Registered Nurses' Association of Ontario
L'Association des infirmières et infirmiers autorisés de l'Ontario

RNAO Speaking Notes:

Joint Review Panel

Darlington Nuclear Project

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RNAO Speaking Notes – Doris Grinspun, Executive Director, RNAO

Joint Review Panel – Darlington Nuclear Project

The Registered Nurses' Association of Ontario (RNAO) is the professional organization representing registered nurses in Ontario. It is the strong, credible voice leading the nursing profession to influence and promote healthy public policy.

We appreciate the opportunity to make a submission to the Joint Review Panel on the proposal by Ontario Power Generation (OPG) for site preparation, construction, operation, decommissioning and abandonment of up to four new nuclear reactors at the existing Darlington Nuclear site near here on the north shore of Lake Ontario.

Last January we presented the Premier of Ontario, other party leaders and all MPPs with a copy of *Creating Vibrant Communities: RNAO's Challenge to Ontario's Political Parties*, our comprehensive platform for the upcoming 2011 provincial election. This fully-costed platform outlines practical and concrete recommendations in six key areas: strengthening social determinants that allow us to create healthy and equitable communities; building sustainable green communities; strengthening Medicare and our not-for-profit health care system; improving access to nursing services and strengthening our public services.

When we talk in our platform about building sustainable, green communities we recognize that the connection between the environment and health is well established.

According to the World Health Organization, environmental factors account for 24 per cent of the world's burden of disease and 23 per cent of all deaths. *Creating Vibrant Communities* means healthier environments through cleaner air and water, good green jobs on a base of equity and environmental sustainability, getting serious about climate change, and reducing toxic substances and other pollutants in the environment and in our food and water.

Registered nurses are particularly concerned about climate change because of its serious environmental and health implications. Confronting the impacts of climate change calls for renewed commitment. That's why the RNAO is advocating to immediately and urgently phase out coal-fired power generators, and not delay until the scheduled date of 2014. In our platform we talk about wind and solar power and the need to be much more aggressive in setting targets for conservation and the production of green, renewable energy.

We are clear on one other thing. The RNAO has been consistent in saying there is no place for new nuclear power in Ontario's long-term energy future. To quote from our platform *Creating Vibrant Communities*:

> RNAO is convinced that one alternative – an expansion of nuclear power – is not the answer. Nuclear power plants are prohibitively expensive, take years to build, present radiation risks and produce large amounts of radioactive waste that must be stored in perpetuity (and no solution for such storage has been found). Ontario relies on expensive, risky nuclear power for half of its electrical power, and it is time to put those resources into clean energy.

I start with this lengthy background so that the panel understands that the RNAO does not come lightly or opportunistically to the issue of whether Ontario Power Generation should be authorized to build four new nuclear reactors. Nuclear power comprises about 50 per cent of Ontario's power supply. It employs thousands, including the family and friends of many registered nurses in communities such as the one we are in today. Yet the RNAO and nurses from the Darlington area with whom I have spoken directly have become increasingly concerned about the staggering health, environmental and economic costs of nuclear power, particularly as safer and more affordable green alternatives are available. Setting in motion a process that would result in up to four new nuclear reactors at Darlington would be a serious mistake that could have serious health consequences to the people of Ontario now and into the future.

In reaching this conclusion, the RNAO takes a precautionary principle to protecting human health and the environment. I will come back to the precautionary principle shortly.

First, we must acknowledge the terrible events of these past weeks that hang like a pall over these hearings.

Like all Canadians, and people around the world, our hearts go out to the people of Japan who are dealing with unthinkable tragedy. We admire their courage and resilience even as the full extent of the disaster continues to take shape.

We know that the best and brightest of the world's nuclear technologists and engineers are working around the clock at great risk to their own health to prevent further catastrophe and we wish them all the best. As their efforts on the other side of the globe inspire us with hope, our government and the nuclear industry here in Ontario assure us it could never happen here and we have nothing to worry about.

Let us not be smug. No doubt the nuclear experts and government leaders in Japan were confident that the sheer magnitude of the disaster could never happen there. But of course it could, and it did. Here in southern Ontario on the shores of a Great Lake it will not be a tsunami and earthquake striking in tandem. That does not mean there is no risk of harm to health. Nuclear power is an unforgiving technology. Japan reminds us that all nuclear reactors are vulnerable to the potentially deadly combination of human error, design failure and natural disaster.

