

# Liquid Nuclear Waste Convoys

## A Threat to the Waters of the Great Lakes

October 3 2016

For Immediate Release

Over two dozen non-governmental organizations from Canada and the United States are asking Prime Minister Justin Trudeau and President Barack Obama to postpone or cancel an unprecedented series of shipments of highly radioactive liquid waste from Ontario to South Carolina along public roads and over bridges crossing the waters of the Great Lakes.

The groups are demanding that an Environmental Impact Statement (EIS) be produced, published and circulated, to allow for scrutiny from other government departments and the public in both countries. In addition, the groups are insisting that proper notification be disseminated through the **Great Lakes Executive Committee (GLEC)** to federal agencies, state and provincial governments, tribal governments, First Nations, Métis, municipal governments, watershed management agencies, and local public agencies, as required under the terms of the **2012 Great Lakes Water Quality Agreement (GLWQA)**.

The **Great Lakes Commission** and **International Joint Commission** are meeting in Toronto this week. “There is enough time for the governments to fulfill their duties under the Great Lakes 2012 Agreement and to respond to the demands of Sierra Club and dozens of other environmental groups to prepare and circulate an independent and meaningful Environmental Impact Statement that considers alternatives to this risky proposal,” said Christine Elwell, Green Energy Campaign, **Sierra Club Canada Foundation**.

A lawsuit was recently launched in U.S. federal court calling for an injunction against the proposed shipments. On September 20, 2016, the **U.S. Department of Energy** stated on the record of the suit that it was withholding shipments until after February 17, 2017, "in order to ensure compliance with all legal and contractual obligations" – in other words, until the federal judge has had the opportunity to rule on the merits of the lawsuit.

The liquid in question is now stored in a large double-walled tank called **FISST** (Fissile Solutions Storage Tank) at Chalk River, Ontario, containing 23 000 litres (6000 gallons) of an intensely radioactive and highly dangerous acidic solution. **FISST** holds a bewildering variety of radionuclides that are created when uranium is irradiated in a reactor. The liquid also contains a quantity of weapons-grade Highly Enriched Uranium (HEU) – essentially the same material as the nuclear explosive that was used in the Hiroshima Bomb.

“Nuclear authorities in both countries have disguised the true nature of this liquid waste by calling it *Highly Enriched Uranyl Nitrate Liquid (HEUNL)*” said Dr. Gordon Edwards, President of the **Canadian Coalition for Nuclear Responsibility**. “In fact uranyl nitrate is only one of dozens of radioactive compounds in the liquid, and that liquid is more than 17,000 times more radioactive than the uranyl nitrate alone. Such high-level radioactive liquid has never before been transported over public roads anywhere in North America.”

There are safer, faster and cheaper ways of dealing with the waste that have already been used in Canada and elsewhere, such as solidification and down-blending. “There are 20 other tanks of liquid radioactive waste at Chalk River, whose contents are being solidified and stored on-site as solid waste,” said Dr. Ole Hendrickson of the **Concerned Citizens of Renfrew County**. “Moreover, since 2003, the liquid waste that would have previously gone into the FISST tank has been routinely solidified, and up until 2011, Chalk River Laboratories was committed to solidifying the liquid contents of the **FISST** tank as well.”

Plans call for 100 to 150 truckloads of liquid waste over a period of several years, from Chalk River, Ontario, to the US Department of Energy’s **Savannah River Site** in South Carolina, along secret routes with heavily armed guards. The ostensible purpose is to “repatriate” the US-origin weapons-grade uranium to avoid any chance of its use in nuclear weapons, according to a program launched by President Obama in 2009. However, it was never originally intended to ship the material in liquid form

Tom Clements, Director of **Savannah River Site Watch** in South Carolina, observed that “The safest and cheapest way to address proliferation concerns is to eliminate the weapons-grade uranium at Chalk River by down-blending it, leaving only low enriched uranium (LEU), which is not nuclear-weapons-usable material. In February 2016, Indonesia was given permission to down-blend its stock of US-origin liquid weapons-grade uranium, thereby eliminating any need to transport the material back to the USA. The same can be done with the Chalk River liquid waste, as was explicitly delineated by Canadian authorities in 2011.” The Indonesian down-blending operation is already completed, just a few months after **US Department of Energy** permission was given.

