

March 23, 2023

Manitoba Clean Environment Commission
305-155 Carlton St.
Winnipeg, MB R3C 3H8

Re: CanWhite Sands Corp (aka SIO Silica or SIO or “the proponent” etc) Silica Sand Extraction Project

Dear members of the Commission:

As you will already be aware in part as this hearing and the evidence from ALL the sources accumulates and is reviewed, SIO Silica’s project creates significant risk to the water supply for ALL of southeastern Manitoba. It is not difficult to come to this conclusion based on logic, common sense, and all the research provided by the experts.

The Experts

By the way, who are the experts? Actually, one of – is Arcadis – the third party engineering company **hired by the Clean Environment Commission (CEC) itself as a technical engineering reviewer**. Who else? PorousTec – Dr. Hartmut Hollander and Dr. Allan Woodbury, P. Eng, Professor Emeritus – University of Manitoba – another third party technical reviewer **also engaged by the CEC – this time for a hydrogeology technical review - their report available here:**

http://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/Hydrogeology_Technical_Review.pdf .

Who else? Dr. Eva Pip – Ph.D - retired University of Winnipeg Professor – with **more than** four decades of experience, 40 as a Professor. Dr. Pip has a Bachelor of Science with Double Honours in Botany and Zoology; a Doctorate in ecophysiology and water quality; is a Post-doctoral Fellow (Natural Sciences and Engineering Research Council (Canada)); is a career Research Scientist and Full (University of Winnipeg) and Adjunct (University of Manitoba) Professor and an author of more than 125 international publications in the fields of biology, toxicology, and water quality/public health; also published in geology. She has served on numerous provincial and federal committees and panels, including 12 years on the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and has received a number of community service and environmental awards, receiving the Clarence Atchison Award for Excellence in Community Service twice. Please see last page of this letter for a summary of Dr. Pip’s accomplishments and career – also available here: [Eva Pip | Awards and Distinctions | The University of Winnipeg \(uwinnipeg.ca\)](#). Her review of the SIO proposal is available online here on the CEC web pages: <http://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/ws21dr.evapip.pdf> and now totals a thorough 563 pages

The independent consultants hired by the CEC and Participants, and scientists such as Dr. Eva Pip who provided voluntary submissions, fairly analyse the project, share objective facts, and identify project/proposal risks, conceptual errors and deficiencies. SIO is NOT A CHARITY. It is a **FOR PROFIT** company motivated by money, happy for southeastern Manitoba’s people and ONLY SUPPLY OF WATER to underwrite their risky and experimental exploration for silica sand for their own personal financial benefit. This proposal is NOT a fair deal for Manitoba. Let me tell you why: **The risks outweigh any possible benefits.**

Who else – what other experts? Matrix Solutions – qualified experts:

- Hydrogeological and Geochemical Subject Matter Experts: – Louis-Charles Boutin, P.Eng. (QC, ON ,MB, AB) Principal Groundwater Engineer (20 years)
- Technical Lead Numerical Modelling Municipal Water Well Design and Testing – Don Haley, M.Sc., B.Math. Senior Groundwater Scientist (+20 years)
- Groundwater Flow and Transport Modelling – Maurice Shevalier, M.Sc., P.Chem. Senior Geochemist (+30 years) Geochemical Modelling

Expert for What the Frack Manitoba:

- D.M. LeNeveu, M.Sc. (biophysics). B.Sc. (honours physics), B.Ed.: providing this analysis of the horrifying impacts and activities in which SIO will be or has already engaged:
<http://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/CEC%20SubmissionLeNeveuVivianSands2023.pdf>

This is **NOT even a complete list** of all the experts who reviewed SIO's proposal and found it wanting: deficiencies; errors and failures in their models; rationale; research and planning. I would also point out that SIO has demonstrated a huge failure in common sense and practical care and concern for their fellow Canadians **AND the Manitoba environment just by PROPOSING A PROJECT THAT PUTS THE ONLY WATER SUPPLY FOR A POPULATION OF ~100,000+ PEOPLE AND ALL THE EXISTING BUSINESS – AT RISK! What world are they even living in that they would propose this?**

Also note, the critiques and deficiencies identified by the third party reviewers **corroborate and support each other's objective and INDEPENDENT review. Not by coincidence, by the fact that the deficiencies are obvious for those with expertise in the subject matter. By the way, deficiencies are also obvious for those without it.**

As a result of ***following the science*** - **I WHOLEHEARTEDLY OPPOSE THIS PROJECT IN THE STRONGEST POSSIBLE TERMS. In the context of PREDICTABLE EVENTS like DROUGHT coming from climate change, the project proposed by SIO Silica puts the ONLY water supply for southeastern Manitoba under serious risk in an already challenging time, ESPECIALLY considering it is the ONLY SOURCE OF WATER FOR APPROXIMATELY ~100,000+ residents of the area and the existing business interests already in place.**

This is what it means to “walk the walk” Manitoba. You have a policy in place to PROTECT WATER.

DO IT!....

Otherwise, these policies are just “the talk”. And we don't need that... we need action.

PROTECT OUR WATER.

CEC - RECOMMEND TO THE MINISTER TO DENY THIS APPLICATION.

A summary of selected rationale to **oppose this project** follows. Note – this “summary” is **not** a complete analysis of all the issues and deficiencies with SIO’s Environment Act Proposal (“EAP” or “SIO’s project”) – it is **JUST THE HIGHLIGHTS!** It is not possible to recreate all the expert critiques and analysis here in a letter to the CEC, but it is just incredible – incredible - that anyone could even come forward with an ill-conceived project such as this.

SUMMARY/HIGHLIGHTED ISSUES – NOT A COMPLETE LIST

1. **Project-splitting:**

The CEC’s own third party technical reviewers – Arcadis – hired for an objective opinion - stated that SIO Silica engaged in “project-splitting”. This is an intentional attempt to break a project into small pieces, such that its full environmental impact cannot be fully understood or evaluated. This strategy is an attempt to work around the rules and is an unacceptable approach in a project that will have irreversible impact on a water supply for a population of ~100,000+ people.

Arcadis called this a “material deficiency”. A “material deficiency” in engineer speak identifies the existence of a fatal flaw in the basic concept or models of a project. It also means that the project model ***does not meet the minimum quality standards of the engineering industry*!**

I don’t understand how anyone can propose a project at this level of “quality”, i.e. BELOW ENGINEERING INDUSTRY STANDARDS – when it affects the sole source of water for approximately ~100,000+ people – not to mention all of the existing business uses! Said another way, from an engineering perspective, this project is of inferior workmanship as determined by applicable Codes and Standards of the industry. See Arcadis report on the CEC website here:

http://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/arcadis_geotechreview_siosilicasandextraction3mar2022.pptx

2. **Not following legislation and/or protecting the integrity of the aquifers - Groundwater and Wells Act Regulation-(3)(1):**

Arcadis identified the impact of this project on the aquifers and their separation by the shale layer between them. In their presentation, available here: http://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/arcadis_geotechreview_siosilicasandextraction3mar2022.pptx - they state that this shale layer is important to separate the aquifers and maintain their integrity:

“It is Arcadis’ understanding that separation of the Red River Carbonate and Winnipeg Sandstone aquifers is necessary to protect the groundwater resource of the region.”