Other countries get it. Germany and Switzerland head a growing list of countries that watched the instability of the Fukushima reactors over the past several weeks and recognize that this is not the time to be talking about plans to expand nuclear facilities. One might ask what those countries know that we apparently do not know. The better question is what do we all NOT know. That's why we must not recklessly push forward with the construction of four new nuclear reactors in a heavily populated area of our province.

This brings us to the precautionary principle. I know many others have referred to the precautionary principle in these hearings, and more will do so. I want to talk about how central the precautionary principle is to how nurses view their responsibility to advocate for social equity, health and environmental sustainability.

The Precautionary Principle, a tenet of Canadian law, requires that when faced with the potential for irreversible harm it is incumbent on decision-makers to examine not merely the mitigation of such effects, but minimizing them. In the context of this review, that would require an examination of non-nuclear alternatives for producing electricity. However, such an examination has been excluded from this review and no such public review has been undertaken by the provincial government.

A commonly accepted statement of the precautionary principle is: “When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically.”

It is important that the process of applying the precautionary principle be open, informed, democratic and include potentially affected parties. The proponent of an activity, rather than the public, should bear the burden of proof. This process must also involve an examination of the full range of alternatives, including no action.

There is an argument to be made that a greater burden should apply to policy decisions concerning an application for new nuclear reactors. Where radiation threats are concerned, not only must people be safe, but they must also *feel* safe. We speak in our written submission about the need to engage the public about radiation and its safety in a non-condescending manner. People do not change their perception of radiation by being told they are wrong. Education must play a role, as does the fact of robust credible analysis. No action must be considered a viable and, in the case of nuclear radiation, a preferred option until public safety is assured both in fact and in perception.

Dr. Cathy Vakil et al, in an article cited in our written submission, refer to a long list of hazardous products that were once considered safe, such as cigarettes, DDT, thalidomide and various food additives, and suggest that the precautionary principle should dictate that radiation be added to the list until such time as a safe dose of radiation exposure can be demonstrated.

Indeed, the government and, in the case of this hearing, Ontario Power Generation have not yet demonstrated that nuclear power is safe

While the government counts nuclear power as being part of the more than 80 per cent of power generation resulting from emissions-free sources in 2009, this is misleading. During “production” of electricity, nuclear power may not emit pollutants as defined by Environment Canada. But nuclear energy certainly produces more than its share of

climate change-causing greenhouse gas emissions during nuclear power plant construction, uranium mining and refining, transportation and fuel fabrication.

Talk of new nuclear generating stations being built in Ontario has stirred a great deal of interest in uranium prospecting and mining, providing more reasons to be concerned about the impact of this proposal on environmental and human health. Uranium mining has been called “potentially the most contaminating stage of nuclear power generation” thanks to the large amounts of radioactive dust and tailings and radon gas that is produced.

In the over 50 years of nuclear power generation in Ontario, a permanent solution has yet to be found for the disposal of nuclear waste. At the Pickering nuclear power station alone, 20,000 tonnes of highly radioactive waste has already been produced and is being stored at site, with no foreseeable solution.

Most alarming, a recent study concludes that there is no safe level of radiation exposure – in fact, any amount of exposure to ionizing radiation is too much and is harmful. Further, the health risks associated with radiation arise at all stages of the nuclear fuel chain, from uranium mining and refining, to the fission process in nuclear reactors and radioactive releases into the air and water, to the legacy of radioactive waste that we leave for our grandchildren and future generations.

Studies have linked human-produced radiation with cancers, genetic damage, birth defects, mental disability due to in utero exposure, immune system dysfunction and diabetes. There is the fear of the large-scale accident or meltdown that has made Three Mile Island, Chernobyl and now Fukushima part of the common lexicon. But the real danger of radiation may well prove to be the chronic low-level exposures the effects of which are poorly understood, particularly in children. If for no other reason, this cries out for application of the precautionary principle. As Dr. Vakil concludes: “Providing the least radioactivity in the environment, water and food seems the most prudent advice”.

While there are relatively few Canadian studies on the deleterious effects of low levels of radiation on health, there is evidence linking increased prevalence of leukemia in children and living near nuclear facilities. Higher rates of congenital abnormalities have also been documented. A 2008 German study (KiKK study) showed a statistically significant relationship between risk of leukemia and living within ten kilometres of a nuclear plant with consistent results across all 16 nuclear power plants in Germany.