The Niagara councillors are unanimously opposed to these shipments coming through the Niagara region. Gracia Janes, from Niagara-on-the-Lake, is the Environment Coordinator of the **National Council of Women of Canada**. She pointed out “our regional councillors represent close to 500,000 people. Being on the edge of Lake Ontario and the Niagara River, with the unique tender fruit lands growing the best peaches in Canada, if not North America, we are very conscious of what an accident and liquid spill would mean.”

Janet McNeill of **Durham Nuclear Awareness** added, “Our governments must do as the Regional Municipality of Niagara Region has done: take the time to examine all the facts very carefully, put this plan under a microscope that involves investigating alternatives, and do all that in an open process, involving the public, and not under the sole jurisdiction of the nuclear industry and its all-too-compliant regulator, so that we can trust that the risks involved and the alternatives available are being fully examined & properly investigated.”

- 30 -

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Canadian Coalition  
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Responsibility



Regroupement pour  
la surveillance  
du nucléaire

September 30, 2016

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Dear GLEC Co-Chairs:

***Re: Transport of Highly Radioactive Liquid Waste over waterways in the Great Lakes Basin***

The accompanying letter, addressed to Prime Minister Trudeau and President Obama, is directly related to the role and mandate of the Great Lakes Executive Committee under the terms of the 2012 Great Lakes Water Quality Agreement. The letter has been endorsed by two dozen non-governmental organizations on both sides of the border.

We expect that GLEC will request the governments of Canada and the United States of America to refrain from beginning the series of shipments of highly radioactive liquid waste material from Chalk River, Ontario, to the U.S. Department of Energy's Savannah River Site in South Carolina, until proper notification has been circulated to stakeholders and the GLEC has had a chance to formulate advice to the two governments on this proposed transport of nuclear waste, in keeping with its mandate.

We look forward to receiving your response within 30 days.

Yours very truly, on behalf of 26 additional non-governmental organizations,

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Canadian Coalition  
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Regroupement pour  
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September 30, 2016

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Dear Prime Minister Trudeau and President Obama:

***Re: Transport of Highly Radioactive Liquid Waste over Public Roads***

We are writing to you in connection with Canada's commitment to eliminate highly enriched uranium (HEU) from civilian nuclear facilities such as Chalk River as part of President Obama's 2009 initiative – a goal that we fully support and applaud as part of a global non-proliferation objective. However we do **not** support current plans to transport HEU in liquid form from Chalk River to the U.S. Department of Energy's Savannah River Site in South Carolina in 100-150 truckloads along public roads and bridges. Each such shipment will carry an inherently dangerous highly radioactive liquid solution containing dozens of nuclear fission waste byproduct materials in addition to the HEU.

**Duty to Act**

Under the 2012 *Great Lakes Water Quality Agreement* (GLWQA) which your two governments are the Parties to you committed to “eliminate or reduce, to the maximum extent practicable, environmental threats to the Waters of the Great Lakes” [Art. 2 1 (c)] and “to anticipate and prevent environmental problems, by implementing measures that are sufficiently protective to achieve the purpose of this Agreement” [Article 2 3].

The proposed series of transports of highly radioactive liquid waste over a period of years could have a potentially devastating impact on the *Great Lakes/St. Lawrence River* ecosystem. Depending on the routes chosen, there could be a spill or spills into a waterway flowing into the Great Lakes or the St. Lawrence River, or a spill into one of the rivers connecting the Lakes (St. Mary's River, St. Clair River, Detroit River or the Niagara River), or a spill directly into the St. Lawrence River itself.

The GLWQA stipulates that notification through the Great Lakes Executive Committee (GLEC) is required where planned activities concerning “storage and transfer of nuclear

waste” could lead to a pollution incident or could have significant cumulative impact on the Great Lakes.<sup>1</sup> Has such notification occurred through the Great Lakes Executive Committee? More importantly, has the Great Lakes Executive Committee been accurately apprised of the contents and potential hazards of these planned shipments?

