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Review of: Project No. 89803, TC Energy Ontario Pumped Storage Hydropower Project

After a limited time to review the proponent's proposal (30 days), we provide our submission for your review. Given more time, we would certainly provide further information and a more detailed review if necessary. We are disappointed that a longer review period has not been granted, since the proponent has had years to prepare for this project.

From the information provided by the proponent, we have determined that this project is a financial incentive for the proponent and a significant risk and setback for the taxpayers of Ontario, who are funding it. It has become difficult to overturn despite extreme opposition over the last few years, but it now raises serious questions for all Georgian Bay residents and wildlife. The threat to health and safety for financial gains or losses is an extreme risk.

If any of the following situations occur during the project or at its completion, they can be difficult to reverse, both environmentally and financially.

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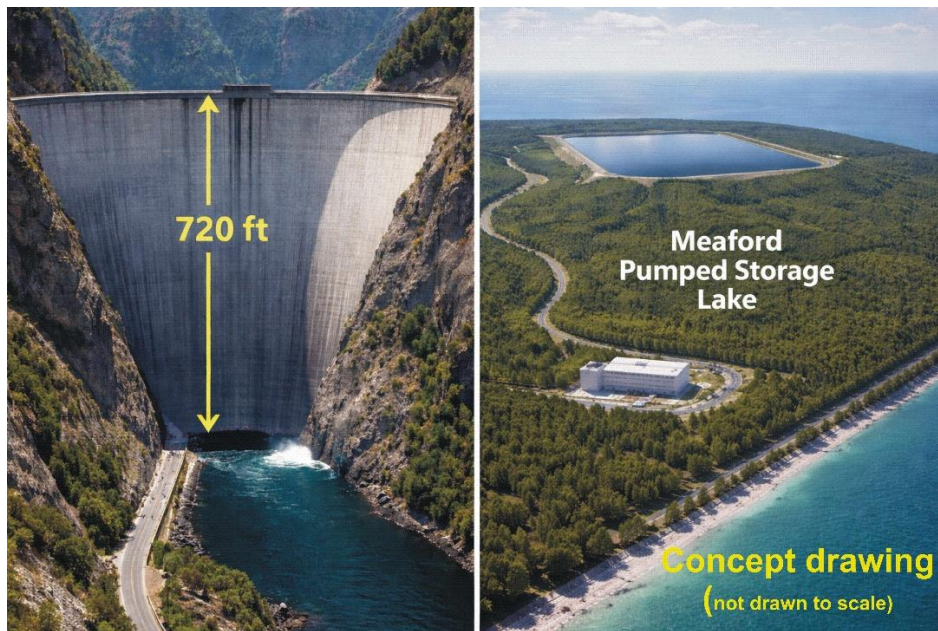
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Here are some of our concerns and suggestions

1. **Liability and accountability for damages:** The DND site is now liable for damages for this project since they lease the land to the proponents. This may require another separate IAAC review. This leaves taxpayers responsible for the clean-up costs, contract cancellation terms and conditions, and damage to the environment and human health. There are too many major industrial waste cleanup sites and canceled projects to list to date. Have we forgotten the 2.6 billion dollars taxpayers paid for the Port Hope Nuclear waste clean-up, the 10 billion dollars to clean up Chalk River, the 4.3 billion to clean up Arsenic Trioxide, Giant Mine 4.3 billion, Lac Saint Pierre(UXO) >500 million, Esquimalt Harbor,>1 billion, Faro Mine 4 billion? These sites are not required to remove all contamination. The focus is on risk mitigation, not full cleanup. There are no strict federal clean-up standards. After 50 years of attempting to resolve the Grassy Narrows cleanup for our indigenous peoples, we have yet to resolve the problem of Mercury in sediments that have been transferred into the ecosystem. Massive public liabilities are still being managed today. It would seem reasonable for the proponent to assume the costs and liabilities, not the public, since its design should be based on proper location reviews, risk assessment, and failure prevention.
2. **The Adam Beck Generating Station:** is the only Canadian pumped-storage site referred to in the proponents' proposal as a successful project; however, the construction complications were not mentioned in the proponents' details. Adam Beck experienced extreme delays primarily due to drilling issues caused by unexpected rock formations. This resulted in cost overruns stemming from poor geophysical modeling and measurements. Project deadlines shifted from 2009 to 2013, and costs escalated from ~\$985 M to ~\$1.6 B. The size of Adam Beck was 175 MW, compared to Meaford's 1000MW project. The geology at Adam Beck, however, is hard bedrock, whereas the Meaford site is mixed soils with weak bedrock. It stands to reason that the extreme weight exerted when the water is filled and refilled may cause fatigue that can lead to fractures and faults over time, creating alternate pathways that flow into GB. Only a detailed geophysical survey with detailed 3D mapping can determine this. To date, this has not been provided. Modeling can be attempted, but model success depends on input parameters that have yet to be accurately identified. The Michigan Ludington pumped storage facility sits on sand, and its foundation is stable. The DND Meaford site is more complex and more unstable than both Adam Beck and Ludington. Meaford Lake is also over 5 times as large/heavy as heavy as Adam Beck Lake. This indicates that the proponent has not

