

Gap Analysis Pertaining to New Information in the CanWhite Letter to the IAAC of
September 11,2020

by

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On behalf of What the Frack Manitoba

October 1, 2020

I am writing concerning the reply of September 14, 2020 from the Acting Regional Director of Environmental Protection and Operations Directorate, Prairie and Northern Region, for ECCC, Margaret Fairbairn, to the request by IAAC for expert advice concerning the Vivian Sand Facility Project.

The ECCC states in their reply;

“At this time, ECCC has received project-specific information to review for the Vivian Sand Processing Facility Project, but not for the Vivian Sand Extraction Project.”

The ECCC response to the IAAC request for expert advice does not refer to important new information in the CanWhite letter by Mr. Somji of September 11. It appears the ECCC did not receive the CanWhite letter of September 11 in time to include the new information in its response to the IAAC. The CanWhite letter includes important new information on the interconnected extraction and processing operations. The inherent interaction between the extraction and processing operations disclosed in the CanWhite letter establishes the necessity for one assessment. The new information in the CanWhite letter was not in the EAP submitted for the public review and approval process. The CanWhite letter includes new information on,

- 1) Extraction and processing of high purity sand for the production of silicon metal,
- 2) Return of water to the aquifer via the CanWhite sand extraction method,
- 3) Sources of pyrite in the area of the CanWhite mineral claims,
- 4) Management of run off from the Vivian Sand Facility,
- 5) Contaminant build up in the continuous slurry loop system,
- 6) GHG emissions,
- 7) Subsidence,
- 8) Borehole Sealing, and
- 9) Air Quality

I describe the implications of the new information disclosed in the CanWhite letter of September 11 below.

1. Extraction and processing of high purity for the production of silicon metal

Mr. Somji in his letter states;

“CWS has a High Purity deposit and defined uptake markets outside the fracking industry and is business modelled on the High Purity Industrial uses.”

The EAP for the Project lists a variety of markets for the Vivian sand including the renewable energy industry and the oil and gas industry. Mr. Somji makes it clear the high purity sand from the Vivian Facility is to be used to supply silicon metal for industrial products such as solar panels and cell phones. I have documented in my submissions to the IAAC on September 23, reference numbers 19 and 22, in terms of the IAAC federal regulations for physical activity, the Vivian Sand Facility is a new metal mill with an ore input

capacity of more than 5000 t/day. Under the federal regulations for physical activity the Vivian Sand Facility must be designated. Other important new information in Mr. Somj's letter of September 11 reinforces the necessity of designation.

2. Return of water to the aquifer

The CanWhite letter of September 11 describes the sand extraction process as using three concentric tubes.

The letter states;

“As the sand is removed the associated water returns to the formation through the annular space between the 25 cm and 15cm tubing.”

This is new significant information that water is returned to the lower sandstone aquifer. Air is used to extract the water through the inner annulus of the concentric tubes. Returned water will be contain dissolved air that will react with pyrite in the formation to form acid that mobilizes toxic heavy metals such as arsenic, barium, and chromium into the aquifer. The ECCC has drawn attention to this pyrite problem in their reply to the IAAC stating;

“The proposed Sand Extraction Project may expose potentially metal-leaching rock to air and water. Interaction between water, air and the exposed rock could then lead to the leaching of metals into the receiving environment and water bodies, resulting in adverse effects on water quality.”

3. Sources of pyrite

In my submissions to the IAAC, reference 3 on September 3, and reference 7 on September 6, I have established the presence of pyrite in the aquifer. The CanWhite letter in response to my evidence about pyrite in the aquifer states;

“Pyrite and Aquifer Contamination

• CWS will not, and never has, harvested sand from the Black Island Member where pyrite could exist. Figure 5 is not a complete detail of the Winnipeg Formation. The upper member is called the Carmen member and is comprised of white silica sandstone. This is the member CWS harvests sand from. The lower members containing Pyrite are the Black Island members, these are layers CWS do not harvest sand from”

The Economic Geology Report by Watson referred to in reference 32 that I submitted to the IAAC on September 25 states;