In the absence of detailed and accurate notification, the GLEC cannot respond by providing meaningful advice to your governments and providing your governments with “perspectives and insights from federal agencies, state and provincial governments, tribal governments, First Nations, Métis, municipal governments, watershed management agencies, and local public agencies on issues relating to the implementation of the GLWQA,” in accordance with the terms of its mandate, which also allows for public input.

### **Misleading Description**

It has come to our attention that the radioactive liquid in question has been misleadingly described by the Canadian Nuclear Safety Commission (CNSC) as “Highly Enriched Uranyl Nitrate Liquid” (HEUNL). Such a description seriously misrepresents the extremely toxic and radiologically complex nature of this liquid waste. Highly enriched uranyl nitrate is a specific chemical compound<sup>2</sup> that is only one of dozens of compounds contained in the acidic liquid solution, which includes (among others) radioactive varieties of cesium, strontium, iodine, yttrium, rhodium, ruthenium, lanthanum, europium, niobium, praseodymium, zirconium, cerium, barium, xenon, and neodymium – each one having a much greater radioactivity than the highly enriched uranium itself. Indeed, the highly enriched uranyl nitrate portion represents less than one ten-thousandth of the total radioactive inventory contained in the liquid contents of the proposed shipments.<sup>3</sup>

Never before in North America has liquid waste of this nature, containing virtually the entire spectrum of fission products found in irradiated uranium, been transported over public roads. Moreover, liquid waste of a very similar nature left over from isotope production operations, also containing highly enriched uranyl nitrate liquid, has been routinely solidified on-site at Chalk River since 2003, ever since the Fissile Solution Storage Tank (FISST) was completely filled and could accommodate no more liquid.

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<sup>1</sup> GLWQA 2012, Article 6, Notification and Response (c) “the Parties shall notify each other, through the Great Lakes Executive Committee, of planned activities that could lead to a pollution incident or that could have a significant cumulative impact on the Waters of the Great Lakes, such as: (i) the storage and transfer of nuclear waste or radioactive materials...”.

<sup>2</sup> The chemical formula of uranyl nitrate is  $\text{UO}_2(\text{NO}_3)_2$  where the uranium (U) in this case is highly enriched (HEU).

<sup>3</sup> CNSC 2014, Technical Assessment Report: NAC-LWT Package Design for Transport of Highly Enriched Uranyl Nitrate Liquid, Table 2. Radioactivity of highly enriched uranyl nitrate per litre is 29.3 MegaBecquerels (2.93E+07 Bq), whereas total radioactivity per liter is 485,000 MegaBecquerels (4.85E+11 Bq). The ratio is 1 to 16,553. The total radioactivity is underestimated because only the principal gamma emitters and actinides are listed.

We therefore fail to understand or accept any justification for transporting this highly dangerous material in liquid form.

## **Failure to prepare an Environmental Impact Statement (EIS)**

We also fail to understand why this unprecedented transport of highly radioactive liquid waste has not been subjected to any public environmental assessment process in Canada or in the USA, involving the preparation of an Environmental Impact Statement (EIS) so that other government departments and the public can provide input on the potential environmental impacts, as well as on alternative waste management approaches that could make the transports unnecessary. Indeed, it appears to us that proper notification through the Great Lakes Executive Committee would only be meaningful if such an EIS were carried out in both countries so that the results of those assessments could be made available to the GLEC.