learned from the Adam Beck experience, as it has not proceeded to provide proper, detailed Geophysical 3D Maps and measurements.

3. **Construction concerns:** Most large and tall hydroelectric dam sites have an inward curvature wall, which helps prevent outward flexing pressures from the reservoirs it supports. A lake of this size and proportion has extreme outward pressure on all sides. Perhaps this is why current Dam site regulations may not be applicable. There are no detailed construction regulations in Canada for structures such as the Meaford pumped storage project.

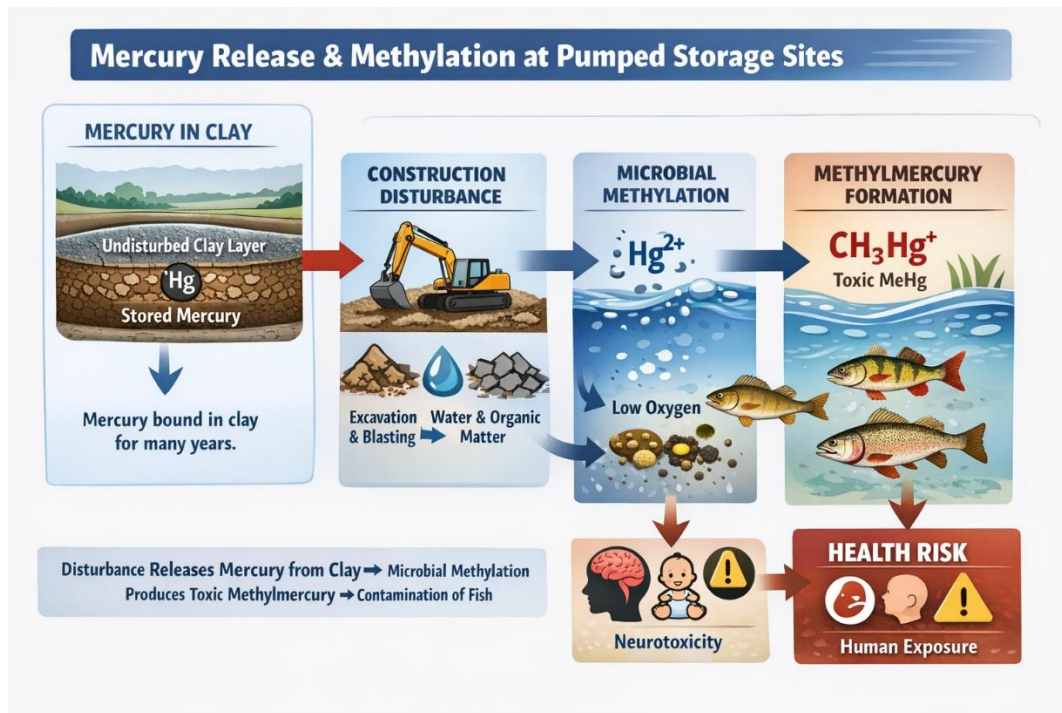


4. **Financial risk and future projections:** A conservative estimate for completion of this project is 2032-2033. There are projections for short-term and long-term daily-night electricity rates, but they are not accurate. Long-term rates, depending on usage time and the number of electric vehicles charging, will affect electricity rates and potentially reduce profit margins, as this adds to grid demand at night. Essentially, smart night-time charging may balance the grid and reduce the financial incentive for day-night usage transfers. How far these rates will go in balance is unknown, but the uncertainty may pose a financial risk. Accurate IESO 50-year day-night rate forecasts are unavailable; however, nighttime rates are projected to rise due to EV charging and pumped-storage use, which would increase costs for ratepayers and reduce the incentive to pump.

