The Fifteen Mile Stream proposed open-pit gold mine is of considerable concern owing to its significant and irreversible environmental impacts. These include:

- the destruction of ecologically sensitive wetland habitat
- the vast amount of water drained from surrounding lakes and rivers
- the toxic chemicals and heavy metals leached into surrounding water systems
- the build-up of metal-laden sediment in nearby water bodies
- the acidification of lakes and rivers through acid rock drainage
- the eutrophication of surrounding lakes through the input of nitrates and ammonia
- the massive tailings impoundments which disrupt critical ecosystems, killing fish, wildlife, and migratory birds, in addition to the serious threat of dam ruptures and spills

Here in Nova Scotia, our unique geology, topography, and climate make us particularly vulnerable to the perils of open-pit gold mining. Specifically, the gold-bearing minerals found here also contain high concentrations of heavy metals, such as arsenic, mercury, antimony, and lead.[1] In addition to the threat of acid rock drainage (ARD), these highly toxic elements can easily leach into waterways. Of particular concern, arsenic is a known carcinogen.[2] The Eastern Shore Forest Watch has already noted a significant increase in the levels of both arsenic and nitrates in Scraggy Lake, where the Touquoy mine discharges its effluent.[3]

At the proposed Fifteen Mile Stream site, the extensive network of lakes and rivers, combined with the high water table, allows these and other pollutants to disperse widely, increasing the potential for groundwater contamination. Underground cracks and fissures in subsurface rock layers also permit such contaminants to spread far from the polluting source. Once polluted, underground aquifers are impossible to clean up.[4]

It should be noted that immediately north of the proposed site, Colchester County has some of the richest soil in the province. Over time, this fertile agricultural land could be contaminated by toxic mine dust and dissolved leachates, as could the adjacent rivers where endangered wild Atlantic salmon return each year to spawn.[5] The high potential for the surrounding lakes and wetlands to be converted into putrid, anoxic swamps, due to the input of nitrates, is another grave concern. Previously described as a nature enthusiast's "paradise", the entire Eastern Shore could be transformed into a giant sewer.[6]

Another challenging aspect of open-pit gold mining at the proposed site is that most of the ore being mined is of extremely low grade. Over a tonne of ore must be unearthed for every gram of gold extracted. To separate out even such miniscule amounts of gold, vast quantities of sodium cyanide are used. This deadly compound is fatal at concentrations of only 0.25 g.[7] According to its Touquoy Environmental Assessment, Atlantic Gold plans to use over 600 tonnes of sodium cyanide at its Moose River processing plant – much of which will collect as waste in its immense tailings impoundments.[8] With the additional processing of two million tonnes of ore per year from the proposed Fifteen Mile Stream site the threat of sodium cyanide contamination increases exponentially.

Of special concern, Nova Scotia has a high risk of tailings impoundment ruptures owing to our repeated freeze-thaw cycles, high rainfall levels, and increasingly extreme weather events – such

as the hurricane which swept the province in September, 2019. On January 3, 2019, barely a year after it opened, the Touquoy mine recorded its first 'spill' releasing nearly 400,000 liters of cyanide-laced waste into the environment.[9] Since then, 32 charges have been laid against Atlantic Gold for exceeding pollution limits and other violations which, ironically, the company has blamed on the weather.[10]

The 2014 Mount Polley collapse, which released millions of cubic meters of toxic slurry into the Polley Lake watershed, is a poignant reminder of the catastrophic impact of dam failures.[11] According to Dr. Ann Maest, a hydrogeochemist with Buka Environmental, leaks, spills, and dam ruptures are commonplace and even inevitable. Because of this, she recommends that waste management include regular pumping out and disposing of the leachate.[12]

Not only is open-pit gold mining extremely deleterious to both surface and underground water owing to the wide range of toxic substances involved, gold mining also consumes vast amounts of water, usually drained from nearby lakes and rivers. It is estimated that Atlantic Gold currently consumes 720,000 litres/day (over 260 million litres/year) at its Touquoy mine – a consumption rate which continued unabated through recent summers when many wells throughout the province went dry.[13] Adding in the withdrawals from the proposed Fifteen Mile Stream mine and the water demand of this single company is staggering.

The impact of this on the water table is not trivial – a fact Atlantic Gold readily acknowledges in its environmental impact statement. With the advance of climate change, water availability for agriculture and household use will increasingly become a problem. Yet, with only 10 - 20% of rainwater ever reaching underground aquifers, groundwater can take centuries to recharge, if ever.[14] The lack of sustainability and obvious impact on water resources is a matter of vital importance for both current and future generations.

Paradoxically, the proposed site for the Fifteen Mile Stream gold mine will entail the destruction of a sizeable wetland area. Owing to the increasing water stresses imposed by climate change, the preservation of Nova Scotia's wetlands is more critical than ever. Acting like natural sponges, wetlands store water, control erosion and flooding, and allow ground water to recharge. They also filter contaminants, and purify water flowing into lakes and rivers. According to a recent GPI Atlantic study, Nova Scotia's wetlands provide almost $8 billion worth of ecological services to Nova Scotia annually.[15]

Wetlands also provide critical habitat for numerous endangered native species, such as the mainland moose, wood turtle, and blue felt lichen, as well as being home to numerous bird species, small fish, crustaceans, and other aquatic life. Heavy metals, such as arsenic and mercury, will inevitably leach into the surrounding environment, where they will enter the food chain and bio-accumulate, further impacting wildlife. A 1980s study revealed that, owing to previous gold mining activity, select lakes and rivers had dissolved arsenic levels 2000 times the acceptable limit for fresh water fish, while soil concentrations were 10,000 times the acceptable level.[16] Regularly consumed fish and shellfish, a staple food in Nova Scotia, had even higher levels.

