



**Supplementary Information  
Oral presentation**

**Presentation from the  
Concerned Citizens of Renfrew  
County and Area**

In the Matter of the

**Canadian Nuclear Laboratories**

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Application for the renewal of the Nuclear  
Research and Test Establishment Operating  
Licence for the Chalk River Laboratories

**Commission Public Hearing**

**January 23-25, 2018**

**Renseignements supplémentaires  
Exposé oral**

**Présentation de  
Concerned Citizens of Renfrew  
County and Area**

À l'égard des

**Les Laboratoires Nucléaires Canadiens**

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Demande de renouvellement du permis  
d'exploitation d'établissement de recherche  
et d'essais nucléaires pour les Laboratoires  
de Chalk River

**Audience publique de la Commission**

**23-25 janvier 2018**

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# CNL's approach to nuclear waste

Presentation to the Canadian Nuclear Safety Commission for the  
Chalk River Laboratories Site Relicensing Hearing  
Best Western Hotel, Pembroke, January 24, 2018  
Concerned Citizens of Renfrew County and Area

# Wastes on the CRL site

- Seven decades' accumulation
  - 509,164 cubic meters (102,462 m<sup>3</sup> nuclear R&D; 382,841 m<sup>3</sup> contaminated soil; 19,726 m<sup>3</sup> radioisotope production/use; 4,135 m<sup>3</sup> decommissioning)\*
  - Origins in World War II Manhattan Project
  - Cold War plutonium production for U.S. nuclear weapons
  - NRX, NRU, ZEEP, PTR, ZED-2 reactors
- Mostly post-irradiation (nuclear reactor) wastes
  - Wide range of fission and activation products, difficult to manage
  - 1952 NRX accident
  - Leaking waste management areas (WMAs) with liquid waste discharges to ground, “special burials” of three reactor cores in the sand

\*Source: CNL 2015. [\*Inventory of Radioactive Waste in Canada: 2013 Inventory Summary Report\*](#).  
Canadian Nuclear Laboratories. Low Level Radioactive Waste Management Office.