## **Alternatives are available**

As noted in a 2011 report prepared for the Canadian Minister of Natural Resources, the liquid waste in the FISST tank that is now planned to be shipped to South Carolina was originally intended to be down-blended in order to eliminate Highly Enriched Uranium (HEU) by converting it to Low Enriched Uranium (LEU). LEU is not nuclear-weapons-usable material and can therefore be solidified and stored on-site indefinitely, along with the solidified contents of some 20 other tanks of liquid nuclear waste at Chalk River.<sup>4</sup>

In February 2016, Indonesia was authorized by the US DOE to carry out such a down-blending of radioactive liquid containing weapons-grade highly enriched uranyl nitrate, thereby foregoing the need to transport the material to the USA. The Indonesian down-blending operation has already been completed, just a few months after permission was granted. The Indonesian weapons-grade HEU liquid was associated with the production of medical isotopes, as is the case with the Chalk River material.<sup>5</sup> Solidification of the liquid waste in the FISST tank at Chalk River is likewise a viable option, as previously mentioned, and can be used in conjunction with down-blending.

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<sup>4</sup> NRCan 2011, **Evaluation of the Nuclear Legacy Liabilities Program (NLLP) of the Energy Sector**, Section 1.52, "The purpose of the *Liquid Waste Transfer and Storage (LWTS)* Project at the Chalk River Laboratories was to provide a new storage facility for legacy radioactive waste contained in 21 aging tanks... The specific objectives of the LWTS Project were to design, licence, construct, and cold commission the equipment, materials and facilities necessary to...down-blend the contents of the Fissile Solution Storage Tank (FISST) to a Uranium-235 enrichment level low enough to minimize criticality and safeguard constraints...."

<sup>5</sup> US Federal Register, Feb 22 2016, DOE Proposed Subsequent Arrangement: "This subsequent arrangement concerns the alteration in form or content of 1.3 kg of U.S.-origin highly enriched uranium (HEU), 1.21 kg of which is in the isotope of U-235 (93 percent enrichment) and currently located at PT Industri Nuklir (PT INUKI) in Serpong, Indonesia, through down-blending to reduce its enrichment to less than 20 percent U-235. The purpose of the down-blending of the HEU is to achieve permanent threat reduction by eliminating HEU from Indonesia... The down-blend operation is scheduled to last for approximately three months."

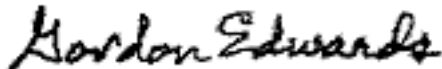
## Recommendations

We ask you, Mr. Prime Minister and Mr. President, to cancel or delay these planned shipments of liquid radioactive waste from Chalk River to the Savannah River Site until (1) a public environmental impact statement has been prepared in Canada and in the United States that includes a full examination of potential environmental impacts as well as viable alternatives to the planned transport, with the opportunity for public input; and (2) proper notification of the radioactive contents and potential impacts of the proposed shipments of highly radioactive liquid waste has been provided through the Great Lakes Executive Committee and communicated to all stakeholders, including the appropriate EIS documents.

We look forward to receiving your response within 30 days as to the status of either cancelling these unprecedented shipments of highly radioactive liquid wastes, or preparing environmental impact statements in both Canada and the USA that are independent, comprehensive and public, to address the unique hazards associated with these proposed transports.

If your office has any questions or comments with respect to any of the above, please feel free to contact the undersigned regarding radiological characteristics and hazards of the proposed shipments, or contact Christine Elwell, Sierra Club Ontario at [christine.elwell@sympatico.ca](mailto:christine.elwell@sympatico.ca) for considerations related to the *Great Lakes Water Quality Agreement*.

With respect,



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*Letter to Prime Minister Trudeau and President Obama, September 30, 2016*

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## ***Background information on the transport of highly radioactive liquid waste***

### **Down-Blending as an Alternative to Transport**

From the US Federal Register, February 22, 2016.

<https://www.federalregister.gov/documents/2016/02/22/2016-03572/proposed-subsequent-arrangement>

“The purpose of the down-blending of the HEU is to achieve permanent threat reduction by eliminating HEU from Indonesia. PT INUKI will down-blend the HEU contained in 514 bottles of irradiated HEU targets in liquid form and 14 containers of un-irradiated liquid HEU used in the plating process for medical isotope production, on-site at the Pusat Penelitian Ilmu Pengetahuan dan Teknologi facility in Serpong. The quantity of uranium will increase from 1.3 kg to 6.72 kg while the U-235 enrichment will decrease from 93 percent to 18 percent. The down-blend operation is scheduled to last for approximately three months.”