5. **Fish entrapment due to high intake rates:** The only diagram in the 250-page proposal is of an intake system, not drawn to scale and dimensionless. Flow rates through small ports would have to be so high as to cause numerous entrapment problems during inflows and turbidity during outflows. We must recognize that the proponent lacks the detail and experience to estimate a flow rate on this scale, which is estimated at 60-70% of the Horseshoe falls (nighttime flow) and 35-45% of the Horseshoe falls (daytime flow). In 2025, there was one incident that killed over 3.5 million fish at the thermal intake of a nuclear generating station. They were pulled into the cooling water intake system (“impingement”). This is an example of mitigation failing over 50 years, even among the experts who design these systems. We seek a detailed design response that guarantees this won’t be repeated, from a company that has not even produced a prototype of the most complex construction project Ontario has ever encountered.

6. **Effects on Tourism:** The surrounding area has many tourist attractions and businesses. It accommodates people who return every year and has built a reputation for a quiet, clean, peaceful society. Creating a 10-12-year environment of noise, truck traffic, pollution, and a lack of accommodation will threaten these *businesses’* livelihoods. Tourists may never return, even after the temporary construction crews leave, when the project is finished. This may also affect other neighborhoods further away throughout Georgian Bay. Turbidity from clay can remain suspended, entering the bay during construction and threatening areas as far as Tobermory, a world-class freshwater dive tourist destination.

7. **Fish contamination:** Ontario already has fish consumption guidelines for human consumption due to many pollutants, some of which are heavy metals such as methyl mercury. (Ref#2) Lead contamination in water can have serious and long-lasting effects on fish, even at relatively low concentrations. It impacts their biology, behavior, and the overall ecosystem. It renders the aquatic environment by disturbed contaminated sediments (e.g., dredging or construction). If we exceed these limits for human consumption of fish due to construction complications, we may reach a point where no fish can be eaten safely in GB. Additional loading may further affect tourism. Combined economic impact: Roughly \$100 million to several hundred million annually tied to Georgian Bay fisheries. No one wants to eat contaminated fish. As with many other contaminated rural sites in Canada, it has been decided that it's best to leave these sites undisturbed. (Ref#2)



8. **Fish Reproduction Turbidity:** Extreme turbulent flow-induced underwater noise, etc., affects fish habitat and reproduction. Key species like walleye, lake trout, and whitefish have declined significantly. The reputation of Georgian Bay has shifted from “world-class fishery” to “inconsistent fishing conditions.” Competing regions (e.g., northern Ontario, U.S. Great Lakes) may attract anglers instead. The massive flow rates entering and exiting Georgian Bay, even though intake systems are reported to be farther away, will vary daily and disrupt heavy metals in sediment, especially in the clay layers. Accurate flow-induced modeling is extremely complex and requires data and skills that the proponent apparently lacks experience with. This can become highly experimental if done incorrectly.

9. **CO2 savings and creation after completion vs. during construction:** The proponent claims 490,000/year in carbon reduction, a figure that is now outdated and therefore misunderstood. We have canceled all the major coal plants in Ontario, including the Nanticoke Generating Station. Natural Gas Capacity in Ontario has now surpassed Hydro Electric Capacity. If there are no guarantees from the proponent that they will not switch to natural gas in the future, this needs clarification in the proponent's proposal and in any future contract terms and conditions to validate the claim of 490,000 tonnes/year. The carbon generated by the construction project is estimated at 800,000 to 1,500,000 tonnes across all

sources combined. The carbon created during construction occurs before any future carbon reduction saved during operation. Since carbon reduction begins only after construction is complete, the net long-term benefit needs to be weighed against the damage incurred during construction. If the expected completion/service period is 2035, it will produce carbon until then and will not begin reducing carbon until 2035.

10. **Electrical Power usage for turbine pumps:** Ontario closed its major coal plants and now has more natural gas capacity than hydroelectric capacity. The electrical source for the pumped-storage turbines is intended to be nuclear power, but it is supplied from the same grid as other generating sources, such as natural gas, which has now surpassed hydroelectric generation capacity in Ontario. There are no guarantees regarding the source of long-term electricity to power the turbines in the proponent's proposal. If market rates indicate that natural gas is less expensive, future decisions may be reconsidered. An example would be the refurbishment shutdowns during a time when the IESO reports a shortage of electricity generation, combined with rapid demand for AI data centers. The IESO is predicting a shortage after 2027, so one may ask why we are entering a net loss of 30% instead of creating more electricity when we are losing 30% with this project.