While there is no definitive evidence in Canada linking nuclear reactors and harm to human health because of small sample sizes, three studies conducted by the Atomic Energy Control Board (AECB) in Ontario provide reason for concern. Two of the studies in 1989 and 1991 examined childhood leukemia within a 25 km radius of nuclear facilities in Ontario, including the Chalk River research centre, the Port Hope uranium processing plant, Elliot Lake uranium mining and Pickering and Bruce electricity generation. The third study looked at childhood leukemia and paternal radiation

exposure. In the initial studies, more cases of childhood leukemia were consistently found at each location except Chalk River, though the overall numbers were small. Though the authors conclude that the findings justify further investigation, a larger case-control study has not yet been done in Canada. Proponents of nuclear power should not take heart from the inconclusive findings of these Ontario-based studies. Rather, they point to the clear need to apply the precautionary principle and put the burden of proof where it belongs, on the agency seeking to construct new nuclear reactors. Further study of the health effects of nuclear facilities in close proximity to heavily populated areas must be conducted before decisions are taken to expose those areas further to risk of nuclear radiation.

Before leaving the topic of potential harm to human health, I want to talk briefly about tritium.

While we do not yet know what technology is being projected for the new Darlington reactors – Canadians are being asked to write Ontario Power Generation a 'blank cheque' - Canada's CANDU (Canada Deuterium Uranium) nuclear reactors use heavy water (deuterium oxide) as a coolant to avoid the buildup of excessive heat. Deuterium easily converts to tritium by absorbing a neutron. Canadian reactors release and leak much greater amounts of tritium than reactors that use light water.

Nurses and other health professionals are concerned about the level of protection that Ontario's drinking water quality standards provide against tritium, a radioactive isotope

of hydrogen with a half-life of 12.3 years. This persistent toxic substance moves quickly through the environment once it is released, and is not readily removed from drinking water, so reducing or stopping releases is the most practical way to control tritium exposure. The Canadian Nuclear Safety Commission recognizes tritium as a risk to human health when it is ingested in drinking water or food, or when it is inhaled or absorbed through the skin. Like other radionuclides, tritium emits ionizing radiation when in the body, and this radiation has been shown to be a teratogen, mutagen and carcinogen. Intentional releases of tritium from the Chalk River nuclear facility have been documented where tritium levels in the Ottawa River did not exceed allegedly "safe" limits. Even small amounts of a carcinogenic, mutagenic and teratogenic substances such as tritium could still be concluded to represent an unacceptable risk when released into the water supply.

The isotope tritium occurs naturally, but it is also known to have been released into the environment in large quantities by Ontario's nuclear reactors. By one estimate, major Canadian nuclear facilities were releasing amounts of tritium equaling about ten per cent of natural production of tritium in the Northern hemisphere. The majority of the releases come from Ontario reactors, and the impact is greatest near nuclear facilities.

A 1991 study looked at birth defects within 25 km of the Pickering nuclear station from 1971 to 1988 and compared them with airborne and waterborne tritium discharges over that period. While the study found a statistically significant increase in babies with Down syndrome born near Pickering and a correlation with tritium discharges, the latter

relationship fell short of being statistically significant. Nevertheless, the higher rates of Down syndrome are eerily reminiscent of similar findings with Chernobyl survivors and suggest that more study is needed before massively increasing tritium-releasing CANDU reactors at Darlington.

The full impact on human health of a substance like tritium is complex and not fully understood: there are multiple health endpoints (and not just cancer mortality); the exposed population is diverse, with many who are vulnerable due to compromised immune systems or due to their stage of development (such as young children and pregnant women); the interaction of chemicals and radioactive nuclides alters health effects; the mechanisms of health impacts are complex; and, multiple forms of tritium enter the body (elemental tritium, tritiated water, and organically bound tritium.

It is essential that there be rigorous studies of the health impacts of tritium exposure immediately before steps are taken to build new nuclear reactors in this area.

If building new nuclear reactors carries increased risk to human health and the environment, why are we here today? Has Ontario Power Generation demonstrated the need to generate up to 4,800 megawatts of electricity at the Darlington nuclear site in Clarington, not far from heavily populated areas of Oshawa, Durham region and Toronto. This is more than double the additional nuclear capacity that even the government of Ontario projects as necessary or justifiable. In fact, the Ontario government has no plans – short term or long term – to build four new nuclear reactors.

Ontario's Long-Term Energy Plan from 2010 to 2030 projects the need to refurbish 10,000 mega watts of existing nuclear capacity over the next ten to 15 years, none of which requires new nuclear construction. To achieve the province's objective of nuclear power playing an ongoing central role in Ontario's energy mix, responsible for 50 per cent of the energy supply, a total nuclear capacity of 12,000 mega watts is projected. It is only the difference between this total (12,000 mega watts) and the capacity currently available from refurbishment (10,000 mega watts) that is required from new nuclear at Darlington. Using the government's own figures then, only 2,000 MW would need to be produced by new construction, a far cry from the 4,800 MW in the proposal now before this Panel.