### **Niagara Regional Council resolution of June 11,2015.**

“That Regional Council *EXPRESS* opposition in principle to any shipment of radioactive liquid waste over public roads and bridge, or on any navigable waterways, or by air, recognizing that such waste can be, has been and should be solidified so that it is far less accessible to the environment and living things, and,

That Regional Council *URGE* the governments of Canada and the United States to halt the shipment of high-level radioactive liquid waste from Chalk river Laboratories to the Savannah river, pending the outcome of full public consultations on the advisability and the potential adverse impacts of the proposed shipments , as well as the alternative procedures to achieve the stated objectives for such shipments.”

### **Radioactivity of the Liquid Waste in the FISST Tank**

From CNSC’s December 2014 “Technical Assessment Report: NAC-LWT Package Design for Transport of Highly Enriched Uranyl Nitrate Liquid”

**Table 2: Concentration of radionuclides in the solution  
(actinides, gamma emitters and their daughter products)**

Isotope	Activity (Bq/L)	Isotope	Activity (Bq/L)	Isotope	Activity (Bq/L)
Nb-95	6.63E9	Ba-137m	70.19E9	Eu-155	1.95E8
Nb-95m	25.35E9	Cs-137	70.19E9	U-234	2.84E7
Zr-95	25.35E9	Ba-140	58.50E9	U-235	5.59E5
Rh-103m	18.13E9	La-140	58.50E9	U-236	3.66E5
Ru-103	18.13E9	Ce-141	42.88E9	U-238	5.59E3
Rh-106	5.46E8	Ce-144	8.19E9	Np-237	4.51E3
Ru-106	5.46E8	Pr-144	8.19E9	Pu-239	1.3E6
I-131	19.50E9	Pr-144m	8.19E9	Pu-240	8.99E4
Xe-131m	19.50E9	Nd-147	15.80E9		
Te-132	10.33E9	Eu-154	8.4E7		

The total radioactivity in this table (which is incomplete) is 17,000 times greater than the radioactivity of all the uranium isotopes combined. It is misleading to call this liquid “Highly Enriched Uranyl Nitrate”.

## ***Background information on the transport of highly radioactive liquid waste***

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- 2016 Law suit filed in US Federal Court by seven plaintiffs on August 12, 2016, calling for an injunction against the proposed shipments.  
[http://ccnr.org/lawsuit\\_2016.pdf](http://ccnr.org/lawsuit_2016.pdf)
- 2016 Recent reports in the media on the proposed shipments compiled by Kevin Kamps of Beyond Nuclear, in Takoma Park Maryland  
<http://tinyurl.com/zo2fss8>
- 2016 A map of one of several possible routes for the proposed shipments (courtesy of Beyond Nuclear)  
<http://tinyurl.com/zc9lpqm>
- 2015 Comments by CCNR on the CNSC Technical Report of December 2014  
[http://ccnr.org/CCNR\\_CNSC\\_HEUNL\\_2015.pdf](http://ccnr.org/CCNR_CNSC_HEUNL_2015.pdf)
- 2011 “A FISST Full of Trouble” by Ian MacLeod of the Ottawa Citizen with a 2013 background commentary by Gordon Edwards  
<http://ccnr.org/FISST.pdf>
- 2013 Background info on proposed shipments by Gordon Edwards and Anna Tilman  
[http://ccnr.org/backgrounder\\_CRL\\_SRS\\_2013.pdf](http://ccnr.org/backgrounder_CRL_SRS_2013.pdf)
- 2013 Resolution opposing the transport of highly radioactive liquid waste  
[http://ccnr.org/resolution\\_CRL\\_SRS\\_2013.pdf](http://ccnr.org/resolution_CRL_SRS_2013.pdf)
- 2013 Endorsers of the 2013 resolution opposing the proposed shipments  
[http://ccnr.org/Endorsing\\_Groups.pdf](http://ccnr.org/Endorsing_Groups.pdf)
- 2011 Chalk River: Canada’s Nuclear Sacrifice Area, by Gordon Edwards  
[http://ccnr.org/crl\\_sacrifice.pdf](http://ccnr.org/crl_sacrifice.pdf)