11. **Effects of long-term blasting noise:** During excavation, millions of tonnes of various rock, clay, and shale need to be removed and converted into gravel. This would require hundreds of thousands of blasts over many years. Intermittent blasting for projects lasting days to years is sometimes considered socially acceptable; however, projects lasting months or many years are a concern. Far-field noise can propagate over long distances, especially over water. Annoyance with explosions can affect return tourism during the construction period. For people who live near the continuous blasting, it results in cumulative annoyance and health issues. (Ref#4)The proposed document mentioned compliance; however, modeling is required for receptors in both the near and far fields. These receptors are homes and businesses as well as tourist leisure craft over water. Normally, the blasts should not exceed a level of between 115-120dB linear peak pressure, and mitigation may not be achievable for close receptors. We may all have heard one or two gunshots. Now consider more than 500,000 blasts over 5-10 years. They sound similar.

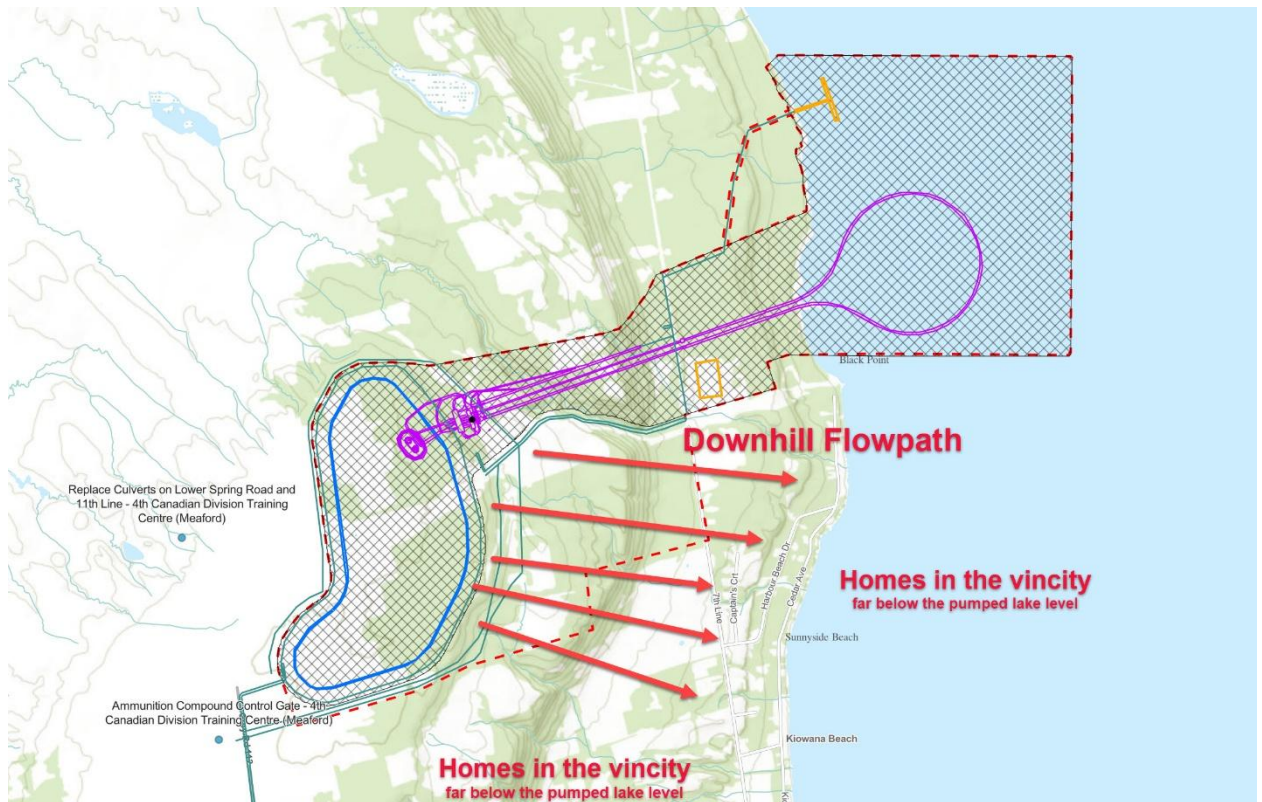
12. **Effects of long-term blasting Shock and Vibration:** The proposal recommends using the ISO-2631 Standard, which is used to assess dose-level vibration exposure for equipment operators and human sensitivity. Whereas DIN-4150 is used for both human exposure and building damage as well. DIN 4150 has been used in Europe because it is more applicable for measuring Peak Particle velocity as a function of frequency for different types of structures. DIN 4150 determines building damage. Both DIN-4150 and ISO-2631 should be considered. Due to prolonged blasting, shale layers may cause fatigue. Eventually, this could result in fractures and cracks that create alternate pathways for clay streams under great pressure, carrying stored toxins into Georgian Bay.
13. **Effects of Ground Vibration during Construction:** Tunnel Drilling and Turbine operation will create continuous long-term ground vibration that can travel into homes, causing disturbance. Disturbing the soil and ground with compaction and vibrations will loosen contaminants and cause erosion/leaching to move trapped/stored contaminants downstream much quicker than they have to date. There is no mention in the proponent's submission that background measurements, before construction begins, as well as measurements during construction using DIN4150-2, Effects on People in Buildings, and DIN4150-3, Effects on Structures. Will these more stringent standards be used?
14. **Noise after construction completion:** Turbines operating near Niagara Falls have noise levels masked by the falls. The Meaford site lies in a quiet, tranquil, noise-free rural setting **without** high-level background noise. One can hear nature far away. These natural sounds may be masked by the turbines' continuous nighttime operation, even when receptors are far away, and the turbine sounds may be at a low level. These turbines vibrate and excite resonances at very low frequencies, including infrasound, that travel great distances both underwater and above water. We may not hear infrasound, but fish and other animals can feel this pressure. Once again, this would be difficult to model and would require experimentation. (Ref#4)
15. **Underwater noise after Construction is completed:** Noise and Infrasound can propagate over long distances, especially at low frequencies. There have been many research papers written on how noise affects fish communication and sensory confusion. It creates stressful effects over time. This may pose a serious threat to the fish population in Georgian Bay. Once a project of this scale is completed, it would be too costly to mitigate or redesign. It may become irreversible, or mitigation