This statement didn’t come to them in a dream. They did their research on WHY this is. It is also, not coincidentally, the reason why regulation 3(1) of the Groundwater and Wells Act exists. We, i.e. the Province – the government administrators – the internal experts - have learned over time that disrupting the state of the water supply puts the quality of the water at risk and that maintaining the separation of the aquifers is essential to maintain the quality and quantity of our ONLY SOURCE OF WATER IN SOUTHEASTERN MANITOBA.

Dr. Eva Pip confirms this fact in her review as well: – p. 35 – available here: [ws21dr.evapip.pdf \(cecmanitoba.ca\)](https://www.cecmanitoba.ca/ws21dr.evapip.pdf)

“Furthermore, the aquifers of the project area are specifically protected by provincial legislation, and interconnection and mixing involving the Winnipeg Formation is prohibited”

Specifically, the Groundwater and Wells Act Regulation 3(1) prohibits construction of any wells or other construction that allow the aquifers to communicate, i.e. intermixing of the separate water sources:

The Groundwater and Water Well Act (C.C.S.M. c.Gg110)
[Well Standards Regulation, M.R. 215/2015 \(gov.mb.ca\):](https://www.gov.mb.ca/sd/eal/registries/6119/appendix_a_part1.pdf)
Interconnection of geologic formations:

3(1) Without limiting the generality of clause 2(e), a **person must not construct or seal a well or test hole in a manner that allows the interconnection or mixing of groundwater between the Winnipeg Formation and any overlying aquifer**

Definition 3(2)

In this section, "Winnipeg Formation" means the shale, sandstone and sands of the Ordovician Winnipeg Formation

SIO's own experts have stated that they expect the shale layer separating the aquifers **to fail based on their activities such as the drilling of the wells and the removal of the silica sand**. They obviously are admitting that their activities will cause the shale layer to fail and cause the aquifer's water to mix in the following statement(s):

P. 53 – AECOM – (SIO's engineering experts)- Hydrogeological assessment final report
https://www.gov.mb.ca/sd/eal/registries/6119/appendix_a_part1.pdf

“It is possible that project operations will result in increased hydraulic communication between the Red River Carbonate and the Winnipeg Sandstone within the Project Area due to fractures and borehole annuli that may extend across the Winnipeg Shale aquitard. Degradation of the Winnipeg Shale could lead to a more interconnected aquifer system comprising the Red River Carbonate aquifer and the underlying Winnipeg Sandstone aquifer.”

This FACT is not in the interests of any Manitoba citizen who uses this **only source of priceless water**. How can SIO/AECOM's project plan even be postulated if the Groundwater and Wells Act says that constructing a well that allows the aquifers to communicate is prohibited? SIO is going to take the prohibited action even further **AND CAUSE THE SHALE LAYER TO FAIL – NOT ONLY “ALLOWING THE AQUIFERS TO COMMUNICATE” – BUT ESSENTIALLY CAUSING THEM TO MERGE. THIS IS AN EXPONENTIALLY WORSE OUTCOME** than drilling a **domestic** well that “allows the aquifers to communicate”! Were SIO's engineering company even aware of this legislation? Answer: yes, but here is what they – SIO'S OWN ENGINEERS – AECOM – in Appendix A - the Hydrogeological Assessment Final Report – available here - p. 18 - Section 1.7.3https://www.gov.mb.ca/sd/eal/registries/6119/appendix_a_part1.pdf -state:

“The Manitoba Water Rights Act prohibits connecting two aquifers within a single well completion to minimize hydraulic communication between saline and freshwater portions of drinking water aquifers.”

So ... they are aware of this prohibition AND PART OF THE RATIONALE FOR IT, even though they referenced the legislation incorrectly, i.e. it is not the Manitoba Water Rights Act, it is the Groundwater and Wells Act! How do they – SIO and their experts - propose something that is **against existing legislation they are actually aware of?** i.e.

https://www.gov.mb.ca/sd/eal/registries/6119/appendix_a_part1.pdf - p. 7

“Should project operations result in a more interconnected aquifer system comprising the Red River Carbonate aquifer and the underlying Winnipeg Sandstone aquifer, groundwater quality would tend to reflect conservative mixing of the two water types (i.e. limited geochemical reactions) resulting in water quality that is similar or slightly better. Although the naturally elevated concentrations of dissolved iron and manganese were simulated to decrease in response to aeration or mixing, **they may remain elevated above drinking water quality criteria during and following operations.**”

Friesen Drillers – SIO’s own “experts” – in their review of SIO’s draft hydrogeological report available here: https://www.gov.mb.ca/sd/eal/registries/6119/appendix_b.pdf - p. 3 state:

“It is our opinion that interconnection (sic – of the aquifers) will result from this project in some way shape or form, and that an approach to address this will be needed in this report.”

In response to Friesen Drillers’ comments, SIO Silica experts (AECOM) state https://www.gov.mb.ca/sd/eal/registries/6119/appendix_b.pdf p. 3:

“**Regardless of the interconnection**, relatively minor drawdown was simulated by the groundwater model to occur in each aquifer in response to sand extraction for a range of scenarios where the aquifers remain separated, or are interconnected during development. The results of Scenario Testing and Sensitivity Analysis are presented in Tables 6-1 and 6-2 of the report and evaluated scenarios where the hydraulic conductivity of the shale was equivalent to the aquifers. The interconnection of the aquifers will be considered during development and implementation of the Groundwater Monitoring and Impact Mitigation Plan”

Wait!.. What? What do you mean “to address this” (Friesen Drillers) or “regardless of the interconnection” AECOM? Are they not aware that causing the aquifers to communicate is PROHIBITED BY THE GROUNDWATER AND WELLS ACT? To answer that question, they DO KNOW what they are proposing – is PROHIBITED – they quoted the legislation – but just referenced it **incorrectly as the Water Rights Act. Good grief! SIO’s response - to minimize and ignore that impact? How is this acceptable? And – they will take “allowing the aquifers to communicate” one **DISASTROUS** step further and, by causing the shale to collapse, take “communication” to a whole other level – of merging!... How arrogant an attitude is that - to ignore the legislation. And... their further reaction... “they will consider it during development and implementation”? That’s acceptable too? First, the project is approved, then they will “consider” impact mitigation? AFTER**

this event (interconnection of the aquifers) has occurred – when **it isn't even permitted at all by the Groundwater and Wells Act?**

Matrix Solutions in their presentation – p. 29 – available here:

http://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/230308_matrix_presentation_viviansands_final.pdf also seems to be as incredulous as I was about SIO's/SIO's experts' response:

“Why important? – Winnipeg Shale and Fractured limestone collapse is irreversible”

“Proponent response: ... considered to not be a concern should this occur: “Interconnection between the two aquifers is a common occurrence because many drinking water wells have been screened across the Red River Carbonate and the Winnipeg Sandstone.”

SIO seems to respond that because drinking water wells have been screened across both aquifers in the past – we assume by accident, but maybe prior to the existing regulation since wells have been drilled in these areas for a long time, it's acceptable for them to do it now too? That is a RIDICULOUS attitude – from an engineering company yet, whose engineers take an oath when they receive their credentials and ring!