Beyond the significant risk of water contamination and water depletion in and around the proposed site, other impacts include the enormous energy draw, the excessive greenhouse gas emissions, the toxic dust that pollutes the air and coats the countryside, the constant light and noise pollution, and the significant road hazard (plus costly maintenance) caused by the steady traffic of heavy mining trucks on roads intended for public use only.[17] The permanent removal of vast swaths of land from potential food production, recreation, and other land use, combined with the widespread contamination of surrounding soil and waterways, also has the potential to jeopardize our agriculture, fishing, and tourism industries.[18] Certainly, there is much room here for concern.

Finally, in attempting to assess the impacts on the environment (and by extension on human health), another important consideration is the tremendous expense of remediating and maintaining the site once the mining company has gone. While Atlantic Gold will be required to post a reclamation bond to cover the cost of 'reclaiming' the site after they cease operating, such bonds rarely cover the true closure costs even when they are actually paid.[19] Nor do they cover the subsequent water treatment and perpetual maintenance costs, given that such sites must be permanently monitored. Significantly, such bonds almost never cover the cost of cleaning up tailings impoundment failures, such as the Mount Polley rupture which will cost British Columbia residents well over $40 million.[20]

It is also worth noting that even for routine operations the environmental degradation and biodiversity loss are permanent and irreversible – and can never be compensated at any price. The provincial government's efforts to clean up the Montague and Goldenville sites – two small-scale 'historical' mines – provides a sober example. More than eighty years after the mines closed, the extremely high arsenic and mercury levels still pose an enormous health risk.[21] Even with a $48 million budget the planned remediation will be neither complete nor lasting.

In conclusion, it is impossible to assess the full scope of negative impacts for the proposed Fifteen Mile Stream gold mine. This is especially true given the unknown cumulative effects of Atlantic Gold's currently operating Touquoy mine, plus the potential for exploration and development by other gold mining companies in the area.[22] Moreover, the sheer scale of today's open-pit gold mines makes any attempt to calculate the true risks and effects formidable.

Another challenge is the insidious nature of the harms caused, which may take years, or even decades to be fully expressed. The inadequacy of the methodologies and tools available to us to measure such dynamics, as well as our lack of understanding of the long-term ramifications is another obstacle. Finally, we can hardly even begin to evaluate the full range of impacts until we know the hidden costs resulting from the lost ecological services we have yet to fully comprehend or appreciate.

It is the recommendation of our organization that the proposed Fifteen Mile Stream open-pit gold mine NOT be approved, given the very significant threat it poses to the ecology of the region. We strongly object to this project for the reasons outlined herein and stress that the development of such a highly polluting and highly destructive heavy industry within a fragile, ecologically sensitive wetland area can never be justified. We urge the Impact Assessment Agency of Canada to reject this mine proposal outright. Thank you for your consideration.

Below please find our additional suggestions/comments:

#1 At the proponent's expense, the government (or an independent body) should be required to conduct a comprehensive, minimum two-year water study (i.e. hydrological survey) to appraise and document the current conditions of the site *prior to* any mining activity or development. The study should include such measures as: the water levels and water quality of all surrounding lakes and reservoirs, the natural stream-flow of the surrounding lakes and rivers (amount and velocity), a detailed mapping of the watershed drainage pattern, a detailed mapping of the underground water table, plus a detailed study of the water level, water quality, and water flow of the groundwater in the area. Weather data, along with precipitation and soil moisture data should also be included.

#2 A detailed survey of the flora and fauna in the region should be conducted *prior to* any mining activity or development, with an emphasis on identifying any species at risk. As per the *Endangered Species Act* and the *Biodiversity Act*, restrictions should be enforced accordingly.

#3 As an absolute minimal requirement, Atlantic Gold should be required to line all tailings impoundments, cap all waste rock piles, and pump out and treat the tailings at its *current* Moose River facility before any future approvals are even considered. Strict adherence to all of its other terms and conditions should also be required. The company's poor environmental record should be given due consideration before *any* further approvals are given.

#4 Finally, the government should undertake a fully transparent true cost accounting of the *actual* cost of reclaiming Atlantic Gold's current and proposed open-pit gold mines so that the sites are restored to their former states. Furthermore, a mandatory disaster fund should be established to cover the cost of all tailings dam failures and other inevitable leaks/spills. An additional fund should be set up to cover the cost of monitoring the sites in perpetuity, another to compensate taxpayers (current and future) for the cost of removing contaminants from their drinking water (estimated at $60 billion/year in the U.S.), while still another fund should be created to address any and all future related medical claims. Given the sums involved, all funds to be collected *prior to* any approvals to cover the costs up front.

Further to the above costs, the proponent should be required to pay the cost of the maintenance and repairs to the roads used by Atlantic Gold's trucks, the full cost of its electricity usage and water usage (currently offered at no or minimal cost). A compensation fee should also be levied for its greenhouse gas emissions, air pollution, noise pollution, water pollution, soil pollution, destruction of habitat and biodiversity loss. Finally, mandatory insurance should be carried for all future liabilities. Additional charges and fees to be added as applicable.

Note that these costs should be in addition to company's obligation to pay federal and provincial taxes for the services it enjoys – but for which it pays nothing – and its royalty fees should be increased considerably.

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