

May 10, 2021

Nicole Armstrong
Director Manitoba Water Branch
Dr. Graham Phipps
Manager
Manitoba Groundwater Section
Via email Nicole.Armstrong@gov.mb.ca and graham.phipps@gov.mb.ca

Response to the Letter from the Director of Manitoba Water Branch May 4, 2021 re:

Report of Suspected Violations of Manitoba Groundwater and Water Well Act by the Operation of CanWhite Wells near Vivian Manitoba by Concerned Citizens of Springfield MB, Assisted by D.M. LeNeveu, M.Sc. (biophysics), B.Ed., B.Sc. (hons. physics), February 5, 2021

Dear Nicole,

Thank-you for your letter of May 4, 2021 in response to the formal “*Report of Suspected Violations of Manitoba Groundwater and Water Well Act by the Operation of CanWhite Wells near Vivian Manitoba, by Concerned Citizens of Springfield MB, assisted by D.M. LeNeveu, February 5, 2021.*” There are many major issues that I would like to address pertaining to your response.

First of all, you refer to “*my correspondence*” as it relates to the Manitoba Groundwater and Well Water Act. What I sent to you was not correspondence. It was a formal report by concerned citizens of Springfield assisted by me. The report documents suspected violations of Manitoba Groundwater and Water Well Act by the operation of CanWhite Sands (CWS) wells near Vivian Manitoba.

The relevant section of the Act is:

“*Persons may report suspected violation*
67(1) *Any person who reasonably believes that a violation of this Act has occurred, or may occur, may report the circumstances leading to that belief to the director or a well drilling officer.*”

The concerned citizens expected a thorough investigation of the documented changes to their well water and of the reported suspected violations. The concerned citizens expected that the investigation would be carried out by qualified technical experts including experts from Manitoba Groundwater. A letter from you, the Director, regarding “*my correspondence*” in lieu of an investigation report is completely inadequate.

Your response letter suggests that the concerns raised may be addressed in the upcoming licensing process for sand extraction. Many of the suspected violations have already occurred during CWS testing activities and past CWS silica sand extraction from quarries. These violations have been thoroughly documented in the report by concerned citizens filed February 5, 2021.

Evidence that CWS is currently extracting silica sand from quarry sites in the area around Vivian is shown in figure 1. Figure 1a shows the satellite image of April 27, 2021 of the quarry site near the south end of the cleared CWS rail loop. The satellite image on May 5, 2021 of figure 1b shows two new white patches consistent with silica sand extraction. No surface water discharge is visible on the satellite image in figure 1b suggesting the excess water withdrawn with the sand is being injected to the aquifers. Concerned citizens

have observed well rigs used for silica sand extraction. This past and ongoing quarry activity and the past CWS sand extraction testing is independent of the licensing process for CWS sand extraction. The CWS extraction of silica sand from quarries has undergone no regulatory scrutiny that we are aware of. The ongoing extraction of silica sand from quarries is likely to continue adversely affecting the aquifers. A thorough and complete independent investigation of silica sand extraction from quarries is required by qualified technical experts.

The reported suspected violation of injection into the carbonate aquifer of excess water withdrawn from the sandstone aquifer has been dismissed in your letter without investigation. Your letter states;

“Information supplied to the department by CanWhite Sands Corporation specifies that water pumped from the sandstone aquifer from testing and sand production is returned to the sand stone aquifer.”

Discolouration of water from a well near the CWS Centre Line Road extraction site occurred during the CWS sand extraction test activities. The report of well water discolouration is in the public comments section of the Vivian Sand Facility Project Registry 6057.00. The violation report of the Springfield concerned citizens provided peer reviewed evidence and calculations that support the hypothesis that the discolouration of the well water was caused by CWS injection of excess water into the carbonate aquifer. This evidence has been ignored by the Manitoba Water Branch. A separate independent investigation of this reported well water discoloration has not been undertaken by the Manitoba Water Branch.