A. Wells that have been screened across both aquifers may be older, perhaps put in place before the legislation, B. SIO is not JUST drilling a drinking water well, AND C. just because mistakes have been made, doesn't give SIO license to keep making them when it is AGAINST EXISTING LEGISLATION WHICH IS IN PLACE FOR A REASON!

Either the proponent's response is:

- a. intentionally not acknowledging the impact – which means they are trying to normalize, trivialize or change the subject, or
- b. not understanding their impact. Not understanding their impact makes them “ignorant” – def'n Oxford dictionary: “lacking knowledge or awareness in general, uneducated”.

Either a. “intentionally not acknowledging the impact” or b. “ignorant” is BAD, especially coming from an engineering company from whom you would anticipate respect for EXISTING LEGISLATION. You don't want any who engage in these activities managing your ONLY water supply. You don't want “ignorance” anywhere close to the water supply for ~100,000+ people either.

In Sio Silica Corporation (SSC) Responses to MBEN/OLS - Matrix Solutions Inc – Hydrogeological Review February 2023 – <http://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/MBEN-OLS%20Matrix%20Response%20Technical%20Expert%20Report%2020.02.23%20Final.pdf> AECOM responded - “AECOM would like to clarify that the interconnection of the aquifers is a statement of fact and not a professional opinion.”

Their opinion seems to be, if anyone was drilling wells in contravention of the Groundwater and Wells Act (not the Water Rights Act as they wrongly referenced), then it's ok if they/SIO do it too? It doesn't matter what has been done in the past. Experience has allowed us to determine that this is not a good idea, so it is not acceptable anymore. For example, there was a time when there

were no laws in writing. But now we have laws against various crimes - theft, murder, etc, because we realize we need them to manage behaviour. Just because we didn't have laws in the far-off past, doesn't mean that we should continue the error of our ways in the future.

By the way, all of SIO's modeling is based on recent HISTORICAL DATA. We know the future will be DIFFERENT and that the impact of drastic coming DROUGHT because of climate change is predictable – but not yet part of the “historical data”.

Consider this commentary from: [Drought past, present, future - Top Crop Manager](#)

“Prairie droughts are definitely not a new phenomenon – just ask Dave Sauchyn from the University of Regina. He has been studying past climate trends on the Prairies by measuring the widths of annual growth rings in trees.

“We've been collecting dead wood for 25 years now; we have more than 8000 pieces. In order to grow, trees need light, heat, soil and water, and they have plenty of all of those in summertime except water. So, the pattern of tree growth tells us very much about the amount of water available every year for the last thousand years,” Sauchyn explains.

“We've found droughts that were much more severe and much more prolonged than anything we've seen on the Prairies in the last 120 years, including the 1930s. For example, just before Europeans came to the Canadian Prairies, there were droughts of 10 or 20 years in duration.”

Sauchyn's research shows that, over the past 1000 years, the Prairie climate has included many droughts that have lasted a decade or longer.

He adds, “Based on the science, it is entirely possible that we could see prolonged drought some time in this century.”

In the coming decades, the Prairies are likely to continue getting warmer. “The most consistent scenarios show increasing temperatures, so a continuation of the trend observed over the last half century. And much of the warming is occurring in the winter, so the Prairies and most of Canada are getting less cold. Minimum temperatures – the temperatures at night and in winter – are rising,” Sauchyn explains.”

Did SIO and their experts consider the 1000 year old historical data too? I presume not. That means they didn't consider SIO's impact in a decade long drought. Boggles the mind...

Back to the Manitoba Water Rights Act – inaccurately quoted by SIO/AECOM - What IS in the Manitoba Water Rights Act AVAILABLE HERE:

<https://web2.gov.mb.ca/laws/statutes/ccsm/w080e.php> that is relevant is this, regardless of SIO's expert's mistaken reference:

Priorities

9 The order of priority of the purposes for which water may be used or diverted, or works constructed, established or maintained, in accordance with this Act is as follows:

1. domestic purposes;

2. municipal purposes;
3. agricultural purposes;
4. industrial purposes;”

PLEASE NOTE HOW DOMESTIC, MUNICIPAL AND AGRICULTURAL PURPOSES ARE PRIORITIZED OVER INDUSTRIAL PURPOSES!!! THIS PRIORITIZATION IS ALREADY SET UP IN EXISTING MANITOBA LEGISLATION!

Please note, Domestic purposes is #1! Municipal purposes is #2! Agricultural purposes is #3! **Industrial puposes is #4.** This means the consideration of this INDUSTRIAL PROPOSAL needs to be considered not second, not third, but fourth! Industrial purposes is #4. SIO does NOT get to override other uses. They come in **FOURTH** and note that AGRICULTURAL PURPOSES is prioritized OVER INDUSTRIAL PURPOSES. Also note water access is provided on a “first come, first served basis”. We are ALREADY HERE! The interest of those already here need to be prioritized **OVER THAT OF SIO BASED ON THE EXISTING LEGISLATION.** Given weather risks –the first three items need to be considered and prioritized first and not be put at risk by a fourth level industrial consideration.

3. IS THIS ACCEPTABLE? - IRREVERSIBLE DAMAGE TO THE ONLY WATER SUPPLY FOR SOUTHEASTERN MANITOBA, MULTIPLY THAT BY DROUGHT RISK

The Province’s Water Management Strategy identifies the **priceless value of water, and it’s scarcity,** even though many in the province seem not to be aware of this. I wasn’t either until I started researching the potential impact of this devastating project. We are very fortunate to have a useable, reasonably safe source of water in the southeastern area of the province. This is also the **ONLY** source of water for ~100,000+ people AND existing business and industries. It cannot be put at risk by a for-profit company, who will leave southeastern Manitobans with an irreversibly damaged source of water, or, who knows (?) – no usable supply of water at all eventually if enough damage occurs.

Any judgement about the water supply needs to be understood in **context.** The consequence of this decision is all the more significant because it is the ***only water supply* for approximately ~100,000+ people and existing business who have already invested in this province.**

The Provincial Water Management Strategy identifies three STRATEGIC OBJECTIVES:

1. **Protect drinking water sources.**
2. **Value groundwater and sustainably manage and protect the resource.**
3. Identify, communicate and mitigate groundwater quality and quantity issues

How is SIO’s project consistent with these objectives? Their project is not “protecting drinking water sources” – it is putting them in harm’s way. SIO’s project is not valuing groundwater, it is expected, given SIO experts own statements, that this project will **irreversibly damage what water sources currently serve us now, however the SIO EXPERTS minimize and trivialize this potential impact by stating that it is expected that possibly the water quality might improve (?).** What? NO – the legislation prohibiting actions that cause the aquifers to communicate comes into effect because of experience and wisdom that allows us to see that to ***protect the water supply and it’s**

quality and quantity* - we are better to keep the aquifers separated. After the shale collapses, an accepted and predictable event as acknowledged by SIO experts, no one knows what the outcome will be. This is not consistent with the Manitoba Water STRATEGY and EXISTING LEGISLATION!

We are already preparing for a water crisis without this project as indicated by the Provincial Water Management Strategy and the Provincial Drought Management Strategy. Climate change risks to the ONLY source of water for southeastern Manitoba need to be considered. They magnify the negative impact of this project. The Manitoba government's own "DROUGHT MANAGEMENT STRATEGY" IDENTIFIES THIS RISK – THAT THERE WILL BE DROUGHT AND THE PRAIRIES ARE THE MOST VULNERABLE. CLIMATE SCIENCE GUARANTEES IT, I.E. THAT DROUGHT will be a huge risk – especially for the prairies, and WITHOUT THE IMPACT OF THIS PROJECT. To even consider adding SIO's impact just makes a predictably bad situation worse!