# Excerpts from 2012 *Great Lakes Water Quality Agreement*

[2012 Great Lakes Water Quality Agreement](#)

## Article 2

### Purpose, Principles and Approaches

#### Purpose

1. The purpose of this Agreement is to restore and maintain the chemical, physical, and biological integrity of the Waters of the Great Lakes. To achieve this purpose, the Parties agree to maximize their efforts to:

- (a) cooperate and collaborate;
- (b) develop programs, practices and technology necessary for a better understanding of the Great Lakes Basin Ecosystem; and
- (c) eliminate or reduce, to the maximum extent practicable, environmental threats to the Waters of the Great Lakes.....

3. The Parties recognize that it is necessary to take action to resolve existing environmental problems, as well as to anticipate and prevent environmental problems, by implementing measures that are sufficiently protective to achieve the purpose of this Agreement.

## Article 6 Notification and Response

The Parties acknowledge the importance of anticipating, preventing and responding to threats to the Waters of the Great Lakes. The Parties commit to the following notification and response process:

- (a) if a Party becomes aware of a pollution incident, or the imminent threat of a pollution incident, that could be of joint concern to both of the Parties, it shall notify the other Party in accordance with the requirements set out in the Canada-United States Joint Inland Pollution Contingency Plan and the Canada-United States Joint Marine Pollution Contingency Plan. A pollution incident is a release of any pollutant of a magnitude that causes or may cause damage to the Waters of the Great Lakes or may constitute a threat to public safety, security, health, welfare, or property;
- (c) the Parties shall notify each other, through the Great Lakes Executive Committee, of planned activities that could lead to a pollution incident or that could have a significant cumulative impact on the Waters of the Great Lakes, such as:
  - (i) the storage and transfer of nuclear waste or radioactive materials;  
\* \* \*
  - (vi) nuclear facilities;
  - (vii) hazardous waste storage;

# Excerpts from 2012 *Great Lakes Water Quality Agreement*

## Mandate of Great Lakes Executive Committee

The [2012 Great Lakes Water Quality Agreement](#) (GLWQA) calls for the Governments of the United States and Canada to establish a Great Lakes Executive Committee (GLEC) to help coordinate and implement the programs and other measures undertaken to achieve the purpose of the GLWQA.

## GLEC Terms of Reference

The [GLEC Terms of Reference](#) outlines the mandate and role of GLEC, the membership of the committee, the functions of the GLEC Secretariat, and the presence of observers at the GLEC meetings.

## 2. MANDATE

Pursuant to Article 5 of the GLWQA, the GLEC will meet at least twice each year, alternating between Canada and the U.S., as directed by the Parties. If mutually agreed upon by the Parties, GLEC meetings need not be conducted in-person. Meetings of the GLEC and its members shall serve as discussion fora with the purpose of providing advice to the Parties via the two GLEC Co-Chairs, one from each Party. The Parties may also consider advice from other bodies in making any decisions.

The role of the GLEC is to help coordinate, implement, review and report on programs, practices and measures undertaken to achieve the purpose of the GLWQA by:

Providing the Parties with perspectives and insights from federal agencies, state and provincial governments, tribal governments, First Nations, Métis, municipal governments, watershed management agencies, and local public agencies on issues relating to the implementation of the GLWQA.

Advising the Parties on establishing binational priorities for science and action.

Advising the Parties on work priorities for the Annex subcommittees to ensure effective implementation of the GLWQA.

Advising the Parties on the preparation of the Progress Report of the Parties.  
December 20, 2012 2 of 5

Recommending chemicals of mutual concern to the Parties.

Providing a forum for the Parties and GLEC members to report on domestic and binational action and progress in the Great Lakes.

Providing a forum for the Parties to notify each other of planned activities that could lead to a pollution incident or that could have a significant cumulative impact on the Great Lakes.

Providing a forum for non-member participants to provide input and advice, as appropriate