CWS did acknowledge that their triple tube wells opened into the carbonate aquifer for the purpose of monitoring the aquifer.

The drilling records obtained from Manitoba Groundwater show some CWS wells were constructed with the outer casing terminating at the start of the carbonate aquifer with open hole drilled below penetrating almost the entire aquifer. The open hole penetration is consistent with injection of excess water into the carbonate aquifer. The aquifer monitoring claimed by CWS would not require an open hole throughout almost the entire width of the carbonate aquifer.

At the CWS test sites single PVC well casings were observed with visible instrumentation wires that would be used for aquifer monitoring. Figure 2 shows a PVC monitoring well with visible wires at the CWS Centre Line Road test sand extraction site. The CWS well records obtained from Manitoba Groundwater list two wells with PVC casing for the Centre Line Road site where sand was extracted. The well use for the PVC wells is given as “*monitoring*” in the drilling report. The wells were constructed on May 1, 2019 and Jun 6, 2018 and are listed as active in the drilling records. These separate PVC cased wells would have been available for aquifer monitoring instead of the wells used for sand extraction that open into the carbonate aquifer at the Centre Line Road site. Figure 3 reproduced from the violation report shows such a PVC well casing at the Vivian test sand extraction site that could have been used for aquifer monitoring.

If the aquifers were being monitored by separate PVC cased wells why would triple tube wells used for sand extraction be monitored? The triple tube wells would be enclosed in a pump-housing for sand and water extraction. One such pump-housing is shown in figure 3. It would be difficult to conceive how or why a closed pump such as shown in figure 3 would be instrumented to monitor the aquifers that were already being monitored by separate wells.

No records of monitoring measurements of the carbonate aquifer such as electrochemical potential, pH, aquifer flow rate, iron, turbidity, and fluid pressure have been provided. Such measurements would have

definitively established if the carbonate aquifer had remained isolated during sand extraction from the sandstone aquifer and would have established that well monitoring had occurred.

It appears that information supplied by an alleged perpetrator that denies an offence without supporting evidence is sufficient and accepted.

The complaints of the residents affected by the violations have been summarily dismissed without any investigation or contact with the complainants. The basis of the dismissal was;

“Our records show that issues related to iron do occur naturally in this area.”

Some of the residents complained about sulphur and swampy smells and cloudy water, not iron staining. Iron staining was reported by others to increase only after CWS sand extraction activities began. Your explanation of naturally occurring iron does not address the substance of the complaints and is completely and inadequate. The failure to contact the residents and to dismiss their complaints in letter to me with no independent investigation is negligent and reprehensible.

Even if all the excess water from CWS sand extraction were returned to the sandstone aquifer as CWS claims, serious contamination of the sandstone aquifer would most certainly result. All of the 42 well logs in the CWS drilling reports supplied by MB Groundwater covering the entire CWS claim area show a shale aquitard overlying the sandstone aquifer. Most well logs show shale layers interbedded within the sand that would be extracted. The interbedded shale layers are of various thicknesses and depths. In some cases, the shale layers occur only a few feet below the ubiquitous shale aquitard. All the shale deposits are known to contain sulphide in the form of pyrite (iron sulphide). The silica sand grains have been shown to be coated with marcasite a form of iron sulphide. Figure 6 of the violation report shows shale fragments interspersed with sand extracted by CWS. Aerated returned water would be in contact with the sulphide bearing aquitard exposed by the sand extraction. The sulphide in interbedded shale layers and in the marcasite would also be exposed to the aerated water. The oxidation of the sulphide from the aerated water would form acid that would mobilize heavy metals into the aquifer. All the evidence in the violation report for sulphide bearing marcasite and shale and subsequent aquifer contamination from excess aerated water returned to the aquifer has been ignored. Dr. Anthony Ingraffea of Carleton University, an internationally renowned expert on fracking and well contamination wrote a testimonial supporting the aquifer contamination hypotheses by CWS extraction activities. The testimonial is reproduced below.