only reduces the effects. Another costly experiment that produces damage. Ref#4)(Ref#6)

16. **Noise during Construction:** The construction and Blasting noise has cumulative Annoyance issues with Human perception of unwanted sounds. These occur during the lengthy construction period. The enormous amount of blasting noise and infrasound has health issues related to stress for humans, wildlife, and fish. (Ref#4)(Ref #6)

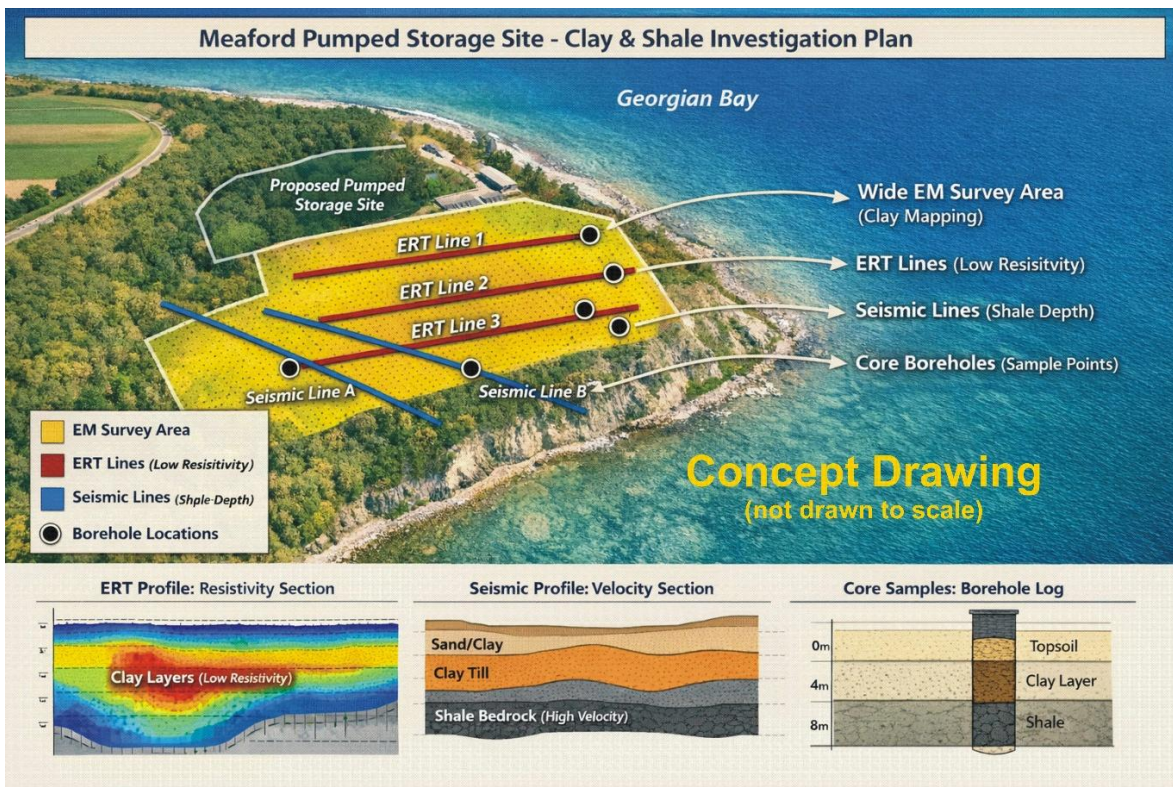
17. **Safety Concerns for nearby residents:**