500,000 cubic meters is equivalent to about 4500 tractor trailer cargo loads

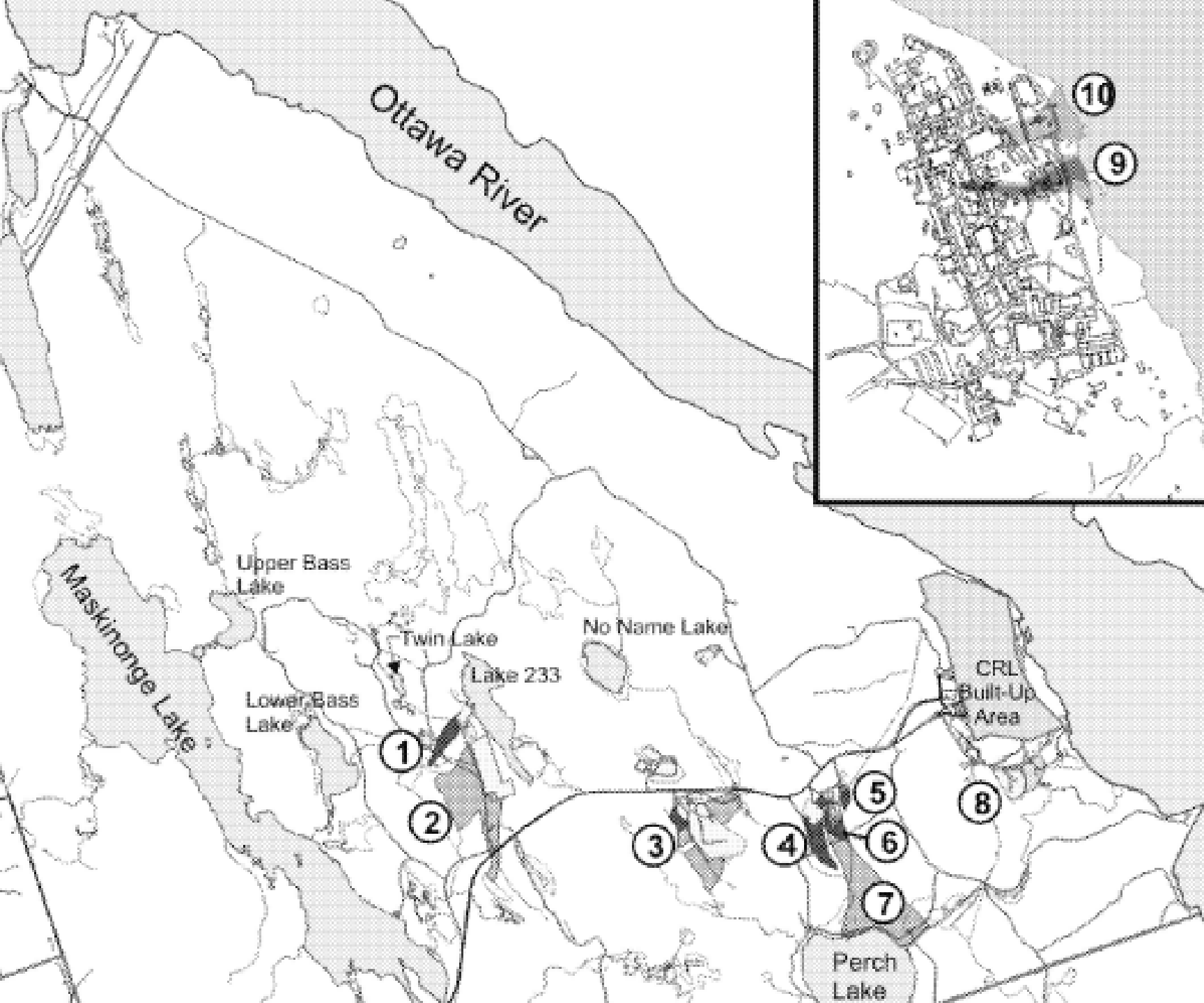
# Estimate to clean up CRL

- Total liability cost estimate of \$7,634,000,000\*
- \$7.6 billion far exceeds the \$5.8 billion gross remediation liability for 2400 federal non-nuclear contaminated sites ([Environmental Liabilities](#), Public Services and Procurement Canada. December 7, 2015)
- Good start in 2006-15 with the Nuclear Legacy Liabilities Program (NLLP)
  - NLLP program cancelled September 2015 after spending \$1.22 billion
  - Previous federal government (via AECL) contracted 5-member multinational consortium to operate CNL
  - Contract calls for CNL to “seek the fastest, most cost effective way(s) of executing the DWM [Decommissioning and Waste Management] Mission including disposal of all waste.”

\* Source: *General Report – 2013 Basis of Cost Estimate: Chalk River Laboratories Decommissioning Liability*. Atomic Energy of Canada Limited. March 2014

# Summary of Liability Cost for CRL from *AECL Basis of Cost Estimate*

| Liability Item                                       | Total in 2013 - \$M |
|--|---------------------|
| Research Reactors                                    | 163                 |
| Environmental Remediation                            | 556                 |
| General Site, Operations, Maintenance & Surveillance | 476                 |
| Waste Processing & Storage Facilities                | 2,243               |
| Long Term Waste Management (Disposal) Facilities     | 869                 |
| Other Waste Management Facilities & Operations       | 206                 |
| Indirect and Capital Costs                           | 3,121               |
| <b>Total</b>   | <b>7,634</b>        |



### CRL Groundwater Plumes

|    |                                       |
|----|---------------------------------------|
| 1  | Nitrate Plant (Beta-Gamma)            |
| 2  | Area C (Tritium, VOCs)                |
| 3  | Area B (Tritium, Beta-Gamma, VOCs)    |
| 4  | Area A and Reactor Pit 1 (Beta-Gamma) |
| 5  | Chemical Pit (Beta-Gamma, Hg)         |
| 6  | Reactor Pit 2 (Beta-Gamma)            |
| 7  | Reactor Pit 2 (Tritium)               |
| 8  | Inactive Landfill (Non-Radiologicals) |
| 9  | NRX Rod Bay (Tritium, Beta-Gamma)     |
| 10 | NRU Area (Tritium, Beta-Gamma)        |



