

backgrounder

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New Greenpeace report shows lack of analysis of new hazards of nuclear waste

The nuclear industry in Canada has failed to find a socially acceptable and technically proven solution to managing radioactive waste, despite billions of dollars spent on research and development.

A new report commissioned by Greenpeace, *The Hazards of Generation III Reactor Fuel Wastes*, shows how the federal government is looking the other way as Canada's nuclear waste problem is about to go from bad to worse.

The report exposes how the new Generation III reactors Ontario wants to build at the Darlington site, east of Toronto, pose increased environmental, human health and financial risks to present and future generations of Canadians.

Greenpeace commissioned the report because the federal government is permitting the agencies responsible for nuclear safety to forgo rigorous examination of the costs and risks of new radioactive waste until after a decision is made to proceed with new reactor construction.

Canada built its first generation of reactors without a plan for managing their radioactive waste. Repeating this mistake is the height of irresponsibility.

New reactor waste = increased hazards

- Canada's operating reactors are Generation II CANDU designs that use natural uranium as fuel.
- All new reactors under consideration are Generation III designs that use enriched uranium as fuel, a more toxic version.
- The long-lived radioactivity of Generation III reactor waste would be between two and 158 times more radioactive than the waste produced by existing CANDU reactors.
- Generation II CANDU fuel waste will take one million years to decay to radioactivity levels of natural uranium.
- Generation III fuel waste will take up to 2.6 million years to decay to the same level.
- The consequences of an accident or sabotage event during the transportation of Generation III used fuel would be up to seven times greater than those of an accident involving current CANDU used fuel.
- Shipments of Generation III waste would contain up to 2.5 times the amount of Cs-137 of a CANDU road shipment and 7.6 times the Cs-137 of a CANDU rail shipment. Cesium is a long-lived fission product that in the event of an accidental release would dominate the dose received by victims.

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- Generation III fuel has a higher “burn-up” rate than CANDU fuel, posing new challenges to the safe reactor operation due to increased wear on materials and components.

Repeating past mistakes: decades without a waste solution

In the 1960s and 1970s, Canada built its first generation of reactors with no plan for managing the radioactive waste they would produce. Public mistrust of the nuclear industry’s research in support of burying radioactive waste has prevented the industry from proceeding with a deep geological repository for long-term storage.

In 1998, a federal panel reviewing the industry’s conceptual proposal for a deep geological repository stated that: “From a social perspective, safety of the AECL concept has not been adequately demonstrated for a conceptual stage of development.” To address public distrust of industry science, the panel recommended that an agency “at arm’s length” from industry and government. In 2002, the Chretien government gave nuclear waste producers control of the federal agency – the Nuclear Waste Management Organization (NWMO) – responsible for managing Canada’s used nuclear fuel.

- Between 2002 and 2005, the NWMO consulted with Canadians, but did not question the scientific bias of nuclear industry studies used to justify deep geological disposal.
- In 2006, federal government accepted an NWMO recommendation for a radioactive waste management strategy called Adaptive Phase Management (APM).
- Under APM, millions of bundles of used nuclear fuel waste would be moved from interim storage at reactor sites to a temporary centralized storage facility and finally to deep-rock disposal. As such, APM is essentially a repackaging AECL’s deep geological repository proposal.
- NWMO’s public consultations and studies only considered the hazards posed by Canada’s current operating Generation II CANDU reactors, not the more hazardous spent fuel produced by Generation III reactors.
- The continued production of CANDU radioactive waste and the introduction of new, more toxic forms of used nuclear fuel waste call into question many of the assumptions of the NWMO plan.

The Greenpeace report shows that overall risk to society from the NWMO APM plan would increase. This conclusion undermines the NWMO’s contention that centralizing stockpiles of radioactive waste in a repository would reduce hazards. The report notes:

- Generation III waste poses significant new risks to operating a fuel repository because of increased thermal output.

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- Generation III fuel has a higher burn-up rate, generating more decay heat, which would create greater thermo-connective forces affecting water migration, waste package corrosion, and even geological deformation of a repository.
- The safety of a geological repository cannot be guaranteed. It is impossible to predict long-term geological activity, including tectonic shifts, earthquakes, and ice ages.

Don't Nuke Green Energy: hidden subsidies for the nuclear industry

Greenpeace works through its Don't Nuke Green Energy Campaign to expose the hidden subsidies governments give the nuclear industry that undermine the development of green energy. If left unassessed and accounted for, new Generation III reactors would be an unfair subsidy, paid for by tax-payers, ratepayers and future generations, over the safer, more cost-effective options of green, renewable energy.

The Greenpeace report shows that cost estimates for the long-term management of nuclear fuel waste, including repository construction, must be considered uncertain and speculative. The need to manage more toxic Generation III fuel wastes would create additional uncertainties and costs.

Generation III waste would require changing the management plans for interim storage, transportation and long-term storage. The NWMO has not assessed these undoubtedly higher costs and has not consulted the public on such changes.

The NWMO wrongly claims that additional waste reduction will reduce fuel waste management cost per unit of production, since it incorrectly assumes additional wastes will have the same risk profile as existing wastes.

The estimated costs for a deep geological repository in Canada have increased by 390 – 687 per cent since the 1970s.

In the U.S, the cost estimates for building the Yucca Mountain waste repository increased 342 per cent since the 1980s to \$38 billion. The Obama administration has abandoned the Yucca site and all money already sunk into its construction.

The Greenpeace report indicates that the costs of building a repository in Canada and the US are expected to continue rising.

The unassessed costs of managing Generation III reactor waste will further erode the economic viability of building new nuclear stations. The estimated up front cost of building Generation III reactors has increased significantly over the past decade. In 2009, Ontario “suspended” its procurement of new reactors because the offers it received were “billions” too high.

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About Radioactive Waste Manage Associates (RWMA):

Founded in 1989, the RWMA is an expert team comprised of scientists and engineers that assists governments and communities to evaluate and address the risks of radioactive waste management. It has provided expert analysis for numerous environmental and regulator reviews on projects involving radioactive sources.

Marvin Resnikoff received his PhD in theoretical physics from the University of Michigan in 1965. Dr. Resnikoff has concentrated exclusively on radioactive waste issues since 1974, researching and providing expert technical advice to municipal authorities, federal and state governments as well as the Nuclear Regulator Commission. He has written numerous papers particle physics and in 1976 co-authored paper that changed the direction of reactor decommissioning in the United States.

For more information, please contact:

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