If all reports of suspected violations of statutes were handled in the manner described by your letter all the jails could be emptied. Alleged perpetrators would simply assert they had committed no violations. Victims complaints would be not be investigated and dismissed as events that could have occurred naturally. All relevant data and independent evidence would be disregarded. This would save considerable money and avoid red tape in line with recent government initiatives. (See the end note.) Would the harm that would result from emptying jails be any worse than the potential contamination and irreversible drawdown of the regional aquifers of southeast Manitoba?

Additional evidence of acid and heavy metal formation in mined cavities in South Africa that flooded with oxidizing surface water was sent by me on April 19. My email of April 19 is mentioned in your response letter but you suggest that such issues would be considered in the upcoming CWS sand extraction environmental licensing process. Once again, I must stress that violations by CWS have already occurred during the CWS testing phase and are ongoing through CWS extraction of silica sand from quarries. These CWS violations are independent of the upcoming environmental licensing of the extraction process and must be investigated independently.

AECOM the engineering company that wrote the CWS Environmental Act Proposal designed the plant to treat the contaminated water from the South African mine. There is no doubt that CWS through AECOM have the knowledge to address the sulphide issue and have ignored and suppressed this issue. The Water Branch is continuing to ignore and suppress the sulphide issue that was thoroughly documented in the violation report from concerned citizens of Springfield whose drinking water is threatened. The Water Branch has deliberately and completely failed in its mandate to protect the drinking water of southeast Manitoba.

Figures:

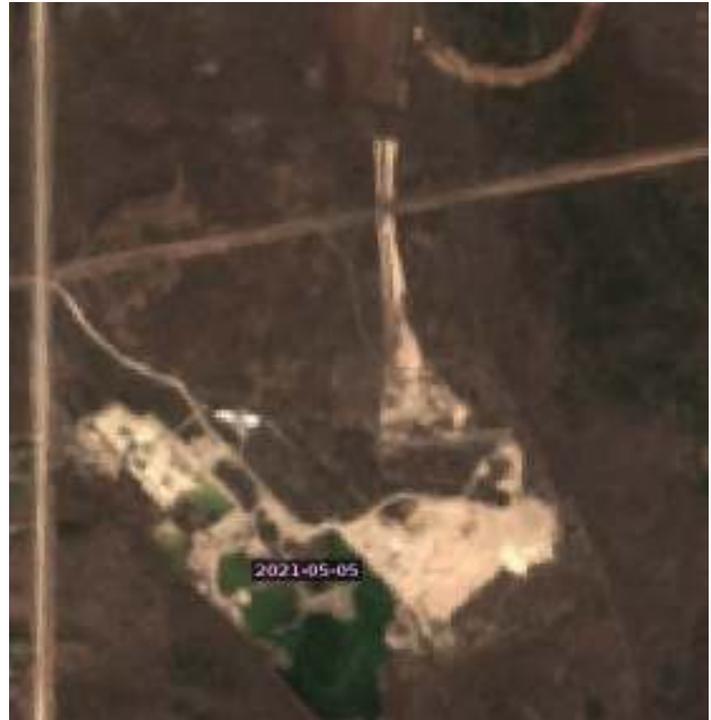


Figure 1a. Quarry satellite image 27 April, 2021

Figure 1b. Quarry satellite image 5 May, 2021

Figure 1. Satellite images of extracted silica sand in a quarry south of the CWS cleared rail loop near Vivian Manitoba (<https://www.sentinel-hub.com/>)



Figure 2. Wired PVC well Centre Line Road Feb, 2020.