The interactive map on the IAAC Website appears to lack nearby homes. There also seems to be no mention of proper evacuation in the event of a catastrophic failure and collapse of the Structure. The flood path can go towards the 7th Line and the Cedar Avenue recreation shoreline community.



18. **Contamination:** Recent measurements (2022-2024) by subcontractors have detailed most of these substances; however, other locations should be considered, particularly the clay layers that capture many of them. Clay acts as a filter, trapping substances that will be disturbed during excavation and reintroduced into the environment. They would reenter the Georgian Bay ecosystem food chain and the

nearby wells and aquifers. If toxins have been measured at low levels in well water and surface soils, it would seem logical that, over the years, they have migrated deeper. Core sampling needs to be conducted in the highly concentrated areas. Heavy Metals and stay-forever chemicals do not disappear in over 80 years. They just sink and settle. They may not remain suspended in the well water at the concentrations they are at in the sediment. Sediment sampling should also be considered in many locations, as well as toxins in the clay where they collect. The proponents, as well as DND, lack these measurement locations. Sediments in Mountain Lake should also be considered, as well as the creek that exists Mountain Lake during spring run-off. These areas will be disturbed during excavation and by any geophysical shifts in the base foundation over many years. When extreme loads are applied and removed daily, this creates extreme pressure fluctuations on an unknown foundation. 26 million metric tonnes would be emptied and moved onto a foundation that may not flex or crack, instead releasing alternate pathways into Georgian Bay. Only time may tell if this project moves forward. This geophysical survey needs to be conducted accurately and should have been completed by now. **The solution to pollution is not dilution.**



The project has serious flaws and gaps in the proposal that indicate the proponents are unaware of major complications and are entering into this without construction experience on a project of this scale.

We understand that some of these concerns may be addressed through mitigation measures, as stated throughout the project proposal, during construction, and post-construction. However, the uncertainty this presents poses risk beyond any form of mitigation. Therefore, this project would proceed experimentally. A project of this size, cost, and risk cannot be an experiment. Even if one of the concerns we raise with this project causes harm, the damage could be irreversible to the pristine nature of GB, human health, and the environment. We cannot reverse an accident. We can only evaluate risk and avoidance with a project that makes sense for everyone. This would include the efficient management of electricity generation and the electrical grid.

There is nothing in this project proposal to give us confidence that the project should proceed with the material presented; therefore, an Impact Assessment is not warranted.

We also understand that the IAAC reviews all these public reports, and submits these recommendations to the Minister, who has the authority to cancel the project at this important juncture. It would save both the proponent from further effort and the taxpayers. Concerned groups can return to living without fear, and developers can return to producing power for the people instead of consuming it for profit.

With this in mind, we urge the IAAC to proceed with extreme caution and not bypass basic engineering principles for the most complex project Canadian taxpayers face.

References:

#1 **Georgian Bay Association** https://georgianbay.ca/tc-energy/?utm_source

#2 **Ontario Fish Consumption Guidelines** <https://www.ontario.ca/page/guide-eating-ontario-fish>

#3 **Save Georgian Bay** <https://savegeorgianbay.ca>

#4 **Health Canada Noise and Sound** Effects on mental health and well-being

<https://www.canada.ca/en/health-canada/services/noise-your-health/effects-mental-health-well-being.html>

#5 **The Meaford Times Local opposition:** https://themeafordindependent.ca/concerns-regarding-deputy-mayors-water-testing-resolution/?utm_source

#6 **Infrasound effects in fish** <https://eolmernormandie.debatpublic.fr/images/documents/bibliotheque-debat/21.detection-and-reaction-of-fish-to-infrasound.pdf>

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