Both the Provincial Water Management Strategy AND the Provincial Drought Management Strategy talk about the **coming droughts**. Climate science and the strategies talk about **predictable drought events, which impact is experienced most drastically on the prairies**. SIO is proposing to remove ~3000 cubic meters of water daily from the aquifers in the spring, summer and fall, **when water is most in demand** https://www.gov.mb.ca/sd/eal/registries/6119/appendix_a_part1.pdf - p. 22:

SIO's water use is set out as follows:

"Groundwater Use During Sand Extraction: Each well will operate for four (4) days and will produce from 262 m³/day (40 gpm) to a maximum of approximately 654 m³/day (120 US gpm) of water and sand. Several wells at a given well cluster will operate at any one time, with a combined production rate of **approximately 2,943 m³/day (540 US gpm) per well cluster.**"

This approximately 3000 cubic meters of water – daily - is the equivalent of **six million – 500 ml bottles of water – DAILY. DAILY! 24/7!!!**

Water in Manitoba is licenced on a first-come, first served basis. The users who are here now, dependent on their **only water** supply can not afford to have the **ony supply** put at risk by this SIO project. The demands of SIO – to be allowed to access this volume of water is INSANE. **In a certain circumstance of coming drought, what happens when they won't stop, when domestic water well supplies are low or destroyed or irreversibly contaminated? Then who do we look to to repair this, this – which is not repairable? Who will provide the water? Is there a source to replace it? NO – It's the ONLY source there is, not just for the existing residents, but for all existing business too.**

Matrix Solutions comment from their presentation available here p. 20

http://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/230308_matrix_presentation_viviansands_final.pdf :

"Reversibility: Irreversible (Adverse effect is likely to not be reversed after project closure)
In Matrix's opinion, there are the two critical irreversible effects the project has on the hydrogeological system that could lead to indirect effects in the long-term:

- 1) degradation of the Winnipeg Shale Aquitard; and,
- 2) increase in fracture density of the Red River Carbonate Aquifer.

Matrix goes on to summarize – from p. 24 of their presentation:

“Winnipeg Shale Aquitard act as a barrier to groundwater flow – Without the barrier, creates a pathway. It increases the vulnerability for both aquifers – Reduces ability to manage aquifers individually (quantity and quality)”

See this article on climate change from 2021: [‘Incredibly destructive’: Canada’s Prairies to see devastating impact of climate change | Globalnews.ca](#) Appendix B, but here are highlighted excerpts:

- As the climate continues to warm at an alarming rate, experts warn if dramatic steps to mitigate global warming are not taken, the effects in Canada’s Prairie region will be **devastating to the country’s agriculture sector**.
- According to Environment and Climate Change Canada, the country is warming, on average, about double the global rate.
- Qualman said there is “massive change coming” to Canada’s Prairies, which will be “incredibly destructive. It’s not going too far to say that if we made that happen, parts of the Prairies wouldn’t be farmable anymore,” he said.
- According to the federal government, in 2018 Canada’s agriculture and agri-food system generated \$143 billion, accounting for 7.4 per cent of the country’s GDP.
- **The sector employed 2.3 million people in 2018. The majority of the 64.2 million hectares of farmland in Canada is concentrated in the Prairies** and in southern Ontario.
- The effects of climate change are already being felt on the ground in the Prairies, Qualman said, adding that the NFU has already heard from farmers complaining of “challenging weather.”
- “And we’re still at the beginning of this.”
- **Extreme weather events, droughts**
- A study released earlier this year by Natural Resources Canada (NRC) titled Canada in a Changing Climate: Regional Perspectives Report, found the Prairies and Western Canada have had “the strongest warming to date across Southern Canada, especially in winter.”
- **“Extreme weather events of amplified severity will likely be the most challenging consequences of climate change in the Prairie provinces,” the report said. “The impacts of flooding, drought, and wildfire in recent years are unprecedented, and climate models suggest increased risk of these events in the future.”**
- **“But in all seasons – including the summer – there’s a lot of warming still to come,” he said.**
- **According to Blair, as the climate gets warmer “the probability [or] chance of having excessive heat for a long period of time gets greater.”**
- **“And so drought should be really high on people’s list about the things to worry about in prairie agriculture in the future,” he said.**
- **Canada’s food basket**
- He said this means the agriculture sector is going to have to prepare for times when water is in short supply.

You know what? Just read the WHOLE ARTICLE! – reprinted in Appendix B. The RISK of DROUGHT on the prairies cannot be overstated. SIO’s project was NEVER a good idea, but given the state of the climate – it is a RIDICULOUS idea to put **THE ONLY WATER SUPPLY FOR ~100,000 PEOPLE AT RISK!**

4. THE NUMBER OF WELLS:

from Dr. Pip's report: "The large number of wells – The proposed project initially planned to drill up to 467 (subsequently amended to 324) production wells per year, **penetrating the aquitard and intruding on both aquifers**. Current estimates amount to >7700 wells over a 24 year period. An unknown number of additional wells will be used for monitoring and testing or will be unusable. The present application refers only to the first 4 (possibly 5) years."

~7,700+wells! This number of wells creates the risk of surface contaminants being introduced into the aquifers, because paths are being created to the aquifers by the wells themselves. How is this even being proposed - for this to happen – TO OUR ONLY SOURCE OF WATER!!!???

In their presentation, Matrix Solutions criticized this aspect of the project as well – p. 27 -

http://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/230308_matrix_presentation_viviansands_final.pdf :

"Fractured porous network are highly heterogeneous and variability in fracture density should be expected. • Increase in fracture density and/or increase in fracture apertures in the "Intact limestone" which could result in increased vertical hydraulic permeability (e.g., pathways). • Risk for preferential pathways increases with number of wells drilled (hundreds/thousands)."

Dr. Pip also discusses the RISK of decommissioned wells: <http://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/ws21dr.evapip.pdf> p. 13/14:

"Since the decommissioned wells will remain in perpetuity, the seals and casings will eventually fail on at least some of them, as there will be many thousands of them. This will provide conduits for contaminants to the aquifers below." and

"Both steel and plastic casings leach toxic substances into groundwater as they age. This will be aggravated by the larger surface area of the casings, and the vast numbers of them. Sealing grouts and cements may also leach undesirable chemicals."

Think of Walkerton, Ontario in 2000 – 7 people died, 2300 were made ill because of surface contamination that was introduced into the wells <https://www.cbc.ca/news/canada/inside-walkerton-canada-s-worst-ever-e-coli-contamination-1.887200> . And note, this was a public water supply being continuously tested. Although this event was TERRIBLE and partially a result of the failures of the stewards, please tell me, when it's **private wells and residents dispersed over a potentially wide area, how long might it take for health departments/government to identify the problem and isolate the cause – when initial symptoms are indiscriminate, i.e. diarrhea, in the southeastern Manitoba population? ESPECIALLY when I know that most rural residents don't test their well water annually as they should, and won't be doing so even more often - as they probably should if this ridiculous project is approved.**

5. WATER QUALITY ISSUES AND RISKS FROM WATER BEING REINJECTED back into the aquifer:

Experts have noted that risks are created when water removed from the slurry is REINJECTED back into the well and aquifer. The reinjected water may contain oxygen, which may potentially cause oxidization of heavy metals – causing them to become mobile in the water in the aquifers. There

are also other reasons why water composition may change. Is more heavy metals – like **ARSENIC for example – in your ONLY SOURCE OF WATER, acceptable?**

I will assume everyone has heard of ARSENIC – it's a POISON - [Arsenic Poisoning: Symptoms, Causes, and Treatment \(healthline.com\)](#).

