pipe break, a stuck-open valve, or some other reason) there is a power surge right away. In other words, the power level goes rapidly up, instead of down. This has the potential to compound the accident and increases the risk of fuel damage, hydrogen gas generation, and core melting.

The licensees and the CNSC staff have told the Commissioners that the PVCR doesn’t matter because there are two independent fast shutdown systems that can terminate the reaction (shut the reactor down) so fast that the power surge will not do much, or any, damage.

But these shutdown systems are not always available, and the CNSC no longer publishes the unavailability statistics for the special safety systems (such as SDS1 and SDS2, the two fast shutdown systems). The fact is that these shutdown systems are not truly “passive” or “fail safe” because there are times when they are not available even when the reactor is operating at full power.

There is a much more satisfactory way to deal with this unresolved safety issue, and that is to redesign the fuel so as to eliminate the possibility of a power surge following a loss of coolant. According to Atomic Energy of Canada Limited and Bruce Power, this can be done at some extra expense by using “slightly enriched uranium” fuel (SEU) instead of natural uranium fuel. SEU is an example of what is called “Low Void Reactivity Fuel” (LVRF).

The CNSC has already allowed Bruce Power to forego the use of the so-called “Low Void Reactivity Fuel” in its refurbished reactors -- because LVRF is, in the opinion of the licensee, too expensive to use. Instead CNSC has required Bruce Power to keep a close eye on the shutdown systems and carry out more stringent mathematical analyses of the consequences of a loss of cooling accident.

However, given the possibly catastrophic consequences of a loss of cooling accident with an unterminated power surge, CCNR formally requests CNSC to report to the Parliament of Canada that political direction from the Canadian population and their elected representatives is required on the question of whether or not to eliminate the Positive Void Coefficient of Reactivity by using Low Void Reactivity Fuel.

What is the price of safety, given the fact that the Government of Canada could be financially responsible for hundreds of billions of dollars in costs in the event of a nuclear catastrophe.

Conclusion

In summary, the Canadian Coalition for Nuclear Responsibility urges the CNSC not to accept the Environmental Assessment Report as a justification for authorizing the refurbishment and continued operation of the Darlington reactors because of fundamental unsolved problems regarding catastrophic nuclear accidents, the long term management of irradiated nuclear fuel, the safe dismantling of defunct nuclear power reactors, and unresolved CANDU safety problems, including the Positive Void Coefficient of Reactivity.

Thank you for considering these comments.

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