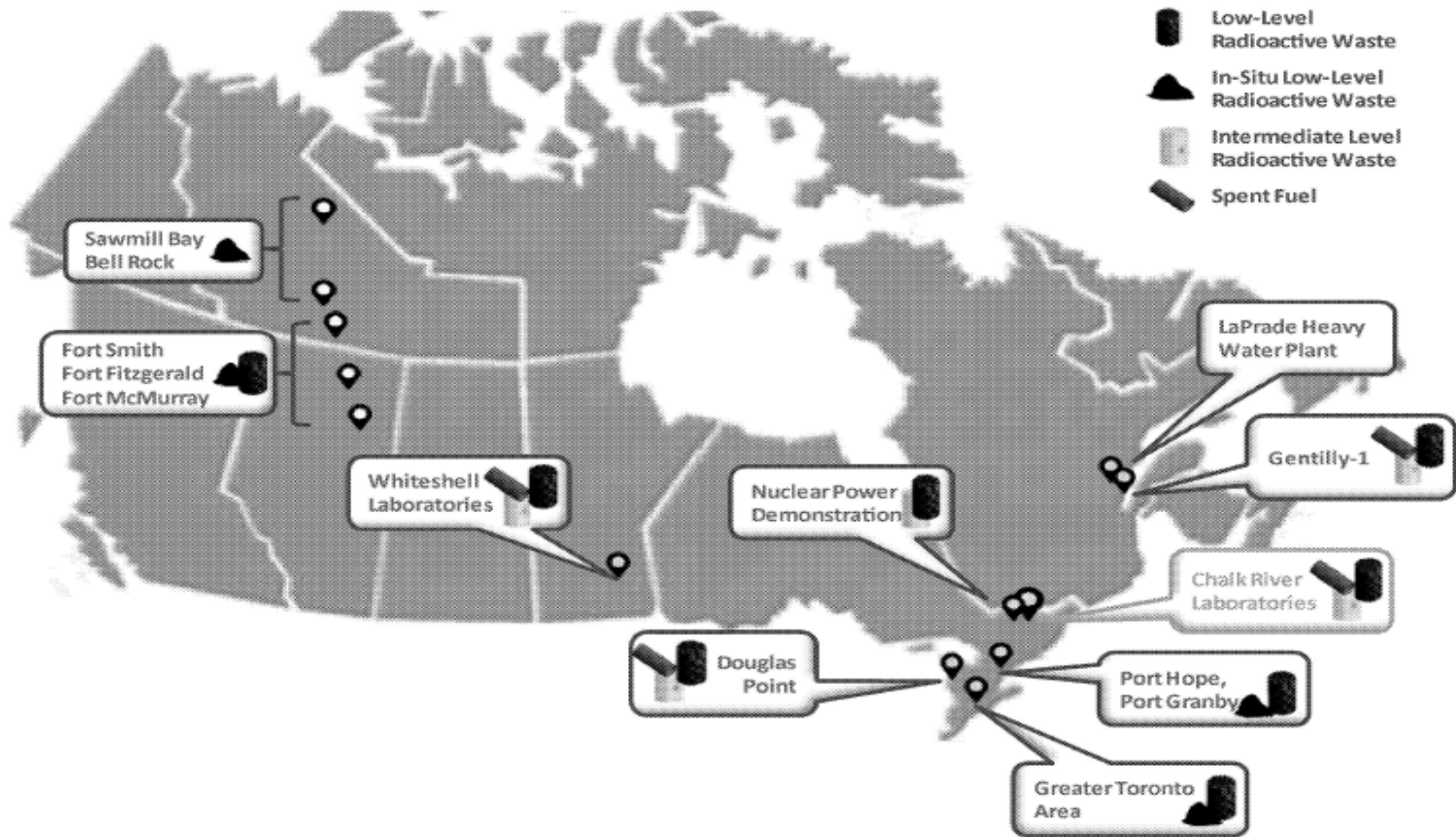
# Now going in reverse?

