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Nov 7, 2019.

I respectfully submit the following for the consideration of any interested party.

What follows was originally to be an assessment by Dr. Steven Earle of the material on *hpcnomissions.ca* up to June 2018, and for my guidance only. On Oct 21st last I sent an email request to Dr. Earle (which follows this preamble) and he subsequently gave his permission to place his assessment on *hpcnomissions.ca* for public viewing.

Concerning the same, and after reading it I offer my opinion to any REMAINING DOUBTERS, “when scrutiny of the facts and common sense conclusions are confirmed by QUALIFIED ASSESSEMENT then a verdict beyond a reasonable doubt can be made by any willing, rational, objective observer” as is herein the case. What is apparent and beyond that reasonable doubt can be summed up as follows, “ the taxpayers of Hornepayne were on the bottom of the priority list as matters unfolded and consequently were left to bear the financial burden of the resulting solution which was a new ten point six (10.6) million dollar system to bring water from Moonlight Lake”. The entire matter was caused by the inadequate safe guards and irresponsible practices of a multibillion dollar corporation which resulted in a spreading environmental disaster and who now slithers like a snake under the radar screen leaving the towns people to pick up the tab. I do believe I can hear someone snickering behind the curtain.

Recently there was circulated a list of gifts bestowed upon various projects and needs within the community by the NWMO which totaled \$377669.31. While

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any financial gift from any source will help reduce the burden carried by the tax payers it must be recognized that these gifts come with no benevolence attached, their source has only one objective, that being to entice the community into hosting a repository for the most poisonous substance ever produced and with no agreed upon science to do it safely.

Perhaps and before we give appreciation for this dark generosity a little mathematics will help put matters into a realistic frame work, the total of the gift package \$377669.31 subtracted from the 10.6 million dollars the community is being defrauded out of leaves a net loss of \$10,222,330.69 .

Champagne and celebration is not in order instead rethinking the matter based upon the available facts is.

George Collins.

George J Collins
Mon 21/10/2019 09:55 AM
Steven Earle

Good Morning Dr. Earle,

I ask, would you give some thought to the following. To allow me to post some of your email dated June 6, 2018, I forward a copy of the same for your convenience and clarity.

As I continue to scrape the sludge off the truth, with no expectations of any final result other than the facts, one of the local (Hornepayne) criticisms being used against me is my lack of "professional qualifications". Were you to allow me the privilege of using some of your assessment, as related in your email, it would provide that missing credibility and go a long way towards eliminating this negative factor. Eliminating this possibility, based upon your experience perhaps you could offer some other solution.

I assure you Dr. I will respect any decision you arrive at concerning this request and remain thankful for your generous help to date.

Sincerely, George

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About the Author

Steven Earle was born in the Okanagan Valley of British Columbia. He earned a BSc in geology from the University of British Columbia in 1975 and a PhD in geochemistry from Imperial College (London University) in 1982. He worked as a geologist and geochemist in the mineral exploration industry in western Canada from 1978 to 2000. For 20 years he developed and taught a wide range of earth science courses at Vancouver Island University. He currently designs and teaches distance courses for Thompson Rivers University (Open Learning), and also helps to grow food and drive the Community Bus on Gabriola Island. He maintains that the best way to see rocks is from a kayak.

RE: Comments on reports concerning the pre-existing water works at Hornepayne ON

Date: 16/06/2018

To: George J. Collins

Re: Hornepayne Ontario Water

I have reviewed the January 2001 first engineer's report on the Hornepayne water works by Engineering Northwest Ltd. (ENL) and the September 2002 hydrogeological study by KGS Group. I've also had a quick look at the 2006 slide presentation on the CN yards by KGS Group, and the March 2014 report on the CN yards by KGS Group

In my opinion, the 2001 ENL report provides a brief but sufficient overview of the nature of the Hornepayne water works at the time, although the lack of any reference to the petroleum spill issues in the CN yards is puzzling.

On the other hand, the 2002 hydrogeological report by KGS seems to fall well short of the stated goal of determining if the Hornepayne wells represent a GUDI source.