See: Heavy Metals Toxicity and the Environment from [Heavy Metals Toxicity and the Environment - PMC \(nih.gov\)](#) Paul B Tchounwou, * Clement G Yedjou, Anita K Patlolla, and Dwayne J Sutton

Abstract: Heavy metals are naturally occurring elements that have a high atomic weight and a density at least 5 times greater than that of water. Their multiple industrial, domestic, agricultural, medical and technological applications have led to their wide distribution in the environment; raising concerns over their potential effects on human health and the environment... Because of their high degree of toxicity, arsenic, cadmium, chromium, lead, and mercury rank among the priority metals that are of public health significance. These metallic elements are considered systemic toxicants that are known to induce multiple organ damage, even at lower levels of exposure. They are also classified as human carcinogens (known or probable) according to the U.S. Environmental Protection Agency, and the International Agency for Research on Cancer.

Dr. Pip identified this risk in her submission, available here:

<http://www.cecmantoba.ca/hearings/silica-sand-extraction-project/doc/ws21dr.evapip.pdf>

p. 13/14

45. Groundwater contaminant plumes will be drawn to active pumping wells.

47. Oxygen will be introduced into the Sandstone aquifer with the reinjected groundwater. The separate patent application also describes potential direct injection of pressurized air pulses into the aquifer to loosen the sand, and potential horizontal reach beyond the borehole axis. Air pockets may lodge against the shale ceiling, and become enriched with radon and hydrogen sulphide gases.

48. Aeration and agitation of the water will displace dissolved radon gas and hydrogen sulphide; the latter gas may generate increased nuisance odor complaints in neighboring wells during and after operation. Radon will be silent and cannot be detected by smell or taste.

49. Modelling to predict water quality changes resulting from oxygen in the reinjected water is not based on measured data, but on assumptions which underestimate the dissolved oxygen content.

50. Oxygen will oxidize soluble iron and manganese to form insoluble precipitates, which may discolor untreated tapwater and further increase turbidity.

51. Oxygen will promote pyrite oxidation in the shale layer, which may contribute to water chemistry changes due to acidification, and heavy metal and trace element mobilization.

52. Oxygen will create favorable conditions for proliferation of iron and manganese bacteria and fungi, should they be introduced into the aquifer with infected tools and equipment, or be already present in nearby infested domestic wells.

A Brief excerpt from expert reviewer - D. M. LeNeve coincidentally also identified this risk – in almost identical terms. Coincidental? NO! This is not coincidental. The same issues were identified without collaboration because they are REAL RISKS visible to those with expertise:

LeNeveu: <http://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/CEC%20SubmissionLeNeveuVivianSands2023.pdf> from: p. 8

“Air would react with the sulphide to form acid and mobilize heavy metals. Sio Silica has dismissed without evidence other potential sources of aquifer contamination measured by geochemical analysis of core logs such as high levels of selenium and fluoride documented in the EAP. The geochemical studies in the Sio Silica Hydrogeological Report demonstrate that oxidizing conditions from air introduction would precipitate iron and manganese degrading well water quality. Sio Silica has claimed without evidence that the iron and manganese would be filtered and absorbed in the sandstone. Evidence is given here that effective absorption of iron and manganese on the sandstone will not occur. The oxidizing conditions caused by Sio Silica extraction activities would promote the growth of iron bacteria and other harmful microbes.”

Where are the HEALTH EXPERTS TO REVIEW THIS RISK? The CEC is supposed to be examining the issues and providing advice and recommendations on the “health risks”. You – Manitoba government and the CEC – also have a “PROCESS PROBLEM”. What was cycled through the provincial staff – to the Technical Advisory Committee (TAC) - the internal provincial experts on the german subjects, i.e. groundwater, wells, water licencing and public health, transportation, etc - was **only SIO’s initial EAP**. **None** of the significant issues identified by the “expert researchers” and objective advisors to the CEC, Municipal Silica Sand Advisory Committee (MSSAC), Our Line in the Sand (OLN), Manitoba Eco-Network (MBEN), What the Frack Manitoba (WTF MB) and others like Dr. Eva Pip’s report – identifying the potential impact of the project and consequent changes to the constituency and quality of the water – were distributed for review. Asking the Technical Advisory Committee (TAC – provincial government experts and staff) to review without the subsequent critiques and analysis of the third party experts is like tying their hands behind their back. We all need to understand the health risks from the potential **IRREVERSIBLE** changes to the water quality. Are you prepared to drink water with a higher amount of arsenic? I didn’t think so. The CEC is to review the health impacts. How does PUBLIC HEALTH of TAC review this potential impact when they haven’t been informed it is a potential risk? **TAC requires the opportunity to review the proposal and ALL THE CRITIQUES.** Neglecting this step is a **HUGE issue for a government that should have the health and environmental interests of its citizens COME FIRST!**

“Kudo’s” to PUBLIC HEALTH HOWEVER, as even they raised questions about DROUGHT and SUBSIDENCE – not their area of expertise – as compared to SIO’s experts for whom drought wasn’t even a consideration at all. CAN YOU SAY ANOTHER MATERIAL DEFICIENCY? Or is this Alberta company also in “climate change denial”?

6. IMPACT TO PRIVATE WELLS:

Friesen Drillers state: “Throughout the report, the treatment of private water wells/private water well resident concerns throughout the course of the project is inadequate.” p. 8 of https://www.gov.mb.ca/sd/eal/registries/6119/appendix_b.pdf

This is a reviewer hired by SIO. Do I need to say any more? What I think is inadequate is the proponent’s response – more promises. All about “plans to be developed” – not acceptable when this ill-conceived plan is putting the **ONLY WATER SUPPLY FOR ~100,000+ PEOPLE AT RISK.**

7. When things go WRONG – a Tale of Two Wells:

It is also identified that when operations go **WRONG – there will be consequences. Not perhaps too significant for SIO, but for the people whose only water supply, or only well will be damaged – it is seriously significant.**

<http://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/CEC%20SubmissionLeNeveuVivianSands2023.pdf> From p.21/22 - The following is about two wells Bru 92-3 and Bru 92-2:

“In the Remarks field of the Bru 92-3 well information report shown in figure 13 this statement was entered; “THREADED PIPE (REMOVABLE) STUCK IN SANDSTONE” This remark explains why the central steel liner appears to be unsupported in the illustration in figure 13. Sio Silica in response to clarification information requests has stated that the threaded stuck pipe was the removable production pipe that had a failure at the connection thread. Sio Silica stated; “Bru 92-3 has a stuck production pipe left in it. It broke during extraction at approximately 165 ft down (TOF 166.5’).” The remainder of the production pipe extends to 225 feet, 14 feet above the bottom of the hole. To extract sand below 225 feet the moveable air tube would have likely been extended below the production pipe injecting air directly into the aquifer providing evidence that the aquifer would be thoroughly saturated with air and that oxidizing conditions would prevail. As described in the Sio Silica patent, the air injection tube could be extended below the production tube to loosen and mobilize the sand.¹ The air injection would be pulsed as described in the patent. Gaseous air would move upward into the carbonate aquifer establishing oxidizing conditions in the carbonate as well. The pulsed extraction of sand into the dewatering tank was observed at the quarry by local citizens. It appears that in the Bru 92-2 airlift well, the steel liner, likely used in construction and airlifting to prevent sand collapse, was successfully removed. The broken production pipe illustrates that many problems could occur in the installation and removal of the production pipes during operation. The Bru 92-3 well design does not conform to the design for extraction wells given in the Sio Silica EAP. (Well #) Bru 92-3 like Bru 92-2 has an open outer annular region from the surface directly into the carbonate. The top of the outer casing is at ground level. Any run-off or snow melt would enter the annular region and could carry surface contamination directly into the carbonate aquifer. The shale trap at the top of the annular space of Bru 92-2 is not present in the well information report for Bru 92-3. The annular region appears to be unsealed and vulnerable to surface contamination in Bru 92-3. The picture of Bru 92-3 shows a cloth skirt duct taped onto the inner casing that extends above ground surface. The skirt extends downward mostly obscuring the open outer casing. Flanges attached to the inner casing rest on top of the outer casing. The chains looping through the flanges secure well Bru 92-3 against well tampering. For a well that has been left unsealed, opening directly to the carbonate aquifer, tamper protection would seem rather superfluous. The Groundwater and Water Well Act (C.C.S.M. c. G110) Well Standards Regulation December 21, 2015 states; “Surface seal required for annular space 31(1) Subject to subsection 30(3) and except as provided in sections 32 and 33, grout must be used to seal the upper annular space of a well as follows: (b) if the depth of the well casing is greater than 6 m (20 ft), the annular space above 6 m must be filled continuously to the established ground surface.” Well Bru 92-3 clearly violates the regulation 31(1). Well Bru 92-2 has a temporary shale trap seal at top of the annular space. Bru 92-2 also violates the regulation that the space above 6 m must be filled continuously with grout to the established ground surface. Sio Silica has clearly violated regulation 31(1) for wells Bru 92-3 and Bru 92-2. The open annular spaces for Bru 92-3 and Bru 92-2 connect directly into the carbonate aquifer allowing any surface contamination and fecal matter to enter into the carbonate aquifer. If this has occurred

in a small number of test extraction wells it is very likely to occur repeatedly in production when over 300 wells are to be drilled per year.”

Duct tape? They are using DUCT TAPE? In the test wells... ? seriously...

Not only does the example demonstrate what WILL happen when things go WRONG, it demonstrates real world examples of how surface contaminants and air, will find their way into the aquifers, putting the WHOLE water supply at risk. All of these types of activities will eventually be occurring any place SIO has a mining claim.

8. **Water Quality – UV Treatment?**

SIO proposes that once the water and sand “slurry” is removed from the aquifer, it be “decontaminated” prior to reinjection back to the aquifer using a UV treatment. There are many reasons identified **by the expert reviewers** as to why this might be ineffective, including the level of turbidity, i.e. particles that will be floating in the “slurry” (water and sand filled material removed from the well). Who identified this? ALMOST EVERY OTHER EXPERT.

UV treatment of water to be returned to the aquifers from the slurry lines is not effective as this water is turbid, murky water and permeated with particles – and this does not allow the UV light to penetrate the water effectively. This process is experimental, and would not be effective for any contaminant that isn’t biological anyways. There are many contaminants that can be introduced into the aquifer, by re-injecting the water separated from the slurry. The following point - #8 - discusses one of them.

9. PolyAcrylamide (PAM)/acrylamide

Identified by both Dr. Eva Pip and D.M. LeNeveu, B.Sc. (hons. physics), B.Ed., M.Sc. (biophysics), former member of the Canadian Society of Safety Engineering

Dr. Pip commentary, p. 230 of her report:

“While PAM has been used as a flocculant in some domestic water treatment plants in some countries, the presence of resulting acrylamide residues and concerns regarding its health effects **have prompted the World Health Organization (WHO, 2011) to caution this use”**

“Residual of PAM during the treatment and flocculation process can contaminate the drinking water by the release of the residue.” (Tepe and Cebi, 2019). According to WHO (2011),

“Conventional treatment processes do not remove acrylamide.”

By the way, where is Public Health’s review on acrylamide and its introduction to the only source of water for southeastern Manitoba? You can’t just ignore this issue - it needs a health impact review now that it has been identified.

10. **Subsidence – surface**

In the last information I have seen, ARCADIS said that they see the issue of **surface subsidence**, i.e. land collapsing into caverns underneath, as substantially resolved **IF SIO DOES WHAT THEY ARE SUPPOSED TO!**

AND BY THE WAY – WHO IS GOING TO MONITOR THIS? And how closely? Is there provincial staff available for this task? What is this going to cost? The cost of administration, monitoring and inspections will be born by the province, meaning the taxpayer? This is not acceptable. SIO is a for-profit company. The cost of any monitoring and inspections by **independent provincial staff**, should be born by THEM. **HAVE WE NOT LEARNED THAT YOU DON'T ALLOW THE FOX TO MONITOR THE hen house?**

And consider, there is only some possible resolution to “surface subsidence”, subsurface subsidence is NOT resolved as you will see.

11. Subsidence – subsurface

1. In their presentation, (reminder: the **CEC's** third party objective reviewer!) Arcadis discusses subsurface subsidence and this can be summarized in their succinct points from their presentation available here: http://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/arcadis_geotechreview_siosilicasandextraction3mar2022.pptx

1. Extraction of the silica sand resource will result in a permanent change to the underground geology in the form of horizontal arrays of rooms and pillars in the sandstone geological layer (between 52 m to 76 m), in the Winnipeg Formation aquifer.
2. Geotechnical analysis of the Project was assessed by Stantec, with a focus on the potential for ground subsidence at surface. Based on that analysis, Stantec predicted that portions of the Red River Carbonate and Winnipeg Shale formations above the sandstone aquifer have the potential to collapse into the underlying sand extraction voids.

Note: Stantec was hired by SIO. Even they predict subsurface collapse.

However, Arcadis then states:

“For clarity, this conclusion **applies exclusively to impacts at surface** and does not address potential impacts that may occur as a result of sub-surface geotechnical failures. In addition, the conclusion does not apply to areas outside of the current spatial scope assessed by Stantec (2022) and is subject to change as additional information becomes available.” – i.e. when there is subsurface collapses, potentially on a large scale underground, causing the shale to fail and the separation of the aquifers to be irreversibly **DAMAGED OR DESTROYED.**

In addition, over the 24 years of the project, will time and other risks, LIKE EXTENSIVE DROUGHT, cause unexpected consequences? **THEN WHAT? Back to point #3 in this written submission – what do you do about IRREVERSIBLE DAMAGE to YOUR ONLY WATER SUPPLY FOR ~100,000 people?**

Is this fair when someone's house falls into a sinkhole in ten or twenty years? This will be what happens when the **UNKNOWN LONG -TERM IMPACT OF THE MATERIAL BEING REMOVED FROM UNDERGROUND** is experienced – collapse of the shale layers – unexpected movements within the aquifers and water flow events occur.