“A thickened portion of the upper part of the Winnipeg sandstone near Ste. Anne was tested for possible mining by hydraulic methods. This unit known as the Carman sand body, varies in thickness and extent. It is generally about 27 m thick and extends westward from Ste. Anne for about km to Ninette. ranges in width from 24 to 100 km (McCabe, 1978). The sand in this body is similar to that in the lower Winnipeg at Black Island. It is a separate body, however, and is separated from the rest of the sand section elsewhere by shalerich rocks. In 1966, the deposit was drilled in the area east of Steinbach (Fig.13) by Norlica Minerals Limited (Underwood McLellan and Associates Limited, 1967). The drill holes intersected silica sand intermixed with shale, with high quality sand beneath the upper sand-shale layer. The sand ranged from loose to well cemented. Various methods were tried to loosen the sand, including water jets, suction and a mechanical cutter, in order to pump it from drill holes These methods were unsuccessful largely due to the

presence of hard sandstone and shale layers within the section. The hard layers could not be broken and thereby prevented slumping and breakup of the sand layers between them.”

It is clear from the description by Watson that the Carman sands contain inter-bedded shale layers that cannot be avoided.

Other independent geology reports that I submitted to the IAAC, reference 10 on September 12, reference 26 on September 24, reference 28 on September 25, and reference 31 on September 28 establish the presence of pyritic shale and oolite in the formations for CanWhite sand extraction throughout the entire area of the CanWhite mineral claims. Independent laboratory reports I submitted in reference 3 on September 3 and reference 24 on September 24 establish the presence of marcasite in the CanWhite sand.

4. Management of run off from the Vivian Sand Facility

The CanWhite letter of September 11 states;

“At the facility the sand is deposited wet into a Work In Process (WIP) pile on an engineered surface which contains the equivalent of French Drains allowing full containment of any water discharge. The water, rain and snow melt are captured and recycled for WIP pile wetting and continuous water loop”

During rain and snow melt events the sand stockpiles already containing 15% water will be saturated. Captured run off water used for wetting the stockpiles would simply run off. The run off water according to the CanWhite letter is to be returned to the aquifer via the continuous water loop.

The ECCC reply to the IAAC states;

“At some point, recycled water will be laden with TSS and/or other contaminants and may require management but no management options have been described”

I have established in my submissions that pyrite will be extracted with the sand in the slurry loop and that the sand itself contains marcasite a form of pyrite. Acid and heavy metal contaminants will build up in the recycled water of the slurry loop. These contaminants cannot be returned to the aquifer. The build up of contaminants will prevent water recycling. As stated in the ECCC reply some form of effluent management that has not been described by CanWhite will be required. Any such effluent management system entails a risk of discharge of toxic contaminants into the accessible environment including fish habitat.

5. The slurry loop system

The CanWhite letter states;

“The continuous water loop is comprised of high-density poly pipe (equivalent to the pipe used by municipalities for water distribution) and portable pumps. This allows the movement of slurry transport to match operational sites and minimizes surface disturbance. Surface crossing will be over private lands under surface use agreements.”

The letter discloses information on the slurry loop that was not provided in the EAP. I have documented in my submissions to the IAAC many issues associated with the slurry loop. The slurry pipes can be expected to leak. Pyrite within the slurry pipes would lead to contaminants from pipe leakage being discharged to the land surface and to nearby fish bearing water bodies. Slurry pipes will cross road ways and may cross the CN

railway. The slurry pipes are likely to eventually cross the Winnipeg aqueduct. Leaks could endanger the Winnipeg water supply. Pipe crossings would be a physical disruption to the aqueduct and to the Great Winnipeg Water District railway. There is federal involvement in the aqueduct that should require federal involvement in the Project assessment.

6. GHG emissions

On major issue of concern in the ECCC reply to the IAAC is GHG emissions associated with the Project. Since the sand according to the CanWhite letter is not to be used for fracking there are will be no associated GHG from burning of fossil fuels extracted by fracking. However GHG will be produced by the transport of sand from the facility particularly to international markets. The markets could be as far as Asia where much of solar panel and cell phone manufacturing occurs. No estimate of GHG from transportation of sand for silicon extraction has been made in the CanWhite EAP. There will be significant GHG emission from pumping of the slurry lines and extraction of the sand that has not been accounted for in the EAP.

The CanWhite letter makes this statement;

“As the cost of the High Pressure Natural Gas transmission line will be borne CWS the community opportunity for residents east of Dugald to Vivian will be the opportunity to gasify their residences with a more environmentally friendly heating fuel option without the capital costs of the mainline installation.”

Switching residential heating from electric to natural gas will increase GHG and is not in keeping with a net zero GHG target for 2050. The increase in GHG from residential natural gas use in the Vivian area has not been documented in the EAP.