GUDI is defined by the US EPA as any groundwater with significant occurrence of insects, macro organisms, algae, or large-diameter pathogens such as *Giardia lamblia* or *Cryptosporidium*. Other indicators include groundwater with significant and relatively rapid shifts in water characteristics that correlate closely to climatological or surface water conditions, including turbidity, temperature, conductivity or pH.

In Ontario recommendations for the evaluation of GUDI include:

using particle counters to demonstrate that the water consistently contains significantly less than 100 particles per ml in the size range 10 microns and greater,

confirming that the particle count is not likely to change during "storm, season or other regular environmental changes", and

determining if the raw water is characterized by good microbiological quality.

In their 2002 study KGS did not follow the EPA or Ontario procedures for evaluating the GUDI situation at Hornepayne. Instead, it appears that they relied mostly on inference and hearsay.

For example, in section 5.3 (p. 19), they state that "it is apparent that fluctuations in the groundwater table are directly linked to fluctuations in the elevation of surface in Hornepayne Creek, and Spurline Lake.", but since there are no data presented on groundwater levels, there is no basis for making this statement. They go on to say that "The proximity of the unconfined aquifer and municipal production wells to the creek suggest that a distinct connection between aquifer groundwater levels and well groundwater would be expected." Again, there are no data to support this statement. Further in the same paragraph there is reference to a conversation with an OCWA staff member to the effect that groundwater and surface water elevations "generally correspond". It seems that nobody - not the OCWA, nor KGS, nor the Township - made any effort to collect actual data that would support these statements. In the next paragraph they state that continuous water level measurements could not be obtained from the production wells to correlate with data for the creek. Of course active production wells cannot be used to monitor groundwater levels, but supply wells 1 and 2, which were not being pumped at the time, could have been used to collect such data.

The main methods used by KGS for assessing GUDI status were the 50-day fixed-radius method, and the USGS Well-head Aquifer Evaluation Model (Section 5.3), and they used these analyses to conclude that the wells are

GUDI. Both of these methods are based on assumptions concerning aquifer thickness, porosity and permeability, and neither involved any type of on-site analysis or testing. Although there is no reason to indicate that the assumptions are invalid, they are only assumptions, and neither method provides actual proof of GUDI status.

In spite of not having shown any actual evidence for a hydraulic connectivity between surface water and the aquifers, KGS goes on to imply that there is a connection in section 6.3 where they state on p. 22 "... the close proximity and hydraulic connectivity of these surface water bodies (Bucknells Pond and Hornepayne Creek) to supply well No. 3 suggests that there is potential for microbiological impacts on the Township supply well." This point is repeated in section 6.5.

In section 8.4 of the report KGS used turbidity data to assess GUDI status. Turbidity levels in Well 3 water consistently lie between 0 and 1 NTU, and as such are within acceptable limits. The turbidity data show no evidence of a surface water-groundwater connection. For a 49-day period in May to July 2002 turbidity levels in Well 3 varied only slightly from 0.1 to 0.8 NTU, and in fact were highest during a low flow-period in Hornepayne Creek, and did not increase (in fact gradually decreased) during the weeks following a high-discharge event in the creek.

It is my opinion that the 2002 KGS study does not fulfill the stated goal of assessing the GUDI status of the water supply at Hornepayne. Instead of collecting data based on well-defined procedures, they relied on assumptions and hearsay to fall back on the principle that a well is GUDI unless proven to be otherwise. I believe that KGS did not adequately serve the Township in conducting this work.

The fact of the matter, however, is that there were periodic elevated coliform levels in the Well 3 water over the period from 1998 to 2002 (Figure 16), and for that reason alone treatment beyond what was being done in 2002 (only chlorination) was needed. (Note that there is no reason to think that the presence of coliform had anything to do with the water being GUDI or not.)

On the other hand, all of this is irrelevant because the Township subsequently made the decision to go elsewhere for water and are apparently unwilling to cooperate with you or anyone else in disclosing the rationale behind that decision. The "60% study" that you have so far been unable to access, might (or might not) provide you with the information you need to understand their decision, but until you get it (if you ever do), I don't think that there's much else that can be done.

Steven Earle, PHD.