- Huge increase in government allocations, with questionable results
  - 2016/17 and 2017/18 federal budgets allocate \$1.05 billion for decommissioning and waste management to AECL
  - Nearly all of this funding passed along to CNL
  - AECL has limited contract oversight capacity (~40 employees, some with previous ties to members of the consortium)
- Unacceptable CNL “mound” proposal not included in current decommissioning plan or liability cost estimate for CRL
  - Separate low- and intermediate-level waste facilities to be operational by 2035
  - ILW facility siting process was to have started in 2013/2014
- CNL emphasizing bulk demolition, clearing the way for new reactors, putting all wastes in an unacceptable above-ground facility
- CNL backing away from environmental remediation of waste management areas

# CNL plans to consolidate ALL federal wastes at CRL

- New CNL “Integrated Waste Strategy”\*
  - consolidate all intermediate level waste and used fuel at CRL, even though
  - appropriate facilities for disposal and used fuel storage do not exist
- Strategy being implemented in the absence of public consultation or environment assessment
  - CRL site seismically active with faults and fractured rock
  - problematic location for storage or disposal
  - transportation risks
  - no examination of alternatives

Source: *Canadian Nuclear Laboratories Integrated Waste Strategy – Company Wide.*  
CW-508600-PLA-002. Revision 0. January 24, 2017.



**Figure 1 CNL Locations**

# CNL using methods and definitions that flout IAEA standards and best practices guidance

- Bulk demolition rather than dismantling and deconstruction
- Misuse of “Near Surface Disposal Facility” term
- Proposed abandonment of long lived radionuclides above ground
- Use of definitions of “intermediate-” and “low-level” waste that relate to worker handling rather than long-term containment and isolation
  - IAEA strongly emphasizes that significant quantities of long-lived radionuclides must be isolated from the biosphere
  - Nine of 15 radionuclides with the highest activity that would be put in the NSDF mound have half-lives of thousands to billions of years\*

\*Source: *Near Surface Disposal Facility. Environmental Impact Statement. Volume 1: EIS Report.* Canadian Nuclear Laboratories Report 232-509220-REPT-004. March 2017. Table 5.7.6-1: Bounding NSDF Project Waste Radionuclide Inventory to be placed in the ECM.

| Radioactive Material | Total Activity (Bq) | Half-Life (years) |
|----------------------|---------------------|-------------------|
| Americium-241        | 51.9 trillion       | 432               |
| Carbon-14            | 44.1 trillion       | 7 thousand        |
| Cesium-137           | 531 quadrillion     | 30.1              |
| Cobalt-60            | 4.4 quadrillion     | 5.3               |
| Hydrogen-3           | 4.8 quadrillion     | 12.3              |
| Iodine-129           | 1.48 trillion       | 15.7 million      |
| Niobium-94           | 29.7 trillion       | 20.3 thousand     |
| Nickel-63            | 25.3 trillion       | 101               |
| Plutonium-239        | 2.01 trillion       | 24 thousand       |
| Plutonium-240        | 3.13 trillion       | 6.6 thousand      |
| Strontium-90         | 1.66 quadrillion    | 28.9              |
| Technetium-99        | 6.88 trillion       | 216 thousand      |
| Uranium-234          | 3.86 trillion       | 245.5 thousand    |
| Uranium-238          | 12.4 trillion       | 4.5 billion       |
| Zirconium-93         | 11.8 trillion       | 1.5 million       |

# CNL wants to create more reactor wastes without cleaning up what's already at CRL

- Licence renewal application says that a “key S&T objective” is to “demonstrate the viability of Small Modular Reactors” (SMRs)
- Three multi-national consortium members active in SMR development
  - Fluor/NuScale
  - SNC Lavalin/Holtec
  - Rolls Royce
- Construction as early as 2026 (within proposed 10-year licence period)
- Deletions of safety and environment provisions from proposed licence and CRL Handbook create serious accident/waste management risks

# Conclusions

- **Given its proposed approach to nuclear waste management, CNL is NOT qualified to make adequate provision for protection of the environment and health.**
- **The Commission should restore existing provisions, or extend current licence and CRL Handbook for three years or less**
  - **CNSC staff proposals to water down licence conditions and delete compliance verification criteria add to existing safety risks**
  - **Standard licence conditions cannot be applied to a site that is anything but standard**
  - **CNL contract up for review in 2021**
- **The Commission should ask the Government of Canada to initiate a strategic impact assessment of how to manage its nuclear wastes**