Not only is the province's need for 4,800 MW of new nuclear-generated power unproven and highly questionable, but there currently is no vendor and no approved or even notional nuclear technology in the proposal now before the Panel. As I mentioned earlier, the OPG is essentially asking the Panel and the public to give it a 'blank cheque' for a project that will certainly cost tens of billions of dollars. RNAO believes the people of Canada deserve better than this.

There are other reasons not to dramatically increase nuclear power in Ontario. That 'blank cheque' will have all of us on the hook for the cost-overruns and increased debt for many years to come. Nuclear power is prohibitively expensive. While the government itself is budgeting $33 billion for its nuclear plans, which alone would elbow out other more cost-efficient and environmentally sound investments, the track record of

nuclear projects is not impressive. Every nuclear project in Ontario has gone considerably over-budget, on average about two and half times. Ontarians concerned about their rising hydro bills are still paying for the huge cost overruns from reactors built decades ago.

As the government manages through a fragile economic recovery, it is understandable that the prospect of losing jobs in the nuclear industry would deter pulling the plug on new nuclear power plants. In fact, replacing aging nuclear power plants with green energy means additional, well-paying jobs. *Renewable is Doable: Ontario's Green Energy Plan 2.0* provides details of a diverse green jobs portfolio totalling an additional 27,000 jobs over ten years to produce the equivalent of the aging Pickering A and B nuclear power plants. That compares favourably with the 25,000 jobs that the Canadian Manufacturers and Exporters projects will be created from refurbishing and operating the Bruce and Darlington reactors.

RNAO strongly suggests that every alternative to the nuclear plants must be explored at the earliest opportunity before making new ill-advised investments in new nuclear power.

Renewable is Doable concludes that we have the opportunity to replace Ontario's aging nuclear plants not with new nuclear generating stations, but with the range of green energy options that are increasingly available to us. With demand having fallen each of the last four years (part of which undoubtedly has been due to the recession), coal

being phased out by 2014, renewable energy sources producing more than originally expected, and the natural gas capacity that ensures the lights stay on during the transition already in place, now is the time to develop a 21st century clean and safe energy plan, not one that is rooted in the practices of the past century. It is this visionary, yet achievable, approach that the RNAO strongly recommends. In fact, failure to move in this direction would make Ontario an outlier jurisdiction. As the United Nations reported in 2008, for the first time global investment in clean, renewable energy exceeded new nuclear, coal and natural gas combined, a trend that was even more pronounced in 2009.

Wind, in particular, when properly sited, has huge potential to deliver clean, plentiful and relatively affordable power; it is estimated that wind will meet at least 20 per cent of Canada's power needs by 2025, up from the current one per cent. Aggressive targets must be adopted for conservation and energy efficiency. Combined heat and power, in addition to renewable solar, geothermal, tidal and bio energy, must be priorities in planning, regulation, procurement and operation.

There is tremendous potential to create new jobs by expanding clean, green sources of energy such as wind, water, solar, biomass and biogas as well as investing in conservation. In fact, implementation of the *Green Energy and Green Economy Act, 2009* is credited by some for attracting more than $16 billion in private sector investment to Ontario and creating more than 50,000 clean energy jobs over three years.

Conclusion

As health-care professionals who practise in all sectors, nurses are profoundly concerned by the proposal to spend billions of dollars in a massive expansion of Ontario's nuclear energy capacity in the absence of convincing evidence that viable, cost-effective and safer alternatives do not exist. There is no demonstrated need for the scale of the Darlington expansion in the province's long-term energy plan. There are no definitive studies showing there is no risk of harm to human health posed by low levels of radiation, including the releases of tritium that are endemic to CANDU reactors. Application of the precautionary principle, and good common sense, compels the conclusion that OPG's proposed construction of four new nuclear reactors at Darlington must be rejected.

Ontario now has safe and clean alternatives to the unacceptable health risks of nuclear power. It is time to invoke the precautionary principle and phase out Ontario's dependence on nuclear power.

Thank you.

RNAO Recommendation:

- Deny Ontario Power Generation's application to build four new nuclear reactors at Darlington on the basis that the need for 4,800 MW in additional nuclear energy has not been justified, details of the vendor and technology are unavailable or not made transparent, the potential risk to human health and the environment is too great and the economic cost is unsustainable.
- Invest in more cost-effective and safe alternatives such as conservation, energy efficiency and renewable energy sources