Sure there are MODELS – all THEORETICAL AND CONCEPTUAL BY THE WAY, and questioned by the third party experts who have HAVE RAISED MANY, MANY QUESTIONS and CRITICISMS ABOUT THE **ACCURACY** of the SIO MODELING SCENARIOS. **IS THIS AN acceptable RISK IF IT impacts the only source of valued, priceless water, as acknowledged by the provincial water management strategy – for ~100,000+ people, AND existing businesses?**

12. **Damage to Ecosystem, habitats, deforestation, light and noise pollution**

From SIO's EAP Part 1 available here:

https://www.gov.mb.ca/sd/eal/registries/6119/eap_part1.pdf:

- P. 31 “Activities will occur 24 hours per day, seven days/week (24/7)”
How is this acceptable, within 100m of a residence?
- P. ix “Considering progressive closure, rehabilitation and revegetation of extraction activity areas will be done each year, it is expected that most natural vegetation will be very well established after approximately four years, with reestablishment of trees and shrubs expecting to be evident within five to 10 years following closure.” EAP p1 -
https://www.gov.mb.ca/sd/eal/registries/6119/eap_part1.pdf .
We can't have those trees and shrubs back in 5 to 10 years. CLIMATE CHANGE requires them not to be disturbed at all! Trees are the carbon capture system we have. Climate change predicts a dire future and DROUGHT. Is SIO – an Alberta company - arguing climate change? They don't even think about it and it isn't raised as an issue because climate change and DROUGHT isn't even an imminent threat in their reality. There is *NO REPUTABLE SCIENTIST on the globe* who denies the impact of climate change*. The trees that will be damaged or removed need to not be damaged or removed at all.
- p. 11 https://www.gov.mb.ca/sd/eal/registries/6119/eap_part1.pdf
“Most of the Project site will remain in the current condition, and vegetation clearing to accommodate the Project footprint will be minimized to the extent feasible. “
“Feasible” means to the extent they think they can do – not an “agreed” standard, which could mean.. almost nothing. To let any FOR-PROFIT company free access with an underdetermined agreed standard is once again, letting the FOX GUARD THE HEN HOUSE. This is unacceptable.

13. **SLURRY LINE:**

Definition “Slurry line”: Fully enclosed, temporary 14-inch (35.6 cm) line to transport sand and water slurry from extraction site to sand Processing Facility site. Line is made from HDPE (high-density polyethylene).p. xiv: https://www.gov.mb.ca/sd/eal/registries/6119/eap_part1.pdf .

So, a question, when the wells are 70 kms from the processing plant, the slurry line will run for... 70 kms? Through and over Manitoba, from whence the sand and water will be extracted, and then the water – contaminated after 70 kms of travel with the introduction of polyacrylamide, will travel back to its original location to be introduced **BACK INTO THE AQUIFER FOR PEOPLE AND ANIMALS TO DRINK AND BATHE IN?** Or will it be put back into the aquifer at the processing plant – not into its original location or cavity, but in some other area in the aquifer? Is this causing the “waters” of the different aquifers to mix? Do we even know any of these details?

SUMMARY OF THE SUMMARY:

You know, I remember the days when Alberta didn't have sales tax; they were riding high and prosperous!... where are they now? Are they still? Nope... all that prosperity went away. They do however, have a seriously damaged environment as they are the most polluted and polluting province in Canada. The fossil fuel and mining industries are still fighting to save their pocket book. Oh sure, they have a lot of advertising and marketing, but how are they really changing? Are they doing EVERYTHING they can to protect the environment, especially the water, and reduce climate change –considering – this is their home too, slowly being metamorphosed into a garbage dump? Nope.. they aren't. This lack of respect for the environment that provides EVERYTHING you have – should not be adopted in Manitoba more widely than it already is. Please tell me we can improve our standards from here, not relax them. Manitoba definitely has our own problems, and much improvement required, but this Alberta company will take their profits and leave Manitoba with **DAMAGE to the only water supply for southeastern Manitoba and a mess that IS IRREVERSIBLE. TO CLARIFY – THE “ONLY WATER SUPPLY” MEANS THAT THERE ISN'T ANOTHER ONE!**

As an example, Alberta has a reclamation fund of almost \$1 billion – and that is not enough to even touch all the environmental damage that has been created by profiteering businesses making their profits, intentionally manipulating their finances, declaring bankruptcy, and leaving the taxpayer to clean up the **IMPOSSIBLE** mess:

From Environmental Science and Technology: [Land and Water Impacts of Oil Sands Production in Alberta | Environmental Science & Technology \(acs.org\)](#) Re: Alberta

“One ambiguity that remains is whether resources will be available at the end of a project to ensure that reclamation occurs. In recent years, this problem has been addressed by new rules that mandate oil sands surface mining companies to provide financial security for reclamation in the form of a bond posted to the Environmental Protection Security Fund. (7) By 2010, the total oil sands security fund was 946 million dollars (CAD). (46) The costs of reclamation may not be adequately represented in these funds,have been chronically underestimated. (7) . The current system is in need of a systematic risk management approach to avoid financial liability to the public.

Alberta has been at this a number of years, and having learned, are now getting funds UP FRONT, and STILL don't have enough to fix their problems!!!

MANITOBA is already giving away money for others to clean up quarries: [Resource Development | Natural Resources and Northern Development | Province of Manitoba \(gov.mb.ca\)](#)

“The Manitoba government has implemented a Quarry Rehabilitation on Private and Municipal Land Program to rehabilitate depleted quarries and pits on private and municipal land. Funding will be available through the program for landowners needing to do rehabilitation work on these lands, with each successful applicant eligible for up to \$200,000 in assistance.”

Why? Why is this necessary? Because apparently, we haven't learned. We haven't learned from our own mistakes, and we haven't apparently learned from other's mistakes either. Companies take their profits, manipulate their finances and leave the taxpayers with a mess. The irony of life with the quarry

clean up is – it might be a municipality cleaning the quarry up, organizing the labor, administering financial requirements, reporting back to the program – absorbing administrative costs as it takes staff to organize this - so – for the company that abandoned their responsibilities, this a good deal. Leave a mess and not only will the taxpayer pay for it – they will organize everything including all the work and labor to get it done. Does Manitoba need to experience this again, on an exponentially **WORSE level, with the saga of SIO Silica – only beginning?**

Einstein – known to be a very smart man if you weren't aware - said "INSANITY is doing the same thing over and over again and expecting different results ". Can we please not make this insane choice? Can we please learn from someone else's mistakes and NOT "the hard way" from our own? Save the whole province some suffering. Based on Einstein's definition and our lived experiences – this project is INSANE – and I am amazed that SIO even has investors or that this project was brought forward at all.

PLEASE RECOMMEND TO THE MINISTER TO UNRESERVEDLY DENY THIS LICENCE!!!

Thank you.