Figure 3. Sand extraction pump and PVC monitoring well at Vivian MB

Sincerely,



Dennis LeNeveu

cc. Dr. Graham Phipps

End Note: Manitoba News Release, September 27, 2019

Manitoba makes progress reducing regulatory requirements:

On July 1, the two-for-one rule came into force, which requires all departments or government agencies to eliminate at least two regulatory requirements for each new regulatory requirement introduced. The two eliminated regulatory requirements must have at least twice the administrative burden of the one being introduced. <https://news.gov.mb.ca/news/print.index.html?item=45758>

Testimonial from Dr. Ingraffea of Carlton University:



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March 3, 2021

To whom it may concern

REF: "Evidence for Aquifer and Slurry Line Contamination and Land Subsidence From Vivian Silica Sand Extraction Wells" a report by Mr. Dennis Leneveu

I have thoroughly reviewed the above-referenced report and my qualifications for so doing are attached to this testimonial.

I can state at the outset that this report is very professionally written, well documented, and evidences very good knowledge of a wide range of related technical issues including mineralogy, well design, chemistry, and regulations. It is clear and compelling to a technical reader.

I found no error in any of the calculations embedded in the report, and fully support the hypotheses for both contamination and subsidence tested by Mr. Leneveu's analyses of available data. I found only one significant typo in this report: "'The specified sand production rate for the CWS Processing Facility is 1.36 tonnes per year according to the CWS EAP.'" This clearly should be 1.36 million tonnes, and Mr. Leneveu's subsequent calculations are based on the correct value.

In summary, I state that this report should be seriously considered in the decision-making process regarding the permitting of the proposed facility.



Anthony R. Ingraffea, Ph.D. P.E.

Dwight C. Baum Professor of Engineering Emeritus

Distinguished Member ASCE

Qualifications of Dr. Ingraffea

Dr. Ingraffea is a Professor of Civil and Environmental Engineering, Emeritus, and a Weiss Presidential Teaching Fellow at Cornell University where he has been since 1977. He holds a B.S. in Aerospace Engineering from the University of Notre Dame, an M.S. in Civil Engineering from Polytechnic Institute of New York, and a Ph.D. in Civil Engineering from the University of Colorado. Dr. Ingraffea's research concentrates on computer simulation and physical testing of complex fracturing processes. He has authored with his students and research associates over 250 papers in these areas. Since 1977, he has been a principal or co-principal investigator on over \$37M in R&D projects from the NSF, EXXON, Shell, Amoco, NASA Langley, Nichols Research, NASA Glenn, AFOSR, FAA, Kodak, U. S. Army Engineer Waterways Experiment Station, U.S. Dept. of Transportation, IBM, Schlumberger, Gas Technology Institute, Sandia National Laboratories, the Association of Iron and Steel Engineers, General Dynamics, Boeing, Caterpillar Tractor, DARPA, and Northrop Grumman. Professor Ingraffea was a member of the first group of Presidential Young Investigators named by the National Science Foundation in 1984. For his research achievements in hydraulic fracturing he won the International Association for Computer Methods and Advances in Geomechanics "1994 Significant Paper Award", and he twice won the National Research Council/U.S. National Committee for Rock Mechanics Award for Research in Rock Mechanics (1978, 1991). He was named the Dwight C. Baum Professor of Engineering at Cornell in 1992. He became a Fellow in 1991 and a Distinguished Member in 2019 of the American Society of Civil Engineers. He became Co-Editor-in-Chief of *Engineering Fracture Mechanics* in 2005. In 2006, he won ASTM's George Irwin Medal for outstanding research in fracture mechanics, and in 2009 was named a Fellow of the International Congress on Fracture. TIME Magazine named him one of its "People Who Mattered" in 2011, and he became the first president of Physicians, Scientists, and Engineers for Healthy Energy, Inc. (www.psehealthyenergy.org) in that same year. He is a co-author of papers on methane emissions (2011, 2012, 2014, 2016), wellbore integrity in Pennsylvania (2014, 2020), and on conversion of New York (2012) and California (2014) to wind/sun/water power for all energy uses in the next few decades