GHG will be produced by neutralization of acid formed from pyrite oxidation. The carbonate content of Wanipigow sand reported in the 2014 NI 43-101 report from Claim Post Resources is 0.035%. Wanipigow sand is from the same Winnipeg Formation as Vivian sand. The carbonate would neutralize the acid formed from sulphide in the sand. Complete reaction of the carbonate in 1.36 million tonnes of sand per year would form about 370 tonnes of CO₂. Neutralization of the acid with carbonate from pyrite in shale and oolite would produce more CO₂ per year. The GHG production from neutralization of acid formed from pyrite oxidation has not been documented by CanWhite.

No plan has been put forward by CanWhite for GHG mitigation.

7. Subsidence

The issue of subsidence due to extraction of both sand and water from the aquifer is mentioned several times in the CanWhite letter of September 11. For instance the letter states;

“Of note, under 5% of the total resource will be extracted using an engineered room and pillar methodology, therefore there are no risks or concerns for subsidence.”

The sand extracted by CanWhite is unconsolidated. The sand pillars remaining in the aquifer around the extracted voids will likely creep with time and not be supportive. In my documentation submitted to the IAAC on September 3, pictures of the shale separating the carbonate and sandstone aquifers illustrate the fragility of the shale layer. The weight of the carbonate layer over the sandstone aquifer would be unsupported and likely to collapse. The CanWhite EAP contains no engineering analysis of the potential for subsidence.

Subsidence could cause many deleterious surface effects such as altering drainage, creating wetlands and providing drain paths for surface fecal matter to enter the carbonate aquifer. Fish habitat and hunting and gathering activities on traditional lands could be disrupted by subsidence.

8. Borehole sealing

The CanWhite letter gives new information that sand extraction from each borehole could continue for up to five days before abandonment and sealing. The CanWhite letter claims that all regulations will be followed for sealing to prevent contamination from entering the aquifers and to ensure carbonate and sandstone aquifer waters do not intermingle. No detail is provided on sealing methods. No drilling and sealing records have been presented for the many boreholes that have been drilled as part of CanWhite advanced exploration activities in the CanWhite letter or in the EAP.

9. Air quality

Several references are made in the CanWhite letter with respect to health threat from silica dust from the CanWhite sand. The letter provides new information that;

“Sand Sieve analysis has been provided to Manitoba Mines Branch and Manitoba Health and the sand size had been proven to not be a health threat. As the sand is produce wet, transported wet and processed in a negative pressure environment CWS air quality studies show no risk to adjacent properties.”

The results from the sand sieve analysis provided to Manitoba Mines Branch and Manitoba Health were not in the EAP or in the CanWhite letter. The source and date of sampling for the sieve analysis was not given. A copy of a sieve analysis report of CanWhite sand taken from a video of Mr. Somji’s 2019 presentation at the noble conference was reproduced in my submission to the public review process and in my submissions to the IAAC. This sieve analysis report clearly identifies a significant fraction of silica particles below 100 microns in diameter. In his letter Mr. Somji disavows his own data presented at the noble conference.

The ECCC response to the IAAC states;

“There are four residences within one kilometer of the proposed Projects. Elevated concentrations of nitrogen dioxide are expected to occur at these receptors as a result of Project activities. This is primarily due to the operation of diesel vehicles, including off-road vehicles for loading and unloading product, and rail car movers for rail transport. Based on the Proponent’s modelling, concentrations of NO2 have the potential to exceed the CAAQS.”

In my submission to the IAAC on September 3 reference³, I drew attention to the large uncertainty in input data and methods used to model the concentration of silica dust for exposure to nearby residents. In my submission to the IAAC of September 3, I did an independent analysis of PM10 concentrations for baghouse stack emissions. The analysis showed exceedances could occur for residences within a radius of two kilometres depending on the efficiency of the baghouse and the amount of fines in the sand feed to the baghouse. The fines content in the feed to the baghouse was not documented in the EAP. Efficiency of the baghouse can vary considerably and will dependent on rigorous maintenance and inspection. My submission documented many concerns regarding lack of adequate documentation in the EAP for worker protection to silica dust exposure within the plant site. We feel Project designation would be required to properly assess the risk of silica dust exposure both within the Facility and nearby.

We hope that the ECCC will in the light of new information from the CanWhite letter of September 11 concur that the IAAC that the Vivian Sand Facility Project must be designated and one impact assessment must be conducted for both the extraction and processing activities.