P. Langstaff

Appendix A:

Eva Pip, BSc (Hons), PhD | Awards and Distinctions | The University of Winnipeg (uwinnipeg.ca)

Throughout her long and distinguished career, which spans nearly four decades at The University of Winnipeg, Eva Pip has served the community as a researcher, academic, and advocate for clean water.

Pip sets a standard to which many academics aspire, but few achieve. She has built a research career on topics of direct interest to the public at large —centering around water quality — and has

skillfully communicated this work to the public, all levels of government, and academia.

Pip has long maintained a direct interest in the health and welfare of First Nations communities, and was one of the first to highlight the chronic water quality issues they face. She has conducted extensive work on groundwater and the effects of industrial agriculture. Additionally, Pip was one of the first to emphasize water quality problems on Lake Winnipeg and is an ongoing advocate for its health.

Pip's expertise is regularly sought out when new reports on water are published, when there is an accidental spill, and when new environmental regulations are proposed. She often is called upon by government agencies and academic colleagues to consult on water issues, and also serves as an expert in legal proceedings when required.

Pip effectively shares her expertise with the public in multiple forums, is always available to offer insight to the media, and is directly engaged in community work. She still makes time to present papers on her extensive research at national and international meetings and to professional societies, all while serving on numerous boards and advisory committees.

For a second* time, The University of Winnipeg honours Eva Pip with The Clarence Atchison Award for Excellence in Community Service — a reflection of her vigor, technical expertise, and genuine commitment to service that has helped impact water protection policy to the benefit of public and environmental health.

**Dr. Eva Pip received The Clarence Atchison Award for Excellence in Community Service in 1987*

Appendix B

[‘Incredibly destructive’: Canada’s Prairies to see devastating impact of climate change | Globalnews.ca](#)

This article is from 2021. Today, March 21, 2023, the first day of spring, we received even worse climate news. Important quotes are **HIGHLIGHTED TO BRING TO THE READER’S ATTENTION**.

As the climate continues to warm at an alarming rate, experts warn if dramatic steps to mitigate global warming are not taken, the effects in Canada’s Prairie region will be devastating to the country’s agriculture sector. According to Environment and Climate Change Canada, the country is warming, on average, about double the global rate.

Scientists with the National Oceanic and Atmospheric Administration in the U.S. recently found 2020 was earth’s second-hottest year on record, with the average land and ocean surface temperature across the globe at 0.98 of a degree C above the 20th-century average. However, the agency found the northern hemisphere saw its hottest year on record, at 1.28 degrees C above the average.

“(In Canada) we are looking at about 6.4C degrees of warming this century, which isn’t much less than one degree per decade, which is just a terrifying rate of warming,” Darrin Qualman, the director of climate crisis policy and action at the National Farmer’s Union said.

Qualman said there is “massive change coming” to Canada’s Prairies, which will be “incredibly destructive.” It’s not going too far to say that if we made that happen, parts of the Prairies wouldn’t be farmable anymore,” he said.

According to the federal government, in 2018 Canada’s agriculture and agri-food system generated \$143 billion, accounting for 7.4 per cent of the country’s GDP. The sector employed 2.3 million people in 2018. **The majority of the 64.2 million hectares of farmland in Canada is concentrated in the Prairies** and in southern Ontario.

The effects of climate change are already being felt on the ground in the Prairies, Qualman said, adding that the NFU has already heard from farmers complaining of “challenging weather.” People are sharing pictures of flattened crops and buildings, et cetera, that have been damaged,” he said. “And we’re still **at the beginning of this.**”

Extreme weather events, droughts

A study released earlier this year by Natural Resources Canada (NRC) titled Canada in a Changing Climate: Regional Perspectives Report, found the Prairies and Western Canada have had “the strongest warming to date across Southern Canada, especially in winter.”

“Extreme weather events of amplified severity will likely be the most challenging consequences of climate change in the Prairie provinces,” the report said. “The impacts of flooding, drought, and wildfire in recent years are unprecedented, and climate models suggest increased risk of these events in the future.”

Additional chapters of the report are scheduled to be released on a rolling basis throughout 2021. Each will outline how climate change is projected to affect the different regions of Canada. So far, the majority of the warming seen in the Prairies has been in the winter months, Danny Blair, a professor in the Department of Geography at the University of Winnipeg who studies climate change told Global

News. “But in all seasons – including the summer – there’s a lot of warming still to come,” he said. According to Blair, as the climate gets warmer “the probability [or] chance of having excessive heat for a long period of time gets greater. And so drought should be really high on people’s list about the things to worry about in prairie agriculture in the future,” he said.

Canada’s food basket

While warmer temperatures may mean a longer growing season in the short-term, Sylvain Charlebois, a professor at Dalhousie University and scientific director at Agri-Food Analytics Lab, said in the long-run climate change will be “quite destructive” to the agriculture sector.

“The problem is that we often see very, very unpredictable weather patterns that can actually be damaging for crops,” he explained. According to the NRC report, in order to receive the “net benefits” from a longer growing season, farmers will have to adapt to “limit the impacts of climate extremes including water availability, and the increased risk of pests, vector-borne diseases and invasive species.”

Asked if Canadians need to be worried about potential food shortages due to climate change, Charlebois said: “I think we do. I actually would say that the number one threat to agriculture anywhere in the world is climate change for sure because it makes things so unpredictable,” he said. “I would say that climate change is to agriculture as the pandemic was to retail. It’s a tsunami of unpredictable scenarios.”

Charlebois said Canadians likely won’t go hungry in the near future, but warming temperatures could impact which types of products are readily available at grocery stores in the next several years. However, Qualman said the availability of certain groceries is the least of our concerns. “The kind of warming we’re on track for goes way beyond what some farmer grows or doesn’t grow and what the price of groceries might be – it changes the world,” he said.

Mitigation and adaptation

According to Blair as temperatures warm and the growing season extends, water management in the Prairies will become increasingly important. “The projection is for precipitation to go up overall, but down a little bit in the summertime,” he explained. “So just at the time when you need the soil to be replenished with moisture to get those crops growing, the probability is that precipitation is going to go down.” He said this means the agriculture sector is going to have to prepare for times when water is in short supply.

As the climate continues to warm, Blair said adaptation is “essential.” “We need to think about these things and invest in these kinds of adaptations now,” he said. “We need to breed crops or be prepared to switch to crops that are more heat-resistant or more drought-tolerant, we need to switch our soil moisture management practices for the purpose of conserving water.”

He said investments need to be made in irrigation, and we must ensure Canadian farms are economically stable. However, Qualman said adaptation “just doesn’t make sense” unless we can find a way to “dramatically slash” the amount of warming Canada is on track to see this century. “The kind of warming that we are on track for, you know, destabilizes entire nations, kills millions and millions of people [and] obliterates cities,” he said. Qualman said in order for adaptation to work, you “have to be aiming at adapting to something reasonable. You can probably adapt to moderate climate change,” he said. “But we’re not facing moderate climate change. We’re facing extreme and devastating climate change. So while it’s prudent to made adaptation plans, it’s much more critical to really reduce emissions fast.”

Qualman said if Canada were to slash its projections in half, “it would start to seem more likely that you could begin to adapt to that.” He said if there are “ambitious emission reduction plans” both nationally and internationally, then adaptation is “prudent and possible.”

“So, it’s not that adaptation is the wrong thing to do — it’s just that adaptation in the current context, won’t work,” he said.